97-0002173

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DNF SAFETY BOARD

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97-WSD-169

The Honorable Mr. John T. Conway
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, N.W., Suite 700
Washington, D.C. 20004

Dear Mr. Chairman:

COMPLETION OF DEFENSE NUCLEAR FACILITIES SAFETY BOARD (DNFSB) RECOMMENDATION 93-5 IMPLEMENTATION PLAN (IP), REVISION 1, MILESTONE 5.4.3.3.a, "LETTER REPORTING COMPLETION OF SUPPORTING TECHNICAL DOCUMENT ON ORGANIC COMPLEXANT SAFETY ISSUE"

This letter reports completion of the "Organic Complexant Topical Report," HNF-SD-WM-CN-058, Revision 1, dated June 1997, which is identified under the DNFSB Recommendation 93-5 IP, Revision 1, Milestone 5.4.3.3.a. The milestone was due in December 1996. The December 24, 1997, letter also stated that the report would be revised and submitted to the DNFSB staff by June 1997.

The IP requires this topical report to describe the current understanding of the Organic Complexant Safety Issue and future work for resolution of the issue.

The U.S. Department of Energy, Richland Operations Office has completed the actions identified under this milestone and proposes closure of this commitment.

A copy of HNF-SD-WM-CN-058, Revision 1, has been provided to your staff. If you have any questions, please contact me, or your staff may contact Jackson Kinzer, Assistant Manager for the Tank Waste Remediation System, on (509) 376-7591.

Sincerely,

John D. Wagoner
Manager

WSD:DHI

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97/2173

HNF-SD-WM-CN-058, Rev. 1

Organic Complexant Topical Report

Prepared for the U.S. Department of Energy
Office of Environmental Restoration and
Waste Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

Approved for Public Release

HNF-SD-WM-CN-058
Revision 1

Organic Complexant Topical Report

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June 1997

Prepared for the U.S. Department of Energy
Office of Environmental Restoration and
Waste Management

Approved for Public Release

CHECKLIST FOR PEER REVIEW

Document Reviewed:

Scope of Review:

Yes	No	NA	
[ ]	[ ]	[X] *	Previous reviews complete and cover analysis, up to scope of this review, with no gaps.
[X]	[ ]	[ ]	Problem completely defined.
[ ]	[ ]	[X]	Accident scenarios developed in a clear and logical manner.
[ ]	[ ]	[X]	Necessary assumptions explicitly stated and supported.
[ ]	[ ]	[ ]	Computer codes and data files documented.
[X]	[ ]	[ ]	Data used in calculations explicitly stated in document.
[X]	[ ]	[ ]	Data checked for consistency with original source information as applicable.
[X]	[ ]	[ ]	Mathematical derivations checked including dimensional consistency of results.
[X]	[ ]	[ ]	Models appropriate and used within range of validity or use outside range of established validity justified.
[X]	[ ]	[ ]	Hand calculations checked for errors. Spreadsheet results should be treated exactly the same as hand calculations.
[ ]	[ ]	[X]	Software input correct and consistent with document reviewed.
[ ]	[ ]	[X]	Software output consistent with input and with results reported in document reviewed.
[ ]	[ ]	[X]	Limits/criteria/guidelines applied to analysis results are appropriate and referenced. Limits/criteria/guidelines checked against references.
[X]	[ ]	[ ]	Safety margins consistent with good engineering practices.
[X]	[ ]	[ ]	Conclusions consistent with analytical results and applicable limits.
[X]	[ ]	[ ]	Results and conclusions address all points required in the problem statement.
[ ]	[ ]	[X]	Format consistent with appropriate NRC Regulatory Guide or other standards
[ ]		[X] *	Review calculations, comments, and/or notes are attached.
[X]	[ ]	[ ]	Document approved.

Robert Marusich   Robert Marusich   6/26/97

Reviewer (Printed Name and Signature)   Date

* Any calculations, comments, or notes generated as part of this review should be signed, dated and attached to this checklist. Such material should be labeled and recorded in such a manner as to be intelligible to a technically qualified third party.

The review of Appendix F was at a high level. Reliance is placed on L. Jensen's review for the details

RMM 6/26/97

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ORGANIC COMPLEXANT TOPICAL REPORT

EXECUTIVE SUMMARY

This document reviews the current understanding of hazards associated with the storage of organic complexant salts in Hanford Site high-level waste tanks. Two distinct hazards were evaluated: spontaneous self-accelerating decomposition reactions in the bulk material (bulk runaway) and ignition followed by condensed phase propagation (point source ignition).

Results from the bulk runaway assessment showed that bulk runaway is not credible for all tanks except C-106. However, speciation of the organic in C-106 shows that it is almost all in the form of low energy oxalate, and there is little potential for a bulk runaway. Additional testing and evaluation would be necessary to definitely conclude that there is no potential for bulk runaway; therefore, controls are currently required for his tank. Temperature monitoring and controls (water addition and active ventilation) are adequate to prevent bulk runaway in C-106.

Tank wastes were evaluated for potential point source ignition using all available data. The wastes were screened using differential scanning calorimetry, total organic carbon waste measurements, and organic speciation to determine if the organic was solvent or complexants. Those wastes that did not pass the screening are being subjected to additional analyses. The analyses include direct combustion testing and organic speciation to determine (1) how much organic has decomposed to non-combustible byproducts and (2) how much organic is in the non-combustible aqueous phase (which can be decreased in a tank by pumping).

Tank wastes with sufficient information to conclude that propagation was not possible were categorized as *safe*. Seventy-five tanks were categorized as *safe*. Twelve tanks are currently categorized as *conditionally safe*, because they contained some organic fuel and also significant water. However, it is anticipated that additional testing and organic speciation will show that some or all of these tanks are *safe*. No tanks were categorized as *unsafe*. Waste process histories and extrapolation of the sample results to the unsampled tanks indicate that the remaining tanks (62) will be categorized as *safe* or *conditionally safe* when more information is available.

A bounding analysis for the tanks showed that potential dose consequences were above risk evaluation guidelines. Therefore, controls were described to reduce accident frequency and to maintain waste safety.

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LIST OF TERMS

ANOVA	analysis of variance
DCRT	double contained receiver tank
DNFSB	Defense Nuclear Facilities Safety Board
DOE	U.S. Department of Energy
DSC	differential scanning calorimetry
DST	double-shell tank
ED3A	ethylenediaminetriacetic
EDDA	ethylenediaminediacetic acid
EDTA	ethylenediaminetetraaceticacid
EMI	electromagnetic induction
HEDTA	hydroxyethylethylenediaminetriaceticacid
IDA	iminodiacetic acid
NIR	near infrared
NTA	nitrilotriaceticacid
PRSST	Propagating Reactive System Screening Tool
RSST	Reactive System Screening Tool
SST	single-shell tank
TGA	thermogravimetric analysis
TOC	total organic carbon
USQ	Unreviewed Safety Question

DEFINITIONS

Bulk Runaway: The point at which the heat liberated from an exothermic chemical reaction exceeds heat loss to the environment. Temperatures within the reacting material grow exponentially and the chemical reaction cannot be stopped or slowed.

Characteristic Time of Adiabatic Runaway, τ_a: The time required to induce bulk runaway under adiabatic conditions. This characteristic time is expressed mathematically by

$$\tau_a = \frac{cRT_0^2}{q_a E_a}$$

where c (J kg^{-1} K^{-1}) is the specific heat capacity, R (8.314 J $mole^{-1}$ K^{-1}) is the gas constant, T_0 (K) is the ambient temperature, q_a (W kg^{-1}) is the specific heat production rate, and E_a is the activation energy (J $mole^{-1}$).

Characteristic Cooling Time, τ_c: The time required to reach a new equilibrium temperature following an instantaneous change in heating rate. For one dimensional heat conduction in an infinite slab geometry, this characteristic time is approximated by

$$\tau_c \approx \frac{H^2}{4\alpha}$$

where H (m) is the waste height and α (m^2 s^{-1}) is the thermal diffusivity.

Fuel: Those organic complexant salts and their intermediate degradation products that support and/or contribute to propagation and combustion.

Organic Complexant Combustion Event: Combustion of enough organic complexants and/or their intermediate degradation products that results in release of toxic and/or radioactive material to the environment.

Point Source Ignition: Localized initiation of a propagating chemical reaction.

Propagation: A self-sustaining exothermic chemical reaction that passes through unreacted material at a slow velocity (6 - 70 millimeters per minute for the organic simulants tested), after being initiated by an ignition source.

1.0 PURPOSE AND SCOPE

The purpose of this report is to review the current knowledge and understanding of the organic complexant hazard, and to describe the path forward for resolution of the Organic Safety Issue. The scope of this report is limited to interim waste storage in single-shell tanks (SSTs), double-shell tanks (DSTs), double-contained receiver tanks (DCRTs), and catch tanks. The document does not address other hazards that may be associated with these tanks (e.g., flammable gas deflagrations or organic solvent fires) except as these hazards relate to the organic complexant safety issue.

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2.0 BACKGROUND

Several waste generating processes were operated at the Hanford Site, including the bismuth phosphate process, the uranium recovery process, the REDOX process, the waste fractionization process, the PUREX process, and the processes conducted at the Plutonium Finishing Plant. The primary goal of these processes was to extract and/or process plutonium. Radioactive wastes from these processes are stored in underground tanks in alkaline slurries (Anderson 1990). There are 149 SSTs, 28 DSTs, six DCRTs, and 12 catch tanks.

Each of the waste-generating processes had a variety of waste streams (at least 49 different types have been identified), but the following broad categories can be established: (1) cladding (or coating) waste from the removal of the fuel element cladding; (2) metal waste from the processing of the fuel itself to remove the plutonium or other fissile material; (3) decontamination waste from the clean-out of the systems (this includes N Reactor decontamination waste); and (4) other miscellaneous waste, such as laboratory waste. Once the waste was generated and initially stored in the tanks, various other operations were performed, including removal/recovery of various materials (e.g., uranium, strontium, and cesium), evaporation, solidification, and settling.

The principal organic compounds sent to the waste tanks were divided into two classes: complexants (for chelating divalent, trivalent, and tetravalent cations) and extraction solvents. This document focuses on the organic complexant hazard; the organic solvent hazard is discussed in other documents (Cowley and Postma 1996, Cowley et al. 1997).

The principal organic complexants were glycolic acid, citric acid, hydroxyethylethylenediaminetriacetic acid (HEDTA), and ethylenediaminetetraacetic acid (EDTA). The approximate quantities of complexants used are summarized in Table 2-1 (Allen 1976). Besides these complexants, organic salts such as nitrilotriacetic acid (NTA) and oxalic acid were also used, but the quantities were relatively small and were not well quantified.

Table 2-1. Approximate Quantities of the Principal Organic Complexants Used at Hanford.

Complexant	Quantity (Metric Tons)
Glycolic Acid	880
Citric Acid	850
Hydroxyethylethylenediaminetriaceticacid (HEDTA)	830
Ethylenediaminetetraaceticacid (EDTA)	220

2.1 UNREVIEWED SAFETY QUESTION

The first organic complexant hazard assessments focused on determining whether bulk runaway (see Section 3.1) could occur, similar to the 1957 accident at Kyshtym. (A brief description and interpretation of the Kyshtym accident are provided in Appendix A). There are two important differences between Kyshtym and the waste stored at Hanford: (1) the Hanford tank wastes have relatively low radiolytic heatloads and temperatures, and (2) Hanford wastes contain large quantities of inerts and diluents. Several early analyses (Beitel 1977, Fisher 1990, Turner and Miron 1994a, 1994b) examined organic-nitrate reaction onset temperatures, and concluded that this type of accident could not occur at the Hanford Site because tank temperatures were well below that necessary for bulk runaway.

Subsequent studies examined a different accident scenario: point source ignition (see Section 3.2) (Webb 1996, Fauske et al. 1997). In this scenario, an external ignition source (e.g., lightning or welding slag) initiates a propagating combustion front that moves through the organic waste. An Unreviewed Safety Question (USQ) evaluation (Farley and Dougherty 1996) determined that localized high energy ignition sources were credible, and that point source ignition of organic complexant waste was not adequately addressed in the current authorization basis. Consequently, a USQ was declared in May 1996 for condensed-phase organic-nitrate reactions (Wagoner 1996).

2.2 WATCH LIST

In November 1990, the Wyden Amendment [Public Law 101-510, Section 3137 (1990)] was enacted. This law required the identification of Hanford Site tanks that may have a serious potential for release of high-level waste due to uncontrolled increases of temperature or pressure. It was recognized that the organic complexants and organic solvents used at Hanford might contained sufficient energy to produce high temperatures or pressures, and an assessment of the waste tanks was made using a total organic carbon (TOC) concentration criterion.

Early experiments showed that a mixture containing 10 wt% sodium acetate (i.e., 3.0 wt% TOC) and sodium nitrate/nitrite would react violently at high temperatures (Fisher 1990). Using this 3 wt% TOC criterion, ten tanks were identified in the February 1991 report to Congress (Watkins 1991) that responded to the Wyden Amendment (tank C-103 was also included on this list because it contained a pool of organic solvent). A subsequent review of historical data (Toth et al. 1994), identified ten more tanks that might exceed the 3 wt% TOC criterion. These tanks were added to the Watch List in May 1994 (Payne 1994), bringing the current number of Organic Watch List tanks to twenty.

2.3 DNFSB RECOMMENDATION 93-5

In July 1993, the Defense Nuclear Facilities Safety Board (DNFSB) transmitted Recommendation 93-5 (Conway 1993) on the Hanford Waste Tank Characterization Studies to the U.S. Department of Energy (DOE). Recommendation 93-5 noted that insufficient tank waste technical information was available to ensure that Hanford Site wastes could be safely stored, and that associated operations could be conducted safely. As a result, the DNFSB recommended that the characterization effort be upgraded and expedited.

The DNFSB accepted an Implementation Plan (DOE 1994) in March 1994 (Conway 1994). Equipment upgrade difficulties and poor rotary-mode sampler reliability prevented completion of the commitments in the original implementation plan. Subsequent revision of the Implementation Plan (DOE 1996) focused characterization efforts on understanding safety-related phenomena to expedite resolution of the waste tank safety issues.

The Recommendation 93-5 Implementation plan (DOE 1996) has two deliverables associated with the organic complexant hazard: (1) a topical report describing the current understanding of the issue and future work for resolution (DNFSB Milestone 5.4.3.3a) and (2) a letter reporting results of testing completion to confirm safe storage criteria, and organic solubility and aging effects on fuel content (DNFSB Milestone 5.4.3.3b). This report meets the topical report deliverable (DNFSB Milestone 5.4.3.3a).

2.4 APPROACH TO RESOLUTION OF THE ORGANIC SAFETY ISSUE

The approach to safety issue resolution consists of two major efforts: (1) improved monitoring and (2) increased understanding of organic waste physicochemical properties corroborated with actual tank waste results. An increased understanding of the conditions and properties necessary for an exothermic event (combustion) will allow assessment of the hazard. Mitigation may be necessary if the potential for an organic-nitrate exothermic reaction is determined to be above acceptable risk thresholds.

2.4.1 Waste Monitoring

In the unlikely circumstance of an organic complexant combustion event, current temperature monitoring activities would detect the occurrence in real time. However, temperature monitoring in the headspace of the tanks would not facilitate interdiction of an event because pressures capable of compromising dome integrity are reached in a short period of time (effectively precluding the possibility of timely interdiction). Temperature monitoring in the tank headspace might, however, facilitate timely implementation of emergency response measures. Therefore, such monitoring has a significant benefit for each tank at risk from an event. Continuous temperature monitoring is currently in place for seventeen of the twenty Organic Watch List tanks, and the remaining three tanks are scheduled for connection to continuous monitoring by September 30, 1997 (Reich et al. 1996a).

Moisture can prevent combustion of waste that may contain a sufficient concentration of organic complexant to burn. Routine, in situ measurements of the water concentration of the wastes could provide a basis for evaluating their safety. Three different technologies for determining water concentrations in the waste have been identified: near infrared (NIR) spectroscopy, neutron diffusion, and electromagnetic induction (EMI).

Initial development of NIR spectroscopy was completed in September 1995 (Reich et al. 1995); however, neutron diffusion and EMI technology proved more promising for in-tank application and further NIR development was canceled.

Neutron and EMI prototype probes were built and tested successfully in September 1993 and September 1995, respectively (Watson 1993, Wittekind 1995). Refinements to the Neutron and EMI probes were completed in FY 1996 (Watson and Finfrock 1996, Wittekind 1996) and the probes are ready for installation. Installation and data collection in an initial six tanks is scheduled for FY 1998.

2.4.2 Physicochemical Waste Properties and Hazard Assessment

To assess the organic-nitrate hazard, it is necessary to first define the physicochemical conditions that support combustion, and then to determine if these conditions exist in the tank waste. Conditions that could support combustion have been examined both theoretically and experimentally. Waste composition is determined using both historic data and analyses of actual tank wastes. The specific composition that support exothermic reaction behavior of the waste are examined using experimental techniques such as differential scanning calorimetry (DSC) and adiabatic calorimetry [Reactive System Screening Tool (RSST) and Propagating Reactive System Screening Tool (PRSST)]. The results of these efforts allow the assessment of whether organic complexant combustion is credible for Hanford Site waste.

Experimental studies show that several properties affect the combustibility of organic complexant waste including organic concentration and species, inerts, diluents, water, organic solubility, and organic aging (decomposition to lower energetic species) (see detailed discussion in Sections 3.0 and 4.0). Because many parameters can affect combustibility, this document uses a graded approach to assess the organic complexant waste hazard.

Condensed-phase combustion is not possible if the waste has insufficient concentrations of organic complexants. Therefore, the initial hazard assessment is based on a tank by tank examination of data on the concentration of organic complexants. Organic complexants were first used at the Hanford Site in 1968 (ERDA 1975). Several tanks received no known incoming waste transfers after 1968, and thus are extremely unlikely to contain organic complexant waste (see Section 4.2.1). Some tanks only contain organic solvent waste, which is important because testing indicates that the solvents do not contribute to the organic complexant hazard (see Section 4.2.2). For the remaining tanks, most received no direct transfers of organic complexant waste, and only received mixed wastes that would have contained low concentrations of organic complexants (Agnew 1996). Other methods used to identify tanks that contain complexant concentrations too low to support combustion include: (1) differential scanning calorimetry (DSC) of waste samples (see Section 4.2.3) and (2) statistical evaluations (that account for tank inhomogeneity and sampling and analysis variability) of total organic carbon (TOC) waste sample data (see Section 4.2.4).

The evaluation based on TOC is an overestimation of the complexant hazard because the TOC measurements do not differentiate between organic species and their energetics (energy content and ability to support condensed phase combustion is based on identity of the organic species). This ignores the aging of complexants to low energy compounds such as oxalate. Therefore, tanks that fail the initial hazard screening require a more detailed, tank by tank analysis. The more detailed analysis includes direct combustion testing (see Section 3.3.2), and organic speciation to determine how much organic has decomposed (aged) to low energy and non-combustible byproducts (see organic aging in Section 4.2.5), and how much organic is contained in the non-combustible aqueous phase (see organic solubility in Section 4.2.6).

The organic complexant wastes have been exposed to high temperatures and radiation during their seventeen to twenty-eight years of storage. Organic complexants age under these conditions to lower energy byproducts. Experiments are investigating the effects of temperature and radiation on organic waste combustibility (see Section 4.2.5). If the organic fuel has substantially aged, then condensed-phase combustion is not credible.

Organic complexants were sent to Hanford Site waste tanks as aqueous (liquid) waste. The open literature and simulant tests indicate that the combustible complexants and chelator fragments [e.g., HEDTA, EDTA, IDA, and NTA] would be contained in the waste liquid, while the non-combustible, low energy decomposition products (e.g., oxalate and carbonate) would be in the waste solids (see Section 4.2.6). If the organic fuel remains in the liquid, then condensed-phase combustion is not credible.

2.4.3 Mitigation

Tanks that pose an unacceptable risk of an organic combustion event would require that mitigation be performed. Mitigation could involve water addition, complexant removal (complexants are soluble), or complete retrieval of the waste.

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3.0 POSTULATED ORGANIC COMPLEXANT ACCIDENTS

Organic complexants were sent to the waste tanks during operations at the Hanford Site. These compounds and some decomposition products have the potential to react exothermically when combined with nitrate/nitrite oxidizers. There are two common hazards associated with safe storage and handling of chemically reactive material (AICHE 1995): (1) spontaneous self-accelerating decomposition reactions in the bulk material (bulk runaway) and (2) deflagration after being initiated by an ignition source (point source ignition and propagation). Both accident scenarios are discussed below.

3.1 BULK RUNAWAY

The bulk runaway accident scenario and safety criteria are summarized in this section. The derivation and basis for the safety criteria are described more fully in Fauske (1997). Section 5.0 gives a comparison of the SSTs with the bulk runaway criteria.

3.1.1 Bulk Runaway Accident Scenario

The scenario for bulk runaway is (1) a loss of active cooling (on a tank with a high heat load) causes the waste to heatup to the self-accelerating decomposition temperature (AICHE 1995), (2) the chemical heating raises the waste temperature which in turn accelerates the chemical reaction, (3) this accelerating bulk runaway continues until the chemical reactants are consumed. The high temperatures and gases produced over-pressurize the tank and large quantities of radiological and toxicological materials are released to the environment. This is analogous to the accident that occurred in 1957 at Kyshtym (see Appendix A).

3.1.2 Bulk Runaway Safety Criteria

3.1.2.1 Chemical Heat Removal. Bulk runaway can occur when the chemical heat generation rate produced by an Arrhenius type reaction exceeds the rate of heat dissipation by conduction in some volume of the substance. Bulk runaway is not credible if heat dissipation exceeds heat generation. The safety criterion is therefore often expressed in terms of two characteristic time constants (Gygax 1990):

$$\tau_a > \tau_c \qquad (3\text{-}1)$$

where τ_a is the characteristic time of adiabatic runaway and τ_c is the characteristic cooling time. The characteristic time of adiabatic runaway is given by (Gygax 1990):

$$\tau_a = \frac{cRT_0^2}{q_a E_a} \tag{3-2}$$

where c (J kg^{-1} K^{-1}) is the specific heat capacity, R (8.314 J $mole^{-1}$ K^{-1}) is the gas constant, T_0 (K) is the ambient temperature, q_a (W kg^{-1}) is the specific heat production rate, and E_a is the activation energy (J $mole^{-1}$).

For infinite slab geometry with similar boundary conditions on both sides of the slab, τ_c is approximated by (Gygax 1990):

$$\tau_c \approx \frac{H^2}{4\alpha} \tag{3-3}$$

where H (m) is the total waste height, and α (m^2 s^{-1}) is the thermal diffusivity. Note that if one side of the slab were completely insulated, the characteristic time of cooling would be H^2 divided by α, instead of 4α. The actual waste tank characteristic times lie between these two values. In either case, the conclusions on bulk runaway remain unchanged (see Section 4.2 for calculations of τ_c).

From Equation 3-2, calculation of the characteristic time of adiabatic runaway requires an understanding of the chemical kinetics associated with the organic waste. However, an assessment of the potential for bulk runaway can be done without calculating τ_a. Instead, safe storage can be assessed by comparing the storage time with the characteristic cooling time. That is, bulk runaway is not credible if the following safety criterion is satisfied:

$$t_s > \tau_c \tag{3-4}$$

where t_s is the storage time, and τ_c is the characteristic time of cooling. Single-shell tanks are assessed for bulk runaway in Section 4.1.

3.1.2.2 Decay Heat Removal. No radioactive waste has been added to the SSTs since 1980, and the major radioactive heat source in the SSTs is ^{137}Cs and ^{90}Sr. Over the last 17 years, the decay heats have decreased about one-third, and the tank waste decay power is continuing to decline during storage. To determine if a bulk runaway accident is credible, it is necessary to assess whether heat from radioactive decay could increase tank waste temperatures to the self-accelerating decomposition temperature (i.e., bulk runaway temperature). Although bulk runaway temperatures for the organic tank wastes are not quantified, safe storage can be ensured if the temperatures are maintained below post-1980 temperatures. That is, if future waste temperatures remain below previous historical temperatures (i.e., the peak temperature maintained for a duration equal to or greater than the characteristic time of cooling), then bulk runaway is not credible (see Fauske 1997 for details):

$$T_{historical} > T_{future} \tag{3-5}$$

Hanford Site SSTs are either passively ventilated (heat is lost primarily through conduction) or actively ventilated (an exhauster is attached to increase air flow through the tank). Only one SST, C-106, requires water for evaporative cooling (see Section 5.1).

Passively Ventilated Tanks. For the passively ventilated tanks, an increase in waste temperature from decay heating would only occur if the thermal conductivity of the waste decreases (see discussions of tank A-101 in Appendix B). Thermal conductivity within the waste will decrease as a waste becomes drier (after stabilization); however, the waste temperature would increase only if the solid waste thermal conductivity decreases faster (as the waste becomes drier) than the volumetric heating rate decreases (from radioactive decay).

The fraction of heat lost out the top of a typical passively ventilated tank is about 0.5 (see Figure 3 in Kummerer 1995), and the fractional (average) yearly decrease in Q from decreasing radioactive decay is about 0.023. The average yearly decrease in the head space temperature, ΔT, can be estimated by

$$\Delta T = (0.5)\,(0.023)\,Q\,H\,\frac{\Delta x}{k_s} \tag{3-6}$$

where Q ($W\ m^{-3}$) is the solid waste volumetric heating rate, k_s (~ 1 $W\ m^{-1}\ K^{-1}$) is the overburden thermal conductivity, and Δx (4 m) is the height of the tank overburden.

The corresponding yearly fractional decrease in the solid waste temperature drop from the decrease in decay heat is

$$\Delta T = (0.023)\,\frac{Q\,H^2}{2\,k} \tag{3-7}$$

where k ($W\ m^{-3}\ K^{-1}$) is the waste thermal conductivity, and H (m) is the waste height.

The total decrease due to decrease in decay heat can then be stated as

$$\Delta T = (0.5)(0.023)\,Q\,H\,\frac{\Delta x}{k_s} + (0.023)\,\frac{Q\,H^2}{2\,k} \tag{3-8}$$

Note that decreases associated with the heat exchange between the ground and the atmosphere and natural convection within the tank airspace are not accounted for in Equation 3-8. These losses are relatively small compared to the conduction losses.

Considering an initially saturated waste and a nonuniform dry out pattern with moisture loss occurring first within the top waste layer of height, h, the relationship between h and void fraction, α, due to a yearly moisture loss, $\dot{m}$, is then given by the following volume balance

$$A\,h\,\alpha = \frac{\dot{m}}{\rho_\ell} \tag{3-9}$$

where ρ_ℓ is the density of water. An estimate of the increase in ΔT due to the void change from 0 to α is provided by

$$\Delta T = Q\,H\,\frac{h}{k}\left(\frac{1}{1 - \alpha} - 1\right) \tag{3-10}$$

We note that Equation 3-10 implies that the entire decay heat flux, $Q\,H$, is conducted across the voided region, h, and that the thermal conductivity, k, decreases linearly with an increase in void fraction, α. The first assumption is conservative, since a fraction of the decay heat is generated within the voided region, h. The second assumption is slightly nonconservative.

According to the recommended equation by Russel (1935), the relationship between the thermal conductivity k_α and void fraction α is slightly nonlinear:

$$k_\alpha = k\,\frac{1 - \alpha^{2/3}}{1 - \alpha^{2/3} + \alpha} \tag{3-11}$$

For $\alpha = 0.1$, the reduction in thermal conductivity is 11% rather than 10%, for $\alpha = 0.2$, 23% rather than 20%, and for $\alpha = 0.3$, 35% rather than 30%.

It follows that the waste temperatures will continue to decrease if the following is satisfied:

$$(0.5)\,(0.023)\,Q\,H\,\frac{\Delta x}{k_s} + (0.023)\,\frac{Q\,H^2}{2\,k} > Q\,H\,\frac{h}{k}\left(\frac{1}{1-\alpha} - 1\right) \tag{3-12}$$

which can be restated as follows

$$4 + \frac{H}{k} > \frac{2}{0.023}\left(\frac{\dot{m}}{\rho_{H_2O}}\right)\left(\frac{1}{A\,\alpha}\right)\left(\frac{1}{k}\right)\left(\frac{1}{1-\alpha} - 1\right) \tag{3-13}$$

From Equation 3-13, the lower bound value of the moisture loss that would assure decreasing waste temperatures can be estimated by setting $H = 0$, and using a value of $\alpha = 0.3$.[1] With a saturated waste thermal conductivity of $k = 1\ W\ m^{-3}\ K^{-1}$ and $A = 410\ m^2$, $\dot{m}$ is about 13,000 kg yr^{-1}. For the smaller 200 series tanks, $A = 29\ m^2$ and $\dot{m}$ is about 930 kg yr^{-1}. (These values reduce to about 10,500 kg yr^{-1} and 750 kg yr^{-1}, respectively, accounting for a nonlinear decrease in thermal conductivity with α). Considering that reasonable estimates for yearly moisture losses are well below these values (Epstein et al. 1994), the waste temperatures in passively ventilated tanks will continue to decrease for all solid waste inventories, consistent with tank farm observations.

Actively Ventilated Tanks. To assess the actively ventilated tanks for the potential for bulk runaway, it is necessary to postulate what the waste temperatures would be if active ventilation were stopped. The fraction of heat loss out of a typical passively ventilated SST is about 0.5 (see Figure 3 in Kummerer 1995). Therefore, the estimated bulk waste temperature ($T_{passive}$) after ventilation is shut off would be the following:

$$T_{passive} \approx (0.5)\,\frac{Q\,\Delta x}{k A} + T_{\infty} + (T_{waste} - T_{head}) \tag{3-14}$$

where Q is the total heat load (W), Δx (4m) is the height of tank overburden, k ($1\ W\ m^{-1}\ K^{-1}$) is the overburden thermal conductivity, A ($410\ m^2$) is the tank cross-sectional area, T_{∞} (14 °C) is the average ambient temperature, T_{waste} is the waste temperature under active ventilation, and T_{head} is the average headspace temperature.

[1]In case of a saturated saltcake, a reasonable value of the volume fraction occupied by the interstitial supernatant is about 0.4. Considering that the supernatant is saturated with salts such as $NaNO_3$ etc., upon dryout the solid salts left behind will result in a void fraction of less than 0.3.

If the temperature after ventilation shutoff is less than the historical operating temperatures (i.e., the peak temperature maintained for a duration equal to or greater than the characteristic time of cooling), then bulk runaway is not credible:

$$T_{historical} > T_{passive} \tag{3-15}$$

Single-shell tanks are assessed for bulk runaway in Section 4.1.

3.2 POINT SOURCE IGNITION

The point source ignition accident scenario, safety criteria, and safety categories are summarized in this section. The derivation and basis for the safety criteria are described more fully in Fauske et al. (1997) and Fauske (1997). A combination of theoretical analysis and experimental measurements were used to determine safe storage criteria.

3.2.1 Point Source Ignition Accident Scenario

The scenario for point source ignition is the following: (1) combustible waste is created by concentrating the combustible organic chemicals that were contained in the waste added to the tanks and drying these wastes to combustible conditions; (2) an ignition source of sufficient energy and temperature contacts the combustible waste and a propagating reaction is initiated; (3) the combustion front spreads through the combustible waste causing over pressurization in the tank, and large quantities of radiological and toxicological materials are released to the environment; and (4) the reaction continues until all contiguous combustible waste is consumed.

3.2.2 Point Source Ignition Safety Criteria

3.2.2.1 Theoretical Ignition Source Requirements. A substantial ignition source must be available to initiate a condensed-phase propagating reaction. For a propagation to occur, the ignition source must raise a sufficient volume of the combustible mixture to the ignition temperature. The minimum energy required can be estimated from the thermal/physical properties of the combustible mixture, and the observed ignition temperature [see Fauske (1997) for details]:

$$Q_{min} = \frac{4}{3} \pi \, r_{crit}^3 \, \rho c \left(T_{ig} - T_0\right) \tag{3-16}$$

where ρ (kg m^{-3}) is the density of the combustible mixture, c (J kg^{-1} K^{-1}) is the specific heat capacity, T_{ig} (K) is the ignition temperature, T_0 (K) is the initial temperature, and $4/3\pi r_{crit}^3$ (m^3) is the minimum volume of material that must be raised to the ignition temperature. The term

r_{crit} (m) is the critical radius of the minimum (spherical) volume. The critical radius can be determined from the heat balance for the system (heat release equals heat loss).

$$\frac{4}{3}\pi r_{crit}^{3}\rho c\left(T_{ad}-T_{o}\right)\frac{U_{b}}{r_{crit}} = 4\pi r_{crit}^{2} k \frac{dT}{dr} \approx 4\pi r_{crit} k\left(T_{ad}-T_{o}\right) \tag{3-17}$$

where T_{ad} (K) is the adiabatic reaction temperature, U_b is the propagation velocity (m s^{-1}), and k (W m^{-1} K^{-1}) is the thermal conductivity. Rearranging Equation 3-17 and solving for r_{crit} results in the following:

$$r_{crit} = \frac{3\alpha}{U_{b}} \tag{3-18}$$

where α (m^2 s^{-1}) is the thermal diffusivity.

Using the following property values from waste simulant experiments[1] (Fauske et al. 1997, Fauske 1996a) T_{ig} = 520 K; ρ = 1500 kg m^{-3}, c = 1500 J kg^{-1} K^{-1}, $\alpha = 2 \times 10^{-7}$ m^2 s^{-1}, $U_b = 5 \times 10^{-4}$ m s^{-1} and T_o = 320 K, leads to a Q_{min} of 3.3 J. This is about four orders of magnitude larger than the 0.21 mJ required for flammable hydrocarbon mixtures (Stull 1977).

3.2.2.2 Experimental Ignition Source Requirement. Propagation tests were conducted to determine the ignition requirements for stoichiometric HEDTA-sodium nitrate mixtures. The mixtures contained no excess oxidizer and sodium aluminate was added as an inert to vary fuel concentration. Stainless steel spheres of varying size (diameters from 1.0 mm to 11 mm) heated to about 1300 °C were used as ignition sources. The spheres were dropped about 1 to 2 cm onto the surface of the fuel oxidizer mixtures that contained about 20 g of sample. The sphere diameter and corresponding energy content required to initiate a propagation is illustrated in Table 3-1. Solid circles note propagation and the open circles represent failed ignition (only limited localized burning immediately surrounding the hot stainless steel spheres). A small amount of energy is lost to the surroundings before the small spheres become imbedded in the sample, however, the energy estimates shown in Table 3-1 are reasonable approximates.

From Table 3-1, the data show that ignition source requirements increase rapidly with decreasing fuel concentration and increasing water concentration. A small amount of water has a large impact on ignitor success. This is important because experiments with waste simulants and actual waste indicate that a minimum of about 8 wt% water would be retained at

[1]No tank waste samples tested to date have propagated. Results from tank waste tests are summarized in Section 3.2.2.4.

equilibrium with Hanford Site air (Scheele et al. 1996 and 1997). A 5 wt% water increases the ignition energy requirements in a stoichiometric mixture by an order of magnitude. The dry stoichiometric mixture was ignited with an 11 J sphere while the mixture with 5 wt% water was ignited by a 300 J sphere. Fifteen wt% water prevented propagation for all the ignition sources tested.

Table 3-1. Ignition Source Requirements for Stoichiometric Fuel ($Na_3HEDTA \bullet 2H_2O$) Oxidizer ($NaNO_3$) Mixtures with Inert ($NaAlO_2$) and Water.

TOC (wt%, dry)	Water (wt%)	Diameter and Energy Content of Stainless Steel Spheres					
		1.0 mm (3 J)	1.6 mm (11 J)	2.4 mm (37 J)	4.8 mm (300 J)	7.9 mm (1400 J)	11 mm (3700 J)
10.6	0	○	●				
	5			○	●		
	10				○	●	
	15						○
9.0	0		○	●			
8.0	0			○	●		
	5				○	●	
	10						○
7.0	0				○	●	
	5					○	●
6.0	0					○	●

Notes: ● = Propagation
○ = No Propagation

Experiments have also been conducted using a pyrotechnic "electrical match" that releases about 140 J over a 3 to 5 msec period. Only 5 wt% water prevents ignition in stoichiometric fuel (acetate, citrate, and HEDTA) nitrate mixtures. Tests were conducted with the match placed on the surface of the mixtures, and submerged about 2.4 cm below the surface.

The experimental ignition energies confirm the calculations in a general way. The 1 mm diameter sphere with about 3 J of energy did not ignite the mixture. A sphere with 1.6 mm diameter containing 11 J did cause propagation. In other words, there was enough energy to overcome thermal diffusivity even though an unknown amount may have escaped to the air instead of being deposited in the mixtures. It should be pointed out that the high temperatures melted the reaction mixture and the hot spheres sunk into the matrix. The larger balls show that over 100 J are needed if the effects of moisture or diluents are be overcome. This was corroborated by the electric match experiments which used about 140 J.

3.2.2.3 Theoretical Fuel and Moisture Requirements. In contrast to bulk runaway, a deflagration propagates by thermal energy transfer (AICHE 1995). Given the presence of an adequate amount of oxidizer ($NaNO_3/NaNO_2$) and an ignition source, sustained propagation depends on the fuel concentration and the absence of diluents such as water.

Suppose a region of combustible material combusts and is instantaneously and uniformly chemically heated to its adiabatic reaction temperature (T_{ad}). To sustain a propagation, the chemical energy release must raise the contact or interface temperature (T_i) above the ignition temperature (T_{ig}) :

$$T_i > T_{ig} \tag{3-19}$$

If Equation 3-19 is not satisfied, the reaction will slow and be quenched by the much colder unreacted material.

The conduction problem that arises immediately following the local, instantaneous chemical heating of the reactive medium resembles the classical thermal contact problem that results from suddenly bringing together two semi-infinite slabs with different initial temperatures, namely the initial temperature (T_0) and the adiabatic reaction temperature (T_{ad}). The temperature at the plane of separation (T_i) of the reacted and unreacted regions are

$$\frac{T_i - T_o}{T_{ad} - T_o} = \frac{1}{1 + \sigma} \tag{3-20}$$

and

$$\sigma = \frac{k_u}{k_r}\left(\frac{\alpha_r}{\alpha_u}\right)^{1/2} \tag{3-21}$$

where k (W m^{-3} K^{-1}) is the thermal conductivity, α (m^2 s^{-1}) is the thermal diffusivity, and subscripts r and u represent reacted and unreacted materials, respectively. The value of T_i is reached instantaneously, or when the two regions contact one another. If the products of the physical properties (i.e., ρck) are assumed to be the same for both regions, then $\sigma \approx 1$. The contact temperature is simply the arithmetic mean of the adiabatic reaction temperature and the initial temperature:

$$T_i = \frac{T_{ad} + T_0}{2} \tag{3-22}$$

In writing Equation 3-22, it is assumed that no heat is transmitted from the reacting region to the surrounding unreacted region before the reacted region is chemically heated to T_{ad}. In most applications of interest, some heat transfer from the reacting region to the surroundings will occur before the reaction is complete. The energy supplied to locally raise the combustible material temperature to its ignition temperature will also result in a reacted-region peak temperature that exceeds T_{ad}. If these departures from the ideal situation of an adiabatically and purely chemically heated region up to T_{ad} are treated in full detail, then the conduction theory for the prediction of T_i becomes complicated and would be difficult to calculate. Separate computer solutions would be needed for each case considered. To avoid this complexity, Equation 3-22 is selected for calculating T_i. The fidelity of this approximation must be judged by comparison of the derived criterion with experimental results.

To sustain a propagation, T_i must be greater than T_{ig}. Substituting Equation 3-19 into Equation 3-22 and rearranging for T_{ad} results in the following:

$$T_{ad} > 2\ T_{ig} - T_0 \qquad (3\text{-}23)$$

Accounting for water by subtracting the effective temperature difference taken up by evaporation of the water (i.e., $x_w\ \lambda\ \bar{c}^{-1}$), the criterion for propagation becomes

$$T_{ad} > 2\ T_{ig} - T_0 + \frac{x_w\ \lambda}{\bar{c}} \qquad (3\text{-}24)$$

where x_w is the water mass fraction, λ is the latent heat of evaporation, and $\bar{c}$ is the effective average specific heat value of the reacting mixture and its products over the temperature range of interest that also accounts for heat of melting and sensible heats of water and its vapor. [For further details on equation development see Fauske et al. (1997).]

A lower bound theoretical value for the chemical energy release (ΔH_{min}) to sustain propagation can now be obtained by assessing the reaction enthalpy required to raise the temperature of a unit mass of reacting mixture from T_0 to T_{ad} (note that exothermic reactions have a negative enthalpy thus the $-\Delta H_{min}$):

$$-\Delta H_{min} = (T_{ad} - T_0)\ \bar{c} + x_w\ \lambda \qquad (3\text{-}25)$$

By combining Equations 3-24 and 3-25, the following is obtained:

$$-\Delta H_{min} > 2\left[T_{ig} - T_0 + \frac{x_w \lambda}{\bar{c}}\right]\bar{c} \qquad (3\text{-}26)$$

Equation 3-26 can be further simplified by treating T_0 as negligible with little loss of accuracy. The claim of lower bound values is still well justified by comparison to experimental data provided below.

$$-\Delta H_{min} > 2\left[T_{ig}\bar{c} + x_w \lambda\right] \qquad (3\text{-}27)$$

Using the ignition temperature for sodium acetate (T_{ig} = 300°C), $\bar{c} \approx 2000$ J kg^{-1} K^{-1}, and λ = 2265 kJ kg^{-1} (Fauske et al. 1997), the minimum chemical energy release (in MJ kg^{-1}) to sustain propagation is

$$-\Delta H_{min} > 1.2 + 4.5\, x_w \qquad (3\text{-}28)$$

For dry material, the x_w term drops out and the minimum chemical energy is simply 1.2 MJ kg^{-1}. This criterion is consistent with the 0.71 to 1.25 MJ kg^{-1} (170 to 300 cal g^{-1}) range found in the literature for materials susceptible to propagation (AICHE 1995). However, direct testing of the materials is recommended to determine a more accurate threshold for propagation (AICHE 1995).

The criterion for propagation or point source ignition can also be expressed in terms of TOC concentration. The equivalent TOC (fuel) concentration is simply the minimum energy requirement ($-\Delta H_{min}$) divided by the heat of reaction ($-\Delta H_{rx}$) for sodium acetate combustion with sodium nitrate [about 27.1 MJ kg^{-1} from Burger (1993)]. It is also important to note that the above Equations become non-physical for values of x_w greater than about 0.2, since the liquid phase now becomes the continuous phase (Fauske et al. 1997). For such conditions the contact temperature T_i will not exceed the boiling point of the salt solution (about 120 °C) which is well below T_{ig} values of interest. Therefore, the criterion for propagation in terms of wt% TOC (as sodium acetate) becomes

$$\text{wt\% TOC (as } NaC_2H_3O_2) > (4.5 + 17\, x_w)\ ; \quad \text{where } x_w < 0.2 \qquad (3\text{-}29)$$

3.2.2.4 Experimental Fuel and Moisture Requirements. In this section, the criterion is compared with measurements obtained to date with various organic waste simulants and actual waste samples. Measured quantities of key interest include ignition and combustion temperatures, the fuel concentration required to support propagating reactions, and the water concentration that will inhibit propagation. A summary of key data is provided below; further details are provided in Appendix C, and in Fauske et al. (1997) and Fauske (1996a, 1996b).

Reactive System Screening Tool Combustion Tests with Waste Simulants. A number of compositions containing organic complexants and $NaNO_3/NaNO_2$ were tested in the RSST (Fauske and Leung 1985). In these tests, sizeable samples (about 10 grams) were heated at 10 °C min^{-1} under low heat loss conditions. A summary of the tests is shown in Table 3-2. As the sample was heated to above the reaction onset temperature, the thermal energy produced by the reaction caused the sample to self-heat. The rate and extent of this self-heating provide direct evidence of the character of the reaction that has taken place.

Table 3-2. Summary of RSST Tests on Organic Simulants[1].

TOC (wt%, dry)	Description	Propagation Observed	Ignition Temperature (°C)
3.5	Sodium Acetate	No	NA
5.0[2]	Sodium Acetate	No	NA
6.0	Sodium Acetate	Yes	300
7.0	Sodium Acetate	Yes	300
8.0	Sodium Citrate	Yes	230
6.0[3]	Sodium HEDTA	Yes	220
Stoichiometric	Sodium Oxalate	No	NA
5.0	Sodium Stearate	No	NA
6.0	Sodium Stearate	No	NA
9.0	Sodium Stearate	Yes	260
5.0	Sodium HEDTA + Sodium Citrate	Yes	230
6.0	Sodium Glycolate + Sodium Citrate + Sodium HEDTA + Sodium EDTA	Yes	230
Stoichiometric	Dibutyl Phosphate	No	NA
Stoichiometric	Tributyl Phosphate	No	NA
Stoichiometric	Aluminum Dibutyl Phosphate	No	NA
Stoichiometric	Sodium Dibutyl Phosphate	No	NA

Notes: NA = Not Applicable.

[1] Data from Fauske (1994), Fauske (1996a), and Fauske et al. (1997).

[2] This test was repeated six times. Sodium hydroxide (0.7 and 1.4 molar) was added to two of the tests with no change in results (Fauske 1994).

[3] This test was repeated three times with different inerts added to the mixture. No changes in propagation were observed, but ignition temperatures increased when several inerts were added (Fauske 1996a).

Two distinct types of behavior were seen depending on sample reactivity: (1) A relatively slow heat-up rate that is typical of an Arrhenius or bulk runaway reaction (any material that contains chemicals that react exothermically will exhibit this behavior); and (2) A sharp transition to a very high self-heating rate indicating ignition and the passing of a reaction front. For materials that exhibit this behavior, propagation is possible, given a sufficient initiator.

It is important to note that the onset of propagating reactions in the RSST tests occurs when the entire sample has essentially reached the ignition temperature. This is in contrast to the tube propagation tests discussed below, in which propagation can occur at ambient waste temperature given an adequate ignition source. The organic simulant tests included a 4:1 mass ratio of $NaNO_3$ and $NaNO_2$. Table 3-2 shows that the lowest ignition temperature of about 220 °C, which is more than 100 °C higher than the maximum waste temperatures.

It may also be noted from Table 3-2 that several compounds did not support propagation, including dibutyl and tributyl phosphates, or their salts such as aluminum and sodium dibutyl phosphate. This behavior can be related to early decomposition of these compounds (in the 150 to 200 °C temperature range) both with and without the presence of the nitrate-nitrite oxidizer. Sodium oxalate also did not support propagation, even under stoichiometric fuel-oxidizer conditions.

Tube Propagation Combustion Tests with Waste Simulants. The effect of water on propagation was evaluated with tube propagation tests. The test apparatus consisted of a thin, insulated stainless-steel cylinder, 25 mm in diameter and 100 mm tall, filled with the test material (Fauske et al. 1997). The reaction was ignited at the top, and the progress of the reaction, if any, was monitored by four thermocouples spaced 20 to 30 mm apart. Again, one of two distinct behaviors was observed. The reaction proceeded to the bottom of the cylinder in samples capable of supporting a propagation. If the reaction would not ignite or failed to sustain combustion, the sample did not support propagation. Results are summarized in Figure 3-1, and experimental details are provided in Appendix C.

Examining Figure 3-1, the test results showed that a minimum of about six wt% TOC was required to support propagation. The TOC concentration required to support propagation increased with the water content of the mixture, and all of the mixtures that supported propagation exceeded the theoretical fuel-water criterion. Stoichiometric mixtures of fuel and oxidizer failed to propagate when 20 wt% water was present.

Several compounds did not sustain propagation, even when no water was added to the mixture. Compounds that did not support propagation included butyrate, formate, oxalate, dibutyl phosphate, and di(2-ethylhexyl) phosphate.

The simulant tests provide a conservative evaluation of the organic hazard. The condition for fuel and oxidizer reactions are optimized by fuel to oxidizer ratio, thorough mixing, use of small particles, and absence of complex mixtures of diluents. Many of the diluents are known to form hydrates and bind water more tightly. However, all possible components and mixtures of waste components can not be evaluated so potential catalysis or synergistic effect (low melting eutectic mixtures) cannot be ruled out. Simulants with compositions approximating those found in tanks have been tested and no such effects were found (Fauske 1996a).

Combustion Testing Using Tank Waste. Dried waste samples from ten tanks have been tested by RSST and/or by tube propagation (using the PRSST). The samples were selected because the measured TOC concentration exceeded 3.0 wt% (the original Watch List criterion) or DSC analysis showed a heat of reaction greater than 480 J g^{-1} [the safety screening criterion (Dukelow et al. 1995). The test apparatuses are described in Appendix C, and the results are summarized in Tables 3-3 and 3-4. It is important to note that none of the dried waste samples exhibited propagation behavior.

Table 3-3. Summary of Adiabatic Calorimetry (RSST) Tests on Waste Samples.

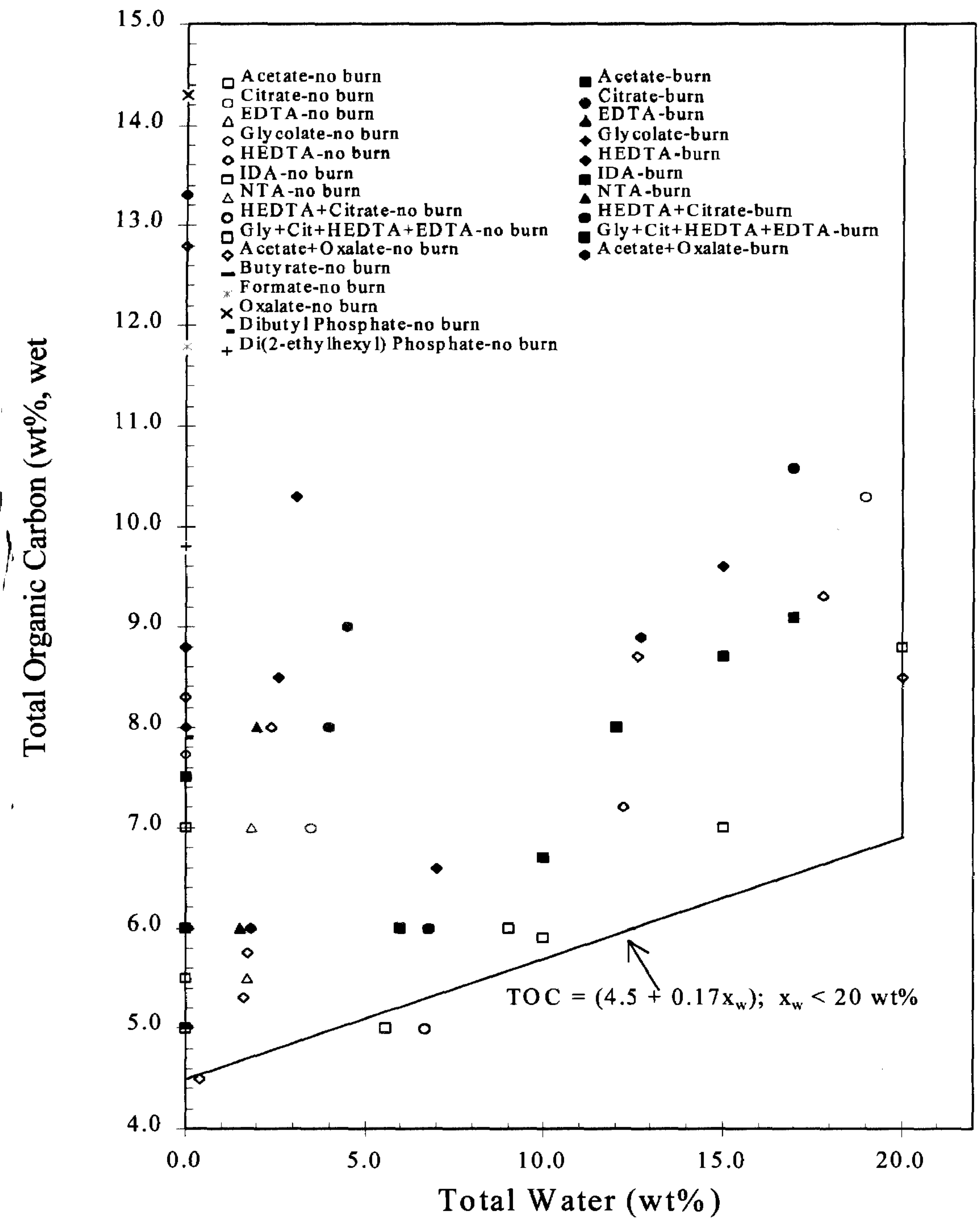
Tank	Waste TOC (wt%, dry)	TOC of Sample tested (wt%, dry)	DSC Result[1] (J g^{-1}, dry)	Propagate[2]
AN-107	4.5 - 9.8	5.5[3]	-1300	No
AW-101	0.8 - 2.0	2.0	-990	No
BY-104	0.2 - 2.6	0.8	-770	No
BY-105	0.1 - 1.1	0.4	-1500[4]	No
BY-108	0.2 - 3.2	3.2	-590	No
C-201	4.4 - 5.1	5.1	-690	No
C-204	6.0 - 13	13[5]	>-1200	No
U-102	0.4 - 2.4	2.3	-620	No
U-106	1.5 - 4.9	4.9	-880	No

Notes: [1] Highest measured DSC exotherm for the sample.
[2] Propagation behavior measured by RSST is described in Appendix C.
[3] Chemical speciation of the organic in tank AN-107 showed that the TOC was about 70% low molecular weight acids and 30% chelators/chelator fragments.
[4] There was high variability in the DSC measurements for BY-105 waste. RSST was performed to further access the sample.
[5] Chemical speciation of the organic in tank C-204 showed that the TOC was TBP solvent.

Table 3-4. Summary of Tube Propagation (PRSST) Tests on Waste Samples.

Tank	Waste TOC (wt%, dry)	TOC of Sample tested (wt%, dry)	DSC Result (J g^{-1}, dry)	Propagate
U-105	1.2 - 3.3	3.3	-630	No

Figure 3-1. Tube Propagation Test Results for Organic Waste Simulants.



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3.2.3 Waste Safety Categories for Tank Waste Screening

As discussed in Section 3.2.2, a combination of theoretical analysis and experimental measurements were used to determine safe storage criteria. This led to the development of a generalized chemical energy threshold for propagating reactions. This minimum chemical energy release to sustain a propagation was shown previously in Equation 3-28. Since TOC values are commonly measured for tank waste and are available for most tanks, a method to screen tanks for reaction hazard using TOC was desired. Sodium acetate was selected as a surrogate for expressing the criterion in terms of TOC. As discussed in Section 3.2.2.4, this selection was confirmed with extensive test data from additional surrogates.

Based on theoretical analyses, which were corroborated with experiments, the screening criterion that defines the *safe* category is as follows:

- Fuel concentration $\leq$ 4.5 wt% TOC (as Acetate). Temperature, oxidizer, and water concentration are not limiting.

The category *safe* defines waste that has a low TOC concentration as fuel. This conclusion is valid even for waste that contains optimum concentrations of oxidizer and/or no water.

For tank wastes that exceed the fuel concentration criterion, the screening criterion that defines the *conditionally safe* category is as follows:

- Mass fraction of water $(x_w) \geq$ 0.0588 Fuel (in wt% TOC as Acetate) - 0.265; for $0 \leq x_w \leq 0.20$. For $x_w > 20$, the waste is *conditionally safe* irrespective of fuel concentration. Temperature and oxidizer are not limiting.

The category *conditionally safe* defines waste that cannot burn because, although it may contain a sufficient fuel and oxidizer concentration, it contains sufficient water to quench any reaction that may be initiated, and thus propagation is prevented. This category is valid even for waste that contains optimum concentrations of oxidizer.

The category *unsafe* defines waste that does not meet the screening criteria for the *safe* or *conditionally safe* categories.

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4.0 ASSESSMENT OF ORGANIC WASTE CONDITIONS

In this section, the waste conditions in the Hanford Site DSTs, DCRTs, catch tanks, and SSTs are assessed for potential bulk runaway and point source ignition hazards. A short discussion of the reasons DSTs, DCRTs and catch tanks are not at risk for organic-nitrate reactions is provided. Tank waste characterization data are compared with the criteria derived in Section 3.0 for the assessment of SSTs.

4.1 ASSESSMENT OF DSTs, DCRTs, AND CATCH TANKS

4.1.1 Double-Shell Tanks

The DSTs were constructed to provide intermediate storage of high-level radioactive waste, including waste capable of boiling from radioactive decay (aging waste) and waste not capable of boiling (non-aging waste). There are 28 DSTs, with 25 located in five tank farms in the 200 East Area and three located in one farm in 200 West Area. A major operational difference between the DSTs and single-shell tanks (SSTs) is that the DST have only stored high water content liquid wastes and slurries. There have been no operations that were intended to dry waste below 20 weight percent water and no operations are planned as part of the TWRS interim storage mission. Therefore, DSTs do not pose a hazard for bulk runaway or point source ignition during the interim storage mission.

4.1.2 Double-Contained Receiver Tanks

A DCRT is a short-term storage facility for liquid waste during waste transfer operations. There are six DCRTs. The 244-A, 244-BX and 244-CR DCRTs are located in 200 East Area and the 244-S, 244-TX and 244-U DCRTs are located in 200 West Area. The DCRTs are active facilities (with the exception of 244-U, which is yet to be put into service) for collection of liquid waste that does not have a high solids loading. These waste streams have a high water content, and would have evaporate to dryness to become a hazard. Because the DCRTs are active, this is not anticipated during the interim storage mission. The DCRTs do not pose a hazard for bulk runaway or point source ignition during the interim storage mission.

4.1.3 Catch Tanks

Catch tanks are underground storage tanks used to collect small amounts of waste drained from waste transfer systems and DST equipment. Catch tanks can be emptied to a DST using a submersible pump or, in some instances, a water or steam jet. There are seven active catch tanks in 200 East Area, four active catch tanks in 200 West Area and one active catch tank in the 600 Area (between the 200 East and West Areas). These waste streams have a high water content, and would have evaporate to dryness to become a hazard. Because the catch tanks are active, this is not anticipated during the interim storage mission. The catch tanks do not pose a hazard for bulk runaway or point source ignition during the interim storage mission.

4.2 ASSESSMENT OF SINGLE-SHELL TANKS FOR BULK RUNAWAY

All of the single-shell tanks are evaluated for bulk runaway in this section. The analysis differs for tanks that are passively ventilated and tanks that are actively ventilated. Therefore, the analysis for bulk runaway is divided into two sections, passively ventilated tanks and actively ventilated tanks.

4.2.1 Passively Ventilated Tanks

Most of the SSTs (134 out of 149) are passively ventilated, which assures that decay heat removal is entirely by passive means. From the discussion in Section 3.1.2.1, temperatures in the tank waste will continue to decline, even as the waste slowly dries and the thermal conductivity decreases. This is true even if the tank is interim stabilized.

The conclusion that the time-averaged annual temperatures in the passively ventilated tanks are continuing to decline is also corroborated by the tank temperature trends over the past fifteen years. The historical temperature data show that the time-averaged annual temperatures within the solid waste are slowly decreasing (Brevick et al. 1994a, 1994b, 1994c, 1994d, 1994e, 1994f, 1994g, 1994h, 1994i, 1994j, 1994k, 1994l). Examination of tank headspace temperatures also indicate waste temperatures and heatloads are decreasing (Crowe et al. 1993). Some specific aspects that may influence this trend are discussed in Appendix B, using tank A-101 as an example. Waste temperatures after interim stabilization have also continued to decline consistent with the principal heat load from radioactive decay rates (Lechelt 1995). Of the 149 SSTs, 114 have been interim stabilized as part of an ongoing program.

From Tables 4-1, 4-2, and 4-3, a bulk runaway accident can be ruled out in connection with chemical heating. The characteristic times of cooling, τ_c, for the passively ventilated tanks are well below the waste storage time of at least seventeen years; the largest value being about three years for tank A-101. The heat from chemical reactions in the wastes is safely removed by passive conductive means through the waste. That is, the values of τ_c are much smaller than the corresponding adiabatic chemical runaway times since no disruptive events are known to have occurred during the Hanford waste storage period.

4.2.2 Actively Ventilated Tanks.

There are fifteen actively ventilated SSTs (C-105, C-106, SX-101, SX-102, SX-103, SX-104, SX-105, SX-106, SX-107, SX-108, SX-109, SX-110, SX-111, SX-112, and SX-114). The assessment for seven of these tanks is straight forward; tanks SX-107 through SX-114 do not contain sufficient organic material to fuel a bulk runaway. Estimates from waste transfer records (Agnew 1996) and waste process histories (Brevick et al. 1997b) indicate negligible TOC is contained in tanks SX-107 through SX-114. Furthermore, tanks SX-107, SX-108, SX-109, and SX-112 stopped receiving waste transfers before organic complexants were used at the Hanford Site in 1968 (see Appendix D).

Table 4-1. Assessment of Passively Ventilated 1,000,000 Gallon SSTs for Bulk Runaway.

Tank	Waste Height[1] (m)	Characteristic Time of Cooling[2] (τ_c)	Runaway Credible
A-101	8.8	3.1 years	No
A-102	0.37	2.0 days	No
A-103	3.4	170 days	No
A-104	0.3	1.1 days	No
A-105	0.2	12 hours	No
A-106	1.2	21 days	No
AX-101	6.9	1.9 years	No
AX-102	0.4	1.9 days	No
AX-103	1.0	16 days	No
AX-104	0.06	1.3 hours	No
SX-113	0.37	2.0 days	No
SX-115	0.24	21 hours	No

Notes: [1] Data from Kummerer (1995).
[2] Calculated using Equation 3-14; thermal diffusivity (α) = 2 x 10^{-7} m^2 s^{-1}.

Table 4-2. Assessment of Passively Ventilated 750,000 Gallon SSTs for Bulk Runaway.
(2 Sheets)

Tank	Waste Height[1] (m)	Characteristic Time of Cooling[2] (τ_c)	Runaway Credible
BY-101	3.6	190 days	No
BY-102	3.4	160 days	No
BY-103	3.9	220 days	No
BY-104	3.3	160 days	No
BY-105	4.6	300 days	No
BY-106	6.1	1.5 years	No
BY-107	2.6	99 days	No
BY-108	2.3	76 days	No
BY-109	4.1	240 days	No
BY-110	3.8	210 days	No
BY-111	4.4	280 days	No
BY-112	2.9	120 days	No

Notes: [1] Data from kummerer (1995).
[2] Calculated using Equation 3-14, thermal diffusivity (α) = 2 x 10^{-7} m^2 s^{-1}.

Table 4-2. Assessment of Passively Ventilated 750,000 Gallon SSTs for Bulk Runaway (2 sheets)

Tank	Waste Height[1] (m)	Characteristic Time of Cooling[2] (τ_c)	Runaway Credible
S-101	4.1	250 days	No
S-102	5.3	1.1 years	No
S-103	2.5	88 days	No
S-104	2.9	120 days	No
S-105	4.4	280 days	No
S-106	5.2	1.1 years	No
S-107	3.6	190 days	No
S-108	5.8	1.3 years	No
S-109	5.4	1.2 years	No
S-110	6.6	1.7 years	No
S-111	5.7	1.3 years	No
S-112	6.1	1.4 years	No
TX-101	1.0	15 days	No
TX-102	1.2	22 days	No
TX-103	1.6	39 days	No
TX-104	0.8	9.1 days	No
TX-105	5.8	1.3 years	No
TX-106	4.4	280 days	No
TX-107	0.5	3.9 days	No
TX-108	1.4	30 days	No
TX-109	3.8	200 days	No
TX-110	4.5	290 days	No
TX-111	3.6	190 days	No
TX-112	6.2	1.5 years	No
TX-113	5.8	1.3 years	No
TX-114	5.1	1.0 years	No
TX-115	6.1	1.5 years	No
TX-116	6.0	1.4 years	No
TX-117	6.0	1.4 years	No
TX-118	3.0	130 days	No
TY-101	1.3	25 days	No
TY-102	0.8	9.1 days	No
TY-103	1.7	42 days	No
TY-104	.6	5.4 days	No
TY-105	2.3	78 days	No
TY-106	0.3	1.6 days	No

Notes: [1] Data from Kummerer (1995).
[2] Calculated using Equation 3-14, thermal diffusivity (α) = 2×10^{-7} m^2 s^{-1}.

Table 4-3. Assessment of Passively Ventilated 500,000 Gallon SSTs for Bulk Runaway. (2 sheets)

Tank	Waste Height[1] (m)	Characteristic Time of Cooling[2] (τ_c, Days)	Runaway Credible
B-101	1.2	22	No
B-102	0.5	3.4	No
B-103	0.7	7.7	No
B-104	3.6	190	No
B-105	3.0	130	No
B-106	1.3	24	No
B-107	1.7	42	No
B-108	1.1	16	No
B-109	1.4	27	No
B-110	2.5	88	No
B-111	2.4	82	No
B-112	0.5	3.4	No
BX-101	0.6	5	No
BX-102	1.0	15	No
BX-103	0.8	9	No
BX-104	1.1	17	No
BX-105	0.7	6.5	No
BX-106	0.6	5.4	No
BX-107	2.4	86	No
BX-108	0.4	2.6	No
BX-109	2.0	57	No
BX-110	2.0	60	No
BX-111	2.3	78	No
BX-112	1.7	42	No
C-101	1.0	15	No
C-102	4.1	250	No
C-103	2.1	66	No
C-104	2.9	120	No
C-107	3.3	160	No
C-108	0.8	8.3	No
C-109	0.8	8.3	No
C-110	2.0	60	No
C-111	0.7	7.7	No
C-112	1.2	19	No

Notes: [1] Data from Kummerer (1995).
[2] Calculated using Equation 3-14, thermal diffusivity (α) = $2 \times 10^{-7}\ m^2\ s^{-1}$.

Table 4-3. Assessment of Passively Ventilated 500,000 Gallon SSTs for Bulk Runaway (2 Sheets)

Tank	Waste Height[1] (m)	Characteristic Time of Cooling[2] (τ_c, Days)	Runaway Credible
T-101	1.4	30	No
T-102	0.5	3.4	No
T-103	0.4	2.6	No
T-104	4.3	270	No
T-105	1.1	17	No
T-106	0.4	2.3	No
T-107	1.9	50	No
T-108	0.6	5.4	No
T-109	0.7	7.7	No
T-110	3.7	197	No
T-111	4.4	283	No
T-112	0.8	9.8	No
U-101	0.4	2.6	No
U-102	3.7	194	No
U-103	4.5	295	No
U-104	1.3	25	No
U-105	4.1	238	No
U-106	2.3	75.6	No
U-107	3.9	223.5	No
U-108	4.5	293	No
U-109	4.5	290	No
U-110	1.9	53.4	No
U-111	3.2	151	No
U-112	0.6	5.9	No

Notes: [1] Data from Kummerer (1995).
[2] Calculated using Equation 3-14, thermal diffusivity (α) = 2 x 10^{-7} m^2 s^{-1}.

Tank C-106 requires water for cooling; consequently, the bulk runaway criteria described in Section 3.1 do not apply because the waste is cooled by both conduction and convection. Speciation of organic in C-106 shows that the TOC is almost all low energy oxalate, and there is little potential for a bulk runaway. Additional testing and evaluation would be necessary to definitely conclude that there is no potential for bulk runaway; therefore, controls are currently required for his tank.

For the remaining seven actively ventilated SSTs (C-105, and SX-101 through SX-106), it is necessary to calculate the characteristic time of cooling, τ_c, and to determine what the time average temperature in the waste tanks would be under passive ventilation alone, $T_{passive}$. Results are summarized in Table 4-4. Excluding tank C-106, the characteristic times of cooling are sufficiently short (much less than the storage time of seventeen plus years), and the temperatures under passive ventilation are less than the historical high temperatures, $T_{historical}$, (i.e., the peak temperature maintained for a duration equal to or greater than the characteristic time of cooling). Therefore, bulk runaway is not credible for Tanks C-105, and SX-101 through SX-106.

Table 4-4. Assessment of Actively Ventilated SSTs for Bulk Runaway.

Tank	Waste Height[1] (m)	T_{head}[1] (°C)	T_{waste}[1] (°C)	Heat Load[1] (W)	$T_{historical}$[2] (°C)	$T_{passive}$[3] (°C)	Characteristic Cooling Time[4] (τ_c)	Runaway Credible
C-105	1.58	28	32	7,300	69	54	36 days	No
C-106	2.32	27	68	32,200	na	na	na	na
SX-101	4.36	30	53	3,700	81	55	280 days	No
SX-102	5.15	33	64	4,400	93	66	1.1 years	No
SX-103	6.16	47	79	8,100	98	86	1.5 years	No
SX-104	5.79	29	74	3,600	93	77	1.3 years	No
SX-105	6.43	30	81	3,700	96	83	1.6 years	No
SX-106	5.09	28	42	3,200	57	44	1.0 years	No

Notes: na = not applicable
[1] Data from Kummerer (1995).
[2] Data from Brevick et al. (1994f and 1994h).
[3] Calculated using Equation 3-10.
[4] Calculated using Equation 3-14, thermal diffusivity (α) = 2 x 10^{-7} m^2 s^{-1}.

4.3 ASSESSMENT OF TANKS FOR POINT SOURCE IGNITION

Propagation of a condensed phase combustion is not possible if the tank waste contains no or low concentrations of organic complexants. Propagation is also not possible if the complexants have decomposed (aged) to low energy products or if the complexants are contained in the non-combustible aqueous phase. In this section, waste process histories and characterization data are used to assess tank wastes determine whether for the tank by tank assessment in this section.

4.3.1 Waste Process Histories and Tank Groupings

The SSTs have been assessed for fuel and water content using tank waste processing histories (Anderson 1990, Agnew 1996). The tank wastes were binned in five groups: (1) high complexant, (2) medium complexant, (3) low complexant, (4) no complexant (tanks that did not receive incoming waste transfers after 1968), and (5) special case tanks that need to be treated individually because of unique process histories (Table 4-6). The tank wastes were also binned in four water groups: (1) saltcake - dry surface, (2) saltcake - wet surface, (3) sludge -

dry surface, and (4) sludge - wet surface. These groups are intended to be mutually exclusive groups and are discussed in turn in the following sections. Results of the assessment are shown in Table 4-5. Many of the tank wastes have been sampled, and the sampled tanks are identified with **bold** face type (see Sections 4.3.2, 4.3.3, and 4.3.4 for discussion of sample results).

4.3.1.1 Assessment of Fuel Content from Waste Process Histories. The first group of tanks (consisting of 21 tanks), are suspected of containing the highest concentrations of organic complexant waste. These tanks were identified from historical records (Anderson 1990, Agnew 1996) and are defined as any tanks which received direct transfers of process wastes containing organic complexants. Fifteen of the 21 tanks in this group have been sampled (see Sections 4.3.2 and 4.3.4).

The medium complexant tanks (consisting of 18 tanks) did not receive direct transfers of complexant waste. However, records indicate that these tanks received waste transfers from those tanks with high complexant concentrations. This tank group consists of those tanks identified in Agnew (1996) as containing an average TOC greater than 0.64 wt%, but not identified by Anderson (1990) as receiving direct transfers of complexant waste. Twelve of the 18 tanks in this group have been sampled.

The low complexant tanks (consisting of 89 tanks) did not receive direct transfers of complexant waste, but might have received secondary (dilute) tank to tank transfers that contained organic complexants. This tank group contains those tanks identified in Agnew (1996) as containing an average TOC less than 0.64 wt%. Forty-one of the 89 tanks in this group have been sampled.

Organic complexants (i.e., citrate, EDTA, glycolate, and HEDTA) were not used in quantity at the Hanford Site until 1968. Before 1968, any testing or pilot plant operations would have used small quantities of complexants, and these wastes were disposed to the C 200 and B 200 series tanks (see special case tanks below). The records indicate that ten tanks received no incoming waste transfers after 1968, and it is extremely unlikely that they contain organic complexant waste. These tanks represent the no complexant tank group, and any TOC in these tanks would most likely be organic solvents or oxalate (a small amount of oxalate waste was disposed in the SSTs). Six of the ten tanks in the group have been sampled, and all the waste samples from these tanks have shown no exothermic chemical reactions or only trivial amounts of TOC (see Section 4.3.2).

In addition to the four fuel groups, some tanks have unique or hard to track waste transfer histories. These tanks have been grouped together as special case tanks (Table 4-6). The C-200 and B-200 series tanks received several small waste transfers from the strontium semiworks at B Plant. The semiworks wastes were often small pilot plant runs that contained unique waste streams. Therefore, it is difficult to assess these tanks on historical records alone, and these tanks must be sampled and characterized individually.

Table 4-5. Assessment of Single-Shell Tank Wastes From Waste Processing Records.[1]

Fuel and Moisture Group	Tanks[2]
High Complexant Waste Dry Surface -Saltcake	**A-101**, **A-106**, AX-101, **AX-102**, AX-103, TX-104, and **U-111**. (7 tanks)
High Complexant Waste Dry Surface -Sludge	**C-104**, **C-105**, and C-107. (3 tanks)
High Complexant Waste Wet Surface - Saltcake	**A-102**, **A-103**, SX-101, SX-106, **U-105**, **U-106**, and **U-107**. (7 tanks)
High Complexant Waste Wet Surface - Sludge	**BX-104**, **BX-105**, **C-106**, and S-107. (4 tanks)
Medium Complexant Waste Dry Surface - Saltcake	**B-109**, **BY-102**, **S-102**, SX-103, **TX-102**, and TX-111. (6 tanks)
Medium Complexant Waste Dry Surface - Sludge	A-105 and **BX-112**. (2 tanks)
Medium Complexant Waste Wet Surface - Saltcake	**S-101**, S-103, **SX-102**, SX-104, SX-105, **U-102**, **U-103**, **U-108**, and **U-109**. (9 tanks)
Medium Complexant Waste Wet Surface - Sludge	**B-111**. (1 tank)
Low Complexant Waste Dry Surface - Saltcake	B-101, **B-103**, B-105, **B-106**, B-108, **BX-111**, BY-101, BY-103, **BY-104**, **BY-105**, **BY-106**, **BY-107**, BY-109, **BY-110**, BY-111, BY-112, **S-104**, S-105, S-108, **S-109**, S-110, S-112, SX-110, SX-111, SX-114, SX-115, **T-108**, **T-109**, TX-103, TX-105, TX-106, **TX-107**, TX-108, TX-110, TX-112, TX-113, TX-114, TX-115, TX-116, TX-117, TX-118, **TY-102**, and **TY-103**. (43 tanks)
Low Complexant Waste Dry Surface - Sludge	A-104, AX-104, **BX-101**, BX-102, **BX-107**, **BX-108**, **BX-109**, **BY-108**, **C-108**, **C-111**, **C-112**, T-101, **T-105**, **T-106**, T-201, T-202, T-203, T-204, TX-101, TX-109, **TY-101**, U-104, and **U-110**. (23 tanks)
Low Complexant Waste Wet Surface - Saltcake	B-102, B-112, **BX-106**, S-106, and **S-111**. (5 tanks)
Low Complexant Waste Wet Surface - Sludge	**B-110**, BX-103, **BX-110**, **C-109**, **C-110**, **T-102**, T-103, **T-107**, T-110, **T-111**, T-112, **TY-104**, U-101, U-112, **U-201**, **U-202**, **U-203**, and **U-204**. (18 tanks)
No Complexant Waste Dry Surface - Saltcake	**SX-108**, SX-109, and SX-112. (3 tanks)
No Complexant Waste Dry Surface - Sludge	**B-104**, B-107, SX-107, **SX-113**, **TY-105**, and **TY-106**. (6 tanks)
No Complexant Waste Wet Surface - Saltcake	(No Tanks in Group)
No Complexant Waste Wet Surface - Sludge	**T-104**. (1 tank)

Notes: [1] There are 11 special case tanks: **B-201**, **B-202**, **B-203**, **B-204**, **C-101**, **C-102**, **C-103**, **C-201**, **C-202**, **C-203**, and **C-204**. (149 tanks total)

[2] Tanks indentified with **BOLD** face type have been sampled. Discussion of the sample results is presented in Sections 4.3.2, 4.3.3, 4.3.4, and 4.3.5.

Also included in the special case tank group are those tanks that received predominantly organic solvent waste. Solvent wastes (i.e., normal paraffin hydrocarbons and tributyl phosphate) deposited in the tank often contribute a large part of the TOC measured in the tank. Experimentation indicates that these materials do not support and do not contribute to condensed-phase combustion (Fauske et al. 1997, Conner 1996). There are a total of eleven special case tanks and all have been sampled. However, additional samples from C-201 and C-202 are required to complete testing (see discussion in Section 4.3.5).

Table 4-6. Special Case Tanks That Require Characterization to Assess.

Tank	Notes
B-201	Tank contains small transfers of strontium semiworks waste and should be characterized separately.
B-202	Tank contains small transfers of strontium semiworks waste and should be characterized separately.
B-203	Tank contains small transfers of strontium semiworks waste and should be characterized separately.
B-204	Tank contains small transfers of strontium semiworks waste and should be characterized separately.
C-101	Predominantly solvent waste tank.
C-102	Tank formerly contained organic solvent pool, TOC predominantly solvent waste.
C-103	Tank contains organic solvent pool, TOC predominantly solvent waste.
C-201	Tank contains small transfers of strontium semiworks waste and should be characterized separately.
C-202	Tank contains small transfers of strontium semiworks waste and should be characterized separately.
C-203	Tank contains small transfers of strontium semiworks waste and should be characterized separately.
C-204	Tank contains small transfers of strontium semiworks waste and should be characterized separately.

4.3.1.2 Assessment of Moisture Content from Waste Process Histories. The two characteristics used for the tank waste water groupings are the following: (1) absence or presence of visible liquid on the tank waste surface and (2) whether the waste contains predominantly saltcake or sludge. Visible liquid on the waste surface suggests that the waste is saturated with liquid. The type of waste (saltcake or sludge) is important because waste simulant experiments, theoretical analyses, and actual waste testing indicate that the saltcakes tend to drain liquid more readily than the sludges (Atherton 1974, Handy 1975, Metz 1975a, 1975b, and 1976, Kirk 1980, Jeppson and Wong 1993, Epstein et al. 1994, and Simpson 1994). Therefore, the saltcake wastes could potentially be drier than the sludge wastes.

The designation of the absence or presence of visible liquid on the tank surface is provided from the initial organic-nitrate screening of 149 SSTs. Photographs of the tank waste indicate that fifty tanks have visible liquid on the surface. The type of waste is derived from the waste descriptions in Agnew (1996).

4.3.2 Tank Waste Screening Using Characterization Data

Waste characterization data are used to corroborate the waste process history assessment, and to determine which tank wastes require more additional analyses. The tank wastes were either core sampled or auger sampled (if the waste was shallow enough for the auger to reach the bottom) and analyses were conducted on segments of the core or auger. The wastes were screened for low organic complexant concentrations using DSC analyses, TOC waste measurements, and chemical speciation for organic solvents. Appendix F describes the sampling events and the TOC/water analytical results.

4.3.2.1 Differential Scanning Calorimetry Data. For twenty tanks, DSC analyses of all the samples show no exothermic chemical reactions. This is consistent with the historical assessment that shows three of these tanks (B-104, SX-108, and SX-113) received no complexants, and that fourteen of the tanks would have only received secondary transfers (low complexants). Three of the tanks (B-201, B-204, and C-101) are special case tanks that require separate characterization. Because these twenty tanks were suspected of receiving little organic complexant, and all the DSC screening showed only endothermic reactions, TOC analyses were usually not performed.

Table 4-7. Tanks With Waste Showing No Exothermic Energy During DSC Analysis and Comparison with Waste Process History Assessment.

Tank	Waste History Assessment	Tank	Waste History Assessment	Tank	Waste History Assessment
B-104	No Complexant	BX-109	Low Complexant	TX-107	Low Complexant
B-106	Low Complexant	C-101	Special Case	TY-104	Low Complexant
B-201	Special Case	SX-108	No Complexant	U-201	Low Complexant
B-204	Special Case	SX-113	No Complexant	U-202	Low Complexant
BX-101	Low Complexant	T-106	Low Complexant	U-203	Low Complexant
BX-106	Low Complexant	T-108	Low Complexant	U-204	Low Complexant
BX-108	Low Complexant	T-109	Low Complexant	-----	----

4.3.2.2 Total Organic Carbon Data. Tanks that contain waste that is too dilute in fuel to support propagation have been identified using TOC data. It is recognized that the concentration of TOC does not provide a consistent, direct correlation with the potential fuel energy that exists in the waste. The organic species associated with the measured TOC concentration include less energetic compounds that result from aging of the original organic complexants. However, assuming that the TOC has the theoretical energy equivalent of sodium acetate allows TOC concentration to be used as an effective, albeit conservative, tool for screening tanks. A discussion of TOC analytical methods is provided in Appendix E.

The tank groupings shown in Section 4.3.1 and TOC characterization data were statistically examined using Analysis of Variance (ANOVA). ANOVA models are used to determine the distributions of TOC and water in each sampled tank. These distributions are then integrated over the region described in Figure 3-1 (which relates water and TOC concentration to propagation behavior) to determine the portion of waste that is combustible. The TOC and water distributions produced from the sampling data are imperfect estimates of the actual tank distributions, because the number of samples are typically small. The uncertainty in these distributions is determined by the statistical procedures used to fit ANOVA models to the data and expressed as a confidence bound.

The ANOVA model and associated combustible waste calculations are described in detail in Appendix F. However, the most important assumptions regarding the calculations are summarized below:

(1) **Distribution** - The TOC and Moisture concentrations are assumed to be log-normally distributed within each tank layer. This implies that if a large number of samples were taken from a single waste layer, and the TOC concentrations plotted as a histogram, the histogram would have a log-normal shape. To verify that this assumption is reasonable, the residuals from the ANOVA (which are from logged-data) were compared to a normal distribution and found to be approximately normally distributed (see Figures F-1 and F-3 in Appendix F).

(2) **Variability** - The variability on the log scale of TOC is roughly the same in all tanks and can be pooled together across tanks. In other words, all the TOC distributions used in the combustible waste have the same standard deviation on the log scale. The reasonableness of this assertion can be evaluated by examining Figure F-2 in Appendix F, which displays TOC data residuals from the ANOVA fit on a tank-by-tank basis.

    The variability of water is also assumed to be the same in all tanks. The reasonableness of this assertion can be evaluated by examining the water data residuals shown in Appendix F (Figure F-4).

(3) **Tank Groupings** - The tanks in a particular group that have been sampled for TOC and water are representative of that group. The tank grouping employed has a negligible impact on the combustible waste estimates for sampled tanks, but the assumption is vital for the combustible waste estimates on unsampled tanks; if the sampled tanks are not representative of the defined groups, the extrapolations will not be legitimate. Appendix D discusses the construction of tank groupings in more detail and Section 6.0 in Appendix F discusses a validation test that is relevant to this assumption.

(4) **Analytical Error** - The measurement errors present in the TOC and water measurements are assumed to be 10% (more specifically, the relative standard deviation of the measurements is assumed to be 10%). The ANOVA fit actually estimates spatial variability and measurement variability, so measurement variability must be subtracted from the ANOVA estimates to obtain a correct spatial variability. Justification for the assumption that the measurement variability is roughly 10% comes from laboratory procedure, and an examination of replicate measurements in the data set (see Appendix F for additional discussion).

(5) **Representativeness** - It is assumed that the samples taken from each tank are representative of the waste within the tank. The assumption of representativeness is perhaps the most important assumption in this list, because its validity impacts upon the general relevance of any measurements taken on the current set of waste samples and any estimates calculated from them.

ANOVA models have a strength in this regard, they can account for a very specific type of non-representativeness in the samples, that due to random sampling error. No direct confirmation of the reasonableness of this assumption has been made.

When assessing tank wastes, it is tempting to ignore statistical uncertainties and require the safety analysis to prove that no waste in a tank is combustible. However, statistical uncertainties cannot be ignored, and acceptable probabilities of making decision errors must be specified. For this evaluation, comparisons were made using one-sided 95% confidence limits on combustible (or equivalently safe) waste fractions. The 95% confidence limit is commonly used in statistical evaluations (Burr 1976, Kreyszig 1988) and this is the confidence limit arrived at in stakeholders discussions during the Data Quality Objective process for the Organic Complexant Safety Issue (Turner et al. 1995).

To pass the ANOVA screening, there must be 95% confidence that 95% of the waste has a dry TOC concentration less than 4.5 wt%. Note that this 95 - 95% requirement is even more conservative than the 95% confidence bound on the tank mean that was used for the recently resolved Ferrocyanide Safety Issue (Meacham et al. 1996). Tank wastes that pass the double 95% requirement have an acceptably low likelihood of supporting propagation.

Sixty-three SSTs have sufficient TOC measurements to be evaluated, and 49 of these tanks passed the TOC screening (Table 4-8). Details on the TOC screening methodology are provided in Appendix F. For tank wastes that pass the screening, the complexant concentrations are too low to support propagation even if all the water was removed. The other fourteen tank wastes (A-102, A-103, A-106, AX-102, BX-104, C-104, C-105, C-106, T-111, TX-118, U-102, U-105, U-106, and U-111) warrant a more thorough examination for organic aging (Section 4.2.5) and solubility (Section 4.2.6).

Table 4-8. Tank Wastes Showing Low Complexant Concentrations from TOC Screening and Comparison with Waste Process History Assessment.

Tank	Waste History Assessment	Measured TOC Concentrations (wt%, wet)	Tank	Waste History Assessment	Measured TOC Concentrations (wt%, wet)
A-101	High Complexant	0.01 - 1.2	S-102	Medium Complexant	0.08 - 1.3
B-103	Low Complexant	0.06 - 0.07	S-104	Low Complexant	0.01 - 0.05
B-106	Low Complexant	0.02 - 1.2	S-107	High Complexant	0.02 - 0.74
B-109	Medium Complexant	0.01 - 0.7	S-109	Low Complexant	0.02 - 0.19
B-110	Low Complexant	0.03 - 0.05	S-111	Low Complexant	0.04- 1.7
B-111	Medium Complexant	0.05 - 0.16	SX-102	Medium Complexant	0.20 - 0.82
BX-105	High Complexant	0.18	SX-108	No Complexant	0.006 - 0.18
BX-107	Low Complexant	0.07 - 0.10	T-102	Low Complexant	0.066 - 0.068
BX-109	Low Complexant	0.04 - 0.11	T-104	No Complexant	0.055 - 0.076
BX-110	Low Complexant	0.35 - 0.41	T-105	Low Complexant	0.09 - 0.54
BX-111	Low Complexant	0.06	T-107	Low Complexant	0.02 - 0.36
BX-112	Medium Complexant	0.05 - 0.11	TX-102	Medium Complexant	0.19
BY-102	Medium Complexant	0.07 - 1.1	TY-101	Low Complexant	0.066
BY-104	Low Complexant	0.32 - 2.8	TY-102	Low Complexant	0.033 - 0.24
BY-105	Low Complexant	0.07 - 0.76	TY-103	Low Complexant	0.071 - 0.15
BY-106	Low Complexant	0.04 - 0.59	TY-104	Low Complexant	0.077 - 0.69
BY-107	Low Complexant	0.02 - 1.2	TY-105	No Complexant	0.081
BY-108	Low Complexant	0.15 - 1.7	TY-106	No Complexant	0.078 - 0.25
BY-110	Low Complexant	0.03 - 3.7	U-103	Medium Complexant	0.69
C-108	Low Complexant	0.02 - 0.35	U-107	High Complexant	0.047 - 0.95
C-109	Low Complexant	0.17 - 0.38	U-108	Medium Complexant	0.17 - 1.1
C-110	Low Complexant	0.04 - 0.07	U-109	Medium Complexant	0.11 - 0.63
C-111	Low Complexant	0.06 - 0.13	U-110	Low Complexant	0.036 - 0.088
C-112	Low Complexant	0.10 - 0.86	U-204	Low Complexant	0.013 - 0.082
S-101	Medium Complexant	0.018 - 0.020	--	---	---

4.3.2.3 Tanks Containing Organic Solvent Waste. Sampling and analyses to date confirm that the TOC in three tanks (C-102, C-103, and C-204) is comprised of mostly organic solvents[1]. Samples of the floating organic layer in tank C-103 waste were analyzed. The organic species were mainly NPH and phosphate esters (Table 4-9). The organic in C-102 waste was comprised of NPH and TBP. The TOC in C-204 was over 99% TBP, with relatively minor amounts of DBP, acetate, and formate. These tanks have low free hydroxide concentrations such that hydrolysis of TBP is slow. Furthermore, the immiscibility of TBP with tank waste supernatants places mass transfer limitations on the rates at which aqueous phase oxidants generated by radiolysis can attack TBP. The long life of immiscible phosphate esters in moderately alkaline wastes is consistent with their chemical properties.

Table 4-9. Tanks That Contain Predominantly Solvent Waste.

Tank	Principal Organic Species (Percent of TOC Measured)	Reference(s)
C-102	NPH (84%)[1], TBP (16%)[1]	Campbell et al. (1995)
C-103	TBP (48%)[2], NPH (43%)[2], oxalate (2%)[2]	Campbell and Wahl (1996) Postma et. al. (1994)
C-204	TBP (99%+)	Campbell and Wahl (1996)

Notes: [1] Percents based on the sum of the individual organic species.
[2] Speciation of the floating organic pool.

4.3.3 Organic Aging

Experiments, theory, and analyses of tank samples indicate that organic complexants decompose to inert chemicals under the chemical and radiological storage conditions found in the Hanford Site tanks. This process, called aging, substantially lowers the energy content and ultimately eliminates the hazards associated with organic complexants. The organic complexants age to low energy compounds (such as formate, oxalate, and carbonate) which do not support propagation reactions.

The complexant containing wastes have been stored in tanks for more than seventeen years. During that time, the organic complexants were exposed to radiation, temperatures of up to 140 °C (284 °F), and a reactive chemical environment. The wastes contain high concentrations of hydroxide, nitrate, nitrite, aluminate, and transition metal oxides including

[1]Tank C-106 sludge samples did contain a small amount of solvent. About 100 mL of sample yielded 2 mL of separable layer when centrifuged. Organic speciation of this separable layer showed that the TOC was 3% TBP, 42% ethyl hexyl phosphates, and 54% oxalate.

noble metals, radioactive elements (e.g., uranium, plutonium, cesium, strontium), and many other species that could act as catalysts or promoters that affect aging pathways or outcomes.

4.3.3.1 Parameters Affecting the Rate of Aging. Extensive studies of both thermal and radiolytic degradation reactions of organic complexants have been performed (Ashby et al. 1993, 1994, 1996; Meisel et al. 1991a, 1991b, 1992, and 1993; Camaioni et al. 1996). Several studies of nonradioactive waste simulants (Delegard 1987; Ashby et al. 1994; Meisel et al. 1993) show that organic complexants are sensitive to temperature and will decompose thermally. An early study by Delegard (1987) reported that HEDTA and glycolate degraded thermally producing hydrogen, nitrogen, nitrous oxide, and ammonia gases. Condensed-phase products identified were ethylenediaminetriacetate (ED3A) and oxalate from HEDTA, and oxalate from glycolate. Ashby et al. (1994) reported that thermal aging of HEDTA produced ethylenediaminediacetate (EDDA), iminodiacetate (IDA), glycine, and formate in addition to ED3A and oxalate. Glycolate aged to produced formate and oxalate. These reactions required nitrite and were found to be catalyzed by aluminum species. Citrate was shown to decompose thermally producing oxalate, and acetate (Ashby et al. 1994). The reaction was found to be catalyzed by hydroxide.

The reactivity order for thermal degradation of the complexants can be summarized as:

$$\text{Glycolate} > \text{HEDTA} > \text{Citrate} >> \text{EDDA} > \text{EDTA, Glycine, IDA, and NTA} \quad (4\text{-}1)$$

Radiolysis promotes aging of complexants by additional reaction pathways. Oxidation of organic complexants occurs by radiolytic generated NO_x radicals, mainly NO_2 and NO, from reactions of primary intermediates (e^-, OH, O^-, H, and NO_3) with nitrate and nitrite (Meisel et al. 1991a, 1991b, and 1993), Equations 4-2 to 4-6.

$$OH + NO_2^- \rightarrow NO_2 + OH^- \qquad k = 1.0 \times 10^{10}\ \text{L mole}^{-1}\ \text{s}^{-1} \quad (4\text{-}2)$$

$$O^- + NO_2^- \ (+ H_2O) \rightarrow NO_2 + 2\,OH^- \qquad k = 3.1 \times 10^{8}\ \text{L mole}^{-1}\ \text{s}^{-1} \quad (4\text{-}3)$$

$$e^-_{(aq)} + NO_3^- \rightarrow NO_3^{2-} \qquad k = 9.7 \times 10^{9}\ \text{L mole}^{-1}\ \text{s}^{-1} \quad (4\text{-}4)$$

$$NO_3^{2-} \ (+ H_2O) \rightarrow NO_2 + 2\,OH^- \qquad k = 5.5 \times 10^{4}\ \text{L mole}^{-1}\ \text{s}^{-1} \quad (4\text{-}5)$$

Because of the high rate constants[1] for these reactions and the high concentrations of nitrate

$$H + NO_2^- \rightarrow NO + OH^- \qquad k = 7.1 \times 10^8 \text{ L mole}^{-1} \text{ s}^{-1} \tag{4-6}$$

and nitrite in the wastes, essentially all the primary radicals from water radiolysis are converted to NO_x radicals. Electrons are scavenged by nitrate to make the reducing radical, NO_3^{2-}. It is short-lived, dissociating to NO_2 in less than 15 μsec (Meisel et al. 1991b, 1997). One expects a yield of G(NO_2) about six molecules per 100 eV and a yield of G(NO) about 0.6 molecule per 100 eV of deposited energy from the water radiolysis (Meisel et al. 1991b, 1993, and 1997). A significant fraction of energy may be directly absorbed by nitrate ion in the concentrated waste solutions to produce NO_3 radical. The redox couple of NO_3/NO_3^- (E^0 = >2.3 V) (Neta and Huie 1986) is significantly more positive than that of NO_2/NO_2^- (E^0 = 1.04 V), so the NO_3 radical is expected to produce NO_2 as shown in Equation 4-5, as well.

$$NO_3 + NO_2^- \rightarrow NO_2 + NO_3^- \tag{4-7}$$

Quenching reactions exist for NO_2 and NO, namely recombination and hydrolysis to nitrate and nitrite ion as shown in equation 4-8 and 4-9. Overall rate constants for Equations 4-8 and 4-9 are about 10^8 L mole^{-1} s^{-1} (Lee and Schwartz 1984; Park and Lee 1988).

$$2\,NO_2 \rightarrow N_2O_4\ (+\ 2\,OH^-) \rightarrow NO_2^- + NO_3^- + H_2O \tag{4-8}$$

$$NO_2 + NO \rightarrow N_2O_3\ (+\ 2\,OH^-) \rightarrow 2\,NO_2^- + H_2O \tag{4-9}$$

Little information exists on the reaction mechanisms and kinetics of NO_2 reacting with organics such as those in the tank wastes. To be effective in aging, NO_2 reactions with the organics complexants must compete against NO_2 quenching reactions. With low dose-rates common to tank wastes [for example, see Parra (1994)], steady-state concentrations of NO_2 are sufficiently low that organic aging reactions with rate constants of approximately $\geq$1 L mole^{-1} s^{-1} are expected to compete with NO_2 hydrolysis reactions (Equations 4-8 and 4-9). The reactivities

[1]All rate constants from Buxton et al. (1988).

are being measured in alkaline nitrate/nitrite solutions to obtain relevant rate and reaction path information (see future work section 7.2.1)

Recently completed experiments with waste simulants (Camaioni et al. 1994, 1995, 1996) show that organic complexants age to lower energy content products when subjected to thermal and radiolytic conditions analogous to tank waste environments. In these experiments, the waste simulants were heated and irradiated, and the products were measured. The simulant was indicative of the waste from B Plant (Carlson and Babad 1996) and contained many inorganic species including nitrate, nitrite, hydroxide, and iron and aluminum species, and the major organic complexants, HEDTA, EDTA, citrate, and glycolate. Principal products were carbonate, formate, oxalate, and chelator fragments such as ED3A, NTA, IDA, and EDDA (Camaioni et al. 1996). Figures 4-1 and 4-2 show how the organic composition of the simulant changes with exposure to radiation and to heat without radiation. Note that the time scale for thermal aging (Figure 4-2) is significantly longer than the time scale for radiolytic aging (Figure 4-1). Radiolytically generated oxidants must be the dominant cause of organic degradation shown in Figure 4.1. Under actual tank waste storage conditions, radiolytic dose-rates are >100 times less than the dose-rate used to obtain the results shown in Figure 4-1. The storage times are about 100 times longer in actual tanks; so thermally activated processes may also contribute significantly to organic aging of tank wastes.

Simulant studies have shown the reactivity of complexants towards radiolytic degradation decreases in the order:

$$\text{HEDTA} \sim \text{EDTA} > \text{Glycolate} > \text{Citrate} \qquad (4\text{-}10)$$

Whereas, thermal decomposition rates were found to decreases in the order[1]:

$$\text{HEDTA} > \text{Citrate} > \text{Glycolate} > \text{EDTA} \qquad (4\text{-}11)$$

Thermal reactivities of citrate and EDTA are the inverse of their radiolytic reactivities. Thus, the long storage times at elevated temperatures and low dose rate conditions experienced by actual wastes may be expected to cause complexants to age more uniformly than might be indicated by Figure 4-1. The results suggest that lifetimes and aging rates of organic complexants will be strongly dependent on radiolytic and thermal history of the wastes, and therefore, the degree of aging may vary from tank to tank.

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[1]The thermal reactivity of glycolate appears to be lower compared to the reactivity reported for simpler simulants (Ashby et al. 1994; Barefield et al. 1995 and 1996). However, glycolate may be more reactive than it appears to be in the simulant, since degradation of HEDTA, EDTA, and citrate could yield glycolate. For similar reasons, glycolate may be more reactive towards radiolysis, as well.

Figure 4-1. Disappearance of complexants (A) and Appearance of Products (B) at 90 °C in a Radiation Field of 10^5 rad hr^{-1}.

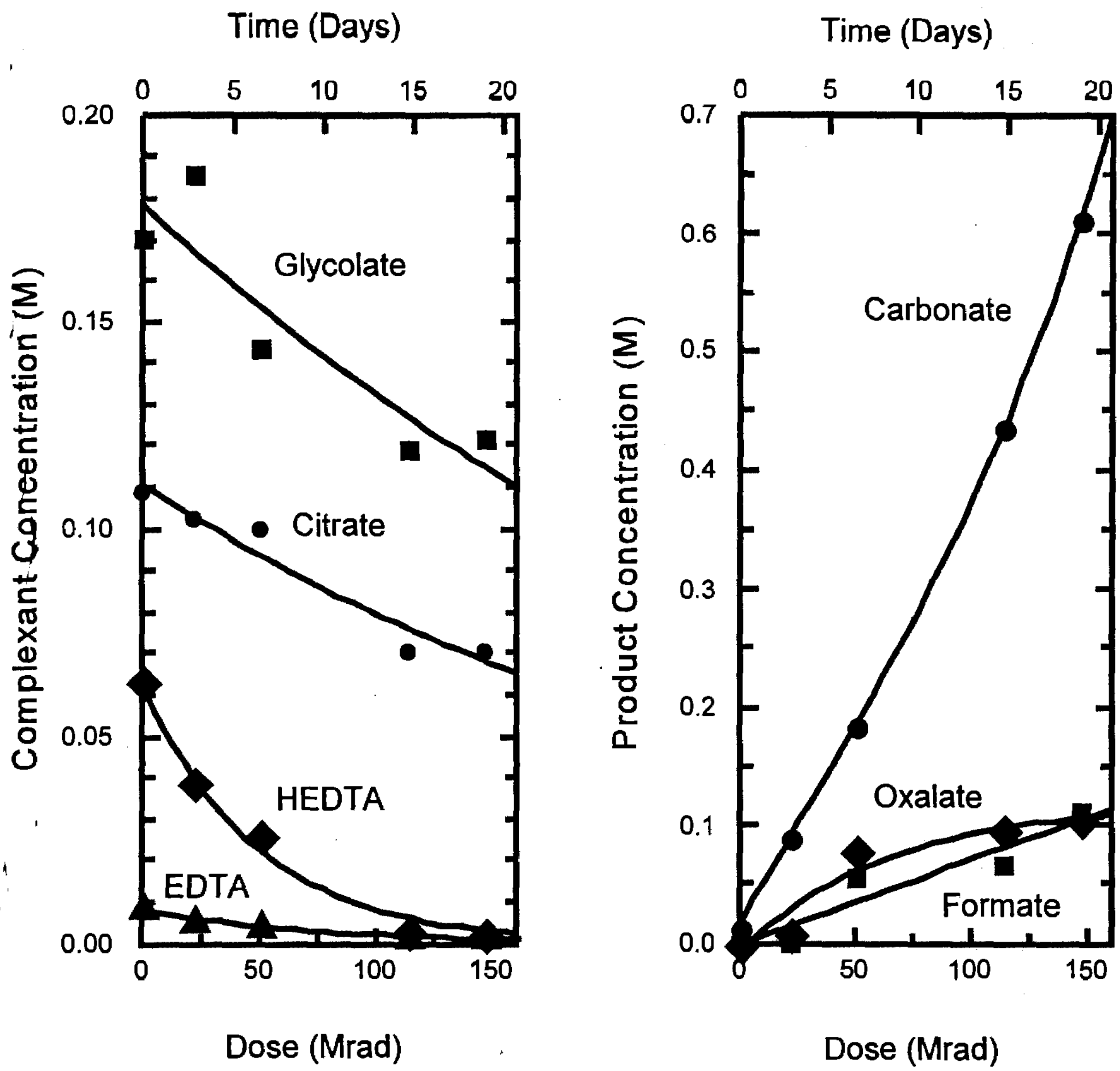
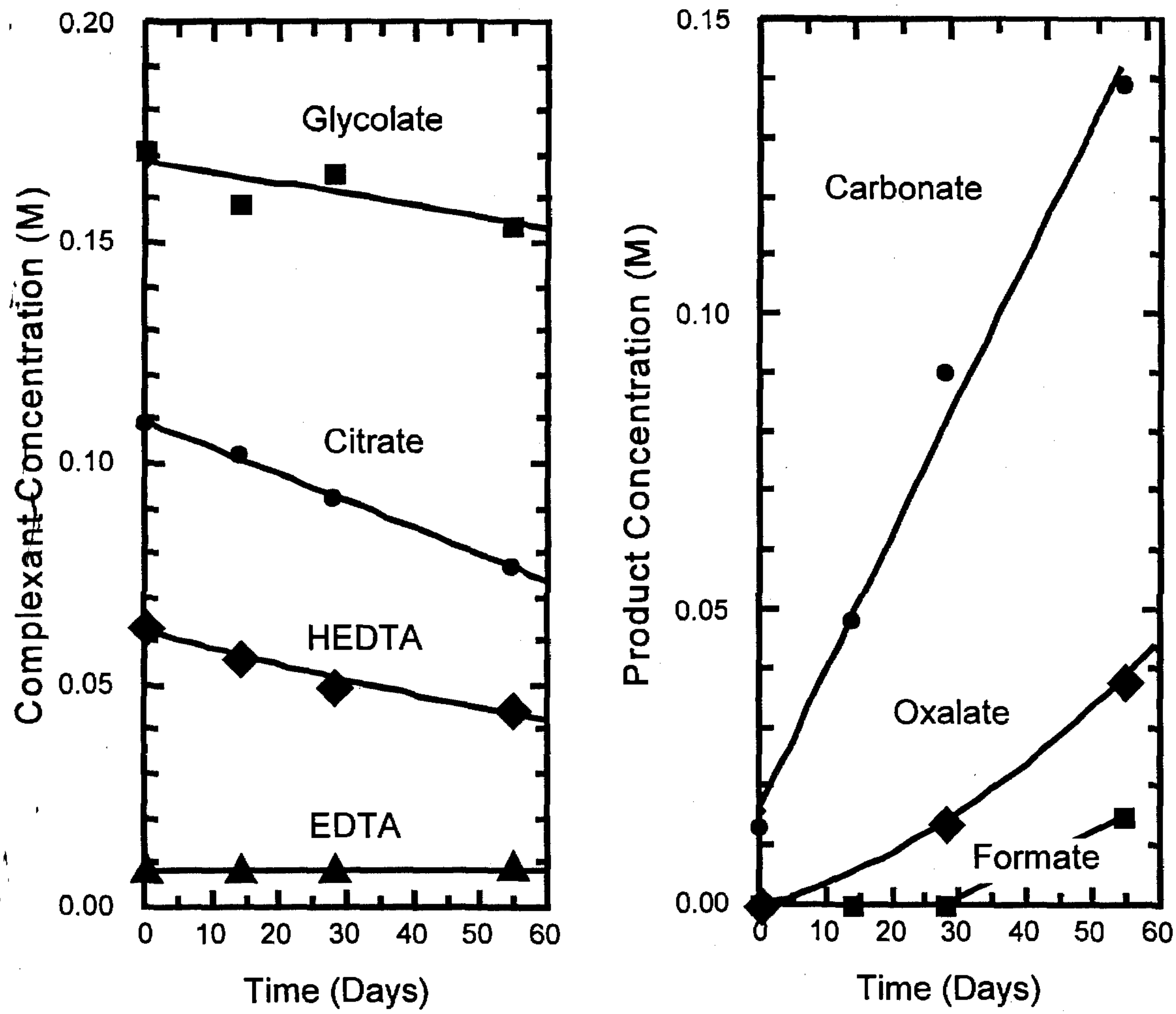


Figure 4-2. Disappearance (A) of Starting Organic Compounds and Appearance (B) of Products Versus Time at 90 °C Without Radiation.



The aging process reduces the likelihood of propagation by reducing the chemical energy potential of the waste. Energy content of the aged simulant has been estimated by summing the nitrate reaction enthalpies (ΔH_{rx}) that each component contributes to the ΔH_{rx}. Figure 4-3 shows a plots of the absolute reaction enthalpy ($-\Delta H_{rx}$) versus the radiation dose and time. Each data point is also labeled with the organic carbon content (dry weight basis) of simulant. The energies plotted in Figure 4-3 are for the dried simulant.

Results show that both radiolytic and thermal aging pathways are operating to lower both the energy and organic carbon content of the wastes. The average oxidation state of the carbon in the simulant increases with aging. As a result, the average energy content per gram of carbon decreases. The average energy content of the organic carbon in the simulant starts at 29.1 kJ g^{-1}. After exposure to a radiation dose of 150 Mrad, the average energy content of the organic carbon in the simulant dropped to 22.5 kJ g^{-1}. After 60 days of aging at 90 °C without radiation exposure, the average energy content of the organic carbon in the simulant had declined from the initial 29.1 to 28.6 kJ g^{-1}.

4.3.3.2 Confirmation of Organic Aging from Waste Sample Data. Many tank waste samples have been analyzed for TOC and oxalate (an aging byproduct), and a small but growing number of tank wastes have been extensively analyzed for organic species to support resolution of the Organic Safety Issue. This section summarizes these analyses as they relate to waste energetics and aging issues.

Detailed Organic Speciation. The current tank wastes which have been speciated include SY-101, SY-103, and S-102. Waste tank histories suggest that samples from these tanks are characteristic of tank wastes that received complexants. Table 4-11 lists the species identified in SY-101, SY-103, and S-102 waste samples (Campbell et al. 1996) and compares the results with historical estimates (Agnew 1996). Process records indicate that S-102, SY-101, and SY-103 received mostly organic complexants, only small amounts of acetate, and negligible amounts of oxalate. The historic distributions of organic species estimated for the three tanks are similar, and the concentrations in S-102 are roughly half as much as in SY-101 and SY-103. Organic speciation shows that the wastes are aging, and that considerable dilution has occurred in S-102.

A review of waste transfer records of SY-101, SY-103, and S-102 offers an explanation of why S-102 is so different from SY-101 and SY-103. Tank S-102 was the 242-S evaporator feed tank. As such, S-102 stored dilute complexed waste that was concentrated in the evaporator and sent to U-105 and U-106. That waste was then moved directly into SY-101 and SY-103. After the complexant evaporator campaigns, there were other types of campaigns involving S-102 that ultimately sent several million gallons of other waste through it. These transfers would have flushed out the soluble organic species. Hence, S-102 should not have and does not have as much complexant as tanks SY-101 and SY-103. After SY-102 was constructed, it became the evaporator feed tank.

Figure 4-3. Nitrate Reaction Enthalpy and Organic Carbon Content (dry wt%) of Simulant versus Dose at 70 ° and 90 °C.

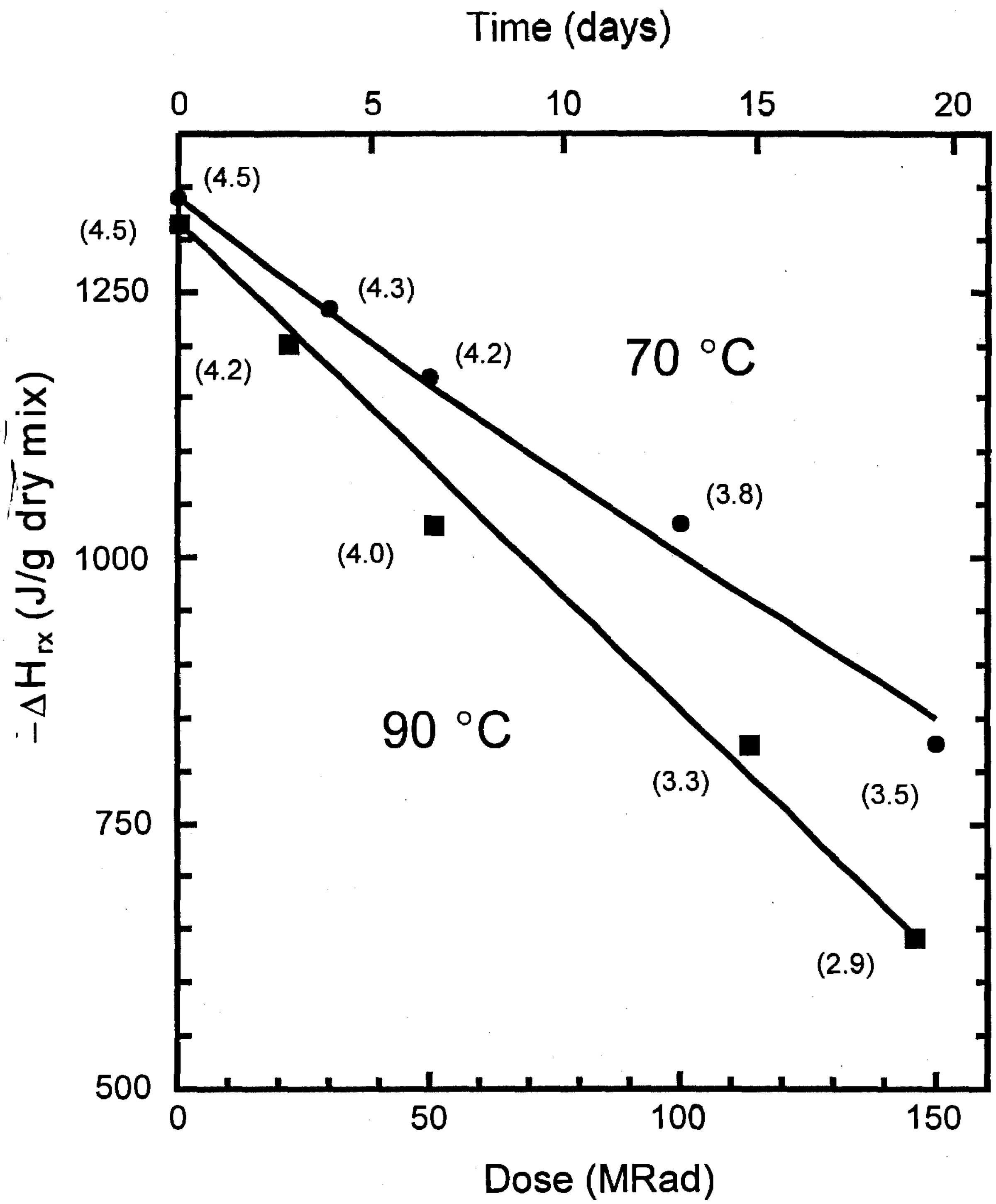


Table 4-11. Comparison of Measured Organic Concentrations with Historical Estimates for Tanks SY-101, SY-103, and S-102.

Organic Species	SY-101 Measured (wt%)	SY-101 Historical (wt%)	SY-103 Measured (wt%)	SY-103 Historical (wt%)	S-102 Measured (wt%)	S-102 Historical (wt%)
Acetate	0.12	0.025	0.16	0.017	0.060	0.012
Citrate	0.08	0.40	0.16	0.35	<0.001	0.19
EDTA	0.39	0.41	0.17	0.36	NA	0.14
ED3A	0.07	<0.01	0.05	<0.01	NA	<0.01
Formate	0.40	<0.01	0.40	<0.01	0.17	<0.01
Glycolate	0.09	0.06	<0.01	0.47	0.06	0.22
HEDTA	<0.01	0.73	0.004	0.67	NA	0.25
IDA	0.26	<0.01	0.22	<0.01	NA	<0.01
Oxalate	1.3	0.0004	1.0	0.0003	0.44	0.0001
NTA	0.07	<0.01	0.07	<0.01	NA	<0.01
Succinate	0.02	<0.01	0.005	<0.01	NA	<0.01

Notes: NA = Not Available

Tank S-102 was the evaporator feed tank and the bottom tank for the evaporator. The fact that oxalate is the only species of significance in S-102 is consistent with the low solubility of oxalate and the accelerated aging of complexants in the evaporator for those campaigns in which S-102 may have received wastes from the evaporator in its role as dump and bottom tank for the evaporator. Agnew (1996) lumped all 242-S evaporator campaigns into one campaign; consequently, this model would not be as reliable for tanks such as S-102, in which many waste transfers occurred.

Tanks with Oxalate Data. Ion chromatography analyses are routinely run on tank waste samples to speciate the major inorganic anions. This analysis also measures oxalate, an important constituent for determining the extent of aging. Oxalate data have been compiled (Carlson 1997), and Table 4-12 compares oxalate concentrations with the TOC concentrations for the same waste samples.

Oxalate and TOC concentrations have been measured on samples from 30 SSTs. Nine SSTs had oxalate concentrations sufficient to account for more than 75% of the TOC (tanks B-109, BY-102, BY-105, BY-107, BY-110, BY-112, C-106, S-109, and SX-108). Thirteen tank wastes had oxalate concentrations sufficient to account for 25 to 75% of the measured TOC (tanks A-101, A-102, BY-104, BY-106, BY-108, BY-111, S-101, S-102, S-107, S-111, U-105, U-107, and U-108). Eight tanks had less than 25% of the TOC identified as oxalate (tanks AX-102, B-106, BX-109, C-104, C-105, U-102, U-106, and U-109). It is important to note that low oxalate concentration does not necessarily imply low aging. The TOC could be formate (an alternative aging byproduct) or organic solvent. Additional organic speciation of the waste from tanks AX-102, U-102, U-105, U-106, and U-109 is planned.

Table 4-12. Sample Data Showing Organic Complexant Aging in Single-Shell Tanks.

Tank	Average TOC[1] (wt %, wet)	Average TOC[2] as Oxalate, (%)	Tank	Average TOC[1] (wt%, wet)	Average TOC[2] as Oxalate, (%)
A-101	0.44	60 ± 11	C-104	0.89	19 ± 18
A-102	1.4	73[3]	C-105	0.61	14 ± 9
AX-102	5.7	11	C-106	0.20	>99 ± 30
B-106	0.07	0	S-101	0.02	54 ± 6
B-109	0.06	77 ± 30	S-102	0.28	42 ± 16
BX-109	0.06	0	S-107	0.14	49 ± 24
BY-102	0.33	>99 ± 16	S-109	0.06	>99 ± 11[4]
BY-104	0.69	66 ± 22	S-111	0.15	63 ± 17
BY-105	0.20	80 ± 11	SX-108	0.04	>99[5]
BY-106	0.24	65 ± 8	U-102	0.81	17 ± 5
BY-107	0.33	82 ± 21	U-105	1.1	25 ± 14
BY-108	0.41	34 ± 23	U-106	2.2	13 ± 4
BY-110	0.42	83 ± 34	U-107	0.21	30 ± 21
BY-111	0.44	68 ± 14	U-108	0.40	27 ± 8
BY-112	0.28	82 ± 16	U-109	0.33	0

Notes: [1] Average (mean) concentrations calculated from tank data see Appendix F.

[2] TOC and oxalate analyses obtained from individual core and segments were used to calculate a percent TOC as oxalate. The average deviations were weighted for the solids and liquids by taking the average deviation for each component and multiplying by the fraction of solids/liquids present. It is important to note that one or two outliers in the oxalate data set significantly increase the average deviation (as is the case for several of the tanks). For more details on the reported oxalate values see Carlson (1997).

[3] Only one sample analyzed.

[4] Estimated because a large number of the values were above 100%.

[5] All values were greater than 100%.

The speciation results shown in Tables 4-11 and 4-12 are consistent with laboratory aging studies showing degradation of complexants to chelator fragments and carboxylate salts such as oxalate and formate. Oxalate appears to persists in the wastes, attaining higher concentrations than formate and many other aging intermediates and is probably due to its low solubility. Oxidation of the organic species mainly occurs in the aqueous solution phase. Therefore, oxidation rates of oxalate are limited by its insolubility in tank supernatant and interstitial liquids.

The measurements of oxalate levels relative to TOC provide an indication of the amount aging that has occurred, and enable the measured TOC to be adjusted relative to the extent of aging. From Burger (1993), oxalate theoretical reaction enthalpy with nitrate/nitrite yields 26% of the energy compared with acetate. The decreased energy content caused by aging can be accounted for by adjusting the TOC concentration and still using the acetate equivalent as shown in Equation 4-12:

$$TOC_{aged} = TOC_{measured} \times \left(1 - 0.74x_{oxalate}\right) \tag{4-12}$$

where $x_{oxalate}$ is the fraction of TOC that is oxalate. For example, the mean TOC in A-102 is 1.4 wt% and 73% of the TOC is oxalate. Therefore, the acetate equivalent for the aged waste is 0.64 wt% TOC. From the oxalate data examined thus far it is apparent that C-106 has aged sufficiently to be categorized as *safe*. Once organic speciation is completed for the tanks which failed the initial TOC screening, a full assessment of the effects of aging will be possible for the remaining tanks (see future work in Section 7.2).

4.3.3.3 Conclusion on Organic Waste Aging. The organic complexants stored in the Hanford Site waste tanks are aging to lower energy content compounds. The rate of aging is sensitive to both temperature and dose rates. Analyses of tank waste samples corroborate aging and indicate the formation of oxalate, an aging byproduct. In addition, detail organic speciation of S-102, SY-101, and SY-103 tank wastes show the intermediate byproducts (e.g., IDA, NTA, and ED3A) of aging and oxalate. The effects of aging can be incorporated into the evaluation of the organic complexant hazard by more accurately assessing the potential energy content of the waste TOC. The simple oxalate conversion of TOC substantially reduces the estimated energy contents for a number of tanks (nine of thirty).

4.3.4 Organic Solubility

The organic complexants used at the Hanford Site are extremely soluble and were originally disposed to the tanks as aqueous (liquid) waste. Because of waste storage operations, the liquid complexant wastes have been mixed with other (non-complexant) waste and partially evaporated (either in situ or using evaporators) to reduce their volumes. If the organic fuel remains in the liquid, then combustion is not credible. Furthermore, the organic complexant inventory in a tank can be decreased by pumping the tank liquids, reducing or eliminating the organic complexant hazard completely. Experiments with waste simulants and analyses of tank waste samples indicate that most of the organic complexants and energetic chelator fragments remain in the tank supernatants and interstitial liquid.

4.3.4.1 Parameters Affecting Organic Solubility. The amount of organic complexant in solution is dictated by the solubility limits at tank temperatures. Waste simulant experiments have investigated the solubility of organic compounds in the highly saline liquid wastes. The sodium salt of the organic compound being tested was always present as a crystalline solid during the measurements to ensure saturation of the aqueous solution. In the first experiments, only one organic compound was used in each mixture to simplify the analyses. This prevented interferences and eliminated the need for separations before analysis. Progressively, more complex mixtures have been examined.

Solubilities were measured in simulated supernatant solutions containing sodium nitrate, sodium nitrite, and sodium hydroxide. Two simulant solutions were used. The first was a mixture containing 4.0 molar sodium nitrate, 0.97 molar sodium nitrite, and sodium hydroxide ranging from 0.00003 to 2.0 molar. The second simulant was a mixture containing 2.0 molar sodium nitrite, saturated sodium nitrate, and sodium hydroxide ranging form 0.1 to 2.0 molar. The solubility experiments were conducted over a 25 to 50 °C temperature range. Results are summarized in Table 4-13, and details of the solubility experiments are provided in Barney (1994, 1995, and 1996).

Table 4-13. Solubility of Acetate, Butyrate, Citrate, EDTA, Formate, Glycolate, HEDTA, Oxalate, NTA, and Succinate in Simulant Solutions at 25 to 50 °C and Hydroxide Concentrations from 0.00003 to 2.0 Molar.

Compound	Solubility in Solution Containing 4.0 Molar $NaNO_3$ and 0.97 Molar $NaNO_2$		Solubility in Solution Containing Saturated $NaNO_3$ and 2.0 Molar $NaNO_2$	
	(moles L^{-1})	(g of TOC L^{-1})	(moles L^{-1})	(g of TOC L^{-1})
Acetate	4.0 - 8.0	96 - 192	3.8 - 5.4	91 - 130
Butyrate	2.6 - 4.0	125 - 192	2.2 - 3.5	106 - 168
Citrate	0.6 - 1.2	43 - 86	pending	pending
EDTA	0.7 - 1.4	84 - 168	pending	pending
Formate	6.8 - 9.8	82 - 118	pending	pending
Glycolate	4.4 - 5.8	106 - 140	pending	pending
HEDTA	1.5 - 1.8	180 - 216	1.1 - 1.2	131 - 143
NTA	1.3 - 1.7	94 - 122	pending	pending
IDA	NT	NT	pending	pending
Oxalate	0.0204 - 0.015	0.1 - 0.36	pending	pending
Succinate	0.9 - 2.3	43 - 110	NT	NT

Notes: NT = Not Tested.
pending = results from testing are not yet available.

From Table 4-13, the major organic complexants (citrate, EDTA, glycolate, and HEDTA) and aging byproducts (acetate, formate, IDA, and NTA) remain soluble, even in the highly saline simulant solutions. The exception to this is oxalate, which has solubilities two orders of magnitude lower than the other organic compounds tested.

4.3.4.2 Confirmation of Organic Solubility from Waste Sample Data. Many tank waste liquid samples have been analyzed for TOC. The TOC concentrations have been collected for 61 tanks. These include single-shell tanks (Van Vleet 1993a) and double-shell tanks (Van Vleet 1993b). The frequency distribution for these 61 tanks is shown in Figure 4-4. As shown in Figure 4-4, no concentration exceeded 40 g L^{-1}, and 55 of the 61 measurements (90%) are below 15 g L^{-1}. The TOC concentrations in the liquid samples from the SSTs average 5.2 ± 1.1 g L^{-1} (at the 95% confidence level) (Toth et al. 1995).

Figure 4-4. Distribution of TOC Concentrations in Supernatant Solutions for 61 Tanks.

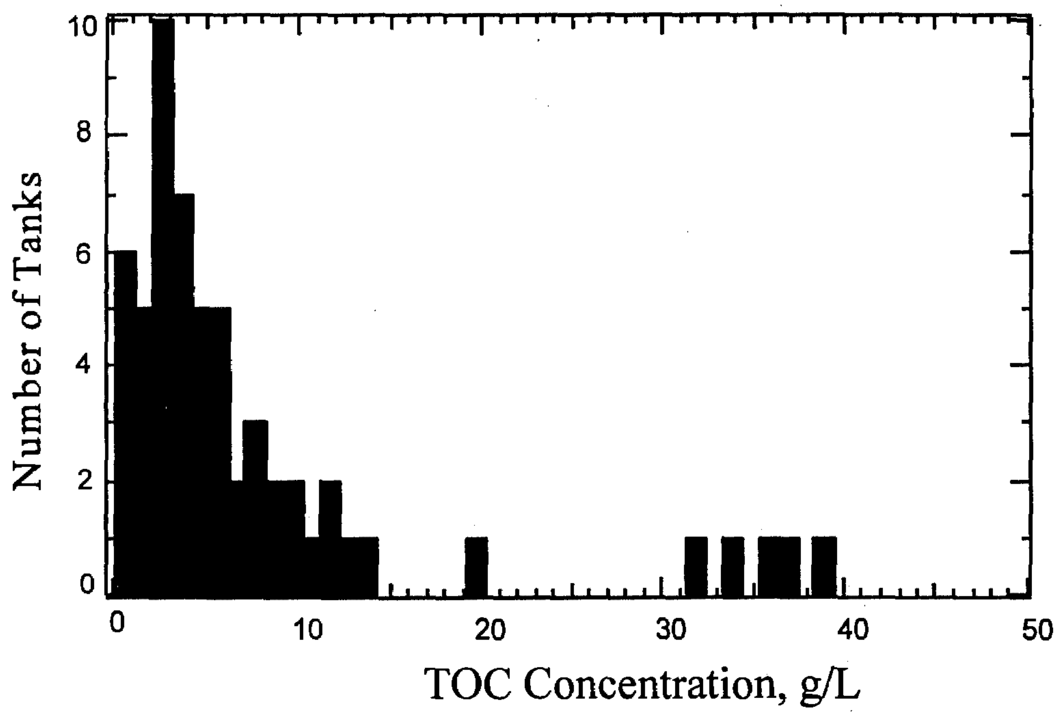


Table 4-14 shows the TOC and water concentrations for the twelve sampled tank wastes that have not yet been tested sufficiently to dismiss propagation (if completely dried). Solubility experiments with waste simulants, and measurements of TOC in actual liquid waste samples indicate that all the energetic (non-oxalate) TOC would be contained in the waste liquids. Organic speciation of the waste liquid and solids (separated by centrifugation) is pending. However, examination of the TOC and water concentrations in these tanks shows that sufficient water is present to prevent propagation.

Table 4-14. The Effects of Moisture on Tank Waste Storage.

Tank	Waste History Assessment	TOC (wt%, wet)	Water (wt%)	Waste *Conditionally Safe*
A-102	High Complexant	1.0 - 1.8	31 - 37	Yes
A-103	High Complexant	0.77 - 0.80	40	Yes
A-106	High Complexant	0.62 - 0.72	43 - 45	Yes
AX-102	High Complexant	4.8 - 6.4	28 - 33	Yes
BX-104	High Complexant	0.18 - 0.44	~30[1]	Yes
C-104	High Complexant	0.61 - 3.2	20 - 82	Yes
C-105	High Complexant	0.55 - 0.68	4.3 - 78	Yes
T-111	Low Complexant	0.20 - 0.41	61 - 84	Yes
U-102	Medium Complexant	0.36 - 1.3	7.7 - 55	Yes
U-105	High Complexant	0.67 - 2.3	14 - 38	Yes
U-106	High Complexant	0.8 - 3.6	16 - 50	Yes
U-111	High Complexant	0.52 - 0.54	39	Yes

Notes: [1] The corresponding water analyses could not be found for these TOC analyses. The water values are derived from ANOVA using the water groupings.

It is important to note that of the twelve tanks currently categorized as *conditionally safe*, only tanks A-102, AX-102, BX-104, C-104, and T-111 have had liquids pumped out. Of these five tanks, only T-111 was jet pumped[1]. The other four tanks only had the surface supernatant removed, leaving behind considerable liquid. Tanks A-103, A-106, and C-105 are considered administratively interim stabilized (i.e., pumping would remove less than 50,000 gallons of liquid), and there are no plans for pumping. Tanks U-102, U-105, U-106, and U-111 are scheduled to be jet pumped by the end of 1998.

4.3.4.3 Conclusions on Organic Solubility. The high solubilities will prevent solid sodium salts of these the organic acids from precipitating from tank solutions. The TOC analyses of actual tank supernatant samples are much lower than the TOC ranges for the simulated supernatant solutions saturated (at the solubility limit) with the organic salts. This is true even if all the dissolved carbon in a given tank sample was comprised of only one of the compounds tested (an unlikely situation). Examination of the TOC and corresponding water measurements

[1]Although tank T-111 was recently jet pumped, the waste still has most of its liquid. Waste samples centrifuged at 500 gravities for two days showed that the waste retained between 58 to 66 wt% water.

in Tanks A-103, A-106, AX-102, BX-104, T-111, TX-118, U-106, and U-111 suggests that all of the TOC might be present in the liquid phase in these tanks. The low solubility of sodium oxalate would allow it to precipitate in some tanks with the nitrate/nitrite salts; however, even stoichiometric oxalate mixtures failed to propagate when tested (Fauske et al. 1997).

4.3.5 Special Case Tanks.

Eleven tanks have unique or hard to track waste transfer histories, and require individual examination. The C-200 and B-200 series tanks received several small waste transfers from the strontium semiworks at B Plant, and these wastes were often small pilot plant runs that contained unique waste streams. Tanks C-101, C-102, and C-103 received predominantly solvent waste, and also need to be characterized separately. The available information for these special case tanks is examined separately below, and the tanks are categorized as *safe*, *conditionally safe*, or indeterminate based on the characterization information available.

4.3.5.1 Tank B-201. The process history of tank B-201 is straight forward, for its entire lifetime (1952 to 1975) it received and stored waste from the B Plant 224 facility (Conner et al. 1997). The waste was a lanthanum fluoride-based separation process (one of the final steps in the bismuth phosphate process) and did not contain complexant waste. Two full-depth core samples were taken in 1991. All the DSC analyses of the wastes samples revealed no exothermic reactions (Conner et al. 1997). Based on the sample data and tank waste history, this tank contains no organic complexant fuel and is categorized as *safe*.

4.3.5.2 Tank B-202. Tank B-202 received mostly non-complexed wastes from B Plant operations. This tank had an active transfer history, but records indicate that it did not receive concentrated complexant waste (Dougherty 1995). Two full-depth (eight segments) core samples were taken in 1991. Normal paraffin hydrocarbons were used as the hydrostatic head fluid, and some samples might have been slightly contaminated with NPH. All of the subsegment DSC analyses showed a small amount of exothermic energy (-9 to -224 J g^{-1} on a dry basis) relative to the -1200 J g^{-1} energy criterion. The TOC analyses for the samples ranged between 0.2 and 0.4 wt% (Dougherty 1995). Based on the corresponding low DSC and TOC analyses for all the waste samples, this tank is categorized as *safe*.

4.3.5.3 Tank B-203. Tank B-203 received mostly waste from the B Plant 224 facility and also received some B Plant flush (Jo et al. 1996). The B Plant flush would probably contain small amounts of detergent and/or cleaning agents. This waste contained primarily sodium, strontium, hydroxide, nitrate, and fluoride, with trace amounts of iron, lanthanum, carbonate, oxalate, and plutonium. Three full-depth (14 segments) core samples were taken in 1995. All the samples contained considerable water, 63 to 81 wt%. Only two of the 43 half-segment waste samples showed any exothermic reactions by DSC analysis.

The two samples that showed some exothermic energy were from segments ten and thirteen. The lower-half of segment ten had four DSC measurements that showed -170 J g^{-1}, -91 J g^{-1}, no exothermic energy, and no exothermic energy. This sample contained 75 wt% water, and the two energetic results were -700 and -370 J g^{-1} on a dry weight basis. The lower half of segment 13 had duplicate DSC analyses of -72 and -69 J g^{-1} (-290 and -280 J g^{-1} on a dry weight basis). The corresponding TOC analyses for these samples were less than 0.01 wt% (Jo et al. 1996). The small exothermic energy is most likely caused by detergents or other small contaminants from the B Plant flush. Based on the sample data and tank waste history, this tank contains negligible organic complexant fuel and is categorized as *safe*.

4.3.5.4 Tank B-204. Tank B-204 received mostly waste from the B Plant 224 facility, and also received some B Plant flush (Sasaki et al. 1996). All the DSC analyses of the wastes samples revealed no exothermic reactions. Based on the sample data and tank waste history, this tank contains no organic complexant fuel and is categorized as *safe*.

4.3.5.5 Tank C-101. The waste transfer records of Tank C-101 indicate little complexant waste, but an appreciable amount of organic solvent (Brevick et al. 1994m). An auger was taken from C-101 in 1995 (Sasaki 1995a). DSC analysis of the samples showed no exothermic energy; however, analyses did indicate the presence of TOC (about 0.4 wt%). This is consistent with the presence of organic solvent that can evaporate or decompose during DSC analysis before the nitrate/nitrate oxidizer melts. Vapor samples taken in the headspace of C-101 also indicates that this tank contains organic solvent (Huckaby et al. 1997).

Although C-101 does contain TOC, the available evidence indicates that this organic is solvent. Experimentation (Cowley et al. 1997, Fauske 1997, Conner 1996) shows that the solvents do not support condensed phase combustion, and thus do not contribute to the organic complexant hazard. The organic solvent hazard is covered in separate reports (Cowley and Postma 1996, Cowley et al. 1997). Because the TOC in tank C-101 is organic solvent, it is categorized as *safe* with respect to the organic complexant hazard.

4.3.5.6 Tank C-102. The waste transfer history of tank C-102 shows an appreciable amount of organic solvent (Brevick et al. 1994m). Two auger samples were taken from C-102, and samples were subjected to detailed chemical speciation (Campbell et al. 1995). Analyses showed that the TOC in this tank waste was comprised of all organic solvent (84% NPH and 16% TBP). The organic solvent hazard is covered in separate reports (Cowley and Postma 1996, Cowley et al. 1997), and because the TOC in tank C-102 is organic solvent, this tank is categorized as *safe* with respect to the organic complexant hazard.

4.3.5.7 Tank C-103. Tank C-103 contains a pool of floating organic solvent. Two full-depth core samples were taken in October through February of 1994/1995 (Winters et al. 1996). The sludge samples, aqueous supernatant, and organic solvent pool were subjected to detailed organic speciation (Campbell and Wahl 1996). The TOC in the solid sludge samples was primarily TBP and NPH (48% and 43%, respectively) with some oxalate (2%). The organic solvent hazard is covered in separate reports (Cowley and Postma 1996, Cowley et al. 1997), and because the TOC in tank C-103 is mostly organic solvent, this tank is categorized as *safe* with respect to the organic complexant hazard.

4.3.5.8 Tank C-201. Tank C-201 has a capacity of 55,000 gallon, and currently has about thirteen inches of waste (about 2000 gallons) (Sasaki 1995b). Two full-depth auger samples were taken in 1995, but sample recovery was poor and only 16 g of material were recovered. Enough material was available to run DSC, TGA, TOC, and a direct propagation (RSST) test. The DSC scans showed exothermic energy of -380 to -620 J g^{-1}. The TOC concentration ranged from 3.8 to 4.6 wt% (wet), and the water concentration ranged from 9.7 to 11.5 wt%. Direct combustion testing in the RSST (see Appendix C) demonstrated that this waste will not support propagation, a strong indication that this tank could be categorized as *safe*. However, final judgement is deferred until additional testing is completed, and this tank is currently categorized as indeterminate.

4.3.5.9 Tank C-202. Tank C-202 has a capacity of 55,000 gallons, and currently has about eight inches of waste (about 1000 gallons). Transfer histories indicate that the waste in C-202 is similar to that in C-201 (Kelly 1995), and indeed the results from DSC, TGA, and TOC are consistent with the C-201 waste. Two full-depth auger samples were taken in 1995, but sample recovery was poor and only 8.5 g of material were recovered. Enough material was available to run DSC, TGA, and TOC analyses. The DSC scans did not return to the baseline at 450 °C, and only greater than values were reported for the exothermic energy content of the samples (greater than -180 to -580 J g^{-1} dry basis). The TOC concentration ranged from 2.0 to 4.4 wt% (wet), and the water concentration ranged from 4.9 to 7.0 wt%. Because of poor sample recovery and the inability to do organic speciation and direct propagation testing, this tank is categorized as indeterminate. However, results thus far suggest that the tank waste will be categorized as *safe* after additional sampling and analysis.

4.3.5.10 Tank C-203. The waste transfers in and out of tank C-203 are not well documented, so most of the judgements about C-203 are based on two full-depth (about 51 cm) auger samples taken in 1995 (Sasaki 1995c). The augers samples were divided into half segments and analyzed by DSC and thermogravimetric analysis (TGA). The DSC showed consistent low exothermic reactions for all the samples ranging from -31 to -97 J g^{-1} (dry basis). The TGA showed 31 to 52 wt% water in the samples. The low consistent DSC results indicate that tank C-203 contains a low concentration of organic complexants, and the tank is categorized as *safe*.

4.3.5.11 Tank C-204. Two full depth auger samples were taken from tank C-204. The waste samples were subjected to detailed organic speciation and combustion testing in the RSST. Organic speciation showed that the TOC in tank C-204 was almost exclusively TBP. An RSST analysis of the waste (see Appendix C) mirrored the RSST test on a TBP waste simulant (Conner 1996, Cowley et al. 1997). Because the TOC in tank C-204 is organic solvent, this tank is categorized as *safe* with respect to the organic complexant hazard.

4.3.6 Tank Wastes with No Sample Data

Those SSTs with insufficient data (two tanks) or no sample data (sixty tanks) are currently categorized as indeterminate. However, some judgements can be made about these tanks through extrapolation of the ANOVA model (see Appendix E) and waste process histories (tank groupings). The ANOVA model predicts that 48 of the indeterminate tanks would have TOC concentrations too low to support propagation (Table 4-15). These tanks are a low priority for future sampling to resolve the Organic Complexant Safety Issue.

The ANOVA extrapolation shows that twelve indeterminate tanks might contain sufficient fuel to warrant sampling and testing (Table 4-16). The model also predicts that these tanks would contain sufficient water to prevent propagation. Sampling of all these tanks might not be necessary if future work is successful (see Section 7.0). Once the tanks that bound the organic complexant hazard (i.e., from the perspective of complexant concentration, organic aging, and solubility) are sampled and evaluated, resolving the Organic Complexant Safety Issue without sampling all tanks will be possible.

Table 4-15. Analysis of Variance Extrapolation Showing Tanks Expected to Contain No or Low Concentrations of Organic Complexants.

Tank	Tank	Tank	Tank	Tank	Tank
A-104	BX-103	S-108	T-103	TX-103	TX-114
AX-104	BY-101	S-110	T-110	TX-105	TX-115
B-101	BY-103	S-112	T-112	TX-106	TX-116
B-102	BY-109	SX-110	T-201	TX-108	TX-117
B-105	BY-111	SX-111	T-202	TX-109	TX-118
B-108	BY-112	SX-114	T-203	TX-110	U-101
B-112	S-105	SX-115	T-204	TX-112	U-104
BX-102	S-106	T-101	TX-101	TX-113	U-112

Table 4-16. Analysis of Variance Extrapolation Showing Tanks Expected to Contain Medium or High Concentrations of Organic Complexants.

Tank	Tank	Tank	Tank
A-105	C-107	SX-103	SX-106
AX-101	S-103	SX-104	TX-104
AX-103	SX-101	SX-105	TX-111

4.3.7 Summary of Tank Categorization

The section summarizes the categorization of all 149 SSTs. Seventy-Five tanks have sufficient data to be categorized as *safe* (Table 4-17). Twelve tanks are currently categorized as *conditionally safe* (Table 4-18); however, these tanks might be categorized as *safe* after additional testing is completed. Sixty-two tanks are indeterminate (Table 4-19) and require more information to definitively categorize. However, it is important to note that the ANOVA estimates and waste histories suggest that none of these tanks are *unsafe*.

Table 4-17. Single-Shell Tanks Categorized as *Safe*.

Tank	Tank	Tank	Tank	Tank
A-101[3]	BX-107[3]	C-103[4]	SX-102[3]	TY-101[3]
B-103[3]	BX-108[2]	C-106[5]	SX-107[1]	TY-102[3]
B-104[1,2]	BX-109[2,3]	C-108[3]	SX-108[1,2,3]	TY-103[3]
B-106[2,3]	BX-110[3]	C-109[3]	SX-109[1]	TY-104[2,3]
B-107[1]	BX-111[3]	C-110[3]	SX-112[1]	TY-105[1,3]
B-109[3]	BX-112[3]	C-111[3]	SX-113[1,2]	TY-106[1,3]
B-110[3]	BY-102[3]	C-112[3]	T-102[3]	U-103[3]
B-111[3]	BY-104[3]	C-203[6]	T-104[1,3]	U-107[3]
B-201[2,6]	BY-105[3]	C-204[4,6]	T-105[3]	U-108[3]
B-202[6]	BY-106[3]	S-101[3]	T-106[2]	U-109[3]
B-203[6]	BY-107[3]	S-102[3]	T-107[3]	U-110[3]
B-204[2,6]	BY-108[3]	S-104[3]	T-108[2]	U-201[2]
BX-101[2]	BY-110[3]	S-107[3]	T-109[2]	U-202[2]
BX-105[3]	C-101[2]	S-109[3]	TX-102[3]	U-203[2]
BX-106[2]	C-102[4]	S-111[3]	TX-107[2]	U-204[2,3]

Notes: [1] Tank does not contain organic complexants because no waste transfers were received after 1968.
[2] DSC analyses up to 450 °C showed no exothermic chemical reactions on all waste samples from this tank.
[3] TOC measurements on tank waste samples show no or low complexant concentrations (ANOVA model).
[4] Speciation of the TOC shows that almost all the organic is solvent.
[5] Speciation of the TOC shows that almost all the organic has aged to low energy oxalate.
[6] The B 200 and C 200 series tanks were assessed individually as special case tanks (see Section 4.3.5). Tank wastes were categorized as *safe* based on a combination of DSC and TOC measurements.

Table 4-18. Single-Shell Tanks Currently Categorized as *Conditionally Safe*.

Tank	Tank	Tank	Tank	Tank	Tank
A-102	A-106	BX-104	C-105	U-102	U-106
A-103	AX-102	C-104	T-111	U-105	U-111

Table 4-19. Indeterminate Single-Shell Tanks.

Tank	Tank	Tank	Tank	Tank	Tank
A-104	BX-103	S-106	SX-114	TX-103	TX-115
A-105	BY-101	S-108	SX-115	TX-104	TX-116
AX-101	BY-103	S-110	T-101	TX-105	TX-117
AX-103	BY-109	S-112	T-103	TX-106	TX-118
AX-104	BY-111	SX-101	T-110	TX-108	U-101
B-101	BY-112	SX-103	T-112	TX-109	U-104
B-102	C-107	SX-104	T-201	TX-110	U-112
B-105	C-201	SX-105	T-202	TX-111	---
B-108	C-202	SX-106	T-203	TX-112	---
B-112	S-103	SX-110	T-204	TX-113	---
BX-102	S-105	SX-111	TX-101	TX-114	---

5.0 WASTE HAZARD POTENTIAL AND ACCIDENT FREQUENCY

The waste hazard potential and accident frequency for the bulk runaway and point source ignition accident scenarios are presented in this section.

5.1 BULK RUNAWAY HAZARD POTENTIAL

The organic waste tanks were assessed for bulk runaway in Section 4-2. Waste storage times exceeded the characteristic times of cooling for all tanks. For all SSTs except C-106 (which requires water for cooling), passive decay heat removal is sufficient to keep the waste temperatures below the historical operating temperatures. Based on this assessment, the bulk runaway accident can be ruled out for all tanks but C-106. The current controls of water addition and temperature monitoring (see Section 6.1) are adequate to prevent this accident.

5.2 POINT SOURCE IGNITION HAZARD POTENTIAL

5.2.1 Evaluation of Initiators

Tank farm operations and activities (Bajwa and Farley 1994) were reviewed to determine which equipment and activities could lead to moderate strength ignition sources (i.e., greater than 3.3 Joules) being present at the waste surface or within the waste (Table 5-1). The potential for organic complexant ignition by rotary-mode core sampling is not assessed in this report, but is addressed in a separate safety analysis (Kubic 1996).

Electrostatic discharges and instrumentation circuit faults would deposit insufficient energy in the waste to ignite an organic complexant combustion. Mechanical sparks from grinding and drilling operations have insufficient energy to cause ignition of solid phase organics. Hot filaments from failed camera lights, welding or torching, vehicle operations, and rotary-mode core sampling could hypothetically supply sufficient ignition energy. The estimated frequencies of these events are shown in Table 5-2 and are discussed more thoroughly in Appendix G.

A review of natural phenomena hazards was also done to identify potential organic-nitrate ignitors. Lightning was determined to be the only natural phenomenon with sufficient energy in ignition sources to ignite solid organics, and is included in Table 5-2. Other effects were evaluated such as seismic-induced collisions between in-tank equipment and resultant sparking of equipment, and it was determined that these would not produce capable ignitors. Nearby facility or range fires could produce flaming brands and sparks that could affect the top of the tank but it was assumed that these phenomena could not enter the tank and fall directly onto the waste surface.

Table 5-1. Summary of Operations Evaluation for Potential Ignition Sources*.

Operation	Incident Conditions	Heating Potential
In-tank instrumentation	Electrical overcurrent	Negligible, ignition not credible
Grinding and drilling operations	Sparks from grinding and drilling operations on or near a riser	Negligible, ignition not credible
Still camera photography	Dropping flash unit onto the waste surface, hot filament contacts waste	Ignition temperatures and energies are possible
Video camera	Dropping light unit onto the waste surface, hot filament contacts waste	Ignition temperatures and energies are possible
Hot metal from welding and torching operations	Hot steel particles or pieces drop and contact the waste	Ignition temperatures and energies are possible
Vehicle operation above the tank	Rupture of fuel tank on aboveground equipment, fuel leakage into the tank, subsequent fire	Ignition temperatures and energies are possible
Rotary-mode core sampling	Loss of bit cooling, failure to shut down drill sampler causes frictional heating of the waste	Ignition temperatures and energies are possible
Lightning strikes	Lightning strike on or near a tank or equipment causes lightning current to reach the waste	Ignition temperatures and energies are possible
Flammable gas burn	Flammable gas burn in an organic tank or adjacent tank ignites the waste	Ignition temperatures are possible, but organic ignition is extremely unlikely

Notes: *See discussion in Appendix F.

Table 5-2. Estimated Frequencies for Credible Ignition Sources in SSTs.

Event	Unmitigated Frequency ($tank^{-1}$ $year^{-1}$)	Mitigated Frequency ($tank^{-1}$ $year^{-1}$)
Hot Filament	1.0 E-3*	1.0 E-5
Welding and Torch Cutting	1.0 E-2*	1.0 E-4
Rotary-mode Core Sampling	see Kubic (1996)	see Kubic (1996)
Vehicle Fuel Fire	2.3 E-6**	2.6 E-8**
Lightning Strikes	2.8 E-5***	2.8 E-5

Notes: *Bajwa and Farley (1994)
**Linberg (1996)
***Zach (1996)

5.2.2 Accident Frequencies

The likelihood that an organic salt-nitrate combustion event depends on whether there is combustible waste present. The probability is proportional to (1) the frequency of ignition sources (Table 5-2), (2) frequency of ignition source contact with the combustible fraction of waste (Table 5-3), (3) frequency of ignitor success once in contact with the combustible waste (Table 5-3), and (4) the number of vulnerable (i.e., *unsafe*) tanks. The likelihoods of ignitors being introduced into the SSTs is taken to be the same for all of tanks, and is governed by the effectiveness of controls to exclude ignitors from tanks.

Table 5-3. Frequencies of Ignition Source Contact and Ignitor Success.[1]

EVENT	FREQUENCY
Ignition Source Contact with the Combustible Fraction of Waste[2]	1.2 E-2
Ignitor Success Once in Contact With the Combustible Waste[3]	1.0 E-1

Notes: [1]Calculation notes provided in Appendix F.
[2] The frequency is 1.2 E-1 for vehicle fuel fires.
[3]This does not include lightning strikes and vehicle fuel fires that have estimated success rates of 1.0.

None of the tanks evaluated to date were categorized as *unsafe*, and extrapolation of the results thus far to the indeterminate tanks suggests that no tanks will be categorized as *unsafe*. Historical records of processing and waste transfers (Agnew 1996) also suggest none of the indeterminate tanks would be categorized as *unsafe*. However, additional work is still required (see Section 7.0) to ensure the bounding tanks have been sampled and analyzed.

A bounding estimate on the number of tanks at risk can be made using simple statistics (Dixon and Massey 1957). Given that 87 tanks have been evaluated and do not pose a point source ignition hazard, no more than four of the remaining 62 tanks should be at risk. Although waste processing histories and the ANOVA extrapolation indicate that no tanks are at risk, uncertainties about the waste character in the indeterminate tanks suggest that this conservatism is prudent. Therefore, the number of tanks that are vulnerable is taken to be four for the purpose of risk calculations.

Combining the frequency of ignition sources, frequency of ignition source contact, frequency of ignitor success, and the number of vulnerable tanks (see Appendix G) the facility wide unmitigated accident frequency is judged to be 5.5 E-5 year^{-1} (extremely unlikely) and the mitigated accident frequency is judged to be 1.8 E-6 year^{-1} (extremely unlikely).

5.2.3 Consequence Analysis

An organic complexant combustion event is not credible for the tanks categorized as *safe* or *conditionally safe*. Therefore, the ANOVA model was extrapolated to the indeterminate tanks to select the bounding case (tank SX-106 which has the largest hypothetical volume of combustible waste). The postulated consequences from an organic complexant combustion event in SX-106 is shown in Table 5-4 (at 50% confidence), and Table 5-5 (at 95% confidence). The combustion model is detailed in Plys et al. (1996), and dose consequence calculations are provided in Appendix H. At 50% confidence, only the toxicological consequences are exceeded. At 95% confidence, the radiological and toxicological consequences exceed risk acceptance guidelines. Mitigated and unmitigated consequences are identical because there are no practical means to limit the amount of radionuclides and chemical compounds released, should the combustion start. Therefore, the focus is on prevention of ignition sources to reduce the frequency of the accident.

Table 5-4. Radiological and Toxicological Consequences at 50% Confidence for Tank SX-106 and Comparison to Risk Acceptance Guidelines.

Consequences	Onsite Dose/Exposure		Offsite Dose/Exposure	
	Calculated Dose	Risk Guideline	Calculated Dose	Risk Guideline
Radiological	0.22 mSv (0.022 rem)	5 mSv (1.5 rem)	0.0018 mSv (0.00018 rem)	1 mSv (0.1 rem)
Toxicological	4.3 ERPG-1 3.2 ERPG-2 0.022 ERPG-3	1.0 ERPG-1 1.0 ERPG-2 1.0 ERPG-3	0.005 PEL-TWA 0.004 ERPG-2 <0.001 ERPG-3	1.0 PEL-TWA 1.0 ERPG-2 1.0 ERPG-3

Notes: The above table is for the bounding indeterminate tank SX-106, which had the largest (hypothetical) volume of combustible waste based on the ANOVA extrapolation. At 50% confidence, the ANOVA extrapolation suggests tank SX-106 would have 0.0091 m^3 of waste that would exceed the criterion shown in Figure 3-1. The consequences shown in this table represent combustion of this 0.0091 m^3 of waste. See Appendix H for further discussion.

Table 5-5. Radiological and Toxicological Consequences at 95% Confidence for Tank SX-106 and Comparison to Risk Acceptance Guidelines

Consequences	Onsite Dose/Exposure		Offsite Dose/Exposure	
	Calculated Dose	Risk Guideline	Calculated Dose	Risk Guideline
Radiological	38,000 mSv (3,800 rem)	5 mSv (1.5 rem)	32 mSv (3.2 rem)	1 mSv (0.1 rem)
Toxicological	2.5 (10^5) ERPG-1 1.9 (10^3) ERPG-2 1.9 (10^3) ERPG-3	1.0 ERPG-1 1.0 ERPG-2 1.0 ERPG-3	300 PEL-TWA 200 ERPG-2 1.5 ERPG-3	1.0 PEL-TWA 1.0 ERPG-2 1.0 ERPG-3

Notes: The above table is for the bounding indeterminate tank SX-106, which had the largest (hypothetical) volume of combustible waste based on the ANOVA extrapolation. At 95% confidence, the ANOVA extrapolation suggests tank SX-106 would have 12.4 m^3 of waste that would exceed the criterion shown in Figure 3-1. The consequences shown in this table represent combustion of this 12.4 m^3 of waste. See Appendix H for further discussion.

6.0 CONTROLS

Controls for organic salt-nitrate reactions in addition to the standard prudent operating controls for SSTs are listed below. These controls will become Technical Safety Requirements or other operating controls as appropriate.

6.1 CONTROLS TO PREVENT BULK RUNAWAY

It would not be prudent to allow C-106 to heat up to the temperature at which an accelerated chemical reaction might occur. Therefore, controls are required. Credit was taken for detection of and recovery actions for loss of evaporative cooling and loss of ventilation in tank C-106.

Controls: Monitor the waste temperature in C-106. Appropriate actions (such as water addition or restoration of ventilation) will be taken to return the waste temperature to safe temperatures.

6.2 CONTROLS TO PREVENT POINT SOURCE IGNITION

Theoretical analysis indicates that the threshold energy for ignition of dry organic salt-nitrate wastes is more than 3.3 Joules (Fauske 1997). Evaluations of potential ignition sources have shown that there are six types of ignitors that could exceed this ignition threshold: hot lamp filaments, hot pieces of metal or slag from torch cutting or welding, vehicle fuel fires, rotary-mode core drilling, lightning strikes, and flammable gas burns. Controls are discussed below for each type of ignitor.

6.2.1 Hot Filaments from Failed Camera Lights

Restraints will be used for power cord installations for lights.

Controls: Restraints (known as "top hats") will be used on the power supply cables for lights to prevent a failed light from dropping to the level of the waste.

6.2.2 Welding and Torch Cutting

A component was assumed to be installed in open risers before welding and cutting activities that prevents hot metal from falling onto the waste surface.

Controls: The procedures, design, and work controls for maintenance, modification, and equipment removal/installation will prevent hot metal pieces and slag from entering the tank and falling to the waste surface. Appropriate equipment, such as plugs or covers will be used to ensure that hot metal pieces do not enter the tank and fall to the waste surface.

6.2.3 Vehicle Fuel Fire

Credit may be taken for prevention of this accident scenario through the use of spotters to assist drivers when maneuvering around in the tank farm. This was not included in the frequency calculations. This is a conservatism in the analysis.

Controls: An administrative control program will be in place to ensure that spotters are used whenever vehicles will be maneuvering around or near tank projections. The duty of the spotter is to assure that the vehicle does not collide with tank projections.

Engineering design and evaluation will assure that vehicle tanks are protected from collisions with tank appurtenances.

Controls: An administrative control program will be used for all waste tanks that limits vehicles operating above the tanks to the following requirements:

- The vehicle must have a protective plate (skid plate) protecting the fuel tank and any reservoir tanks from contacting risers protruding above grade, or
- The fuel tanks should not project below the bumpers or main structural members of the vehicle, or
- The fuel tank (and any reservoir tank) must be physically located at a height greater than the highest riser that would impact a tank located at a lower level.

6.2.4 Lightning Strikes

Controls: If lightning storm activity is reported within 80 km (50 miles) of the tank farm, all activities will cease, tall objects will be lowered (secured in lowest practicable position), and the tank and equipment will be secured until the storm has passed. This control requires that securing the tank and equipment begins when the storm is at 80 km.

6.3 WASTE TRANSFER CONTROLS

6.3.1 Indeterminate Leaking Tank

Controls: When an indeterminate tank is determined to be leaking, attempts will be made to assess the TOC concentration to determine if the tank can be categorized as *safe*. If this cannot be done in time or if the answer should prove negative, then salt well pumping will be evaluated and a waiver sought from DOE to pursue salt well pumping if a comparison of risks indicates that this is the best course.

6.3.2 Before Interim Stabilization

To reduce future leakage of tank wastes to the environment, tank waste characterization should be pursued for tanks that have not been interim stabilized to determine which of these tanks can be categorized as *safe*.

Controls: An assessment of tank waste must be made before interim stabilization to ensure that the post pumped waste state would be *safe* or *conditionally safe*.

6.3.3 Moisture Monitoring

Moisture monitoring is important for *unsafe* tanks (currently none identified), *conditionally safe* tanks, and indeterminate tanks. In these tank categories maintaining the water in the waste helps to maintain safety. A baseline surveillance should be done visually to determine whether there is visible water near the solids surface. Additional means should be used depending upon available instrumentation and waste samples to give measurements to correlate the visual observations or to establish baseline water where visual observation does not show surface water. Techniques that may be used include manual tape, ENRAF, or FIC instruments. Neutron scans in liquid observation wells or electromagnetic induction scans may also be used and also neutron and EMI in the Surface Moisture Monitoring System as it becomes available and practicality is demonstrated.

Periodic water monitoring (e.g., quarterly) using additional waste samples, the same measurements or other measurements that have been suitably cross-correlated to the original should be used to verify continuing waste water. If the level does not change by more than a nominal amount to allow for instrument error (e.g., 5% of original value), the tank waste water can be regarded as remaining static.

Controls: Periodic surveillance or evaluation of water will be done to determine water concentration in those tanks categorized as *conditionally safe*.

Controls: For the *conditionally safe* tanks, proposed changes to the SST ventilation systems design or operations will be evaluated to guard against unacceptable waste dry out. This is to prevent a tank moving from the *conditionally safe* to the *unsafe* category.

6.4 APPLICATION OF CONTROLS

6.4.1 Controls Applied to Safe Tanks

Tanks categorized as *safe* lack sufficient fuel to sustain a propagation. Therefore, no additional controls, other than those controls applied to all tanks, are required.

6.4.2 Controls Applied to Conditionally Safe Tanks

Tanks categorized as *conditionally safe* might contain sufficient fuel, however, are too wet to sustain a propagation. Waste water is the principal control in maintaining safety for these tanks, therefore, waste transfer controls are applied to the *conditionally safe* tanks.

6.4.3 Controls Applied to Indeterminate Tanks

Tanks that have insufficient data are indeterminate. However, tank histories and the ANOVA model extrapolation suggest that all of the remaining tanks will be at least conditionally safe. As a prudent measure, ignition controls and waste transfer controls will be applied to the indeterminate tanks.

6.4.4 Controls Applied to Unsafe Tanks

Unsafe tanks contain waste that exceeds the safety criteria and therefore prevention of ignition by all sources is essential. No operations that could produce ignition sources (e.g., photography, welding, and torch cutting) are allowed in tanks categorized as *unsafe*. In addition, physical barriers are required around the tank risers to reduce the potential for a vehicle gasoline tank rupture over a riser. Waste transfer controls are also required on *unsafe* tanks.

7.0 FUTURE WORK

Although significant progress has been made in assessing tank safety, some additional work remains to categorize all the waste tanks and to bring the Organic Complexant Safety Issue to closure. The question remaining is how well do the sampled tanks bound the organic complexant hazard. To answer this question, it is necessary to better understand the parameters that affect organic aging and solubility. Better understanding will allow extrapolation of the current results to the unsampled tanks, and allow future predictions of tank waste behavior during storage. A description of this future work is presented below.

7.1 DATA ON ENERGETICS, TOC, AND MOISTURE

Additional tanks will be sampled and screened using TOC and water data. The ANOVA model extrapolations will be evaluated by comparing ANOVA predictions with new TOC/water sample data (see details in Appendix F). Once sufficient confidence in the extrapolations is established, comprehensive sampling and analysis can be focused on those few tanks that contain significant organic fuel.

Those waste samples that show some fuel value [i.e., the sample contains greater than 3.0 wt% TOC (dry basis) or shows exothermic energy greater than 480 J g^{-1}] will be subjected to tube propagation (PRSST) tests. Direct testing for propagation is informative (AICHE 1995), and this testing offers the best direct measure of the point source ignition hazard. However, it is important to note that vast majority of waste samples contain little or no organic complexants.

None of waste samples tested thus far have supported propagation. Waste samples from bounding tanks (i.e., those that are the least aged) will be spiked with representative complexants to determine what the actual waste fuel concentration must be to support propagation. For each tank waste of interest, these tests will provide a reasonable estimate of the margin of safety between the measured fuel concentration and that necessary to support propagation.

7.2 ORGANIC AGING TESTS

7.2.1 Aging Experiments with Waste Simulants

A waste aging model will enable distributions of species found in samples to be understood and matched with historical records of tank contents. The efforts associated with aging studies will better define the factors that affect aging. With knowledge of the species and waste conditions (temperature and dose rate), the model will enable quantitative predictions of future aging and quantification of the future risk from organic complexants.

Experiments to date shows that the reaction rate depends on four factors: dose rate, radiolytic yield of oxidants, relative reactivities (k_j/k_1) of other species, and relative concentrations of other reactive species. Reaction path and reactivity information for organic specie aging will be obtained by running a series of binary aging studies in which each of the original organic species is aged in the presence of ^{13}C-labeled sodium formate. Analyses by ^{13}C and proton NMR spectroscopies and by ion and liquid chromatographies will show the primary or initial products and yield relative rate constants as shown in Equation 7-1.

$$\frac{k_{EDTA}}{k_{^{13}CO_3^{2-}}} = \frac{\ln\left(\frac{[EDTA]_t}{[EDTA]_0}\right)}{\ln\left(1 - \frac{\left[^{13}CO_3^{2-}\right]_t}{\left[H\,^{13}CO_2^{-}\right]_0}\right)} \qquad (7\text{-}1)$$

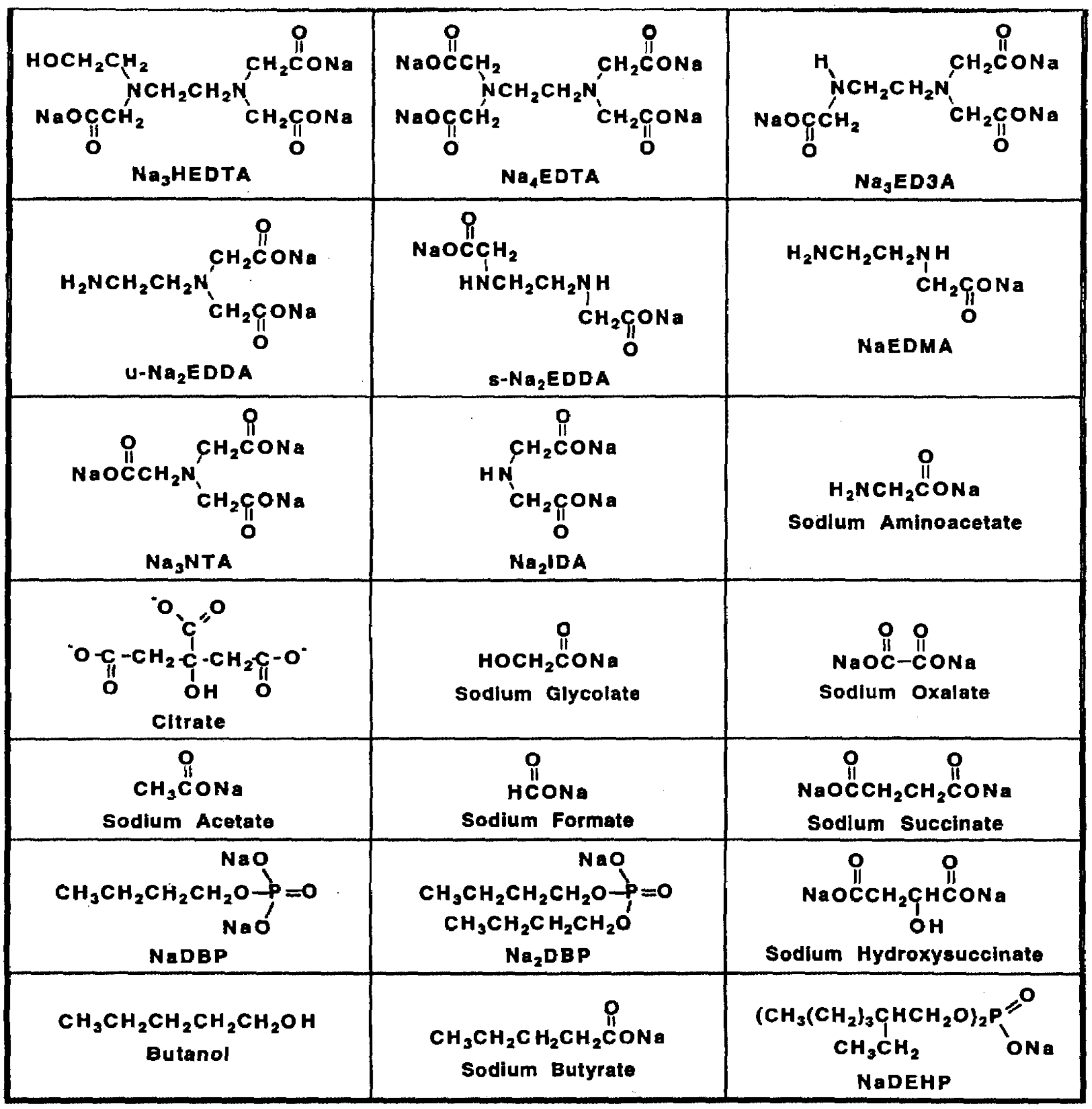
In turn, reactivities of the primary products and resultant products will be determined by similar competition experiments with labeled formate. The approach will be repeated until sufficient information is obtained to model aging from the initial species to oxalate and carbonate. Table 7-1 shows the species for which relative rate data will be measured. It includes the major organic process chemicals, and various intermediate and penultimate species of aging.

Experiments are also in progress to examine the effects of oxygen on the rate of aging. Previous studies have shown that oxygen is consumed by organic aging (Meisel et al. 1993; Ashby et al. 1994; Camaioni et al. 1995, 1996). Similar experiments without oxygen in the headspace are in progress to determine how aging products and simulant energy content may depend on oxygen availability. The headspace gas and condensed phase will be analyzed to determine how much oxygen is consumed when present and if any is produced when it is absent from the headspace at the start of experiments.

Dose rates determine the relative contributions of thermal and radiolytic aging. Since radiolytic aging experiments use dose rates that are much higher than dose rates of tank wastes, a quantitative understanding of dose rate effects is needed to predict rates and product distributions of waste aging. There are good reasons to expect that radiolytic aging is either independent or inversely dependent on dose rate. Oxidants are generated by interaction of radiolytic decay energy with solution (Meisel et al. 1991) and solid-solution interfaces. Oxidants either attack organic species or undergo quenching self-reactions. The relative importance of quenching reactions depends on the oxidation rates and concentrations of organic species relative to the self-quenching rates and concentrations of oxidants.

Because the steady-state concentration of the oxidants is directly dependent on dose rate, and the quenching reactions are second order processes whereas the former are pseudo-first order reactions, decreasing dose rates should shift the competition in favor of organic oxidation over oxidant self-quenching. Verification of this outcome will be tested as part of the model development work that is measuring relative reactivities of organic species. For example, yields of carbonate from irradiation of formate will be measured as a function of dose rate and initial formate concentration.

Table 7-1. Organic Compounds Selected for Relative Rate Experiments.



7.2.2 Organic Aging in Tank Waste

Waste aging is an integral part of the effort to understand and assess the organic complexant hazard. An aggressive campaign to speciate organic tank wastes is underway to bound organic aging. Oxalate and TOC concentrations will continue to be routinely measured on all waste samples. In addition, some waste samples will be speciated to corroborate results from the relative rate experiments on waste simulants.

7.3 ORGANIC SOLUBILITY TESTS

7.3.1 Solubility Experiments with Waste Simulants

Simulant studies will be expanded to test the organic compounds known to exist in the tanks, including IDA that was found in tanks SY-101 and SY-103 (Campbell et al. 1996). Complexant solutions will be combined with metal ions (e.g., iron, aluminum, and chromium) to determine whether metal precipitates will form under waste conditions. Based on the observations described in Barney (1995), aluminum oxalate, iron DBP, and aluminum DBP are not stable if significant concentrations of free hydroxide are present. Metal-organic complexes that have high stability, such as EDTA complexes with thorium, bismuth, or zirconium, will be examined to determine stability and solubility under tank waste conditions.

The effects of dissolved organics on the solubility of other organic compounds will be examined. It seems likely that the presence of organic sodium salts in solution will lower the solubility of other organic sodium salts because of the common ion effect of sodium. There will be other factors involved, however, that could influence organic salt solubility such as organic anion-anion interactions. Several pairs of organic salts will be studied including acetate-citrate and EDTA-NTA.

Experiments are also examining the potential for the soluble complexants and aging byproducts to adsorb on waste particles. Small concentrations (0.001 to 0.01 M) of EDTA, HEDTA, IDA, NTA, citrate, and glycolate will be placed in simulant supernatants (supersaturated with nitrate/nitrite) containing various hydroxide concentrations and at temperatures between 25 and 50 °C. The complexant concentration in solution will be measured to estimate the adsorption that occurs.

7.3.2 Organic Solubility in Tank Waste

Organic solubility data obtained in the laboratory using simulated waste will be compared with actual waste solubility information. Liquid and solid waste samples will continue to be analyzed for TOC. For samples that show high TOC, the waste solids and liquids will be separated by centrifugation over a fritted glass filter. The liquid and solids will be separately analyzed for organic species. This detailed speciation is expected to corroborate that the energetic organic species (i.e., acetate, citrate, EDTA, ED3A, glycolate, HEDTA, and NTA) are in solution, and only the lower energy byproducts (e.g., oxalate) have precipitated.

Future efforts are also focused on refining the estimate of waste dry out rate and selection of those tanks that bound organic solubility. Tanks that are shallow, warm (i.e., contain significant decay heat), and have higher ventilation rates would be at greatest risk. If the organic complexant concentration is too low to support propagation (because either the fuel was removed when interim stabilized or the organic has aged significantly) or the energetic organic species remain in the liquid phase of the bounding tanks, then the tanks can be categorized as *safe* and the safety issue can be resolved for all tanks.

7.4 SAFETY DOCUMENTATION

Considerable progress has been made since the previous assessment of the organic complexant hazard (Webb 1996). Waste sample analyses show that many tank wastes are aging and are forming oxalate over time. TOC analyses also show that the tank waste liquids contain organic fuel, and that this fuel is transferred to DSTs when the tanks are interim stabilized. The double-shell tanks contain aqueous waste and pose negligible risk of point source ignition. This safety analysis will be updated as additional information becomes available from the tanks that bound fuel content, organic aging, and organic solubility. The final assessment of the organic complexant hazard will combine knowledge of organic aging, organic solubility, and the rate of waste dryout. In turn, this knowledge will direct any necessary monitoring or mitigation activities.

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APPENDIX A

THE 1957 KYSHTYM ACCIDENT

The Kyshtym incident resulted from disruption of a decay heat removal system that resulted in severe overheating and combustion of a sodium acetate - sodium nitrate mixture (Fisher 1990). A layout of a typical Kyshtym tank (1 of 60) is shown in Figure A-1. During normal operation (see Figure A-2), the actively cooled tank contained about 175 m^3 of waste solution with about 100 g/L of sodium nitrate and about 60 g/L of sodium acetate. The estimated decay heat of about 200 kW (this is considerably higher than the Hanford Site tank heat loads) was removed at temperatures well below 100 °C. Disruption of the active cooling system, however, led to complete loss of all water leaving behind a solid residue (containing ~10,000 kg of sodium acetate) which continued to overheat and resulted in a severe over-pressurization event when the temperature reached about 300 °C (Figures A-3 and A-4).

Consistent with the above observation, Reactive System Screening Tool (RSST) calorimeter tests with various sodium acetate-sodium nitrate mixtures have demonstrated the onset of combustion at a temperature of about 300 °C when the sodium acetate concentration exceeded about 20 wt% (Babad and Turner 1993). A simulation of the Kyshtym incident is illustrated in Figure A-5. Extrapolation of the noted RSST pressure to the Kyshtym tank suggests a pressure buildup of about 400 psi for the case where the tank does not vent. However, the required overpressure to lift the 160,000 kg tank head plate is only about 4 psi. This plate was found some distance from the incident tank.

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Figure A-1. Kyshtym Tank Layout

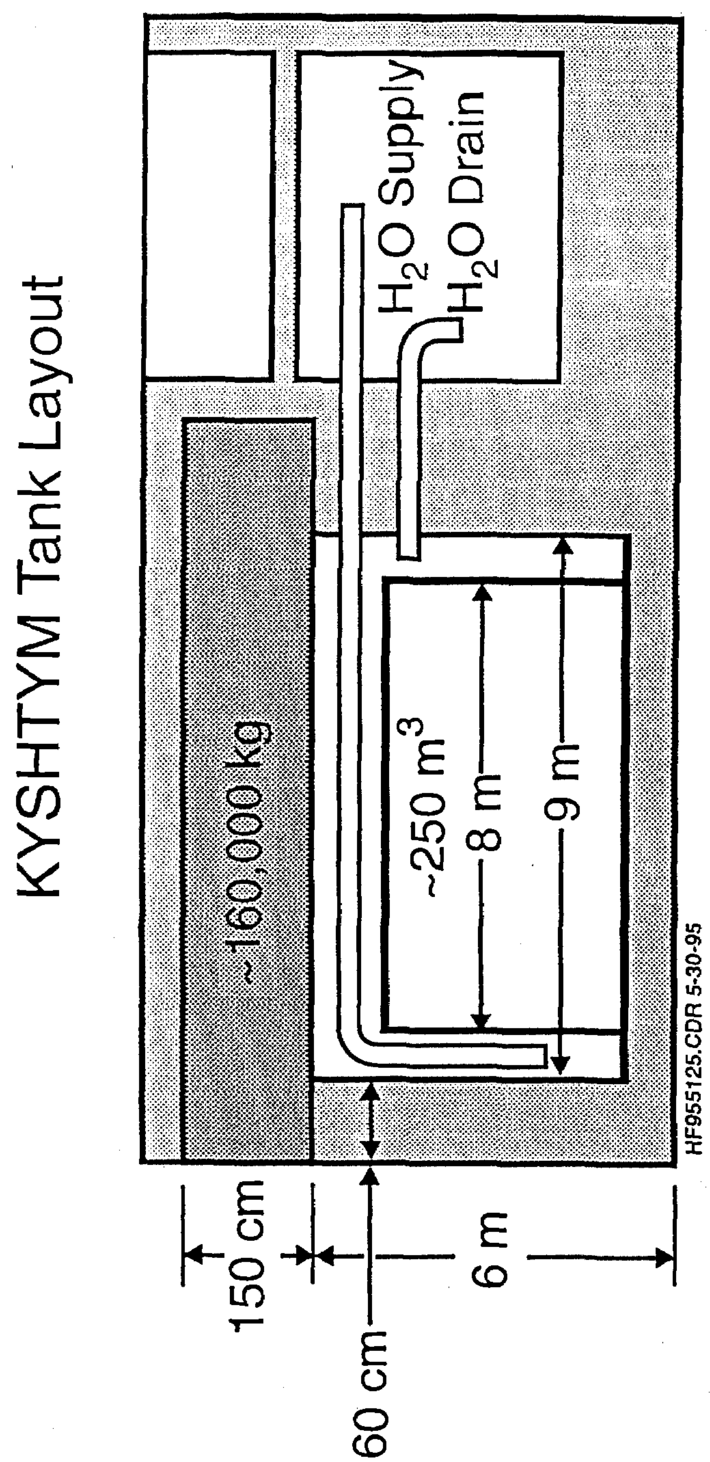


Figure A-2. Kyshtym Normal Operation

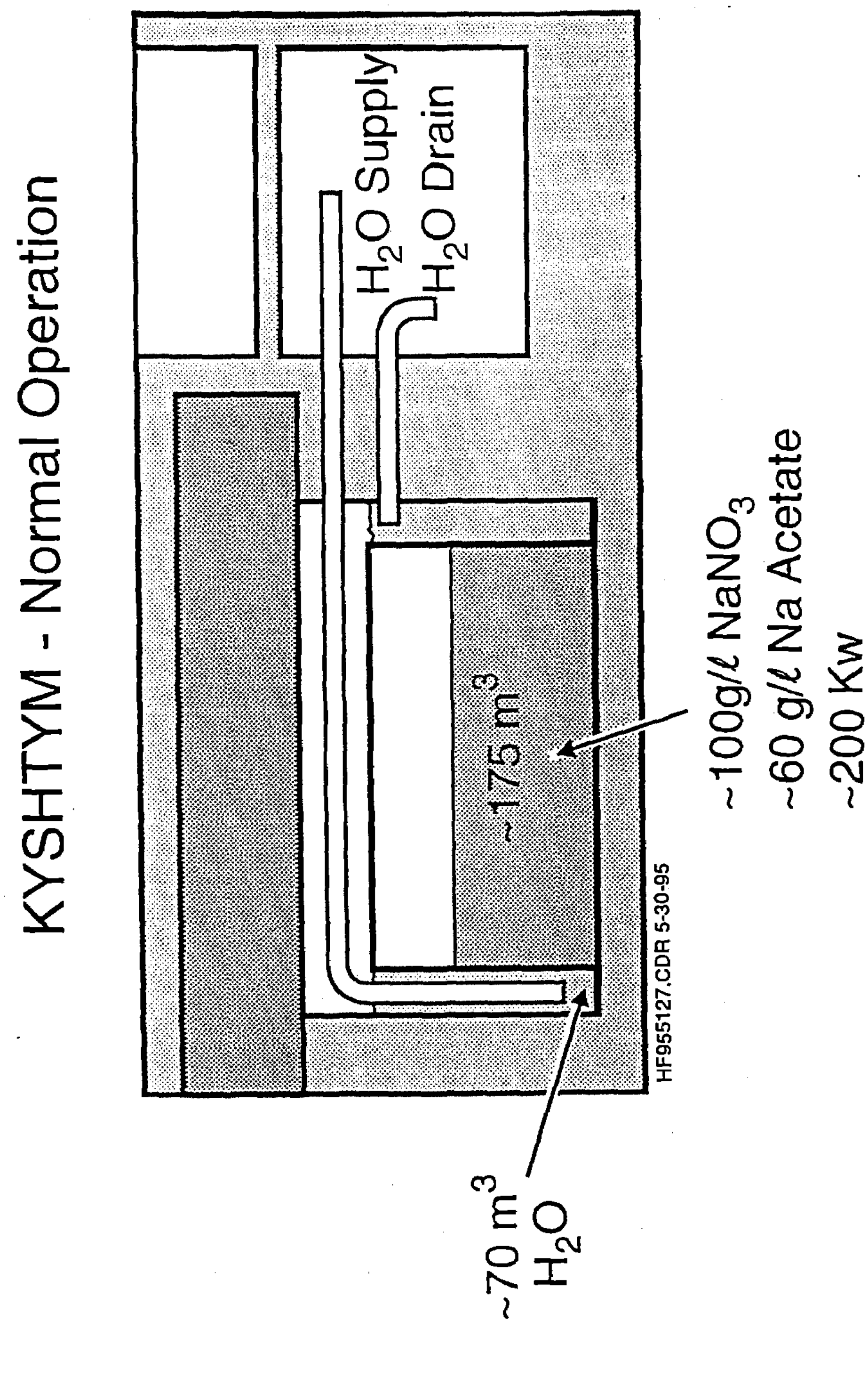


Figure A-3. Kyshtym Incident - Loss of Coolant

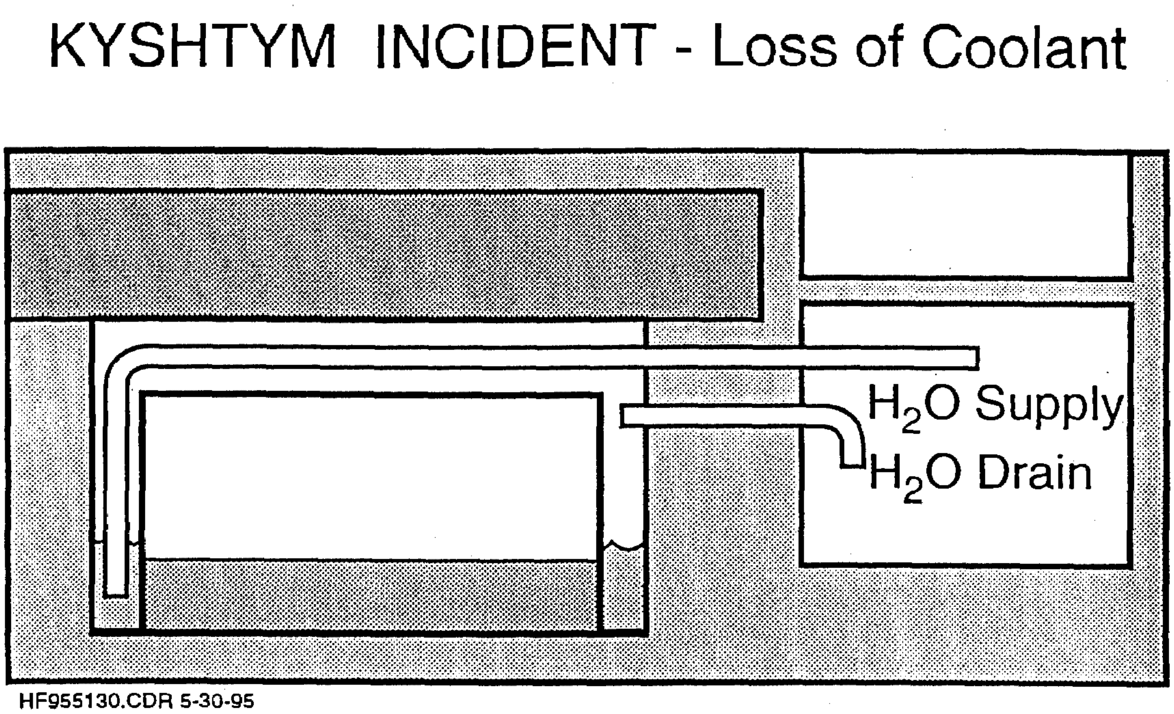


Figure A-4. Kyshtym Incident - Final Stage

KYSHTYM INCIDENT - Final Stage

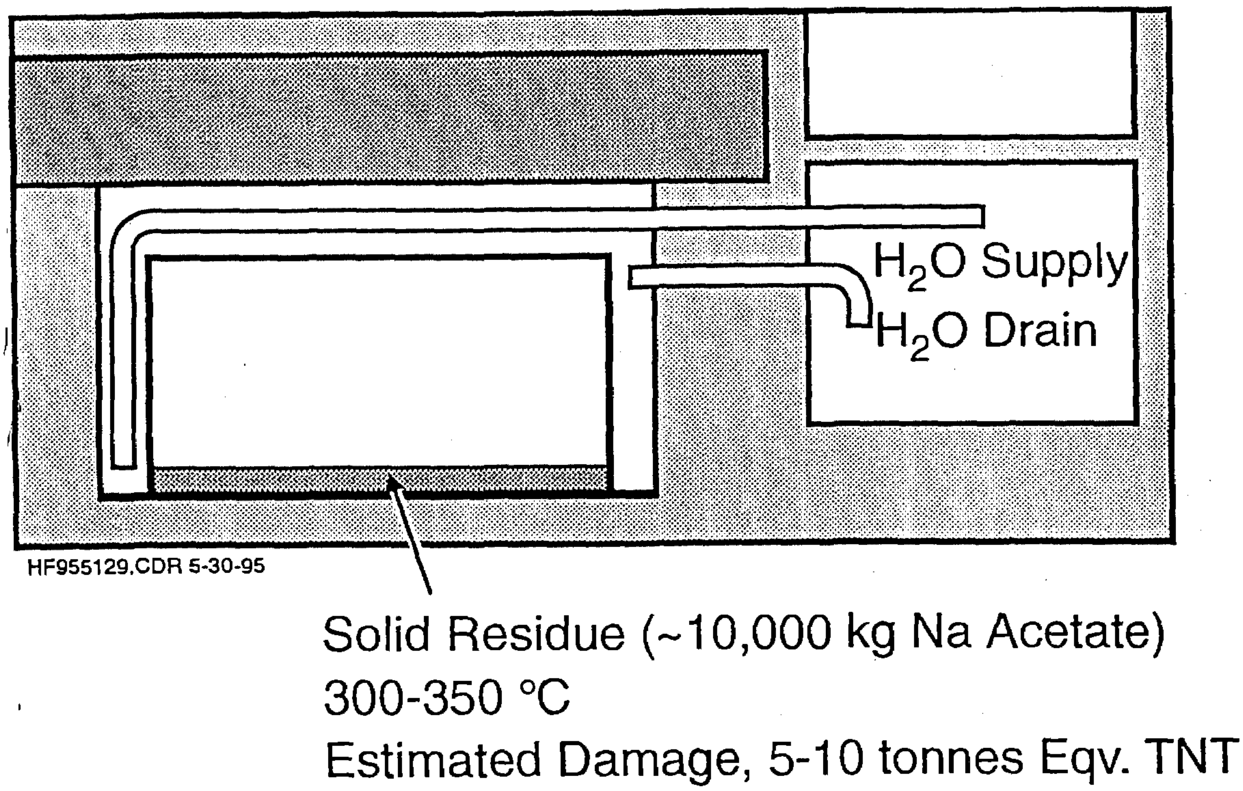
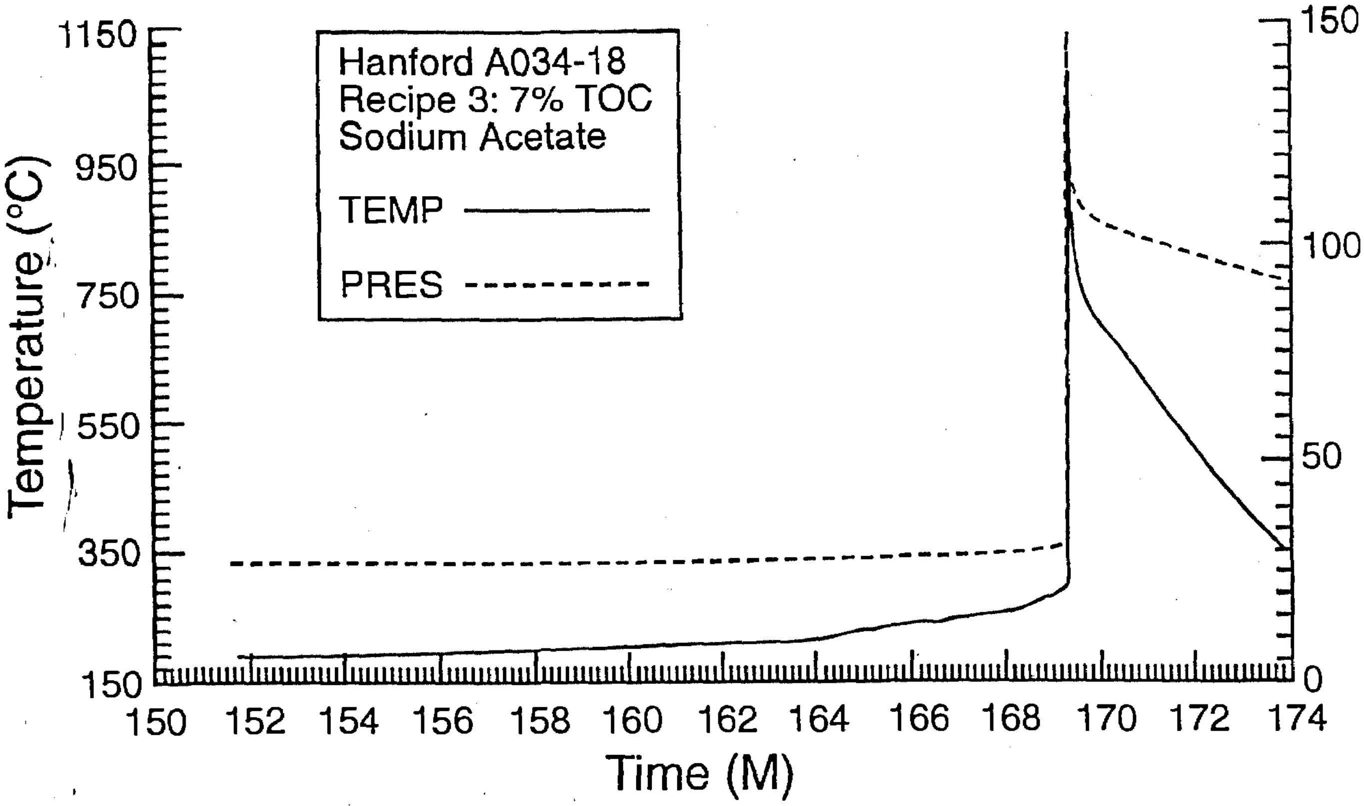


Figure A-5. RSST Simulation of Kyshtym Incident - Following Loss of Water



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APPENDIX B

TANK A-101 TEMPERATURE TRENDS

1.0 INTRODUCTION

An analysis of the time-averaged temperature in the dome space of tank A-101 by Crowe et al. (1993) indicated that the temperature in the dome space had increased by 0.5 °F per year from January 1988 to March 1993. A subsequent analysis of the thermal information for the dome space and the waste for the interval between January 1993 and September 1995 (Crowe 1995) concluded that the temperatures of the wastes in the lower 23 feet of the tank were cooling, but that the wastes in the upper 6 to 7 feet of the waste were warming by between 0.5 and 1.4 °F per year. Ogden et al. (1996) completed out an evaluation of the temperature behavior of tank A-101 from January 1993 to January 1996. They reaffirmed the general conclusions of the previous study that the first 23 feet of the wastes were cooling, and pointed out that the averaged dome gas space and waste/dome gas space interface temperatures were increasing at the rate of approximately 1.25 to 1.45 °F per year. Several different explanations have been considered for the seemingly unusual temperature behavior of this tank (Ogden et al. 1996, Fauske 1997), and it was recommended that the temperatures in tank A-101 continue to be monitored (Ogden et al. 1996).

2.0 MORE RECENT OBSERVATIONS

The analytic information for the cores removed from the tank in 1996 (Field et al. 1997) and the retained gas sampler program (Shekarriz et al. 1997) and other observations including the temperature profile and gamma scan for a prolonged interval provided a new perspective about the distribution of the waste in tank A-101 (Stock 1997). The new body of evidence has established that the waste in tank A-101 is distributed between a lower, essentially liquid, convective layer (approximately 525,000 gallons) that contains only 0.4 % voids and an upper nonconvective layer that consists of wet solids (approximately 410,000 gallons) containing about 15 % voids. The temperature profile (Figures B-1, B-2, B-3, and B-4) and the other recent findings locate the interface between the two layers at about 190 inches from the bottom of the tank (Stock 1997).

The temperature profile also indicates that the temperature of the larger lower, convective layer is quite uniform. There is only an 8 °F temperature gradient from the cooler bottom of the tank to the interface between the lower convective layer and the upper nonconvective layer. However, the upper, non-convective layer has a large temperature gradient (about 60 °F) from the interface between the convective and nonconvective layers, to the interface between the nonconvective layer and the dome space.

Figure B-1. Tank A-101 Temperature Trends from May 1993 to April 1997 for Thermocouples 1 through 4.

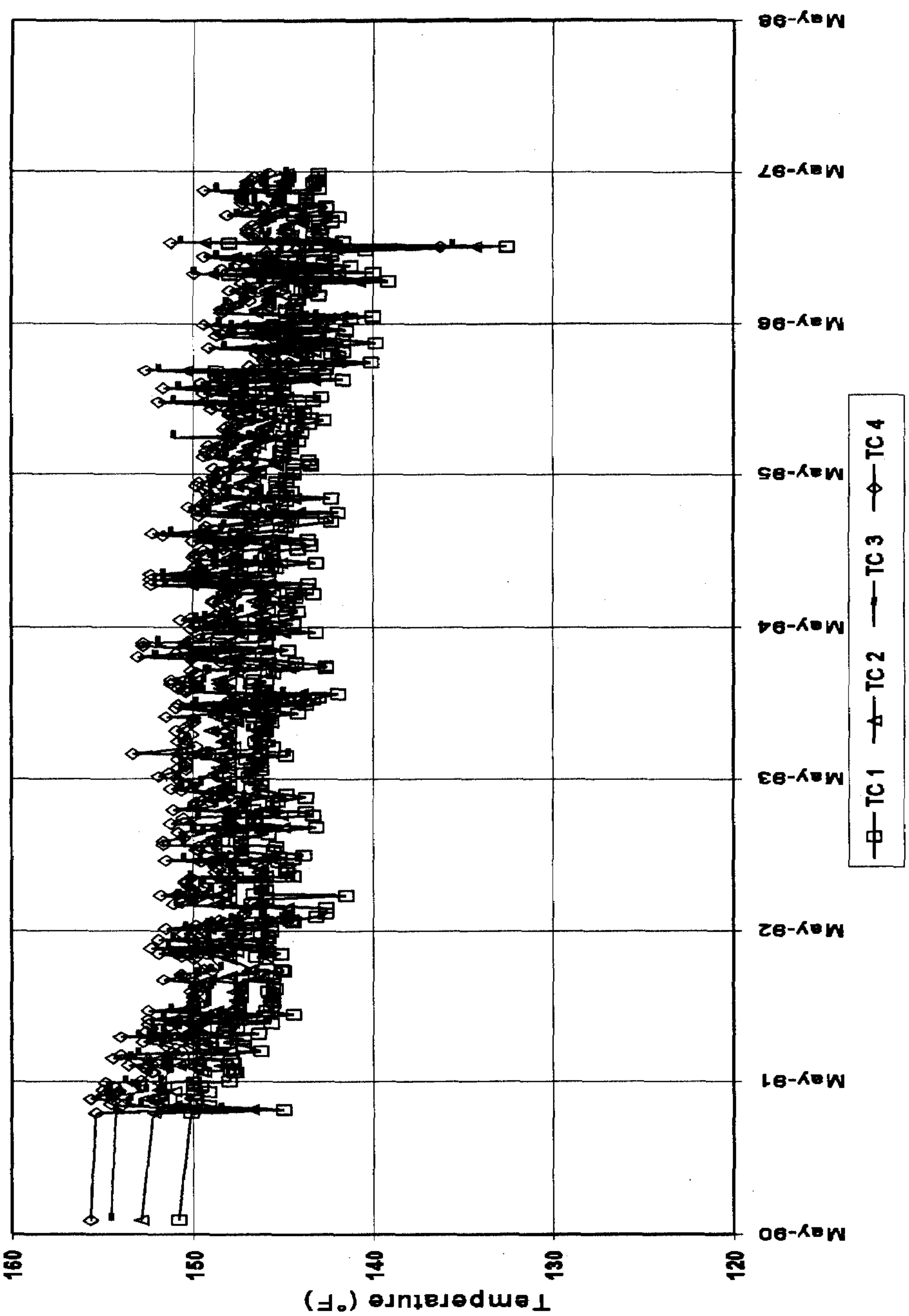


Figure B-2. Tank A-101 Temperature Trends from May 1993 to April 1997 for Thermocouples 5 through 8.

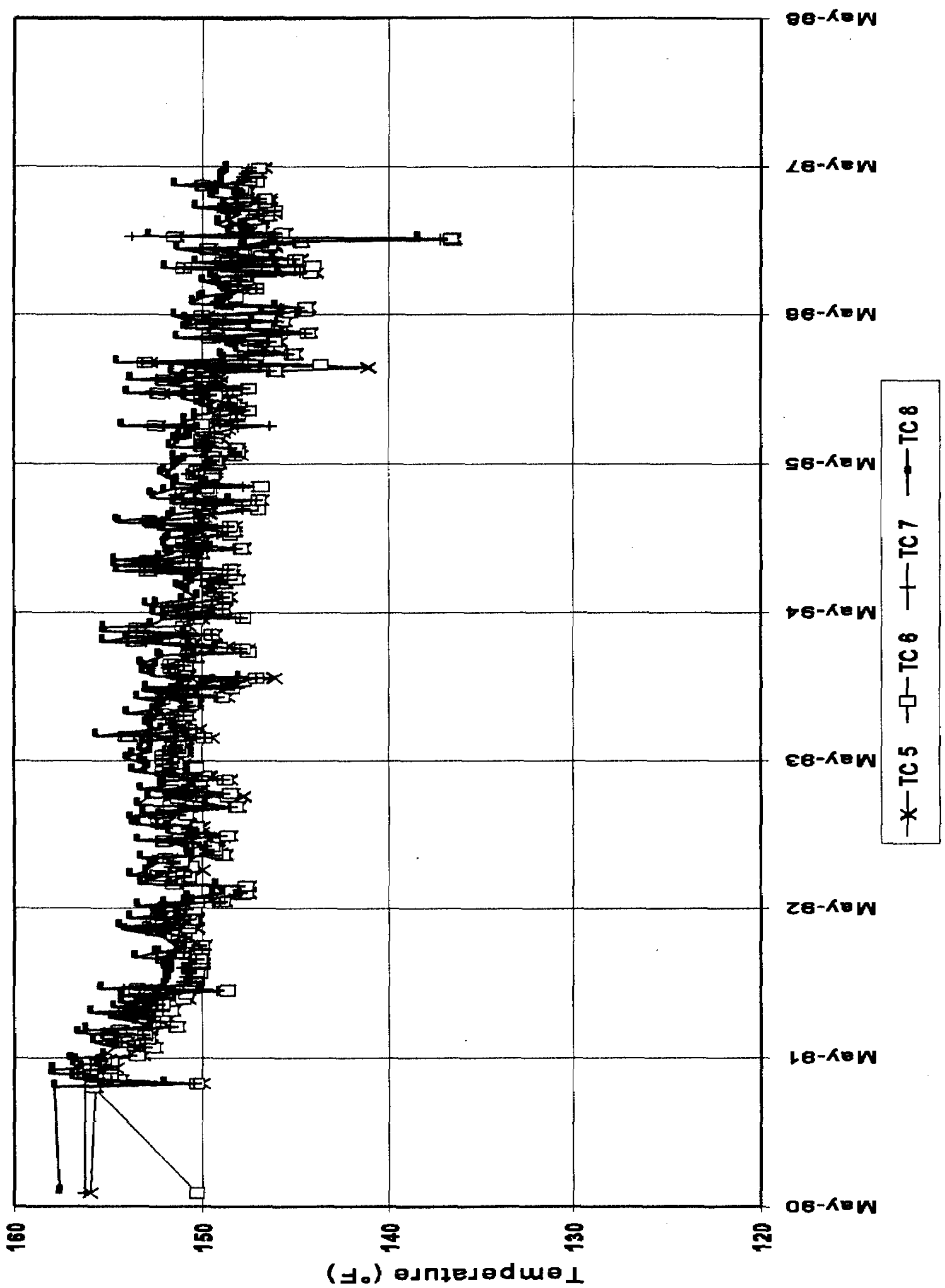


Figure B-3. Tank A-101 Temperature Trends from May 1993 to April 1997 for Thermocouples 9 through 13.

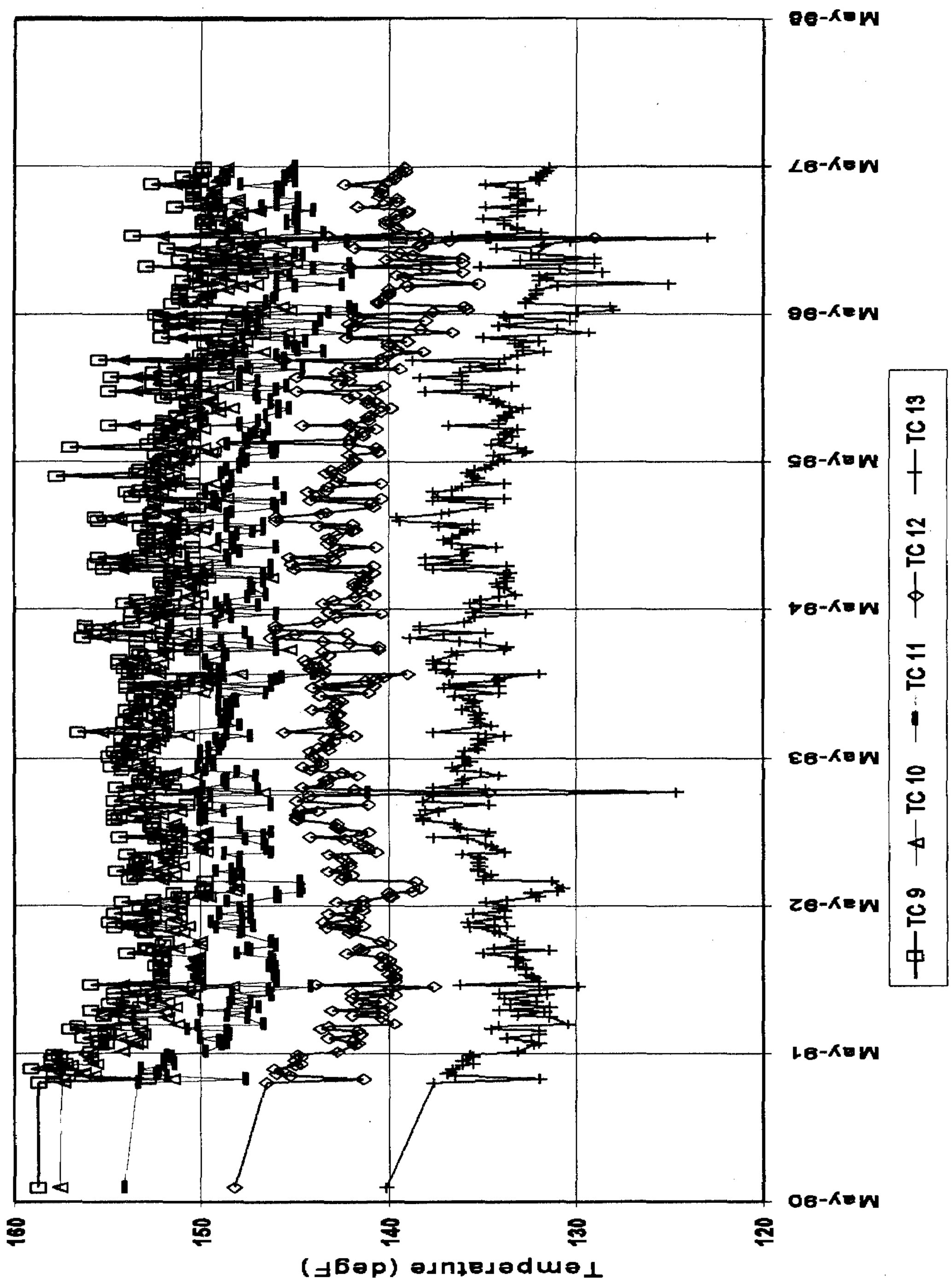
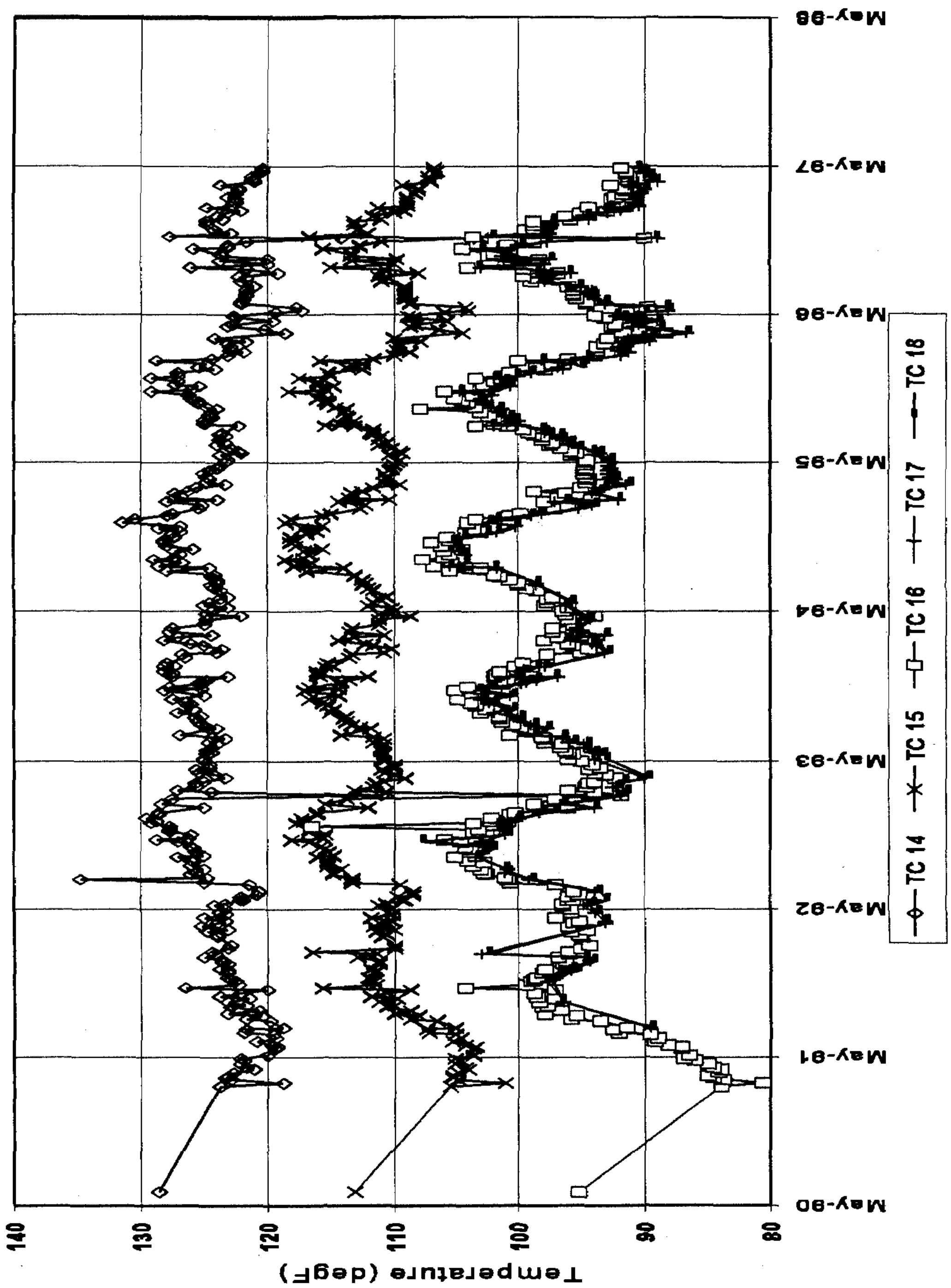


Figure B-4. Tank A-101 Temperature Trends from May 1993 to April 1997 for Thermocouples 14 through 18.



Representative temperature information for tank A-101 from May 1991 to March 1997 is displayed in Figures B-1 through B-4. The temperature profile for thermocouple four, which is located approximately six feet from the bottom of the tank near the center of the lower convective layer is shown in Figure B-1. Regression analyses of the data for the six year interval indicates that the temperature at this point in the waste has cooled from 152 °F in 1991 to 147 °F in 1997 in accord with the previous conclusion (Ogden et al. 1996) that the waste at this location was cooling by 0.81 °F per year.

The temperature profiles provided by the three thermocouples in the top six to seven feet of the upper nonconvective layer are shown in Figure B-4. Seasonal temperature variations influence the temperature of the waste in this region. Analysis of the thermal behavior of this portion of the waste is also complicated by the fact that ventilation equipment was operated intermittently in 1990 and possibly in 1991 (Ogden et al. 1996). Consequently, the data for these thermocouples, especially the results for 1991 and 1992, are difficult to interpret. The most recent results show that the temperatures in the upper 6 to 7 feet of the waste, which are monitored by thermocouples 14, 15, and 16, increased from 1991 to 1994 and then declined from 1994 to 1997.

This feature is very well illustrated by the measurements of the top thermocouple (#18), Figure B-4, which closely parallels the temperature changes in the dome space. Ogden et al. did not weight the observation that the temperatures measured in 1995 were lower than the temperatures measured in 1994 and they concluded that the data for the interval from January 1993 to January 1996 meant that the rate of temperature increase was 1.25 °F per year at this location. Examination of the recent data suggests that a maximum temperature was reached late in 1994, and that the waste at this location has been cooling, rather than warming since that time. The results for thermocouples 14 and 15 exhibit essentially the same trends with decreases in the maximum and minimum temperatures realized in 1995 and 1996, compared to the observations for 1994.

In summary, all measurements from 1991 to the present for all the waste in the lower convective layer and the lower component of the nonconvective layer indicate that this region (about 75 % of the total) was cooling over the past six years. The wastes in the upper portion of the tank were apparently warming from 1991 to 1994, but the warming trend has reversed in the past three years. All the waste in the tank now is cooling.

3.0 INTERPRETATION OF OBSERVATIONS

Analyses of the cores (Field et al. 1997) show that the organic content of the lower convective layer is approximately 0.25 wt%, and the organic content of the nonconvective layer is approximately 0.50 wt % (1.00 wt% TOC - 0.50 wt % carbon in oxalate ion). Hence, the ongoing oxidation of the organic constituents contributes quite modestly to the heat load. This finding coupled with the fact that the cooling characteristics of the lower 23 feet of the waste in Tank A-101 parallel the behavior of the wastes in the other Hanford tanks very strongly indicates that the cooling rates observed for tank A-101 are the consequence of the decreasing radiolytic heat load (Ogden et al. 1996). This feature of the results has already been discussed by Ogden and his associates.

The temperature behavior of the wastes in the upper part of the tank have been much less consistent during the past six years for which reliable temperature data have been available. The information for the first three years cannot be confidently interpreted because the ventilation system was used intermittently. Ogden et al. (1996) examined the data for the interval from 1993 through 1995 and concluded that the temperature for this region was increasing, but the more recent data shown in Figures B-2 and B-3 indicate that the temperature trend has changed and that the wastes in this region are now cooling.

Tank A-101 differs from the other tanks because the hotter convective layer is located beneath a gas rich nonconvective layer (Stock 1997), and because gas is continuously forming and evolving (Shekarriz et al. 1996).

Ogden and his coworkers pointed out that a change in the rate of heating or cooling of 1.3 °F per year is equivalent to a heat change of only 100 watts (Ogden et al. 1996). Such modest changes can be realized in several different ways, including heat from precipitation of salts, chemical heat from organic oxidization, and changes in heat transfer. The merit of each of these explanations is considered below.

3.1 HEAT FROM SALT CRYSTALLIZATION

The crystallization of sodium nitrate liberates about 21 kJ per mole. Ogden and his coworkers (1996) considered the possibility that water loss and salt crystallization might warm the upper layer. The conclusion was that the heat from this source would be insufficient to account for the projected temperature increase of 1.3 °F per year. This temperature increase corresponds to the release of approximately 100 watts in the uppermost portions of the waste (Ogden et al. 1996, Fauske 1997). Approximately 1.5 (10^5) moles of sodium nitrate would have to crystallize each year [i.e., 1.5 (10^5) moles the first year, 3.0 (10^5) moles the second, and 4.50 (10^5) moles the third year] to sustain this temperature change. The top three feet of waste contains only 1,200,000 moles of sodium nitrate, the vast majority of which is already in the solid state in the non-convective layer. It is implausible that salt crystallization is responsible for the observed temperature increase.

3.2 CHEMICAL HEAT FROM ORGANIC OXIDATION

Agnew et al. (1996) suggest that 0.06 mole fraction of carbon is oxidized to produce 509 kJ per mole of carbon per Curie per year. The rate of heat production from the decomposition of organic compounds was postulated to be as high as 1.1 kW per year (Agnew et al. 1997), about 15 % of the total heat load in tank A-101. Information of this kind prompted Ogden et al.

(1996) to consider the possibility that oxidation of organic compounds might selectively warm the upper layers. They concluded that the oxidation of organic compounds could not be solely responsible for the temperature increase in the upper portions of the waste because the concentrations of the organic compounds were too low and could not supply sufficient heat of reaction to warm the upper layer for a prolonged interval. The calculation below confirms this observation.

Ignoring the temperature increase between January 1991 and December 1992 for the moment, the upper three feet of waste has increased in temperature about 1.3 °F per year for the period between January 1993 and January 1996. From Ogden et al. (1996), this would take an increased power output of 100 Watts per year (i.e., a total of 600 Watts over the three year period) to achieve this temperature rise. The chemical energy required for this power output is

$$600\ \mathrm{J\,sec^{-1}} \cdot 3.145(10^{7})\ \mathrm{sec} \ = \ 1.89(10^{10})\ \mathrm{J}$$

For the organic material placed in the tank, the energy one could expect is about 5.09 (10^5) J mole^{-1} (Agnew 1996). This equates to 3.71 (10^4) moles of material oxidized over this three year period. Recent core sample results show that the upper non-convective layer of waste has a fairly uniform TOC concentration of 0.5 wt% (Field et al. 1997). Organic speciation reveals that about 50% of the TOC remaining has been aged to low energy oxalate (Field et al. 1997). The moles of organic carbon in this top three feet is

$$0.0050\frac{\mathrm{kg\ of\ TOC}}{\mathrm{kg\ of\ waste}}\left(330\ \mathrm{m^3\ of\ waste}\right)\left(1500\ \frac{\mathrm{kg\ of\ waste}}{\mathrm{m^3\ of\ waste}}\right)\left(83.3\ \frac{\mathrm{moles\ of\ TOC}}{\mathrm{kg\ of\ TOC}}\right) = 2.06\ (10^{5})\ \mathrm{moles}$$

It would take oxidation of about 18% of the available TOC to produce this temperature rise. The waste has been stored for 17 years, and it is unlikely that this much oxidation occurred between 1993 to 1996. If this rate were sustained throughout the storage time, essentially all of the organic would have been consumed by now. Furthermore, experiments indicate that the rate of oxidation depends primarily on the dose rate (Camaioni et al. 1996). Oxidation would have been more favorable in 1980 when the dose rates were higher. The observed variations in the temperature profiles are inconsistent with the trends expected on the basis of the dose rate.

Although chemical oxidation could contribute a small amount to the temperature trend, it is highly unlikely that it is the primary contributor to the small fluctuations in temperature.

3.3 CHANGES IN HEAT TRANSFER

Ogden et al. (1996) examined several alternative explanations related to changes in the rate of heat transfer from the contents of the tank to the surroundings. They noted that changes in the temperature of the upper waste and the dome space could be caused by variations in tank breathing rate, the rate of drying of the surface of the waste, and changes in the conductivity of the soil overburden. Fauske (1997) discussed the same features, and concluded that relatively small changes in the ambient air temperature, thermal conductivity of the tank overburden, or alterations in the convective heat transfer in dome space could influence the temperature of the waste. A change of 2.3% in the thermal conductivity of the soil would reduce cooling enough to account for the temperature rise in the headspace (Fauske 1997). Temperatures in the headspace and upper waste are influenced by changes in ventilation rate, thermal conductivity of the overburden, and similar parameters. These small changes offer the most plausible explanation for the small temperature fluctuations observed in tank A-101.

4.0 CONCLUSIONS

In conclusion, the small increases and subsequent decreases in temperatures in the dome space and the upper 6 to 7 feet of the waste in tank A-101 appear to be related to small and unpredictable external climatic induced changes in the heat transfer rate rather than to internal chemical or physical changes.

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APPENDIX C

SUMMARY OF PROPAGATION TESTS ON ORGANIC WASTE SIMULANTS AND WASTE SAMPLES

1.0 INTRODUCTION

A large number of tests including both Reactive System Screening Tool (RSST) and tube propagation tests have been performed to date. Samples ranging from 10 (RSST tests) up to 50 g (tube propagation) were made up of reagent grade chemicals. The chemicals were ground using a mortar and pestle to sizes generally less than 100 μm and mixed in a small beaker, which is vigorously stirred prior to loading the samples into appropriate test cells. Measured quantities of key interest included ignition and combustion temperatures, the fuel concentration required to support propagating reactions, and moisture concentration that would inhibit such reactions. A summary of key data and the testing techniques used are provided below.

2.0 REACTIVE SYSTEM SCREENING TOOL

The Reactive System Screening Tool (RSST) was used to measure the ignition temperature. The RSST (Figure C-1) consists of a spherical glass reaction vessel, its surrounding jacket heater and insulation, a thermocouple (imbedded in sample), a pressure transducer, a stainless steel containment vessel, and, not shown, a magnetic stirrer base, a control box containing the heater power supply, temperature/pressure amplifiers, and a data acquisition and control panel. The sample cell volume is 10 mL and the containment volume is 350 mL. A key feature of the apparatus is its low effective heat capacity relative to that of the sample whose value, expressed as the capacity ratio, is ~1.04 (i.e., quite adiabatic).

Typically, a sample (~10 g) was heated at a constant rate of approximately 1 °C per minute and the sample self-heat rate (dT/dt) was found as a function of sample temperature under an essentially zero heat loss conditions. Figure C-2 is an example of the reaction kinetics for an initially solid waste simulant of sodium acetate, sodium nitrate, and sodium hydroxide, with a sodium acetate concentration of 24 wt% [or 7 wt% total organic carbon (TOC) content]. For this test, significant exothermic activity was noted at about 200°C which led to a runaway reaction exhibiting an Arrhenius type dependence on temperature up to approximately 300°C; at this temperature, a dramatic step change in the rate of temperature rise was observed. This is interpreted as a threshold for rapid wave-like reaction propagation, and the temperature of 300°C is referred to as the ignition temperature.

Figure C-1. Reactive System Screening Tool Containment and Test Cell

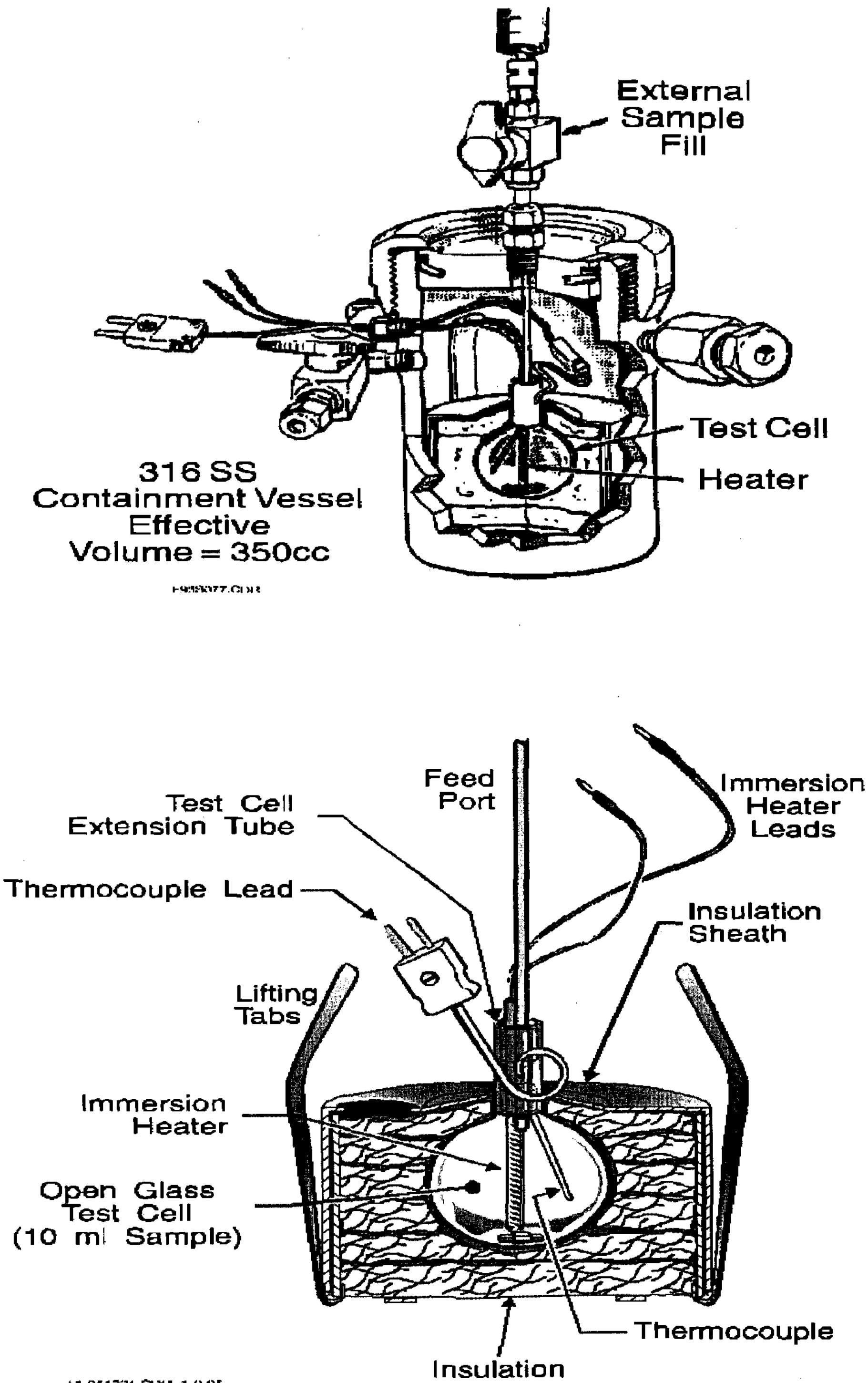
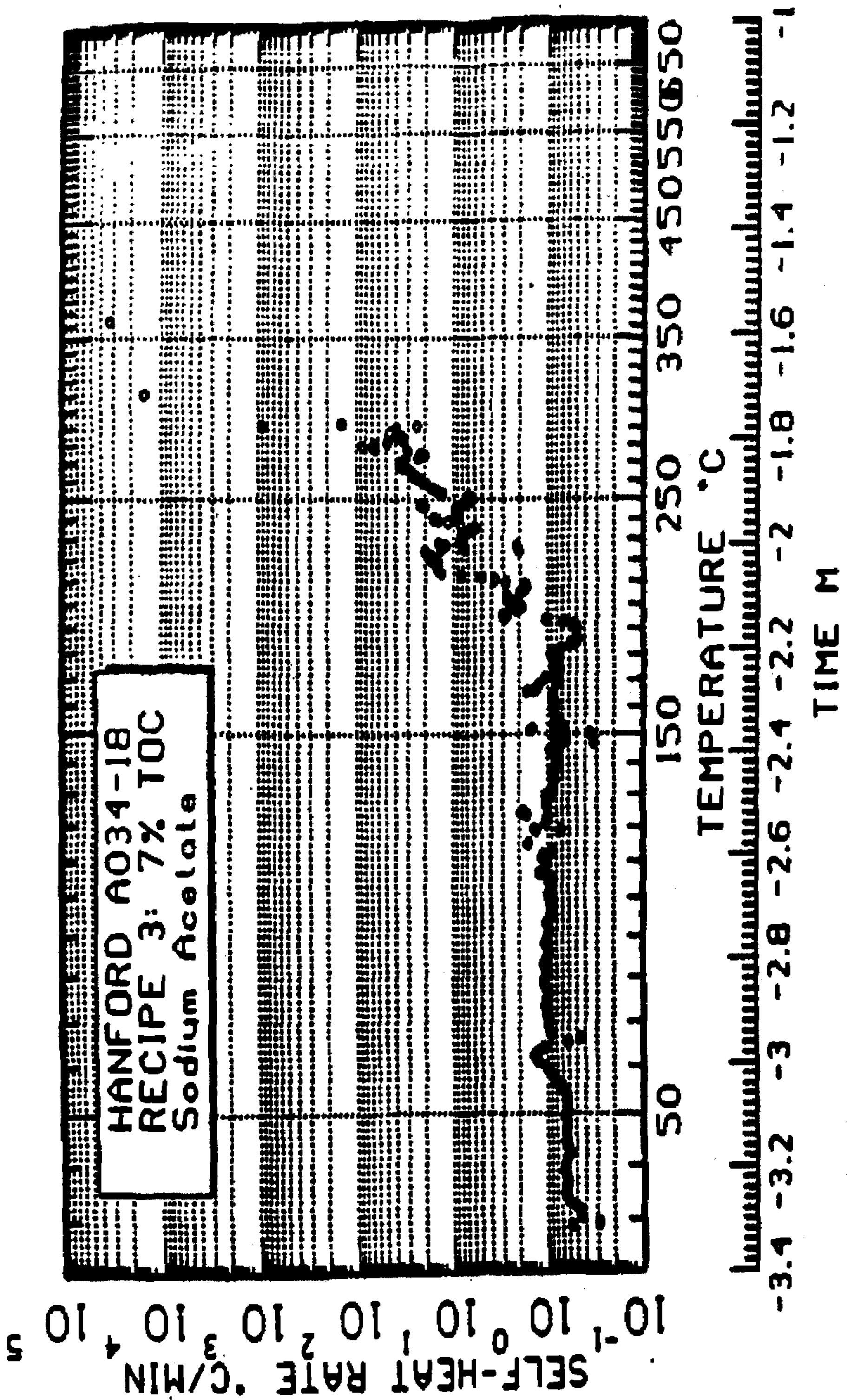


Figure C-2. Transition From a Homogeneous Runaway Reaction to a Propagating Reaction Occurring at About 300°C



It is important to note that the onset of propagating reactions in the RSST tests occurs when the entire sample has essentially reached the ignition temperature. This is in contrast to the dedicated tube propagation tests discussed in Section 3.0 of this Appendix in which propagation can occur at ambient waste temperature given an adequate ignition source. The simulant mixtures tested in the RSST are reviewed in Table C-1. Examples of measured ignition temperatures are listed in Table C-2. Table C-2 shows that the lowest ignition temperature of about 220°C is about 200°C higher than typical waste temperatures, and that the ignition temperatures are not significantly affected by the presence of transition metals (Fauske 1996).

Table C-1. Description of Simulant Mixtures Tested by RSST and Propagation Results.

Organic Fuel	TOC (wt%)	$NaNO_3$ (wt%)	$NaNO_2$ (wt%)	NaOH (wt%)	Propagate
Na Acetate	3.0	67.8	16.8	7.2	No
Na Acetate	3.5	62.9	16.8	8.5	No
Na Acetate	5.0	59.7	14.6	8.5	No
Na Acetate	5.0	59.7	14.6	8.5	No
Na Acetate	5.0	59.7	14.6	8.5	No
Na Acetate	5.0	59.7	14.6	8.5	No
Na Acetate	5.0	66.4	16.6	0.0	No
Na Acetate	5.0	61.6	15.5	5.8	No
Na Acetate	5.0	56.2	14.1	12.6	No
Na Acetate	7.0	51.4	12.6	12.0	Yes
Na Oxalate	11.0	16.4	4.1	18.4	No
Nitrododecanoic Acid	5.0	66.5	16.7	8.5	Yes
Nitrododecanoic Acid	5.0	67.2	17.2	0.8	Yes
Na Stearate	4.0	70.9	17.6	5.8	No
Na Stearate	6.0	66.4	16.5	8.6	Yes
Na Stearate	6.0	73.2	18.2	0.0	Yes
Na Stearate	6.0	45.9	11.4	34.2	No
Na Stearate	8.0	61.9	15.5	11.3	Yes
NaEDTA	5.0	55.1	14.0	15.5	No

Table C-2. Measured Combustion Data for Organic Complexants: Lower Propagation Limit, LPL, at 30°C, Ignition Temperature, T_{ig}, Combustion Temperature, T_c, and Burn Velocity, U_b.

Organic Complexant	Fuel (TOC) (wt%)	$NaNO_3$ (wt%)	$NaNO_2$ (wt%)	NaOH (wt%)	Inert[1] (wt%)	H_2O (wt%)	T_{ig} (°C)	T_c (°C)	U_b ($m\ s^{-1}$)
NaAcetate	20.5 (6)	47.2	11.8	20.5	--	--	~ 300	~800	~ 3.3 • 10
$Na_3Citrate \cdot 2H_2O$	32.7 (8)	41.7	10.4	15.2	--	4.0	230	~ 800	~ 3.0 • 10
$Na_3HEDTA \cdot 2H_2O$	19.0 (6)	49.6	12.4	19.0	--	1.8	220	~ 800	~ 2.5 • 10
47.5% Na_3 HEDTA•$2H_2O$ / 52.5% $Na_3Citrate \cdot 2H_2O$	21.0 (6)	29.7	13.8	22.5	12.5	6.8	~ 230	~ 730	~ 2.0 • 10
31.6% NaGlycolate / 30.6% $Na_3Citrate \cdot 2H_2O$ / 29.8% $Na_3HEDTA \cdot 2H_2O$ / 7.9% $Na_4EDTA \cdot 2H_2O$	22.3 (6)	29.4	13.7	22.3	12.3	6.0	~ 230	~ 700	~ 1.7 • 10

Notes: [1] The inert was a mixture of 40.7% $Al(NO_3)_3 \cdot 9H_2O$, 1.1% $Na_2SiO_3 \cdot 9H_2O$, 5.5% NaF, 1.5% Na_2SO_4, 3.9% $Na_3PO_4 \cdot 12H_2O$, 37.1% $Fe(NO_3)_3 \cdot 9H_2O$, 0.7% $Cr(NO_3)_3 \cdot 9H_2O$, 1% $Ni(NO_3)_2 \cdot 6H_2O$, 0.4% $Mn(NO_3)_2$, 0.5% KNO_3, 0.01% $Pd(NO_3)_2$, 0.02% $Ru_4 \cdot 5H_2O$, 0.02% $Rh(NO_3)_3 \cdot 2H_2O$, 2.3% $de(NO_3)_3 \cdot 6H_2O$, 1.9 $Bi(NO_3)_3 \cdot 5H_2O$, 3.3% $Pb(NO_3)_2$.

Waste samples from ten tanks have been tested by RSST and/or by tube propagation [using the Propagating Reactive System Screening Tool (PRSST)]. The samples were selected because the measured TOC concentration exceeded 3.0 wt% or differential scanning calorimetry (DSC) analysis showed a heat of reaction greater than 480 J g^{-1}. The TOC concentration for the waste samples tested and the results are summarized in Tables C-3 and C-4. Plots of dT/dt versus temperature are shown in Figures C-3 through C-13. None of the tank waste samples exhibited propagation (see Figure C-2 for example of propagation in a simulant mixture), even those that exceeded the 4.5 wt% TOC criterion.

Table C-3. Summary of Adiabatic Calorimetry (RSST) Tests on Tank Waste Samples.

Tank	Waste TOC (wt%, dry)	TOC of Sample tested (wt%, dry)	DSC Result[1] (J g^{-1}, dry)	Propagate[2]
AN-107	4.5 - 9.8	5.5[3]	-1300	No
AW-101	0.8 - 2.0	2.0	-990	No
BY-104	0.2 - 2.6	0.8	-770	No
BY-105	0.1 - 1.1	0.4	-1500[4]	No
BY-108	0.2 - 3.2	3.2	-590	No
C-201	4.4 - 5.1	5.1	-690	No
C-204	6.0 - 13	13[5]	>-1200	No
U-102	0.4 - 2.4	2.3	-620	No
U-106	1.5 - 4.9	4.9	-880	No

Notes: [1] Highest measured DSC exotherm for the sample.
[2] Propagation behavior measured by RSST is described in Appendix C.
[3] Chemical speciation of the organic in tank AN-107 showed that the TOC was about 70% low molecular weight acids and 30% chelators/chelator fragments.
[4] There was high variability in the DSC measurements for BY-105 waste. RSST was performed to further access the sample.
[5] Chemical speciation of the organic in tank C-204 showed that the TOC was tributyl phosphate solvent.

Table C-4. Summary of Tube Propagation (PRSST) Tests on Tank Waste Samples.

Tank	Waste TOC (wt%, dry)	TOC of Sample tested (wt%, dry)	DSC Result (J g^{-1}, dry)	Propagate
U-105	1.2 - 3.3	3.3	-630	No

Figure C-3. Change in Self-Heating Rate (dT/dt) as a Function of Temperature for AN-107 Tank Waste.

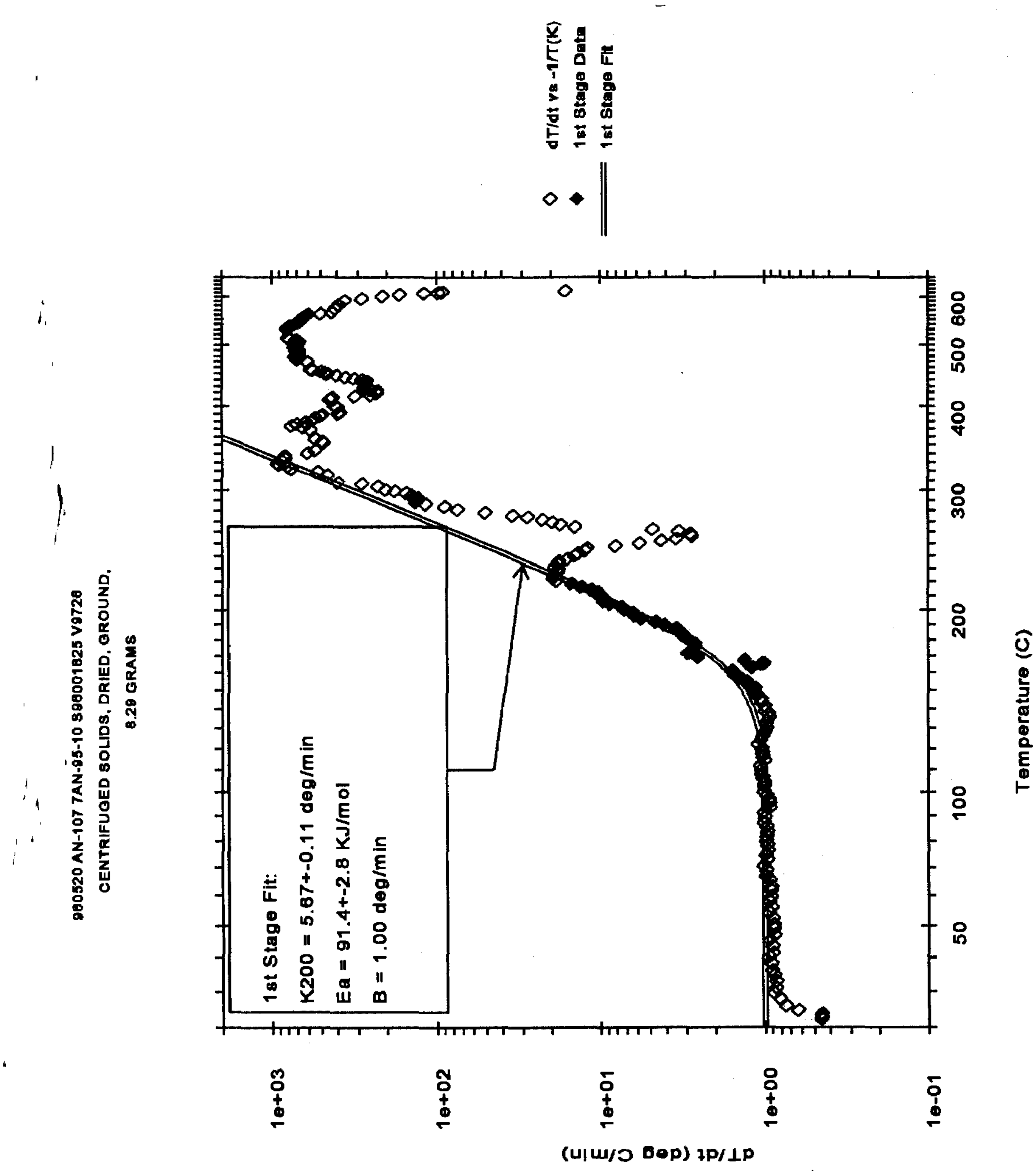


Figure C-4. Change in Self-Heating Rate (dT/dt) as a Function of Temperature for AW-101 Tank Waste.

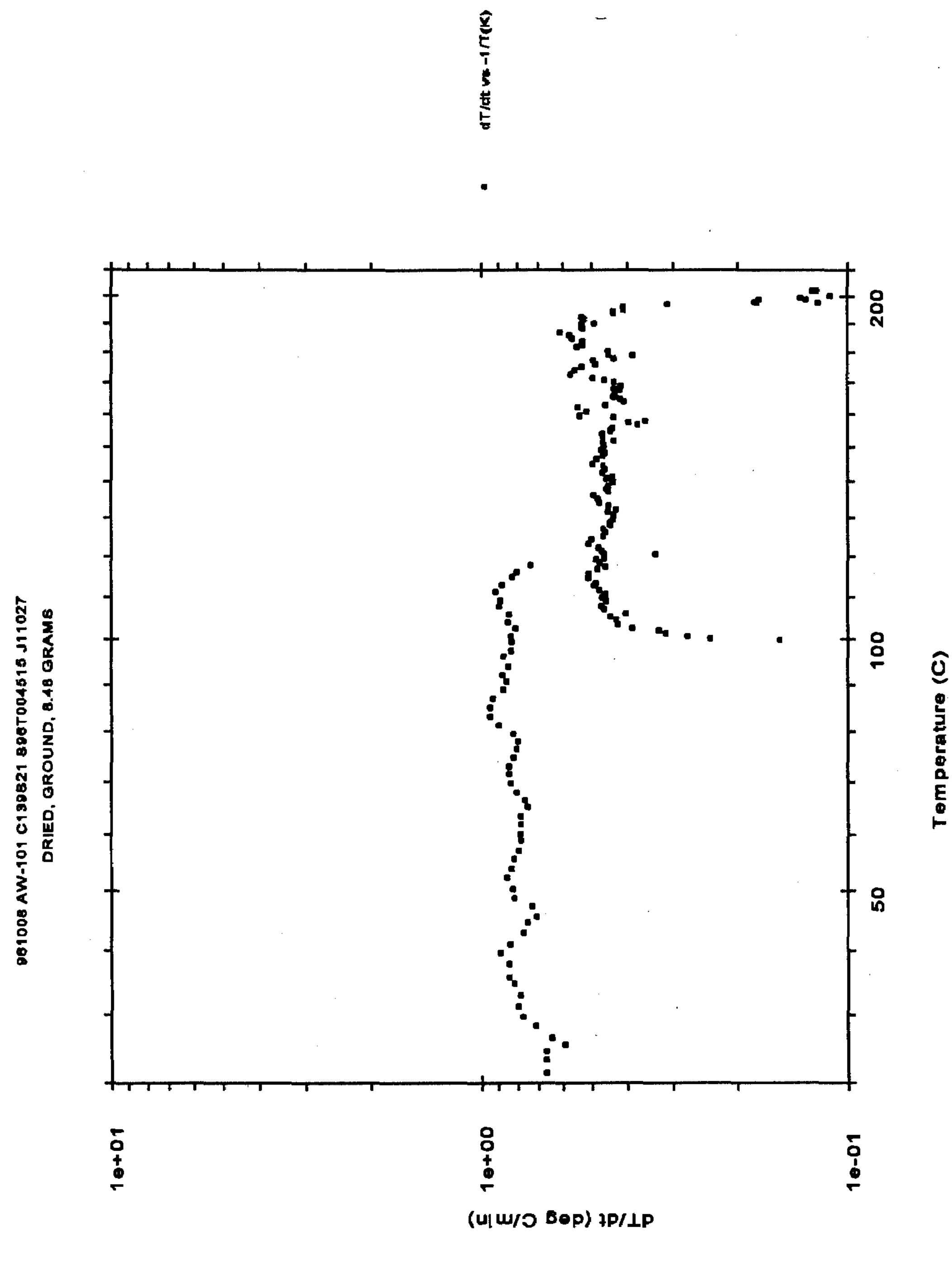


Figure C-5. Change in Self-Heating Rate (dT/dt) as a Function of Temperature for BY-104 Tank Waste.

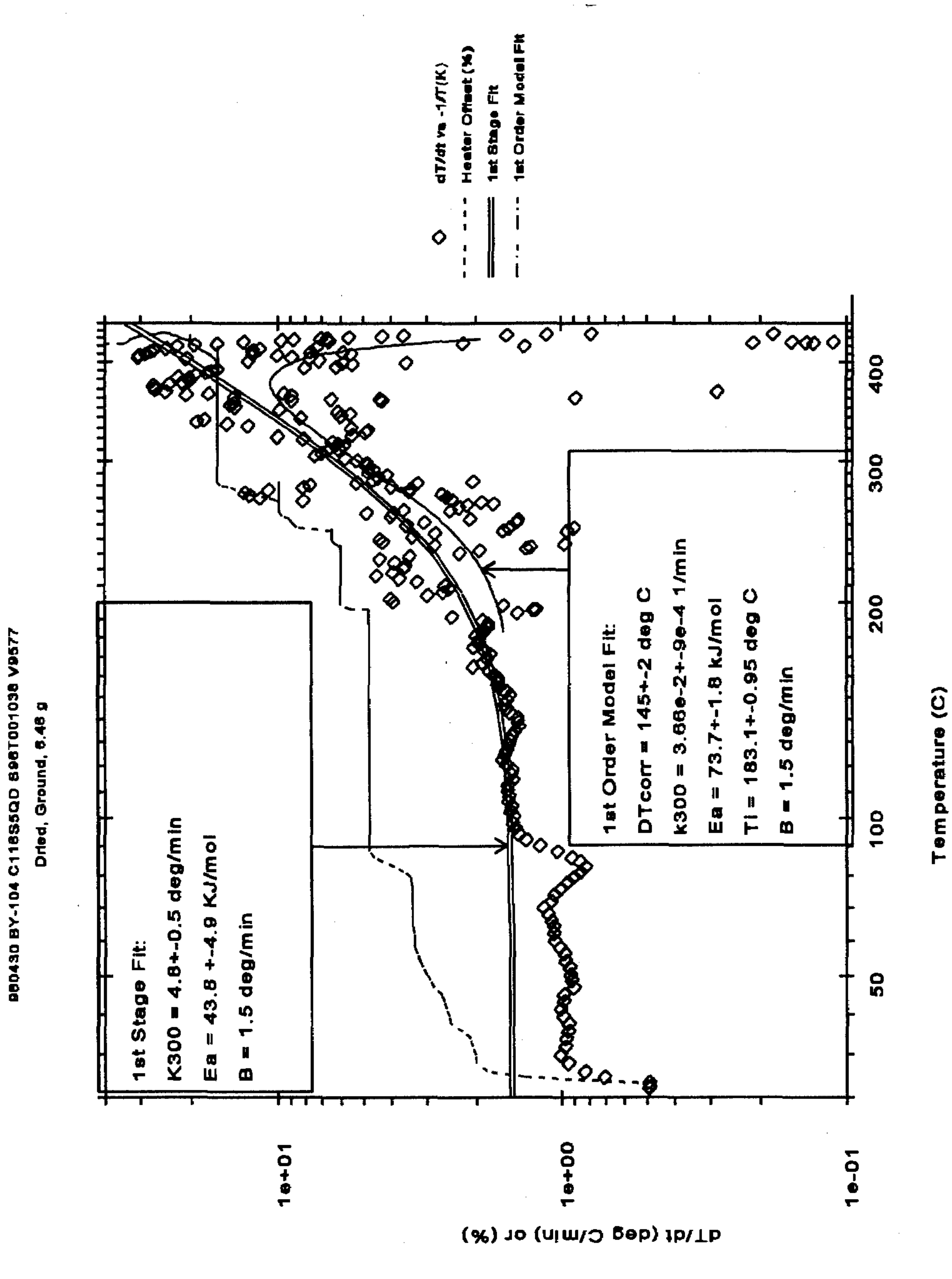


Figure C-6. Change in Self-Heating Rate (dT/dt) as a Function of Temperature for BY-105 Tank Waste.

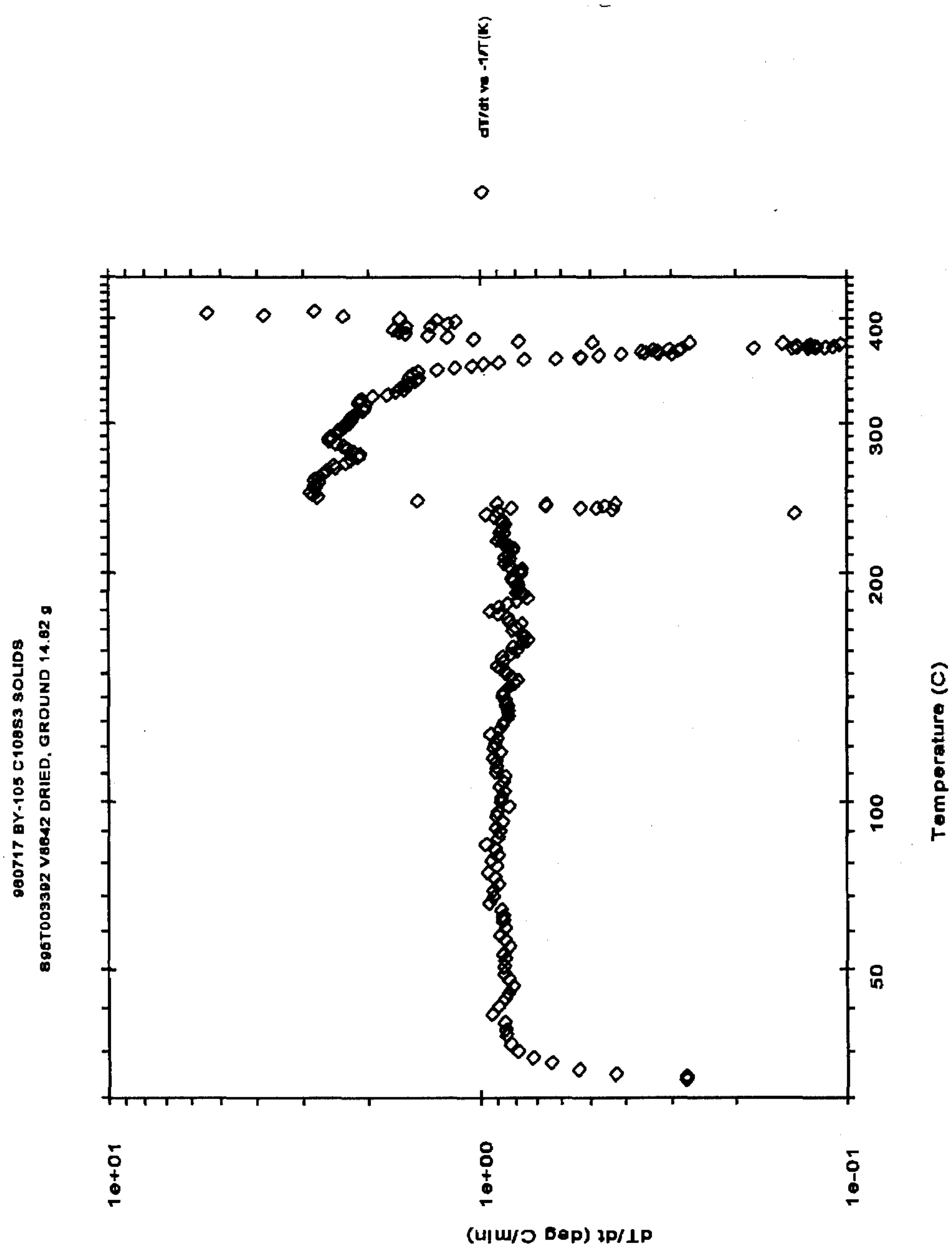


Figure C-7. Change in Self-Heating Rate (dT/dt) as a Function of Temperature for BY-108 Tank Waste.

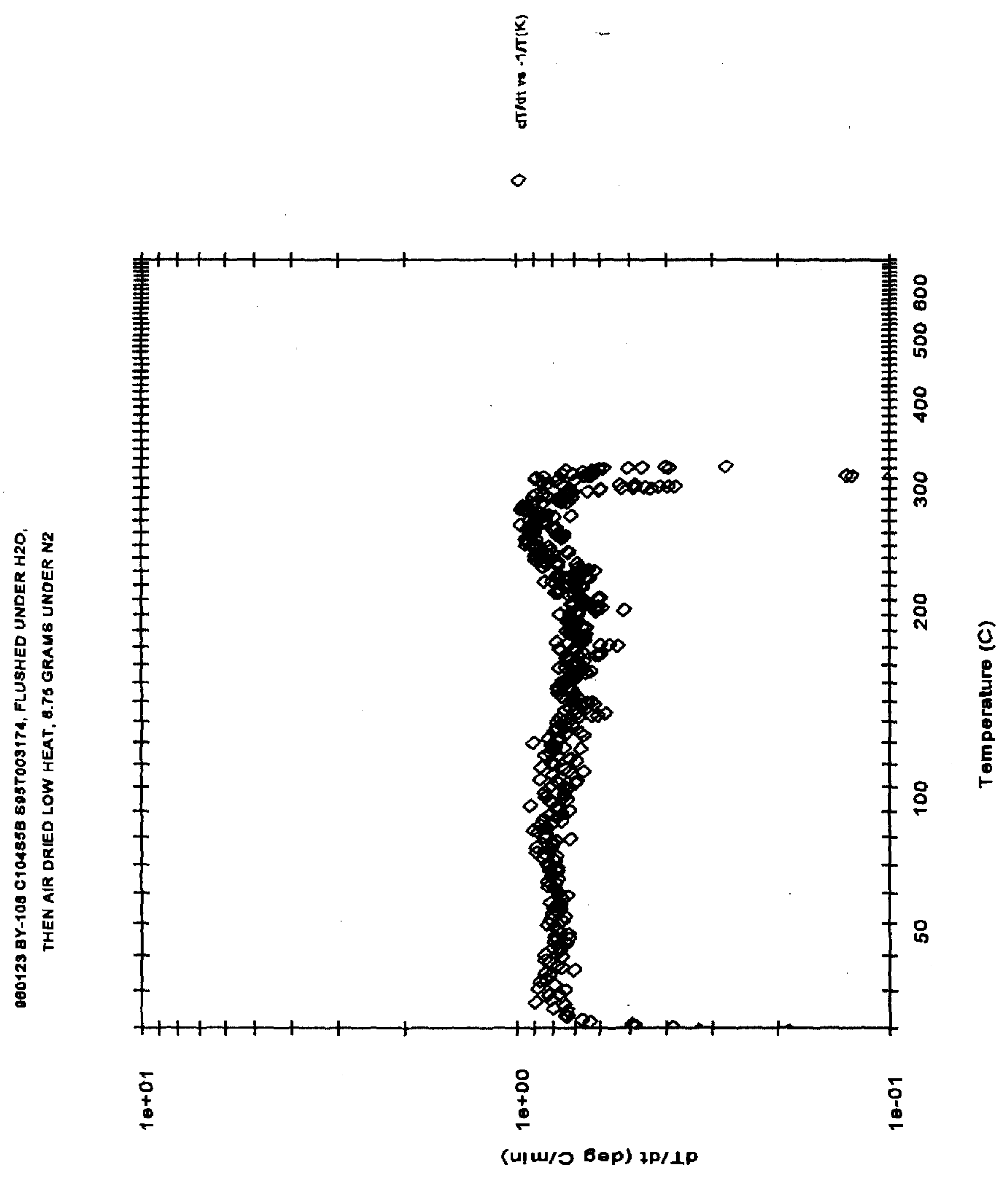


Figure C-8. Change in Self-Heating Rate (dT/dt) as a Function of Temperature for C-201 Tank Waste.

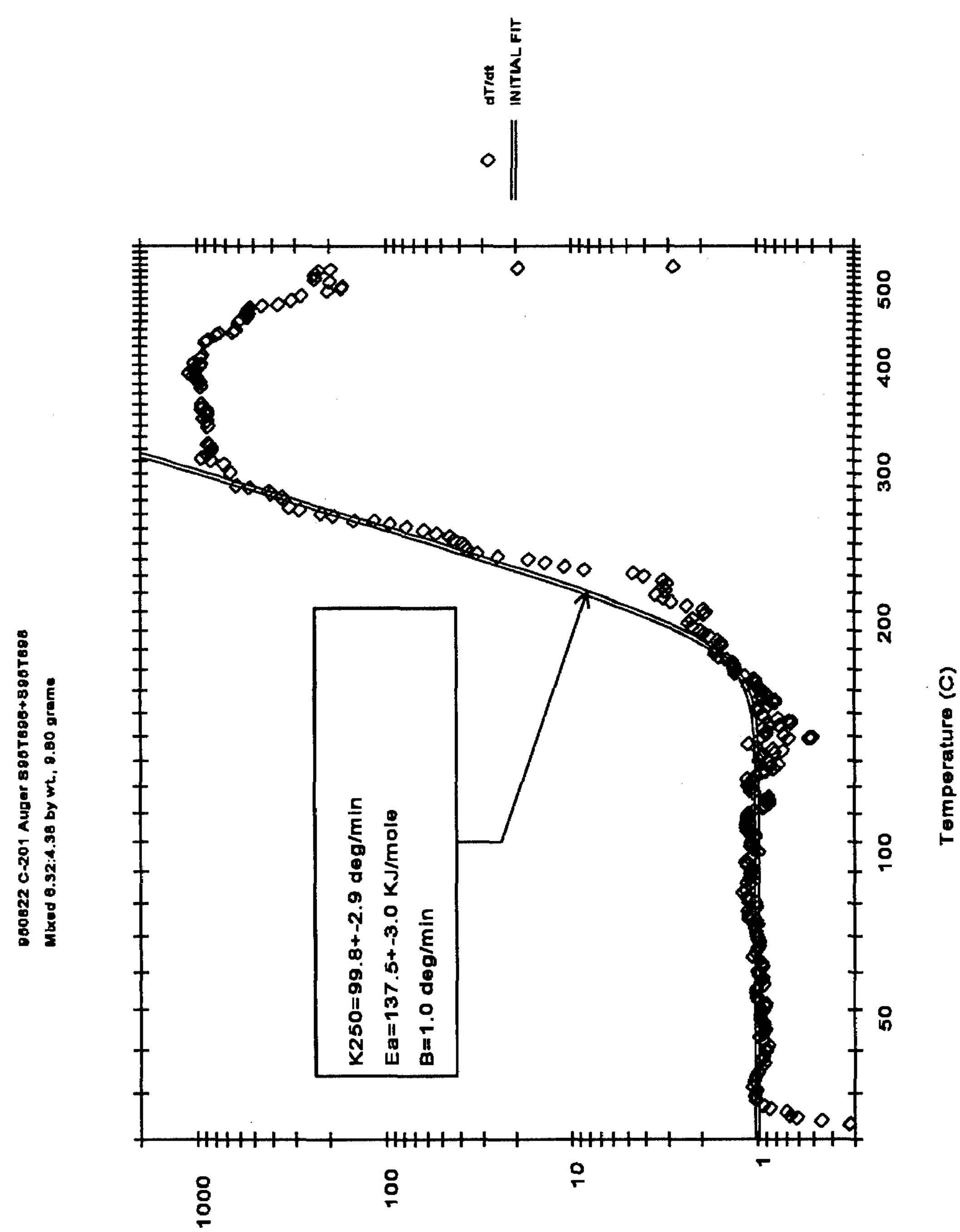


Figure C-9. Change in Self-Heating Rate (dT/dt) as a Function of Temperature for Tank C-204 Waste.

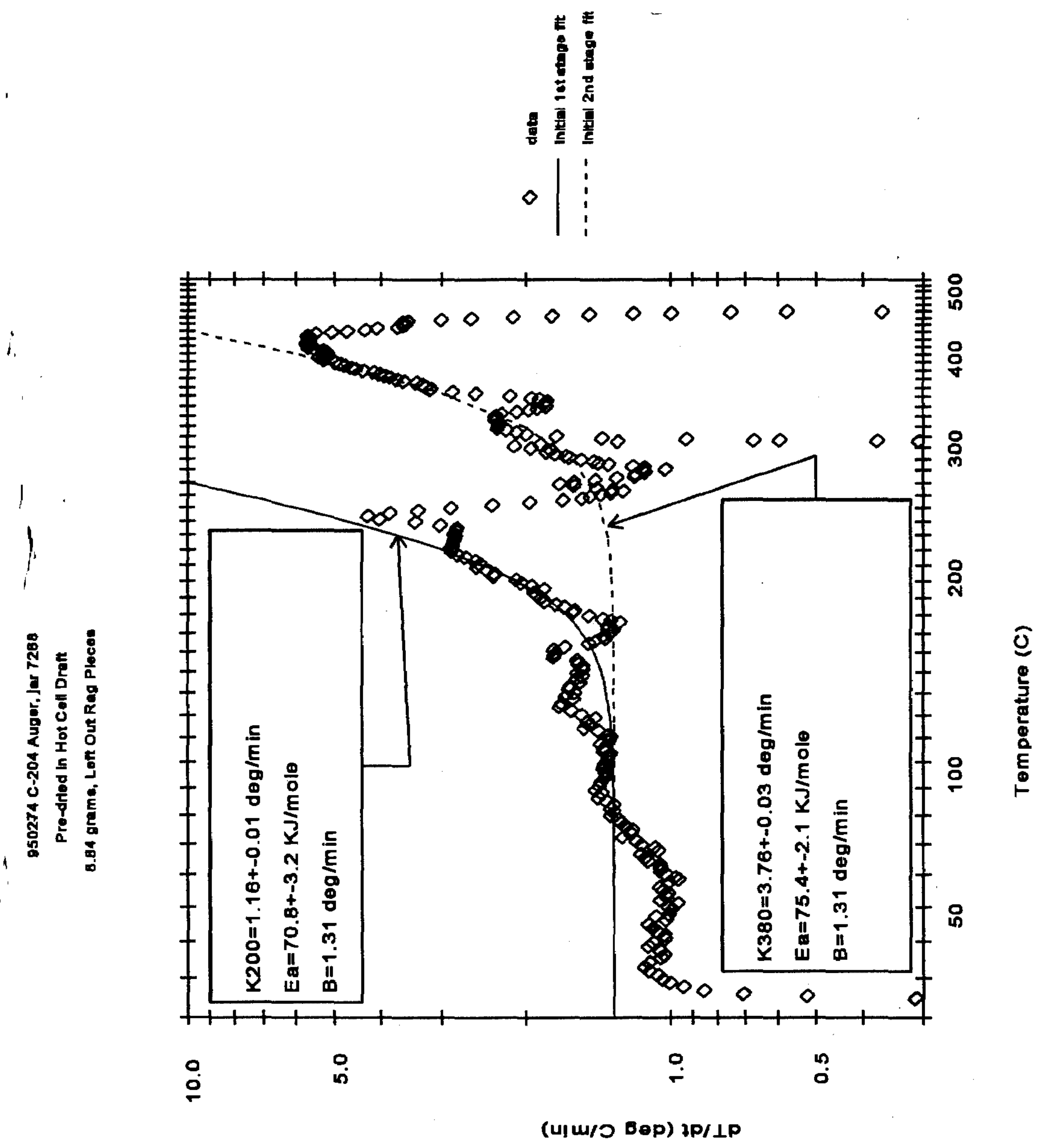


Figure C-10. Change in Self-Heating Rate (dT/dt) as a Function of Temperature for Tank U-102 Waste.

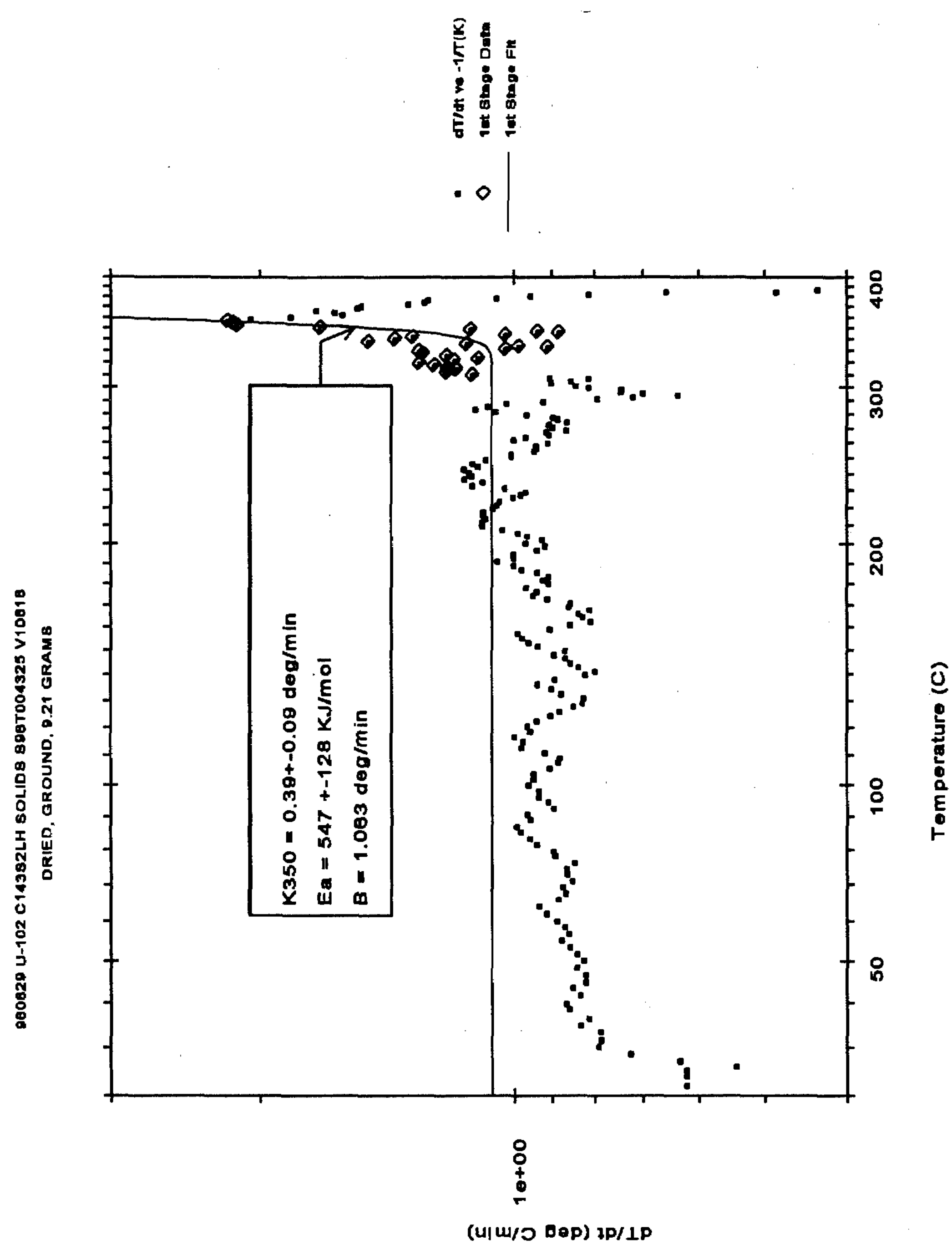


Figure C-11. Change in Self-Heating Rate (dT/dt) as a Function of Temperature for Tank U-105 Waste.

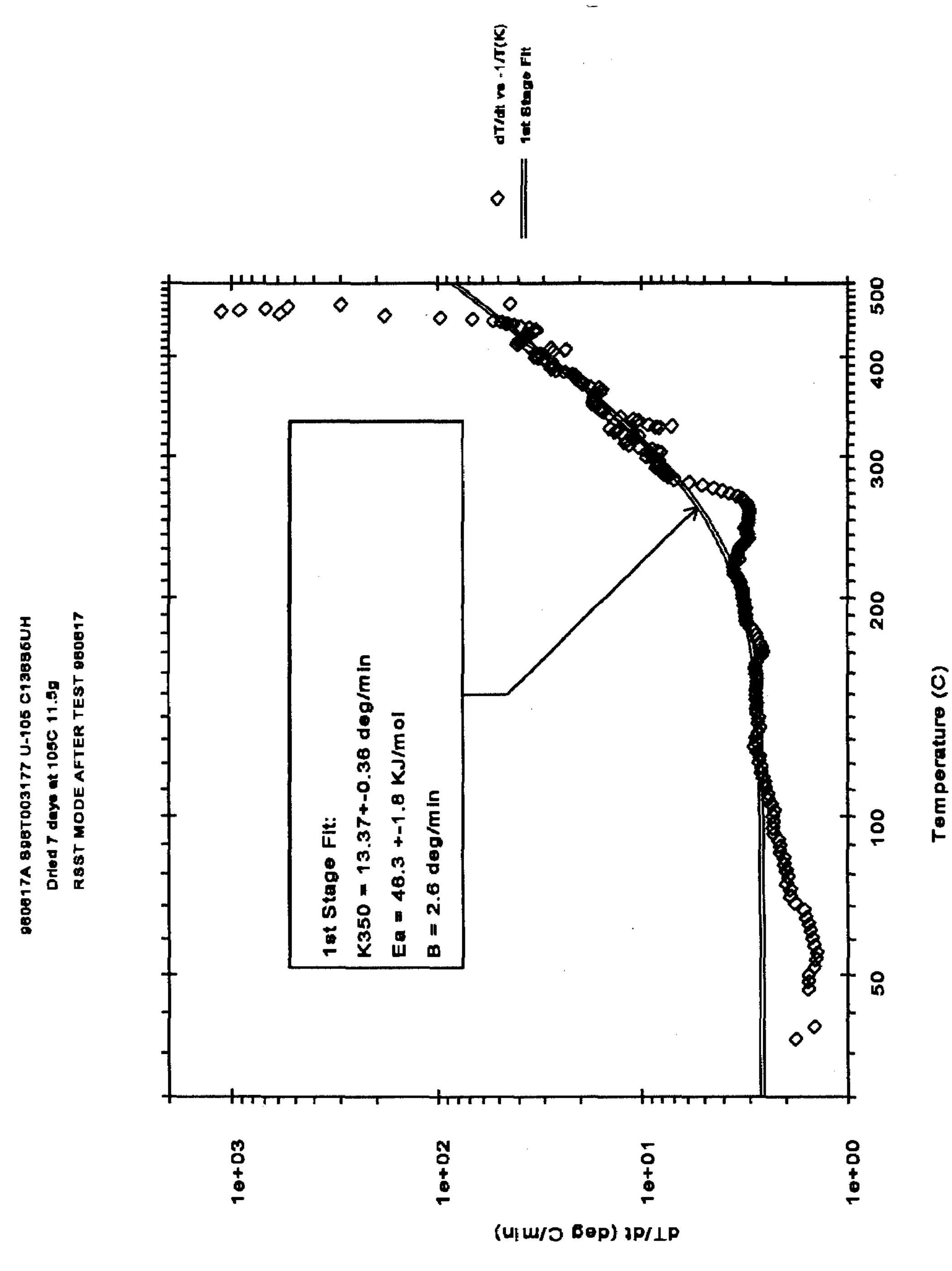
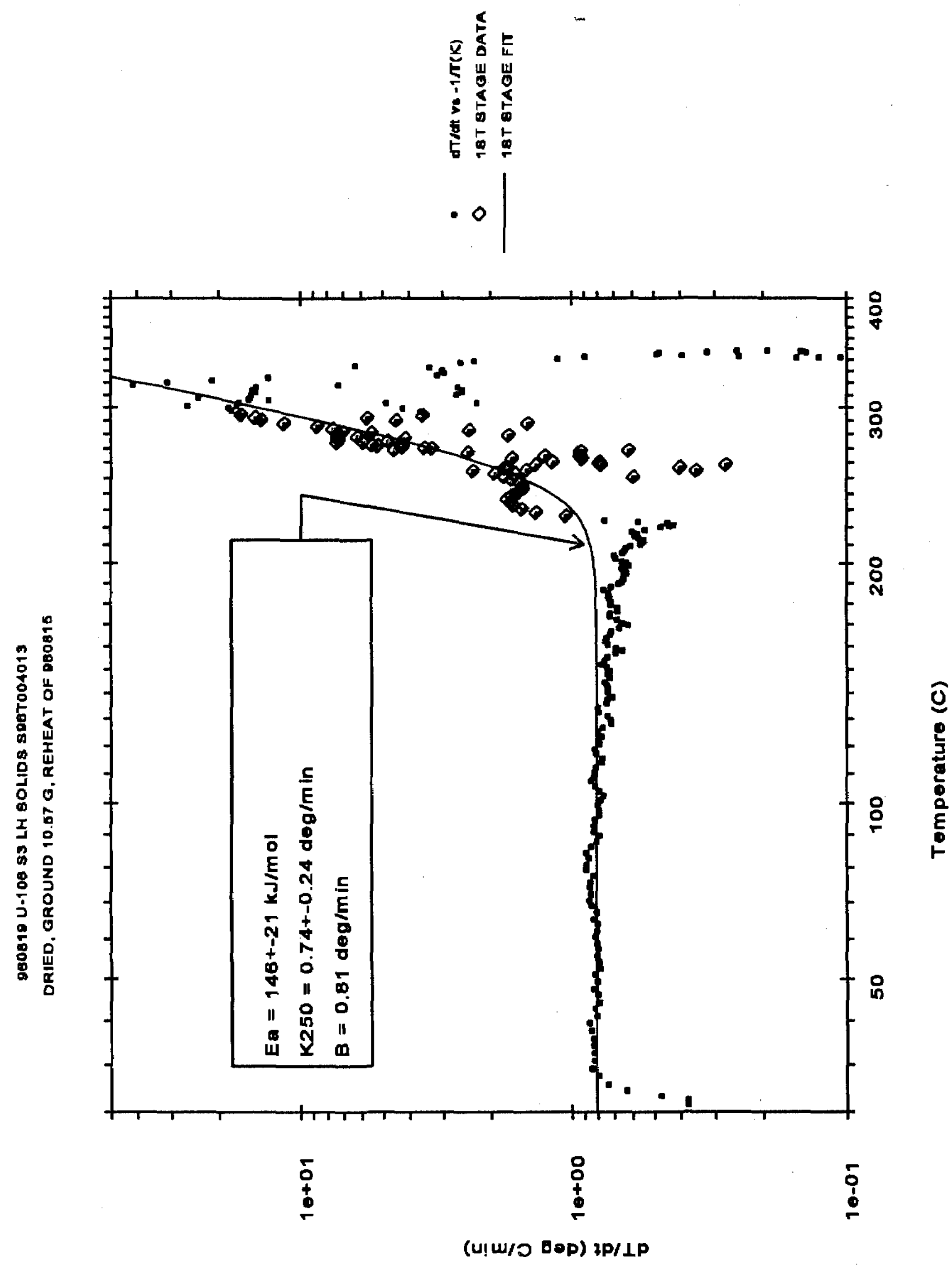


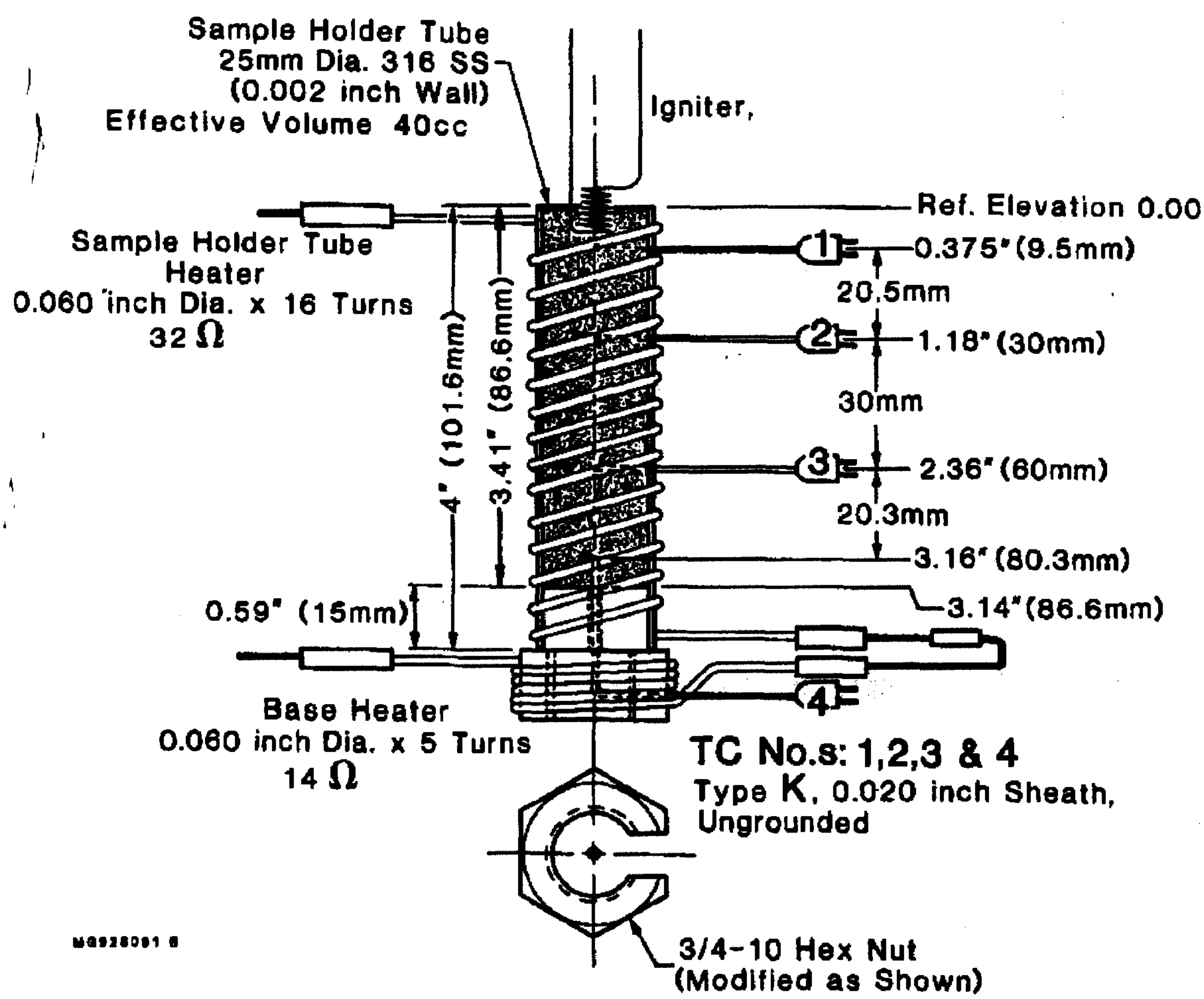
Figure C-12. Change in Self-Heating Rate (dT/dt) as a Function of Temperature for Tank U-106 Waste.



3.0 TUBE PROPAGATION TESTS

Tube propagation tests have been performed that provide measurements of reaction or combustion temperatures in connection with sustained propagation through cold waste simulant material. In these tests (see Figure C-14), a confined low heat capacity stainless steel cylinder containing simulated waste (50-70 g) was ignited at the open upper end and the rate of propagation (if any) was measured by noting the time when the reaction front passed imbedded thermocouples. The ignition energy was about 20 watts and the ignitor was left on until sustained propagation was observed (~15-20 seconds). In case of no propagation, the ignitor was usually left on for at least 1 minute. These data also provided the necessary fuel concentration to sustain propagating reactions, corresponding burn velocities, and the moisture content that will inhibit propagation including stoichiometric fuel-oxidizer mixtures at ambient waste temperature.

Figure C-14. Illustration of Tube Propagation Test Cell



The effect of moisture on propagation including all tube propagation tests completed to date are listed in Table C-5, including both successful and unsuccessful propagation events.

Table C-5. Tube Propagation Results for Organic Waste Simulant Mixtures.

Organic Fuel	TOC (wt%)	$NaNO_3$ (wt%)	$NaNO_2$ (wt%)	NaOH (wt%)	Inert (wt%)	Total Water (wt%)	Propagate	Notes
Na Acetate	5.0	83.0	0.0	0.0	0.0	0.0	No	
Na Acetate	5.0	83.0	0.0	0.0	0.0	0.0	No	Replicate of above
Na Acetate	5.5	49.9	12.5	18.8	0.0	0.0	No	
Na Acetate	5.5	31.2	0.0	0.0	50.0	0.0	No	
Na Acetate	6.0	47.2	11.8	20.5	0.0	0.0	Yes	
Na Acetate	6.0	63.6	15.9	0.0	0.0	0.0	No	
Na Acetate	6.0	59.0	20.5	0.0	0.0	0.0	No	
Na Acetate	6.0	0.0	79.5	0.0	0.0	0.0	Yes	
Na Acetate	6.0	34.0	0.0	0.0	45.5	0.0	Yes	Stoichiometric mixture
Na Acetate	7.0	76.1	0.0	0.0	0.0	0.0	No	
Na Acetate	7.5	74.4	0.0	0.0	0.0	0.0	Yes	
Na Acetate	5.9	69.8	0.0	0.0	0.0	10.0	No	
Na Acetate	6.7	35.2	8.8	23.0	0.0	10.0	Yes	
Na Acetate	7.0	33.0	8.2	20.0	0.0	15.0	No	
Na Acetate	8.7	44.2	11.0	0.0	0.0	15.0	Yes	
Na Acetate	9.1	51.8	0.0	0.0	0.0	17.0	Yes	Stoichiometric mixture
Na Acetate	8.8	49.9	0.0	0.0	0.0	20.0	No	Stoichiometric mixture
Na Butyrate	5.0	62.8	15.8	10.0	0.0	0.0	No	
Na Butyrate	6.0	61.0	15.2	10.0	0.0	0.0	No	
Na Citrate	7.0	45.0	11.2	15.2	0.0	3.5	No	
Na Citrate	8.0	53.9	13.5	0.0	0.0	4.0	No	
Na Citrate	8.0	41.7	10.4	15.2	0.0	4.0	Yes	
Na Citrate	9.0	50.6	12.7	0.0	0.0	4.5	Yes	
Na Citrate	10.6	45.0	0.0	0.0	0.0	17.0	Yes	Stoichiometric mixture
Na Citrate	10.3	43.8	0.0	0.0	0.0	19.0	No	Stoichiometric mixture

Table C-5. Tube Propagation Results for Organic Waste Simulant Mixtures.

Organic Fuel	TOC (wt%)	$NaNO_3$ (wt%)	$NaNO_2$ (wt%)	NaOH (wt%)	Inert (wt%)	Total Water (wt%)	Propagate	Notes
Na EDTA	5.5	49.4	12.4	19.1	0.0	1.7	No	
Na EDTA	6.0	46.7	11.7	20.8	0.0	1.6	Yes	
Na Formate	11.8	33.0	0.0	0.0	0.0	0.0	No	Stoichiometric mixture
Na Formate	11.8	33.0	0.0	0.0	0.0	0.0	No	Replicate of above
Na Glycolate	7.6	45.0	11.3	12.7	0.0	0.0	No	
Na Glycolate	8.0	43.2	10.8	13.3	0.0	0.0	Yes	
Na HEDTA	4.5	57.2	14.3	14.2	0.0	0.4	No	Large scale test (Fauske 1996)
Na HEDTA	5.3	53.2	13.3	16.8	0.0	1.6	No	
Na HEDTA	5.8	35.8	0.0	0.0	46.0	1.7	No	Stoichiometric mixture
Na HEDTA	6.0	49.6	12.4	19.0	0.0	1.8	Yes	
Na HEDTA	6.0	37.4	0.0	0.0	43.6	1.8	Yes	Stoichiometric mixture
Na HEDTA	8.0	74.7	0.0	0.0	0.0	2.4	No	
Na HEDTA	8.5	73.1	0.0	0.0	0.0	2.6	Yes	
Na HEDTA	10.3	54.0	13.5	0.0	0.0	3.1	Yes	Large scale test (Fauske 1996)
Na HEDTA	6.6	41.1	0.0	0.0	33.0	7.0	Yes	Stoichiometric mixture
Na HEDTA	7.2	44.9	0.0	0.0	22.3	12.2	No	Stoichiometric mixture
Na HEDTA	8.7	62.4	0.0	0.0	0.0	12.6	No	
Na HEDTA	8.9	49.4	12.4	0.0	0.0	12.7	Yes	
Na HEDTA	9.3	56.2	0.0	0.0	0.0	17.8	No	Stoichiometric mixture
Na HEDTA	9.6	59.6	0.0	0.0	0.0	15.0	Yes	Stoichiometric mixture
Na HEDTA	8.5	44.6	11.1	0.0	0.0	20.0	No	Large scale test (Fauske 1996)
Na IDA	6.0	55.1	13.8	0.0	0.0	9.0	No	
Na IDA	8.0	46.8	11.7	0.0	0.0	12.0	Yes	
Na NTA	7.0	46.4	11.6	15.2	0.0	1.8	No	
Na NTA	8.0	43.4	10.9	15.2	2.0	2.0	Yes	
Na Oxalate	14.3	20.0	0.0	0.0	0.0	0.0	No	Stoichiometric mixture
Na Oxalate	14.3	20.0	0.0	0.0	0.0	0.0	No	Replicate of above
Na Dodenate	6.0	65.2	16.3	9.1	0.0	0.0	No	
Nitrododecanoic Acid	5.0	66.6	16.5	8.5	0.0	0.0	No	
Nitrododecanoic Acid	6.0	63.6	15.7	10.3	0.0	0.0	Yes	

Table C-5. Tube Propagation Results for Organic Waste Simulant Mixtures.

Organic Fuel	TOC (wt%)	$NaNO_3$ (wt%)	$NaNO_2$ (wt%)	NaOH (wt%)	Inert (wt%)	Total Water (wt%)	Propagate	Notes
HEDTA + Citrate	5.0	30.3	14.2	23.0	12.8	6.7	No	47.5% HEDTA, 52.5% Citrate
HEDTA + Citrate	6.0	29.7	13.8	22.5	12.5	6.8	Yes	47.5% HEDTA, 52.5% Citrate
Glycolate + Citrate +HEDTA+EDTA	5.0	30.1	14.1	22.8	12.6	5.6	No	31.6% Glycolate, 30.6% Citrate, 29.8% HEDTA, 7.9% EDTA
Glycolate + Citrate +HEDTA+EDTA	6.0	29.4	13.7	22.3	12.3	6.0	Yes	31.6% Glycolate, 30.6% Citrate, 29.8% HEDTA, 7.9% EDTA
Acetate + Oxalate	8.3	32.9	0.0	0.0	31.7	0.0	No	48% Acetate, 52% Oxalate
Acetate + Oxalate	8.8	34.8	0.0	0.0	72.5	0.0	Yes	48% Acetate, 52% Oxalate
Acetate + Oxalate	12.8	32.3	0.0	0.0	3.4	0.0	No	18% Acetate, 82% Oxalate
Acetate + Oxalate	13.3	33.2	0.0	0.0	0.0	0.0	Yes	18% Acetate, 82% Oxalate
Al Dibutyl Phosphate	7.9	57.9	14.5	10.0	0.0	0.0	No	
Citrate + DBP	6.0	56.8	14.2	10.0	0.0	0.0	No	63.5% Citrate, 36.5% DBP
Na di(2-ethylhexyl) Phosphate	9.8	82.4	0.0	0.0	0.0	0.0	No	Stoichiometric mixture
TBP + NPH	11.3	85.0	0.0	0.0	0.0	0.0	No	30% TBP, 70% NPH
Mineral Oil	ND (12)	88.0	0.0	0.0	0.0	0.0	No	Mixture contained 12 wt% Mineral Oil
Roofing Asphalt	ND (30)	69.9	0.0	0.0	0.0	ND	No	Mixture contained 30 wt% Roofing Asphalt

Notes: ND = Not Determined.

4.0 REFERENCES

Fauske, H. K., 1996, *An Assessment of Requirements for Organic-Nitrate Propagating Reactions Including RSST and Tube Propagation Test Results With Waste Simulants,* FAI/96-48, Rev. 0, Fauske and Associates, Inc., Burr Ridge, Illinois.

APPENDIX D

TANK GROUPING BY FUEL AND MOISTURE

1.0 INTRODUCTION

All of the single-shell tanks (SSTs), 100- and 200- series, were evaluated for the organic complexant hazard. The double-shell tanks (DSTs) have been evaluated qualitatively and it has been concluded that as long as moisture is maintained high in the DSTs that there is no hazard of an organic complexant combustion event.

Tanks have been arranged into groups for screening based upon common waste types and waste transfer histories. Some of the SST have not been sufficiently characterized at this time to determine total organic carbon concentrations. The hazard, if it exists in a particular tank, will only occur if the waste is sufficiently dry. Therefore, the grouping focuses on waste types, processing, and history which could leave a solid residue of dry reactive waste.

Five tank groups have been developed to address the potential fuel concentration in the tanks: (1) high complexant, (2) medium complexant, (3) low complexant (precipitation wastes), (4) no complexant (tanks that did not receive incoming waste transfers after 1968), and (5) special case tanks (tanks that need to be treated individually because they do not fit the groups). These groups are intended to be mutually exclusive groups and are discussed in turn in the following sections.

Waste moisture is also key to whether tanks might be hazardous. As a secondary parameter, following fuel concentrations in the waste, the current moisture content and expected drainability of the waste was evaluated and provides a key input to the analysis of variance (ANOVA) modeling, as described in Appendix F of this report.

2.0 TANKS WITH HIGH ORGANIC COMPLEXANT WASTE

The first group of tanks (consisting of 21 tanks), are suspected of containing the highest concentrations of organic complexant waste, and are listed in Table D-1. These tanks were identified from historical records (Anderson 1990, Agnew 1997), and were defined as any tanks which received direct transfers of organic complexants waste from B Plant. These tanks are identified in Anderson (1990) by the following waste types: CC, CPLX, CCPLX, HS, and SRR (see glossary for a definition of each of these waste types). In some cases the actual waste type did not change but the terminology for it changed in the quarterly reports over the years.

Table D-1. Tanks Suspected of Containing the Highest Organic Complexant Concentrations

Tank	Principal Waste Type	Notes
A-101	P,OWW1,P1,OWW2,P2,OWW3,P2, B,PL1,SRR, EVAP, DSSF, HDRL, RESID, CPLX, NCLPX	Last incoming waste transfer in 1982.
A-102	P,OWW1,P1,OWW2,PSS,B,EVAP, AR, SRR, NCPLX, DSSF, CPLX	Last incoming waste transfer in 1980
A-103	P,OWW1,P1,DW,OWW2,IX,AR,B, CSR, SRR, EVAP, PSS, CPLX, DSSF, HDRL, NCPLX, RESID	Last incoming waste transfer in 1980
A-106	P,OWW1,P1,P2,OWW2,AR,OWW3, SRR, B, EVAP, CCPLX, NCPLX, CCW	Last incoming waste transfer in 1980
AX-101	P,OWW,FP,OWW2,B,P2,PL1,PSS, SRR, EVAP, RESID, DSSF, NCPLX, CPLX	Last incoming waste transfer in 1980
AX-102	P,OWW,OWW2,B,PL1,AR,EVAP, RESID, HDRL, CCPLX, CPLX	Last incoming waste transfer in 1980
AX-103	P,P2,OWW2,OWW3,BL,PL1,B,PSS,AR,EVAP,CC,NCPL X,CPLX,DSSF	Last incoming waste transfer in 1980
BX-104	MW,MW1,TBP,CW,CWP2,CW,IX, EB, CSR, R, BL, EVAP, BYSLTCK, NCPLX, DSSF, CPLX	Last incoming waste transfer in 1980
BX-105	MW, TBP, CW, I X, EB, EVAP, BYSLTCK, NCPLX, DSSF, CPLX	Last incoming waste transfer in 1980
C-104	MW,MW1,TBP,CW,CWP1,DW, OWW,IWW,P,CWP2, OWW3, DW, PL1,TH2,N,BNW,EB,R,IX,LW,LW, PL, B, PSS, NCPLX, BL, FD, CPLX	Last incoming waste transfer in 1980
C-105	MW,TBP,CW,UR,CWP1,P,BL,R, RSN, UNK, PSS, AR, NCPLX, CPLX, CF	Last incoming waste transfer in 1979
C-106	MW,TBP,P,UR,CW,CWP1,DW,PSS,BL,SRS,CPLX, NCPLX	Last incoming waste transfer in 1978
C-107	1C, 1C1, TBP, UR, CW, CWP2, HS, DW, HLO, HS, SSW, BNW, IX, EB, LW, N, SRS, NCPLX	Last incoming waste transfer in 1978
S-107	R,CWR1,R1,CW,CWR2,RSLTCK, EB, B, BL, BNW, DW, IX, LW, N, PL, EVAP, RESID, TL, CC, DSSF, NDRL, PNF	Last incoming waste transfer in 1980
SX-101	R,R1,RSLTCK,EB,RIX,PNF,RESID,TL,CPLX,NCPLX	Last incoming waste transfer in 1980
SX-106	R, HLO, RSLTCK, EB, RIX, B, BL, BNW, CW, DIL, EVAP, IX, LW, N, OWW, PL, PSS, RESID, TBP, CCPLX, CPLX, DSSF, NCPLX, PNF, NIT	Last incoming waste transfer in 1980

Table D-1. Tanks Suspected of Containing the Highest Organic Complexant Concentrations

Tank	Principal Waste Type	Notes
TX-104	MW, R, BL, OWW, R, RIX, TBP, CPLX, EB, EVAP	Last incoming waste transfer in 1976
U-105	MW, R, CW, R, CW, EB, EVAP, R, RESID, CCPLX, HDRL	Last incoming waste transfer in 1978
U-106	MW, R, BL, EB, EVAP, PL, RESID, CCPLX, HDRL	Last incoming waste transfer in 1976
U-107	MW,MW1,MW2,CW,EB,BL,BNW, CW, DW, N, IX, LW, R, EVAP, NCPLX, CPLX, DSSF, NIT	Last incoming waste transfer in 1980
U-111	1C,R,BNW,DW,EB,EVAP,RESID, HDRL, LW, N, PNF, CPLX, DSSF, PNF	Last incoming waste transfer in 1980

3.0 TANKS WITH MEDIUM COMPLEXANT WASTE

This second group of tanks, medium complexant tanks (consisting of 18 tanks), did not receive direct transfers of complexant waste (Table D-2). However, the tanks might have received secondary transfers of waste that contained organic complexants. This tank group contains those tanks identified in Agnew (1996) as containing an average TOC greater than or equal to 0.64 wt%, but were not identified by Anderson (1990) as receiving direct transfers of complexant waste.

Table D-2. Tanks Suspected of Containing Medium Complexant Concentration.

Tank	Primary Waste Types	Notes
A-105	P,P1,P2,CSR,IX,EVAP,NCPLX	Last incoming waste transfer in 1978
B-109	1C,EB,BSLTCK,CW,CWP2,IX, 224,NCPLX,BYSLTCK	Last incoming waste transfer in 1976
B-111	2C, 1C, 5-6, EB, DW, FP, P, IX, CSR	Last incoming waste transfer in 1970
BX-112	1C,EB,BSLTCK,CW,,IX,224, BYSLTCK, EVAP, CSR	Last incoming waste transfer in 1974
BY-102	MW, TBP, CW, TBP, EB, EVAP, BYSLTCK	Last incoming waste transfer in 1977
S-101	R,CWR1,R1,RSLTCK,B,BNW, CW, DW, EB, IX, LW, N, PL, TL, EVAP, HDRL, PNF, RESID, DSSF, PNF, (CCPLX in transit)	Last incoming waste transfer in 1979. S-evaporator slurry receiver tank. Received concentrated product but passed to other tanks.
S-102	R,R1,EB,EVAP,DSSF,NCPLX, PNF, NIT (CCPLX in transit)	Last incoming waste transfer in 1980. Feed tank to S evaporator, but was flushed out by other wastes.
S-103	R, EB, EVAP, PNF, DSSF, NCPLX, NIT.	Last incoming waste transfer in 1980

Table D-2. Tanks Suspected of Containing Medium Complexant Concentration.

Tank	Primary Waste Types	Notes
SX-102	R, EB, EVAP, PNF, DSSF, RESID	Last incoming waste transfer in 1980
SX-103	R,R1,CW,OWW,EB,EVAP,PNF, RESID ,RSLTCK, DSSF	Last incoming waste transfer in 1978
SX-104	R,R1,RIX,EB,EVAP,PNF, RESID.,RSLTCK, DSSF	Last incoming waste transfer in 1980
SX-105	R,R1,R2,RSLTCK,EB,HLO,RIX, EVAP, PNF, REDID, DSSF	Last incoming waste transfer in 1980
TX-102	MW,MW2,R,CW,EB,OWW,RIX,	Last incoming waste transfer in 1976
TX-111	1C,TBP,EB,EVAP,NCPLX	Last incoming waste transfer in 1977.
U-102	MW,MW2,R,EB,EVAP,R,RESID, NIT,HDRL,NCPLX	Last incoming waste transfer in 1977
U-103	MW,R,224,BL,BNW,CW,DW,EB, IX, RIX, NIT, DSSF, HDRL, PNF	Last incoming waste transfer in 1977
U-108	MW,CW,CWR2,EB,BNW,DW,N, EVAP, HDRL, LW, N, RESID, NCPLX, PNF	Last incoming waste transfer in 1976
U-109	MW, CW, R, EB, EVAP, RESID, HDRL, NCPLX, PNF	Last incoming waste transfer in 1977

4.0 TANKS WITH LOW COMPLEXANT WASTE

This third group of tanks, low complexant tanks (consisting of 89 tanks), did not receive direct transfers of complexant waste (Table D-3). This tank group contains those tanks identified in Agnew (1996) as containing an average TOC less than 0.64 wt%.

Table D-3. Tanks Suspected of Containing Low Complexant Concentration.

Tank	Principal Waste Types	Notes
A-104	P, P1, OWW1, OWW2,OWW3, B, PSS, AR, CSR	Last incoming waste transfer in 1974, lot of waste sluiced out in 1975.
AX-104	P, 1WW, OWW, PSS, EF, B, AR	Last incoming waste transfer in 1978
B-101	MW,MW1,EB,BSLTCK,CW,BL,EB	Last incoming waste transfer in 1973.
B-102	MW,EB,BSLTCK,CW,CWP2,BL,IX,EF, NCPLX	Last incoming waste transfer in 1978
B-103	MWBSLTCK,EB,CW,CWP2,OWW,IX,BL, IX,BNW,N,LW,R,DW,TBP,224,NCPLX	Last incoming waste transfer in 1975
B-105	2C,1C,BSLTCK,	Last incoming waste transfer in 1955
B-106	2C,1C,EB,TBP,BSLTCK,HLO,BNW,224, EB, IX, NCPLX	Last incoming waste transfer in 1975
B-108	1C,1C1,EB,BSLTCK,CW,CWP2	Last incoming waste transfer in 1967
B-110	2C, 1C, EB, FP, DW, P, BL, IX, BYSltCk, B, CSR	Last incoming waste transfer in 1968. Agnew indicates CSR in 69
B-112	2C,5-6, 1C,DW,FP,EB,BL,IX,P2, BYSLTCK, NCPLX	Last incoming waste transfer in 1977
BX-101	MW,MW1,TBP,CW,BL,OWW,IWW,RIX, CSR, SIX, IX,,BYSLTCK	Last incoming waste transfer in 1974
BX-102	MW, TBP, CW, EB, BL, OWW, DE	Last incoming waste transfer in 1970
BX-103	MW, TBP, CW, OWW, BL, IWW, RIX, EB, SIX, P, DW, IC, BWW, LW, PL, N, EVA	Last incoming waste transfer in 1977
BX-106	MW, TBP, CW, EB, IX, SIX, BL, OWW, RIX, IX, EVAP, BYSLTCK, NCPLX	Last incoming waste transfer in 1977
BX-107	1C, TBP, IX, EF, NCPLX	Last incoming waste transfer in 1970
BX-108	1C, TBP, CW, IX, NCPLX	Last incoming waste transfer in 1970
BX-109	1C,TBP,UR,CW,CSR,IX	Last incoming waste transfer in 1970
BX-110	1C,1C1,EB,CW,CSR,EB,IX,EVAP, BYSLTCK	Last incoming waste transfer in 1977
BX-111	1C,EB,CW,IX,EVAP,NCPLX,BYSLTCK	Last incoming waste transfer in 1975
BY-101	MW,TBP,CW,1C,EB,EVAP,NCPLX, BYSLTCK	Last incoming waste transfer in 1977
BY-103	MW,TBP,P,CW,CWP2,OWW,EB, BYSLTCK	Last incoming waste transfer in 1973
BY-104	MW, TBP, CW, IX, EB, EVAP, NCPLX	Last incoming waste transfer in 1975
BY-105	MW, TBP, CW, EB, BYSLTCK, CEM, EVAP	Last incoming waste transfer in 1974

Table D-3. Tanks Suspected of Containing Low Complexant Concentration.

Tank	Principal Waste Types	Notes
BY-106	MW,1C,TBP,PFeCN1,PFeCN2,CW,EB, EVAP, BYSLTCK	Last incoming waste transfer in 1977
BY-107	1C,TBP,1C1,UR,PFeCN1,PFeCN2,CW, TBP, EB, BYSLTCK, EVAP	Last incoming waste transfer in 1977
BY-108	1C,TBP,PFeCN1,PFeCN2,CW,EB, BYSLTCK, EVAP	Last incoming waste transfer in 1977
BY-109	TBP, MW, CW, OWW, EB, BYSLTCK, EVAP, NCPLX	Last incoming waste transfer in 1977
BY-110	1C,TBP,1C1,1C2,DW,CW,EB,BYSLTCK, EVAP	Last incoming waste transfer in 1979
BY-111	MW1,MW2,MW,TBP,OWW,CW,EB, CWP2,EVAP,BYSLTCK	Last incoming waste transfer in 1978
BY-112	MW1,MW2,MW,TBP,OWW,CW,EB, CWP2,EVAP,BYSLTCK	Last incoming waste transfer in 1975
C-108	1C,TBP,UR,EB,TFeCN,CWP2,HS,SSW, OWW, IX, BNW, N, LW, DW, R	Last incoming waste transfer in 1974
C-109	1C,TBP,1C,TBP,EB,CW,FP,HS, SSW, IX, NCPLX	Last incoming waste transfer in 1970
C-110	1C,1C1,TBP,UR,OWW,OWW1,IX,EB,RIX, NCPLX	Last incoming waste transfer in 1972
C-111	1C, UR, TBP, FeCN, OWW, CWP, CW, EB, FP, HS, SSW, NCPLX	Last incoming waste transfer in 1972.
C-112	1C,TBP,UR,TFeCN,EB,CWP1, CW,P2,HS,CW,HS,FP,IX,SWW, OWW, RIX	Last incoming waste transfer in 1975
S-104	R,CWR1,R1,RSLTCK,NCPLX,PNF	Last incoming waste transfer in 1968 Agnew indicates unknown gain in 1975
S-105	R, EB, NCPLX, PNF	Last incoming waste transfer in 1978
S-106	R, EB, EVAP, HDRL, PNF, RESID, NCPLX	Last incoming waste transfer in 1977
S-108	R, EB, EVAP, TL, HDRL, PNF, RESID, NCPLX	Last incoming waste transfer in 1979
S-109	R, EB, EVAP, TL, HDRL, PNF, RESID, NCPLX	Last incoming waste transfer in 1977
S-110	R,CWR1,R1,BL,CW,DW,EB,IX,OWW, RIX,224,EVAP,HDRL,PNF,RESID,NCPLX	Last incoming waste transfer in 1976
S-111	R, EB, EVAP, PNF, NCPLX	Last incoming waste transfer in 1976
S-112	R,EB,EVAP,HDRL, PNF, RESID, NCPLX	Last incoming waste transfer in 1976

Table D-3. Tanks Suspected of Containing Low Complexant Concentration.

Tank	Principal Waste Types	Notes
SX-110	R,R2,RSLTCK,RIX,224,BL,BNW,EB, EVAP, IX	Last incoming waste transfer in 1976
SX-111	R,R1,R2,RSLTCK,EB,RIX	Last incoming waste transfer in 1972
SX-114	R,R1,R2,RSLTCK,EB,RIX,	Last incoming waste transfer in 1972
SX-115	R,R1,RSLTCK	Last incoming waste transfer in 1964
T-101	MW,MW1,TBP,MW2,PFeCN1,CW,BL, DW,EB,IX,R,RIX,CWR2,BL,BNW,CW, DW,EB,EVAP,IX,224,NCPLX	Last incoming waste transfer in 1978
T-102	MW, CW, BL, CW, EB, IX, R, RIX	Last incoming waste transfer in 1972
T-103	MW, CW, BL, EB, IX, R, RIX	Last incoming waste transfer in 1972
T-105	1C,2C,2C1,CW,CWR1,HLO,DW, BL,IX	Last incoming waste transfer in 1973
T-106	1C,2C,CW,BL,CW,DW,IX	Last incoming waste transfer in 1973
T-107	1C,1C1,TBP,UR,CW,BL,IX,EVAP,NCPLX	Last incoming waste transfer in 1976
T-108	1C,EB,TBP,T1SLTCK,HLO,BNW,BL,IX	Last incoming waste transfer in 1973
T-109	1C,EB,TBP,T1SLTCK,BL,BNW,IX	Last incoming waste transfer in 1973
T-110	2C,2C1,224,2C2	Last incoming waste transfer in 1966
T-111	2C, 224	Last incoming waste transfer in 1967
T-112	2C2, DW, 2C, BNW, 224, DW, CW, BL, IX, EVAP, NCPLX	Last incoming waste transfer in 1975
T-201	224,EVAP	Last incoming waste transfer in 1975
T-202	224	Last incoming waste transfer in 1953
T-203	224,EVAP	Last incoming waste transfer in 1975
T-204	224	Last incoming waste transfer in 1957
TX-101	MW,MW1,MW2,R,1C,BL,CW,EB,IX, OWW,RIX,SIX,TBP,B,BL, BNW,EVAP, LW,N, OWW,PL, NCPLX,PNF	Last incoming waste transfer in 1978
TX-103	MW,TBP,T1SLTCK,EB,EVAP, NCPLX, PNF	Last incoming waste transfer in 1979
TX-105	MW,MW1,MW2,UR,DW,R,CW,EB,OWW, R,RIX,EVAP	Last incoming waste transfer in 1975
TX-106	MW,R,CW,EB,OWW,RIX,EVAP	Last incoming waste transfer in 1976
TX-107	MW1,MW2,MW,R,EB,EVAP	Last incoming waste transfer in 1976
TX-108	MW,R,TBP,DW,EB,EVAP	Last incoming waste transfer in 1975
TX-109	1C,TBP,1C2,EB,EVAP	Last incoming waste transfer in 1974
TX-110	1C,TBP,EB,EVAP	Last incoming waste transfer in 1976

Table D-3. Tanks Suspected of Containing Low Complexant Concentration.

Tank	Principal Waste Types	Notes
TX-112	1C,EB,T1SLTCK,EVAP,NCPLX	Last incoming waste transfer in 1975
TX-113	1C1,EB,T1SLTCK,1C	Last incoming waste transfer in 1970
TX-114	1C,MW,EB,T1SLTCK	Last incoming waste transfer in 1973
TX-115	TBP,MW,UR,R,DW,CW,EB,EVAP	Last incoming waste transfer in 1975
TX-116	EB,T1SLTCK,DE	Last incoming waste transfer in 1969. DE is diatomaceous earth added in 1970
TX-117	1C,EB,T1SLTCK,DE	Last incoming waste transfer in 1956. DE is diatomaceous earth added in 1971
TX-118	1C,TBP,1CEB,DW,EB,T2SLTCK,Z,EVAP, NCPLX,PNF	Last incoming waste transfer in 1979
TY-101	1C,EB,1CFeCN,T1SLTCK,TBP,R	Last incoming waste transfer in 1967
TY-102	1C,EB,T1SLTCK,BL,OWW,R,RIX,TBP, EVAP,FD,NCPLX	Last incoming waste transfer in 1975
TY-103	1C,TBP,1CFeCN,UR,DW,BL,CW,OWW,R, RIX & MISCELLANEOUS UNLABELED TRANSFERS FROM BX & T -SEE ER-351	Last incoming waste transfer in 1973
TY-104	1C,TBP,1C,DW,TBP,BL,OWW,R,RIX, EVAP,NCPLX	Last incoming waste transfer in 1970
U-101	MW,MW1,MW2,R,EVAP,NCPLX	Last incoming waste transfer in 1979
U-104	MW,MW1,MW2,R,DE	Last incoming waste transfer in 1957. 60 tons diatomaceous earth added 1972
U-110	1C,MW1,R,CWR1,R1,CW,BNW, LW	Last incoming waste transfer in 1973
U-112	1C, R, EVAP	Last incoming waste transfer in 1976
U-201	CW,R,EVAP,NCPLX	Last incoming waste transfer in 1970
U-202	CW,R,EVAP,NCPLX	Last incoming waste transfer in 1958
U-203	CW,R,EVAP,NCPLX	Last incoming waste transfer in 1970
U-204	2C,R,CW,EVAP,NCPLX	Last incoming waste transfer in 1965

5.0 TANKS WITH NO COMPLEXANT WASTE

A fourth group of tanks (consisting of 10 tanks) were formed from those tanks which received no incoming waste transfers after 1968 (Table D-4). Organic complexants were not used at the Hanford Site until 1969 and it is extremely unlikely that these tanks received complexant waste.

Table D-4. Tanks That Contain No Complexant Waste.

Tank	Principal Waste Types	Notes
B-104	2C, 1C, EB, B1SltCk	Last incoming waste transfer in 1953. Agnew indicates 1957
B-107	1C, EB, TBP, CW, NCPLX	Last incoming waste transfer in 1967. Agnew indicates 1963
SX-107	R,R1,CWR1,R2,RSLTCK	Last incoming waste transfer in 1968. Agnew indicates 1968
SX-108	R,R1,R2,RSLTCK	Last incoming waste transfer in 1968. Agnew indicates 1968
SX-109	R,R1,R2,RSLTCK	Last incoming waste transfer in 1967. Agnew indicates 1967
SX-112	R,R1,R2,RSLTCK	Last incoming waste transfer was from SX-107 (which contained no complexants) in 1969. The last incoming waste transfer other than SX-107 occurred in 1968. Agnew indicates gain in 74 which may be measurement error
SX-113	R,R1,DE	Last incoming waste transfer in 1967. Agnew indicates diatomaceous earth added 1972
T-104	1C,1C2	Last incoming waste transfer in 1957. Agnew indicates 1954
TY-105	TBP, UR, EVAP	Last incoming waste transfer in 1958. Agnew indicates 1965
TY-106	TBP, DE	Last incoming waste transfer in 1959. Agnew indicates diatomaceous earth added 1972

6.0 SPECIAL CASE WASTE TANKS

Some tank have unique or unusual waste transfer histories. These tanks have been grouped together as special case tanks (consisting of 11 tanks). The C-200 and B-200 series tanks received several small waste transfers from the strontium semiworks at B Plant. These wastes were often small pilot plant runs that contained unique waste streams. Therefore, these tanks must be sampled and characterized individually, and do not fit in the other four waste groups.

Also included in the unique tank group are those tanks that received predominantly organic solvent waste. Solvent wastes (i.e., normal paraffin hydrocarbons, tributyl phosphate and their degradation products) deposited in the tank often contribute a large part of the TOC measured in the tank. Experimentation indicates that these materials do not support and do not contribute to condensed phase combustion (Fauske et al. 1997). Therefore, TOC measurements from this group of tanks are not included in the general ANOVA model. The tanks that are treated individually are summarized in Table D-5.

Table D-5. Special Case Tanks.

Tank	Primary Waste Types	Notes
B-201	224, MW, NCPLX	Strontium semiworks waste. Last incoming waste transfer in 1960.
B-202	224, MW, B, NCPLX	Strontium semiworks waste. Last incoming waste transfer in 1963.
B-203	224, MW, NCPLX	Strontium semiworks waste. Last incoming waste transfer in 1965.
B-204	224, MW, NCPLX	Strontium semiworks waste. Last incoming waste transfer in 1965.
C-101	MW,MW1,TBP,UR,EB,CWP1, CWP2,CW,P,CW,P	Predominantly solvent waste tank. Last incoming waste transfer in 1970
C-102	MW, TBP, OWW, UR, CW, TH66	Tank formerly contained organic solvent pool, TOC predominantly solvent waste. Last incoming waste transfer in 1973.
C-103	MW, TBP, P, CW, CWP, BNW, LW, B, DW, IX, EB, R, BL, PL, OWW, N, PSS, RIX, NCPLX	Tank contains organic solvent pool, TOC predominantly solvent waste. Last incoming waste transfer in 1978.
C-201	(MW before 1954), SSW, HS, SSW, NCPLX	Strontium semiworks waste. Last incoming waste transfer in 1980.
C-202	(MW before 1953), SSW, HS, NCPLX	Strontium semiworks waste. Last incoming waste transfer in 1973.
C-203	(MW before 1953), SSW, HS, SSW, NCPLX	Strontium semiworks waste. Last incoming waste transfer in 1980.
C-204	(MW before 1954), SSW, HS, SSW, NCPLX	Strontium semiworks waste. Last incoming waste transfer in 1974.

GENERAL NOTES FOR TABLES C-1 THROUGH C-5:

- Primary Waste Type data in 2nd columns are taken directly from Hanford Tank Contents Estimates (HTCE) (Brevick, et al. 1996 and 1997) as the Anderson (1990) and Agnew (1996) timelines on the Waste and Level History diagrams for each tank. The waste types from both timelines are repeated here in sequence but without water and without repeating a waste type that had already appeared earlier in the listings. In general, this relates qualitatively that this type of waste was deposited at some time in the tank. No allowance is made for removals, so some waste types may have been effectively removed by pumpout and sluicing. Refer to Agnew (1996) for actual history of waste deposition and removal. In general, the most recent waste types are found later in the listing. Definitions of the waste types can be found in the HTCE references as detailed on the level diagrams used for the source.

- The date of latest transfer of waste appears in Column 3 of the tables. This date was inferred from upward level inflections on the HTCE level history diagrams discussed above. This is provided as a convenience for the reader but the HTCE and or Anderson and Agnew references should be consulted for more precise dating.

- HTCE for the North East Quadrant of 200 East: -
  - A Tank Farm
  - AX
  - B
  - BX
  - BY
  - C

- HTCE for the South West Quadrant of 200 West:
  - S Tank Farm
  - SX
  - U

- HTCE for the North West Quadrant of 200 West:
  - T Tank Farm
  - TX
  - TY

7.0 MOISTURE GROUPING OF THE TANKS

This section describes how the tank wastes were grouped according to moisture conditions. While fuel grouping of wastes is the primary key to evaluating the hazard potentials of tanks, the amount of moisture that waste now contains or is expected to retain in the future is also important. As a secondary key to tank safety, the tanks are assigned subgroups within each primary group. These subgroups are based upon whether a tank is currently demonstrated to have a wet surface or a dry surface, and whether the waste contains saltcakes or sludges.

If the waste surface contains aqueous liquid (as determined by visual means, samples, and/or liquid level measurements), then the waste cannot support propagation. Therefore, there is a distinction between tanks that have supernatant, and those that do not. Tanks containing liquid at or above the waste surface are termed "Wet" in Table D-6.

Liquid retention properties of wastes are generally related to whether the wastes are saltcakes or sludges. In general, large crystals were formed as precipitates from the evaporator slurries. These crystals constitute what is termed: "saltcake". Large crystal wastes allow their liquids to drain out comparatively rapidly. Thus, these wastes are expected to loose moisture easily if the tank is salt-well pumped or if the tank leaks. By contrast, many of the metal wastes formed sludges when they were deposited. These sludges typically have very fine structures or small particles. These sludges do not drain easily, and therefore are expected to retain considerable moisture even if pumped or if the tank leaks. The tank groupings are listed in Table D-6. Tanks are classified in the table as saltcake if Agnew (1997) indicates that 30% or more by volume of the waste is saltcake. Tanks having more than 70% sludge are classified as sludge tanks.

Table D-6. Moisture Groups

Moisture Group	Tanks
Dry Surface - Saltcake	A-101, A-106, AX-101, AX-102, AX-103, B-101, B-103, B-105, B-106, B-108, B-109, BX-111, BY-101, BY-102, BY-103, BY-104, BY-105, BY-106, BY-107, BY-109, BY-110, BY-111, BY-112, S-102, S-104, S-105, S-108, S-109, S-110, S-112, SX-103, SX-108, SX-109, SX-110, SX-111, SX-112, SX-114, SX-115, T-108, T-109, TX-102, TX-103, TX-104, TX-105, TX-106, TX-107, TX-108, TX-110, TX-111, TX-112, TX-113, TX-114, TX-115, TX-116, TX-117, TX-118, TY-102, TY-103, U-111. (59 tanks)
Dry Surface - Sludge	A-104, A-105, AX-104, B-104, B-107, BX-101, BX-102, BX-107, BX-108, BX-109, BX-112, BY-108, C-101, C-102, C-104, C-105, C-107, C-108, C-111, C-112, C-201, C-202, C-203, C-204, SX-107, SX-113, T-101, T-105, T-106, T-201, T-202, T-203, T-204, TX-101, TX-109, TY-101, TY-105, TY-106, U-104, U-110. (40 tanks)
Wet Surface - Saltcake	A-102, A-103, B-102, B-112, BX-106, S-101, S-103, S-106, S-111, SX-101, SX-102, SX-104, SX-105, SX-106, U-102, U-103, U-105, U-106, U-107, U-108, U-109. (21 tanks)
Wet Surface - Sludge	B-110, B-111, B-201, B-202, B-203, B-204, BX-103, BX-104, BX-105, BX-110, C-103, C-106, C-109, C-110, S-107, T-102, T-103, T-104, T-107, T-110, T-111, T-112, TY-104, U-101, U-112, U-201, U-202, U-203, U-204. (29 tanks)

8.0 FUEL AND MOISTURE GROUPINGS

This section shows which tank wastes comprise each of the fuel and moisture groups. When combining the fuel and moisture groups together, each SST waste belongs to one of sixteen possible groups (one of the four moisture groups, and one of the four fuel groups; special case tanks are not included). The fuel moisture groups are shown in Table D-7.

Table D-7. Fuel and Moisture Groups.

Fuel and Moisture Group	Tanks
High Complexant Waste Dry Surface -Saltcake	A-101, A-106, AX-101, AX-102, AX-103, TX-104, and U-111. (7 tanks)
High Complexant Waste Dry Surface -Sludge	C-104, C-105, and C-107. (3 tanks)
High Complexant Waste Wet Surface - Saltcake	A-102, A-103, SX-101, SX-106, U-105, U-106, and U-107. (7 tanks)
High Complexant Waste Wet Surface - Sludge	BX-104, BX-105, C-106, and S-107. (4 tanks)
Medium Complexant Waste Dry Surface - Saltcake	B-109, BY-102, S-102, SX-103, TX-102, and TX-111. (6 tanks)
Medium Complexant Waste Dry Surface - Sludge	A-105 and BX-112. (2 tanks)
Medium Complexant Waste Wet Surface - Saltcake	S-101, S-103, SX-102, SX-104, SX-105, U-102, U-103, U-108, and U-109. (9 tanks)
Medium Complexant Waste Wet Surface - Sludge	B-111. (1 tank)
Low Complexant Waste Dry Surface - Saltcake	B-101, B-103, B-105, B-106, B-108, BX-111, BY-101, BY-103, BY-104, BY-105, BY-106, BY-107, BY-109, BY-110, BY-111, BY-112, S-104, S-105, S-108, S-109, S-110, S-112, SX-110, SX-111, SX-114, SX-115, T-108, T-109, TX-103, TX-105, TX-106, TX-107, TX-108, TX-110, TX-112, TX-113, TX-114, TX-115, TX-116, TX-117, TX-118, TY-102, and TY-103. (43 tanks)
Low Complexant Waste Dry Surface - Sludge	A-104, AX-104, BX-101, BX-102, BX-107, BX-108, BX-109, BY-108, C-108, C-111, C-112, T-101, T-105, T-106, T-201, T-202, T-203, T-204, TX-101, TX-109, TY-101, U-104, and U-110. (23 tanks)
Low Complexant Waste Wet Surface - Saltcake	B-102, B-112, BX-106, S-106, and S-111. (5 tanks)
Low Complexant Waste Wet Surface - Sludge	B-110, BX-103, BX-110, C-109, C-110, T-102, T-103, T-107, T-110, T-111, T-112, TY-104, U-101, U-112, U-201, U-202, U-203, and U-204 . (18 tanks)
No Complexant Waste Dry Surface - Saltcake	SX-108, SX-109, and SX-112. (3 tanks)
No Complexant Waste Dry Surface - Sludge	B-104, B-107, SX-107, SX-113, TY-105, and TY-106. (6 tanks)
No Complexant Waste Wet Surface - Saltcake	No Tanks in Group.
No Complexant Waste Wet Surface - Sludge	T-104. (1 tank)

Note: There are 11 special tanks: B-201, B-202, B-203, B-204, C-101, C-102, C-103, C-201, C-202, C-203, and C-204.

Total Tanks: 7+3+7+4+6+2+9+1+43+23+5+18+3+6+1+11 = 149 Total SSTs

9.0 TANK GROUPING DATA BY INDIVIDUAL TANKS

Tanks were grouped by the amount of fuel they contain (in terms of TOC or DSC energy), their surface wetness (whether or not there is liquid near the surface), and their waste type (saltcake or sludge). If Agnew (1997) indicates that at least 30% of the waste is saltcake, then the tank is grouped as a "saltcake" tank. Where sludge makes up 70% or more of the waste, the tank is grouped as a "sludge" tank. Table D-8 compiles the information in Tables D-1 through D-7. The SSTs are listed serially in Column 1, the tank grouping is shown in Columns 2 to 4 and the bases for tank grouping are listed in Columns 5 and 6. Detailed notes explaining Columns 5 and 6 entries follow the table.

Table D-8. Tank Grouping by Fuel, Surface Wetness, and Waste Type.

Tanks 1	Fuel Group 2	Surface 3	Waste Type 4	Fuel Group Basis 5	Waste Type 6
A-101	H	DRY	SALTCAKE	Anderson ,Agnew-3	A1 saltcake
A-102	H	WET	SALTCAKE	Anderson, Agnew-3, Agnew-6, Agnew-7	A1 saltcake
A-103	H	WET	SALTCAKE	Anderson, Agnew-3	A1 saltcake
A-104	L	DRY	SLUDGE	Agnew-5(1962.8)	Sludge
A-105	M	DRY	SLUDGE	Agnew-5(1970.0), Agnew-7	Sludge
A-106	H	DRY	SALTCAKE	Anderson , Agnew-3, Agnew-6	A1 saltcake
AX-101	H	DRY	SALTCAKE	Anderson ,Agnew-3, Agnew-6	A1 saltcake
AX-102	H	DRY	SALTCAKE	Anderson ,Agnew-3	A1 saltcake
AX-103	H	DRY	SALTCAKE	Anderson ,Agnew-3	A1 saltcake
AX-104	L	DRY	SLUDGE	Agnew-5(1978.5), Agnew-7	Sludge
B-101	L	DRY	SALTCAKE		B saltcake
B-102	L	WET	SALTCAKE		B saltcake
B-103	L	DRY	SALTCAKE	Agnew-4	B saltcake
B-104	N	DRY	SLUDGE	And53, Agn57	Sludge
B-105	L	DRY	SALTCAKE		B saltcake
B-106	L	DRY	SALTCAKE		B saltcake
B-107	N	DRY	SLUDGE	And67, Agn63	Sludge
B-108	L	DRY	SALTCAKE		B saltcake
B-109	M	DRY	SALTCAKE	Agnew-3	B saltcake
B-110	L	WET	SLUDGE	And68,Agn69(2kgal CSR)	Sludge

Table D-8. Tank Grouping by Fuel, Surface Wetness, and Waste Type.

Tanks 1	Fuel Group 2	Surface 3	Waste Type 4	Fuel Group Basis 5	Waste Type 6
B-111	M	WET	SLUDGE	Agnew-3	Sludge
B-112	L	WET	SALTCAKE		BY saltcake
B-201	S	WET	SLUDGE	Agnew-6, Unique: SrSemiWorks	Sludge
B-202	S	WET	SLUDGE	Agnew-6, Unique: SrSemiWorks	Sludge
B-203	S	WET	SLUDGE	Agnew-6, Unique: SrSemiWorks	Sludge
B-204	S	WET	SLUDGE	Agnew-6, Unique: SrSemiWorks	Sludge
BX-101	L	DRY	SLUDGE		Sludge
BX-102	L	DRY	SLUDGE		Sludge
BX-103	L	WET	SLUDGE		Sludge
BX-104	H	WET	SLUDGE	Anderson ,Agnew-3	Sludge
BX-105	H	WET	SLUDGE	Anderson ,Agnew-3	Sludge
BX-106	L	WET	SALTCAKE		BY saltcake
BX-107	L	DRY	SLUDGE		Sludge
BX-108	L	DRY	SLUDGE		Sludge
BX-109	L	DRY	SLUDGE		Sludge
BX-110	L	WET	SLUDGE		Sludge
BX-111	L	DRY	SALTCAKE		BY saltcake
BX-112	M	DRY	SLUDGE	Agnew-3, Agnew-7	Sludge
BY-101	L	DRY	SALTCAKE		BY saltcake
BY-102	M	DRY	SALTCAKE	Agnew-3, Agnew-7	BY saltcake
BY-103	L	DRY	SALTCAKE		BY saltcake
BY-104	L	DRY	SALTCAKE		BY saltcake
BY-105	L	DRY	SALTCAKE		BY saltcake
BY-106	L	DRY	SALTCAKE	Agnew-5 (1977.6), Agnew-7	BY saltcake
BY-107	L	DRY	SALTCAKE		BY saltcake
BY-108	L	DRY	SLUDGE		Sludge
BY-109	L	DRY	SALTCAKE		BY saltcake
BY-110	L	DRY	SALTCAKE	Agnew-5(1978.6)	BY saltcake
BY-111	L	DRY	SALTCAKE		BY saltcake
BY-112	L	DRY	SALTCAKE	Agnew-5(1972.4)	BY saltcake

Table D-8. Tank Grouping by Fuel, Surface Wetness, and Waste Type.

Tanks 1	Fuel Group 2	Surface 3	Waste Type 4	Fuel Group Basis 5	Waste Type 6
C-101	S	DRY	SLUDGE	Agnew-7, Solvent waste	Sludge
C-102	S	DRY	SLUDGE	Agnew-4, Solvent waste	Sludge
C-103	S	WET	SLUDGE	Agnew-3, Solvent waste	Sludge
C-104	H	DRY	SLUDGE	Anderson ,Agnew-3, Agnew-6, Agnew-7	Sludge
C-105	H	DRY	SLUDGE	Anderson, Agnew-7	Sludge
C-106	H	WET	SLUDGE	Anderson	Sludge
C-107	H	DRY	SLUDGE	Anderson, Agnew-5 (1984.0), Agnew-6, Agnew-7	Sludge
C-108	L	DRY	SLUDGE		Sludge
C-109	L	WET	SLUDGE	Agnew-6	Sludge
C-110	L	WET	SLUDGE		Sludge
C-111	L	DRY	SLUDGE	Agnew-5(1970.5), Agnew-7	Sludge
C-112	L	DRY	SLUDGE	Agnew-6	Sludge
C-201	S	DRY	SLUDGE	Agnew-5(1966.0), Agnew-6, Agnew-7, Unique: SrSemiWorks	Sludge
C-202	S	DRY	SLUDGE	Agnew-5(1956.5), Agnew-6, Agnew-7, Unique: SrSemiWorks	Sludge
C-203	S	DRY	SLUDGE	Agnew-5(1956.0), Agnew-6, Agnew-7, Unique: SrSemiWorks	Sludge
C-204	S	DRY	SLUDGE	Agnew-5(1956.0), Agnew-6, Agnew-7, Unique: SrSemiWorks	Sludge
S-101	M	WET	SALTCAKE	Complexant only in Transit, Anderson Listed, Agnew-3	S1 saltcake

Table D-8. Tank Grouping by Fuel, Surface Wetness, and Waste Type.

Tanks 1	Fuel Group 2	Surface 3	Waste Type 4	Fuel Group Basis 5	Waste Type 6
S-102	M	DRY	SALTCAKE	Complexant only in Transit, Anderson Listed, Agnew-3	S2 saltcake
S-103	M	WET	SALTCAKE	Agnew-3	S2 saltcake
S-104	L	DRY	SALTCAKE	And68,Agn75(161kg al R SLTCK)	R saltcake
S-105	L	DRY	SALTCAKE		S1 saltcake
S-106	L	WET	SALTCAKE		S1 saltcake
S-107	H	WET	SLUDGE	Anderson ,Agnew-3	Sludge
S-108	L	DRY	SALTCAKE		S1 saltcake
S-109	L	DRY	SALTCAKE		S1 saltcake
S-110	L	DRY	SALTCAKE		S1 saltcake
S-111	L	WET	SALTCAKE	Agnew-4	S1 saltcake
S-112	L	DRY	SALTCAKE	Agnew-4	S1 saltcake
SX-101	H	WET	SALTCAKE	Anderson, Agnew-4	S2 saltcake
SX-102	M	WET	SALTCAKE	Agnew-3	S1 saltcake
SX-103	M	DRY	SALTCAKE	Agnew-3	S1 saltcake
SX-104	M	WET	SALTCAKE	Agnew-3	S1 saltcake
SX-105	M	WET	SALTCAKE	Agnew-3	S1 saltcake
SX-106	H	WET	SALTCAKE	Anderson ,Agnew-3	S2 saltcake
SX-107	N	DRY	SLUDGE	And68,Agn68	Sludge
SX-108	N	DRY	SALTCAKE	And68,Agn68	R2 saltcake
SX-109	N	DRY	SALTCAKE	And67, Agn67	R saltcake
SX-110	L	DRY	SALTCAKE		R saltcake
SX-111	L	DRY	SALTCAKE		R saltcake
SX-112	N	DRY	SALTCAKE	And68,Agn69(Last Incoming waste from SX-107 not complexant)	R saltcake
SX-113	N	DRY	SLUDGE	And67, Agn72 (diatomaceous earth)	Sludge
SX-114	L	DRY	SALTCAKE		R saltcake
SX-115	L	DRY	SALTCAKE		R saltcake
T-101	L	DRY	SLUDGE		Sludge
T-102	L	WET	SLUDGE		Sludge
T-103	L	WET	SLUDGE		Sludge

Table D-8. Tank Grouping by Fuel, Surface Wetness, and Waste Type.

Tanks 1	Fuel Group 2	Surface 3	Waste Type 4	Fuel Group Basis 5	Waste Type 6
T-104	N	WET	SLUDGE	And57,Agn54	Sludge
T-105	L	DRY	SLUDGE	Agnew-5(1980.5)	Sludge
T-106	L	DRY	SLUDGE		Sludge
T-107	L	WET	SLUDGE		Sludge
T-108	L	DRY	SALTCAKE		T1 saltcake
T-109	L	DRY	SALTCAKE		T1 saltcake
T-110	L	WET	SLUDGE	Agnew-4, Agnew-6	Sludge
T-111	L	WET	SLUDGE	Agnew-4, Agnew-6	Sludge
T-112	L	WET	SLUDGE		Sludge
T-201	L	DRY	SLUDGE	Agnew-6	Sludge
T-202	L	DRY	SLUDGE	Agnew-6	Sludge
T-203	L	DRY	SLUDGE	Agnew-6	Sludge
T-204	L	DRY	SLUDGE	Agnew-6	Sludge
TX-101	L	DRY	SLUDGE	Agnew-5(1975.5)	Sludge
TX-102	M	DRY	SALTCAKE	Agnew-3	T2 saltcake
TX-103	L	DRY	SALTCAKE		T2 saltcake
TX-104	H	DRY	SALTCAKE	Anderson ,Agnew-3	T2 saltcake
TX-105	L	DRY	SALTCAKE	Agnew-4	T2 saltcake
TX-106	L	DRY	SALTCAKE		T2 saltcake
TX-107	L	DRY	SALTCAKE		T2 saltcake
TX-108	L	DRY	SALTCAKE		T2 saltcake
TX-109	L	DRY	SLUDGE	Agnew-5(1977.7), Agnew-7	Sludge
TX-110	L	DRY	SALTCAKE		T2 saltcake
TX-111	M	DRY	SALTCAKE	Agnew-3	T2 saltcake
TX-112	L	DRY	SALTCAKE		T2 saltcake
TX-113	L	DRY	SALTCAKE		T2 saltcake
TX-114	L	DRY	SALTCAKE		T2 saltcake
TX-115	L	DRY	SALTCAKE		T2 saltcake
TX-116	L	DRY	SALTCAKE		T2 saltcake
TX-117	L	DRY	SALTCAKE		T2 saltcake
TX-118	L	DRY	SALTCAKE	Agnew-4	T2 saltcake
TY-101	L	DRY	SLUDGE		Sludge
TY-102	L	DRY	SALTCAKE		T2 saltcake
TY-103	L	DRY	SALTCAKE		T2 saltcake

Table D-8. Tank Grouping by Fuel, Surface Wetness, and Waste Type.

Tanks 1	Fuel Group 2	Surface 3	Waste Type 4	Fuel Group Basis 5	Waste Type 6
TY-104	L	WET	SLUDGE	Agnew-4	Sludge
TY-105	N	DRY	SLUDGE	And58,Agn65	Sludge
TY-106	N	DRY	SLUDGE	And59,Agn72 (20 kgal DE)	Sludge
U-101	L	WET	SLUDGE		Sludge
U-102	M	WET	SALTCAKE	Agnew-3	T2 saltcake
U-103	M	WET	SALTCAKE	Agnew-3	S1 saltcake
U-104	L	DRY	SLUDGE		Sludge
U-105	H	WET	SALTCAKE	Anderson ,Agnew-3	S2 saltcake
U-106	H	WET	SALTCAKE	Anderson ,Agnew-3	S1 saltcake
U-107	H	WET	SALTCAKE	Anderson ,Agnew-3	S2 saltcake
U-108	M	WET	SALTCAKE	Agnew-3	S1 saltcake
U-109	M	WET	SALTCAKE	Agnew-3	S1 saltcake
U-110	L	DRY	SLUDGE		Sludge
U-111	H	DRY	SALTCAKE	Anderson ,Agnew-3	S2 saltcake
U-112	L	WET	SLUDGE		Sludge
U-201	L	WET	SLUDGE		Sludge
U-202	L	WET	SLUDGE		Sludge
U-203	L	WET	SLUDGE	Agnew-4	Sludge
U-204	L	WET	SLUDGE	Agnew-4	Sludge

NOTES TO SUPPORT TABLE D-8 ABOVE:

In Fuel Group Basis: The Groups in Column 2 are justified by explanations in Column 5.

"Anderson" indicates that Anderson (1990) identified that these tanks contained some form of complexant waste type: CC, CPLX, CCPLX, HS, and SRR

"Agnew-#" indicates that Agnew(1996) History of Organic Carbon in Hanford HLW Tanks listed this tank in the relevant table(s):

Agnew-3: "Table 3. Tank Concentrates Sorted by Decreasing TOC (no aging or evaporator degradation) with TOC > 0.64 wt%" (Hanford interpretation for this report- Medium to High TOC)

Agnew-4: "Table 4. Watch List Tank Concentrates with TOC < 0.64 wt%" (Hanford interpretation for this report - Low TOC)

Agnew-5: "Table 5. Concentrates in Non-Watch List Tanks with Historical TOCs > 1.0 wt%" [Dates of Maximum TOC for tank are indicated from Agnew Table 5] (Current TOC Residual is predicted to be very low- Hanford interpretation for this report - Low TOC)

Agnew-6: "Table 6. Tank TLM Layers with TOC > 1.0 wt%" (Hanford interpretation for this report - Low TOC)

Agnew-7: "Table 7. Other Tanks with Residual Organic Layers" (Hanford interpretation for this report - Low TOC)

Last Incoming Date: (Example Entry: And67 equals Anderson (1990) indicated last transfer was 1967, Agn74 equals Agnew(1997) indicates last transfer was 1974 - The waste type that created layer post Anderson layer is identified in parentheses) First Date is from Anderson (1990), Second Date is from Agnew(1997) Where dates are before 1968, the tanks cannot contain complexant wastes because these chemicals were not used at Hanford until after 1968.

Unique History: Unique waste history different from general waste grouping.

Basis for waste type in Column 4 is stated in Column 6.

SaltCakes were identified in Agnew (1997) as being at least 30 % of the waste total. When two major saltcakes are present in a tank, the saltcake at the top of the waste is identified unless the other saltcake is significantly larger.

"A1 saltcake" indicates A1 Saltcake, etc.

10.0 REFERENCES

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GLOSSARY

This glossary of Hanford terminology has been compiled from numerous sources. A lot of the terms have come from Anderson(1991), Jungfleisch(1984) and Agnew(1996). These definitions may conflict with other sources.

1C First-cycle decontamination waste from the bismuth phosphate($BiPO_4$) process at B and T Plants consisting of by-products co-precipitated from a solution containing plutonium (contains 10% of the original fission product activity and 2% of the products). By-product cake solution was mixed with product waste and neutralized with 50% caustic. Coating waste from removing aluminum fuel element cladding was added and comprised about 24% of the waste.

1C1 First-cycle decontamination waste from the bismuth phosphate($BiPO_4$) process, 1944-49 (LANL defined waste #3)

1C2 First-cycle decontamination waste from the bismuth phosphate($BiPO_4$) process, 1950-56 (LANL defined waste #4)

224 224-U Waste. LaF_3 finishing waste from $BiPO_4$ process and uranium recovery in the 224 buildings by T Plant and B Plant and the Plutonium Finishing Plant (LANL defined waste #7)

2C Second-cycle decontamination waste from the bismuth phosphate($BiPO_4$) process at B and T Plants (see second-cycle decontamination waste)

2C1 Second-cycle decontamination waste from the bismuth phosphate($BiPO_4$) process, 1944-49 (LANL defined waste #5)

2C2 Second-cycle decontamination waste from the bismuth phosphate($BiPO_4$) process, 1950-56 (LANL defined waste #6)

5-6 Waste from cell 5 tank 6 in B Plant; the hot waste collected in the bottom of cell 5 when the liquid boiled over during dissolving and neutralizing phases of the $BiPO_4$ process.

Active Drywell Drywell in which radiation readings of greater than 50 counts per second are detected. The readings must be consistent as to depth and radiation level for repeated readings to be considered active.

Airlift Circulator A device installed in aging waste tanks to promote mixing of the supernate. By maintaing motion within the body of the liquid, the circulators minimize superheat buildup and, consequently, minimize burping.

AR Washed PUREX sludge from the 244-AR Vault (LANL defined waste #31)

Assumed Leaker A waste storage tank for which past surveillance data has indicated a loss of liquid attributed to a breach of integrity.In 1984, the designations of "suspect leaker," "questionable integrity," "confirmed leaker," "declared leaker," "dormant", and "borderline" were merged into one category called "assumed leaker."

B High-level waste from PUREX acidified waste processed through B Plant to extract strontium (LANL defined waste #32)

BG Below grade

BL B Plant low-level waste beginning 1968 (LANL defined waste #33)

BM Bench mark

BNW Battelle Northwest Laboratory waste

BSLTCK Saltcake waste generated from the 242-B Evaporator, 1951-53 (LANL defined waste #41)

BYSLTCK Saltcake waste generated from in-tank solidification units 1 and 2 in BY Tank Farm, 1965-74 (LANL defined waste #44)

Cascade Eleven of the single-shell tank farms (all except the AX Tank Farm) were equipped with overflow lines between tanks. The tanks were connected in series and were placed at different elevations creating a downhill gradient for liquids to flow (cascade) from one tank to another. Thus, multiple tanks could be filled with one pump.

Catch Tanks Small capacity single-shell tanks associated with diversion boxes and diverter stations. The tanks are designed to receive any transfer line clean out, spills or leakage from the boxes, or leakage from the adjacent pipe encasement.

CC Complexant concentrate waste or concentrated complexant; concentrated product from evaporating dilute complexed waste which contained high concentrations of organic complexants, such as HEDTA, EDTA, and citric acid.

CCPLX Complexant concentrate or concentrated complexant waste; see CC.

CCW Concentrated customer waste; the product of concentrating waste received from 100N or the Fast Flux Test Facility having phosphate and/or sulfate concentrations which, after concentration, exhibit the characteristics of a complexed liquid.

CEM Cement

CF Cesium feed; a PUREX sludge supernate.

CP Concentrated phosphate waste; the product of concentrating waste orginating from the decontamination of the N Reactor in the 100 N Area.

CPLX Complexed waste; dilute waste containing relatively high concentrations of organic chelating agents such as EDTA and HEDTA form B Plant waste fractionization.

Crib An underground structure filled with aggregate designed to receive liquid waste, usually through a perforated pipe. The filtration and ion exchange properties of the soil in and around the crib were used to contain the radionuclides.

CSR Waste (supernate) from cesium recovery of tank supernate at B Plant (LANL defined waste #35)

CW Coating (cladding) waste produced at PUREX from dissolution of Zircaloy or aluminum fuel cladding.

CWZR1 Coating (cladding) waste (PUREX), Zircaloy cladding; 1968-72 (LANL defined waste #23)

CWZR2 Coating (cladding) waste (PUREX), Zircaloy cladding; 1983-88 (LANL defined waste #47); see NCRW and PD; also known as CWP/ZR2

CWP Coating (cladding) waste (PUREX)

CWP1 Coating (cladding) waste (PUREX); (LANL defined waste #21, CWP/Al, 1956-60)

CWP2 Cladding (coating) waste (PUREX), (LANL defined waste #22, CWP/Al, 1961-72)

CWP/ZR Now called PD or NCRW

CWR1 REDOX cladding (coating) waste, (LANL defined waste #15, CWR/Al, 1952-60)

CWR2 Coating (cladding) waste (REDOX), (LANL defined waste #16, CWL/Al with some Zr, 1961-72)

DC Dilute complexed waste characterized by organic carbon including organic complexants: EDTA, citric acid, HEDTA, and iminodiacetate.

DE Diatomaceous Earth; Diatomite(SiO_2); a light friable siliceous material derived from diatom (algal) remains; added to some underground waste storage tanks to absorb residual liquids.

Ditch A linear excavation often used for the temporary diversion or disposal of process waste streams.

Diversion Box A below grade, concrete enclosure containing the remotely maintained jumpers and spare nozzles for routing waste solution to storage tank farms.

DSSF Double-shell slurry feed; Waste concentrated in evaporators until the solution is nearly saturated with sodium aluminate without exceeding receiver tank composition limits. This form is not as concentrated as double-shell slurry.

Drywell A steel casing, generally 6-inch internal diameter, drilled into the ground to various depths (but do not reach the water table) and used to insert monitoring instruments for measuring the presence of radioactivity or moisture content.

DW Decontamination waste; a wash solution from equipment decontamination at T Plant (LANL defined waste #39)

EB Evaporator bottoms; a slurry from the evaporators

EF Evaporator feed; various supernatant liquids whose composition depends on the source

EVAP Evaporator feed (post 1976 designation)

Evaporator Feed Any waste liquid that can be concentrated to form saltcake; e.g., aged waste, low heat waste, dilute interstitial liquor, and other radioactive waste solutions.

FD Feed dilute

Ferrocyanide An ion composed of iron and cyanide with the chemical formula of $Fe(CN)_6^{-4}$.

H_2O Water

HDRL Hanford defense residual liquor; late 1970s designation for terminal liquors remaining after evaporation; includes complexed and noncomplexed waste, partially neutralized waste, and DSSF (see RESID).

HLO Hanford Laboratory Operations; also, Hanford laboratory operations waste; laboratory waste from the 300 Area

HS Hot Semiworks (C Plant); a pilot facility with a variety of operations. Also, Hot or Strontium Semiworks waste (LANL defined waste #28); see SSW.

ILL Interstitial liquid level

Inactive Tank A tank that has been removed from liquid-processing service, has been pumped to less than 33,000 gallons of waste, and will be, or is in the process of being, stabilized followed by intrusion prevention. This includes all tanks not in active or active-restricted categories. Also included are inactive spare tanks that would be used if an active tank failed.

Interim Isolation An administrative designation reflecting the completion of the physical effort required to minimize the addition of liquids into an inactive storage tank, process vault, sump, catch tank, or diversion box. (In June 1993, "interim isolation" was replaced by "intrusion prevention".)

Interim Stabilization A tank which contains less than 50,000 gallons of drainable interstitial liquid and less than 5,000 gallons of supernate. If a jet pump was used to achieve interim stabilization, then the jet pump flowrate must have been at or below 0.05 gallons per minute before interim stabilization was completed.

Interstitial Liquid The interstitial liquid within the tanks is the liquid that fills the interstitial(voids) spaces of the solid waste.

Intrusion Prevention An administrative designation reflecting the completion of the physical effort required to minimize the addition of liquids into an inactive storage tank, process vault, catch tank, sump, or diversion box.

IWW Inorganic wash waste (i.e., concentrated neutralized high-level waste from PUREX); see NCAW and P. This was also designated as 1WW because it is bottoms waste from the #1 acid concentrator.

IX Ion exchange waste from the cesium recovery process at B Plant

Knuckle Point where the side wall and the bottom curved surface of a tank meet.

Level Adjustment Any update in the waste inventory (or tank level) in a tank. The adjustments usually result from surveillance observations or historical investigations.

Liquid Observation Well (LOW) A liquid observation well is a fiber glass or tefzel-reinforced epoxy-polyester resin, 89 mm (3.5 inches) diameter pipe that is capped on the bottom end. This end is placed within 25 mm (1 inch) above the bottom portion of the steel tank liner. Three types of probes are used in the LOW to monitor changes in the interstitial liquid level: acoustic, gamma, and neutron.

LW Laboratory waste from the 222-S Building

Mixed Waste Waste containing both radioactive and hazardous (dangerous as defined in WAC 173-303) waste.

MW Waste from the bismuth phosphate process (which extracted plutonium) containing all the uranium, approximately 90% of the original fission product activity, and approximately 1% of the product. This waste was brought to the neutral point with 50% caustic and then treated with an excess of sodium carbonate. This procedure yielded almost completely soluble waste at a minimum total volume. The exact composition of the carbonate compounds was not known, but was assumed to be a uranium phosphate carbonate mixture. The term "metal" was the code word for plutonium.

MW1 Metal waste from $BiPO_4$, 1944-49 (LANL defined waste #1, same as MW)

MW2 Metal waste from $BiPO_4$, 1950-56 (LANL defined waste #2, same as MW)

N Phosphate decontamination waste from N Reactor (LANL defined waste #40)

NCAW Neutralized current acid waste, primary high-level waste stream from PUREX process (LANL defined waste #45, formerly P3, 1983-88)

NCPLX Non-complexed waste; general term for supernates and salt well liquors that did not contain organic complexants.

NCRW Neutralized cladding removal waste, same as CWP/Zr.

NIT $HNO_3/KMNO_4$ solution added during evaporator operation

Non-Complexed General waste term applied to all Hanford Site liquors not identified as complexed (containing organics).

Out-of-Service-Tank A tank that does not meet the definition of an in-service tank. Before September 1988, these tanks were defined as inactive. (Note: All single-shell tanks are out of service.)

OWW Organic Wash Waste; The solvent used in PUREX was treated before reuse by washing with potassium permanganate and sodium carbonate, followed by dilute nitric acid.

OWW1 Organic wash waste, 1956-62, also known as CARB (LANL defined waste #24)

OWW2 Organic wash waste, 1963-67 (LANL defined waste #25)

OWW3 Organic wash waste, 1968-72 (LANL defined waste #26)

P High-level neutralized acid waste from PUREX

P1 PUREX high-level waste, 1956-62 (LANL defined waste #17)

P2 PUREX high-level waste, 1963-67 (LANL defined waste #18)

P2' 1968-1972, assigned to P2.

P3 1983-1988, now called PXNAW or NCAW.

Partial Interim Isolation The administrative designation for completing the physical effort required for interim isolation, except for isolating the risers and piping that will be required for jet pumping or for other methods of stabilization.

PASF PUREX ammonia scrubber feed (LANL defined waste #48)

PD PUREX decladding waste

PFeCN1 Ferrocyanide sludge produced by in-plant scavenging (using 0.005 M ferrocyanide) of waste from uranium recovery (LANL defined waste #9)

PFeCN2 Same as PFeCN1 except 0.0025 M ferrocyanide used (LANL defined waste #10)

pH A measure of the hydrogen ion concentration in solution.

PL Low-level waste from PUREX

PL1 PUREX low-level waste (LANL defined waste #20)

PL2 1983-88, now called PXMSC, among other things.

Primary Addition An addition of waste from a specific plant or process vault.

PSS PUREX sludge supernate; produced by leaching PUREX sludge

PXMSC Dilute, non-complexed waste from PUREX misc. streams

PXNAW Aging waste from PUREX high level waste; see NCAW (LANL defined waste #45, formerly P3, 1983-88)

R High-level waste from REDOX

R1 REDOX waste, 1952-57 (LANL defined waste #13)

R2 REDOX waste, 1958-66 (LANL defined waste #14)

RESID Hanford defense residual liquor (see HDRL)

Riser A vertical pipe through a tank dome (access to the tank interior).

RIX REDOX ion exchange waste produced at B Plant by extractng cesium from REDOX supernate

RSLTCK Salt-cake waste from the REDOX concentrator (LANL defined waste #43)

RSN REDOX supernate

SACS Surveillance analysis computer system

Saltcake Crystallized nitrate and other salts deposited in waste tanks, usually after the waste is concentrated by evaporation.

Salt Well A hole drilled or sluiced into saltcake and lined with a cylindrical screen to permit drainage and jet pumping of interstitial liquids.

Scavenged Waste Waste which has been treated with ferrocyanide to remove cesium from the supernate by precipitating it into a sludge.

Self-Concentrating Waste Liquid, high-level radioactive waste whose decaying radionuclides heat the solution sufficiently to boil off (i.e., evaporate) the water, thus concentrating the waste.

SIX Waste from removing cesium from PUREX sludge supernate by ion exchange at B Plant

Sluicing, or sluiced To wash with water. At Hanford, this has meant to dissolve or suspend waste in solution using a high pressure water stream.

Slurry Insoluble material suspended in water or aqueous solution.

SMM Supernatant Mixing Model (created at LANL) that calculates the composition of tank liquids and concentrates as linear combinations of supernates from the *Hanford Defined Wastes: Chemical and Radionuclide Compositions* (Agnew, 1995a)

SMP Sludge measuring port

SMMA1 Solids from concentrate calculated by SMM. Waste type is tank dependent.

SMMA2 Solids from concentrate calculated by SMM. Waste type is tank dependent.

Sound The integrity classification of a waste storage tank for which surveillance data indicate no loss of liquid attributed to a breach of integrity.

SRR Sluiced PUREX sludge from A and AX Tank Farms sent to B Plant to recover strontium from 1967-76 (LANL defined waste #34). The sludge returned from B Plant was sent to the AR Vault and the supernate was sent to 241-C-105.

SRS Strontium sludge; PUREX sludges sluiced for strontium recovery at B Plant were washed in the AR Vault with supernate from 241-C-105, and the resulting supernates were sent to CSR.

SST Single-shell tank

SSW Strontium Semiworks waste; produced from the strontium extraction process at the Strontium Semiworks after 1961

Stabilization The removal or immobilization, as completely as possible, of the liquid contained in a radioactive waste storage tank by pumping via a salt well, adding diatomaceous earth, etc.

Supernatant or Supernate Liquid floating above the solids in the waste storage tanks. Supernate is usually derived by subtracting the solids level measurement from the liquid level measurement.

T1SLTCK Salt-cake waste generated from the 242-T Evaporator, 1951-56 (LANL defined waste #42)

T2SLTCK Salt-cake waste generated from the 242-T Evaporator, 1965-76

Tank Farm An area containing underground storage tanks for storing waste.

TBP Tributyl phosphate, a solvent used in the uranium extraction process at U Plant; also, a waste which is sometimes called uranium recovery waste (UR).

Terminal Liquor — The concentrated supernatant liquid decanted from the evaporator bottoms (produced by the evaporators), which may not be concentrated further without forming solids that was unacceptable for storage in single-shell tanks (see HDRL). Terminal liquor is characterized by a caustic concentration of approximately 5.5 M (the caustic molarity was lower if the aluminum salt saturation was reached first).

TFeCN — Ferrocyanide sludge produced by in-tank or in-farm scavenging (LANL defined waste #11)

TH1 — Thoria high-level or cladding waste, 1966 (LANL defined waste #29, formerly TH66)

TH2 — Thoria high-level or cladding waste, 1970 (LANL defined waste #30, formerly TH70)

TH66 — See TH1.

TH70 — Thoria 1970.

Thermocouple — Thermocouples are simple devices that develop a millivoltage when parts of the thermocouple are exposed to temperature differentials. The millivoltage can be converted to a temperature reading based upon a specific voltage versus temperature curve inherent to the type of thermocouple being used. Thermocouples are attached to a fabricated assembly called a thermocouple tree.

Thermocouple Tree — Thermocouples are attached to a fabricated assembly called a thermocouple tree. The number of thermocouples attached to the tree varies as a function of the depth of the tank as well as the thermocouple tree design. The thermocouples are spaced at intervals, along trees that have many thermocouples, so that a vertical temperature profile of the tank contents can be developed. The thermocouple tree is installed in a riser and left in place inside the tank.

Thorium — A chemical element which is fertile material. Fertile means that when it is subjected to radiation in a nuclear reactor, it will be converted, in this case, to ^{233}U, a potential fuel.

TLM — Tank Layer Model (created at LANL and derived from *Waste Status and Transaction Record Summary* database) models the volumes of wastes in the tanks.

Trench — A linear excavation used for the disposal of solid waste.

TRUEX — Transuranic extraction process

UNK Unknown waste type (LANL defined waste)

UR Uranium recovery operation in U Plant, 1952-57. Created uranium recovery waste (UR) (LANL defined waste #8), also known as tributyl phosphate (TBP) waste, and FeCN (scavenging wastes). See TFeCN and PFeCN.

Watch List Tank An underground storage tank requiring special safety precautions because the tank potentially could release high-level radioactive waste if uncontrolled increases in pressure or temperature occur. Special restrictions have been placed on the tanks by "Safety Measures for Waste Tanks at Hanford Nuclear Reservation," Section 3137, National Defense Authorization Act for Fiscal Year 1991, November 5, 1990, Public Law 101-501 (also called the Wyden Amendment).

WC Weather cover

WESF Waste Encapsulation and Storage Facility

WTR Water; flush water from miscellaneous sources.

Wyden Amendment See watch list tank.

Z Waste discharged from Z Plant (PFP) (LANL defined waste #27)

APPENDIX E

TOTAL ORGANIC CARBON ANALYSES

1.0 DESCRIPTION OF TOTAL ORGANIC CARBON ANALYSIS METHODS

The basis of the screening of tanks for an organic nitrate safety issue is the measurement and prediction of total organic carbon (TOC). This appendix will discuss the methods, the quality controls used, and some of the results from measuring waste. Much of this work was done in support of the ferrocyanide safety issue but the information is relevant to the organic nitrate issue.

1.1 Hot Persulfate Method

The Ag(I)-catalyzed, O_2-sparged hot persulfate method, operating in a batch-mode at 92 - 95 °C, is in routine use at Hanford for TOC analysis of tank waste samples. In this method, a 50-milligram sample is loaded into the acid digestion unit for the wet oxidation step. Normally, the sample is initially reacted only with acid, releasing the carbonate for a measure of total inorganic carbon (TIC). Then, potassium persulfate is added, in solid form to the 50 ml digestion flask to a concentration of 20% in 2 M H_2SO_4. The catalyst (0.2 mmol of 1 M $AgNO_3$) is added directly to the flask. The system is closed, inserted into the preheated heater well, and oxidation and release of CO_2 begins. A coulometric detector system is used for detection of liberated CO_2. Alternatively, all reactants can be added initially for a single measurement of total carbon.

Most tank sludge sample are found to be nearly entirely dissolved by this hot sulfuric acid/persulfate treatment. This method is not used for acid-insoluble silica-based solids, such as soils and sand materials.

1.2 Furnace Oxidation Method

This method is well described in the literature (literature examples are provided in Baldwin 1994) but the application of this method for the organic content of caustic salt solutions is not discussed in the literature. Furnace oxidation methods may use both liquid and solid samples. The furnace tube at the 222-S laboratory is configured to receive an aqueous sample that is injected by syringe. Therefore, the sample is typically a water leach of a solid but can also be an aqueous sample. The liquid (typically 200 microliters) is injected into a furnace operating at 800 °C with an oxygen purge. The carbon is reacted and the carbon dioxide is measured with the coulometer. Normally, sparging of the acidified sample is performed prior to the furnace injection so that carbonates are removed.

2.0 EVALUATION OF ANALYTICAL METHODS FOR TOTAL ORGANIC CARBON

The analytical recovery of several organic compound were evaluated at Hanford (Baldwin 1994) and at Los Alamos National Laboratory (Vance 1994). These studies were performed with 34 compounds representing 12 different categories. This work included several different tests of the methodology including spike tests with pure compounds. Results are shown in Table E-1.

Volatile compounds tend to be a problem for both methods. To drive off the inorganic carbons, the sample is acidified and purged with oxygen. This sweeps the volatile carbons from the solutions prior to the oxidation step. The hot persulfate method may have higher volatile loses than furnace method due to the higher temperature used during the purge.

It was found that the hot persulfate method was useful for most non-volatile organic compounds, which would be analogous to the complexant and complexant degradation products. The evaluation tests show that the compounds of most concern for the organic nitrate reaction study (ie. complexants) are oxidized and recovered very well. There is no indication that this class of compounds will be a problem in routine measurements.

3.0 EVALUATION OF RESULTS WITH ACTUAL WASTE

Data from the Tank Characterization Database was examined to assess the accuracy and the precision of the TOC analyses. On June 1, 1997, there were 6671 data points labeled TOC from all single-shell and double-shell tanks including numerous Quality Assurance observations for the Hanford Waste.

3.1 Quality Assurance

Most of the analyses performed for TOC are associated with quality assurance runs rather than actual waste samples. These include standard recovery, minimum detection, method blanks, reagent blanks, and spike recovery. The various blank samples (method blank, field blank, hot cell blank, reagent blank, etc.) uniformly showed TOC below minimum detection except for an occasional value above the detection threshold of 40 μg/g.

The minimum detection limit has been measured about 1800 times. The minimum detection level was most commonly reported to be 40 μg/g by the hot persulfate method. The furnace TOC method tended to have more higher minimum detection levels. The furnace method for solids frequently reported minimum detection levels in the 400 to 500 μg/g range. However, that is still two orders of magnitude below the limits of concern for organic nitrate reactions and the addition of 0.05 wt% to any value would still not influence the interpretation of the observation.

Table E-1. Tested Carbon Compounds and Recovery (%Rec ± SD) for Each Method[1]

Compound	Name	Hot Persulfate	Furnace method[3]	LANL Persulfate[4]
organic salts	sodium formate	93.2 ±1	102	NT
	sodium oxalate	93.4 ±5	98.8	100
	sodium gluconate	85.1 ±6	101 ±1	NT
	potassium acetate	95.5 ±1	NT	99
	ethyl acetate[2]	17.4 ±2	88.3 ±1	NT
	potassium acid phthalate	90.7 ±4	NT	NT
complexants	EDTA	83.6 ±7	96.6 ±5	98
	HEDTA	82.9 ±5	119 ±1	NT
	NTA	83.2 ±6	97.2 ±2	NT
	DPTA	97.7 ±5	96.8 ±2	49
saccharide	glucose	95.4 ±3	101 ±3	91.5
ketones, alkanes, organic acids	MIBK[2]	22.1 ±4	NT	NT
	dodecane	<1	NT	NT
	succinic acid	97.4 ±1	99.4 ±1	NT
	glycolic acid	102 ±1	111 ±1	NT
	citric acid	NT	NT	102
alcohols, diols	1-butanol[2]	58.2 ±9	103 ±2	28.7
	ethylene glycol	96.0 ±3	99.9 ±1	95.7
	glycerol	94.0 ±9	98.1 ±1	NT
long-chain hydrocarbons	NPH[2]	<1	NT	NT
	Paraffin wax	<1	NT	NT
N-containing organics	hexylamine[2]	56.1 ±12	NT	NT
	urea	84.3 ±2	98.2 ±1	101
P-containing compounds	tributyl phosphate[2]	40.2 ±14	NT	NT
	dibutyl butyl phosphate	74.7 ±2	NT	NT
cyanide compounds	sodium ferrocyanide	10.0 ±5	105 ±1	40
	sodium thiocyanate	35.0 ±5	74.4 ±2	79

Notes: [1] Table extracted from Baldwin.

[2] Compound is volatile at 90 °C and is partially lost during sparged oxidation.

[3] Furnace method values shown were obtained with no acid sparging.

[4] Vance (1994).

NT = Not Tested

There were 1074 points from standard recovery tests. All of the standard recoveries were between 85% and 106%. The standard recovery samples uses pure potassium acid phthalate and the purpose is to determine the reliability of the analytical information.

Spike recovery tests are done by adding a known amount of organic (potassium acid phthalate) spike to an actual sample and then performing the test. The purpose of a spike recovery is to assure that there is not a matrix interference with the method. There are 484 spike recovery tests reported. The average value 93.55% recovery with a standard deviation of 26.2%. There were 69 tests which had less than 80% recovery and 31 tests with greater than 120% recovery. This would mean that about 1 out of 5 spikes is outside this desired range. However, there were only 9 less than 40% and 8 greater than 160%. Spiked samples are prepared before the actual organic content of the waste has been measured. When the sample contains more organic material than anticipated, and the amount of organic material in the spike is small relative to the analytical observation, and the spike recovery is overshadowed by the TOC in the waste. Because the amount of TOC in the waste is subtracted from the spike and the TOC value comes from a different analytical run, sample inhomogeneity also affects the spike recovery.

After examining the QA type analysis, it is clear that the methods are running in a controlled method with blanks below detection levels and spike recovery in an acceptable range.

3.2 Waste Sample Considerations

There were 2687 observations from waste samples. There were 1352 primary samples; 1248 duplicate samples; and 76 triplicate samples. Triplicate samples are typically run when there is an unacceptably large difference between primary and duplicate samples. About 5% of the analyses were performed in triplicate.

The data was sorted by the units given for the values. There were two units that predominated: μg/g representing solid samples and μg/ml which represents liquid samples. The analytic information reveals that about half of the solids samples and most of the liquid samples are less than 0.5% TOC.

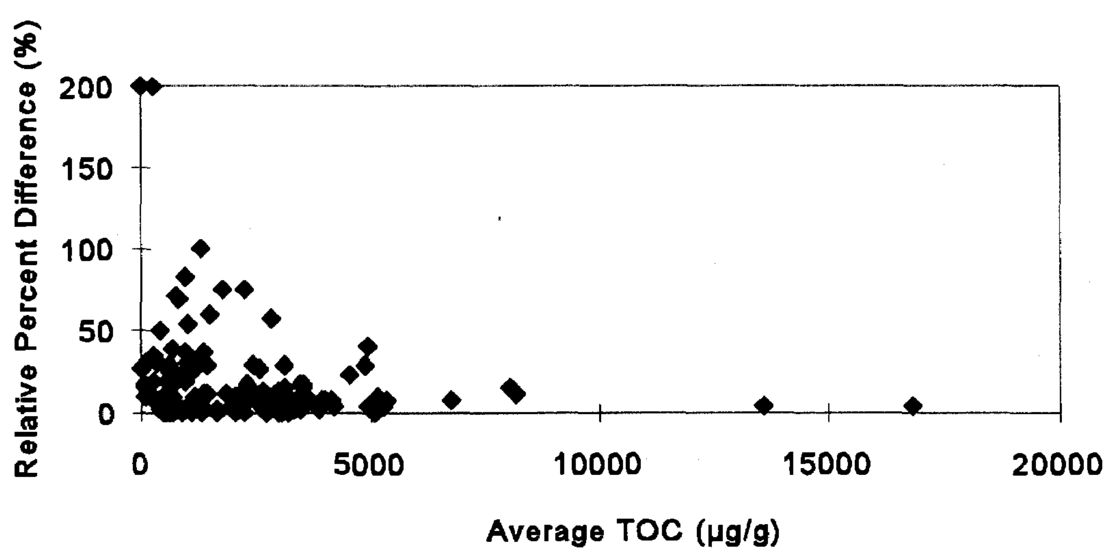
Inspection of the observations indicates that the tanks thought to contain relatively high concentrations of organic materials on the basis of historical information provide the largest TOC values. For example, all liquid points greater than 50,000 μg/ml were from AN-107 which is know to contain complexed concentrate with the highest amount of organics in the tank farms. The remainder of the liquid data points over 30,000 μg/ml are from either U-106 or C-106. Tank U-106 is known to contain complexed concentrate in the past. The liquid samples from C-106 represent a separable phase organic, rich in phosphate esters, and is expected to be high in TOC.

Qualitative observations suggested that the results for the samples with low organic content appeared to be less precise than the results for the samples with higher organic content.

Herting (1996) investigated this feature of the method by measuring the organic content of a simulant which was spiked with a sodium salts of glycolate, HEDTA, EDTA and citrate. The simulant was successively diluted and the TOC measured. The results showed that the measured TOC did not deviate from the expected values until detection levels were reached (a one to one thousand dilution). This study suggests that the method is more accurate for the samples with higher concentrations of organic carbon than for the samples with barely detectable quantities of organic carbon.

Another measure of the differences in the precision of the method for samples with different amounts of organic carbon is provided by an examination of the difference between the primary and secondary sample. The difference is captured in a term called the relative percent difference (RPD). This is a measure of method repeatability but any sample inhomogeneity will also influence this value. When examining the RPD from several hundred samples, it was found that there was an inverse relationship between the RPD and the quantity of organic carbon in the waste. As shown in Figure E-1, the samples with high TOC values tended to exhibit low RPD values and samples with low TOC tended to exhibit high RPD values. These results indicate that the precision of the TOC analysis is poorer for the samples containing small amounts of organic carbon, and higher for samples containing larger amounts of organic carbon. Thus, the samples with higher organic content are more precise than the results for samples with low organic content. It is pertinent that accurate but imprecise information can be tolerated for the samples with low organic content without compromising conclusions about the safety of the tank. Further, when an RPD is greater than 20%, the analyst performs a third analysis.

Figure E-1. Relative Percent Difference (RPD) Between Replicate Total Organic Carbon (TOC) Measurements as a Function of TOC Concentration.



4.0 CONCLUSIONS

The technical literature reports that hot persulfate oxidation is able to oxidize the organic compounds including solvents and complexants that exist in the Hanford waste tanks. One of the many possible approaches, the hot persulfate method with a silver ion catalyst has been employed at Hanford for many years. The implementation of the hot persulfate method for the measurement of the TOC content requires the removal of carbonate ion and this approach removes some low molecular weight organic solvents, but tests at Hanford and LANL indicate that the complexants are retained and accurately determined.

Thousands of analyses have been performed providing a large data base for the assessment of the precision and accuracy of the method. Virtually every waste analysis has been performed in duplicate. It has been established that the detection limit for liquid samples is 40 and that solids is 400 to 500 micrograms per gram. The analyses of a pure standard range between 85% and 106%. The average value for about 500 spike recovery tests is 93.5% with a standard deviation of 26.2%. The relatively large standard deviation arises from the use of independent samples in the test and the blind nature of the test which can result in a mismatch between the organic content of the sample and the spike.

Tanks that are known to contain high quantities of organic solvents on the basis of historical information or other work provide high TOC values. Other assessments of the accuracy indicate that the precision of the method decreases when the samples contain small amounts of organic carbon. These findings indicate that the method measures the organic carbon content of the wastes with more than sufficient accuracy for screening the organic complexant hazard.

5.0 REFERENCES

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APPENDIX F

CALCULATION NOTES FOR ANALYSIS OF VARIANCE (ANOVA) MODEL

1.0 PURPOSE

This appendix describes how moisture (H_2O) and total organic carbon (TOC) sample data are used to screen tanks. Moisture and TOC data are used to estimate the fraction of waste in a tank that is combustible. Tanks with a low fraction of combustible waste (or equivalently, a high fraction of non-combustible waste) are classified *safe*.

These calculations determine the fraction of combustible waste in the tanks under two different conditions; for tanks in their current condition, and after they are completely dried out. The first fraction is called the **current combustible waste fraction** and the second is called the **dry combustible waste fraction**. These two fractions are used to screen tanks into *safe*, *conditionally safe*, and *unsafe* categories. The screening operation compares upper 95% bounds on these fractions (also called tolerance bounds in the statistical literature) to a 5% screening threshold.

The specific rules for classifying tanks in the three categories are;

1. If the upper 95% bound on the current fraction of combustible waste is above 5%, classify the tank as *unsafe*.

2. If the upper 95% bound on the current fraction of combustible waste is below 5%, but the upper 95% bound on the dry fraction is above, classify the tank as *conditionally safe*.

3. If the upper 95% bound on the dry fraction is below 5%, classify the tank as *safe*. (Note that this insures that the 95% bound on the current fraction is also below.)

This screening operation is only the first step in the complete tank assessment strategy described in Section 4.0 of this document. Other information is used in the overall categorization of a tank. The current strategy also categorizes tanks without sampling data as "indeterminant" even though this screening calculation provides estimates for all tanks and allows assignment to one of the three categories listed above.

2.0 DESCRIPTION OF THE DATA

This section describes the data used to estimate the combustible waste fractions for tank screening. The data consists of total organic carbon (TOC) and moisture (H_2O) measurements taken on various waste samples. Samples at Hanford have been obtained through core sampling, auger sampling, and grab (bottle-on-a-string) sampling with the majority of measurements in the compiled data originating from core sampling. An attempt was made to gather all relevant measurements, including those made before the current Tank Waste Characterization Program was initiated (i.e. pre-1989 measurements). This data set is intended to contain all TOC and moisture data available as of March 1997.

Core sampling typically provides a complete vertical profile of the waste and is the most valuable type of sample. Auger samples provide information for the top 40 cm of waste, and grab samples provide information on supernate.

In the laboratory, drainable liquid is separated from the core and auger samples before analysis. If a sufficient volume of drainable liquid exists, the laboratory will perform TOC and moisture measurements on the liquid, so the measurements reported are unique to the phase of the waste. The Tank Characterization Database (TCD) identifies the samples as solid or liquid (liquid analyses are also reported per unit volume). In most cases, the measurements on the two phases (solid and liquid) are not combined. However, data from tanks with drainable liquids having TOC concentration greater than 2.5 mg/mL were added to the TOC measurements from the solids to better represent the original composition of the sample. This drainable liquid correction was made to the data for nine tanks.

A significant portion (about 15%) of the data collected was not used in the analysis. The major reasons for excluding the data are:

1. A review of the laboratory records indicated an incorrect measurement or QA problems.

2. The measurement was on supernate, drainable liquid, or liner lquid. Since this evaluation is interested in only that fraction of waste that might be combustible, measurements on the liquids were excluded except as noted above for nine tanks.

3. The measurement is on a composited core and segment-level measurements are present. Segment-level measurements provide a much better picture of within tank variability than core-composite measurements. When both sets of measurements exist, the composite measurements have been excluded.

4. More recent samples from the tank exist. We have tried to gather all relevant historical (pre-1989) samples, but exclude any early sampling that has been succeeded by later sampling.

All tank sample data collected for this analysis are presented in Table F-8 of this appendix. Data points excluded from the analysis are marked as "del."

The objective of this data collection effort is to obtain a relatively complete and unbiased description of TOC and moisture in the tanks. It is important for the assembled data to be representative of the actual waste in the tanks. For example, a data-set that only concentrates on high-TOC samples from the waste would not produce correct estimates. We have attempted to deal with potential biases by grouping the tanks into TOC and moisture groups. These groupings are based upon tank process history and should help reduce the biases associated with the current set of sampling data (See Appendix D).

It should be noted that at least one obvious bias exists in this data set. Until last year, TOC measurements were only taken **after** a positive DSC measurement. Such a measurement scheme would tend to produce a TOC dataset that was biased high. Most TOC data taken from 1992 to 1995 were produced by such an analysis scheme. No attempt has been made to correct for this bias because the relationship between DSC and TOC has not been quantified.

Each measurement taken from the Tank Characterization Database (TCD) provides an identification of the analysis method. A total of 4448 of the 4741 records in the sample dataset (i.e., 93%) were taken from the TCD. For each sample record, a total of 46 descriptors are provided.

The additional 293 records not from the TCD includes (1) data from the process aids reports (2) selected core composite data, and (3) data measured in 1997 that have not yet been entered into TCD. Data from the process aids reports, were referenced earlier in SARR-033 Rev 1. These sample measurements for TOC and H_2O were all reviewed for pedigree to verify that the sample measurements represent the tank waste at the time the tank was sampled. If sample measurements were not representative, they were not used in the ANOVA calculations.

Ninety-three selected measurements of core composite data were added to the data base because there were no other TOC or H_2O sample data was available. In lieu of having no data for the tank, it was decided to use core composite data and to treat the core composite data as subsurface measurements.

Samples measured in 1997 that have not yet been entered into TCD were added to the TOC and H_2O dataset. This data includes 126 measurements from tank A-101. This data can be found in the data summary table.

2.1 FORMAT OF THE H_2O/TOC DATA FILE

The basic data set used for this evaluation is a simple rectangular data file with each row describing a (H_2O,TOC) measurement on a sample. The file contains 14 fields which describe the measurements. Approximately 4,700 moisture and TOC measurements are recorded in the data file. This file is available electronically, and the most important fields from this file have been printed out in Section 6.0 of this appendix.

The H_2O/TOC dataset includes information about the location of the tank sample, sampling date, QA status of the sample (i.e., whether or not the sample was used in the ANOVA analysis), along with the sample analysis results. Table F-1 contains a more complete description of the fields in this file.

2.2 FORMAT OF THE TANK DATA FILE

To perform the combustible waste calculations, certain miscellaneous information concerning each tank is needed such as waste volume and tank dimensions. The Hanlon report [9] was the primary source of this information. Tank information has been assembled into a *tank data file*. This file contains information about the TOC and H_2O tank groupings, various tank status and surveillance measures and general physical properties of each tank's waste. Table F-2 contains a complete description of the fields in this file.

3.0 METHODOLOGY

This section describes the mathematical calculations that produce current and dry combustible waste fractions from H_2O/TOC sampling data. The calculations can be broken into four steps:

1. Perform an ANOVA analysis on moisture data to determine the moisture distribution in each tank.

2. Perform an ANOVA analysis on TOC data to determine the TOC distribution in each tank.

3. Calculate the correlation between moisture and TOC concentrations within the tanks, to determine the bivariate component of the joint H_2O/TOC distributions.

4. Perform a Monte Carlo simulation that produces the current (or dry) combustible waste fractions from the joint H_2O/TOC distributions. The Monte Carlo integrates the joint H_2O/TOC distributions over the current and dry combustible waste regions to produce current and dry combustible waste fractions. The simulation also produces an uncertainty distribution for each of the two waste fractions. The best estimate is the median from this distribution and the upper 95% quantile is compared to the 5% screening threshold to categorize tanks as *safe*, *unsafe*, or *conditionally safe*.

Table F-1. H_2O/TOC Data Field Descriptions.

Field	Description
key	A unique identifier that we assign to each record in the data file.
tank.id	Name of the tank that was sampled.
lab.samp.idIdentifier	assigned by the lab that analyzed the sample (e.g., s96t000032).
riser.id	Tank riser that the sample was taken from.
segment.id	When a core sample was taken, this identifies the vertical location of the 19" core-segment (1 is top). A '999' in this field indicates a composite measurement.
sample.layer	Identifies whether the sample is a surface, sub-surface, or supernate sample. This field represents the ANOVA model layer term. Supernate samples were not used in the ANOVA.
h2o	Measured moisture (wt%) of the sample.
toc	Measured total organic carbon (wet basis) concentration (wt%) of the sample.
date	Date the sample was taken from the tank or if not available, the date of the document the data came from. The format is 2 digits for each of year, month, and day in that order (e.g., 950322)
result.type	Indicates whether a record is a primary, duplicate, or triplicate result.
sampling.device	Indicates the type of device used to sample the tank. The sample types are auger, grab (bottle-on-a-string sampling used to take liquid samples), rotary-mode core, and push-mode core samples.
qa.status	This field indicates the result of an internal QA review of the record. The possible results are: del: Based on a QA check, delete the record from analysis nr: Record not reviewed prelim: Preliminary result, currently being recorded in TCD. qa: Quality reviewed for accuracy.
subdivision.id	If a core-segment was divided into smaller portions for analysis (i.e. top, bottom), this field identifies the subsample.
status	Indicates if record was used in the ANOVA modeling effort (If value is 'use,' the record is used in the ANOVA).

Table F-2. Tank Data Field Descriptions.

Field	Description
tank.id	tank number such as 'a101.'
salt.vol	The estimated saltcake volume in cubic meters for the tank from [9].
sludge.vol	The estimated sludge volume in cubic meters for the tank from [9].
pump.liq	The estimated pumpable liquid volume in cubic meters for the tank from [9].
waste.type	Predominate HDW [4] waste type in the tank.
liquid.level	Categorizes tanks into one of the three liquid categories: High, Medium, Low from [9].
jet.pump	Indicates whether a tank has been jet pumped from [9].
waste.phase	Predominate waste phase in the tank as judged by the largest of salt.vol, sludge.vol, or pumpable.liq, taken from [9].
tank.dia	Specifies the diameter of a tank in feet. The 100-series tanks have a 75 ft. diameter and the 200-series tanks have a 20 ft. diameter.
pump.flag	Identifies whether or not the tank has been pumped. A tank may experience two types of pumping; jet-pumping or supernatant pumping. This variable identifies whether the tank was supernatant or jet-pumped (0=not pumped, 1=pumped).
h2o.grp	This field categorizes tanks into one of the following four categories: dry.lg: Tanks with little liquid retention (saltcake), large particle size and dry surface. dry.sm: Tanks with much liquid retention (sludge), small particle size and dry surface. wet.lg: Tanks with little liquid retention (saltcake), large particle size and wet surface. wet.sm: Tanks with much liquid retention (sludge), small particle size and wet surface.
series	Indicates whether a tank is a 100-series or a 200-series tanks. The 100-series tanks have a 75 ft. diameter and the 200-series tanks have a 20 ft. diameter.
toc.grp	This is the tank grouping for TOC. Five groups are identified in this field. They are; High TOC, Medium TOC, Low TOC, Non-TOC, and Special tanks. The ANOVA model is not thought to be applicable to the special tanks, so they are excluded from the evaluation.
surface.condition	This field indicates whether the tank surface is wet or dry.
particle.size	This field categorizes the sample results into large or small particle size bins. This field is used in conjunction with surface.condition to get the tank grouping for the H_2O ANOVA.

Combustible waste that is currently in a tank is defined as waste that meets the following criteria:

$$TOC > 4.5\% + 0.17H_2O \ and \ H_2O < 20\% \qquad \text{(F-1)}$$

The objective is to calculate the fraction of waste that would meet this criteria. This fraction is called the **current combustible waste fraction**. The variable, TOC, represents the weight concentration of total organic carbon in a unit of waste, (percent wet basis), while H_2O represents the concentration of moisture. The ($H2O$,TOC) data can be used to determine the fraction of the solid waste that meets this criteria, and hence the fraction of combustible waste currently in a tank.

Dry combustible waste can be defined by a similar criteria. A unit of waste in the tank will become unsafe when dried out if its current (H_2O,TOC) concentration satisfies:

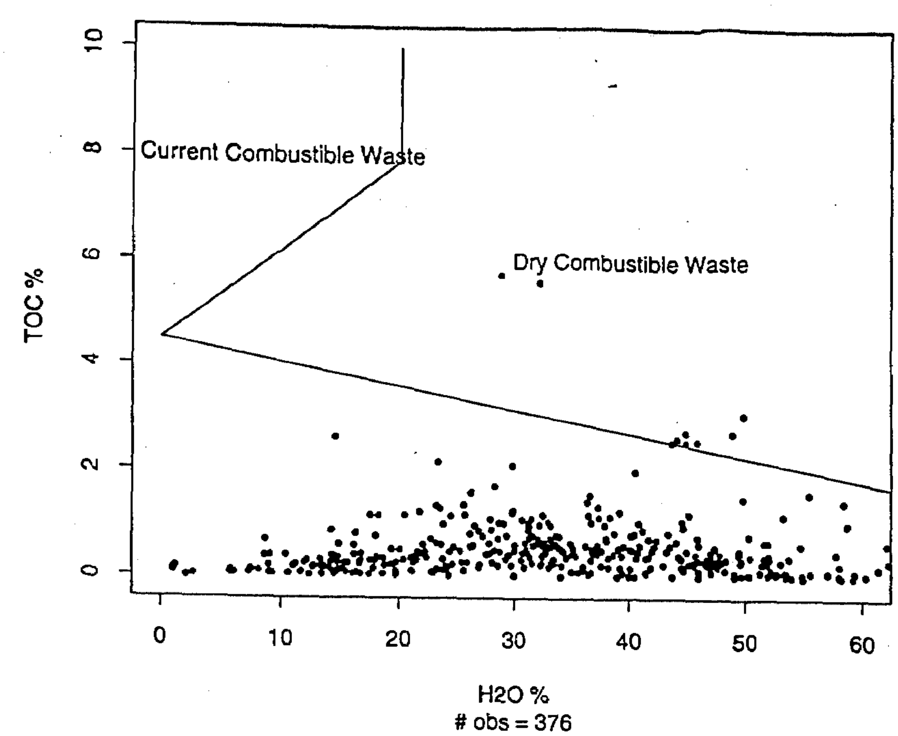
$$TOC > 4.5\% - 0.045H_2O \qquad \text{(F-2)}$$

(This is equivalent to requiring TOC > 4.5% on a dry basis.) The fraction of dry combustible waste in a tank can be determined by identifying the units of waste that satisfy the above criterion, integrating over their dry mass, and then dividing by the total amount of dry waste.

The strategy employed to calculate combustible waste requires that the joint distribution of TOC and H_2O in a tank be estimated. Such a distribution describes what fraction of the waste has H_2O and TOC that meets criteria in Equations F-1 or F-2 above. Integrating the joint (H_2O,TOC) distribution over the combustible region defined in Equation F-1 or F-2 determines the fraction of combustible waste in the tank.

This basic strategy can be illustrated with tank data. Figure F-1 presents all paired ($H2O$,TOC) data in the data base (371 points), plotted against the two regions defined by Eqations F-1 and F-2. If this data represented a random sample from the tank farm, this scatter plot would represent an empirical estimate of the actual site-wide ($H2O$,TOC) distribution. One could therefore estimate the site-wide combustible waste fractions by counting the number of points that fall in the appropriate regions. For example, no points fall into the "current combustible" waste region, so the best estimate for the current combustible fraction is 0/371. Also, 9 points fall into the "dry combustible" waste region, so the best estimate for dry combustible fraction is 9/371=2.4%.

Figure F-1. Illustration of the Combustible Fraction Calculation from (*H2O*,TOC) Distributions.



This illustrative calculation has several deficiencies: it produces site-wide estimates, when tank specific estimates are needed; it requires random sampling of the site when sampling is done in a highly structured manner; it requires a great deal of data to produce accurate estimates; and finally, it cannot make use of all the data because a great deal does not exist as (*H2O*,TOC) pairs. The methodology developed in this section utilizes the same simple strategy as the illustration, but accounts for the limitations in the available data in a more realistic manner.

To estimate the distribution of (H_2O,TOC) in the tanks, a statistical procedure suited to the structure of the available data has been chosen. The distribution of (H_2O,TOC) has been assumed to have a bivariate log-normal distribution and the five unknown parameters that define such a distribution are estimated using ANOVA (Analysis of Variance) procedures. The unknown parameters consist of 2 log-means, 2 standard deviations, and the correlation between moisture and TOC. A simple parametric form has been chosen for the distribution because sufficient data does not exist to estimate the distribution empirically. Although the assumption of log-normality is undoubtedly an approximation to reality, the residual plots presented in later in Figures F-2 and F-5 demonstrate that the assumption is reasonable.

ANOVA is also employed for the same reason. Only about 30% of the tank waste layers have TOC measurements, and the typical sampled tank contains only 2 or 3 measurements -- not enough data to estimate even a simple parametric distribution like the log-normal. ANOVA combines information from similar tanks so that it is possible to construct the desired distributions. ANOVA also allows reasonable distributions to be constructed for unsampled tanks.

Of course, with this amount of data, many of the ANOVA tank estimates must be considered extrapolative. Fortunately, the ANOVA procedure also provides uncertainties for the estimated parameters, so that one can evaluate just how good the extrapolations are. The uncertainties provided by the ANOVA are a very important component of this calculation because we desire more than a "best estimate" of combustible waste. A reasonable evaluation of risk requires that the uncertainty in the estimate be accounted for. The ANOVA fits also produce uncertainties in the TOC and H_2O estimates which are propagated to form an uncertainty distribution on combustible waste.

This uncertainty distribution describes how close the calculated values are to the true combustible waste and represents the adequacy of the existing data to estimate the combustible waste fraction.

3.1 QUANTITIES TO BE ESTIMATED

Four different combustible waste fractions are actually estimated from this analysis. The four types of combustible waste are:

$R_{cur,surf}$ = Current combustible waste fraction at the tank surface layer (within 20 cm of the surface),

$R_{cur,bot}$ = Current combustible waste fraction in the tank subsurface layer,

$R_{dry,surf}$ = Dry combustible waste fraction in the tank surface, and

$R_{dry,bot}$ = Dry combustible waste fraction on the tank subsurface.

In other words, combustible waste is actually estimated for two layers in the tank; the surface layer, and the sub-surface layer. These two layers were originally included in the ANOVA model because (1) TOC and moisture were expected to be influenced by vertical location and (2) the surface layer is more likely to be exposed to initiators (e.g., sparks from operations is the dome space), making the combustible waste at the surface of greater safety consequence than the sub-surface waste. However, since the current screening criteria does not distinguish between surface and subsurface waste, the second justification for using these two layers is no longer relevant.

Although four combustible waste fractions are actually calculated by the methodology, only two are reported: the total current fraction of combustible waste and the total dry fraction of combustible waste. These are calculated by averaging together the surface and subsurface fractions using a weighting that accounts for the different sizes of the two layers. The appropriate formulas are:

$$R_{cur} = \frac{V_{surf}}{V_{surf} + V_{bot}} \cdot R_{cur,surf} + \frac{V_{bot}}{V_{surf} + V_{bot}} \cdot R_{cur,bot} \qquad \text{(F-3)}$$

and

$$R_{dry} = \frac{V_{surf}}{V_{surf} + V_{bot}} \cdot R_{dry,surf} + \frac{V_{bot}}{V_{surf} + V_{bot}} \cdot R_{dry,bot} \qquad \text{(F-3)}$$

where V_{surf} and V_{bot} are the surface and subsurface waste volumes. For the current combustible waste region these volumes are calculated as:

$$V_{surf} = (0.2)\ m)\,\pi\,(D/2)^2 \qquad \text{(F-5)}$$

$$V_{bot} = V_{tot} - V_{surf} \qquad \text{(F-6)}$$

where D is the diameter of a tank in meters and V_{tot} is the total waste volume of a tank in cubic meters taken from [9]. The '0.2 m' in the above equation, is the defined depth of the surface layer. The dry combustible waste region volume estimates are calculated by multiplying V_{surf} and V_{bot} in the above equation by the estimated solids proportions from the surface and subsurface layers respectively.

3.2 TOC/H_2O ANOVA MODEL

Both H_2O and TOC data are analyzed using a random effects ANOVA model, which produces estimates of H_2O or TOC in the tanks as well as their variability. The formula for the random-effects ANOVA model is:

$$Y_{ijk\ell} = \mu_i + G_j + DG_{ij} + T_{jk} + DT_{ijk} + E_{ijk\ell} \qquad \text{(F-7)}$$

The measurement, $Y_{ijk\ell}$, represents a log_{10}(H_2O or TOC) measurement (expressed in percent) taken under conditions $ijk\ell$. The indices $ijk\ell$ describe the conditions that the TOC measurements were taken under. These are defined as:

i: describes the layer the measurement was taken from (i=surface layer, subsurface layer).

j: identifies a tank group. There are 4 and 5 groups for H_2O and TOC respectively.

k: represents the tank associated with the measurement.

ℓ: identifies the "replicate" measurements that occur within a layer in a specific tank.

The ANOVA fitting procedure will produce estimates for all the unknown terms present in the above equation. Since all terms in the model are considered to be random variables (with the exception of μ), it also calculates their variances (such as $Var(E_{ijk\ell}) = \sigma_E^2$, $Var(T_{jk}) = \sigma_T^2$, etc.). These variances are used by the ANOVA procedure to calculate uncertainty in the TOC and H_2O estimates. The model terms are summarized in Table F-3.

Table F-3: Summary of Terms in The ANOVA Model

Term	Description
μ	Mean concentration for the site
D_i	Deviation of layer *i* (surface, sub-surface) from the mean μ
G_j	Deviation of tank Group *j* from the mean μ
DG_{ij}	Deviation of of layer i form group average
T_{jk}	Deviation of Tank *k* from the group average
DT_{ijk}	Deviation of layer i in tank k from its average
$E_{ijk\ell}$	Spatial deviations within layer *(i,j,k)*
σ_T^2	$Var(T_{jk})$, tank to tank variability.
σ_{DT}^2	$Var(TD_{ijk})$, layer to layer variability within a tank.
σ_E^2	$Var(E_{ijk\ell})$, within layer variability. Note: all parameters describe deviations of TOC or H_2O in terms of log(% wt)

This model can produce estimates for all random effects by conditioning on the observed data ($Y_{ijk\ell}$). We explain how this is done by re-specifying the model (see [8] and [7]) in Equation F-7 in matrix form as:

$$Y = X\beta + E \qquad \text{(F-7)}$$

where Y is a $n \times 1$ response vector, X is the design matrix from the over-parameterized model comprised on zeros and ones denoting absence or presence of effects for a particular response. β is a vector comprised of μ and all of the random effects in the model, and E is the error vector of $Eijk\ell$. We assume that Y is the log base 10 transformation of the TOC or H_2O measurements and we also assume initially that:

$$\beta \sim N(0,\Sigma) \tag{F-9}$$
$$E \sim N(0,\sigma^2 I) \tag{F-10}$$

where Σ is a diagonal matrix with the variances of the model effects on the diagonal (i.e., $\Sigma = diag\{\infty, \sigma_D^2, \sigma_D^2, \sigma_G^2, \sigma_G^2, \cdots\}$). The first diagonal element corresponds to μ which is fixed and it is mathematically equivalent to consider it as a random term with infinite variance (see [8]). The joint density of the random variables Y and β can be written as:

$$\begin{bmatrix} Y \\ \beta \end{bmatrix} \sim N\left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} X\Sigma X^T + \sigma^2 I & X\Sigma \\ \Sigma X^T & \Sigma \end{bmatrix}\right). \tag{F-11}$$

If Y is observed, then the conditional distribution of β given Y is a multivariate normal with:

$$E(\beta \backslash Y) = (X^T X + \sigma^2 \Sigma^{-1})^{-1} X^T Y \ and \tag{F-12}$$
$$Cov(\beta \backslash Y) = \sigma^2 (X^T X + \sigma^2 \Sigma^{-1})^{-1}. \tag{F-13}$$

and the Σ inverse matrix having the form:

$$\Sigma^{-1} = diag\left\{0, \frac{1}{\sigma_D^2}, \frac{1}{\sigma_D^2}, \frac{1}{\sigma_G^2}, \frac{1}{\sigma_G^2}, \cdots\right\}. \tag{F-14}$$

$E(\beta \backslash Y)$ is the "best estimate" for the random effect vector β and $Cov(\beta \backslash Y)$ represents its associated uncertainty. The ANOVA fitting procedure (Restricted Maximum Likelihood, [8]) uses the above formulas to determine all unknown model parameters in an iterative fashion. Given estimates for Σ, an estimate for the random effects parameter β is determined. Given β, the variances in Σ can be determined using sum of squares formulas (see [6]).

In matrix form, the best estimate for a specific layer (identified by indices *(i,j,k)*) is given by:

$$\hat{\mu}_{ijk} = V^T E(\beta \backslash Y) \ or \quad \text{(F-15)}$$
$$= \hat{\mu} + \hat{D}_i + \hat{G}_j + \hat{DG}_{ij} + \hat{T}_{jk} + \hat{DT}_{ijk} \quad \text{(F-16)}$$

where *V* represents a vector of zeros and ones chosen to select the 6 terms listed in the second part of the above equation. The uncertainty of this estimate is given by:

$$Var(\hat{\mu}_{ijk} \backslash Y) = V^T Cov(\beta \backslash Y) V \quad \text{(F-17)}$$

It so happens that formulas F-15 and F-17 produce valid estimates for tank layers, even when no data actually exists for that layer. To have these estimates produced, one must only include columns in the design matrix, *X* that represent all layers to be estimated.

For a tank having no data, it can be shown that the best estimate is actually reduced to

$$\hat{\mu}_{ijk} = \hat{\mu} + \hat{G}_j + \hat{D}_i + \hat{DG}_{ij} \quad \text{(F18)}$$

because $T_{j,k}$, and $DT_{top,j,k}$ are estimated as zero. In other words, when no data exists for a tank, the ANOVA uses group averages to estimate the layer concentrations, a strategy that makes intuitive sense. Of course, estimates associated with unsampled tanks are much less certain than the previous estimate, and their uncertainties are inflated by the amount *Var(T)* + *Var(DT)*. The actual estimates for all tank layers are automatically produced by an ANOVA estimation program (see [12] and [6]) using equation F-12.

The variance σ_E^2 (specified above as σ^2) represents within-layer variability (contaminated with some measurement error) and is particularly important in the combustible waste calculation because it describes how homogeneous the waste is. If this variance were zero, one measurement from a tank layer would be sufficient to determine whether or not it was safe. This variability is also affected by the physical dimensions of the sample used to produce the data for the ANOVA modeling. Making the samples dramatically larger or smaller than those currently produced by TWRS sampling might produce a significantly different σ_E^2.

Since the measurement $Y_{ijk\ell}$ is typically on a core-segment, the unit of waste being described in the ANOVA model is actually a cylinder 1 inch in diameter and about 20 inches in height. This analysis is therefore evaluating the variability for units of waste that are about 20 inches (or 0.4m) in dimension. It so happens that a unit of waste of this dimension is approximately the size of concern for safety.

The log-normal distribution for TOC in a layer therefore has a log-mean of $\hat{\mu}_{ijk}$ with a variance given by $\sigma_E^2 - \sigma_M^2$, where σ_M^2 represents measurement error. Replicate measurements have been evaluated from the data base to determine a measurement error of about 10% (0.043 on the log scale) for both Moisture and TOC measurements.

The ANOVA model chosen to describe TOC is not unique; its form depends heavily on the amount and type of data available. Using the present ANOVA model, only about 20% of the tank layers contain data, making it difficult to fit models that are much more complex than this.

The H_2O and TOC data are separately fit to the above ANOVA model because much of the original H_2O and TOC data was not paired. In the original data set (compiled in 1994), only about 18% of the H_2O measurements were paired with a TOC measurement. Separate ANOVA analyses provide the best description of the joint (H_2O,TOC) distribution in this case. However, in the current data set, the percentage is much higher, about 60% of the data is paired. As more current sampling data is added to the data base, this percentage will continue to increase. At some point, it will become more efficient to analyze the (H_2O,TOC) data using a multivariate ANOVA model. Such a model would have the same form as Equation F-7, except that $Y_{ikj\ell}$ would represent a multivariate observation of H_2O and TOC.

3.3 TANK GROUPING

Tank groups (as identified by index *j*) have been introduced into the ANOVA model to allow TOC and H_2O to be predicted in unmeasured tanks. Tanks have been arranged into 5 complexant waste groups to represent the expected concentration of complexants (TOC), and these are described in detail in Appendix D.

Five categorizations cannot perfectly predict TOC. For example, a "non-complexant" tank may still contain TOC because secondary waste streams contain TOC, because the TOC may be solvents or extractants, or because of errors in the historical records. Splitting the tanks into more categories will decrease the within group variations, but also decrease the amount of data available to estimate TOC for each group. Given this constraint (i.e. data must exist to describe TOC in each group), we decided to limit the categories to the five above.

For moisture prediction, tanks are grouped according to the the wetness of the waste surface and the type of waste. Two waste types are identified, saltcake and sludge, while photographs have been used to categorize the tank into wet (visible standing water on the surface) and dry. This results in four moisture groups: *dry.saltcake, dry.sludge, wet.saltcake, and wet.sludge.* These tank groups are discussed in more detail in Appendix D.

3.4 CALCULATION OF THE CORRELATION BETWEEN MOISTURE AND TOC

One required parameter not directly supplied by the moisture and TOC ANOVA modeling is the correlation coefficient between the two quantities. To obtain an estimate for ρ, the correlation between the ANOVA residuals was used (i.e. $E_{ijk\ell}$). A single correlation coefficient was computed for all available $E_{ijk\ell}$ (H_2O,TOC) pairs. This resulted in an estimate based upon approximately 60% of the data. The value for correlation obtained from this calculation was 32%. This parameter also has uncertainty associated with it, but because of the relatively large number of observations associated with the estimate, it was decided to assume that this parameter was perfectly known.

The correlation between H_2O and TOC is calculated using the standard formula:

$$\rho = \frac{1}{M}\sum_{ijk\ell} E_{ijk\ell}^{TOC} E_{ijk\ell}^{H_2O} \tag{F-19}$$

where M represents the total number of (H_2O,TOC) residual pairs in the data set, $E_{ijk\ell}^{TOC}$ represents a TOC residual, and $E_{ijk\ell}^{H_2O}$ an H_2O residual.

3.5 ESTIMATION OF COMBUSTIBLE WASTE

The ANOVA results described in the last two sections produce a description of the individual moisture and TOC distributions of waste in a tank. In this section, these ANOVA estimates will be used to calculate the four types of combustible waste in a tank ($R_{dry,surf}$, $R_{cur,surf}$, $R_{dry,surf}$, and $R_{dry,bot}$). The estimates for these four quantities are not given as a single "best estimate," but as a Bayesian probability distribution that describes our state of uncertainty about the true value.

It should be noted that this estimation problem is fundamentally different than most waste estimation problems in that **no direct measurements** on the variable of interest have been taken. Only measurements that are indirectly related to the fraction of combustible waste are available, and can only be used by postulating a relationship between the quantities. The measured variables indirectly related to combustible waste are total organic carbon (TOC) and moisture (% H_2O) of the waste. This section presents the formulas that relate (H_2O,TOC) concentrations in a unit of tank waste and its reactivity.

The ANOVA produces an estimate of the distribution of (H_2O,TOC) concentrations in a tank, which can be related to the combustible (reactive) waste in the tank through the integral formula;

$$R = \int_{(X_{H_2O},X_{TOC})\in A} f(X_{H_2O},X_{TOC})\,dX_{H_2O}\,dX_{TOC} \tag{F-20}$$

where $f(X_{H2O},X_{TOC})$ represents the distribution of (H_2O,TOC) values in the tank, the set A defines combustible waste in terms of (H_2O,TOC), and R is the estimate of combustible waste fraction in the tank.

Using the assumption of log-normality (or equivalently, normality on the log scale), the estimate for combustible waste becomes:

$$R = C_0 \int_{Y \in \log(A)} \exp\left[-\frac{1}{2}(Y - \mu)^T \Gamma^{-1} (Y - \mu)\right] dY \qquad \text{(F-21)}$$

with

$$Y = (\log(X_{H_2O}), \log(X_{TOC})) \qquad \mu = (\mu_{H_2O}, \mu_{TOC}) \qquad \text{(F-22)}$$

$$C_0 = \frac{1}{2\pi\sqrt{1 - \rho^2}\,\sigma_{H_2O}\sigma_{TOC}} \qquad \Gamma = \begin{bmatrix} \sigma^2_{H_2O} & \rho\,\sigma_{H_2O}\sigma_{TOC} \\ \rho\,\sigma_{H_2O}\sigma_{TOC} & \sigma^2_{TOC} \end{bmatrix} \qquad \text{(F-23)}$$

The means and standard deviations (i.e. μ's and σ's) appearing in this formula define the distribution and are produced by the ANOVA fits. The fact that these parameters aren't exactly known means that the resulting combustible waste R is not perfectly known. The posterior distribution of R is determined by a Monte Carlo calculation that utilizes all the ANOVA-derived uncertainty distributions on the μ's and σ's. To be more specific, the ANOVA results are used to produce Bayesian posterior distributions as described in [1]. The Monte Carlo then propagates these distributions to combustible waste using Equation F-21.

As mentioned, earlier, four different types of combustible waste are to be calculated. Formula F-21 presented above is actually applicable to the calculation of *current combustible waste.* Here is how these parameters are defined for current combustible waste fractions:

$R_{cur,surf}$: A is defined as $X_{H2O} < 20\%$ and $X_{TOC} > 4.5\% + 0.17\, X_{H2O}$. The means, μ_{H2O} and μ_{TOC} represent (H_2O,TOC) concentrations of waste at the surface, and.

$R_{cur,bot}$: A is defined as $X_{H2O} < 20\%$ and $X_{TOC} > 4.5\% + 0.17\, X_{H2O}$. The means, μ_{H2O} and μ_{TOC} represent (H_2O,TOC) concentrations of waste below the surface.

To calculate dry fractions, the mass-loss of H_2O has to be accounted for in the integration. This leads to a formula of the form:

$$R = C_0 \int_{(X_{H_2O}, X_{TOC}) \in A} (100\% - X_{H_2O}) f(X_{H_2O}, X_{TOC})\, dX_{H_2O}\, dX_{TOC} \qquad \text{(F-24)}$$

ıstant C0 defined so that the integral integrates to one. In other words:

$$C_0^{-1} = \int (100\% - X_{H_2O}) f(X_{H_2O}, X_{TOC}) dX_{H_2O} dX_{TOC} \qquad \text{(F-25)}$$

and TOC are assumed to be log-normally distributed, the concentrations are not
. to be less than 100%, and this can lead to an undefined integrand in Eq. F-24. To
the integration produces reasonable results, the physical constraint:

$$X_{H_2O} + X_{TOC} < 100\% \qquad \text{(F-26)}$$

uded in the region of integration.

of integration and distributional parameters for the top and bottom layers are defined

is defined as $X_{TOC} > 4.5\% - 0.045\, X_{H2O}$ and $X_{TOC} + X_{H2O} < 100\%$. The means, μ_{H2O} and
present (H_2O,TOC) concentrations of waste at the surface, and

s defined as $X_{TOC} > 4.5\% - 0.045\, X_{H2O}$ and $X_{TOC} + X_{H2O} < 100\%$. The means, μ_{H2O} and
present ($_{H2O}$,TOC) concentrations of waste below the surface.

TE CARLO CALCULATIONS TO DETERMINE UNCERTAINTY 'RIBUTIONS

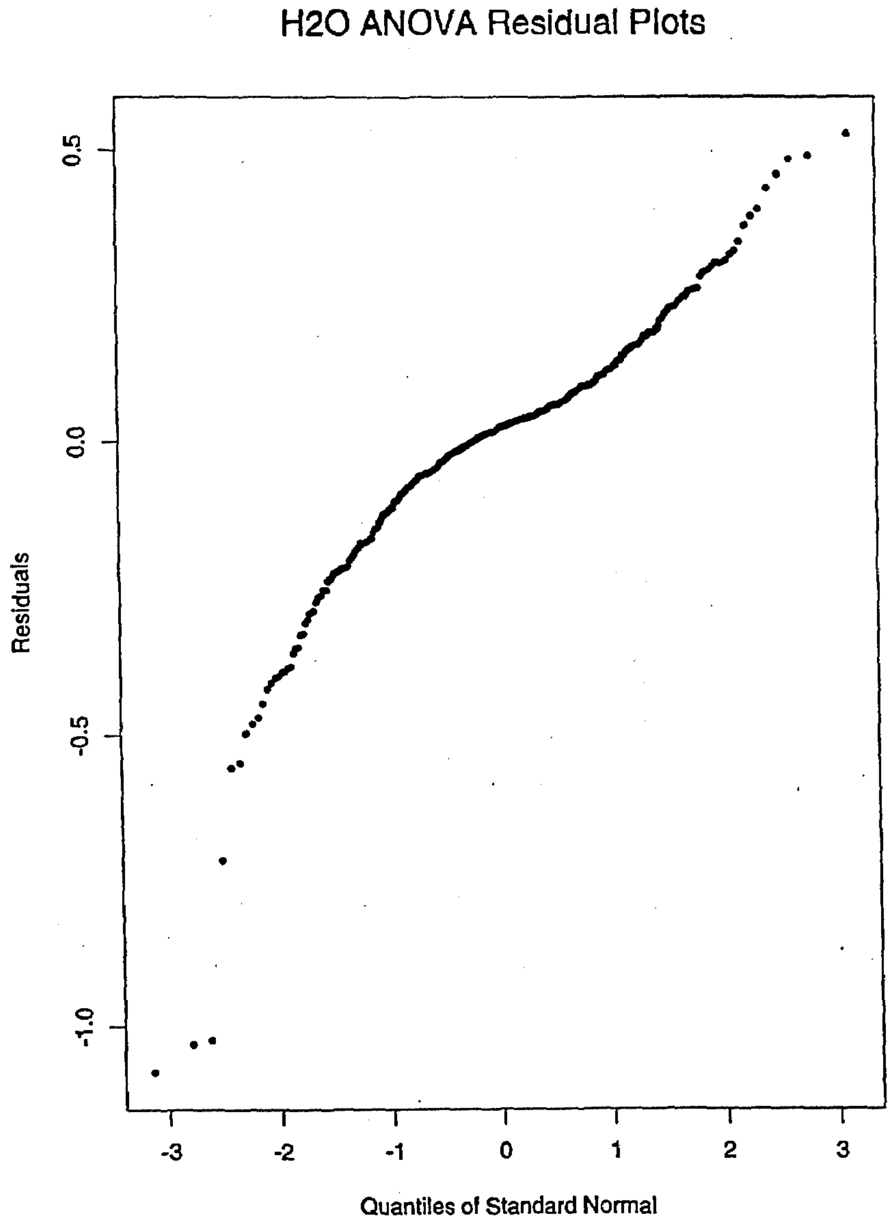
'-21 basically expresses combustible waste in terms of five distributional parameters,
., σ_{H2O}, σ_{H2O}, σ_{TOC}, and ρ. To calculate a distribution of combustible waste that
the uncertainty in this estimate, a Monte Carlo calculation is performed that assumes
eters have standard Bayesian posterior distributions (See [1] for further details). The
meters (μ_{H2O}, μ_{TOC},, σ_{H2O}, σ_{H2O}) that define combustible waste are simulated in the
manner by the Monte Carlo

mulate σ^2_{TOC} from a Chi-squared variate using the formula:

$$\sigma^2_{TOC} = \frac{DOF\,\hat{\sigma}^2_{TOC}}{\chi^2_{DOF}} \qquad \text{(F-27)}$$

: $\hat{\sigma}^2_{TOC} = \hat{\sigma}^2_E - \sigma^2_M$ represents ANOVA residual variability with an allowance for
ırement error, and χ^2_N represents a Chi-squared variate with N degrees of freedom. The
ɔle DOF represents the degrees of freedom associated with σ_E. For the σ_E from the

Figure F-2: Q Normal-Plot of Moisture Anova Residuals



are from log transformed data, so they should be normally distributed if the assumption is correct. When the residuals are normally distributed, the Q-normal plot should produce roughly a straight line. As one can see, this is largely the case, except for one or two small outlier values on the left side of the distribution.

The ANOVA also predicts the (log) means for the two layers in each tank. These predictions are presented graphically in Figure F-3. The Figure lists tanks by moisture groups, with the group mean identified by the solid line on each plot. Of course, these predictions have an uncertainty associated with them and this is represented in the plots by square brackets, which identify 95% bounds on the prediction (the prediction is represented by the open circle). The figures also present the data used in the ANOVA fit; this data is represented on the plots as solid dots. Each data point in this plot does not necessarily represent a single raw data point; each data point is actually the average of all raw data (usually sample/duplicate measurements) from a single location. Thus the scatter of the data points represents the spatial variability of moisture within the defined layer.

As one can see from the plots, the ANOVA basically computed a layer estimate by averaging existing data on the log scale. If the layer has only one or two data points, the estimate might deviate from the simple log-mean, because the ANOVA includes the group mean in the averaging process. One can also see a substantial difference in confidence bound widths on the plots. Layers that have data can have confidence bounds that are about an order of magnitude smaller than layers without data.

Figure F-3: H_2O ANOVA Results

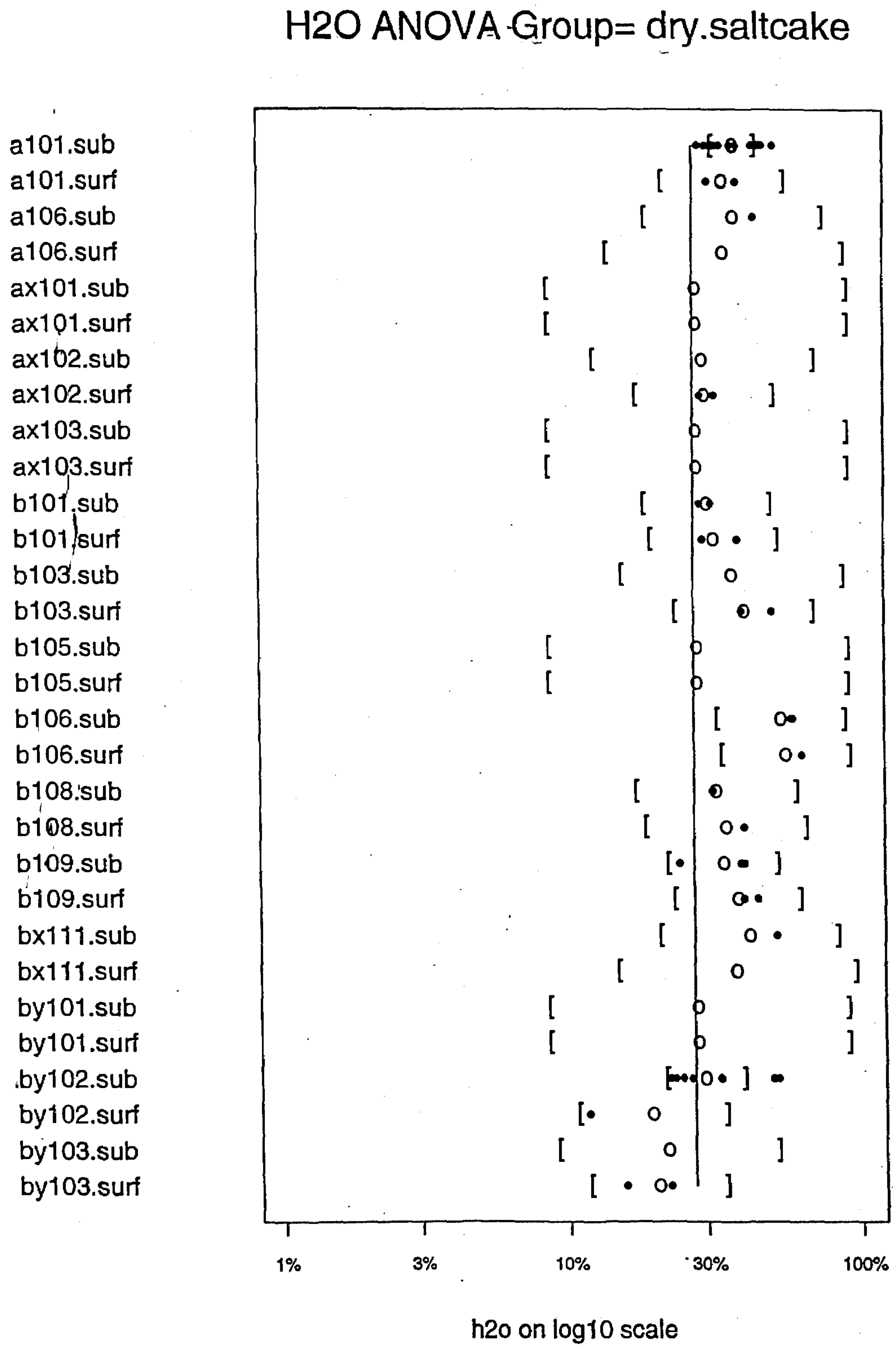


Figure F-3: H_2O ANOVA Results

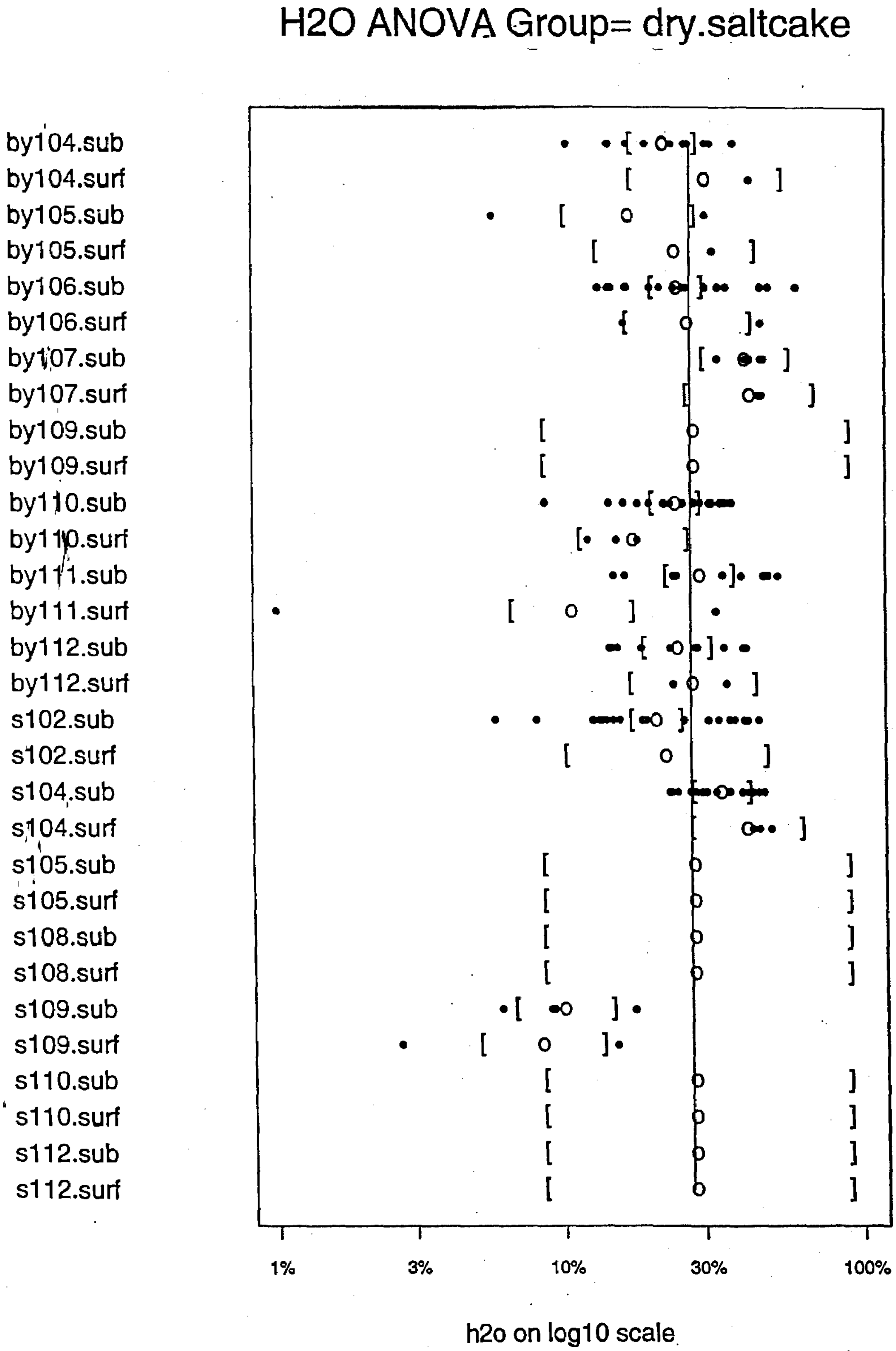


Figure F-3: H_2O ANOVA Results

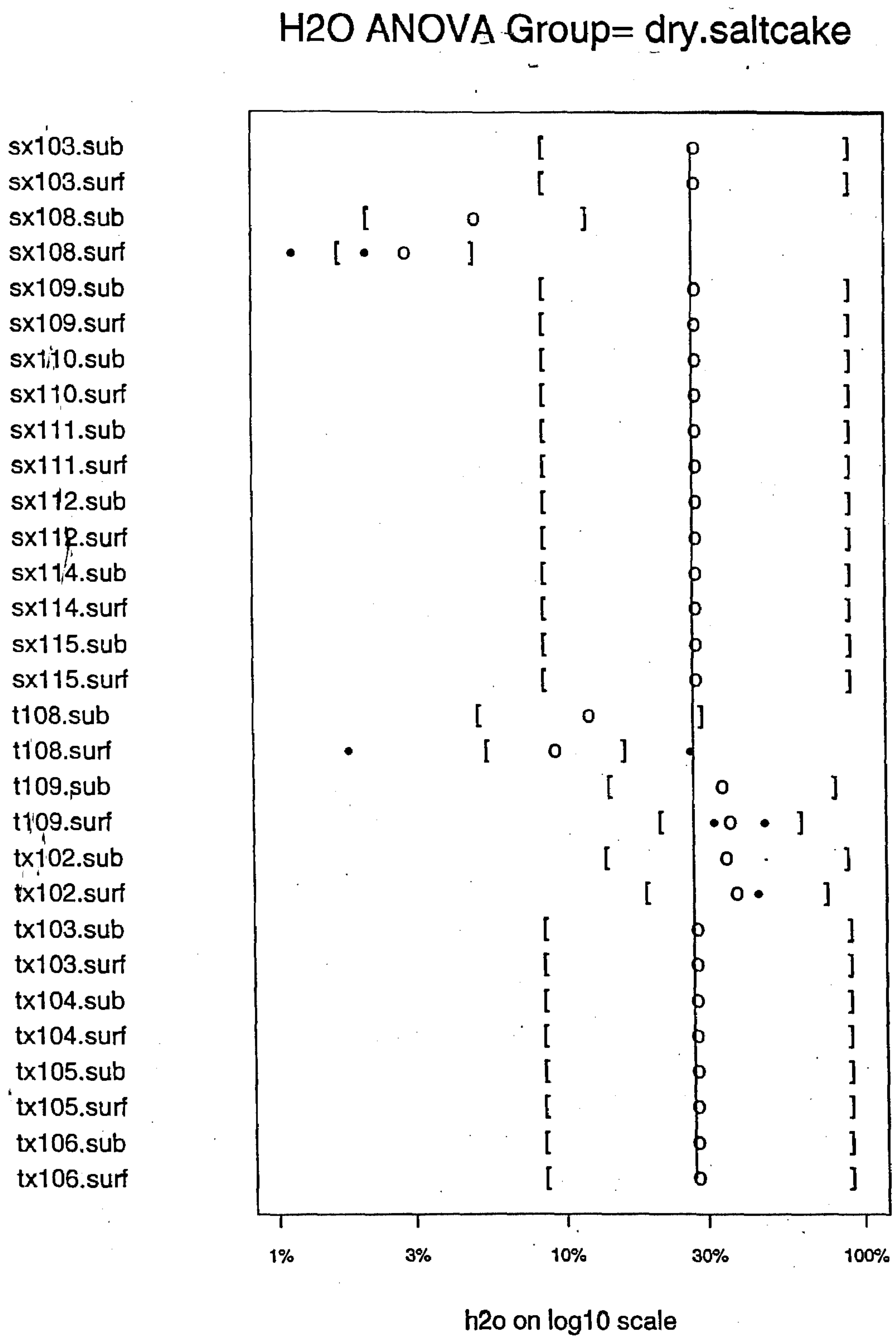


Figure F-3: H_2O ANOVA Results

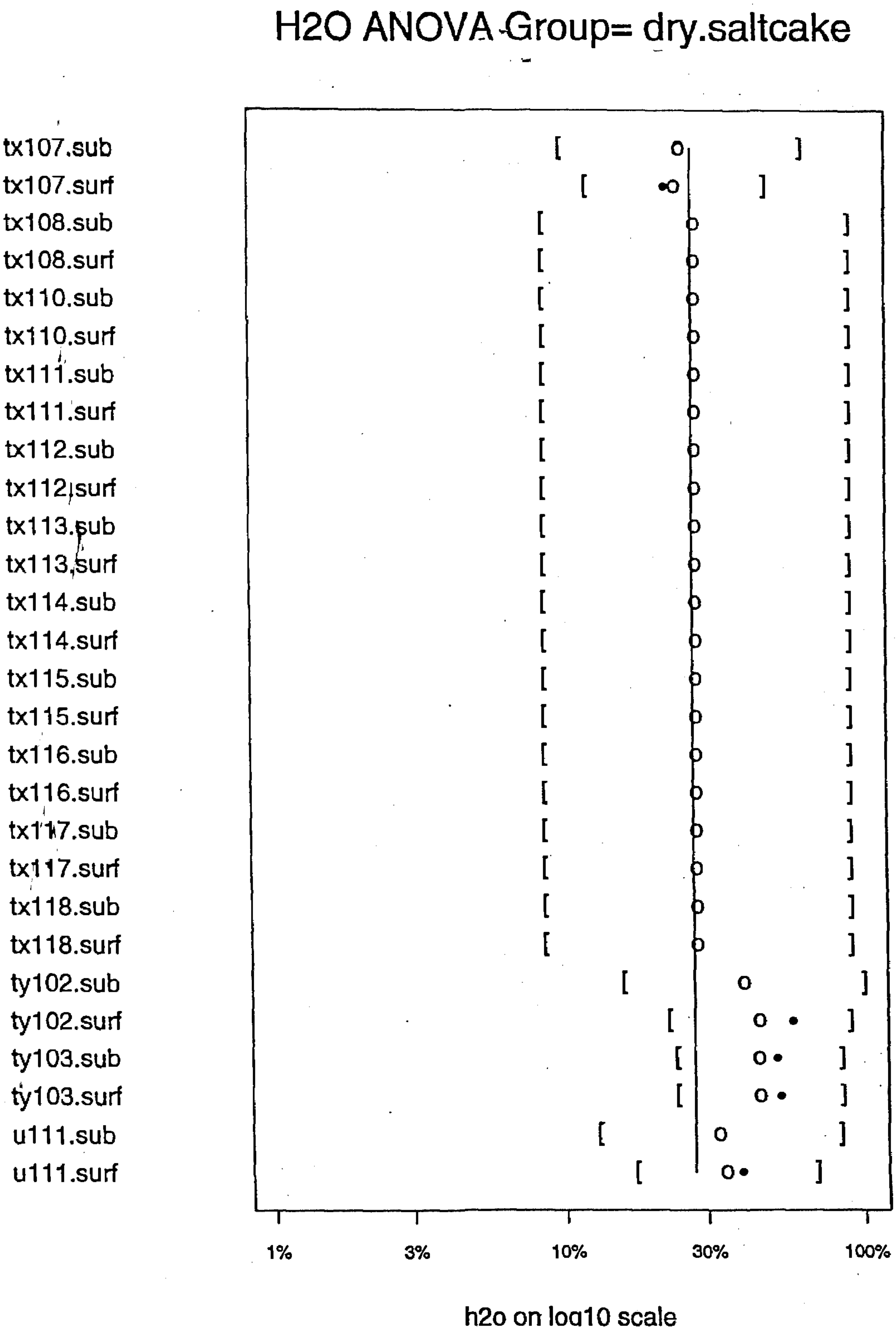


Figure F-3: *H_2O* ANOVA Results

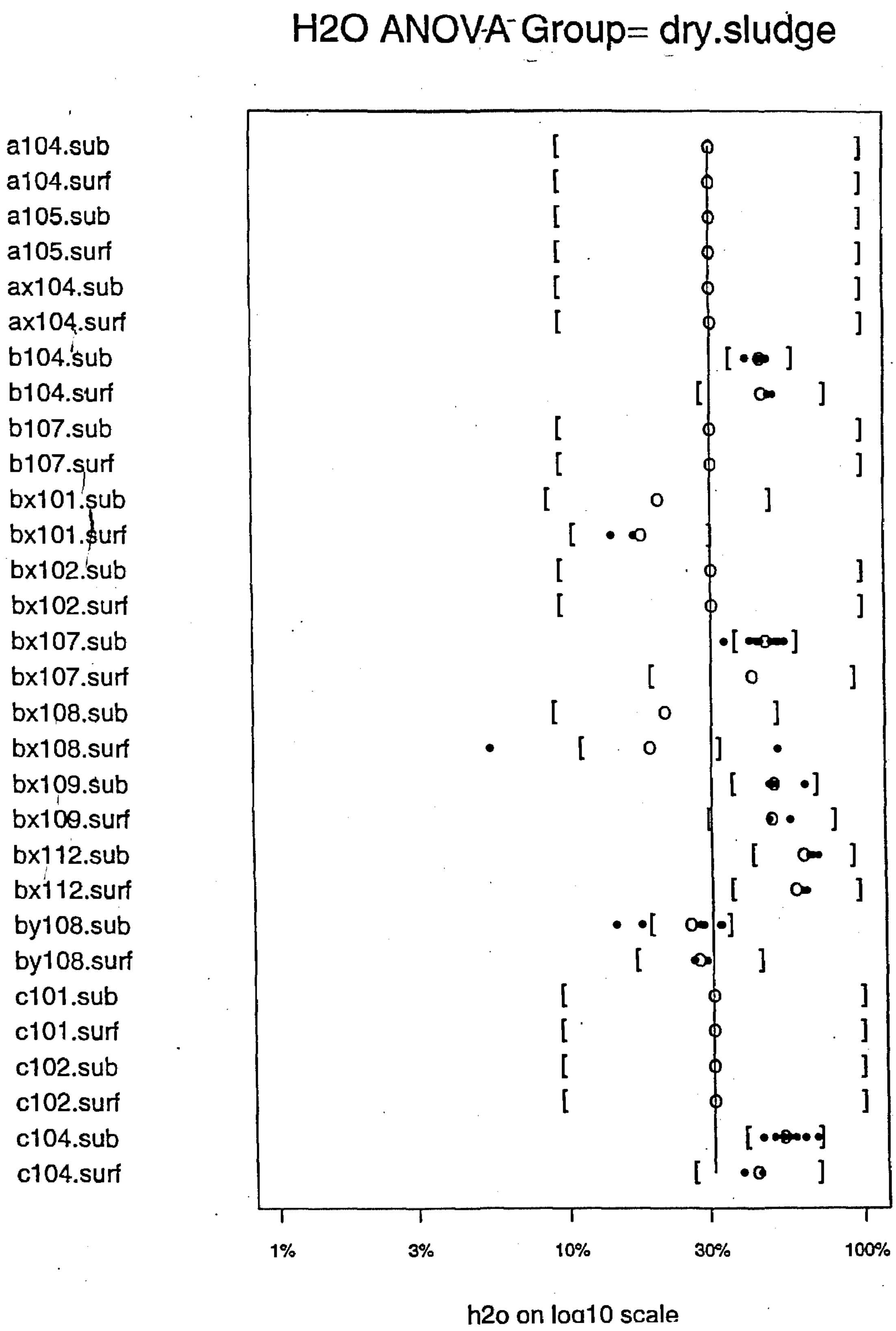


Figure F-3: H_2O ANOVA Results

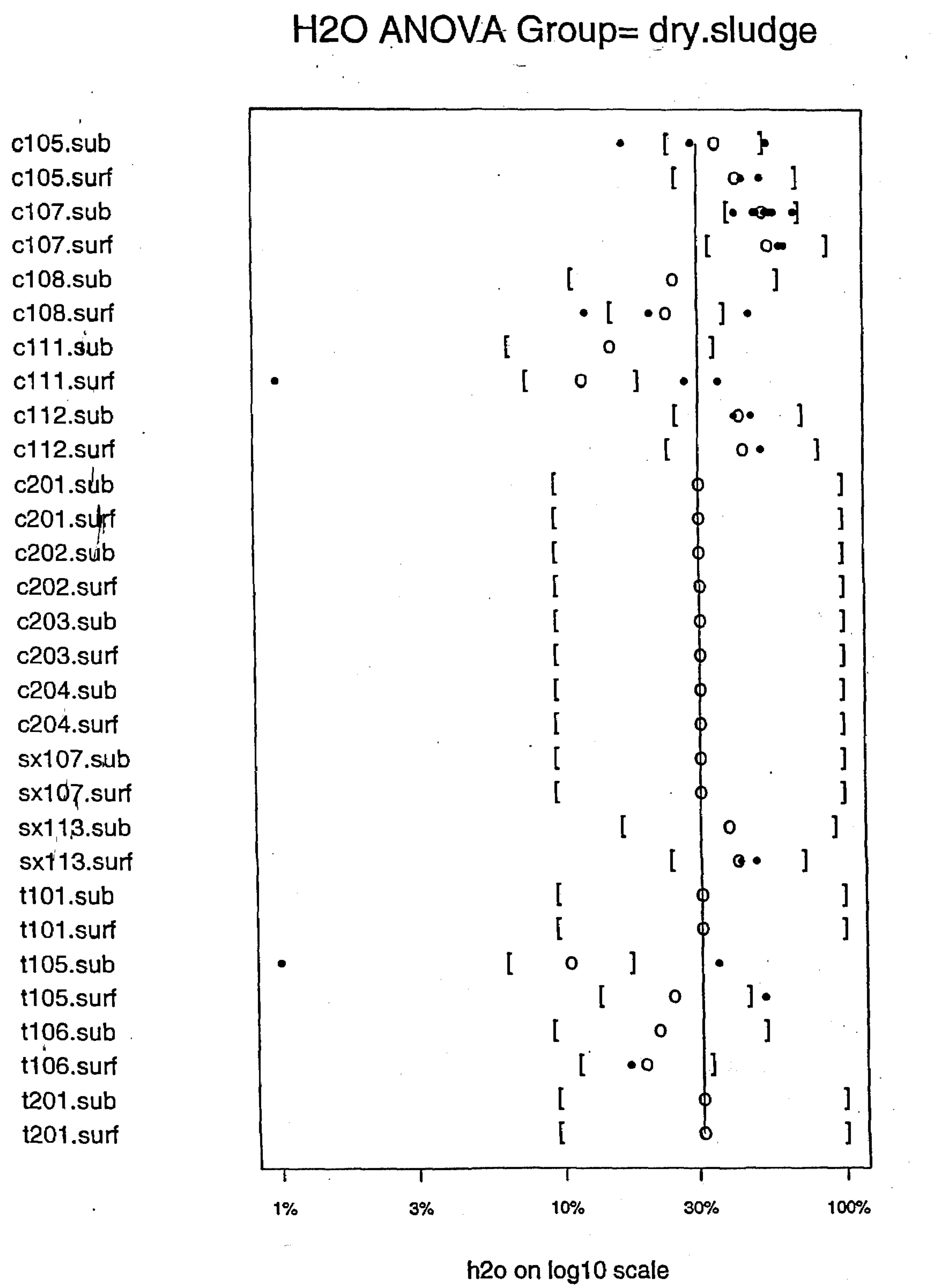


Figure F-3: H_2O ANOVA Results

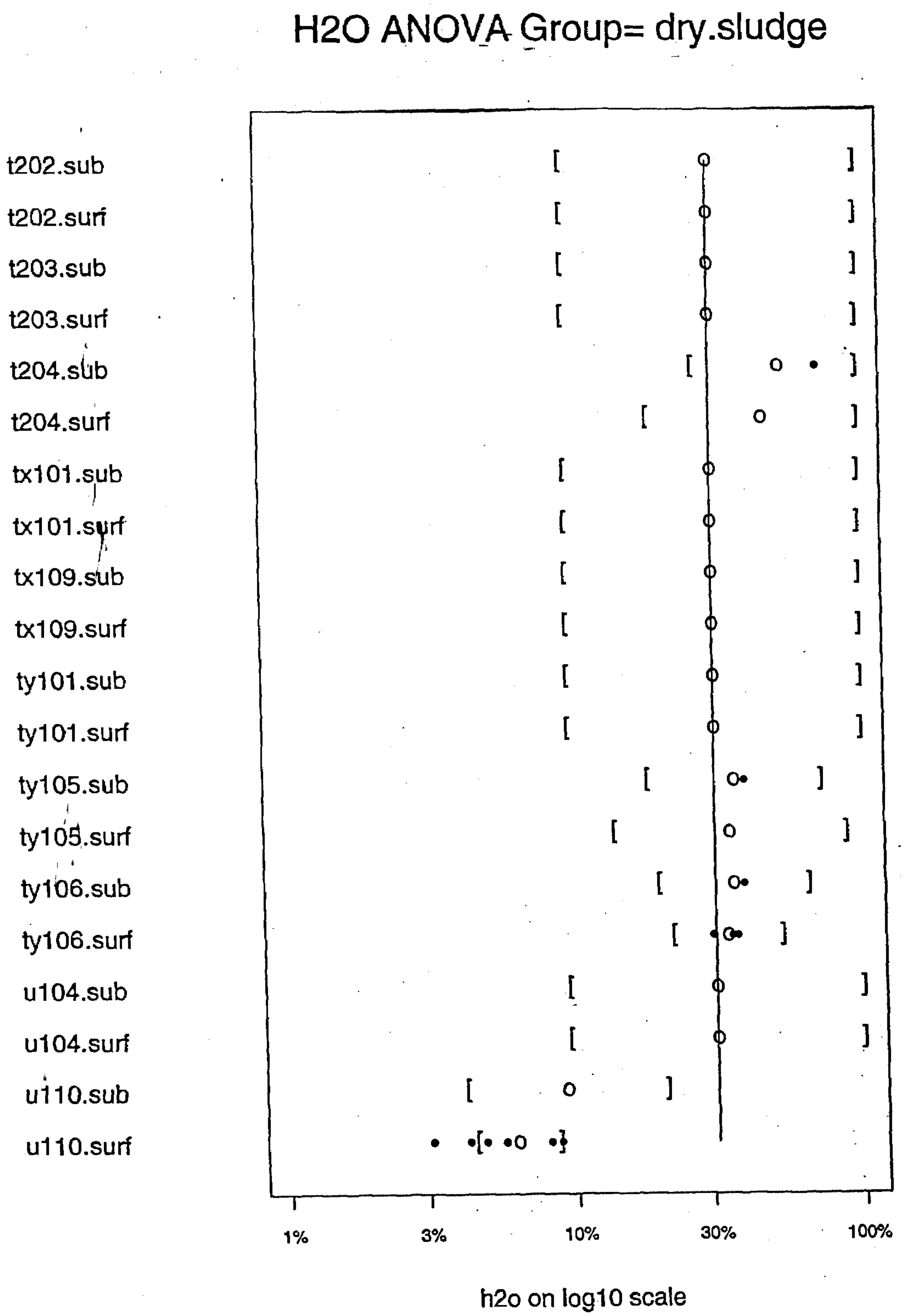


Figure F-3: H_2O ANOVA Results

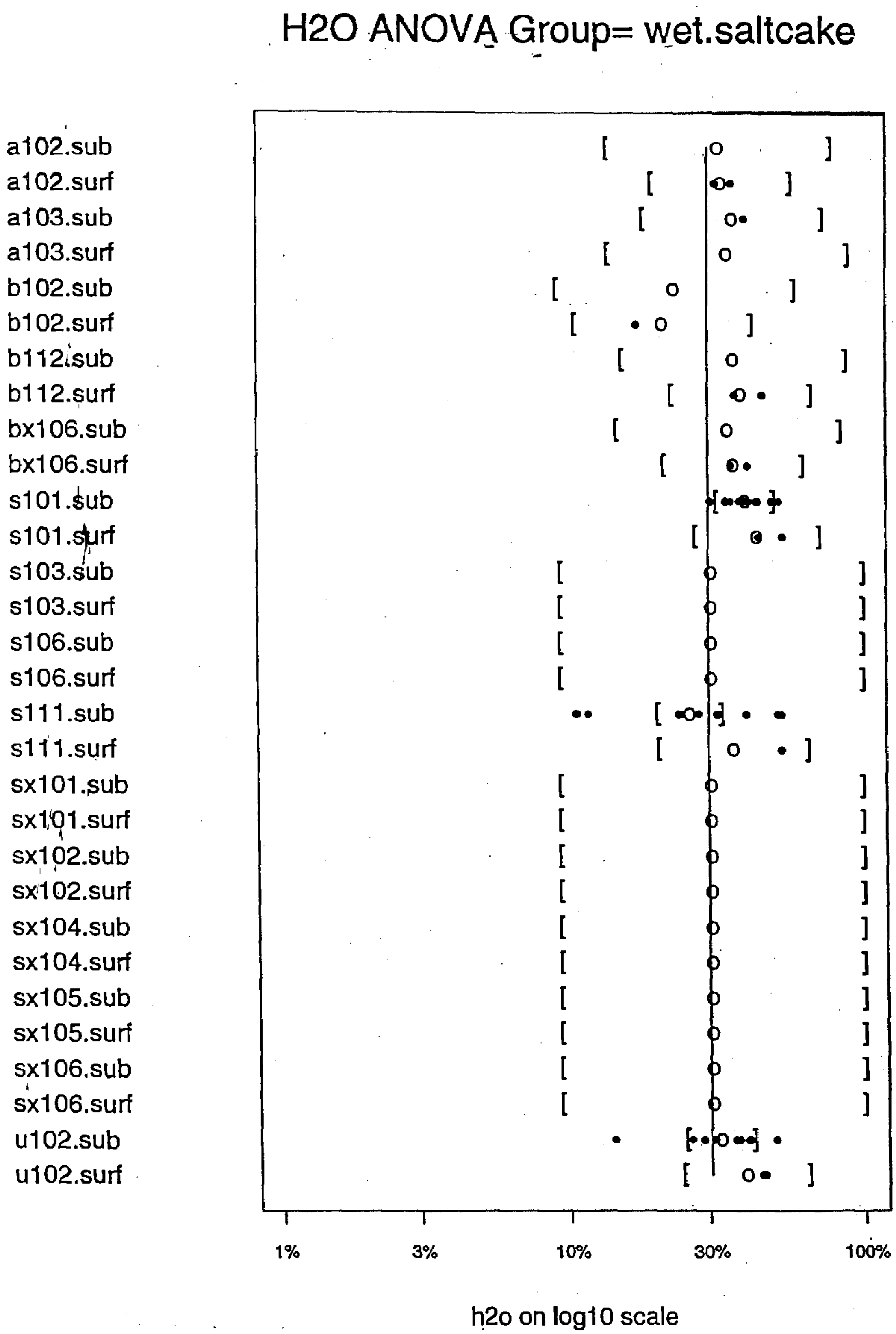


Figure F-3: H_2O ANOVA Results

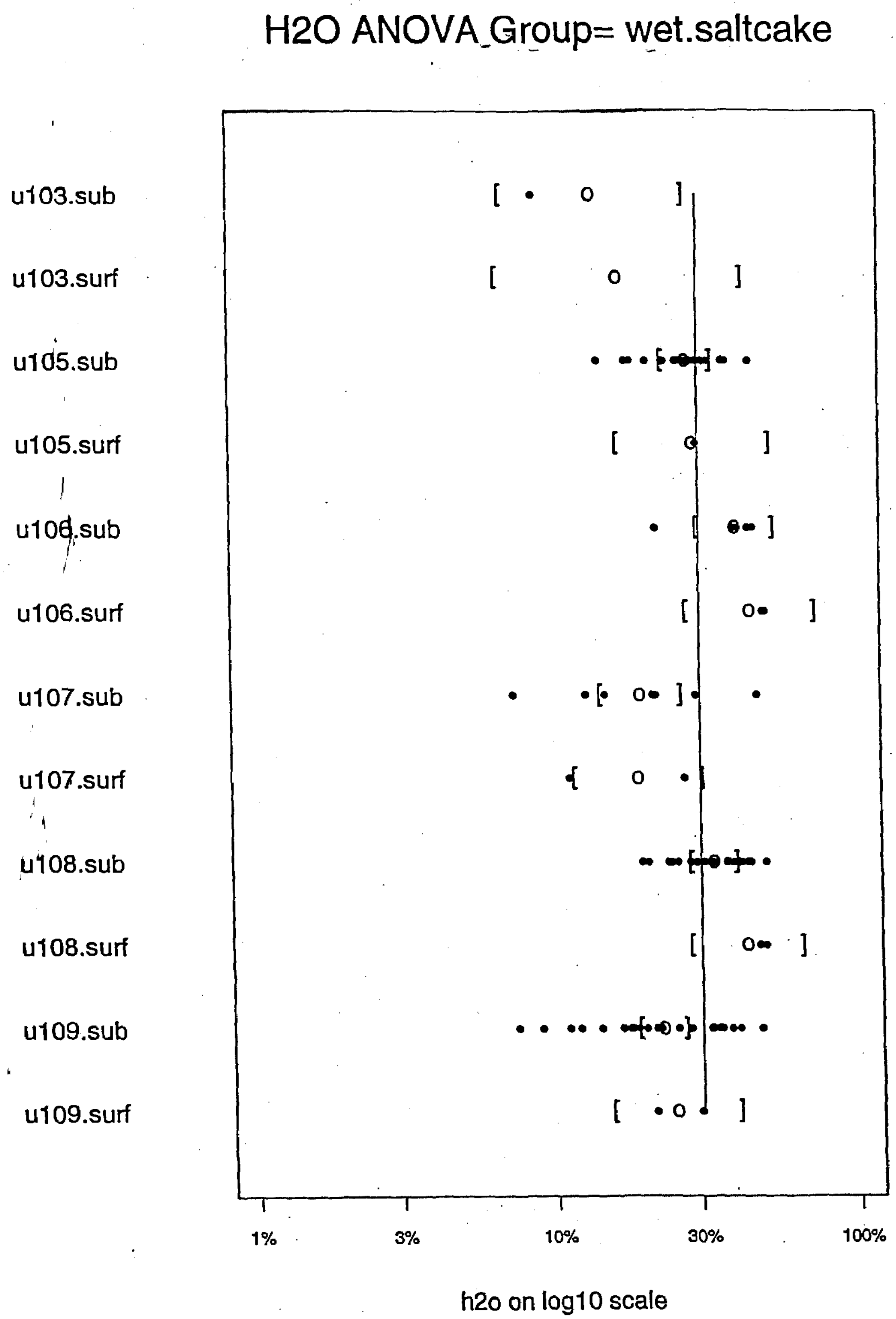


Figure F-3: H_2O ANOVA Results

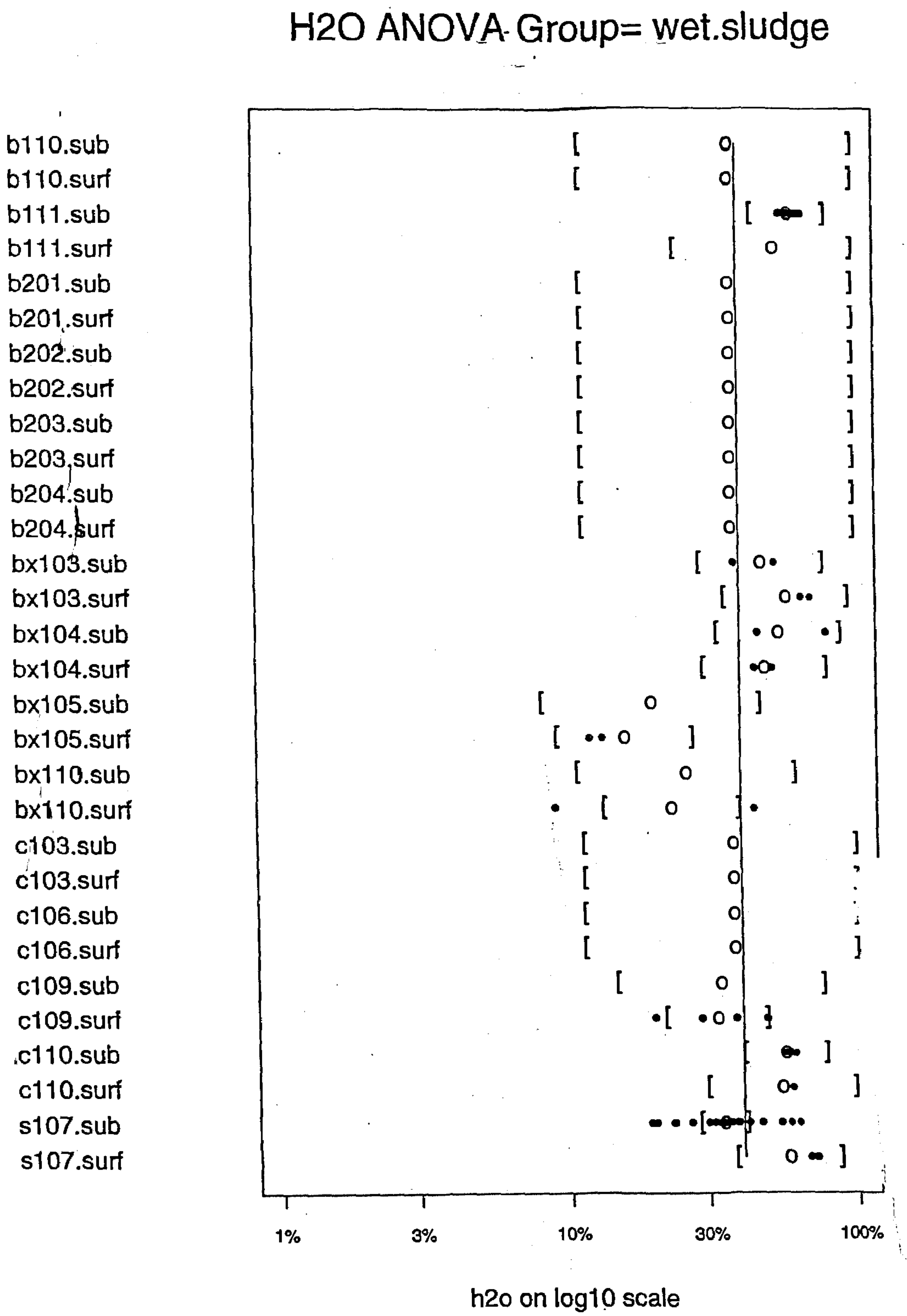
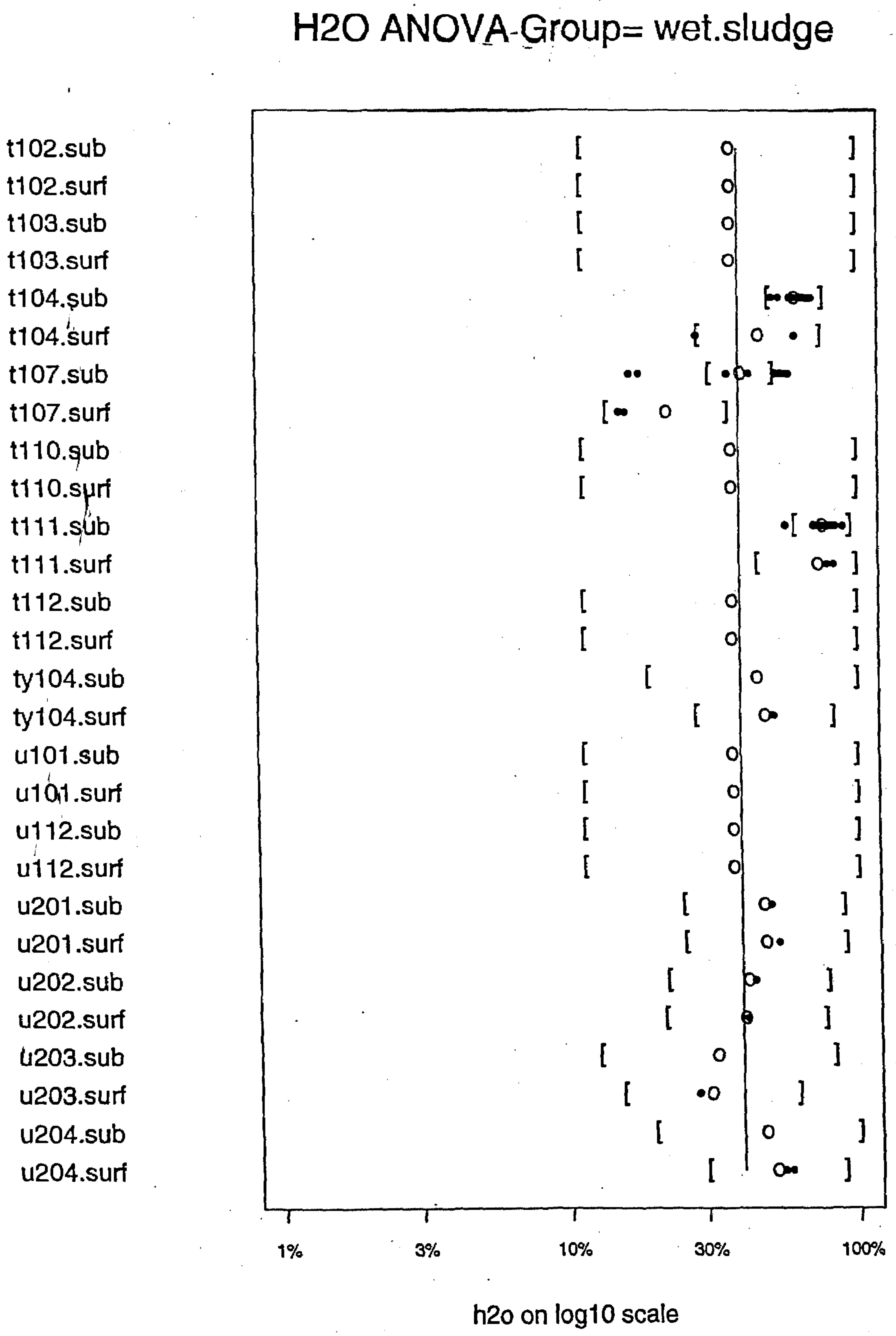


Figure F-3: H_2O ANOVA Results



4.2 ANOVA FIT TO TOC

The ANOVA model fitted to the TOC data is the same as that used for moisture in the last section. The ANOVA estimated variance components are given in Table F-5.

Table F-5: ANOVA Table For TOC

Variance Component	ANOVA Estimate	Converted to RSD
σ_D^2	2.29e-03	11.1%
σ_G^2	1.51e-01	111.0%
σ_T^2	1.05e-01	86.3%
σ_{DG}^2	2.93e-23	0.0%
σ_{DT}^2	2.57e-02	38.2%
σ_E^2	8.67e-02	76.4%

The within-group correlation (ρ), which is a measure of how well the tank grouping predicts TOC, is 58%, quite a respectable value. The log-mean TOC for the entire tank farm, μ, is estimated as μ = -0.72, which translates into an unlogged value of 0.2%.

A Q normal plot of the residuals is given in Figure F-4 to check for normality (or log-normality of the unlogged data). This plot shows that the residuals are indeed approximately normal.

The surface and subsurface TOC predictions from the ANOVA are graphically presented in the following plots. These plots have the same format as those presented in the previous section.

Figure F-4: Q Normal Plot of Residuals from TOC ANOVA

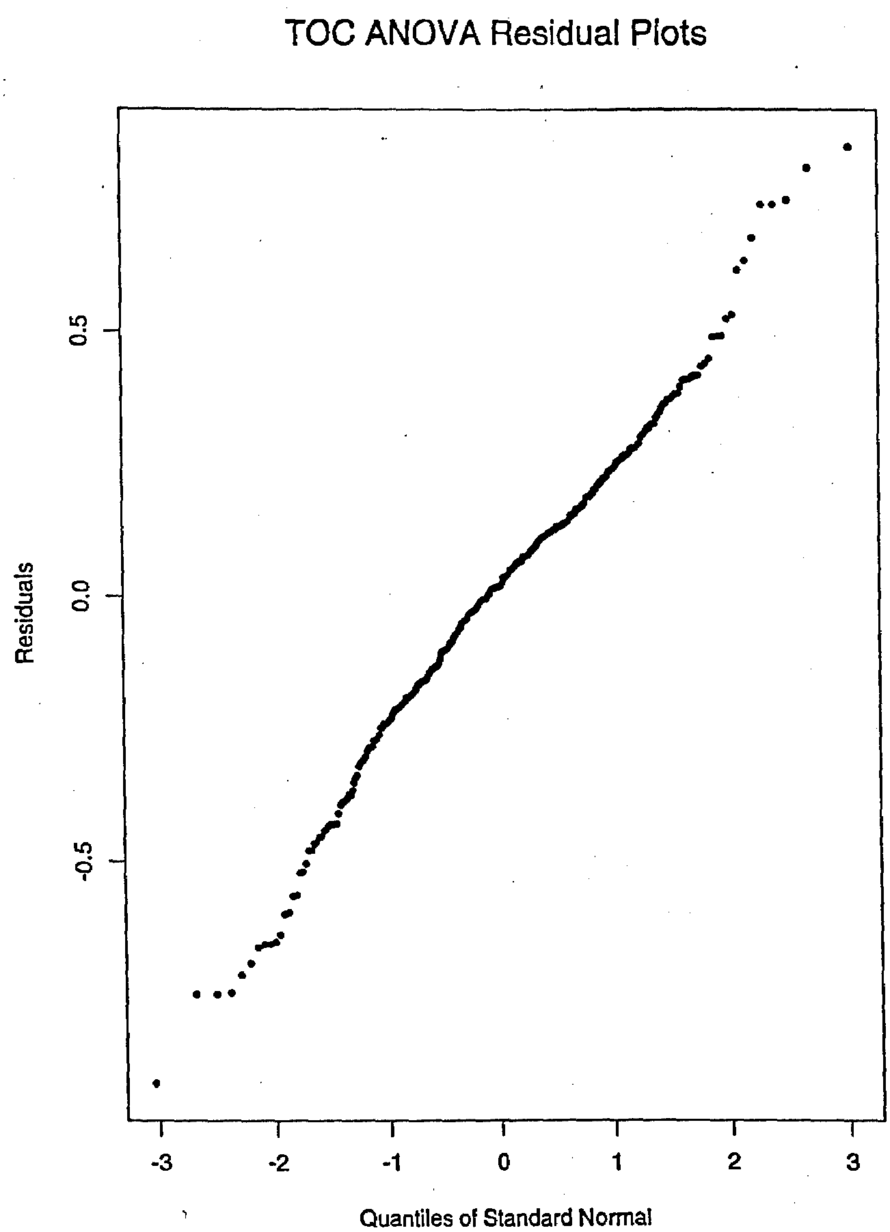


Figure F-5: TOC ANOVA Results

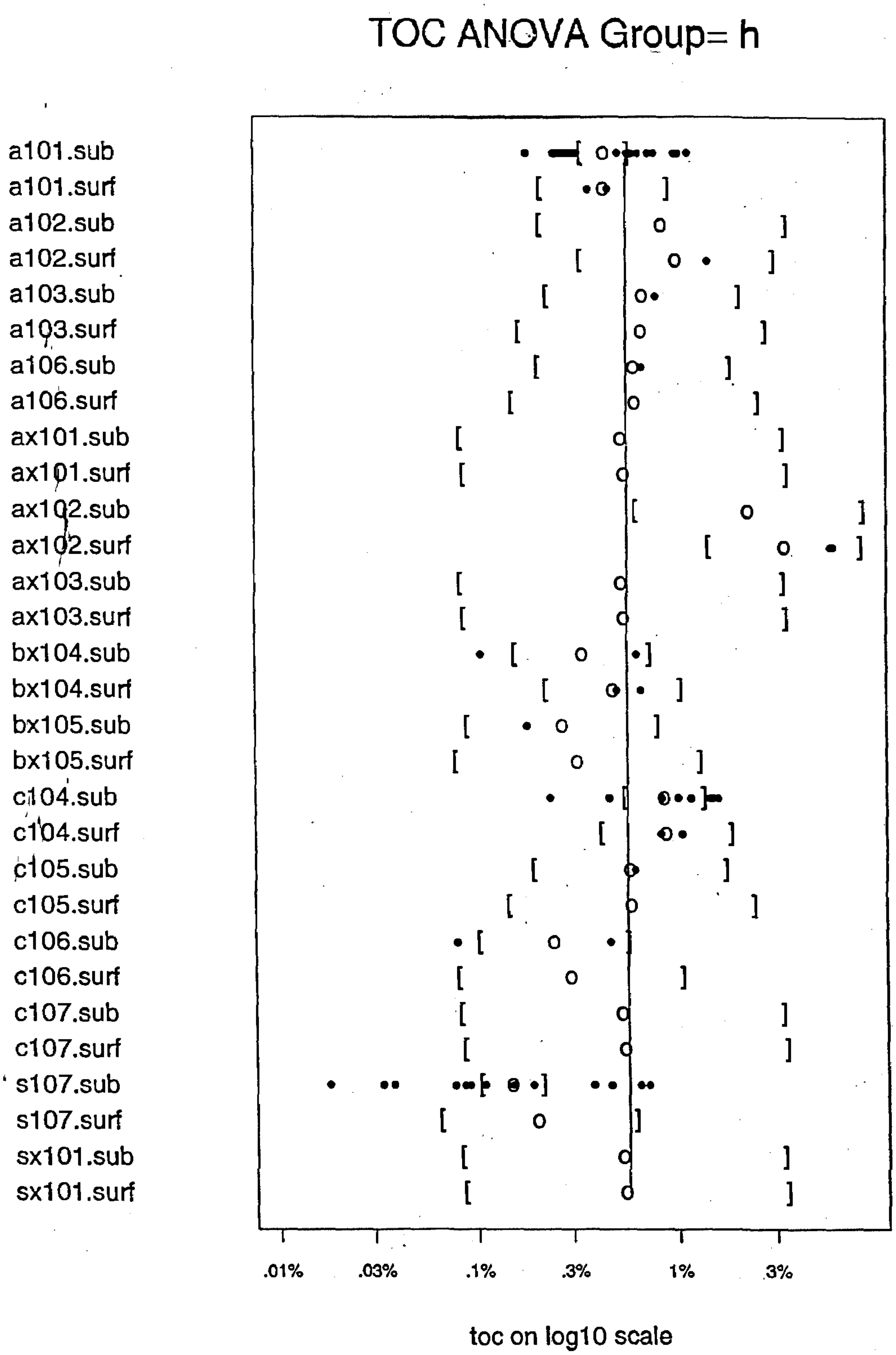


Figure F-5: TOC ANOVA Results

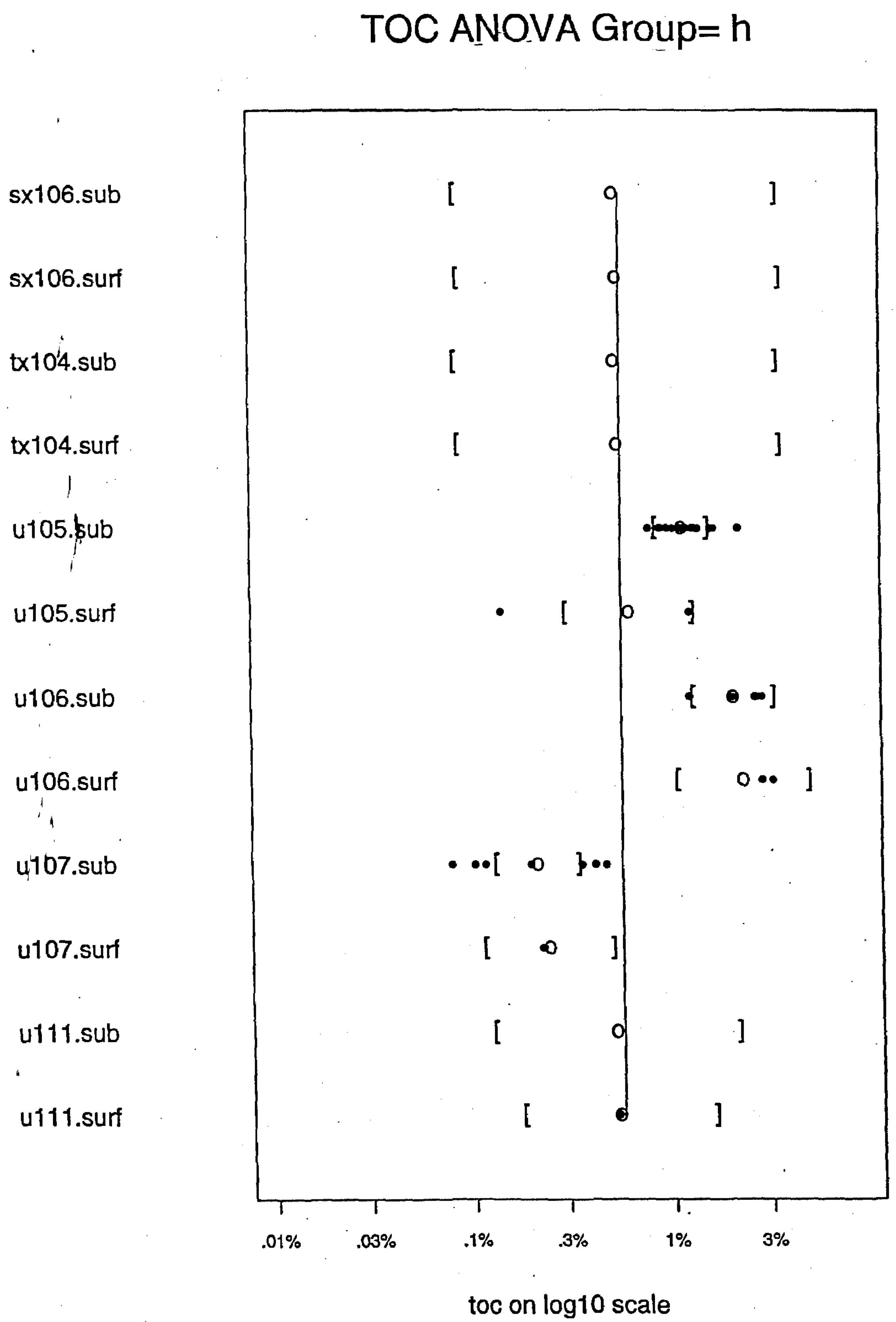


Figure F-5: TOC ANOVA Results

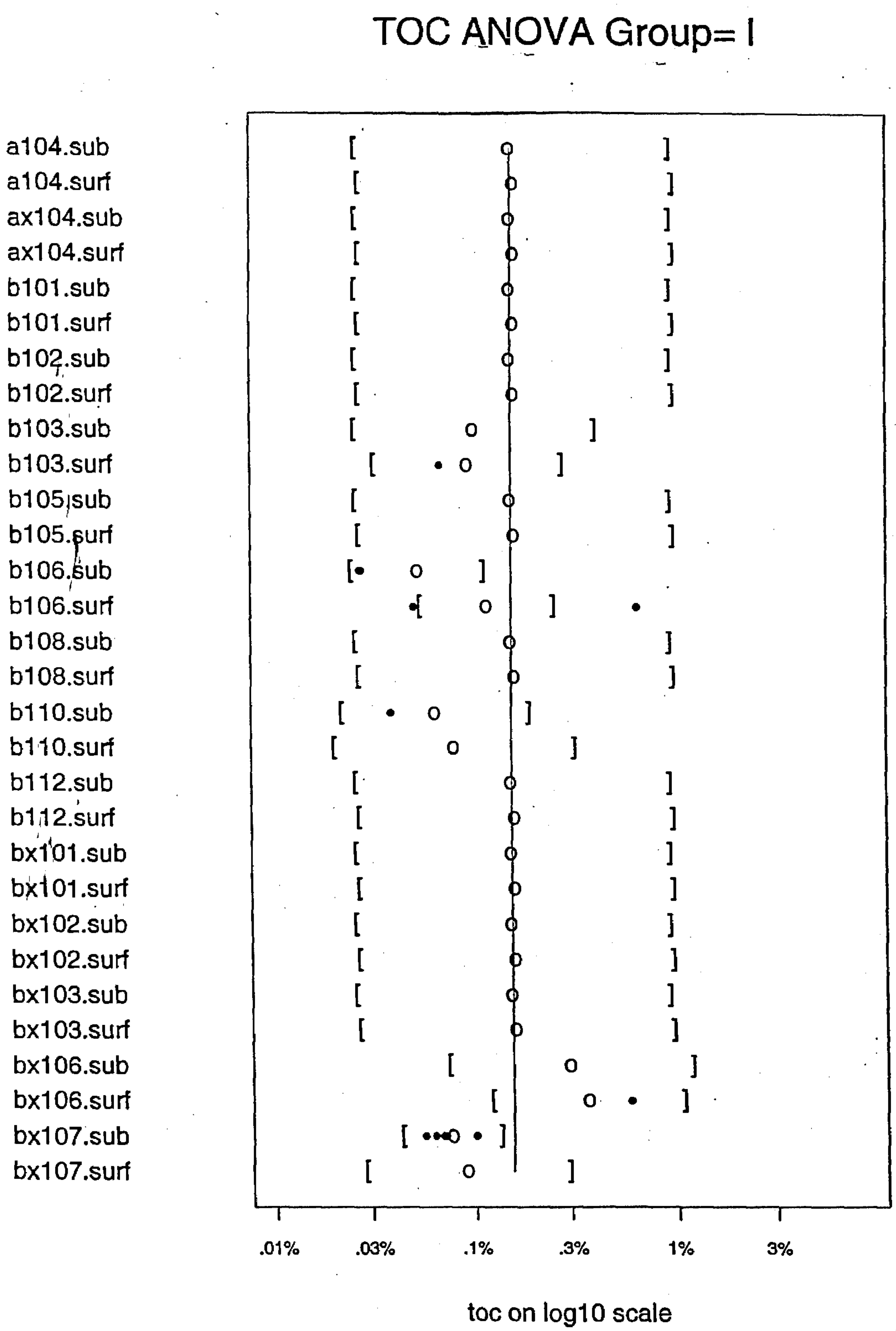


Figure F-5: TOC ANOVA Results

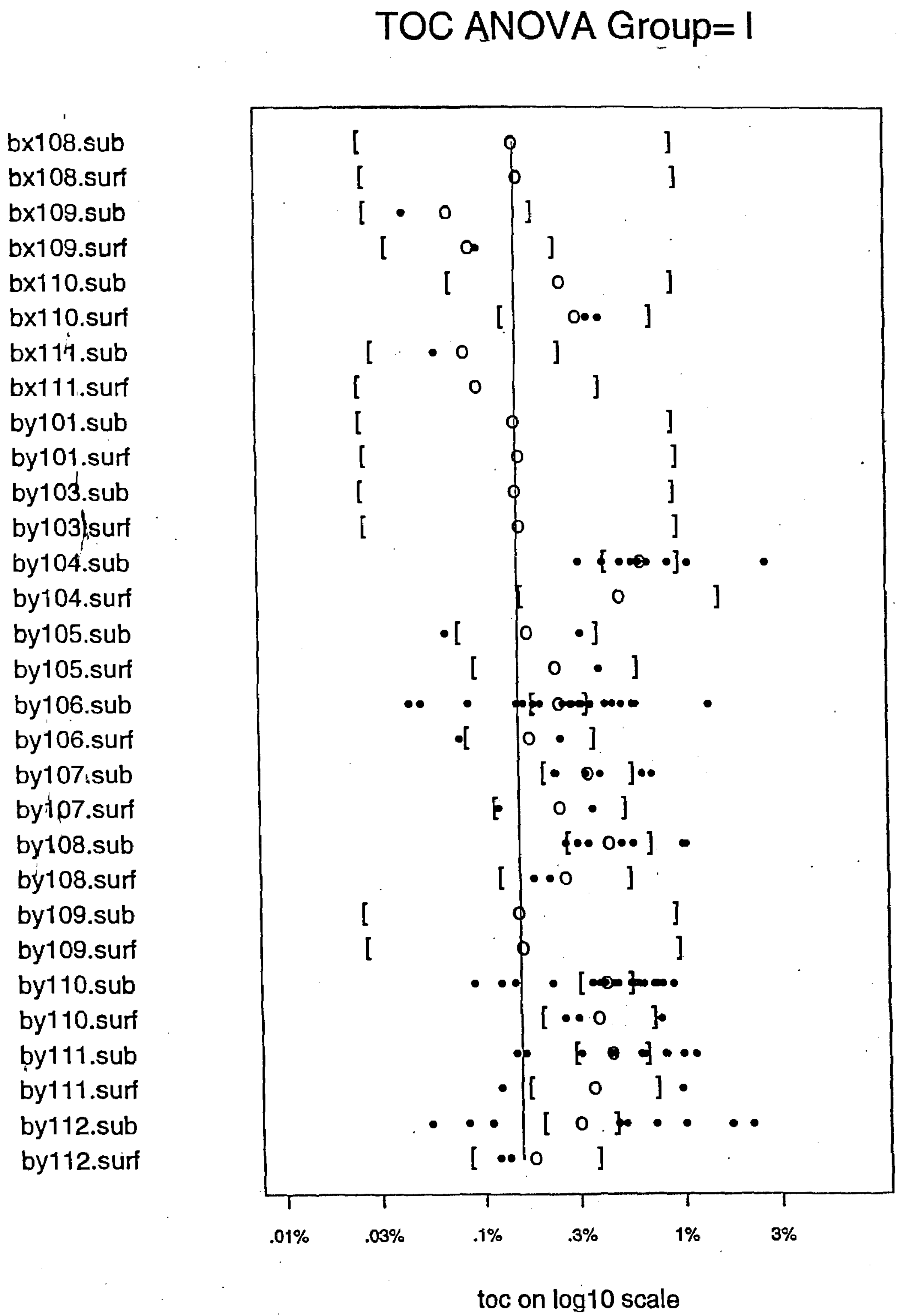


Figure F-5: TOC ANOVA Results

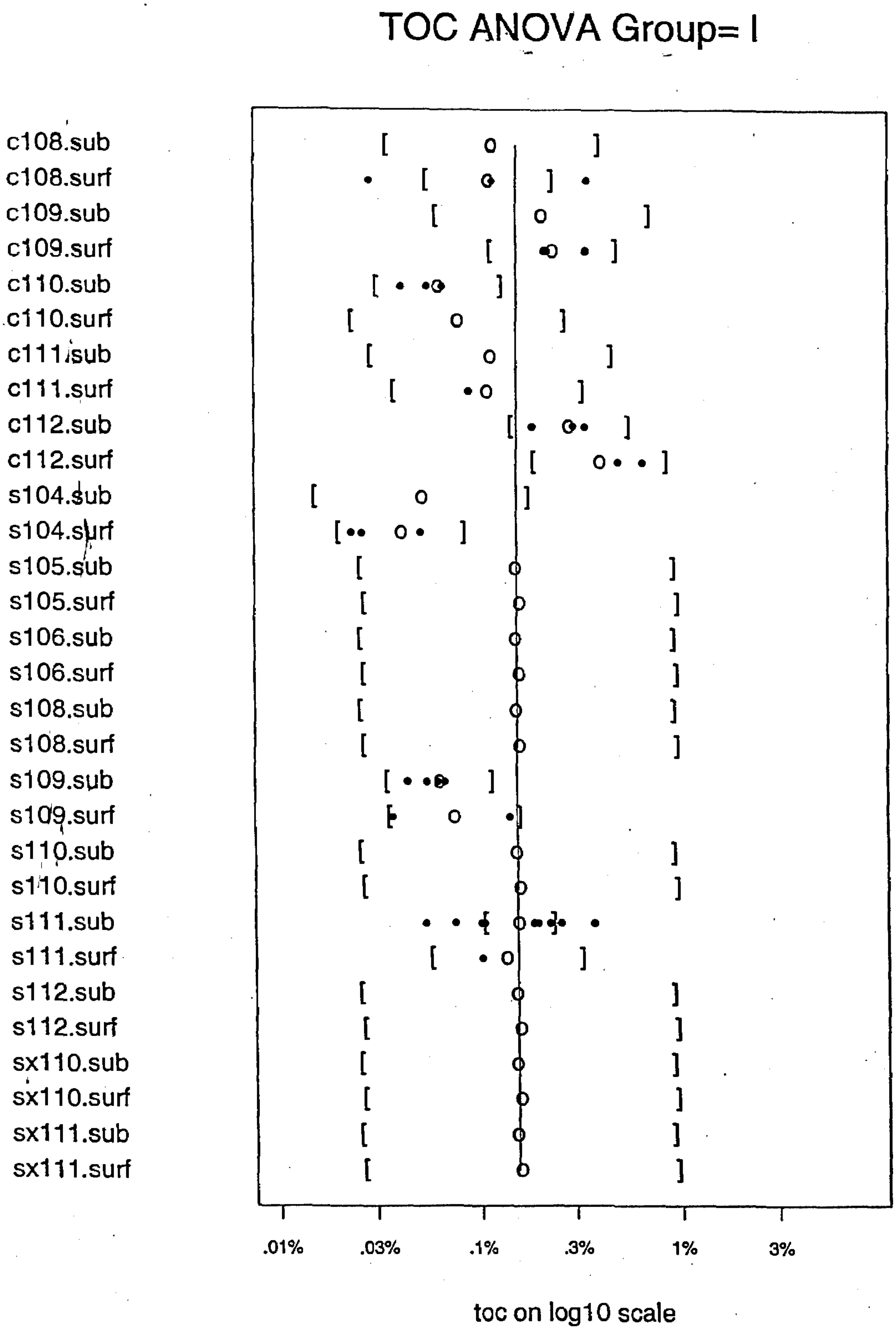


Figure F-5: TOC ANOVA Results

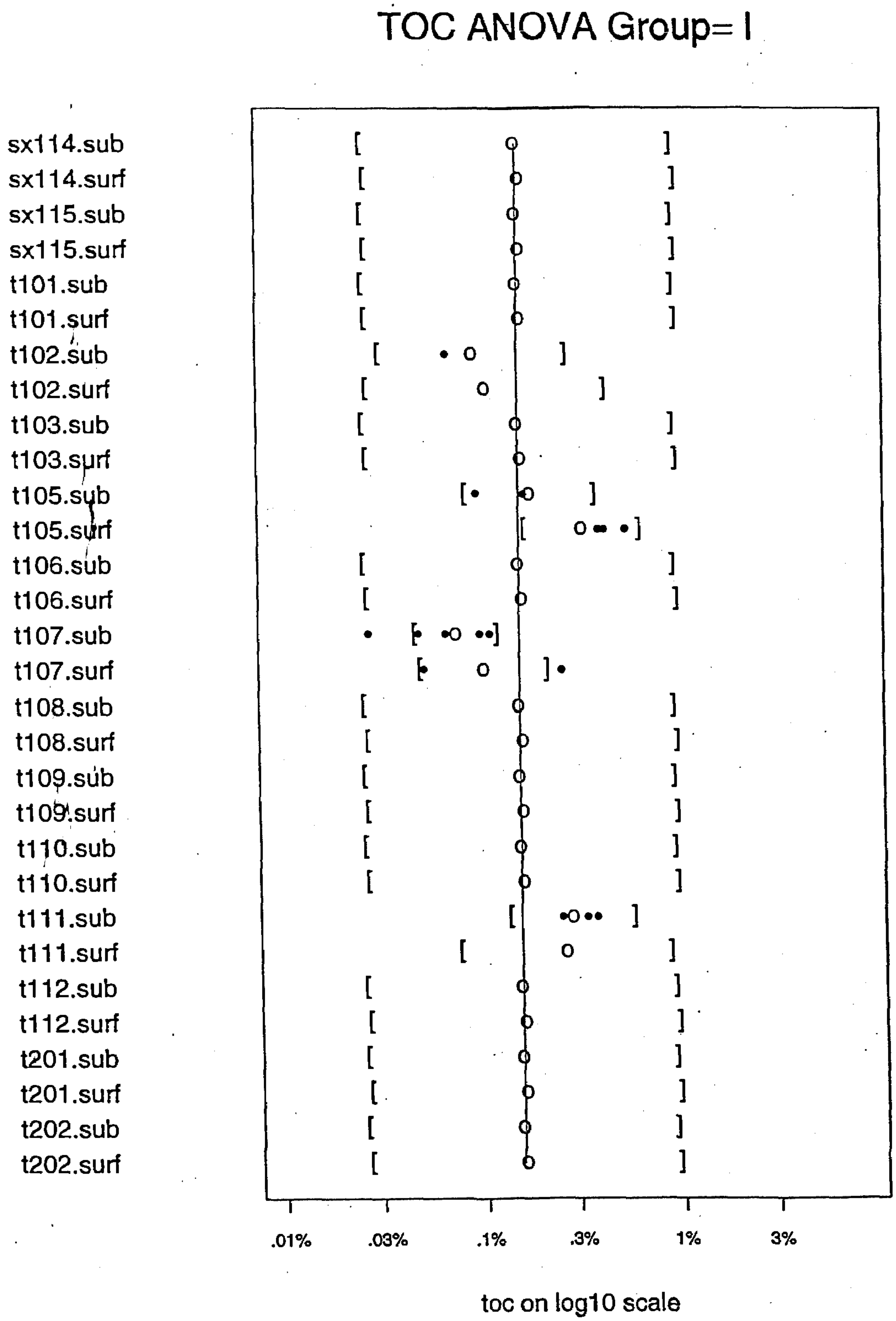


Figure F-5: TOC ANOVA Results

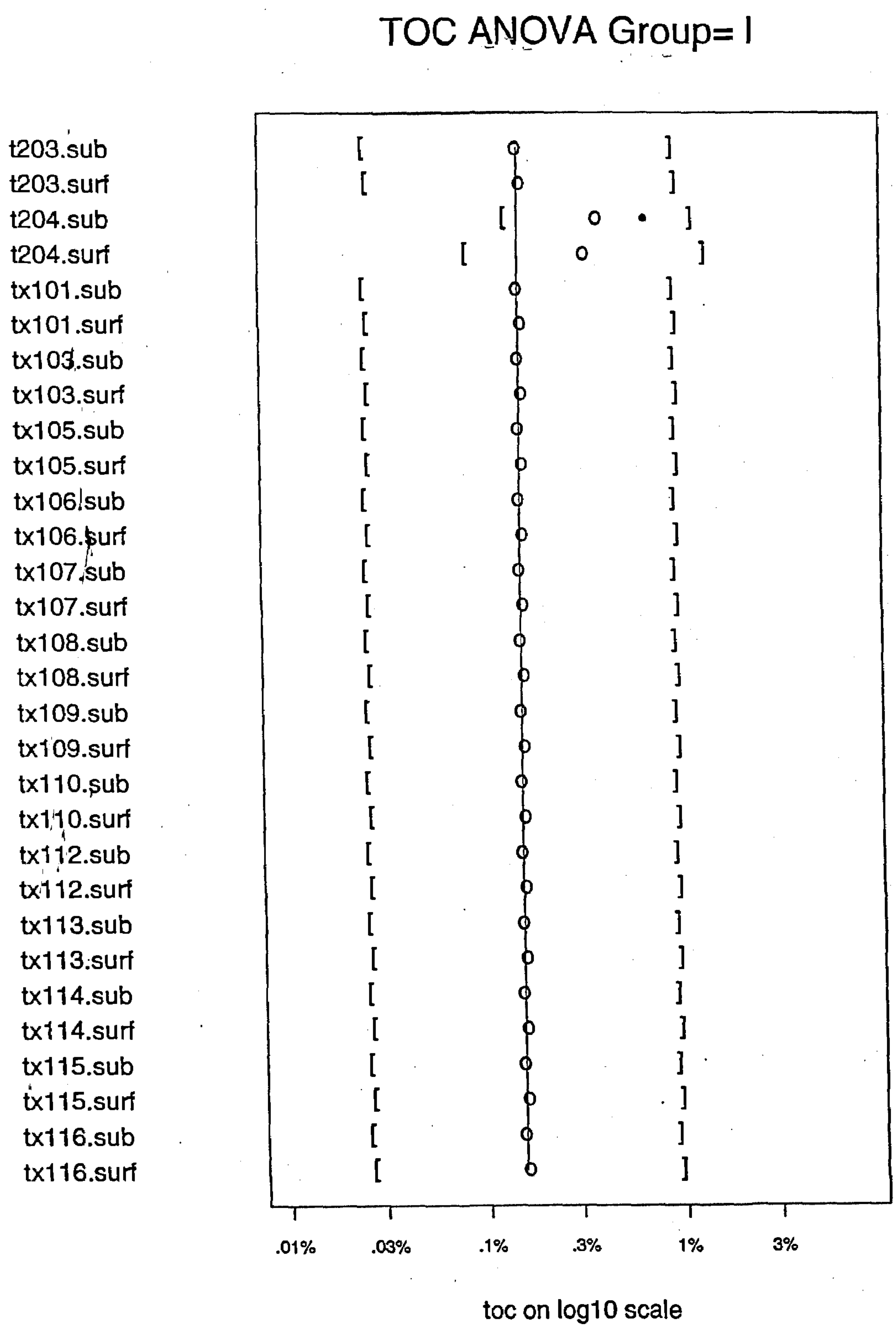


Figure F-5: TOC ANOVA Results

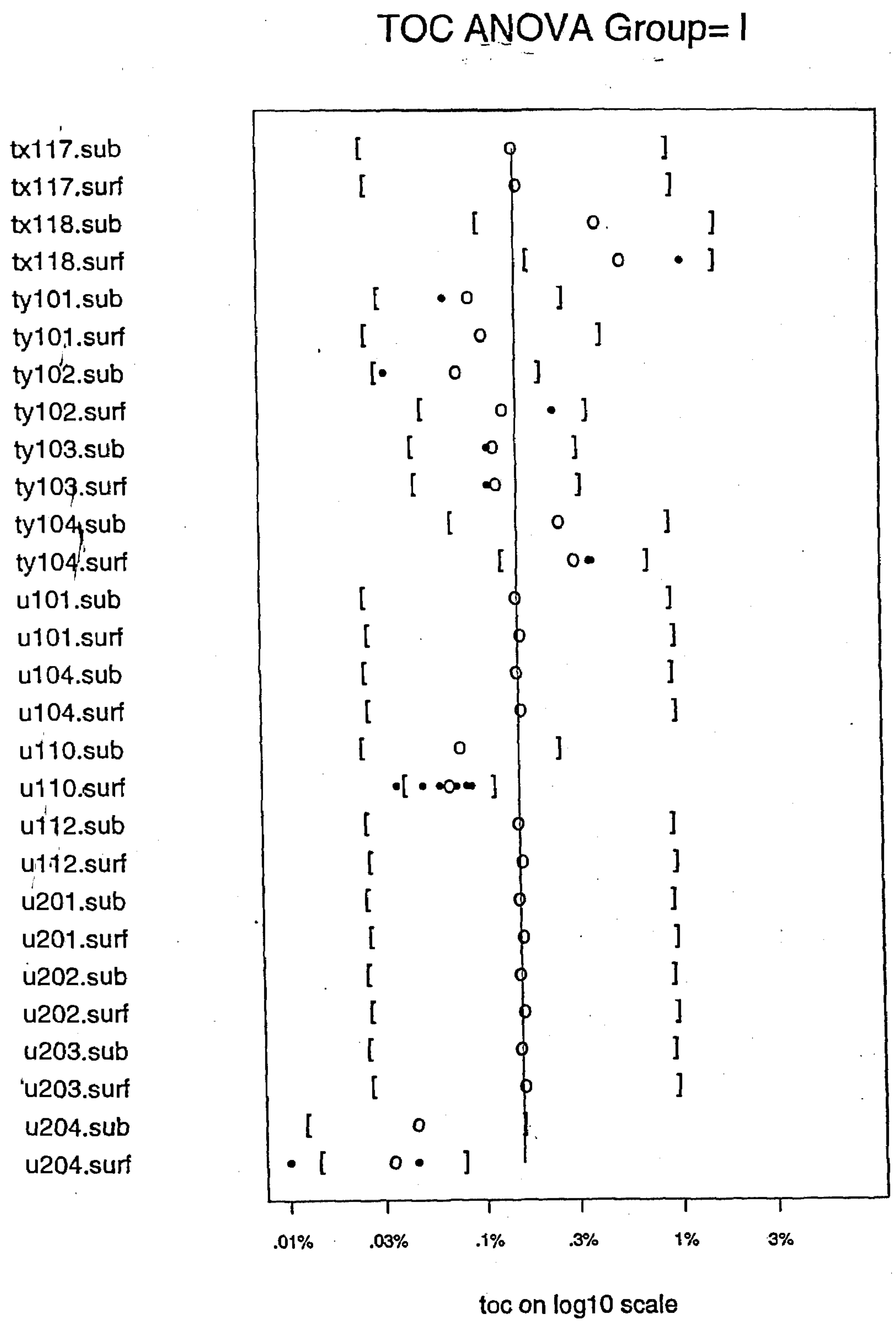


Figure F-5: TOC ANOVA Results

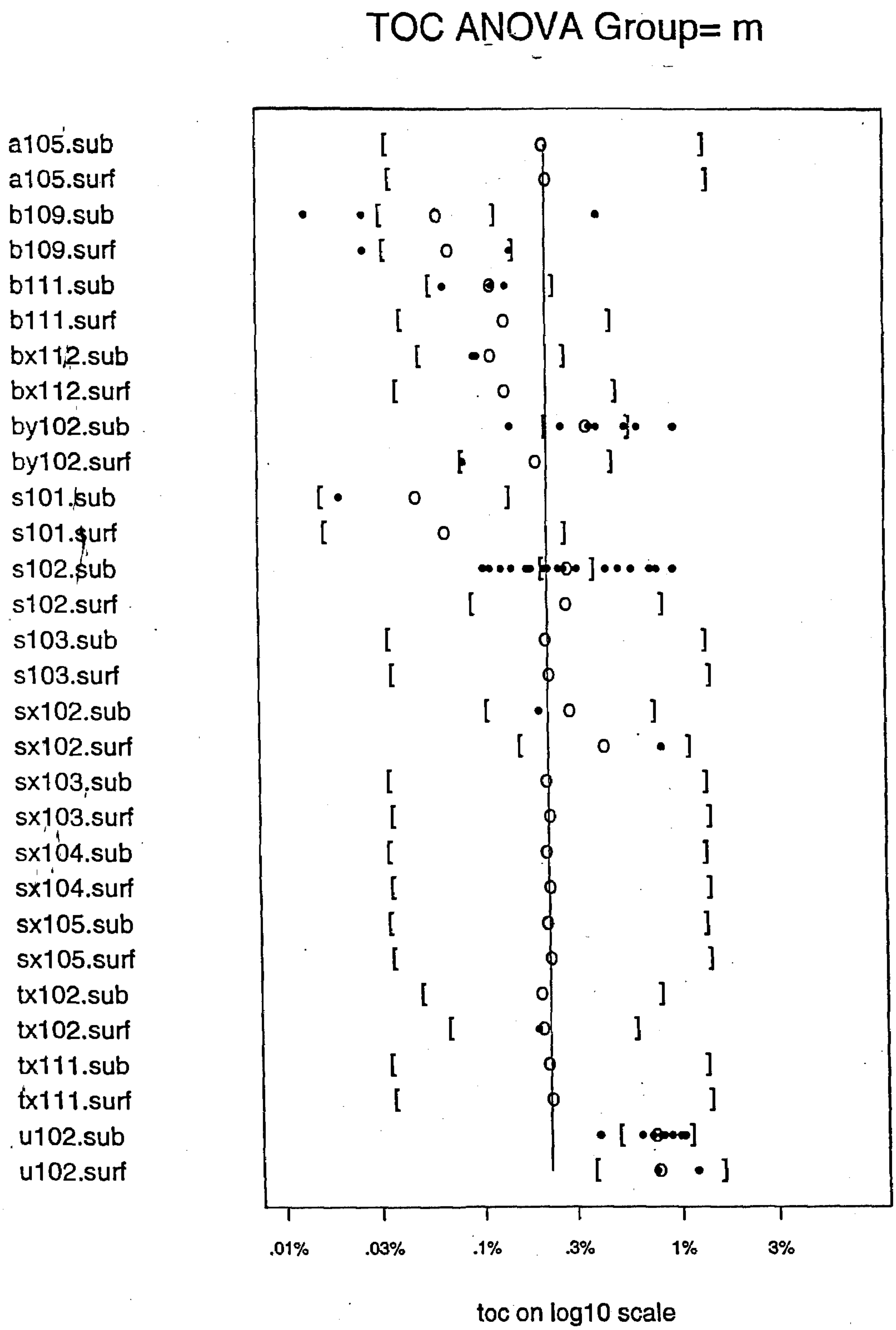


Figure F-5: TOC ANOVA Results

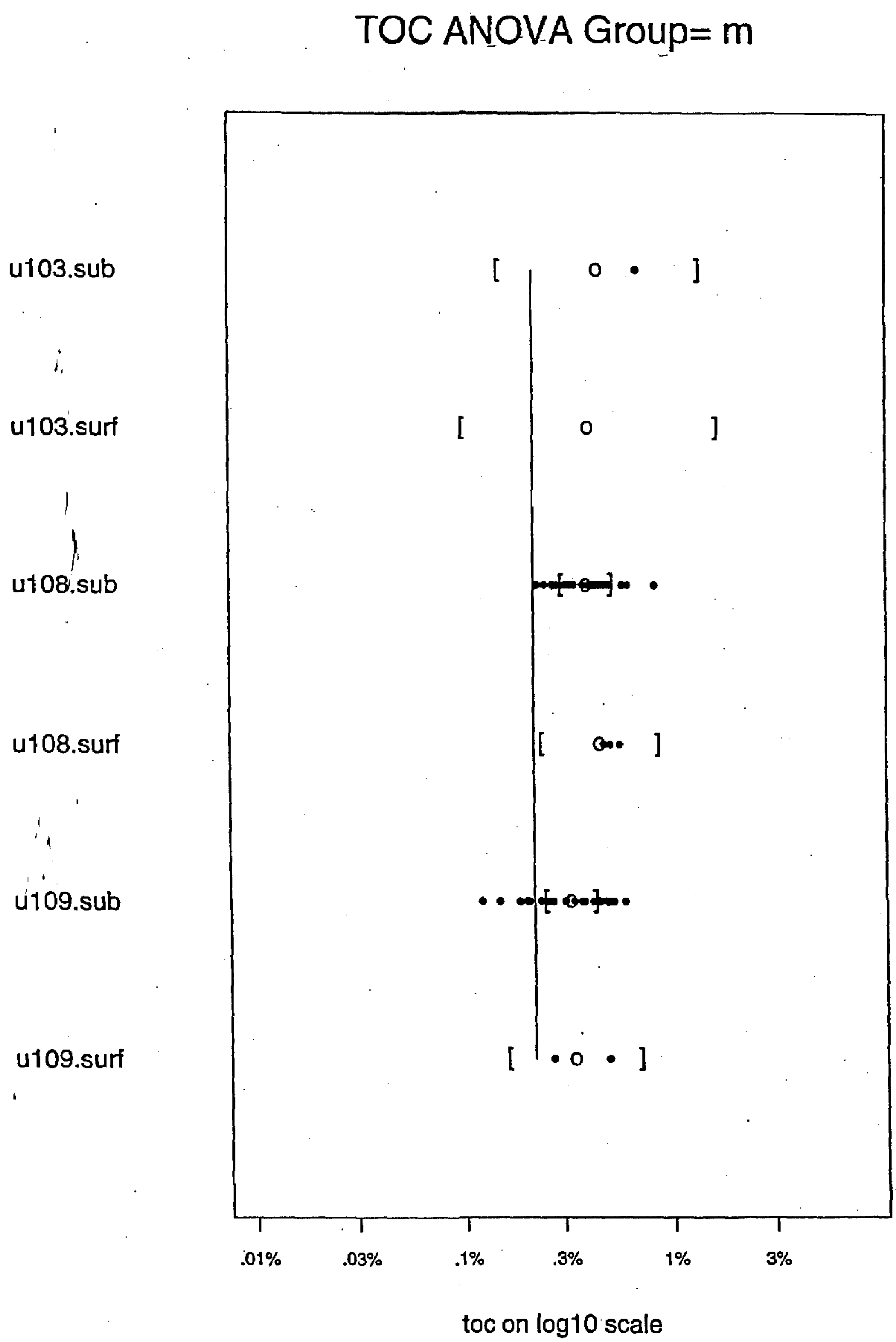


Figure F-5: TOC ANOVA Results

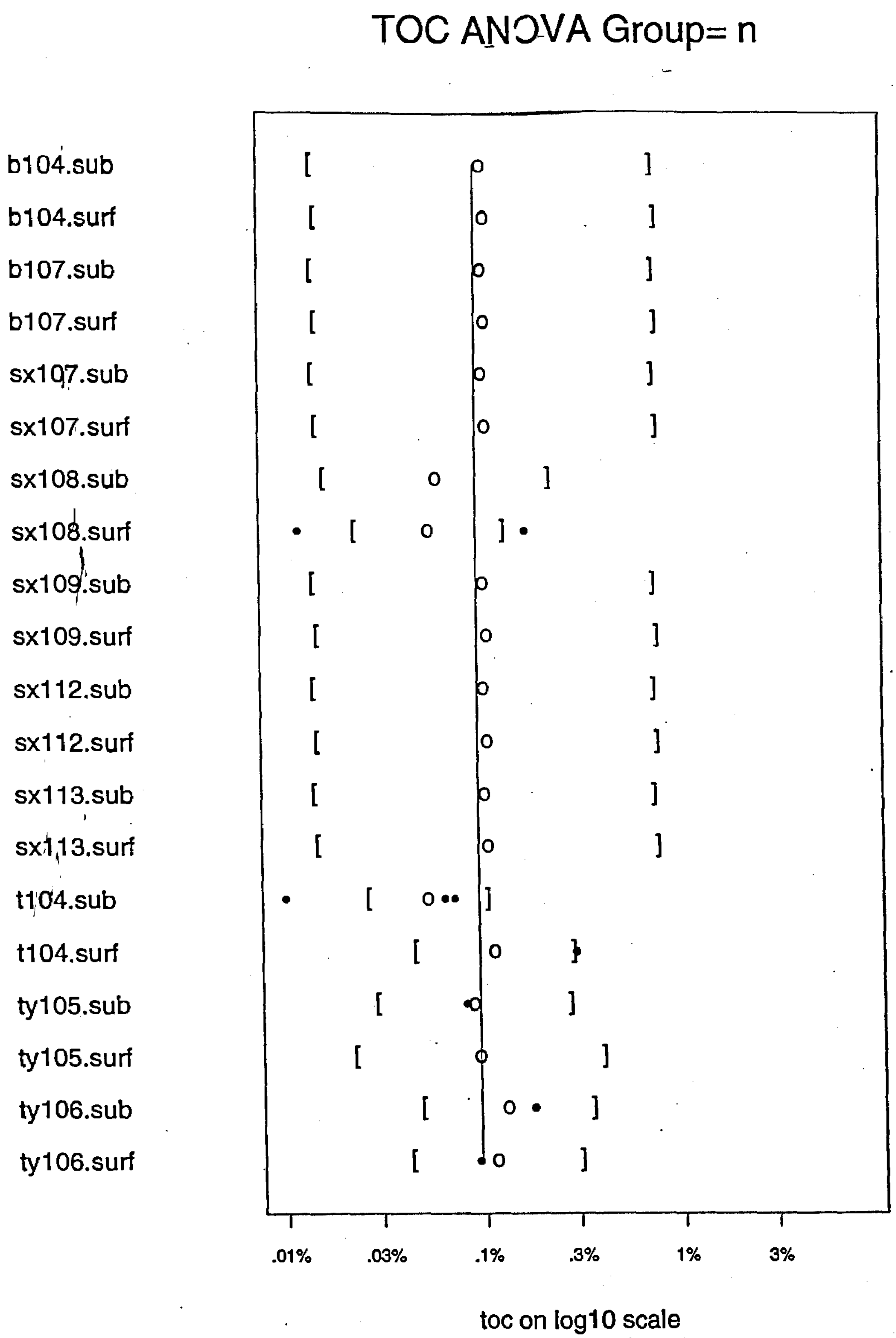
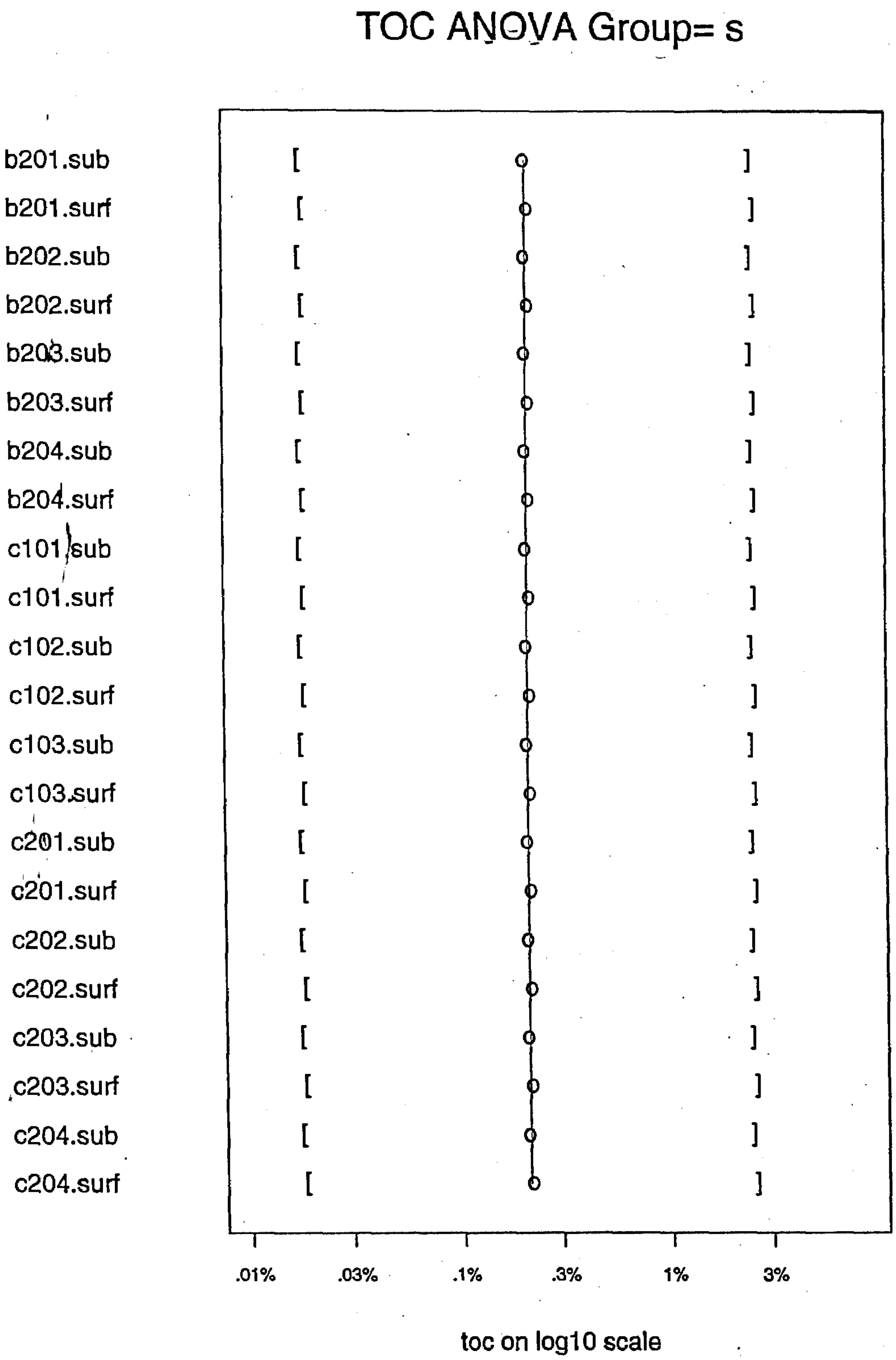


Figure F-5: TOC ANOVA Results



4.3 CALCULATION OF COMBUSTIBLE WASTE FRACTIONS

The ANOVA results are used to calculate the current fraction of combustible waste and the dry fraction of combustible waste. These fractions are then used to screen tanks into *safe*, *unsafe*, and *conditionally safe* categories as described earlier. Table F-6 presents best estimates (medians) for these fractions as well as upper 95% bounds.

Figure F-6 presents the upper bounds on the current and dry combustible waste fractions for each relevant tank. The 5% screening thresholds are also plotted on the Figure; Safe tanks reside in the lower left-hand region defined by the 5% thresholds, conditionally safe tanks reside in the upper left-hand region, and unsafe tanks reside in the upper right-hand region. As one can see from the figure, only one tank (ax102) is classified as unsafe. The reader should note that this screening is a first step in final categorization of the tanks. The final categorizations of the tanks may be changed because of other information. Section 4.0 utilizes this screening information to obtain a final categorization.

The combustible waste fractions are also presented in Table F-6, for the reader's reference. The last column in the table presents the tank's status (s-*safe*, c-*conditionally safe*, u-*unsafe*), according to the screening calculations.

Table F-6: Combustible Waste Fractions

Tank	H20 # Obs	TOC # Obs	grp	Current Median	Fraction Upper 95	Dry Median	Fraction Upper 95	class
a101	28	28	1/h	1.19e-08	1.55e-07	1.07e-02	1.99e-02	s
a102	2	1	3/h	3.44e-05	5.15e-03	8.57e-02	2.87e-01	c
a103	1	1	3/h	1.02e-06	3.86e-04	3.51e-02	2.27e-01	c
a104	0	0	2/l	9.51e-11	9.85e-06	1.02e-03	3.53e-02	s
a105	0	0	2/m	5.41e-11	4.77e-05	9.64e-04	9.29e-02	c
a106	1	1	1/h	8.93e-07	3.71e-04	3.52e-02	1.84e-01	c
ax101	0	0	1/h	2.24e-06	5.71e-03	1.32e-02	3.31e-01	c
ax102	2	2	1/h	6.86e-03	7.39e-02	4.54e-01	7.26e-01	u
ax103	0	0	1/h	5.88e-06	6.70e-03	2.25e-02	2.97e-01	c
ax104	0	0	2/l	1.68e-12	5.65e-06	3.85e-04	3.66e-02	s
b101	4	0	1/l	1.13e-10	3.36e-06	5.84e-04	2.72e-02	s
b102	1	0	3/l	2.52e-09	4.56e-05	1.79e-04	1.67e-02	s
b103	2	1	1/l	2.14e-14	9.46e-10	3.94e-04	6.80e-03	s
b104	14	0	2/n	5.79e-14	1.44e-08	8.12e-04	2.16e-02	s

Tank	H20 # Obs	TOC # Obs	grp	Current Median	Fraction Upper 95	Dry Median	Fraction Upper 95	class
b105	0	0	1/l	2.39e-10	9.35e-06	5.57e-04	3.45e-02	s
b106	4	4	1/l	1.90e-17	1.74e-13	5.61e-04	2.06e-03	s
b107	0	0	2/n	2.27e-12	1.12e-06	3.72e-04	2.32e-02	s
b108	2	0	1/l	7.16e-11	3.86e-06	8.85e-04	2.97e-02	s
b109	5	5	1/m	2.30e-17	2.04e-13	6.97e-05	3.30e-04	s
b110	0	1	4/l	1.31e-15	1.37e-10	1.42e-04	2.42e-03	s
b111	8	3	4/m	2.32e-15	4.27e-11	2.04e-03	7.53e-03	s
b112	2	0	3/l	2.30e-11	2.39e-06	1.56e-03	3.80e-02	s
b201	0	0	4/s	1.12e-09	4.18e-04	3.43e-03	2.07e-01	c
b202	0	0	4/s	9.31e-10	3.70e-04	3.22e-03	2.00e-01	c
b203	0	0	4/s	8.74e-10	1.76e-04	2.77e-03	1.84e-01	c
b204	0	0	4/s	9.69e-10	3.70e-04	2.69e-03	2.09e-01	c
bx101	2	0	2/l	5.39e-09	6.97e-05	1.55e-04	1.50e-02	s
bx102	0	0	2/l	1.03e-10	9.77e-06	1.21e-03	3.92e-02	s
bx103	4	0	4/l	6.67e-13	3.37e-08	3.65e-03	5.73e-02	c
bx104	4	4	4/h	7.80e-10	1.69e-07	1.99e-02	5.94e-02	c
bx105	2	1	4/h	5.29e-07	3.32e-04	8.73e-04	2.06e-02	s
bx106	2	1	3/l	1.09e-08	1.06e-05	7.53e-03	6.15e-02	c
bx107	13	5	2/l	1.30e-16	2.03e-12	3.52e-04	1.13e-03	s
bx108	2	0	2/l	2.88e-09	8.62e-05	1.45e-04	1.31e-02	s
bx109	8	2	2/l	2.77e-17	3.21e-13	4.53e-04	2.65e-03	s
bx110	2	2	4/l	2.20e-08	1.32e-05	1.12e-03	2.49e-02	s
bx111	1	1	1/l	1.41e-14	3.22e-10	3.58e-04	4.13e-03	s
bx112	6	2	2/m	6.62e-16	7.75e-12	2.70e-03	1.12e-02	s
by101	0	0	1/l	2.28e-10	1.34e-05	4.46e-04	2.62e-02	s
by102	8	8	1/m	1.33e-08	5.81e-07	2.36e-03	9.57e-03	s
by103	2	0	1/l	1.19e-09	3.21e-05	1.37e-04	1.68e-02	s
by104	12	10	1/l	7.40e-06	1.05e-04	1.04e-02	3.13e-02	s
by105	3	3	1/l	2.31e-09	5.27e-07	5.32e-05	6.61e-04	s

Tank	H20 # Obs	TOC # Obs	grp	Current Median	Fraction Upper 95	Dry Median	Fraction Upper 95	class
by106	21	21	1/l	1.84e-09	3.55e-08	3.45e-04	1.22e-03	s
by107	8	8	1/l	3.34e-10	1.98e-08	6.81e-03	2.36e-02	s
by108	9	9	2/l	6.21e-08	1.90e-06	4.40e-03	1.70e-02	s
by109	0	0	1/l	1.65e-10	1.46e-05	4.32e-04	2.96e-02	s
by110	24	24	1/l	3.09e-07	3.54e-06	2.31e-03	5.75e-03	s
by111	12	12	1/l	3.25e-07	9.18e-06	4.64e-03	1.43e-02	s
by112	12	12	1/l	1.04e-08	3.03e-07	7.84e-04	3.30e-03	s
c101	0	0	2/s	7.65e-09	1.35e-03	3.91e-03	1.59e-01	c
c102	0	0	2/s	6.15e-09	4.46e-04	2.71e-03	1.84e-01	c
c103	0	0	4/s	2.37e-09	6.50e-04	5.31e-03	1.89e-01	c
c104	10	10	2/h	1.38e-07	6.00e-06	9.92e-02	1.92e-01	c
c105	6	1	2/h	3.28e-07	8.70e-05	3.01e-02	1.52e-01	c
c106	0	2	4/h	1.03e-09	3.36e-06	3.72e-03	2.97e-02	s
c107	10	0	2/h	1.99e-08	4.24e-05	4.65e-02	4.16e-01	c
c108	3	3	2/l	4.02e-12	1.48e-08	7.14e-05	2.24e-03	s
c109	4	3	4/l	2.95e-10	3.82e-07	1.50e-03	1.67e-02	s
c110	7	3	4/l	2.11e-19	6.84e-14	4.79e-04	1.95e-03	s
c111	3	1	2/l	4.71e-10	1.13e-06	2.96e-06	5.67e-04	s
c112	3	5	2/l	5.27e-10	1.52e-07	8.20e-03	2.83e-02	s
c201	0	0	2/s	6.79e-09	1.03e-03	3.74e-03	1.88e-01	c
c202	0	0	2/s	2.77e-11	5.39e-04	8.54e-04	2.11e-01	c
c203	0	0	2/s	7.77e-09	1.26e-03	4.17e-03	1.84e-01	c
c204	0	0	2/s	4.85e-09	1.05e-03	4.32e-03	1.98e-01	c
s101	16	1	3/m	1.81e-19	2.15e-13	8.34e-05	5.02e-04	s
s102	20	20	1/m	3.15e-08	1.20e-06	3.75e-04	1.38e-03	s
s103	0	0	3/m	2.71e-09	1.17e-04	2.09e-03	6.79e-02	c
s104	18	3	1/l	0.00e+00	4.65e-13	2.63e-05	3.32e-04	s
s105	0	0	1/l	1.68e-10	1.02e-05	4.82e-04	2.71e-02	s
s106	0	0	3/l	6.90e-11	9.54e-06	5.72e-04	3.39e-02	s

Tank	H20 # Obs	TOC # Obs	grp	Current Median	Fraction Upper 95	Dry Median	Fraction Upper 95	class
s107	24	14	4/h	1.15e-12	9.16e-11	6.22e-04	1.99e-03	s
s108	0	0	1/l	1.75e-10	1.06e-05	4.23e-04	2.83e-02	s
s109	6	6	1/l	1.99e-12	4.10e-10	2.70e-09	1.32e-07	s
s110	0	0	1/l	2.22e-10	1.89e-05	5.24e-04	2.44e-02	s
s111	12	12	3/l	1.58e-11	9.66e-10	1.17e-04	4.63e-04	s
s112	0	0	1/l	2.90e-10	1.72e-05	4.35e-04	2.76e-02	s
sx101	0	0	3/h	1.39e-06	5.46e-03	1.71e-02	3.44e-01	c
sx102	0	2	3/m	2.18e-08	1.12e-05	2.42e-03	3.86e-02	s
sx103	0	0	1/m	3.91e-09	1.43e-04	1.21e-03	6.48e-02	c
sx104	0	0	3/m	3.24e-09	4.48e-05	1.36e-03	7.48e-02	c
sx105	0	0	3/m	2.14e-09	9.07e-05	1.43e-03	7.52e-02	c
sx106	0	0	3/h	2.31e-06	5.80e-03	1.65e-02	3.33e-01	c
sx107	0	0	2/n	1.59e-12	2.76e-06	4.26e-04	1.78e-02	s
sx108	2	2	1/n	1.88e-11	7.64e-08	6.89e-10	1.05e-06	s
sx109	0	0	1/n	7.76e-12	3.59e-06	2.21e-04	1.71e-02	s
sx110	0	0	1/l	4.51e-10	1.70e-05	8.28e-04	3.02e-02	s
sx111	0	0	1/l	4.86e-10	1.57e-05	7.14e-04	3.23e-02	s
sx112	0	0	1/n	6.32e-12	3.81e-06	2.39e-04	1.73e-02	s
sx113	2	0	2/n	8.30e-14	1.09e-07	8.32e-04	2.19e-02	s
sx114	0	0	1/l	2.59e-10	1.35e-05	6.56e-04	2.92e-02	s
sx115	0	0	1/l	9.03e-12	8.46e-06	1.92e-04	2.42e-02	s
t101	0	0	2/l	1.11e-10	1.02e-05	1.24e-03	3.78e-02	s
t102	0	1	4/l	3.44e-15	6.42e-09	1.95e-04	8.77e-03	s
t103	0	0	4/l	2.33e-11	3.36e-06	1.12e-03	3.83e-02	s
t104	18	4	4/n	2.56e-17	3.29e-13	4.35e-04	1.39e-03	s
t105	3	5	2/l	1.49e-11	9.31e-09	5.21e-03	1.67e-02	s
t106	2	0	2/l	1.05e-10	2.85e-05	1.97e-05	1.02e-02	s
t107	13	9	4/l	3.94e-14	7.38e-11	1.34e-04	4.25e-04	s
t108	2	0	1/l	9.94e-08	5.26e-04	2.47e-05	8.01e-03	s

Tank	H20 # Obs	TOC # Obs	grp	Current Median	Fraction Upper 95	Dry Median	Fraction Upper 95	class
t109	2	0	1/l	6.79e-11	2.95e-06	1.47e-03	3.80e-02	s
t110	0	0	4/l	3.01e-11	2.28e-06	1.08e-03	4.50e-02	s
t111	17	3	4/l	9.86e-14	5.95e-11	2.06e-02	5.80e-02	c
t112	0	0	4/l	2.68e-11	4.38e-06	1.74e-03	4.82e-02	s
t201	0	0	2/l	6.50e-11	4.59e-06	7.33e-04	4.04e-02	s
t202	0	0	2/l	8.88e-11	6.86e-06	9.33e-04	3.58e-02	s
t203	0	0	2/l	5.23e-11	3.21e-06	6.88e-04	5.03e-02	c
t204	1	1	2/l	4.11e-10	1.49e-06	1.95e-02	1.37e-01	c
tx101	0	0	2/l	1.20e-10	1.05e-05	1.13e-03	3.68e-02	s
tx102	1	1	1/m	5.63e-11	5.41e-07	1.70e-03	3.29e-02	s
tx103	0	0	1/l	2.72e-10	2.14e-05	6.46e-04	2.87e-02	s
tx104	0	0	1/h	8.53e-06	1.15e-02	2.68e-02	2.79e-01	c
tx105	0	0	1/l	1.56e-10	8.01e-06	4.12e-04	3.14e-02	s
tx106	0	0	1/l	1.50e-10	1.35e-05	4.14e-04	3.35e-02	s
tx107	1	0	1/l	1.01e-09	1.88e-05	4.07e-04	2.24e-02	s
tx108	0	0	1/l	2.40e-10	2.77e-05	7.23e-04	2.72e-02	s
tx109	0	0	2/l	5.07e-11	7.43e-06	8.23e-04	3.72e-02	s
tx110	0	0	1/l	2.25e-10	1.53e-05	4.61e-04	2.54e-02	s
tx111	0	0	1/m	5.00e-09	8.57e-05	1.39e-03	7.43e-02	c
tx112	0	0	1/l	1.42e-10	1.02e-05	4.61e-04	3.02e-02	s
tx113	0	0	1/l	1.92e-10	1.43e-05	4.37e-04	3.28e-02	s
tx114	0	0	1/l	1.98e-10	9.33e-06	4.31e-04	2.94e-02	s
tx115	0	0	1/l	1.92e-10	2.09e-05	4.27e-04	3.18e-02	s
tx116	0	0	1/l	1.78e-10	1.12e-05	4.15e-04	2.68e-02	s
tx117	0	0	1/l	1.54e-10	1.12e-05	4.54e-04	3.25e-02	s
tx118	0	1	1/l	5.88e-07	4.35e-04	7.49e-03	1.17e-01	c
ty101	0	1	2/l	2.39e-13	1.26e-08	2.35e-04	4.18e-03	s
ty102	1	2	1/l	1.50e-14	1.62e-10	6.64e-04	4.29e-03	s
ty103	2	2	1/l	3.00e-14	1.67e-10	9.16e-04	6.52e-03	s

Tank	H20 # Obs	TOC # Obs	grp	Current Median	Fraction Upper 95	Dry Median	Fraction Upper 95	class
ty104	2	2	4/l	1.13e-10	2.51e-07	9.41e-03	5.19e-02	c
ty105	1	1	2/n	2.53e-14	1.22e-09	2.35e-04	3.36e-03	s
ty106	4	2	2/n	2.05e-14	2.05e-10	1.76e-04	2.21e-03	s
u101	0	0	4/l	1.21e-11	2.42e-06	8.03e-04	4.67e-02	s
u102	12	12	3/m	1.79e-06	2.57e-05	3.37e-02	7.70e-02	c
u103	1	1	3/m	1.23e-05	1.57e-03	1.74e-03	3.50e-02	s
u104	0	0	2/l	1.01e-10	9.48e-06	1.14e-03	3.34e-02	s
u105	22	23	3/h	5.89e-05	3.38e-04	6.68e-02	1.18e-01	c
u106	10	10	3/h	1.35e-04	1.23e-03	3.12e-01	4.89e-01	c
u107	9	9	3/h	1.16e-09	6.34e-08	2.54e-04	1.14e-03	s
u108	27	27	3/m	1.06e-08	1.20e-07	5.84e-03	1.17e-02	s
u109	26	26	3/m	5.48e-08	6.39e-07	8.75e-04	2.34e-03	s
u110	6	6	2/l	1.26e-11	3.90e-08	8.27e-09	1.04e-05	s
u111	1	1	1/h	2.22e-07	3.08e-04	1.72e-02	2.05e-01	c
u112	0	0	4/l	4.22e-11	2.36e-06	1.80e-03	4.90e-02	s
u201	2	0	4/l	1.93e-12	1.40e-07	3.45e-03	5.48e-02	c
u202	2	0	4/l	1.27e-11	5.23e-07	2.08e-03	4.51e-02	s
u203	1	0	4/l	8.89e-11	6.30e-06	8.45e-04	3.01e-02	s
u204	2	2	4/l	0.00e+00	2.04e-15	1.27e-04	7.25e-04	s

Figure F-6: Combustible Waste Fractions

5.0 VALIDATION OF THE ANOVA MODEL

The ANOVA modeling results presented previously in this appendix should produce reasonable predictions of TOC and moisture in unsampled tanks. "Reasonable" in this context means that the predictions and actual values agree within the limits of uncertainty produced by the ANOVA model. In the near future, data from eight previously unsampled tanks will become available and this data could be used to "validate" the predictions made by the ANOVA model. This section discusses how such a validation might be accomplished.

The tanks that are being considered for this validation exercise are: BY111, BY112, S106, T110, T112, T201, T202 and T203. In the previous section, the median estimates of TOC in the top and bottom layers of these tanks were given, along with associated standard errors. These results are summarized below for the tanks of interest.

Table F-7. Tank TOC Estimates for Validation of the ANOVA Model.

	Top Layer		Top Layer	
	Median	Std Err.	Median	Std Err.
Tank	$\hat{\mu}_{i1}$	S_{i1}	$\hat{\mu}_{i2}$	S_{i2}
by111	-0.824	0.371	-0.875	0.370
by112	-0.824	0.371	-0.875	0.370
s106	-0.824	0.371	-0.875	0.370
t110	-0.615	0.374	-0.665	0.373
t112	-0.824	0.371	-0.875	0.370
t201	-0.615	0.374	-0.665	0.373
t202	-0.615	0.374	-0.665	0.373
t203	-0.615	0.374	-0.665	0.373

Note: Values are given in Log_{10}(Wt %)

5.1 A CHI-SQUARED VALIDATION TEST

In mathematical terms, the ANOVA has produced predictions $\hat{\mu}_{ij}$ for each layer *j* in each of the *i* tanks listed above, as well as the associated standard errors S_{ij}. The sampling data that will soon be available can be averaged together (on the log scale) to form data-derived estimates for each of the layers, which we denote by X_{ij}. Each of these averages will have a standard error given by:

$$Stderr(X_{ij}) = \sigma_E/\sqrt{N_{ij}} \qquad \text{(F-30)}$$

where N_{ij} represents the number of sample measurements averaged together to produce X_{ij} and σ_E is the within-layer standard deviation produced by the ANOVA ($\sigma_E^2 = 0.0867$).

The most standard test for X_{ij} versus $\hat{\mu}_{ij}$ uses a Chi-squared statistic that compares the distance between the predictions and data to their standard errors. This statistic has the form:

$$\chi^2 = \sum_{i,j} \frac{(X_{ij} - \hat{\mu}_{ij})^2}{S_{ij}^2 + \sigma_E^2/N_{ij}} \qquad \text{(F-31)}$$

If the two sets of estimates are the same, we would expect this statistic to have a Chi-squared distribution with 16 degrees of freedom. If there are significant differences between the ANOVA predictions and data-derived estimates, the statistic will be much larger than a chi-squared variate. A 5% critical value for this statistic is 26.3, so if the calculated statistic is above 26.3, one would conclude that the ANOVA predictions are not entirely satisfactory.

5.2 PREDICTION INTERVAL TEST

The Chi-squared statistic compares all 16 predictions with the data-derived estimates in one calculation. One may also desire to individually check each prediction. To accomplish this, we can use the ANOVA estimates to produce a 95% prediction interval for the X_{ij}. This prediction interval is given by:

$$\hat{\mu}_{ij} \pm 1.96\sqrt{S_{ij}^2 + \sigma_E^2/N_{ij}} \qquad \text{(F-32)}$$

When X_{ij} falls within this interval, the ANOVA prediction can be considered a success; if not, it is suspect. Since these are 95% prediction intervals, one would expect about 5% of the prediction intervals to fail, even when there is nothing wrong with the model, so it would not be unusual to see one or two failures among 16 prediction intervals. However, more than 3 prediction interval failures would be considered significant.

6.0 RAW DATA FOR INDIVIDUAL TANK

This section presents all available moisture and TOC data for the Single-Shell Tanks, Table F-8 . The raw data is organized by sampled locations, which have been averaged together to form a best estimate of (H_2O,TOC) at that location. "Sampled locations" are generally equivalent to core segments. However, data points with missing core or segment information are averaged by layers. Typically only a portion of the data is used in the analysis. Due to space limitations, all information associated with each data point has not been printed out. The fields presented are:

Tank: SST farm and tank number, 241- usually precedes tank designation but is not shown in the table.

Riser: Riser ID used for sampling event.

Segment: Segment of a core sample. It ranges from 1 to 23, 1 being the top segment. Segment number 99 indicates a data quality problem. Segment number 999 indicates a core composite. Core composite sample results were assigned to the sub-surface layer. Auger and grab samples were assigned 1 as segment number.

TOC: TOC in weight %.

H_2O: H_2O in weight %.

Date: date of sampling.

Method: This indicates the method of sampling (e.g., push-mode core, grab, auger).

Subdivision: This indicates what subsegment the sample comes from.

Status: This indicates whether a data point is used in ANOVA or not: "use" means used in ANOVA, "del.***" means deleted from use in ANOVA, where "***" indicates the reason for the deletion.

Solid frac: Indicates the mass fraction of waste in a segment that was solid.

Liquid frac: Indicates the mass fraction of waste in a segment that was liquid.

Although the H_2O and TOC measurements are actually paired by sample, most of the data in this database does not exist as pairs. An entry in the "Data From Tank" portion will typically contain an H_2O or a TOC measurement, but not both. The data is recorded this way because the principal source of this data TCD (the Tank Characterization Database) reports the H_2O separately from the TOC.

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
a101	15	1	NA	30.15	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	1	NA	29.94	960718	NA	upper.1/2	del.repl	NA	NA
a101	15	1	NA	31.89	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	1	0.356	NA	960718	NA	upper.1/2	del.repl	NA	NA
a101	15	1	0.555	NA	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	1	0.376	NA	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	1	NA	29.94	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	1	NA	28.36	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	1	0.356	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	1	0.378	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	1	NA	31.89	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	1	NA	32.93	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	1	0.555	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	1	0.543	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	2	NA	26.61	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	2	NA	32.42	960718	NA	upper.1/2	del.repl	NA	NA
a101	15	2	0.574	NA	960718	NA	upper.1/2	del.repl	NA	NA
a101	15	2	0.677	NA	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	2	0.409	NA	960718	NA	upper.1/2	del.repl	NA	NA
a101	15	2	NA	32.42	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	2	NA	32.64	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	2	0.574	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	2	0.565	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	2	NA	26.61	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	2	NA	30.15	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	2	NA	30.7	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	2	NA	37.05	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	2	0.599	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	2	0.644	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	3	NA	32.98	960718	NA	upper.1/2	del.repl	NA	NA
a101	15	3	NA	33.48	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	3	0.563	NA	960718	NA	upper.1/2	del.repl	NA	NA
a101	15	3	0.419	NA	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	3	NA	32.98	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	3	NA	30.59	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	3	0.563	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	3	0.775	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	3	0.537	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	3	NA	33.48	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	3	NA	33.86	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	3	0.419	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	3	0.548	NA	960711	push_mode	lower.1/2	use.new	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
a101	15	4	NA	36.88	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	4	NA	35.61	960718	NA	upper.1/2	del.repl	NA	NA
a101	15	4	NA	33.13	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	4	0.672	NA	960718	NA	upper.1/2	del.repl	NA	NA
a101	15	4	0.642	NA	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	4	0.64	NA	960718	NA	upper.1/2	del.repl	NA	NA
a101	15	4	0.541	NA	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	4	NA	35.61	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	4	NA	33.4	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	4	0.672	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	4	0.671	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	4	NA	33.13	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	4	NA	36.88	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	4	NA	22.39	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	4	NA	34.3	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	4	0.642	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	4	0.594	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	5	0.509	NA	960718	NA	upper.1/2	del.repl	NA	NA
a101	15	5	0.388	NA	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	5	0.765	NA	960718	NA	upper.1/2	del.repl	NA	NA
a101	15	5	0.69	NA	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	6	NA	33.51	960718	NA	upper.1/2	del.repl	NA	NA
a101	15	6	NA	31.39	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	6	0.561	NA	960718	NA	upper.1/2	del.repl	NA	NA
a101	15	6	0.356	NA	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	6	0.716	NA	960718	NA	upper.1/2	del.repl	NA	NA
a101	15	6	0.657	NA	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	6	NA	33.51	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	6	NA	34.52	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	6	0.509	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	6	0.707	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	6	0.402	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	6	NA	31.39	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	6	NA	24.75	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	6	0.388	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	6	0.56	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	7	NA	36.35	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	7	NA	33.37	960718	NA	upper.1/2	del.repl	NA	NA
a101	15	7	0.587	NA	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	7	NA	33.37	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	7	NA	41.54	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	7	0.561	NA	960711	push_mode	upper.1/2	use.new	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
a101	15	7	0.592	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	7	NA	36.35	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	7	NA	35.7	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	7	0.356	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	7	0.547	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	8	1.02	NA	960718	NA	upper.1/2	del.repl	NA	NA
a101	15	8	0.973	NA	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	9	NA	30.94	960718	NA	upper.1/2	del.repl	NA	NA
a101	15	9	NA	26.43	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	9	0.808	NA	960718	NA	upper.1/2	del.repl	NA	NA
a101	15	9	0.926	NA	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	9	NA	30.94	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	9	NA	29.07	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	9	0.808	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	9	0.931	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	9	NA	26.43	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	9	NA	27.84	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	9	0.926	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	9	1.52	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	9	0.906	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	10	NA	38.81	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	10	NA	37.34	960718	NA	upper.1/2	del.repl	NA	NA
a101	15	10	1.22	NA	960718	NA	upper.1/2	del.repl	NA	NA
a101	15	10	1.01	NA	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	10	1.07	NA	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	10	0.254	NA	960718	NA	upper.1/2	del.repl	NA	NA
a101	15	10	NA	37.34	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	10	NA	38.62	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	10	1.22	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	10	1.28	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	15	10	NA	38.81	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	10	NA	38.5	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	10	1.01	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	10	1.01	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	15	11	NA	93.67	960718	NA	liner liquid	del.lin	NA	NA
a101	15	11	NA	93.67	960711	push_mode	total	del.lin	NA	NA
a101	15	11	NA	93.07	960711	push_mode	total	del.lin	NA	NA
a101	15	11	0.08077	NA	960711	push_mode	total	del.lin	NA	NA
a101	15	11	0.10923	NA	960711	push_mode	total	del.lin	NA	NA
a101	15	11	0.06131	NA	960711	push_mode	total	del.lin	NA	NA
a101	15	12	0.203	NA	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	13	NA	42.71	960718	NA	lower.1/2	del.repl	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
a101	15	13	NA	48.17	960718	NA	drainable	del.repl	NA	NA
a101	15	13	0.195	NA	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	13	NA	48.17	960711	push_mode	drainable	del.dr	0.22	0.78
a101	15	13	NA	48.14	960711	push_mode	drainable	del.dr	0.22	0.78
a101	15	13	0.29385	NA	960711	push_mode	drainable	del.dr	0.22	0.78
a101	15	13	0.29692	NA	960711	push_mode	drainable	del.dr	0.22	0.78
a101	15	13	NA	46.9688	960711	push_mode	lower.1/2	use.new	0.22	0.78
a101	15	13	NA	47.1434	960711	push_mode	lower.1/2	use.new	0.22	0.78
a101	15	13	0.272103	NA	960711	push_mode	lower.1/2	use.new	0.22	0.78
a101	15	13	0.2782376	NA	960711	push_mode	lower.1/2	use.new	0.22	0.78
a101	15	14	NA	45.7	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	14	NA	52.91	960718	NA	drainable	del.repl	NA	NA
a101	15	14	0.158	NA	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	14	NA	52.91	960711	push_mode	drainable	del.dr	0.17	0.83
a101	15	14	NA	52.87	960711	push_mode	drainable	del.dr	0.17	0.83
a101	15	14	0.27692	NA	960711	push_mode	drainable	del.dr	0.17	0.83
a101	15	14	0.27308	NA	960711	push_mode	drainable	del.dr	0.17	0.83
a101	15	14	NA	51.6843	960711	push_mode	lower.1/2	use.new	0.17	0.83
a101	15	14	NA	51.1887	960711	push_mode	lower.1/2	use.new	0.17	0.83
a101	15	14	0.2567036	NA	960711	push_mode	lower.1/2	use.new	0.17	0.83
a101	15	14	0.2541964	NA	960711	push_mode	lower.1/2	use.new	0.17	0.83
a101	15	15	NA	44.13	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	15	NA	45.54	960718	NA	drainable	del.repl	NA	NA
a101	15	15	0.146	NA	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	15	NA	45.54	960711	push_mode	drainable	del.dr	0.32	0.68
a101	15	15	NA	46.69	960711	push_mode	drainable	del.dr	0.32	0.68
a101	15	15	0.30692	NA	960711	push_mode	drainable	del.dr	0.32	0.68
a101	15	15	0.30539	NA	960711	push_mode	drainable	del.dr	0.32	0.68
a101	15	15	NA	45.0888	960711	push_mode	lower.1/2	use.new	0.32	0.68
a101	15	15	NA	45.0292	960711	push_mode	lower.1/2	use.new	0.32	0.68
a101	15	15	0.2554256	NA	960711	push_mode	lower.1/2	use.new	0.32	0.68
a101	15	15	0.2614252	NA	960711	push_mode	lower.1/2	use.new	0.32	0.68
a101	15	16	NA	46.36	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	16	NA	47.47	960718	NA	drainable	del.repl	NA	NA
a101	15	16	0.276	NA	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	16	NA	47.47	960711	push_mode	drainable	del.dr	0.31	0.69
a101	15	16	NA	47.95	960711	push_mode	drainable	del.dr	0.31	0.69
a101	15	16	0.25846	NA	960711	push_mode	drainable	del.dr	0.31	0.69
a101	15	16	0.22923	NA	960711	push_mode	drainable	del.dr	0.31	0.69
a101	15	16	NA	47.1259	960711	push_mode	lower.1/2	use.new	0.31	0.69
a101	15	16	NA	47.2866	960711	push_mode	lower.1/2	use.new	0.31	0.69
a101	15	16	0.2638974	NA	960711	push_mode	lower.1/2	use.new	0.31	0.69

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
a101	15	16	0.2338087	NA	960711	push_mode	lower.1/2	use.new	0.31	0.69
a101	15	17	NA	93.44	960718	NA	liner	del.lin	NA	NA
a101	15	17	0.186	NA	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	17	NA	93.44	960711	push_mode	liner	del.lin	0	1
a101	15	17	NA	93.54	960711	push_mode	liner	del.lin	0	1
a101	15	17	0.031	NA	960711	push_mode	liner	del.lin	0	1
a101	15	17	0.12308	NA	960711	push_mode	liner	del.lin	0	1
a101	15	17	0.06931	NA	960711	push_mode	liner	del.lin	0	1
a101	15	18	NA	11.66	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	18	NA	15.66	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	18	NA	45.44	960718	NA	drainable	del.repl	NA	NA
a101	15	18	0.0079	NA	960718	NA	lower.1/2	del.repl	NA	NA
a101	15	18	NA	45.44	960711	push_mode	drainable	del.dr	0.26	0.74
a101	15	18	NA	46.4	960711	push_mode	drainable	del.dr	0.26	0.74
a101	15	18	0.28462	NA	960711	push_mode	drainable	del.dr	0.26	0.74
a101	15	18	0.29539	NA	960711	push_mode	drainable	del.dr	0.26	0.74
a101	15	18	NA	27.8744	960711	push_mode	lower.1/2	use.new	0.26	0.74
a101	15	18	NA	29.9544	960711	push_mode	lower.1/2	use.new	0.26	0.74
a101	15	18	NA	31.4656	960711	push_mode	lower.1/2	use.new	0.26	0.74
a101	15	18	NA	34.0396	960711	push_mode	lower.1/2	use.new	0.26	0.74
a101	15	18	0.2126728	NA	960711	push_mode	lower.1/2	use.new	0.26	0.74
a101	15	18	0.2439126	NA	960711	push_mode	lower.1/2	use.new	0.26	0.74
a101	15	18	0.0897	NA	960711	push_mode	lower.1/2	use.new	0.26	0.74
a101	15	19	NA	72.15	960718	NA	lower.1/2	del.lin	NA	NA
a101	15	19	NA	76.59	960718	NA	liner	del.lin	NA	NA
a101	15	19	0.13	NA	960718	NA	lower.1/2	del.lin	NA	NA
a101	15	19	NA	76.59	960711	push_mode	liner	del.lin	0.65	0.35
a101	15	19	NA	72.84	960711	push_mode	liner	del.lin	0.65	0.35
a101	15	19	0.14846	NA	960711	push_mode	liner	del.lin	0.65	0.35
a101	15	19	0.16769	NA	960711	push_mode	liner	del.lin	0.65	0.35
a101	15	19	NA	72.15	960711	push_mode	lower.1/2	del.lin	0.65	0.35
a101	15	19	NA	68.73	960711	push_mode	lower.1/2	del.lin	0.65	0.35
a101	15	19	0.13	NA	960711	push_mode	lower.1/2	del.lin	0.65	0.35
a101	15	19	0.117	NA	960711	push_mode	lower.1/2	del.lin	0.65	0.35
a101	15	999	NA	40.31	960718	NA	cc	del.repl	NA	NA
a101	15	999	0.447	NA	960718	NA	cc	del.repl	NA	NA
a101	15	999	0.447	NA	960711	push_mode	cc	del.cc	NA	NA
a101	24	1	NA	38.69	960725	NA	lower.1/2	del.repl	NA	NA
a101	24	1	NA	38.69	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	1	NA	37.71	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	1	0.376	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	1	0.363	NA	960711	push_mode	lower.1/2	use.new	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
a101	24	3	NA	34.1	960725	NA	lower.1/2	del.repl	NA	NA
a101	24	3	NA	29.49	960725	NA	upper.1/2	del.repl	NA	NA
a101	24	3	NA	29.49	960711	push_mode	upper.1/2	use.new	NA	NA
a101	24	3	NA	31.37	960711	push_mode	upper.1/2	use.new	NA	NA
a101	24	3	0.409	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	24	3	0.542	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	24	3	NA	34.1	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	3	NA	35.61	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	3	0.677	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	3	0.537	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	3	0.679	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	4	NA	29.72	960725	NA	upper.1/2	del.repl	NA	NA
a101	24	4	NA	25.83	960725	NA	lower.1/2	del.repl	NA	NA
a101	24	4	NA	29.72	960711	push_mode	upper.1/2	use.new	NA	NA
a101	24	4	NA	35.83	960711	push_mode	upper.1/2	use.new	NA	NA
a101	24	4	0.64	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	24	4	0.674	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	24	4	NA	25.83	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	4	NA	28.81	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	4	0.541	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	4	0.546	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	5	NA	37.2	960725	NA	upper.1/2	del.repl	NA	NA
a101	24	5	NA	30.65	960725	NA	lower.1/2	del.repl	NA	NA
a101	24	5	NA	37.2	960711	push_mode	upper.1/2	use.new	NA	NA
a101	24	5	NA	34.4	960711	push_mode	upper.1/2	use.new	NA	NA
a101	24	5	0.765	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	24	5	0.726	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	24	5	NA	30.65	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	5	NA	30.36	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	5	0.69	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	5	0.711	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	6	NA	31.18	960725	NA	upper.1/2	del.repl	NA	NA
a101	24	6	NA	33.74	960725	NA	lower.1/2	del.repl	NA	NA
a101	24	6	NA	31.18	960711	push_mode	upper.1/2	use.new	NA	NA
a101	24	6	NA	36.23	960711	push_mode	upper.1/2	use.new	NA	NA
a101	24	6	0.716	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	24	6	0.715	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	24	6	NA	33.74	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	6	NA	34.5	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	6	0.657	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	6	1.16	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	6	0.628	NA	960711	push_mode	lower.1/2	use.new	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
a101	24	7	NA	36.06	960725	NA	lower.1/2	del.repl	NA	NA
a101	24	7	NA	31.05	960725	NA	upper.1/2	del.repl	NA	NA
a101	24	7	NA	31.5	960711	push_mode	upper.1/2	use.new	NA	NA
a101	24	7	NA	34.4	960711	push_mode	upper.1/2	use.new	NA	NA
a101	24	7	0.665	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	24	7	0.576	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	24	7	NA	36.06	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	7	NA	31.05	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	7	0.587	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	7	0.557	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	8	NA	26.34	960725	NA	upper.1/2	del.repl	NA	NA
a101	24	8	NA	40.81	960725	NA	lower.1/2	del.repl	NA	NA
a101	24	8	NA	31.66	960725	NA	lower.1/2	del.repl	NA	NA
a101	24	8	NA	26.34	960711	push_mode	upper.1/2	use.new	NA	NA
a101	24	8	NA	32.32	960711	push_mode	upper.1/2	use.new	NA	NA
a101	24	8	1.02	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	24	8	0.937	NA	960711	push_mode	upper.1/2	use.new	NA	NA
a101	24	8	NA	31.66	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	8	NA	40.81	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	8	NA	29.55	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	8	NA	32.22	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	8	0.973	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	8	0.996	NA	960711	push_mode	lower.1/2	use.new	NA	NA
a101	24	10	NA	21.13	960725	NA	upper.1/2	del.repl	NA	NA
a101	24	10	NA	43.08	960725	NA	lower.1/2	del.repl	NA	NA
a101	24	10	NA	47.02	960725	NA	drainable	del.repl	NA	NA
a101	24	10	NA	43.9132	960711	push_mode	upper.1/2	use.new	0.06	0.52
a101	24	10	NA	43.2996	960711	push_mode	upper.1/2	use.new	0.06	0.52
a101	24	10	0.2579248	NA	960711	push_mode	upper.1/2	use.new	0.06	0.52
a101	24	10	0.231532	NA	960711	push_mode	upper.1/2	use.new	0.06	0.52
a101	24	10	NA	47.02	960711	push_mode	drainable	del.dr	0.48	0.52
a101	24	10	NA	46.95	960711	push_mode	drainable	del.dr	0.48	0.52
a101	24	10	0.25846	NA	960711	push_mode	drainable	del.dr	0.48	0.52
a101	24	10	0.22615	NA	960711	push_mode	drainable	del.dr	0.48	0.52
a101	24	10	NA	43.7104	960711	push_mode	lower.1/2	use.new	0.42	0.52
a101	24	10	NA	43.1952	960711	push_mode	lower.1/2	use.new	0.42	0.52
a101	24	10	0.9401536	NA	960711	push_mode	lower.1/2	use.new	0.42	0.52
a101	24	10	0.926584	NA	960711	push_mode	lower.1/2	use.new	0.42	0.52
a101	24	11	NA	46.61	960725	NA	lower.1/2	del.repl	NA	NA
a101	24	11	NA	47	960725	NA	drainable	del.repl	NA	NA
a101	24	11	NA	46.75	960725	NA	drainable	del.repl	NA	NA
a101	24	11	NA	46.75	960711	push_mode	drainable	del.dr	0.23	0.77

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
a101	24	11	NA	46.87	960711	push_mode	drainable	del.dr	0.23	0.77
a101	24	11	0.18462	NA	960711	push_mode	drainable	del.dr	0.23	0.77
a101	24	11	0.31692	NA	960711	push_mode	drainable	del.dr	0.23	0.77
a101	24	11	0.23	NA	960711	push_mode	drainable	use.dl	0.23	0.77
a101	24	11	NA	46.7178	960711	push_mode	lower.1/2	use.new	0.23	0.77
a101	24	11	NA	46.801	960711	push_mode	lower.1/2	use.new	0.23	0.77
a101	24	11	0.2224274	NA	960711	push_mode	lower.1/2	use.new	0.23	0.77
a101	24	11	0.3107284	NA	960711	push_mode	lower.1/2	use.new	0.23	0.77
a101	24	12	NA	45.89	960725	NA	lower.1/2	del.repl	NA	NA
a101	24	12	NA	47	960711	push_mode	drainable	del.dr	0.25	0.75
a101	24	12	NA	46.6	960711	push_mode	drainable	del.dr	0.25	0.75
a101	24	12	0.33462	NA	960711	push_mode	drainable	del.dr	0.25	0.75
a101	24	12	0.33154	NA	960711	push_mode	drainable	del.dr	0.25	0.75
a101	24	12	NA	46.7225	960711	push_mode	lower.1/2	use.new	0.25	0.75
a101	24	12	NA	45.965	960711	push_mode	lower.1/2	use.new	0.25	0.75
a101	24	12	0.301715	NA	960711	push_mode	lower.1/2	use.new	0.25	0.75
a101	24	12	0.297155	NA	960711	push_mode	lower.1/2	use.new	0.25	0.75
a101	24	13	NA	47.48	960725	NA	lower.1/2	del.repl	NA	NA
a101	24	13	NA	47.09	960725	NA	drainable	del.repl	NA	NA
a101	24	13	NA	47.09	960711	push_mode	drainable	del.dr	0.17	0.83
a101	24	13	NA	46.98	960711	push_mode	drainable	del.dr	0.17	0.83
a101	24	13	0.28462	NA	960711	push_mode	drainable	del.dr	0.17	0.83
a101	24	13	0.29692	NA	960711	push_mode	drainable	del.dr	0.17	0.83
a101	24	13	NA	47.1563	960711	push_mode	lower.1/2	use.new	0.17	0.83
a101	24	13	NA	46.9834	960711	push_mode	lower.1/2	use.new	0.17	0.83
a101	24	13	0.2675146	NA	960711	push_mode	lower.1/2	use.new	0.17	0.83
a101	24	13	0.2722836	NA	960711	push_mode	lower.1/2	use.new	0.17	0.83
a101	24	14	NA	41.33	960725	NA	lower.1/2	del.repl	NA	NA
a101	24	14	NA	46.02	960725	NA	drainable	del.repl	NA	NA
a101	24	14	NA	46.02	960711	push_mode	drainable	del.dr	0.19	0.81
a101	24	14	NA	46.25	960711	push_mode	drainable	del.dr	0.19	0.81
a101	24	14	0.31231	NA	960711	push_mode	drainable	del.dr	0.19	0.81
a101	24	14	0.32923	NA	960711	push_mode	drainable	del.dr	0.19	0.81
a101	24	14	NA	45.1289	960711	push_mode	lower.1/2	use.new	0.19	0.81
a101	24	14	NA	45.8624	960711	push_mode	lower.1/2	use.new	0.19	0.81
a101	24	14	0.2765311	NA	960711	push_mode	lower.1/2	use.new	0.19	0.81
a101	24	14	0.2906163	NA	960711	push_mode	lower.1/2	use.new	0.19	0.81
a101	24	15	NA	45.26	960725	NA	lower.1/2	del.repl	NA	NA
a101	24	15	NA	46.82	960725	NA	drainable	del.repl	NA	NA
a101	24	15	NA	46.82	960711	push_mode	drainable	del.dr	0.2	0.81
a101	24	15	NA	47.53	960711	push_mode	drainable	del.dr	0.2	0.81
a101	24	15	0.27615	NA	960711	push_mode	drainable	del.dr	0.2	0.81

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
a101	24	15	0.28692	NA	960711	push_mode	drainable	del.dr	0.2	0.81
a101	24	15	NA	46.508	960711	push_mode	lower.1/2	use.new	0.2	0.81
a101	24	15	NA	46.62	960711	push_mode	lower.1/2	use.new	0.2	0.81
a101	24	15	0.25452	NA	960711	push_mode	lower.1/2	use.new	0.2	0.81
a101	24	15	0.263736	NA	960711	push_mode	lower.1/2	use.new	0.2	0.81
a101	24	17	NA	44.1	960725	NA	lower.1/2	del.repl	NA	NA
a101	24	17	NA	46.46	960725	NA	drainable	del.repl	NA	NA
a101	24	17	NA	46.46	960711	push_mode	drainable	del.dr	0.16	0.84
a101	24	17	NA	46.41	960711	push_mode	drainable	del.dr	0.16	0.84
a101	24	17	0.35231	NA	960711	push_mode	drainable	del.dr	0.16	0.84
a101	24	17	0.35462	NA	960711	push_mode	drainable	del.dr	0.16	0.84
a101	24	17	NA	46.0824	960711	push_mode	lower.1/2	use.new	0.16	0.84
a101	24	17	NA	45.6916	960711	push_mode	lower.1/2	use.new	0.16	0.84
a101	24	17	0.3257004	NA	960711	push_mode	lower.1/2	use.new	0.16	0.84
a101	24	17	0.3241208	NA	960711	push_mode	lower.1/2	use.new	0.16	0.84
a101	24	18	NA	42.11	960725	NA	lower.1/2	del.repl	NA	NA
a101	24	18	NA	47.29	960725	NA	drainable	del.repl	NA	NA
a101	24	18	NA	47.29	960711	push_mode	drainable	del.dr	0.29	0.71
a101	24	18	NA	47.63	960711	push_mode	drainable	del.dr	0.29	0.71
a101	24	18	0.29154	NA	960711	push_mode	drainable	del.dr	0.29	0.71
a101	24	18	0.29308	NA	960711	push_mode	drainable	del.dr	0.29	0.71
a101	24	18	NA	45.7878	960711	push_mode	lower.1/2	use.new	0.29	0.71
a101	24	18	NA	47.4705	960711	push_mode	lower.1/2	use.new	0.29	0.71
a101	24	18	0.3151634	NA	960711	push_mode	lower.1/2	use.new	0.29	0.71
a101	24	18	0.3092968	NA	960711	push_mode	lower.1/2	use.new	0.29	0.71
a101	4	999	NA	40.31	960711	push_mode	cc	del.cc	NA	NA
a101	4	999	NA	39.73	960711	push_mode	cc	del.cc	NA	NA
a101	4	999	0.479	NA	960711	push_mode	cc	del.cc	NA	NA
a101	4	-4232	1.21	NA	800922	NA	supernate	del.sup	NA	NA
a101	4	-4231	NA	50.56	800922	NA	supernate	del.sup	NA	NA
a101	4	-4230	1.3218	NA	801022	NA	supernate	del.sup	NA	NA
a101	4	-4229	NA	46.1	801022	NA	supernate	del.sup	NA	NA
a101	4	-4228	1.45138	NA	791102	NA	supernate	del.sup	NA	NA
a101	na10	-4227	NA	50.25	791102	NA	supernate	del.sup	NA	NA
a101	na9	-4226	2.74387	NA	800822	NA	supernate	del.sup	NA	NA
a101	na8	-4225	NA	63.92	800822	NA	supernate	del.sup	NA	NA
a101	na7	-4224	3.36406	NA	800822	NA	supernate	del.sup	NA	NA
a101	na6	-4223	NA	65.86	800822	NA	supernate	del.sup	NA	NA
a101	na5	1	NA	44.78	960403	grab	supernate	del.sup	NA	NA
a101	na4	1	0.15067	NA	960403	grab	supernate	del.sup	NA	NA
a101	na3	1	NA	46.72	960403	grab	supernate	del.sup	NA	NA
a101	na2	1	NA	47.22	960403	grab	supernate	del.sup	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
a101	na1	1	0.38856	NA	960403	grab	supernate	del.sup	NA	NA
a101	15	1	0.4049	NA	960403	grab	supernate	del.sup	NA	NA
a101	15	1	NA	46.88	960403	grab	supernate	del.sup	NA	NA
a101	15	1	NA	47.15	960403	grab	supernate	del.sup	NA	NA
a102	19	1	NA	30.66	950607	auger	total	use	NA	NA
a102	19	1	NA	33.59	950607	auger	total	use	NA	NA
a102	5	1	NA	36.13	960321	auger	total	use	NA	NA
a102	5	1	NA	36.63	960321	auger	total	use	NA	NA
a102	5	1	1.01	NA	960321	auger	total	use	NA	NA
a102	5	1	1.46	NA	960321	auger	total	use	NA	NA
a102	5	1	1.79	NA	960321	auger	total	use	NA	NA
a103	NA	NA	0.804	NA	NA	NA	NA	use.old	NA	NA
a103	NA	NA	0.773	NA	NA	NA	NA	use.old	NA	NA
a103	NA	NA	NA	40.1	NA	NA	NA	use.old	NA	NA
a103	NA	NA	NA	40.3	NA	NA	NA	use.old	NA	NA
a106	NA	NA	0.623	NA	NA	NA	NA	use.old	NA	NA
a106	NA	NA	0.715	NA	NA	NA	NA	use.old	NA	NA
a106	NA	NA	NA	45.1	NA	NA	NA	use.old	NA	NA
a106	NA	NA	NA	43	NA	NA	NA	use.old	NA	NA
ax101	na12	-4234	1.10294	NA	801111	NA	supernate	del.sup	NA	NA
ax101	na11	-4233	NA	44.66	801111	NA	supernate	del.sup	NA	NA
ax102	3a	1	NA	28.01	950210	auger	total	use	NA	NA
ax102	3a	1	NA	29.57	950210	auger	total	use	NA	NA
ax102	3a	1	5.34	NA	950210	auger	total	use	NA	NA
ax102	3a	1	6.12	NA	950210	auger	total	use	NA	NA
ax102	9e	1	NA	31.12	950214	auger	total	use	NA	NA
ax102	9e	1	NA	33.3	950214	auger	total	use	NA	NA
ax102	9e	1	4.81	NA	950214	auger	total	use	NA	NA
ax102	9e	1	6.35	NA	950214	auger	total	use	NA	NA
ax102	na13	-4235	2.83	NA	881114	NA	supernate	del.sup	NA	NA
ax103	na14	-4236	2.8	NA	800924	NA	supernate	del.sup	NA	NA
b101	2	1	NA	18.74	950619	push_mode	total	use	NA	NA
b101	2	1	NA	18.75	950619	push_mode	total	use	NA	NA
b101	2	1	NA	23.25	950619	push_mode	total	use	NA	NA
b101	2	1	NA	23.45	950619	push_mode	total	use	NA	NA
b101	2	1	NA	33.07	950619	push_mode	upper.1/2	use	NA	NA
b101	2	1	NA	33.09	950619	push_mode	upper.1/2	use	NA	NA
b101	2	1	NA	41.51	950619	push_mode	lower.1/2	use	NA	NA
b101	2	1	NA	42.49	950619	push_mode	lower.1/2	use	NA	NA
b101	2	2	NA	11.54	950619	push_mode	upper.1/2	use	NA	NA
b101	2	2	NA	11.7	950619	push_mode	upper.1/2	use	NA	NA
b101	2	2	NA	13.57	950619	push_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
b101	2	2	NA	13.7	950619	push_mode	upper.1/2	use	NA	NA
b101	2	2	NA	14.69	950619	push_mode	upper.1/2	use	NA	NA
b101	2	2	NA	16.42	950619	push_mode	upper.1/2	use	NA	NA
b101	2	2	NA	18.75	950619	push_mode	lower.1/2	use	NA	NA
b101	2	2	NA	20.97	950619	push_mode	lower.1/2	use	NA	NA
b101	2	2	NA	40.78	950619	push_mode	upper.1/2	use	NA	NA
b101	2	2	NA	41.26	950619	push_mode	upper.1/2	use	NA	NA
b101	2	2	NA	47.58	950619	push_mode	lower.1/2	use	NA	NA
b101	2	2	NA	48.82	950619	push_mode	lower.1/2	use	NA	NA
b101	2	2	NA	49.41	950619	push_mode	drainable	use	NA	NA
b101	2	2	NA	49.63	950619	push_mode	drainable	use	NA	NA
b101	2	2	NA	50.6	950619	push_mode	lower.1/2	use	NA	NA
b101	2	2	NA	50.6	950619	push_mode	lower.1/2	use	NA	NA
b101	7	1	NA	33.48	950623	push_mode	upper.1/2	use	NA	NA
b101	7	1	NA	34.72	950623	push_mode	upper.1/2	use	NA	NA
b101	7	1	NA	41.68	950623	push_mode	lower.1/2	use	NA	NA
b101	7	1	NA	44.13	950623	push_mode	lower.1/2	use	NA	NA
b101	7	2	NA	9.2	950623	push_mode	lower.1/2	use	NA	NA
b101	7	2	NA	13.8	950623	push_mode	total	use	NA	NA
b101	7	2	NA	16.62	950623	push_mode	total	use	NA	NA
b101	7	2	NA	17.56	950623	push_mode	total	use	NA	NA
b101	7	2	NA	18	950623	push_mode	total	use	NA	NA
b101	7	2	NA	18.48	950623	push_mode	total	use	NA	NA
b101	7	2	NA	18.9	950623	push_mode	total	use	NA	NA
b101	7	2	NA	25.55	950623	push_mode	lower.1/2	use	NA	NA
b101	7	2	NA	26.79	950623	push_mode	lower.1/2	use	NA	NA
b101	7	2	NA	28.03	950623	push_mode	lower.1/2	use	NA	NA
b101	7	2	NA	28.44	950623	push_mode	lower.1/2	use	NA	NA
b101	7	2	NA	29.27	950623	push_mode	lower.1/2	use	NA	NA
b101	7	2	NA	38.58	950623	push_mode	upper.1/2	use	NA	NA
b101	7	2	NA	48.11	950623	push_mode	upper.1/2	use	NA	NA
b101	7	2	NA	48.83	950623	push_mode	upper.1/2	use	NA	NA
b101	7	2	NA	50.07	950623	push_mode	drainable	use	NA	NA
b101	7	2	NA	50.86	950623	push_mode	drainable	use	NA	NA
b102	1	1	NA	13.07	941016	auger	lower.1/2	use	NA	NA
b102	1	1	NA	15.15	941016	auger	lower.1/2	use	NA	NA
b102	1	1	NA	16.98	941016	auger	total	use	NA	NA
b102	1	1	NA	17.82	941016	auger	total	use	NA	NA
b102	1	1	NA	18.17	941016	auger	upper.1/2	use	NA	NA
b102	1	1	NA	22.83	941016	auger	upper.1/2	use	NA	NA
b103	7	1	NA	50.08	950524	auger	total	use	NA	NA
b103	7	1	NA	50.26	950524	auger	total	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
b103	7	1	0.0644	NA	950524	auger	total	use	NA	NA
b103	7	1	0.071	NA	950524	auger	total	use	NA	NA
b103	2	1	NA	38.76	950601	auger	total	use	NA	NA
b103	2	1	NA	40.31	950601	auger	total	use	NA	NA
b104	2	1	NA	42.34	950601	push_mode	total	use	NA	NA
b104	2	1	NA	48.98	950601	push_mode	total	use	NA	NA
b104	2	1	NA	49.9	950601	push_mode	drainable	use	NA	NA
b104	2	1	NA	51.68	950601	push_mode	drainable	use	NA	NA
b104	2	1	NA	61.19	950601	push_mode	total	use	NA	NA
b104	2	2	NA	40.9	950601	push_mode	upper.1/2	use	NA	NA
b104	2	2	NA	44.75	950601	push_mode	upper.1/2	use	NA	NA
b104	2	2	NA	49.14	950601	push_mode	lower.1/2	use	NA	NA
b104	2	2	NA	49.93	950601	push_mode	lower.1/2	use	NA	NA
b104	2	3	NA	40.79	950601	push_mode	upper.1/2	use	NA	NA
b104	2	3	NA	44.18	950601	push_mode	upper.1/2	use	NA	NA
b104	2	3	NA	46.69	950601	push_mode	lower.1/2	use	NA	NA
b104	2	3	NA	47.98	950601	push_mode	lower.1/2	use	NA	NA
b104	2	4	NA	28.08	950601	push_mode	upper.1/2	use	NA	NA
b104	2	4	NA	42.5	950601	push_mode	upper.1/2	use	NA	NA
b104	2	4	NA	43.64	950601	push_mode	upper.1/2	use	NA	NA
b104	2	4	NA	44.72	950601	push_mode	lower.1/2	use	NA	NA
b104	2	4	NA	46.69	950601	push_mode	lower.1/2	use	NA	NA
b104	2	5	NA	44.24	950601	push_mode	upper.1/2	use	NA	NA
b104	2	5	NA	48.39	950601	push_mode	lower.1/2	use	NA	NA
b104	2	5	NA	48.98	950601	push_mode	lower.1/2	use	NA	NA
b104	2	5	NA	49.84	950601	push_mode	upper.1/2	use	NA	NA
b104	2	6	NA	45.15	950601	push_mode	upper.1/2	use	NA	NA
b104	2	6	NA	46.11	950601	push_mode	upper.1/2	use	NA	NA
b104	2	6	NA	46.15	950601	push_mode	lower.1/2	use	NA	NA
b104	2	6	NA	46.26	950601	push_mode	lower.1/2	use	NA	NA
b104	2	7	NA	44.37	950601	push_mode	lower.1/2	use	NA	NA
b104	2	7	NA	44.64	950601	push_mode	lower.1/2	use	NA	NA
b104	2	7	NA	46.2	950601	push_mode	upper.1/2	use	NA	NA
b104	2	7	NA	47.65	950601	push_mode	upper.1/2	use	NA	NA
b104	7	1	NA	45.46	950609	push_mode	upper.1/2	use	NA	NA
b104	7	1	NA	46.64	950609	push_mode	upper.1/2	use	NA	NA
b104	7	1	NA	47.14	950609	push_mode	lower.1/2	use	NA	NA
b104	7	1	NA	47.84	950609	push_mode	lower.1/2	use	NA	NA
b104	7	1	NA	53.11	950609	push_mode	drainable	use	NA	NA
b104	7	1	NA	53.69	950609	push_mode	drainable	use	NA	NA
b104	7	2	NA	47.09	950609	push_mode	lower.1/2	use	NA	NA
b104	7	2	NA	47.16	950609	push_mode	lower.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
b104	7	2	NA	48.13	950609	push_mode	upper.1/2	use	NA	NA
b104	7	2	NA	48.32	950609	push_mode	upper.1/2	use	NA	NA
b104	7	3	NA	46.2	950609	push_mode	lower.1/2	use	NA	NA
b104	7	3	NA	47.55	950609	push_mode	upper.1/2	use	NA	NA
b104	7	3	NA	47.63	950609	push_mode	upper.1/2	use	NA	NA
b104	7	3	NA	47.93	950609	push_mode	lower.1/2	use	NA	NA
b104	7	4	NA	46.97	950609	push_mode	lower.1/2	use	NA	NA
b104	7	4	NA	47.23	950609	push_mode	lower.1/2	use	NA	NA
b104	7	4	NA	48.17	950609	push_mode	upper.1/2	use	NA	NA
b104	7	4	NA	48.24	950609	push_mode	upper.1/2	use	NA	NA
b104	7	5	NA	47.12	950609	push_mode	lower.1/2	use	NA	NA
b104	7	5	NA	47.4	950609	push_mode	lower.1/2	use	NA	NA
b104	7	5	NA	49.08	950609	push_mode	upper.1/2	use	NA	NA
b104	7	5	NA	49.8	950609	push_mode	upper.1/2	use	NA	NA
b104	7	6	NA	46.98	950609	push_mode	upper.1/2	use	NA	NA
b104	7	6	NA	47.07	950609	push_mode	upper.1/2	use	NA	NA
b104	7	6	NA	48.02	950609	push_mode	lower.1/2	use	NA	NA
b104	7	6	NA	50.27	950609	push_mode	lower.1/2	use	NA	NA
b104	7	7	NA	46.56	950609	push_mode	upper.1/2	use	NA	NA
b104	7	7	NA	46.62	950609	push_mode	upper.1/2	use	NA	NA
b104	7	7	NA	47.82	950609	push_mode	lower.1/2	use	NA	NA
b104	7	7	NA	47.88	950609	push_mode	lower.1/2	use	NA	NA
b106	2	1	NA	58.84	950714	push_mode	upper.1/2	use	NA	NA
b106	2	1	NA	59.52	950714	push_mode	upper.1/2	use	NA	NA
b106	2	1	NA	62.6	950714	push_mode	lower.1/2	use	NA	NA
b106	2	1	NA	63.52	950714	push_mode	lower.1/2	use	NA	NA
b106	2	1	NA	67.13	950714	push_mode	total	use	NA	NA
b106	2	1	NA	67.32	950714	push_mode	total	use	NA	NA
b106	2	1	0.0935	NA	950714	push_mode	lower.1/2	use	NA	NA
b106	2	1	0.125	NA	950714	push_mode	lower.1/2	use	NA	NA
b106	2	1	1.13	NA	950714	push_mode	upper.1/2	use	NA	NA
b106	2	1	1.21	NA	950714	push_mode	upper.1/2	use	NA	NA
b106	2	2	NA	55.98	950714	push_mode	lower.1/2	use	NA	NA
b106	2	2	NA	57.2	950714	push_mode	lower.1/2	use	NA	NA
b106	2	2	NA	59.13	950714	push_mode	upper.1/2	use	NA	NA
b106	2	2	NA	60.39	950714	push_mode	upper.1/2	use	NA	NA
b106	2	2	0.0246	NA	950714	push_mode	lower.1/2	use	NA	NA
b106	2	2	0.0254	NA	950714	push_mode	lower.1/2	use	NA	NA
b106	2	2	0.0273	NA	950714	push_mode	upper.1/2	use	NA	NA
b106	2	2	0.0286	NA	950714	push_mode	upper.1/2	use	NA	NA
b106	7	1	NA	62.34	950718	push_mode	upper.1/2	use	NA	NA
b106	7	1	NA	62.36	950718	push_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
b106	7	1	NA	63.13	950718	push_mode	lower.1/2	use	NA	NA
b106	7	1	NA	65.05	950718	push_mode	lower.1/2	use	NA	NA
b106	7	1	0.0278	NA	950718	push_mode	lower.1/2	use	NA	NA
b106	7	1	0.0299	NA	950718	push_mode	lower.1/2	use	NA	NA
b106	7	1	0.0644	NA	950718	push_mode	upper.1/2	use	NA	NA
b106	7	1	0.077	NA	950718	push_mode	upper.1/2	use	NA	NA
b106	7	2	NA	57.01	950718	push_mode	lower.1/2	use	NA	NA
b106	7	2	NA	57.08	950718	push_mode	lower.1/2	use	NA	NA
b106	7	2	NA	61.31	950718	push_mode	upper.1/2	use	NA	NA
b106	7	2	NA	61.45	950718	push_mode	upper.1/2	use	NA	NA
b106	7	2	0.0152	NA	950718	push_mode	lower.1/2	use	NA	NA
b106	7	2	0.0179	NA	950718	push_mode	lower.1/2	use	NA	NA
b106	7	2	0.0275	NA	950718	push_mode	upper.1/2	use	NA	NA
b106	7	2	0.0293	NA	950718	push_mode	upper.1/2	use	NA	NA
b106	7	2	0.0452	NA	950718	push_mode	upper.1/2	use	NA	NA
b108	3	1	NA	32.63	960904	push_mode	upper.1/2	use	NA	NA
b108	3	1	NA	34.1	960904	push_mode	lower.1/2	use	NA	NA
b108	3	1	NA	34.4	960904	push_mode	upper.1/2	use	NA	NA
b108	3	1	NA	34.68	960904	push_mode	lower.1/2	use	NA	NA
b108	3	1	NA	78.5	960904	push_mode	total	use	NA	NA
b108	3	1	NA	79.39	960904	push_mode	total	use	NA	NA
b108	3	2	NA	18.54	960904	push_mode	lower.1/2	use	NA	NA
b108	3	2	NA	20.12	960904	push_mode	lower.1/2	use	NA	NA
b108	3	1	NA	18.34	960904	push_mode	upper.1/2	use	NA	NA
b108	3	1	NA	18.38	960904	push_mode	upper.1/2	use	NA	NA
b108	3	1	NA	34.86	960904	push_mode	lower.1/2	use	NA	NA
b108	3	1	NA	36.85	960904	push_mode	lower.1/2	use	NA	NA
b108	3	2	NA	43.03	960904	push_mode	lower.1/2	use	NA	NA
b108	3	2	NA	44.53	960904	push_mode	lower.1/2	use	NA	NA
b109	7	1	NA	44.45	960823	push_mode	lower.1/2	use	NA	NA
b109	7	1	NA	44.79	960823	push_mode	lower.1/2	use	NA	NA
b109	7	1	0.146	NA	960823	push_mode	lower.1/2	use	NA	NA
b109	7	1	0.146	NA	960823	push_mode	lower.1/2	use	NA	NA
b109	7	2	NA	43.79	960823	push_mode	lower.1/2	use	NA	NA
b109	7	2	NA	44.81	960823	push_mode	lower.1/2	use	NA	NA
b109	7	2	NA	46.8	960823	push_mode	lower.1/2	use	NA	NA
b109	7	2	NA	65.41	960823	push_mode	lower.1/2	use	NA	NA
b109	7	2	0.226	NA	960823	push_mode	lower.1/2	use	NA	NA
b109	7	2	0.239	NA	960823	push_mode	lower.1/2	use	NA	NA
b109	7	2	NA	14.27	960823	push_mode	upper.1/2	use	NA	NA
b109	7	2	NA	20.96	960823	push_mode	upper.1/2	use	NA	NA
b109	7	2	0.312	NA	960823	push_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
b109	7	2	0.536	NA	960823	push_mode	upper.1/2	use	NA	NA
b109	7	2	0.7	NA	960823	push_mode	upper.1/2	use	NA	NA
b109	4	1	NA	39.11	960826	push_mode	lower.1/2	use	NA	NA
b109	4	1	NA	40.79	960826	push_mode	lower.1/2	use	NA	NA
b109	4	1	0.0251	NA	960826	push_mode	lower.1/2	use	NA	NA
b109	4	1	0.0271	NA	960826	push_mode	lower.1/2	use	NA	NA
b109	4	2	NA	23.81	960826	push_mode	subsegd	use	NA	NA
b109	4	2	NA	28.44	960826	push_mode	subsegd	use	NA	NA
b109	4	2	NA	41.66	960826	push_mode	subsegc	use	NA	NA
b109	4	2	NA	43.63	960826	push_mode	subsegb	use	NA	NA
b109	4	2	NA	44.25	960826	push_mode	subsega	use	NA	NA
b109	4	2	NA	44.85	960826	push_mode	subsega	use	NA	NA
b109	4	2	NA	47.64	960826	push_mode	subsegc	use	NA	NA
b109	4	2	NA	49.35	960826	push_mode	subsegb	use	NA	NA
b109	4	2	0.00649	NA	960826	push_mode	subsega	use	NA	NA
b109	4	2	0.00784	NA	960826	push_mode	subsega	use	NA	NA
b109	4	2	0.00984	NA	960826	push_mode	subsegb	use	NA	NA
b109	4	2	0.00997	NA	960826	push_mode	subsegb	use	NA	NA
b109	4	2	0.015	NA	960826	push_mode	subsegd	use	NA	NA
b109	4	2	0.0177	NA	960826	push_mode	subsegc	use	NA	NA
b109	4	2	0.0195	NA	960826	push_mode	subsegc	use	NA	NA
b109	4	2	0.0209	NA	960826	push_mode	subsegd	use	NA	NA
b109	4	3	NA	22.68	960826	push_mode	upper.1/2	use	NA	NA
b109	4	3	NA	25.76	960826	push_mode	upper.1/2	use	NA	NA
b109	4	3	0.0253	NA	960826	push_mode	upper.1/2	use	NA	NA
b109	4	3	0.0263	NA	960826	push_mode	upper.1/2	use	NA	NA
b110	NA	999	0.0312	NA	NA	NA	cc	use.old	NA	NA
b110	NA	999	0.0456	NA	NA	NA	cc	use.old	NA	NA
b110	NA	999	0.0304	NA	NA	NA	cc	use.old	NA	NA
b110	NA	999	0.0457	NA	NA	NA	cc	use.old	NA	NA
b110	NA	999	0.0463	NA	NA	NA	cc	use.old	NA	NA
b110	NA	999	0.0398	NA	NA	NA	cc	use.old	NA	NA
b110	NA	999	0.0358	NA	NA	NA	cc	use.old	NA	NA
b110	NA	999	0.03	NA	NA	NA	cc	use.old	NA	NA
b110	NA	999	0.0298	NA	NA	NA	cc	use.old	NA	NA
b110	NA	999	0.0421	NA	NA	NA	cc	use.old	NA	NA
b110	NA	999	0.0439	NA	NA	NA	cc	use.old	NA	NA
b110	NA	999	0.0328	NA	NA	NA	cc	use.old	NA	NA
b110	NA	999	0.0407	NA	NA	NA	cc	use.old	NA	NA
b110	NA	999	0.0396	NA	NA	NA	cc	use.old	NA	NA
b111	3	2	NA	61.4	910924	push_mode	total	use.new	NA	NA
b111	3	2	NA	62.2	910924	push_mode	total	use.new	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
b111	3	3	NA	64.2	910924	push_mode	total	use.new	NA	NA
b111	3	3	NA	63.8	910924	push_mode	total	use.new	NA	NA
b111	3	4	NA	57.8	910924	push_mode	total	use.new	NA	NA
b111	3	4	NA	59	910924	push_mode	total	use.new	NA	NA
b111	3	5	NA	54.4	910924	push_mode	total	use.new	NA	NA
b111	3	5	NA	58.3	910924	push_mode	total	use.new	NA	NA
b111	5	2	NA	67.1	911002	push_mode	total	use.new	NA	NA
b111	5	2	NA	67.2	911002	push_mode	total	use.new	NA	NA
b111	5	3	NA	65.9	911002	push_mode	total	use.new	NA	NA
b111	5	3	NA	65.2	911002	push_mode	total	use.new	NA	NA
b111	5	4	NA	59	911002	push_mode	total	use.new	NA	NA
b111	5	4	NA	60.4	911002	push_mode	total	use.new	NA	NA
b111	5	5	NA	65	911002	push_mode	total	use.new	NA	NA
b111	5	5	NA	65.1	911002	push_mode	total	use.new	NA	NA
b111	3	999	0.053	NA	NA	NA	cc	use.old	NA	NA
b111	3	999	0.082	NA	NA	NA	cc	use.old	NA	NA
b111	3	999	0.075	NA	NA	NA	cc	use.old	NA	NA
b111	3	999	0.056	NA	NA	NA	cc	use.old	NA	NA
b111	5	999	0.125	NA	NA	NA	cc	use.old	NA	NA
b111	5	999	0.159	NA	NA	NA	cc	use.old	NA	NA
b111	5	999	0.133	NA	NA	NA	cc	use.old	NA	NA
b111	5	999	0.134	NA	NA	NA	cc	use.old	NA	NA
b111	NA	999	0.162	NA	NA	NA	cc	use.old	NA	NA
b111	NA	999	0.159	NA	NA	NA	cc	use.old	NA	NA
b111	NA	999	0.132	NA	NA	NA	cc	use.old	NA	NA
b111	NA	999	0.134	NA	NA	NA	cc	use.old	NA	NA
b111	NA	999	0.132	NA	NA	NA	cc	use.old	NA	NA
b111	NA	999	0.067	NA	NA	NA	cc	use.old	NA	NA
b111	NA	999	0.068	NA	NA	NA	cc	use.old	NA	NA
b111	NA	999	0.134	NA	NA	NA	cc	use.old	NA	NA
b111	NA	999	0.082	NA	NA	NA	cc	use.old	NA	NA
b111	NA	999	0.159	NA	NA	NA	cc	use.old	NA	NA
b111	NA	999	0.056	NA	NA	NA	cc	use.old	NA	NA
b112	7	1	NA	21.08	950316	auger	upper.1/2	use	NA	NA
b112	7	1	NA	32.75	950316	auger	upper.1/2	use	NA	NA
b112	7	1	NA	40.04	950316	auger	lower.1/2	use	NA	NA
b112	7	1	NA	40.19	950316	auger	upper.1/2	use	NA	NA
b112	7	1	NA	43.26	950316	auger	lower.1/2	use	NA	NA
b112	7	1	NA	46.96	950316	auger	lower.1/2	use	NA	NA
b112	3	1	NA	45.57	950316	auger	total	use	NA	NA
b112	3	1	NA	47.14	950316	auger	total	use	NA	NA
b201	7	1	NA	65.4	910703	push_mode	total	del.sp	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
b201	7	1	NA	67.7	910703	push_mode	total	del.sp	NA	NA
b201	7	2	NA	68.6	910703	push_mode	total	del.sp	NA	NA
b201	7	2	NA	74.7	910703	push_mode	total	del.sp	NA	NA
b201	7	3	NA	5.8	910703	push_mode	total	del.sp	NA	NA
b201	7	3	NA	0.8	910703	push_mode	total	del.sp	NA	NA
b201	7	4	NA	60.2	910703	push_mode	total	del.sp	NA	NA
b201	7	4	NA	54.2	910703	push_mode	total	del.sp	NA	NA
b201	7	5	NA	53.4	910703	push_mode	total	del.sp	NA	NA
b201	7	5	NA	52.9	910703	push_mode	total	del.sp	NA	NA
b201	7	6	NA	35.4	910703	push_mode	total	del.sp	NA	NA
b201	7	6	NA	31.9	910703	push_mode	total	del.sp	NA	NA
b201	7	7	NA	19.4	910703	push_mode	NA	del.sp	NA	NA
b201	7	7	NA	19.4	910703	push_mode	NA	del.sp	NA	NA
b201	7	7	NA	15.5	910703	push_mode	NA	del.sp	NA	NA
b201	7	7	NA	15.5	910703	push_mode	NA	del.sp	NA	NA
b201	7	7	NA	15.5	910703	push_mode	total	del.sp	NA	NA
b201	7	7	NA	19.4	910703	push_mode	total	del.sp	NA	NA
b201	7	8	NA	28.1	910703	push_mode	total	del.sp	NA	NA
b201	7	8	NA	35.3	910703	push_mode	total	del.sp	NA	NA
b202	2	2	NA	6.44	910626	push_mode	total	del.sp	NA	NA
b202	2	2	NA	41.6	910626	push_mode	total	del.sp	NA	NA
b202	2	2	NA	64.9	910626	push_mode	total	del.sp	NA	NA
b202	2	2	NA	74.6	910626	push_mode	total	del.sp	NA	NA
b202	2	2	NA	80.1	910626	push_mode	total	del.sp	NA	NA
b202	2	2	NA	80.9	910626	push_mode	total	del.sp	NA	NA
b202	2	3	NA	7.99	910626	push_mode	total	del.sp	NA	NA
b202	2	3	NA	35.2	910626	push_mode	total	del.sp	NA	NA
b202	2	4	NA	13.7	910626	push_mode	total	del.sp	NA	NA
b202	2	4	NA	37.13	910626	push_mode	total	del.sp	NA	NA
b202	2	4	NA	56.75	910626	push_mode	total	del.sp	NA	NA
b202	2	4	NA	57.22	910626	push_mode	total	del.sp	NA	NA
b202	2	4	NA	100	910626	push_mode	total	del.sp	NA	NA
b202	2	5	NA	10.97	910626	push_mode	total	del.sp	NA	NA
b202	2	5	NA	14.66	910626	push_mode	total	del.sp	NA	NA
b202	2	6	NA	0	910626	push_mode	total	del.sp	NA	NA
b202	2	6	NA	74.4	910626	push_mode	total	del.sp	NA	NA
b202	2	6	NA	74.81	910626	push_mode	total	del.sp	NA	NA
b202	2	6	NA	74.81	910626	push_mode	total	del.sp	NA	NA
b202	2	7	NA	70.34	910626	push_mode	total	del.sp	NA	NA
b202	2	7	NA	71.99	910626	push_mode	total	del.sp	NA	NA
b202	2	7	NA	76.66	910626	push_mode	total	del.sp	NA	NA
b202	2	7	NA	78	910626	push_mode	total	del.sp	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
b202	2	8	NA	63.04	910626	push_mode	total	del.sp	NA	NA
b202	2	8	NA	75.6	910626	push_mode	total	del.sp	NA	NA
b202	2	999	NA	77	910626	push_mode	cc	del.sp	NA	NA
b202	2	999	NA	89.02	910626	push_mode	cc	del.sp	NA	NA
b202	5	1	NA	62.66	910712	push_mode	total	del.sp	NA	NA
b202	5	1	NA	63.7	910712	push_mode	total	del.sp	NA	NA
b202	5	1	NA	74.2	910712	push_mode	total	del.sp	NA	NA
b202	5	1	NA	76.02	910712	push_mode	total	del.sp	NA	NA
b202	5	1	NA	88.2	910712	push_mode	total	del.sp	NA	NA
b202	5	2	NA	37.6	910712	push_mode	total	del.sp	NA	NA
b202	5	2	NA	60	910712	push_mode	total	del.sp	NA	NA
b202	5	2	NA	78.65	910712	push_mode	total	del.sp	NA	NA
b202	5	3	NA	71.48	910712	push_mode	total	del.sp	NA	NA
b202	5	3	NA	80.04	910712	push_mode	total	del.sp	NA	NA
b202	5	4	NA	73.99	910712	push_mode	total	del.sp	NA	NA
b202	5	4	NA	78.29	910712	push_mode	total	del.sp	NA	NA
b202	5	5	NA	67.1	910712	push_mode	total	del.sp	NA	NA
b202	5	5	NA	74.1	910712	push_mode	total	del.sp	NA	NA
b202	5	5	NA	78.69	910712	push_mode	total	del.sp	NA	NA
b202	5	6	NA	72.9	910712	push_mode	total	del.sp	NA	NA
b202	5	6	NA	77.18	910712	push_mode	total	del.sp	NA	NA
b202	5	7	NA	52.3	910712	push_mode	total	del.sp	NA	NA
b202	5	7	NA	74.97	910712	push_mode	total	del.sp	NA	NA
b202	5	8	NA	72.61	910712	push_mode	total	del.sp	NA	NA
b202	5	8	NA	75.35	910712	push_mode	total	del.sp	NA	NA
b202	na15	999	3.23	NA	900410	core	cc	del.sp	NA	NA
b202	2	999	3.32	NA	910626	push_mode	cc	del.sp	NA	NA
b202	2	999	3.14	NA	910626	push_mode	cc	del.sp	NA	NA
b203	2	1	NA	93.37	951120	push_mode	total	del.sp	NA	NA
b203	2	1	NA	93.71	951120	push_mode	total	del.sp	NA	NA
b203	2	1	NA	88.71	951205	push_mode	total	del.sp	NA	NA
b203	2	1	NA	89.63	951205	push_mode	total	del.sp	NA	NA
b203	2	1	0.00894	NA	951205	push_mode	total	del.sp	NA	NA
b203	2	1	0.00936	NA	951205	push_mode	total	del.sp	NA	NA
b203	2	4	NA	80.88	951205	push_mode	lower.1/2	del.sp	NA	NA
b203	2	4	NA	81.12	951205	push_mode	upper.1/2	del.sp	NA	NA
b203	2	4	NA	81.18	951205	push_mode	lower.1/2	del.sp	NA	NA
b203	2	4	NA	81.33	951205	push_mode	upper.1/2	del.sp	NA	NA
b203	2	5	NA	76.38	951205	push_mode	upper.1/2	del.sp	NA	NA
b203	2	5	NA	77.91	951205	push_mode	lower.1/2	del.sp	NA	NA
b203	2	5	NA	78.16	951205	push_mode	upper.1/2	del.sp	NA	NA
b203	2	5	NA	79.02	951205	push_mode	lower.1/2	del.sp	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
b203	2	6	NA	74.6	951205	push_mode	upper.1/2	del.sp	NA	NA
b203	2	6	NA	75.87	951205	push_mode	upper.1/2	del.sp	NA	NA
b203	2	6	NA	76.91	951205	push_mode	lower.1/2	del.sp	NA	NA
b203	2	6	NA	77.84	951205	push_mode	lower.1/2	del.sp	NA	NA
b203	2	7	NA	69.29	951205	push_mode	upper.1/2	del.sp	NA	NA
b203	2	7	NA	73.4	951205	push_mode	upper.1/2	del.sp	NA	NA
b203	2	7	NA	79.88	951205	push_mode	lower.1/2	del.sp	NA	NA
b203	2	7	NA	80.03	951205	push_mode	lower.1/2	del.sp	NA	NA
b203	2	8	NA	72.24	951205	push_mode	lower.1/2	del.sp	NA	NA
b203	2	8	NA	72.89	951205	push_mode	lower.1/2	del.sp	NA	NA
b203	2	8	NA	75.28	951205	push_mode	upper.1/2	del.sp	NA	NA
b203	2	8	NA	76.29	951205	push_mode	upper.1/2	del.sp	NA	NA
b203	2	9	NA	70.39	951205	push_mode	lower.1/2	del.sp	NA	NA
b203	2	9	NA	72.84	951205	push_mode	lower.1/2	del.sp	NA	NA
b203	2	9	NA	72.99	951205	push_mode	upper.1/2	del.sp	NA	NA
b203	2	9	NA	75.25	951205	push_mode	upper.1/2	del.sp	NA	NA
b203	2	10	NA	75.52	951205	push_mode	lower.1/2	del.sp	NA	NA
b203	2	10	NA	76.49	951205	push_mode	upper.1/2	del.sp	NA	NA
b203	2	10	NA	76.75	951205	push_mode	upper.1/2	del.sp	NA	NA
b203	2	10	NA	76.98	951205	push_mode	lower.1/2	del.sp	NA	NA
b203	2	13	NA	74.63	951205	push_mode	upper.1/2	del.sp	NA	NA
b203	2	13	NA	76.38	951205	push_mode	upper.1/2	del.sp	NA	NA
b203	2	13	NA	77.15	951205	push_mode	lower.1/2	del.sp	NA	NA
b203	2	13	NA	77.85	951205	push_mode	lower.1/2	del.sp	NA	NA
b203	2	14	NA	73.13	951205	push_mode	upper.1/2	del.sp	NA	NA
b203	2	14	NA	75.04	951205	push_mode	upper.1/2	del.sp	NA	NA
b203	2	14	NA	77.98	951205	push_mode	lower.1/2	del.sp	NA	NA
b203	2	14	NA	78	951205	push_mode	lower.1/2	del.sp	NA	NA
b203	7	1	NA	89.67	951214	push_mode	total	del.sp	NA	NA
b203	7	1	NA	89.87	951214	push_mode	total	del.sp	NA	NA
b203	7	2	NA	77.57	951214	push_mode	total	del.sp	NA	NA
b203	7	2	NA	78.4	951214	push_mode	total	del.sp	NA	NA
b203	7	3	NA	78.31	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	3	NA	78.67	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	3	NA	80.81	951214	push_mode	upper.1/2	del.sp	NA	NA
b203	7	3	NA	81.03	951214	push_mode	upper.1/2	del.sp	NA	NA
b203	7	3	NA	89.28	951214	push_mode	total	del.sp	NA	NA
b203	7	3	NA	89.38	951214	push_mode	total	del.sp	NA	NA
b203	7	4	NA	79.96	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	4	NA	80.39	951214	push_mode	upper.1/2	del.sp	NA	NA
b203	7	4	NA	80.91	951214	push_mode	upper.1/2	del.sp	NA	NA
b203	7	4	NA	80.93	951214	push_mode	lower.1/2	del.sp	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
b203	7	5	NA	70.29	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	5	NA	72.31	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	5	NA	77.57	951214	push_mode	upper.1/2	del.sp	NA	NA
b203	7	5	NA	79	951214	push_mode	upper.1/2	del.sp	NA	NA
b203	7	6	NA	75.55	951214	push_mode	upper.1/2	del.sp	NA	NA
b203	7	6	NA	76.27	951214	push_mode	upper.1/2	del.sp	NA	NA
b203	7	6	NA	77.12	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	6	NA	77.22	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	7	NA	76.35	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	7	NA	76.87	951214	push_mode	upper.1/2	del.sp	NA	NA
b203	7	7	NA	77.93	951214	push_mode	upper.1/2	del.sp	NA	NA
b203	7	7	NA	78.18	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	8	NA	48.49	951214	push_mode	upper.1/2	del.sp	NA	NA
b203	7	8	NA	73.56	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	8	NA	74.95	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	8	NA	77.9	951214	push_mode	upper.1/2	del.sp	NA	NA
b203	7	9	NA	75.31	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	9	NA	75.34	951214	push_mode	upper.1/2	del.sp	NA	NA
b203	7	9	NA	75.95	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	9	NA	76.11	951214	push_mode	upper.1/2	del.sp	NA	NA
b203	7	10	NA	73.21	951214	push_mode	upper.1/2	del.sp	NA	NA
b203	7	10	NA	75.12	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	10	NA	75.17	951214	push_mode	upper.1/2	del.sp	NA	NA
b203	7	10	NA	75.47	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	10	0.00618	NA	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	10	0.0115	NA	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	11	NA	67.87	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	11	NA	73.87	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	11	NA	77.18	951214	push_mode	upper.1/2	del.sp	NA	NA
b203	7	11	NA	77.33	951214	push_mode	upper.1/2	del.sp	NA	NA
b203	7	12	NA	74.73	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	12	NA	74.86	951214	push_mode	upper.1/2	del.sp	NA	NA
b203	7	12	NA	75.07	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	12	NA	75.84	951214	push_mode	upper.1/2	del.sp	NA	NA
b203	7	13	NA	73.92	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	13	NA	73.98	951214	push_mode	upper.1/2	del.sp	NA	NA
b203	7	13	NA	74.54	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	13	NA	74.83	951214	push_mode	upper.1/2	del.sp	NA	NA
b203	7	14	NA	66.59	951214	push_mode	upper.1/2	del.sp	NA	NA
b203	7	14	NA	68.98	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	14	NA	73.22	951214	push_mode	lower.1/2	del.sp	NA	NA
b203	7	14	NA	75.57	951214	push_mode	upper.1/2	del.sp	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
b204	2	1	NA	89.12	951011	push_mode	drainable	del.sp	NA	NA
b204	2	1	NA	89.33	951011	push_mode	drainable	del.sp	NA	NA
b204	2	2	NA	79.05	951011	push_mode	total	del.sp	NA	NA
b204	2	2	NA	79.15	951011	push_mode	total	del.sp	NA	NA
b204	2	2	NA	89.24	951011	push_mode	drainable	del.sp	NA	NA
b204	2	2	NA	89.33	951011	push_mode	drainable	del.sp	NA	NA
b204	2	2	NA	98.1	951011	push_mode	total	del.sp	NA	NA
b204	2	2	NA	98.19	951011	push_mode	total	del.sp	NA	NA
b204	2	3	NA	77.62	951011	push_mode	lower.1/2	del.sp	NA	NA
b204	2	3	NA	78.23	951011	push_mode	lower.1/2	del.sp	NA	NA
b204	2	3	NA	79.54	951011	push_mode	total	del.sp	NA	NA
b204	2	3	NA	81.37	951011	push_mode	total	del.sp	NA	NA
b204	2	4	NA	76.62	951011	push_mode	lower.1/2	del.sp	NA	NA
b204	2	4	NA	76.78	951011	push_mode	lower.1/2	del.sp	NA	NA
b204	2	4	NA	78.41	951011	push_mode	upper.1/2	del.sp	NA	NA
b204	2	4	NA	78.72	951011	push_mode	upper.1/2	del.sp	NA	NA
b204	2	5	NA	71.32	951011	push_mode	upper.1/2	del.sp	NA	NA
b204	2	5	NA	76.7	951011	push_mode	upper.1/2	del.sp	NA	NA
b204	2	5	NA	79.35	951011	push_mode	lower.1/2	del.sp	NA	NA
b204	2	5	NA	79.8	951011	push_mode	lower.1/2	del.sp	NA	NA
b204	2	6	NA	72.54	951011	push_mode	upper.1/2	del.sp	NA	NA
b204	2	6	NA	77.9	951011	push_mode	upper.1/2	del.sp	NA	NA
b204	2	6	NA	78.24	951011	push_mode	lower.1/2	del.sp	NA	NA
b204	2	6	NA	78.42	951011	push_mode	lower.1/2	del.sp	NA	NA
b204	2	7	NA	75.26	951011	push_mode	lower.1/2	del.sp	NA	NA
b204	2	7	NA	75.45	951011	push_mode	lower.1/2	del.sp	NA	NA
b204	2	7	NA	78.25	951011	push_mode	upper.1/2	del.sp	NA	NA
b204	2	7	NA	79.13	951011	push_mode	upper.1/2	del.sp	NA	NA
b204	2	8	NA	67.37	951011	push_mode	lower.1/2	del.sp	NA	NA
b204	2	8	NA	77.48	951011	push_mode	upper.1/2	del.sp	NA	NA
b204	2	8	NA	78.38	951011	push_mode	lower.1/2	del.sp	NA	NA
b204	2	8	NA	78.95	951011	push_mode	upper.1/2	del.sp	NA	NA
b204	2	9	NA	74.7	951011	push_mode	upper.1/2	del.sp	NA	NA
b204	2	9	NA	76.86	951011	push_mode	upper.1/2	del.sp	NA	NA
b204	2	9	NA	77.93	951011	push_mode	lower.1/2	del.sp	NA	NA
b204	2	9	NA	78.64	951011	push_mode	lower.1/2	del.sp	NA	NA
b204	2	10	NA	76.06	951011	push_mode	upper.1/2	del.sp	NA	NA
b204	2	10	NA	76.85	951011	push_mode	lower.1/2	del.sp	NA	NA
b204	2	10	NA	77.66	951011	push_mode	upper.1/2	del.sp	NA	NA
b204	2	10	NA	79.02	951011	push_mode	lower.1/2	del.sp	NA	NA
b204	2	11	NA	76.57	951011	push_mode	lower.1/2	del.sp	NA	NA
b204	2	11	NA	76.6	951011	push_mode	upper.1/2	del.sp	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
b204	2	11	NA	78.22	951011	push_mode	upper.1/2	del.sp	NA	NA
b204	2	11	NA	78.56	951011	push_mode	lower.1/2	del.sp	NA	NA
b204	2	12	NA	75.85	951011	push_mode	lower.1/2	del.sp	NA	NA
b204	2	12	NA	76.53	951011	push_mode	lower.1/2	del.sp	NA	NA
b204	2	12	NA	76.96	951011	push_mode	upper.1/2	del.sp	NA	NA
b204	2	12	NA	78.59	951011	push_mode	upper.1/2	del.sp	NA	NA
b204	2	13	NA	78.17	951011	push_mode	lower.1/2	del.sp	NA	NA
b204	2	13	NA	78.31	951011	push_mode	upper.1/2	del.sp	NA	NA
b204	2	13	NA	78.39	951011	push_mode	upper.1/2	del.sp	NA	NA
b204	2	13	NA	78.78	951011	push_mode	lower.1/2	del.sp	NA	NA
b204	2	14	NA	71.02	951011	push_mode	upper.1/2	del.sp	NA	NA
b204	2	14	NA	76.12	951011	push_mode	upper.1/2	del.sp	NA	NA
b204	2	14	NA	76.17	951011	push_mode	lower.1/2	del.sp	NA	NA
b204	2	14	NA	77.86	951011	push_mode	lower.1/2	del.sp	NA	NA
b204	7	1	NA	88.56	951013	push_mode	drainable	del.sp	NA	NA
b204	7	1	NA	89.2	951013	push_mode	drainable	del.sp	NA	NA
b204	7	2	NA	78	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	2	NA	80.86	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	2	NA	80.93	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	2	NA	81.14	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	3	NA	80.3	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	3	NA	80.99	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	3	NA	81.36	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	3	NA	81.59	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	4	NA	54.36	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	4	NA	76.22	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	4	NA	76.94	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	4	NA	78.64	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	4	NA	79.88	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	4	NA	80.24	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	5	NA	72.88	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	5	NA	81.5	951013	push_mode	total	del.sp	NA	NA
b204	7	5	NA	81.55	951013	push_mode	total	del.sp	NA	NA
b204	7	5	NA	81.7	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	6	NA	74.93	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	6	NA	78.08	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	6	NA	81.74	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	6	NA	82.78	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	7	NA	76.45	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	7	NA	79.93	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	7	NA	81.18	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	7	NA	81.3	951013	push_mode	lower.1/2	del.sp	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
b204	7	8	NA	79.12	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	8	NA	79.76	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	8	NA	79.78	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	8	NA	80.15	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	9	NA	78.54	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	9	NA	78.59	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	9	NA	78.93	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	9	NA	80.08	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	10	NA	78.97	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	10	NA	79.13	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	10	NA	79.7	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	10	NA	80.46	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	11	NA	75.76	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	11	NA	77.96	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	11	NA	79.11	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	11	NA	79.3	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	12	NA	77.87	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	12	NA	78.56	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	12	NA	79.46	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	12	NA	79.6	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	13	NA	40.95	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	13	NA	50.78	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	13	NA	74.58	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	13	NA	77.56	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	13	NA	78.29	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	14	NA	76.67	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	14	NA	77	951013	push_mode	upper.1/2	del.sp	NA	NA
b204	7	14	NA	77.15	951013	push_mode	lower.1/2	del.sp	NA	NA
b204	7	14	NA	78.05	951013	push_mode	upper.1/2	del.sp	NA	NA
bx101	1	1	NA	8.45	940620	auger	total	use	NA	NA
bx101	1	1	NA	13.14	940620	auger	total	use	NA	NA
bx101	1	1	NA	14.14	940620	auger	total	use	NA	NA
bx101	1	1	NA	14.21	940620	auger	total	use	NA	NA
bx101	1	1	NA	24.8	940620	auger	total	use	NA	NA
bx101	1	1	NA	27.77	940620	auger	total	use	NA	NA
bx101	7	1	NA	0.9	940621	auger	total	use.dl	NA	NA
bx101	7	1	NA	2.13	940621	auger	total	use	NA	NA
bx101	7	1	NA	15.35	940621	auger	total	use	NA	NA
bx101	7	1	NA	15.76	940621	auger	total	use	NA	NA
bx101	7	1	NA	16.37	940621	auger	total	use	NA	NA
bx101	7	1	NA	18.36	940621	auger	total	use	NA	NA
bx101	7	1	NA	21.98	940621	auger	total	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
bx101	7	1	NA	23.83	940621	auger	total	use	NA	NA
bx103	7	1	NA	60.65	950524	push_mode	upper.1/2	use	NA	NA
bx103	7	1	NA	63.17	950524	push_mode	upper.1/2	use	NA	NA
bx103	7	1	NA	78.13	950524	push_mode	drainable	use	NA	NA
bx103	7	1	NA	78.78	950524	push_mode	drainable	use	NA	NA
bx103	7	2	NA	39.25	950524	push_mode	upper.1/2	use	NA	NA
bx103	7	2	NA	40.68	950524	push_mode	lower.1/2	use	NA	NA
bx103	7	2	NA	40.75	950524	push_mode	upper.1/2	use	NA	NA
bx103	7	2	NA	44.91	950524	push_mode	lower.1/2	use	NA	NA
bx103	7	2	NA	75.16	950524	push_mode	drainable	use	NA	NA
bx103	7	2	NA	75.31	950524	push_mode	drainable	use	NA	NA
bx103	2	1	NA	55.2	950530	push_mode	upper.1/2	use	NA	NA
bx103	2	1	NA	57.21	950530	push_mode	upper.1/2	use	NA	NA
bx103	2	1	NA	59.61	950530	push_mode	lower.1/2	use	NA	NA
bx103	2	1	NA	62.98	950530	push_mode	lower.1/2	use	NA	NA
bx103	2	1	NA	77.79	950530	push_mode	drainable	use	NA	NA
bx103	2	1	NA	79.44	950530	push_mode	drainable	use	NA	NA
bx103	2	2	NA	22.14	950530	push_mode	upper.1/2	use	NA	NA
bx103	2	2	NA	23.4	950530	push_mode	upper.1/2	use	NA	NA
bx103	2	2	NA	23.6	950530	push_mode	upper.1/2	use	NA	NA
bx103	2	2	NA	24.14	950530	push_mode	upper.1/2	use	NA	NA
bx103	2	2	NA	25.01	950530	push_mode	upper.1/2	use	NA	NA
bx103	2	2	NA	29.6	950530	push_mode	upper.1/2	use	NA	NA
bx103	2	2	NA	76.84	950530	push_mode	drainable	use	NA	NA
bx103	2	2	NA	79.73	950530	push_mode	drainable	use	NA	NA
bx104	7	1	0.64	NA	960105	push_mode	subsega	use	NA	NA
bx104	7	1	0.71	NA	960105	push_mode	subsega	use	NA	NA
bx104	7	1	NA	24.8	960105	push_mode	subsega	use.new	NA	NA
bx104	7	1	NA	24.4	960105	push_mode	subsega	use.new	NA	NA
bx104	7	1	NA	65.1	960105	push_mode	drainable	use.new	NA	NA
bx104	7	1	NA	65.4	960105	push_mode	drainable	use.new	NA	NA
bx104	7	1	0.3154	NA	960105	push_mode	drainable	use.new	NA	NA
bx104	7	1	0.3285	NA	960105	push_mode	drainable	use.new	NA	NA
bx104	7	2	1.04	NA	960105	push_mode	upper.1/2	use	NA	NA
bx104	7	2	1.1	NA	960105	push_mode	upper.1/2	use	NA	NA
bx104	7	2	0.6	NA	960105	push_mode	lower.1/2	use	NA	NA
bx104	7	2	0.68	NA	960105	push_mode	lower.1/2	use	NA	NA
bx104	7	2	NA	36.8	960105	push_mode	lower.1/2	use.new	NA	NA
bx104	7	2	NA	39.1	960105	push_mode	lower.1/2	use.new	NA	NA
bx104	7	2	NA	63.4	960105	push_mode	drainable	use.new	NA	NA
bx104	7	2	NA	64.8	960105	push_mode	drainable	use.new	NA	NA
bx104	7	2	NA	35	960105	push_mode	upper.1/2	use.new	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
bx104	7	2	NA	36.7	960105	push_mode	upper.1/2	use.new	NA	NA
bx104	7	2	0.1638	NA	960105	push_mode	drainable	use.new	NA	NA
bx104	7	2	0.1731	NA	960105	push_mode	drainable	use.new	NA	NA
bx104	1	1	0.489	NA	960106	push_mode	lower.1/2	use	NA	NA
bx104	1	1	0.538	NA	960106	push_mode	lower.1/2	use	NA	NA
bx104	1	1	0.744	NA	960106	push_mode	upper.1/2	use	NA	NA
bx104	1	1	0.868	NA	960106	push_mode	upper.1/2	use	NA	NA
bx104	1	1	NA	47.2	960106	push_mode	lower.1/2	use.new	NA	NA
bx104	1	1	NA	49.2	960106	push_mode	lower.1/2	use.new	NA	NA
bx104	1	1	NA	53.6	960106	push_mode	upper.1/2	use.new	NA	NA
bx104	1	1	NA	56.5	960106	push_mode	upper.1/2	use.new	NA	NA
bx104	1	2	0.23	NA	960106	push_mode	total	del.lin	NA	NA
bx104	1	2	0.26	NA	960106	push_mode	total	del.lin	NA	NA
bx104	1	2	NA	79.3	960106	push_mode	drainable	use.new	NA	NA
bx104	1	2	NA	80.3	960106	push_mode	drainable	use.new	NA	NA
bx104	1	2	NA	42.6	960106	push_mode	total	del.lin	NA	NA
bx104	1	2	NA	41.6	960106	push_mode	total	del.lin	NA	NA
bx104	1	2	0.1115	NA	960106	push_mode	drainable	use.new	NA	NA
bx104	1	2	0.1	NA	960106	push_mode	drainable	use.new	NA	NA
bx105	2	1	NA	7.24	940930	auger	upper.1/2	use	NA	NA
bx105	2	1	NA	9.86	940930	auger	total	use	NA	NA
bx105	2	1	NA	11.53	940930	auger	total	use	NA	NA
bx105	2	1	NA	13.43	940930	auger	lower.1/2	use	NA	NA
bx105	2	1	NA	13.76	940930	auger	upper.1/2	use	NA	NA
bx105	2	1	NA	15.74	940930	auger	lower.1/2	use	NA	NA
bx105	6	1	NA	4.91	941005	auger	upper.1/2	use	NA	NA
bx105	6	1	NA	5.54	941005	auger	upper.1/2	use	NA	NA
bx105	6	1	NA	14.78	941005	auger	lower.1/2	use	NA	NA
bx105	6	1	NA	16.18	941005	auger	lower.1/2	use	NA	NA
bx105	6	1	NA	18.77	941005	auger	total	use	NA	NA
bx105	6	1	NA	18.97	941005	auger	total	use	NA	NA
bx105	NA	999	0.18	NA	NA	NA	cc	use.old	NA	NA
bx106	6	1	NA	32.75	951215	auger	drainable	use	NA	NA
bx106	6	1	NA	39.64	951215	auger	drainable	use	NA	NA
bx106	6	1	0.5815	NA	951215	auger	drainable	use.new	NA	NA
bx106	6	1	0.5892	NA	951215	auger	drainable	use.new	NA	NA
bx106	2	1	NA	38.9	951218	auger	total	use	NA	NA
bx106	2	1	NA	43.46	951218	auger	total	use	NA	NA
bx107	7	2	NA	43.7	920427	push_mode	total	use	NA	NA
bx107	7	2	NA	45	920427	push_mode	total	use	NA	NA
bx107	7	2	NA	54.68	920427	push_mode	total	use	NA	NA
bx107	7	2	NA	54.7	920427	push_mode	total	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
bx107	7	2	NA	55.15	920427	push_mode	total	use	NA	NA
bx107	7	2	NA	55.2	920427	push_mode	total	use	NA	NA
bx107	7	4	NA	50.8	920427	push_mode	total	use	NA	NA
bx107	7	4	NA	51.2	920427	push_mode	total	use	NA	NA
bx107	7	4	NA	51.4	920427	push_mode	total	use	NA	NA
bx107	7	4	NA	52.9	920427	push_mode	total	use	NA	NA
bx107	7	4	NA	53.4	920427	push_mode	total	use	NA	NA
bx107	7	5	NA	50.8	920427	push_mode	total	use	NA	NA
bx107	7	5	NA	54.9	920427	push_mode	total	use	NA	NA
bx107	7	5	NA	56.6	920427	push_mode	total	use	NA	NA
bx107	7	5	NA	57.7	920427	push_mode	total	use	NA	NA
bx107	7	6	NA	46	920427	push_mode	total	use	NA	NA
bx107	7	6	NA	46.2	920427	push_mode	total	use	NA	NA
bx107	7	6	NA	56.2	920427	push_mode	total	use	NA	NA
bx107	7	6	NA	56.2	920427	push_mode	total	use	NA	NA
bx107	7	6	NA	56.3	920427	push_mode	total	use	NA	NA
bx107	7	6	NA	56.3	920427	push_mode	total	use	NA	NA
bx107	7	7	NA	43	920427	push_mode	total	use	NA	NA
bx107	7	7	NA	43	920427	push_mode	total	use	NA	NA
bx107	7	7	NA	44.3	920427	push_mode	total	use	NA	NA
bx107	7	7	NA	44.3	920427	push_mode	total	use	NA	NA
bx107	7	7	NA	48.8	920427	push_mode	total	use	NA	NA
bx107	7	7	NA	50.4	920427	push_mode	total	use	NA	NA
bx107	3	2	NA	39.6	920519	push_mode	total	use	NA	NA
bx107	3	2	NA	49.1	920519	push_mode	total	use	NA	NA
bx107	3	3	NA	52.5	920519	push_mode	total	use	NA	NA
bx107	3	3	NA	54.1	920519	push_mode	total	use	NA	NA
bx107	3	3	NA	56.8	920519	push_mode	total	use	NA	NA
bx107	3	3	NA	56.89	920519	push_mode	total	use	NA	NA
bx107	3	5	NA	27.9	920519	push_mode	total	use	NA	NA
bx107	3	5	NA	36.4	920519	push_mode	total	use	NA	NA
bx107	3	5	NA	39.4	920519	push_mode	total	use	NA	NA
bx107	3	6	NA	38.4	920519	push_mode	total	use	NA	NA
bx107	3	6	NA	44	920519	push_mode	total	use	NA	NA
bx107	3	6	NA	48.72	920519	push_mode	total	use	NA	NA
bx107	3	6	NA	50.16	920519	push_mode	total	use	NA	NA
bx107	3	7	NA	34	920519	push_mode	total	use	NA	NA
bx107	3	7	NA	35.2	920519	push_mode	total	use	NA	NA
bx107	3	7	NA	48.7	920519	push_mode	total	use	NA	NA
bx107	3	7	NA	50.34	920519	push_mode	total	use	NA	NA
bx107	NA	7	0.055	NA	NA	NA	NA	use.old	NA	NA
bx107	NA	7	NA	49.6	NA	NA	NA	use.old	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
bx107	7	999	0.07	NA	NA	NA	cc	use.old	NA	NA
bx107	3	999	0.0997	NA	NA	NA	cc	use.old	NA	NA
bx107	NA	999	0.0796	NA	NA	NA	cc	use.old	NA	NA
bx107	NA	999	0.07	NA	NA	NA	cc	use.old	NA	NA
bx107	NA	999	0.055	NA	NA	NA	cc	use.old	NA	NA
bx107	NA	999	0.07	NA	NA	NA	cc	use.old	NA	NA
bx107	NA	999	0.055	NA	NA	NA	cc	use.old	NA	NA
bx107	NA	999	0.055	NA	NA	NA	cc	use.old	NA	NA
bx107	NA	999	0.0897	NA	NA	NA	cc	use.old	NA	NA
bx107	NA	999	NA	52.5	NA	NA	cc	use.old	NA	NA
bx107	NA	NA	0.05	NA	NA	NA	NA	use.old	NA	NA
bx107	NA	NA	0.073	NA	NA	NA	NA	use.old	NA	NA
bx107	NA	NA	NA	55.95	NA	NA	NA	use.old	NA	NA
bx107	NA	NA	NA	53.7	NA	NA	NA	use.old	NA	NA
bx108	6	1	NA	3.29	940714	auger	total	use	NA	NA
bx108	6	1	NA	4.42	940714	auger	total	use	NA	NA
bx108	6	1	NA	4.57	940714	auger	total	use	NA	NA
bx108	6	1	NA	4.74	940714	auger	total	use	NA	NA
bx108	6	1	NA	6.59	940714	auger	total	use	NA	NA
bx108	6	1	NA	9.19	940714	auger	total	use	NA	NA
bx108	2	1	NA	51.8	940722	auger	total	use	NA	NA
bx108	2	1	NA	52.78	940722	auger	total	use	NA	NA
bx109	6	1	NA	48.07	950404	push_mode	total	use	NA	NA
bx109	6	1	NA	49.92	950404	push_mode	total	use	NA	NA
bx109	6	1	0.0921	NA	950404	push_mode	total	use	NA	NA
bx109	6	1	0.107	NA	950404	push_mode	total	use	NA	NA
bx109	6	2	NA	50.03	950404	push_mode	upper.1/2	use	NA	NA
bx109	6	2	NA	50.78	950404	push_mode	upper.1/2	use	NA	NA
bx109	6	2	NA	50.89	950404	push_mode	lower.1/2	use	NA	NA
bx109	6	2	NA	51.17	950404	push_mode	lower.1/2	use	NA	NA
bx109	6	3	NA	48.67	950404	push_mode	lower.1/2	use	NA	NA
bx109	6	3	NA	48.91	950404	push_mode	upper.1/2	use	NA	NA
bx109	6	3	NA	49.02	950404	push_mode	upper.1/2	use	NA	NA
bx109	6	3	NA	49.52	950404	push_mode	lower.1/2	use	NA	NA
bx109	6	3	0.0376	NA	950404	push_mode	lower.1/2	use	NA	NA
bx109	6	3	0.0457	NA	950404	push_mode	lower.1/2	use	NA	NA
bx109	6	4	NA	47.98	950404	push_mode	lower.1/2	use	NA	NA
bx109	6	4	NA	48.87	950404	push_mode	lower.1/2	use	NA	NA
bx109	6	4	NA	52.78	950404	push_mode	upper.1/2	use	NA	NA
bx109	6	4	NA	52.92	950404	push_mode	upper.1/2	use	NA	NA
bx109	2	1	NA	52.56	950411	push_mode	total	use	NA	NA
bx109	2	1	NA	52.78	950411	push_mode	total	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
bx109	2	1	NA	57.53	950411	push_mode	total	use	NA	NA
bx109	2	1	NA	57.73	950411	push_mode	total	use	NA	NA
bx109	2	1	NA	67.45	950411	push_mode	total	use	NA	NA
bx109	2	2	NA	43.72	950411	push_mode	upper.1/2	use	NA	NA
bx109	2	2	NA	49.58	950411	push_mode	lower.1/2	use	NA	NA
bx109	2	2	NA	50.65	950411	push_mode	upper.1/2	use	NA	NA
bx109	2	2	NA	51.36	950411	push_mode	lower.1/2	use	NA	NA
bx109	2	3	NA	50.86	950411	push_mode	lower.1/2	use	NA	NA
bx109	2	3	NA	50.98	950411	push_mode	upper.1/2	use	NA	NA
bx109	2	3	NA	51.23	950411	push_mode	lower.1/2	use	NA	NA
bx109	2	3	NA	51.7	950411	push_mode	upper.1/2	use	NA	NA
bx109	2	4	NA	51.29	950411	push_mode	lower.1/2	use	NA	NA
bx109	2	4	NA	51.39	950411	push_mode	lower.1/2	use	NA	NA
bx109	2	4	NA	53.46	950411	push_mode	upper.1/2	use	NA	NA
bx109	2	4	NA	54.63	950411	push_mode	upper.1/2	use	NA	NA
bx109	2	4	NA	87.61	950411	push_mode	total	use	NA	NA
bx109	2	4	NA	87.66	950411	push_mode	total	use	NA	NA
bx110	6	1	NA	43.67	951012	auger	total	use	NA	NA
bx110	6	1	NA	45.22	951012	auger	total	use	NA	NA
bx110	6	1	0.347	NA	951012	auger	total	use	NA	NA
bx110	6	1	0.348	NA	951012	auger	total	use	NA	NA
bx110	3	1	NA	7.03	951012	auger	total	use	NA	NA
bx110	3	1	NA	9.66	951012	auger	total	use	NA	NA
bx110	3	1	NA	10.42	951012	auger	total	use	NA	NA
bx110	3	1	0.389	NA	951012	auger	total	use	NA	NA
bx110	3	1	0.41	NA	951012	auger	total	use	NA	NA
bx111	NA	NA	0.06	NA	NA	NA	NA	use.old	NA	NA
bx111	NA	NA	NA	51.9	NA	NA	NA	use.old	NA	NA
bx112	2	1	NA	68.7	951130	push_mode	lower.1/2	use.new	NA	NA
bx112	2	1	NA	73.5	951130	push_mode	lower.1/2	use.new	NA	NA
bx112	2	1	NA	58.5	951130	push_mode	lower.1/2	use.new	NA	NA
bx112	2	1	NA	57.3	951130	push_mode	lower.1/2	use.new	NA	NA
bx112	2	1	NA	66.1	951130	push_mode	drainable	use.new	NA	NA
bx112	2	1	NA	65.1	951130	push_mode	drainable	use.new	NA	NA
bx112	2	1	NA	67.6	951130	push_mode	upper.1/2	use.new	NA	NA
bx112	2	1	NA	68.1	951130	push_mode	upper.1/2	use.new	NA	NA
bx112	2	1	NA	59.5	951130	push_mode	upper.1/2	use.new	NA	NA
bx112	2	1	NA	60.5	951130	push_mode	upper.1/2	use.new	NA	NA
bx112	2	2	0.083	NA	951130	push_mode	upper.1/2	use	NA	NA
bx112	2	2	0.088	NA	951130	push_mode	lower.1/2	use	NA	NA
bx112	2	2	0.107	NA	951130	push_mode	lower.1/2	use	NA	NA
bx112	2	2	0.113	NA	951130	push_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
bx112	2	2	NA	63.9	951130	push_mode	lower.1/2	use.new	NA	NA
bx112	2	2	NA	66.5	951130	push_mode	lower.1/2	use.new	NA	NA
bx112	2	2	NA	70.1	951130	push_mode	upper.1/2	use.new	NA	NA
bx112	2	2	NA	69.7	951130	push_mode	upper.1/2	use.new	NA	NA
bx112	2	3	NA	69.2	951130	push_mode	total	use.new	NA	NA
bx112	2	3	NA	66.5	951130	push_mode	total	use.new	NA	NA
bx112	2	3	NA	74.7	951130	push_mode	drainable	use.new	NA	NA
bx112	2	3	NA	73.1	951130	push_mode	drainable	use.new	NA	NA
bx112	3	1	NA	66.5	951221	push_mode	lower.1/2	use.new	NA	NA
bx112	3	1	NA	69	951221	push_mode	lower.1/2	use.new	NA	NA
bx112	3	1	NA	63	951221	push_mode	upper.1/2	use.new	NA	NA
bx112	3	1	NA	66.8	951221	push_mode	upper.1/2	use.new	NA	NA
bx112	3	2	0.052	NA	951221	push_mode	lower.1/2	use	NA	NA
bx112	3	2	0.106	NA	951221	push_mode	lower.1/2	use	NA	NA
bx112	3	2	0.108	NA	951221	push_mode	upper.1/2	use	NA	NA
bx112	3	2	0.11	NA	951221	push_mode	upper.1/2	use	NA	NA
bx112	3	2	NA	66.2	951221	push_mode	lower.1/2	use.new	NA	NA
bx112	3	2	NA	67.7	951221	push_mode	lower.1/2	use.new	NA	NA
bx112	3	2	NA	66.8	951221	push_mode	upper.1/2	use.new	NA	NA
bx112	3	2	NA	64.7	951221	push_mode	upper.1/2	use.new	NA	NA
bx112	3	3	NA	68.4	951221	push_mode	lower.1/2	use.new	NA	NA
bx112	3	3	NA	66.9	951221	push_mode	lower.1/2	use.new	NA	NA
bx112	3	3	NA	68.6	951221	push_mode	upper.1/2	use.new	NA	NA
bx112	3	3	NA	67.8	951221	push_mode	upper.1/2	use.new	NA	NA
bx112	3	1	NA	55.59	951116	auger	upper.1/2	use	NA	NA
bx112	3	1	NA	60.72	951116	auger	upper.1/2	use	NA	NA
bx112	3	1	NA	61.77	951116	auger	upper.1/2	use	NA	NA
bx112	3	1	NA	62.3	951116	auger	upper.1/2	use	NA	NA
bx112	3	1	NA	63.37	951116	auger	lower.1/2	use	NA	NA
bx112	3	1	NA	63.52	951116	auger	lower.1/2	use	NA	NA
bx112	2	1	NA	65.42	951117	auger	total	use	NA	NA
bx112	2	1	NA	65.5	951117	auger	total	use	NA	NA
by102	5	1	NA	11.42	960708	push_mode	lower.1/2	use	NA	NA
by102	5	1	NA	11.89	960708	push_mode	lower.1/2	use	NA	NA
by102	5	1	0.0747	NA	960708	push_mode	lower.1/2	use	NA	NA
by102	5	1	0.0895	NA	960708	push_mode	lower.1/2	use	NA	NA
by102	5	2	NA	12.92	960708	push_mode	lower.1/2	use	NA	NA
by102	5	2	NA	20.11	960708	push_mode	lower.1/2	use	NA	NA
by102	5	2	NA	28.6	960708	push_mode	lower.1/2	use	NA	NA
by102	5	2	NA	31.13	960708	push_mode	lower.1/2	use	NA	NA
by102	5	2	0.456	NA	960708	push_mode	lower.1/2	use	NA	NA
by102	5	2	0.652	NA	960708	push_mode	lower.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by102	5	2	0.779	NA	960708	push_mode	lower.1/2	use	NA	NA
by102	5	3	NA	26.42	960708	push_mode	lower.1/2	use	NA	NA
by102	5	3	NA	26.57	960708	push_mode	lower.1/2	use	NA	NA
by102	5	3	0.792	NA	960708	push_mode	lower.1/2	use	NA	NA
by102	5	3	1.03	NA	960708	push_mode	lower.1/2	use	NA	NA
by102	5	3	1.05	NA	960708	push_mode	lower.1/2	use	NA	NA
by102	5	4	NA	19.83	960708	push_mode	subsegc	use	NA	NA
by102	5	4	NA	20.46	960708	push_mode	subsegc	use	NA	NA
by102	5	4	NA	23.59	960708	push_mode	subsega	use	NA	NA
by102	5	4	NA	24.88	960708	push_mode	subsegb	use	NA	NA
by102	5	4	NA	28.7	960708	push_mode	subsegb	use	NA	NA
by102	5	4	NA	30.6	960708	push_mode	subsega	use	NA	NA
by102	5	4	0.18	NA	960708	push_mode	subsegc	use	NA	NA
by102	5	4	0.261	NA	960708	push_mode	subsegc	use	NA	NA
by102	5	4	0.299	NA	960708	push_mode	subsega	use	NA	NA
by102	5	4	0.413	NA	960708	push_mode	subsega	use	NA	NA
by102	5	4	0.599	NA	960708	push_mode	subsega	use	NA	NA
by102	5	4	1	NA	960708	push_mode	subsegb	use	NA	NA
by102	5	4	1.08	NA	960708	push_mode	subsegb	use	NA	NA
by102	5	5	NA	22.04	960708	push_mode	lower.1/2	use	NA	NA
by102	5	5	NA	22.68	960708	push_mode	lower.1/2	use	NA	NA
by102	5	5	0.333	NA	960708	push_mode	lower.1/2	use	NA	NA
by102	5	5	0.407	NA	960708	push_mode	lower.1/2	use	NA	NA
by102	5	5	NA	16.69	960708	push_mode	upper.1/2	use	NA	NA
by102	5	5	NA	16.84	960708	push_mode	upper.1/2	use	NA	NA
by102	5	5	NA	22.56	960708	push_mode	lower.1/2	use	NA	NA
by102	5	5	NA	32.7	960708	push_mode	lower.1/2	use	NA	NA
by102	5	5	0.113	NA	960708	push_mode	lower.1/2	use	NA	NA
by102	5	5	0.141	NA	960708	push_mode	lower.1/2	use	NA	NA
by102	5	5	0.182	NA	960708	push_mode	lower.1/2	use	NA	NA
by102	5	5	0.676	NA	960708	push_mode	upper.1/2	use	NA	NA
by102	5	5	0.693	NA	960708	push_mode	upper.1/2	use	NA	NA
by102	5	6	NA	49.02	960708	push_mode	upper.1/2	use	NA	NA
by102	5	6	NA	50.22	960708	push_mode	lower.1/2	use	NA	NA
by102	5	6	NA	50.71	960708	push_mode	lower.1/2	use	NA	NA
by102	5	6	NA	51.46	960708	push_mode	upper.1/2	use	NA	NA
by102	5	6	0.346	NA	960708	push_mode	upper.1/2	use	NA	NA
by102	5	6	0.357	NA	960708	push_mode	upper.1/2	use	NA	NA
by102	5	6	0.4	NA	960708	push_mode	lower.1/2	use	NA	NA
by102	5	6	0.408	NA	960708	push_mode	lower.1/2	use	NA	NA
by102	5	6	0.453	NA	960708	push_mode	lower.1/2	use	NA	NA
by102	5	7	NA	21.58	960708	push_mode	subsegb	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by102	5	7	NA	23.64	960708	push_mode	subsegb	use	NA	NA
by102	5	7	NA	24.14	960708	push_mode	subsega	use	NA	NA
by102	5	7	NA	29.85	960708	push_mode	subsega	use	NA	NA
by102	5	7	NA	30.48	960708	push_mode	subsegd	use	NA	NA
by102	5	7	NA	32.63	960708	push_mode	subsegc	use	NA	NA
by102	5	7	NA	33.8	960708	push_mode	subsegc	use	NA	NA
by102	5	7	NA	36.55	960708	push_mode	subsegd	use	NA	NA
by102	5	7	NA	50.56	960708	push_mode	total	use	NA	NA
by102	5	7	NA	50.95	960708	push_mode	total	use	NA	NA
by102	5	7	0.104	NA	960708	push_mode	subsegb	use	NA	NA
by102	5	7	0.10497	NA	960708	push_mode	total	use	NA	NA
by102	5	7	0.10841	NA	960708	push_mode	total	use	NA	NA
by102	5	7	0.11	NA	960708	push_mode	subsegb	use	NA	NA
by102	5	7	0.258	NA	960708	push_mode	subsegd	use	NA	NA
by102	5	7	0.262	NA	960708	push_mode	subsegd	use	NA	NA
by102	5	7	0.274	NA	960708	push_mode	subsega	use	NA	NA
by102	5	7	0.297	NA	960708	push_mode	subsega	use	NA	NA
by102	5	7	0.501	NA	960708	push_mode	subsegc	use	NA	NA
by102	5	7	0.584	NA	960708	push_mode	subsegc	use	NA	NA
by102	5	8	NA	52.03	960708	push_mode	total	use	NA	NA
by102	5	8	NA	52.24	960708	push_mode	total	use	NA	NA
by102	5	8	0.14316	NA	960708	push_mode	total	use	NA	NA
by102	5	8	0.14386	NA	960708	push_mode	total	use	NA	NA
by103	10b	1	NA	14.06	950308	auger	total	use	NA	NA
by103	10b	1	NA	18.76	950308	auger	total	use	NA	NA
by103	10b	1	NA	33.59	950308	auger	total	use	NA	NA
by103	12a	1	NA	11.63	950310	auger	total	use	NA	NA
by103	12a	1	NA	15.72	950310	auger	total	use	NA	NA
by103	12a	1	NA	19.49	950310	auger	total	use	NA	NA
by104	11	2	NA	7.29	951115	rotary_mode	upper.1/2	use	NA	NA
by104	11	2	NA	12.96	951115	rotary_mode	upper.1/2	use	NA	NA
by104	11	2	NA	13.4	951115	rotary_mode	upper.1/2	use	NA	NA
by104	11	2	NA	14.66	951115	rotary_mode	upper.1/2	use	NA	NA
by104	11	2	NA	15.74	951115	rotary_mode	upper.1/2	use	NA	NA
by104	11	2	NA	16.08	951115	rotary_mode	subsega	use	NA	NA
by104	11	2	NA	16.52	951115	rotary_mode	upper.1/2	use	NA	NA
by104	11	2	NA	16.71	951115	rotary_mode	subsega	use	NA	NA
by104	11	2	NA	16.9	951115	rotary_mode	subsega	use	NA	NA
by104	11	2	NA	18.34	951115	rotary_mode	subsega	del.qa	NA	NA
by104	11	2	2.45	NA	951115	rotary_mode	subsega	use	NA	NA
by104	11	2	2.81	NA	951115	rotary_mode	subsega	use	NA	NA
by104	11	3	NA	6.13	951115	rotary_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by104	11	3	NA	8.45	951115	rotary_mode	lower.1/2	use	NA	NA
by104	11	3	NA	8.98	951115	rotary_mode	upper.1/2	use	NA	NA
by104	11	3	NA	9.22	951115	rotary_mode	lower.1/2	use	NA	NA
by104	11	3	NA	10.1	951115	rotary_mode	lower.1/2	use	NA	NA
by104	11	3	NA	11.8	951115	rotary_mode	upper.1/2	use	NA	NA
by104	11	3	NA	11.86	951115	rotary_mode	upper.1/2	use	NA	NA
by104	11	3	NA	12.32	951115	rotary_mode	lower.1/2	use	NA	NA
by104	11	3	NA	12.53	951115	rotary_mode	upper.1/2	use	NA	NA
by104	11	3	NA	12.61	951115	rotary_mode	upper.1/2	use	NA	NA
by104	11	3	0.4	NA	951115	rotary_mode	lower.1/2	use	NA	NA
by104	11	3	0.419	NA	951115	rotary_mode	lower.1/2	use	NA	NA
by104	11	4	NA	18.71	951115	rotary_mode	subsegb	use	NA	NA
by104	11	4	NA	19	951115	rotary_mode	subsega	use	NA	NA
by104	11	4	NA	22.41	951115	rotary_mode	subsega	use	NA	NA
by104	11	4	NA	24.2	951115	rotary_mode	subsegb	use	NA	NA
by104	11	4	NA	25.16	951115	rotary_mode	subsegb	use	NA	NA
by104	11	4	NA	31.67	951115	rotary_mode	subsegb	use	NA	NA
by104	11	4	NA	33.91	951115	rotary_mode	subsegc	use	NA	NA
by104	11	4	NA	33.92	951115	rotary_mode	subsegc	use	NA	NA
by104	11	4	0.527	NA	951115	rotary_mode	subsegb	use	NA	NA
by104	11	4	0.542	NA	951115	rotary_mode	subsega	use	NA	NA
by104	11	4	0.571	NA	951115	rotary_mode	subsegc	use	NA	NA
by104	11	4	0.581	NA	951115	rotary_mode	subsegc	use	NA	NA
by104	11	4	0.606	NA	951115	rotary_mode	subsega	use	NA	NA
by104	11	4	0.609	NA	951115	rotary_mode	subsegb	use	NA	NA
by104	11	5	NA	20.34	951115	rotary_mode	subsegb	use	NA	NA
by104	11	5	NA	21.08	951115	rotary_mode	subsegb	use	NA	NA
by104	11	5	NA	21.29	951115	rotary_mode	subsegd	use	NA	NA
by104	11	5	NA	21.7	951115	rotary_mode	subsegd	use	NA	NA
by104	11	5	NA	22.52	951115	rotary_mode	subsegd	use	NA	NA
by104	11	5	NA	23.36	951115	rotary_mode	subsegc	use	NA	NA
by104	11	5	NA	24.11	951115	rotary_mode	subsega	use	NA	NA
by104	11	5	NA	24.42	951115	rotary_mode	subsega	use	NA	NA
by104	11	5	NA	24.45	951115	rotary_mode	subsegd	use	NA	NA
by104	11	5	NA	32.83	951115	rotary_mode	subsegc	use	NA	NA
by104	11	5	0.505	NA	951115	rotary_mode	subsegc	use	NA	NA
by104	11	5	0.602	NA	951115	rotary_mode	subsegb	use	NA	NA
by104	11	5	0.605	NA	951115	rotary_mode	subsegc	use	NA	NA
by104	11	5	0.617	NA	951115	rotary_mode	subsega	use	NA	NA
by104	11	5	0.626	NA	951115	rotary_mode	subsegd	use	NA	NA
by104	11	5	0.628	NA	951115	rotary_mode	subsegd	use	NA	NA
by104	11	5	0.641	NA	951115	rotary_mode	subsega	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by104	11	5	0.657	NA	951115	rotary_mode	subsegb	use	NA	NA
by104	11	6	NA	0.752	951115	rotary_mode	subsegd	use.dl	NA	NA
by104	11	6	NA	0.894	951115	rotary_mode	subsegc	use.dl	NA	NA
by104	11	6	NA	0.963	951115	rotary_mode	subsegc	use.dl	NA	NA
by104	11	6	NA	0.997	951115	rotary_mode	subsegd	use.dl	NA	NA
by104	11	6	NA	22.9	951115	rotary_mode	subsegc	use	NA	NA
by104	11	6	NA	22.97	951115	rotary_mode	subsegd	use	NA	NA
by104	11	6	NA	23	951115	rotary_mode	subsegc	use	NA	NA
by104	11	6	NA	23.1	951115	rotary_mode	subsegd	use	NA	NA
by104	11	6	NA	23.2	951115	rotary_mode	subsegd	use	NA	NA
by104	11	6	NA	24.24	951115	rotary_mode	subsegd	use	NA	NA
by104	11	6	NA	26.33	951115	rotary_mode	subsega	use	NA	NA
by104	11	6	NA	28.005	951115	rotary_mode	subsegc	use	NA	NA
by104	11	6	NA	28.77	951115	rotary_mode	subsega	use	NA	NA
by104	11	6	NA	30.64	951115	rotary_mode	subsegb	use	NA	NA
by104	11	6	NA	33.01	951115	rotary_mode	subsegb	use	NA	NA
by104	11	6	0.393	NA	951115	rotary_mode	subsegb	use	NA	NA
by104	11	6	0.405	NA	951115	rotary_mode	subsegb	use	NA	NA
by104	11	6	0.485	NA	951115	rotary_mode	subsega	use	NA	NA
by104	11	6	0.496	NA	951115	rotary_mode	subsega	use	NA	NA
by104	11	6	0.516	NA	951115	rotary_mode	subsegc	use	NA	NA
by104	11	6	0.539	NA	951115	rotary_mode	subsegc	use	NA	NA
by104	11	6	0.6	NA	951115	rotary_mode	subsegd	use	NA	NA
by104	11	6	0.61	NA	951115	rotary_mode	subsegd	use	NA	NA
by104	11	7	NA	24.36	951115	rotary_mode	subsegd	use	NA	NA
by104	11	7	NA	25.73	951115	rotary_mode	subsega	use	NA	NA
by104	11	7	NA	25.85	951115	rotary_mode	subsega	use	NA	NA
by104	11	7	NA	26.65	951115	rotary_mode	subsegb	use	NA	NA
by104	11	7	NA	26.81	951115	rotary_mode	subsegd	use	NA	NA
by104	11	7	NA	27.83	951115	rotary_mode	subsegc	use	NA	NA
by104	11	7	NA	28.21	951115	rotary_mode	subsegb	use	NA	NA
by104	11	7	NA	29.2	951115	rotary_mode	subsegc	use	NA	NA
by104	11	7	0.631	NA	951115	rotary_mode	subsega	use	NA	NA
by104	11	7	0.668	NA	951115	rotary_mode	subsegb	use	NA	NA
by104	11	7	0.731	NA	951115	rotary_mode	subsega	use	NA	NA
by104	11	7	0.759	NA	951115	rotary_mode	subsegb	use	NA	NA
by104	11	7	0.843	NA	951115	rotary_mode	subsegc	use	NA	NA
by104	11	7	0.85	NA	951115	rotary_mode	subsegc	use	NA	NA
by104	11	7	1.22	NA	951115	rotary_mode	subsegd	use	NA	NA
by104	11	7	1.28	NA	951115	rotary_mode	subsegd	use	NA	NA
by104	11	8	NA	26.76	951115	rotary_mode	subsega	use	NA	NA
by104	11	8	NA	26.96	951115	rotary_mode	subsega	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by104	11	8	NA	33.59	951115	rotary_mode	subsegd	use	NA	NA
by104	11	8	NA	35.26	951115	rotary_mode	subsegd	use	NA	NA
by104	11	8	0.675	NA	951115	rotary_mode	subsegd	use	NA	NA
by104	11	8	0.707	NA	951115	rotary_mode	subsegd	use	NA	NA
by104	11	8	1.36	NA	951115	rotary_mode	subsega	use	NA	NA
by104	11	8	1.62	NA	951115	rotary_mode	subsega	use	NA	NA
by104	11a	1	NA	36.64	951115	rotary_mode	upper.1/2	use	NA	NA
by104	11a	1	NA	37.49	951115	rotary_mode	upper.1/2	use	NA	NA
by104	11a	1	NA	48.93	951115	rotary_mode	total	use	NA	NA
by104	11a	1	NA	49.05	951115	rotary_mode	total	use	NA	NA
by104	11a	2	NA	28.11	951115	rotary_mode	subsega	use	NA	NA
by104	11a	2	NA	30.24	951115	rotary_mode	subsega	use	NA	NA
by104	11a	2	NA	34.4	951115	rotary_mode	subsegd	use	NA	NA
by104	11a	2	NA	37.81	951115	rotary_mode	subsegd	use	NA	NA
by104	11a	2	NA	48.8	951115	rotary_mode	total	use	NA	NA
by104	11a	2	NA	48.95	951115	rotary_mode	total	use	NA	NA
by104	11a	2	0.322	NA	951115	rotary_mode	subsega	use	NA	NA
by104	11a	2	0.356	NA	951115	rotary_mode	subsega	use	NA	NA
by104	11a	2	1.01	NA	951115	rotary_mode	subsegd	use	NA	NA
by104	11a	2	1.06	NA	951115	rotary_mode	subsegd	use	NA	NA
by104	11a	3	NA	26.37	951115	rotary_mode	subsegc	use	NA	NA
by104	11a	3	NA	28.19	951115	rotary_mode	subsegc	use	NA	NA
by104	11a	3	NA	35.97	951115	rotary_mode	upper.1/2	use	NA	NA
by104	11a	3	NA	37.06	951115	rotary_mode	upper.1/2	use	NA	NA
by104	11a	3	0.602	NA	951115	rotary_mode	subsegc	use	NA	NA
by104	11a	3	0.649	NA	951115	rotary_mode	subsegc	use	NA	NA
by104	11a	4	NA	13.4	951115	rotary_mode	upper.1/2	use	NA	NA
by104	11a	4	NA	13.86	951115	rotary_mode	upper.1/2	use	NA	NA
by104	11a	4	NA	14.6	951115	rotary_mode	upper.1/2	use	NA	NA
by104	11a	4	NA	15.6	951115	rotary_mode	upper.1/2	use	NA	NA
by104	11a	5	NA	15.26	951115	rotary_mode	subsegc	use	NA	NA
by104	11a	5	NA	16.14	951115	rotary_mode	subsegc	use	NA	NA
by104	11a	5	NA	16.4	951115	rotary_mode	subsegc	use	NA	NA
by104	11a	5	NA	16.61	951115	rotary_mode	subsega	use	NA	NA
by104	11a	5	NA	17.55	951115	rotary_mode	subsegc	use	NA	NA
by104	11a	5	NA	18.13	951115	rotary_mode	subsega	use	NA	NA
by104	11a	5	0.295	NA	951115	rotary_mode	subsega	use	NA	NA
by104	11a	5	0.306	NA	951115	rotary_mode	subsega	use	NA	NA
by104	11a	5	0.318	NA	951115	rotary_mode	subsegc	use	NA	NA
by104	11a	5	0.33	NA	951115	rotary_mode	subsegc	use	NA	NA
by104	10b	1	NA	15	930502	auger	NA	del.qa	NA	NA
by104	10b	1	1.1	NA	930502	auger	NA	del.qa	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by104	5	1	NA	17	930503	auger	NA	del.qa	NA	NA
by104	5	1	0.6	NA	930503	auger	NA	del.qa	NA	NA
by104	5	1	NA	17	930501	auger	NA	del.qa	NA	NA
by104	5	1	0.9	NA	930501	auger	NA	del.qa	NA	NA
by105	12a	1	NA	19.88	950914	rotary_mode	total	use	NA	NA
by105	12a	1	NA	27.11	950914	rotary_mode	total	use	NA	NA
by105	12a	1	NA	29	950914	rotary_mode	total	use	NA	NA
by105	12a	1	NA	54.03	950914	rotary_mode	total	use	NA	NA
by105	12a	1	NA	54.41	950914	rotary_mode	total	use	NA	NA
by105	12a	1	0.13813	NA	950914	rotary_mode	total	use	NA	NA
by105	12a	1	0.13885	NA	950914	rotary_mode	total	use	NA	NA
by105	12a	1	0.346	NA	950914	rotary_mode	total	use	NA	NA
by105	12a	1	0.347	NA	950914	rotary_mode	total	use	NA	NA
by105	12a	1	NA	9.09	950914	rotary_mode	total	use	NA	NA
by105	12a	1	NA	9.47	950914	rotary_mode	total	use	NA	NA
by105	12a	1	NA	54.07	950914	rotary_mode	total	use	NA	NA
by105	12a	1	NA	54.36	950914	rotary_mode	total	use	NA	NA
by105	12a	1	0.13979	NA	950914	rotary_mode	total	use	NA	NA
by105	12a	1	0.14265	NA	950914	rotary_mode	total	use	NA	NA
by105	12a	1	0.68	NA	950914	rotary_mode	total	use	NA	NA
by105	12a	1	0.697	NA	950914	rotary_mode	total	use	NA	NA
by105	12a	1	NA	21.06	950914	rotary_mode	total	use	NA	NA
by105	12a	1	NA	22.83	950914	rotary_mode	total	use	NA	NA
by105	12a	1	NA	53.58	950914	rotary_mode	total	use	NA	NA
by105	12a	1	NA	54.1	950914	rotary_mode	total	use	NA	NA
by105	12a	1	0.12624	NA	950914	rotary_mode	total	use	NA	NA
by105	12a	1	0.1461	NA	950914	rotary_mode	total	use	NA	NA
by105	12a	1	0.54	NA	950914	rotary_mode	total	use	NA	NA
by105	12a	1	0.571	NA	950914	rotary_mode	total	use	NA	NA
by105	12a	1	NA	18.07	950914	rotary_mode	total	use	NA	NA
by105	12a	1	NA	28.58	950914	rotary_mode	total	use	NA	NA
by105	12a	1	NA	34.23	950914	rotary_mode	total	use	NA	NA
by105	12a	1	0.634	NA	950914	rotary_mode	total	use	NA	NA
by105	12a	1	0.761	NA	950914	rotary_mode	total	use	NA	NA
by105	12a	1	NA	14.76	950914	rotary_mode	total	use	NA	NA
by105	12a	1	NA	17.69	950914	rotary_mode	total	use	NA	NA
by105	12a	1	NA	39.65	950914	rotary_mode	total	use	NA	NA
by105	12a	1	0.403	NA	950914	rotary_mode	total	use	NA	NA
by105	12a	1	0.41	NA	950914	rotary_mode	total	use	NA	NA
by105	12a	2	NA	16.46	950914	rotary_mode	total	use	NA	NA
by105	12a	2	NA	17.1	950914	rotary_mode	total	use	NA	NA
by105	12a	2	0.403	NA	950914	rotary_mode	total	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by105	12a	2	0.412	NA	950914	rotary_mode	total	use	NA	NA
by105	12a	2	NA	19.43	950914	rotary_mode	total	use	NA	NA
by105	12a	2	NA	20.74	950914	rotary_mode	total	use	NA	NA
by105	12a	2	NA	37.32	950914	rotary_mode	total	use	NA	NA
by105	12a	2	NA	41.35	950914	rotary_mode	total	use	NA	NA
by105	12a	2	NA	53.1	950914	rotary_mode	total	use	NA	NA
by105	12a	2	NA	53.29	950914	rotary_mode	total	use	NA	NA
by105	12a	2	0.15801	NA	950914	rotary_mode	total	use	NA	NA
by105	12a	2	0.16157	NA	950914	rotary_mode	total	use	NA	NA
by105	12a	2	0.199	NA	950914	rotary_mode	total	use	NA	NA
by105	12a	2	0.237	NA	950914	rotary_mode	total	use	NA	NA
by105	12a	2	NA	22.61	950914	rotary_mode	total	use	NA	NA
by105	12a	2	NA	22.89	950914	rotary_mode	total	use	NA	NA
by105	12a	2	NA	32.35	950914	rotary_mode	total	use	NA	NA
by105	12a	2	0.45	NA	950914	rotary_mode	total	use	NA	NA
by105	12a	2	0.516	NA	950914	rotary_mode	total	use	NA	NA
by105	12a	3	NA	2.8	950914	rotary_mode	total	use	NA	NA
by105	12a	3	NA	6.12	950914	rotary_mode	total	use	NA	NA
by105	12a	3	NA	8.27	950914	rotary_mode	total	use	NA	NA
by105	12a	3	0.065	NA	950914	rotary_mode	total	use	NA	NA
by105	12a	3	0.0687	NA	950914	rotary_mode	total	use	NA	NA
by106	10b	1	NA	46.24	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	1	NA	47.17	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	1	0.241	NA	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	1	0.257	NA	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	2	NA	46.65	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	2	NA	47.26	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	2	0.227	NA	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	2	0.285	NA	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	3	NA	60.4267	950121	rotary_mode	upper.1/2	use	0.21	0.79
by106	10b	3	NA	62.2154	950121	rotary_mode	upper.1/2	use	0.21	0.79
by106	10b	3	NA	67.93	950121	rotary_mode	drainable	del.dr	0.21	0.79
by106	10b	3	NA	68.57	950121	rotary_mode	drainable	del.dr	0.21	0.79
by106	10b	3	0.1494	NA	950121	rotary_mode	drainable	del.dr	0.21	0.79
by106	10b	3	0.15743	NA	950121	rotary_mode	drainable	del.dr	0.21	0.79
by106	10b	3	0.18474	NA	950121	rotary_mode	drainable	del.dr	0.21	0.79
by106	10b	3	0.18635	NA	950121	rotary_mode	drainable	del.dr	0.21	0.79
by106	10b	3	0.1830431	NA	950121	rotary_mode	upper.1/2	use	0.21	0.79
by106	10b	3	0.1804953	NA	950121	rotary_mode	upper.1/2	use	0.21	0.79
by106	10b	4	NA	9.7	950121	rotary_mode	lower.1/2	use	NA	NA
by106	10b	4	NA	9.78	950121	rotary_mode	lower.1/2	use	NA	NA
by106	10b	4	NA	21.07	950121	rotary_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by106	10b	4	NA	25.62	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	4	0.123	NA	950121	rotary_mode	lower.1/2	use	NA	NA
by106	10b	4	0.131	NA	950121	rotary_mode	lower.1/2	use	NA	NA
by106	10b	4	0.418	NA	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	4	0.441	NA	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	5	NA	14.24	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	5	NA	14.37	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	5	0.0733	NA	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	5	0.0994	NA	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	6	NA	49.6788	950121	rotary_mode	upper.1/2	use	0.14	0.86
by106	10b	6	NA	49.4516	950121	rotary_mode	upper.1/2	use	0.14	0.86
by106	10b	6	NA	54.57	950121	rotary_mode	drainable	del.dr	0.14	0.86
by106	10b	6	NA	55.22	950121	rotary_mode	drainable	del.dr	0.14	0.86
by106	10b	6	0.28115	NA	950121	rotary_mode	upper.1/2	use	0.14	0.86
by106	10b	6	0.288472	NA	950121	rotary_mode	upper.1/2	use	0.14	0.86
by106	10b	6	0.32	NA	950121	rotary_mode	drainable	del.dr	0.14	0.86
by106	10b	6	0.3123	NA	950121	rotary_mode	drainable	del.dr	0.14	0.86
by106	10b	8	NA	8.26	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	8	NA	11.57	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	8	NA	17.65	950121	rotary_mode	lower.1/2	use	NA	NA
by106	10b	8	NA	20.47	950121	rotary_mode	lower.1/2	use	NA	NA
by106	10b	8	NA	43.17	950121	rotary_mode	lower.1/2	use	NA	NA
by106	10b	8	NA	43.45	950121	rotary_mode	lower.1/2	use	NA	NA
by106	10b	8	0.0823	NA	950121	rotary_mode	lower.1/2	use	NA	NA
by106	10b	8	0.094	NA	950121	rotary_mode	lower.1/2	use	NA	NA
by106	10b	8	0.105	NA	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	8	0.105	NA	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	8	0.286	NA	950121	rotary_mode	lower.1/2	use	NA	NA
by106	10b	8	0.302	NA	950121	rotary_mode	lower.1/2	use	NA	NA
by106	10b	9	NA	14.94	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	9	NA	18.38	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	9	0.0403	NA	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	9	0.0464	NA	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	10	NA	11.66	950121	rotary_mode	lower.1/2	use	0.35	0.58
by106	10b	10	NA	57.0938	950121	rotary_mode	upper.1/2	use	0.07	0.58
by106	10b	10	NA	31.408	950121	rotary_mode	lower.1/2	use	0.35	0.58
by106	10b	10	NA	33.225	950121	rotary_mode	lower.1/2	use	0.35	0.58
by106	10b	10	NA	23.54	950121	rotary_mode	upper.1/2	use	0.07	0.58
by106	10b	10	NA	58.4656	950121	rotary_mode	upper.1/2	use	0.07	0.58
by106	10b	10	NA	63.85	950121	rotary_mode	drainable	del.dr	0.42	0.58
by106	10b	10	NA	64.07	950121	rotary_mode	drainable	del.dr	0.42	0.58
by106	10b	10	0.103898	NA	950121	rotary_mode	lower.1/2	use	0.35	0.58

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by106	10b	10	0.1793916	NA	950121	rotary_mode	upper.1/2	use	0.07	0.58
by106	10b	10	0.147473	NA	950121	rotary_mode	lower.1/2	use	0.35	0.58
by106	10b	10	0.1776626	NA	950121	rotary_mode	upper.1/2	use	0.07	0.58
by106	10b	10	0.17891	NA	950121	rotary_mode	drainable	del.dr	0.42	0.58
by106	10b	10	0.18906	NA	950121	rotary_mode	drainable	del.dr	0.42	0.58
by106	10b	11	NA	3.51	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	11	NA	4.05	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	11	0.04	NA	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	11	0.0596	NA	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	13	NA	10.15	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	13	NA	12.26	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	13	0.0111	NA	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	13	0.0123	NA	950121	rotary_mode	upper.1/2	use	NA	NA
by106	10b	11	NA	20.63	950124	rotary_mode	upper.1/2	use	NA	NA
by106	10b	11	NA	25.28	950124	rotary_mode	upper.1/2	use	NA	NA
by106	10b	13	NA	27.38	950124	rotary_mode	upper.1/2	use	NA	NA
by106	10b	13	NA	28.93	950124	rotary_mode	upper.1/2	use	NA	NA
by106	10b	13	NA	36.62	950124	rotary_mode	upper.1/2	use	NA	NA
by106	10b	13	NA	38.01	950124	rotary_mode	upper.1/2	use	NA	NA
by106	10b	13	1.92	NA	950124	rotary_mode	upper.1/2	use	NA	NA
by106	10b	13	1.99	NA	950124	rotary_mode	upper.1/2	use	NA	NA
by106	10b	13	2.08	NA	950124	rotary_mode	upper.1/2	use	NA	NA
by106	10b	13	2.17	NA	950124	rotary_mode	upper.1/2	use	NA	NA
by106	5	1	NA	15.06	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	1	NA	17.45	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	1	0.0752	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	1	0.0812	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	2	NA	30.5	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	2	NA	30.84	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	2	0.424	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	2	0.477	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	3	NA	17.91	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	3	NA	19.02	960102	rotary_mode	lower.1/2	use	NA	NA
by106	5	3	NA	21.57	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	3	NA	27.47	960102	rotary_mode	lower.1/2	use	NA	NA
by106	5	3	0.245	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	3	0.309	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	3	0.318	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	3	0.339	NA	960102	rotary_mode	lower.1/2	use	NA	NA
by106	5	3	0.389	NA	960102	rotary_mode	lower.1/2	use	NA	NA
by106	5	4	NA	12.05	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	4	NA	12.7	960102	rotary_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by106	5	4	NA	12.74	960102	rotary_mode	lower.1/2	use	NA	NA
by106	5	4	NA	15.58	960102	rotary_mode	lower.1/2	use	NA	NA
by106	5	4	0.202	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	4	0.202	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	4	0.277	NA	960102	rotary_mode	lower.1/2	use	NA	NA
by106	5	4	0.417	NA	960102	rotary_mode	lower.1/2	use	NA	NA
by106	5	4	0.442	NA	960102	rotary_mode	lower.1/2	use	NA	NA
by106	5	5	NA	19.45	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	5	NA	20.58	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	5	0.495	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	5	0.5	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	6	NA	14.6	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	6	NA	14.91	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	6	0.338	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	6	0.366	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	7	NA	16.08	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	7	NA	17.37	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	7	0.417	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	7	0.419	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	8	NA	26.58	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	8	NA	30.19	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	8	NA	33.85	960102	rotary_mode	lower.1/2	use	NA	NA
by106	5	8	NA	36.63	960102	rotary_mode	lower.1/2	use	NA	NA
by106	5	8	NA	37	960102	rotary_mode	lower.1/2	use	NA	NA
by106	5	8	NA	38.64	960102	rotary_mode	lower.1/2	use	NA	NA
by106	5	8	0.54	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	8	0.542	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	8	0.567	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	8	0.584	NA	960102	rotary_mode	lower.1/2	use	NA	NA
by106	5	8	0.589	NA	960102	rotary_mode	lower.1/2	use	NA	NA
by106	5	8	0.591	NA	960102	rotary_mode	lower.1/2	use	NA	NA
by106	5	9	NA	21.02	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	9	NA	24.54	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	9	NA	29.53	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	9	NA	30.42	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	9	0.592	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	9	0.593	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	10	NA	6.31	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	10	NA	10.49	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	10	0.103	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	10	0.113	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	10	0.121	NA	960102	rotary_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by106	5	10	NA	18.35	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	10	NA	18.47	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	10	0.49	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	10	0.513	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	10	NA	36.81	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	10	NA	45.28	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	10	NA	48.24	960102	rotary_mode	lower.1/2	use	NA	NA
by106	5	10	NA	48.82	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	10	NA	48.86	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	10	NA	48.93	960102	rotary_mode	lower.1/2	use	NA	NA
by106	5	10	NA	49.56	960102	rotary_mode	total	use	NA	NA
by106	5	10	NA	51.38	960102	rotary_mode	total	use	NA	NA
by106	5	10	0.106	NA	960102	rotary_mode	lower.1/2	use	NA	NA
by106	5	10	0.112	NA	960102	rotary_mode	lower.1/2	use	NA	NA
by106	5	10	0.119	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	10	0.144	NA	960102	rotary_mode	upper.1/2	use	NA	NA
by106	5	10	0.1636	NA	960102	rotary_mode	total	use	NA	NA
by106	5	10	0.18555	NA	960102	rotary_mode	total	use	NA	NA
by107	8	1	NA	44.5403	960612	push_mode	lower.1/2	use	0.11	0.89
by107	8	1	NA	44.7383	960612	push_mode	lower.1/2	use	0.11	0.89
by107	8	1	NA	48.75	960612	push_mode	drainable	del.dr	0.11	0.89
by107	8	1	NA	49.08	960612	push_mode	drainable	del.dr	0.11	0.89
by107	8	1	0.0151	NA	960612	push_mode	lower.1/2	use	0.11	0.89
by107	8	1	0.1552104	NA	960612	push_mode	lower.1/2	use	0.11	0.89
by107	8	1	0.1329776	NA	960612	push_mode	lower.1/2	use	0.11	0.89
by107	8	1	0.14484	NA	960612	push_mode	drainable	del.dr	0.11	0.89
by107	8	1	0.17186	NA	960612	push_mode	drainable	del.dr	0.11	0.89
by107	8	1	NA	46.4296	960612	push_mode	lower.1/2	use	0.12	0.88
by107	8	1	NA	47.9772	960612	push_mode	lower.1/2	use	0.12	0.88
by107	8	1	NA	48.82	960612	push_mode	drainable	del.dr	0.12	0.88
by107	8	1	NA	50.49	960612	push_mode	drainable	del.dr	0.12	0.88
by107	8	1	0.149828	NA	960612	push_mode	lower.1/2	use	0.12	0.88
by107	8	1	0.1571816	NA	960612	push_mode	lower.1/2	use	0.12	0.88
by107	8	1	0.15845	NA	960612	push_mode	drainable	del.dr	0.12	0.88
by107	8	1	0.16457	NA	960612	push_mode	drainable	del.dr	0.12	0.88
by107	8	2	NA	37.64372	960612	push_mode	upper.1/2	use	0.29	0.4
by107	8	2	NA	37.7504	960612	push_mode	upper.1/2	use	0.29	0.4
by107	8	2	NA	38.0561	960612	push_mode	upper.1/2	use	0.29	0.4
by107	8	2	NA	42.401	960612	push_mode	lower.1/2	use	0.3	0.4
by107	8	2	NA	47.0333	960612	push_mode	upper.1/2	use	0.29	0.4
by107	8	2	NA	47.075	960612	push_mode	lower.1/2	use	0.3	0.4
by107	8	2	NA	48.26	960612	push_mode	drainable	del.dr	0.6	0.4

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by107	8	2	NA	48.47	960612	push_mode	drainable	del.dr	0.6	0.4
by107	8	2	0.16113	NA	960612	push_mode	drainable	del.dr	0.6	0.4
by107	8	2	0.16247	NA	960612	push_mode	drainable	del.dr	0.6	0.4
by107	8	2	0.2515346	NA	960612	push_mode	upper.1/2	use	0.29	0.4
by107	8	2	0.416	NA	960612	push_mode	upper.1/2	use	0.29	0.4
by107	8	2	0.3593974	NA	960612	push_mode	upper.1/2	use	0.29	0.4
by107	8	2	0.421388	NA	960612	push_mode	lower.1/2	use	0.3	0.4
by107	8	2	0.499452	NA	960612	push_mode	lower.1/2	use	0.3	0.4
by107	8	3	NA	46.25	960612	push_mode	lower.1/2	use	NA	NA
by107	8	3	NA	47.1	960612	push_mode	upper.1/2	use	NA	NA
by107	8	3	NA	48.36	960612	push_mode	lower.1/2	use	NA	NA
by107	8	3	NA	48.93	960612	push_mode	upper.1/2	use	NA	NA
by107	8	3	0.0259	NA	960612	push_mode	lower.1/2	use	NA	NA
by107	8	3	0.0504	NA	960612	push_mode	lower.1/2	use	NA	NA
by107	8	3	0.482	NA	960612	push_mode	lower.1/2	use	NA	NA
by107	8	3	0.528	NA	960612	push_mode	upper.1/2	use	NA	NA
by107	8	3	0.573	NA	960612	push_mode	upper.1/2	use	NA	NA
by107	8	4	NA	29.86	960612	push_mode	upper.1/2	use	NA	NA
by107	8	4	NA	31.24	960612	push_mode	upper.1/2	use	NA	NA
by107	8	4	NA	36.44	960612	push_mode	lower.1/2	use	NA	NA
by107	8	4	NA	36.79	960612	push_mode	lower.1/2	use	NA	NA
by107	8	4	0.541	NA	960612	push_mode	lower.1/2	use	NA	NA
by107	8	4	0.557	NA	960612	push_mode	lower.1/2	use	NA	NA
by107	8	4	0.686	NA	960612	push_mode	upper.1/2	use	NA	NA
by107	8	4	0.749	NA	960612	push_mode	upper.1/2	use	NA	NA
by107	9b	1	NA	47.008	960725	push_mode	lower.1/2	use	0.36	0.64
by107	9b	1	NA	47.0688	960725	push_mode	lower.1/2	use	0.36	0.64
by107	9b	1	NA	49.47	960725	push_mode	drainable	del.dr	0.36	0.64
by107	9b	1	NA	49.6	960725	push_mode	drainable	del.dr	0.36	0.64
by107	9b	1	0.12996	NA	960725	push_mode	drainable	del.dr	0.36	0.64
by107	9b	1	0.15458	NA	960725	push_mode	drainable	del.dr	0.36	0.64
by107	9b	1	0.3570512	NA	960725	push_mode	lower.1/2	use	0.36	0.64
by107	9b	1	0.3600144	NA	960725	push_mode	lower.1/2	use	0.36	0.64
by107	9b	2	NA	36.1255	960725	push_mode	subsegc	use	0.15	0.6
by107	9b	2	NA	38.5915	960725	push_mode	subsegc	use	0.15	0.6
by107	9b	2	NA	45.577	960725	push_mode	subsega	use	0.1	0.6
by107	9b	2	NA	46.066	960725	push_mode	subsega	use	0.1	0.6
by107	9b	2	NA	44.5612	960725	push_mode	subsegb	use	0.14	0.6
by107	9b	2	NA	45.4588	960725	push_mode	subsegb	use	0.14	0.6
by107	9b	2	NA	49.81	960725	push_mode	drainable	del.dr	0.4	0.6
by107	9b	2	NA	50.08	960725	push_mode	drainable	del.dr	0.4	0.6
by107	9b	2	0.0925315	NA	960725	push_mode	subsegc	use	0.15	0.6

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by107	9b	2	0.1346145	NA	960725	push_mode	subsegc	use	0.15	0.6
by107	9b	2	0.10948	NA	960725	push_mode	subsegc	use	0.15	0.6
by107	9b	2	0.1222534	NA	960725	push_mode	subsegb	use	0.14	0.6
by107	9b	2	0.123768	NA	960725	push_mode	subsegb	use	0.14	0.6
by107	9b	2	0.1411	NA	960725	push_mode	drainable	del.dr	0.4	0.6
by107	9b	2	0.15343	NA	960725	push_mode	drainable	del.dr	0.4	0.6
by107	9b	2	0.1943442	NA	960725	push_mode	subsegb	use	0.14	0.6
by107	9b	2	0.21849	NA	960725	push_mode	drainable	del.dr	0.4	0.6
by107	9b	2	0.338943	NA	960725	push_mode	subsega	use	0.1	0.6
by107	9b	2	0.302701	NA	960725	push_mode	subsega	use	0.1	0.6
by107	9b	2	NA	44.7412	960725	push_mode	upper.1/2	use	0.09	0.59
by107	9b	2	NA	37.6904	960725	push_mode	lower.1/2	use	0.32	0.59
by107	9b	2	NA	46.3518	960725	push_mode	upper.1/2	use	0.09	0.59
by107	9b	2	NA	43.8348	960725	push_mode	lower.1/2	use	0.32	0.59
by107	9b	2	NA	48.91	960725	push_mode	drainable	del.dr	0.41	0.59
by107	9b	2	NA	49.14	960725	push_mode	drainable	del.dr	0.41	0.59
by107	9b	2	0.086752	NA	960725	push_mode	lower.1/2	use	0.32	0.59
by107	9b	2	0.107	NA	960725	push_mode	lower.1/2	use	0.32	0.59
by107	9b	2	0.1585804	NA	960725	push_mode	lower.1/2	use	0.32	0.59
by107	9b	2	0.148	NA	960725	push_mode	drainable	del.dr	0.41	0.59
by107	9b	2	0.22539	NA	960725	push_mode	drainable	del.dr	0.41	0.59
by107	9b	2	0.3279198	NA	960725	push_mode	upper.1/2	use	0.09	0.59
by107	9b	2	0.844	NA	960725	push_mode	upper.1/2	use	0.09	0.59
by107	9b	2	0.29614	NA	960725	push_mode	upper.1/2	use	0.09	0.59
by107	9b	3	NA	45.4535	960725	push_mode	lower.1/2	use	0.59	0.41
by107	9b	3	NA	46.36	960725	push_mode	drainable	del.dr	0.59	0.41
by107	9b	3	NA	47.43	960725	push_mode	drainable	del.dr	0.59	0.41
by107	9b	3	NA	47.3571	960725	push_mode	lower.1/2	use	0.59	0.41
by107	9b	3	0.16051	NA	960725	push_mode	drainable	del.dr	0.59	0.41
by107	9b	3	0.18048	NA	960725	push_mode	drainable	del.dr	0.59	0.41
by107	9b	3	0.1938391	NA	960725	push_mode	lower.1/2	use	0.59	0.41
by107	9b	3	0.2085168	NA	960725	push_mode	lower.1/2	use	0.59	0.41
by107	9b	3	NA	46.5292	960725	push_mode	lower.1/2	use	0.24	0.76
by107	9b	3	NA	47.6472	960725	push_mode	lower.1/2	use	0.24	0.76
by107	9b	3	NA	48.06	960725	push_mode	drainable	del.dr	0.24	0.76
by107	9b	3	NA	48.31	960725	push_mode	drainable	del.dr	0.24	0.76
by107	9b	3	0.14461	NA	960725	push_mode	drainable	del.dr	0.24	0.76
by107	9b	3	0.15689	NA	960725	push_mode	drainable	del.dr	0.24	0.76
by107	9b	3	0.2692364	NA	960725	push_mode	lower.1/2	use	0.24	0.76
by107	9b	3	0.2673436	NA	960725	push_mode	lower.1/2	use	0.24	0.76
by107	9b	4	NA	38.59	960725	push_mode	lower.1/2	use	0.5	0.15
by107	9b	4	NA	38.69	960725	push_mode	lower.1/2	use	0.5	0.15

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by107	9b	4	NA	44.6436	960725	push_mode	upper.1/2	use	0.17	0.15
by107	9b	4	NA	45.14	960725	push_mode	drainable	del.dr	0.85	0.15
by107	9b	4	NA	47.4032	960725	push_mode	upper.1/2	use	0.17	0.15
by107	9b	4	NA	48.43	960725	push_mode	drainable	del.dr	0.85	0.15
by107	9b	4	0.16769	NA	960725	push_mode	drainable	del.dr	0.85	0.15
by107	9b	4	0.18207	NA	960725	push_mode	drainable	del.dr	0.85	0.15
by107	9b	4	0.3054662	NA	960725	push_mode	upper.1/2	use	0.17	0.15
by107	9b	4	0.2986954	NA	960725	push_mode	upper.1/2	use	0.17	0.15
by107	9b	4	1.06	NA	960725	push_mode	lower.1/2	use	0.5	0.15
by107	9b	4	1.15	NA	960725	push_mode	lower.1/2	use	0.5	0.15
by108	12a	1	NA	22.616	950727	rotary_mode	seg	use	0.4	0.6
by108	12a	1	NA	23.86	950727	rotary_mode	seg	use	0.4	0.6
by108	12a	1	NA	31.9	950727	rotary_mode	drainable	del.dr	0.4	0.6
by108	12a	1	NA	34.04	950727	rotary_mode	drainable	del.dr	0.4	0.6
by108	12a	1	NA	35.832	950727	rotary_mode	seg	use	0.4	0.6
by108	12a	1	NA	36.556	950727	rotary_mode	seg	use	0.4	0.6
by108	12a	1	0.21568	NA	950727	rotary_mode	seg	use	0.4	0.6
by108	12a	1	0.21506	NA	950727	rotary_mode	seg	use	0.4	0.6
by108	12a	1	0.2031	NA	950727	rotary_mode	drainable	del.dr	0.4	0.6
by108	12a	1	0.2108	NA	950727	rotary_mode	drainable	del.dr	0.4	0.6
by108	12a	2	NA	14.125	950727	rotary_mode	subsegd	use	0.14	0.31
by108	12a	2	NA	14.061	950727	rotary_mode	subsegd	use	0.14	0.31
by108	12a	2	NA	18.381	950727	rotary_mode	upper.1/2	use	0.14	0.31
by108	12a	2	NA	17.918	950727	rotary_mode	upper.1/2	use	0.14	0.31
by108	12a	2	NA	25.03	950727	rotary_mode	drainable	del.dr	0.69	0.31
by108	12a	2	NA	27.11	950727	rotary_mode	drainable	del.dr	0.69	0.31
by108	12a	2	NA	32.975	950727	rotary_mode	subsegd	use	0.14	0.31
by108	12a	2	NA	35.377	950727	rotary_mode	subsegd	use	0.14	0.31
by108	12a	2	NA	35.327	950727	rotary_mode	subsegc	use	0.14	0.31
by108	12a	2	NA	36.819	950727	rotary_mode	subsegd	use	0.14	0.31
by108	12a	2	NA	38.863	950727	rotary_mode	subsegc	use	0.14	0.31
by108	12a	2	NA	38.393	950727	rotary_mode	subsegd	use	0.14	0.31
by108	12a	2	0.313035	NA	950727	rotary_mode	upper.1/2	use	0.23	0.31
by108	12a	2	0.314632	NA	950727	rotary_mode	upper.1/2	use	0.23	0.31
by108	12a	2	0.444135	NA	950727	rotary_mode	subsegc	use	0.23	0.31
by108	12a	2	0.480922	NA	950727	rotary_mode	subsegc	use	0.23	0.31
by108	12a	2	0.689775	NA	950727	rotary_mode	subsegd	use	0.23	0.31
by108	12a	2	0.738292	NA	950727	rotary_mode	subsegd	use	0.23	0.31
by108	12a	2	0.2085	NA	950727	rotary_mode	drainable	del.dr	0.69	0.31
by108	12a	2	0.2092	NA	950727	rotary_mode	drainable	del.dr	0.69	0.31
by108	12a	3	NA	18.924	950727	rotary_mode	subsegc	use	0.14	0.19
by108	12a	3	NA	19.3944	950727	rotary_mode	subsega	use	0.14	0.19

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by108	12a	3	NA	19.688	950727	rotary_mode	subsega	use	0.14	0.19
by108	12a	3	NA	20.444	950727	rotary_mode	subsegc	use	0.14	0.19
by108	12a	3	NA	35.1696	950727	rotary_mode	subsegd	use	0.14	0.19
by108	12a	3	NA	38.6804	950727	rotary_mode	subsega	use	0.14	0.19
by108	12a	3	NA	38.7056	950727	rotary_mode	subsegd	use	0.14	0.19
by108	12a	3	NA	38.58	950727	rotary_mode	drainable	del.dr	0.81	0.19
by108	12a	3	NA	39.0672	950727	rotary_mode	subsegd	use	0.14	0.19
by108	12a	3	NA	39.4448	950727	rotary_mode	subsegd	use	0.14	0.19
by108	12a	3	NA	39.47	950727	rotary_mode	drainable	del.dr	0.81	0.19
by108	12a	3	NA	40.8732	950727	rotary_mode	subsega	use	0.14	0.19
by108	12a	3	NA	46.9878	950727	rotary_mode	subsegc	use	0.27	0.19
by108	12a	3	NA	43.67	950727	rotary_mode	subsegc	use	0.14	0.19
by108	12a	3	0.255	NA	950727	rotary_mode	drainable	del.dr	0.81	0.19
by108	12a	3	0.29469	NA	950727	rotary_mode	subsegd	use	0.27	0.19
by108	12a	3	0.299129	NA	950727	rotary_mode	subsegd	use	0.27	0.19
by108	12a	3	0.338009	NA	950727	rotary_mode	subsegc	use	0.27	0.19
by108	12a	3	0.36192	NA	950727	rotary_mode	subsegc	use	0.27	0.19
by108	12a	3	0.37083	NA	950727	rotary_mode	subsega	use	0.27	0.19
by108	12a	3	0.368789	NA	950727	rotary_mode	subsega	use	0.27	0.19
by108	12a	3	0.1931	NA	950727	rotary_mode	drainable	del.dr	0.81	0.19
by108	12a	4	NA	16.31	950727	rotary_mode	subsega	use	NA	NA
by108	12a	4	NA	17.58	950727	rotary_mode	subsega	use	NA	NA
by108	12a	4	NA	19.95	950727	rotary_mode	subsegd	use	NA	NA
by108	12a	4	NA	20.93	950727	rotary_mode	subsegd	use	NA	NA
by108	12a	4	NA	28.88	950727	rotary_mode	subsega	use	NA	NA
by108	12a	4	NA	35.32	950727	rotary_mode	subsegd	use	NA	NA
by108	12a	4	NA	35.41	950727	rotary_mode	subsegb	use	NA	NA
by108	12a	4	NA	35.81	950727	rotary_mode	subsegb	use	NA	NA
by108	12a	4	NA	36.03	950727	rotary_mode	subsegb	use	NA	NA
by108	12a	4	NA	36.23	950727	rotary_mode	subsega	use	NA	NA
by108	12a	4	NA	36.4	950727	rotary_mode	subsegd	use	NA	NA
by108	12a	4	NA	36.49	950727	rotary_mode	subsegd	use	NA	NA
by108	12a	4	NA	36.64	950727	rotary_mode	subsega	use	NA	NA
by108	12a	4	NA	36.69	950727	rotary_mode	subsega	use	NA	NA
by108	12a	4	NA	37.28	950727	rotary_mode	subsegb	use	NA	NA
by108	12a	4	NA	37.47	950727	rotary_mode	subsegc	use	NA	NA
by108	12a	4	NA	37.91	950727	rotary_mode	subsegc	use	NA	NA
by108	12a	4	NA	38.31	950727	rotary_mode	subsegc	use	NA	NA
by108	12a	4	NA	39.45	950727	rotary_mode	subsegd	use	NA	NA
by108	12a	4	NA	39.82	950727	rotary_mode	subsegc	use	NA	NA
by108	12a	4	0.337	NA	950727	rotary_mode	subsegd	use	NA	NA
by108	12a	4	0.35	NA	950727	rotary_mode	subsegd	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by108	12a	4	0.567	NA	950727	rotary_mode	subsegc	use	NA	NA
by108	12a	4	0.587	NA	950727	rotary_mode	subsegc	use	NA	NA
by108	12a	4	1.04	NA	950727	rotary_mode	subsega	use	NA	NA
by108	12a	4	1.26	NA	950727	rotary_mode	subsega	use	NA	NA
by108	12a	4	2.07	NA	950727	rotary_mode	subsegb	use	NA	NA
by108	12a	4	2.09	NA	950727	rotary_mode	subsegb	use	NA	NA
by108	7	1	0.09923	NA	950801	rotary_mode	total	use.new	NA	NA
by108	7	1	0.07077	NA	950801	rotary_mode	total	use.new	NA	NA
by108	7	1	NA	39.3	950801	rotary_mode	total	use.new	NA	NA
by108	7	1	NA	42.4	950801	rotary_mode	total	use.new	NA	NA
by108	7	2	0.2385	NA	950801	rotary_mode	drainable	del.dr	0.11	0.89
by108	7	2	NA	47.3	950801	rotary_mode	drainable	use.dl	0.11	0.89
by108	7	2	0.1077	NA	950801	rotary_mode	drainable	del.dr	0.11	0.89
by108	7	2	NA	53.4	950801	rotary_mode	drainable	use.dl	0.11	0.89
by108	7	2	NA	11.8	950801	rotary_mode	total	use.dl	0.11	0.89
by108	7	2	NA	11.4	950801	rotary_mode	total	use.dl	0.11	0.89
by108	7	2	NA	18.8	950801	rotary_mode	total	use.dl	0.11	0.89
by108	7	2	NA	20.1	950801	rotary_mode	total	use.dl	0.11	0.89
by108	7	2	0.0990672	NA	950801	rotary_mode	seg	use.new	0.11	0.89
by108	7	2	0.2007524	NA	950801	rotary_mode	seg	use.new	0.11	0.89
by108	7	2	0.1261448	NA	950801	rotary_mode	seg	use.new	0.11	0.89
by108	7	2	0.2213994	NA	950801	rotary_mode	seg	use.new	0.11	0.89
by108	7	3	0.0846	NA	950801	rotary_mode	drainable	del.dr	0.63	0.37
by108	7	3	NA	53.3	950801	rotary_mode	drainable	use.dl	0.63	0.37
by108	7	3	0.1846	NA	950801	rotary_mode	drainable	del.dr	0.63	0.37
by108	7	3	NA	52.9	950801	rotary_mode	drainable	del.dr	0.63	0.37
by108	7	3	NA	36.9	950801	rotary_mode	total	use.dl	0.63	0.37
by108	7	3	NA	29.023	950801	rotary_mode	seg	use.new	0.63	0.37
by108	7	3	0.2398573	NA	950801	rotary_mode	seg	use.new	0.63	0.37
by108	7	3	0.1606914	NA	950801	rotary_mode	seg	use.new	0.63	0.37
by108	7	4	NA	28.5	950801	rotary_mode	total	use.new	NA	NA
by108	7	4	NA	28.9	950801	rotary_mode	total	use.new	NA	NA
by108	7	4	NA	44	950801	rotary_mode	total	use.new	NA	NA
by108	7	4	NA	43.2	950801	rotary_mode	total	use.new	NA	NA
by108	7	4	NA	40.7	950801	rotary_mode	total	use.new	NA	NA
by108	7	4	NA	40.9	950801	rotary_mode	total	use.new	NA	NA
by108	7	4	NA	47.8	950801	rotary_mode	total	use.new	NA	NA
by108	7	4	NA	45.7	950801	rotary_mode	total	use.new	NA	NA
by108	7	4	1.26923	NA	950801	rotary_mode	total	use.new	NA	NA
by108	7	4	1.31538	NA	950801	rotary_mode	total	use.new	NA	NA
by108	7	4	1.06923	NA	950801	rotary_mode	total	use.new	NA	NA
by108	7	4	1.02308	NA	950801	rotary_mode	total	use.new	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by108	7	4	0.43077	NA	950801	rotary_mode	total	use.new	NA	NA
by108	7	4	0.32077	NA	950801	rotary_mode	total	use.new	NA	NA
by108	7	4	0.24154	NA	950801	rotary_mode	total	use.new	NA	NA
by108	7	4	0.28462	NA	950801	rotary_mode	total	use.new	NA	NA
by108	7	1	NA	15.02	950816	rotary_mode	total	use	NA	NA
by108	7	1	NA	15.74	950816	rotary_mode	total	use	NA	NA
by108	7	1	NA	23.78	950816	rotary_mode	total	use	NA	NA
by108	7	1	NA	24.9	950816	rotary_mode	total	use	NA	NA
by108	7	1	0.25	NA	950816	rotary_mode	total	use	NA	NA
by108	7	1	0.3	NA	950816	rotary_mode	total	use	NA	NA
by108	7	2	NA	9.88	950816	rotary_mode	subsegc	use	NA	NA
by108	7	2	NA	10.41	950816	rotary_mode	subsega	use	NA	NA
by108	7	2	NA	12.77	950816	rotary_mode	subsega	use	NA	NA
by108	7	2	NA	13	950816	rotary_mode	subsega	use	NA	NA
by108	7	2	NA	15.4	950816	rotary_mode	subsegc	use	NA	NA
by108	7	2	NA	19.25	950816	rotary_mode	subsega	use	NA	NA
by108	7	2	NA	20.84	950816	rotary_mode	subsega	use	NA	NA
by108	7	2	NA	22.95	950816	rotary_mode	subsegc	use	NA	NA
by108	7	2	NA	23.67	950816	rotary_mode	subsegc	use	NA	NA
by108	7	2	NA	29.88	950816	rotary_mode	subsegb	use	NA	NA
by108	7	2	NA	29.9	950816	rotary_mode	subsegb	use	NA	NA
by108	7	2	NA	30.68	950816	rotary_mode	subsegb	use	NA	NA
by108	7	2	NA	33.54	950816	rotary_mode	subsegb	use	NA	NA
by108	7	2	0.238	NA	950816	rotary_mode	subsega	use	NA	NA
by108	7	2	0.245	NA	950816	rotary_mode	subsega	use	NA	NA
by108	7	2	0.281	NA	950816	rotary_mode	subsegc	use	NA	NA
by108	7	2	0.287	NA	950816	rotary_mode	subsegc	use	NA	NA
by108	7	2	0.424	NA	950816	rotary_mode	subsegb	use	NA	NA
by108	7	2	0.484	NA	950816	rotary_mode	subsegb	use	NA	NA
by108	7	3	NA	7.15	950816	rotary_mode	subsega	use	NA	NA
by108	7	3	NA	7.68	950816	rotary_mode	subsegc	use	NA	NA
by108	7	3	NA	7.79	950816	rotary_mode	subsega	use	NA	NA
by108	7	3	NA	7.82	950816	rotary_mode	subsegd	use	NA	NA
by108	7	3	NA	8.07	950816	rotary_mode	subsegd	use	NA	NA
by108	7	3	NA	11.12	950816	rotary_mode	subsegc	use	NA	NA
by108	7	3	NA	15.6	950816	rotary_mode	subsegd	use	NA	NA
by108	7	3	NA	22.2	950816	rotary_mode	subsegd	use	NA	NA
by108	7	3	NA	25.93	950816	rotary_mode	subsegc	use	NA	NA
by108	7	3	NA	26.93	950816	rotary_mode	subsegc	use	NA	NA
by108	7	3	NA	32.06	950816	rotary_mode	subsegd	use	NA	NA
by108	7	3	NA	41.3	950816	rotary_mode	subsega	use	NA	NA
by108	7	3	NA	41.77	950816	rotary_mode	subsega	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by108	7	3	0.148	NA	950816	rotary_mode	subsegc	use	NA	NA
by108	7	3	0.159	NA	950816	rotary_mode	subsegc	use	NA	NA
by108	7	3	0.199	NA	950816	rotary_mode	subsega	use	NA	NA
by108	7	3	0.213	NA	950816	rotary_mode	subsega	use	NA	NA
by108	7	3	0.624	NA	950816	rotary_mode	subsegd	use	NA	NA
by108	7	3	0.655	NA	950816	rotary_mode	subsegd	use	NA	NA
by108	7	4	NA	7.08	950816	rotary_mode	subsega	use	NA	NA
by108	7	4	NA	7.49	950816	rotary_mode	subsega	use	NA	NA
by108	7	4	NA	8.8	950816	rotary_mode	subsegd	use	NA	NA
by108	7	4	NA	9.77	950816	rotary_mode	subsegd	use	NA	NA
by108	7	4	NA	31.01	950816	rotary_mode	subsega	use	NA	NA
by108	7	4	NA	33.09	950816	rotary_mode	subsega	use	NA	NA
by108	7	4	NA	33.78	950816	rotary_mode	subsegd	use	NA	NA
by108	7	4	NA	36.22	950816	rotary_mode	subsegd	use	NA	NA
by108	7	4	NA	41.1	950816	rotary_mode	subsegc	use	NA	NA
by108	7	4	NA	41.13	950816	rotary_mode	subsegc	use	NA	NA
by108	7	4	NA	43.26	950816	rotary_mode	subsegc	use	NA	NA
by108	7	4	NA	45.28	950816	rotary_mode	subsegc	use	NA	NA
by108	7	4	0.221	NA	950816	rotary_mode	subsegd	use	NA	NA
by108	7	4	0.23	NA	950816	rotary_mode	subsegc	use	NA	NA
by108	7	4	0.267	NA	950816	rotary_mode	subsegd	use	NA	NA
by108	7	4	0.281	NA	950816	rotary_mode	subsegc	use	NA	NA
by108	7	4	0.476	NA	950816	rotary_mode	subsega	use	NA	NA
by108	7	4	0.497	NA	950816	rotary_mode	subsega	use	NA	NA
by108	7	5	NA	8.98	950816	rotary_mode	subsega	use	NA	NA
by108	7	5	NA	9.37	950816	rotary_mode	subsega	use	NA	NA
by108	7	5	NA	12.81	950816	rotary_mode	subsega	use	NA	NA
by108	7	5	NA	13.13	950816	rotary_mode	subsega	use	NA	NA
by108	7	5	NA	26.36	950816	rotary_mode	subsegc	use	NA	NA
by108	7	5	NA	29.31	950816	rotary_mode	subsegd	use	NA	NA
by108	7	5	NA	29.84	950816	rotary_mode	subsegc	use	NA	NA
by108	7	5	NA	32.34	950816	rotary_mode	subsegd	use	NA	NA
by108	7	5	NA	32.4	950816	rotary_mode	subsegc	use	NA	NA
by108	7	5	NA	33.04	950816	rotary_mode	subsegc	use	NA	NA
by108	7	5	NA	34.59	950816	rotary_mode	subsegd	use	NA	NA
by108	7	5	NA	35.21	950816	rotary_mode	subsegd	use	NA	NA
by108	7	5	NA	35.23	950816	rotary_mode	subsegb	use	NA	NA
by108	7	5	NA	35.5	950816	rotary_mode	subsegc	use	NA	NA
by108	7	5	NA	35.5	950816	rotary_mode	subsegc	use	NA	NA
by108	7	5	NA	35.62	950816	rotary_mode	subsegb	use	NA	NA
by108	7	5	NA	36.23	950816	rotary_mode	subsegb	use	NA	NA
by108	7	5	NA	37.56	950816	rotary_mode	subsegb	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by108	7	5	NA	37.69	950816	rotary_mode	subsegb	use	NA	NA
by108	7	5	0.406	NA	950816	rotary_mode	subsega	use	NA	NA
by108	7	5	0.421	NA	950816	rotary_mode	subsega	use	NA	NA
by108	7	5	0.758	NA	950816	rotary_mode	subsegd	use	NA	NA
by108	7	5	0.772	NA	950816	rotary_mode	subsegd	use	NA	NA
by108	7	5	1.32	NA	950816	rotary_mode	subsegc	use	NA	NA
by108	7	5	1.34	NA	950816	rotary_mode	subsegb	use	NA	NA
by108	7	5	1.36	NA	950816	rotary_mode	subsegc	use	NA	NA
by108	7	5	1.72	NA	950816	rotary_mode	subsegb	use	NA	NA
by110	12b	4	NA	15.48	950713	rotary_mode	total	use	NA	NA
by110	12b	4	NA	18	950713	rotary_mode	total	use	NA	NA
by110	12b	4	0.361	NA	950713	rotary_mode	total	use	NA	NA
by110	12b	4	0.398	NA	950713	rotary_mode	total	use	NA	NA
by110	12b	4	0.517	NA	950713	rotary_mode	total	use	NA	NA
by110	12b	5	NA	14.36	950713	rotary_mode	total	use	NA	NA
by110	12b	5	NA	14.49	950713	rotary_mode	total	use	NA	NA
by110	12b	5	NA	89.22	950713	rotary_mode	total	use	NA	NA
by110	12b	5	NA	89.32	950713	rotary_mode	total	use	NA	NA
by110	12b	5	0.316	NA	950713	rotary_mode	total	use	NA	NA
by110	12b	5	0.331	NA	950713	rotary_mode	total	use	NA	NA
by110	12b	6	NA	15.2	950713	rotary_mode	lower.1/2	use	NA	NA
by110	12b	6	NA	15.69	950713	rotary_mode	lower.1/2	use	NA	NA
by110	12b	6	NA	25.8	950713	rotary_mode	upper.1/2	use	NA	NA
by110	12b	6	NA	33.47	950713	rotary_mode	upper.1/2	use	NA	NA
by110	12b	6	NA	36.15	950713	rotary_mode	total	use	NA	NA
by110	12b	6	NA	38.41	950713	rotary_mode	total	use	NA	NA
by110	12b	6	0.09	NA	950713	rotary_mode	lower.1/2	use	NA	NA
by110	12b	6	0.092	NA	950713	rotary_mode	lower.1/2	use	NA	NA
by110	12b	6	0.136	NA	950713	rotary_mode	upper.1/2	use	NA	NA
by110	12b	6	0.145	NA	950713	rotary_mode	upper.1/2	use	NA	NA
by110	12b	7	NA	37.35	950713	rotary_mode	total	use	NA	NA
by110	12b	7	NA	37.9	950713	rotary_mode	total	use	NA	NA
by110	12b	7	NA	38.07	950713	rotary_mode	total	use	NA	NA
by110	12b	7	NA	40.44	950713	rotary_mode	total	use	NA	NA
by110	12b	7	0.195	NA	950713	rotary_mode	total	use	NA	NA
by110	12b	7	0.201	NA	950713	rotary_mode	total	use	NA	NA
by110	12b	7	0.21	NA	950713	rotary_mode	total	use	NA	NA
by110	12b	1	NA	1.76	950802	rotary_mode	total	use	NA	NA
by110	12b	1	NA	7.42	950802	rotary_mode	total	use	NA	NA
by110	12b	1	0.287	NA	950802	rotary_mode	total	use	NA	NA
by110	12b	1	0.29	NA	950802	rotary_mode	total	use	NA	NA
by110	12b	3	NA	36.88	950802	rotary_mode	total	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by110	12b	3	NA	36.95	950802	rotary_mode	total	use	NA	NA
by110	12b	4	NA	11.89	950802	rotary_mode	total	use	NA	NA
by110	12b	4	NA	12.13	950802	rotary_mode	total	use	NA	NA
by110	12b	4	0.291	NA	950802	rotary_mode	total	use	NA	NA
by110	12b	4	0.335	NA	950802	rotary_mode	total	use	NA	NA
by110	12b	5	NA	14.26	950802	rotary_mode	lower.1/2	use	NA	NA
by110	12b	5	NA	15.65	950802	rotary_mode	lower.1/2	use	NA	NA
by110	12b	5	NA	16.73	950802	rotary_mode	upper.1/2	use	NA	NA
by110	12b	5	NA	18.6	950802	rotary_mode	upper.1/2	use	NA	NA
by110	12b	5	0.0997	NA	950802	rotary_mode	lower.1/2	use	NA	NA
by110	12b	5	0.1	NA	950802	rotary_mode	lower.1/2	use	NA	NA
by110	12b	5	0.234	NA	950802	rotary_mode	upper.1/2	use	NA	NA
by110	12b	5	0.249	NA	950802	rotary_mode	upper.1/2	use	NA	NA
by110	12b	6	NA	3.96	950802	rotary_mode	total	use	NA	NA
by110	12b	6	NA	4.01	950802	rotary_mode	total	use	NA	NA
by110	12b	6	NA	4.17	950802	rotary_mode	total	use	NA	NA
by110	12b	6	NA	19.76	950802	rotary_mode	total	use	NA	NA
by110	12b	6	0.0322	NA	950802	rotary_mode	total	use	NA	NA
by110	12b	6	0.0466	NA	950802	rotary_mode	total	use	NA	NA
by110	12b	7	NA	0.76	950802	rotary_mode	total	use.dl	NA	NA
by110	12b	7	NA	8.9	950802	rotary_mode	total	use	NA	NA
by110	12b	7	NA	10.72	950802	rotary_mode	total	use	NA	NA
by110	12b	7	NA	11.14	950802	rotary_mode	total	use	NA	NA
by110	12b	7	0.0535	NA	950802	rotary_mode	total	use	NA	NA
by110	12b	7	0.0653	NA	950802	rotary_mode	total	use	NA	NA
by110	12b	1	NA	14.34	950925	rotary_mode	total	use	NA	NA
by110	12b	1	NA	16.28	950925	rotary_mode	total	use	NA	NA
by110	12b	1	0.233	NA	950925	rotary_mode	total	use	NA	NA
by110	12b	1	0.24	NA	950925	rotary_mode	total	use	NA	NA
by110	12b	2	NA	6.99	950925	rotary_mode	total	use	NA	NA
by110	12b	2	NA	10.33	950925	rotary_mode	total	use	NA	NA
by110	12b	2	0.319	NA	950925	rotary_mode	total	use	NA	NA
by110	12b	2	0.42	NA	950925	rotary_mode	total	use	NA	NA
by110	12b	2	0.421	NA	950925	rotary_mode	total	use	NA	NA
by110	12b	3	NA	12.28	950925	rotary_mode	subsega	use	NA	NA
by110	12b	3	NA	13.43	950925	rotary_mode	subsega	use	NA	NA
by110	12b	3	NA	44.38	950925	rotary_mode	subsegb	use	NA	NA
by110	12b	3	NA	45.67	950925	rotary_mode	subsegb	use	NA	NA
by110	12b	3	0.0766	NA	950925	rotary_mode	subsega	use	NA	NA
by110	12b	3	0.182	NA	950925	rotary_mode	subsega	use	NA	NA
by110	12b	3	0.227	NA	950925	rotary_mode	subsega	use	NA	NA
by110	12b	3	1.15	NA	950925	rotary_mode	subsegb	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by110	12b	3	1.16	NA	950925	rotary_mode	subsegb	use	NA	NA
by110	7	2	NA	13.4	950829	rotary_mode	total	use	NA	NA
by110	7	2	NA	13.6	950829	rotary_mode	total	use	NA	NA
by110	7	2	0.357	NA	950829	rotary_mode	total	use	NA	NA
by110	7	2	0.365	NA	950829	rotary_mode	total	use	NA	NA
by110	7	3	NA	11.55	950829	rotary_mode	total	use	NA	NA
by110	7	3	NA	13.05	950829	rotary_mode	total	use	NA	NA
by110	7	3	0.274	NA	950829	rotary_mode	total	use	NA	NA
by110	7	3	0.4	NA	950829	rotary_mode	total	use	NA	NA
by110	7	3	0.585	NA	950829	rotary_mode	total	use	NA	NA
by110	7	4	NA	32.05	950829	rotary_mode	total	use	NA	NA
by110	7	4	NA	37.69	950829	rotary_mode	total	use	NA	NA
by110	7	4	NA	70.64	950829	rotary_mode	total	use	NA	NA
by110	7	4	NA	70.92	950829	rotary_mode	total	use	NA	NA
by110	7	4	0.281	NA	950829	rotary_mode	total	use	NA	NA
by110	7	4	0.42	NA	950829	rotary_mode	total	use	NA	NA
by110	7	4	0.626	NA	950829	rotary_mode	total	use	NA	NA
by110	7	5	NA	17.05	950829	rotary_mode	total	use	NA	NA
by110	7	5	NA	17.38	950829	rotary_mode	total	use	NA	NA
by110	7	5	0.731	NA	950829	rotary_mode	total	use	NA	NA
by110	7	5	1.04	NA	950829	rotary_mode	total	use	NA	NA
by110	7	6	NA	20.39	950829	rotary_mode	upper.1/2	use	NA	NA
by110	7	6	NA	21.23	950829	rotary_mode	upper.1/2	use	NA	NA
by110	7	6	0.623	NA	950829	rotary_mode	upper.1/2	use	NA	NA
by110	7	6	0.63	NA	950829	rotary_mode	upper.1/2	use	NA	NA
by110	7	6	NA	23.34	950829	rotary_mode	lower.1/2	use	NA	NA
by110	7	6	NA	24.38	950829	rotary_mode	lower.1/2	use	NA	NA
by110	7	6	0.99	NA	950829	rotary_mode	lower.1/2	use	NA	NA
by110	7	6	1.1	NA	950829	rotary_mode	lower.1/2	use	NA	NA
by110	7	7	NA	25.88	950829	rotary_mode	subsegc	use	NA	NA
by110	7	7	NA	26.84	950829	rotary_mode	subsegc	use	NA	NA
by110	7	7	NA	26.9	950829	rotary_mode	subsega	use	NA	NA
by110	7	7	NA	27.86	950829	rotary_mode	subsegb	use	NA	NA
by110	7	7	NA	29.11	950829	rotary_mode	subsegd	use	NA	NA
by110	7	7	NA	30.52	950829	rotary_mode	subsegb	use	NA	NA
by110	7	7	NA	30.78	950829	rotary_mode	subsegd	use	NA	NA
by110	7	7	NA	30.84	950829	rotary_mode	subsega	use	NA	NA
by110	7	7	NA	43.46	950829	rotary_mode	total	use	NA	NA
by110	7	7	NA	44.02	950829	rotary_mode	total	use	NA	NA
by110	7	7	0.47	NA	950829	rotary_mode	total	use	NA	NA
by110	7	7	0.498	NA	950829	rotary_mode	subsegd	use	NA	NA
by110	7	7	0.503	NA	950829	rotary_mode	total	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by110	7	7	0.529	NA	950829	rotary_mode	subsega	use	NA	NA
by110	7	7	0.531	NA	950829	rotary_mode	subsega	use	NA	NA
by110	7	7	0.554	NA	950829	rotary_mode	subsegd	use	NA	NA
by110	7	7	0.631	NA	950829	rotary_mode	subsegb	use	NA	NA
by110	7	7	0.644	NA	950829	rotary_mode	subsegb	use	NA	NA
by110	7	7	2.77	NA	950829	rotary_mode	subsegc	use	NA	NA
by110	7	7	2.97	NA	950829	rotary_mode	subsegc	use	NA	NA
by110	7	8	NA	22.19	950829	rotary_mode	subsegd	use	NA	NA
by110	7	8	NA	24.65	950829	rotary_mode	subsega	use	NA	NA
by110	7	8	NA	26.26	950829	rotary_mode	subsega	use	NA	NA
by110	7	8	NA	32.37	950829	rotary_mode	subsegc	use	NA	NA
by110	7	8	NA	32.45	950829	rotary_mode	subsegc	use	NA	NA
by110	7	8	NA	36.03	950829	rotary_mode	subsegb	use	NA	NA
by110	7	8	NA	37.11	950829	rotary_mode	subsegd	use	NA	NA
by110	7	8	NA	37.51	950829	rotary_mode	subsegb	use	NA	NA
by110	7	8	0.42	NA	950829	rotary_mode	subsegb	use	NA	NA
by110	7	8	0.457	NA	950829	rotary_mode	subsegb	use	NA	NA
by110	7	8	0.502	NA	950829	rotary_mode	subsega	use	NA	NA
by110	7	8	0.527	NA	950829	rotary_mode	subsega	use	NA	NA
by110	7	8	0.603	NA	950829	rotary_mode	subsegc	use	NA	NA
by110	7	8	0.613	NA	950829	rotary_mode	subsegd	use	NA	NA
by110	7	8	0.615	NA	950829	rotary_mode	subsegc	use	NA	NA
by110	7	8	0.616	NA	950829	rotary_mode	subsegd	use	NA	NA
by110	7	9	NA	0	950829	rotary_mode	subsega	use.dl	NA	NA
by110	7	9	NA	15.89	950829	rotary_mode	subsegd	use	NA	NA
by110	7	9	NA	25.29	950829	rotary_mode	subsega	use	NA	NA
by110	7	9	NA	25.44	950829	rotary_mode	subsegb	use	NA	NA
by110	7	9	NA	27.21	950829	rotary_mode	subsegb	use	NA	NA
by110	7	9	NA	28.41	950829	rotary_mode	subsegc	use	NA	NA
by110	7	9	NA	29.9	950829	rotary_mode	subsegd	use	NA	NA
by110	7	9	NA	31.37	950829	rotary_mode	subsegc	use	NA	NA
by110	7	9	0.885	NA	950829	rotary_mode	subsega	use	NA	NA
by110	7	9	0.899	NA	950829	rotary_mode	subsegb	use	NA	NA
by110	7	9	0.9	NA	950829	rotary_mode	subsegb	use	NA	NA
by110	7	9	0.96	NA	950829	rotary_mode	subsega	use	NA	NA
by110	7	9	1.05	NA	950829	rotary_mode	subsegc	use	NA	NA
by110	7	9	1.12	NA	950829	rotary_mode	subsegc	use	NA	NA
by110	7	9	1.14	NA	950829	rotary_mode	subsegd	use	NA	NA
by110	7	9	1.5	NA	950829	rotary_mode	subsegd	use	NA	NA
by110	7	1	NA	13.21	950815	rotary_mode	lower.1/2	use	NA	NA
by110	7	1	NA	15.52	950815	rotary_mode	lower.1/2	use	NA	NA
by110	7	1	NA	19.43	950815	rotary_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by110	7	1	NA	26.16	950815	rotary_mode	upper.1/2	use	NA	NA
by110	7	1	0.167	NA	950815	rotary_mode	lower.1/2	use	NA	NA
by110	7	1	0.173	NA	950815	rotary_mode	lower.1/2	use	NA	NA
by110	7	1	0.234	NA	950815	rotary_mode	upper.1/2	use	NA	NA
by110	7	1	0.249	NA	950815	rotary_mode	upper.1/2	use	NA	NA
by110	7	2	NA	16.12	950815	rotary_mode	total	use	NA	NA
by110	7	2	NA	16.56	950815	rotary_mode	total	use	NA	NA
by110	7	2	0.607	NA	950815	rotary_mode	total	use	NA	NA
by110	7	2	0.615	NA	950815	rotary_mode	total	use	NA	NA
by110	7	3	NA	17.51	950815	rotary_mode	total	use	NA	NA
by110	7	3	NA	17.95	950815	rotary_mode	total	use	NA	NA
by110	7	3	0.652	NA	950815	rotary_mode	total	use	NA	NA
by110	7	3	0.761	NA	950815	rotary_mode	total	use	NA	NA
by110	7	4	NA	15.11	950815	rotary_mode	lower.1/2	use	NA	NA
by110	7	4	NA	16.99	950815	rotary_mode	upper.1/2	use	NA	NA
by110	7	4	NA	17.05	950815	rotary_mode	upper.1/2	use	NA	NA
by110	7	4	NA	17.42	950815	rotary_mode	lower.1/2	use	NA	NA
by110	7	4	NA	17.81	950815	rotary_mode	lower.1/2	use	NA	NA
by110	7	4	NA	18.52	950815	rotary_mode	lower.1/2	use	NA	NA
by110	7	4	0.792	NA	950815	rotary_mode	lower.1/2	use	NA	NA
by110	7	4	0.878	NA	950815	rotary_mode	lower.1/2	use	NA	NA
by110	7	4	1.03	NA	950815	rotary_mode	upper.1/2	use	NA	NA
by110	7	4	1.13	NA	950815	rotary_mode	upper.1/2	use	NA	NA
by110	7	5	NA	15.56	950815	rotary_mode	total	use	NA	NA
by110	7	5	NA	17.34	950815	rotary_mode	total	use	NA	NA
by110	7	5	NA	17.45	950815	rotary_mode	total	use	NA	NA
by110	7	5	NA	17.45	950815	rotary_mode	total	use	NA	NA
by110	7	5	0.441	NA	950815	rotary_mode	total	use	NA	NA
by110	7	5	0.501	NA	950815	rotary_mode	total	use	NA	NA
by110	7	6	NA	25.28	950815	rotary_mode	lower.1/2	use	NA	NA
by110	7	6	NA	29.77	950815	rotary_mode	lower.1/2	use	NA	NA
by110	7	6	NA	33.02	950815	rotary_mode	upper.1/2	use	NA	NA
by110	7	6	NA	34.21	950815	rotary_mode	upper.1/2	use	NA	NA
by110	7	6	0.374	NA	950815	rotary_mode	upper.1/2	use	NA	NA
by110	7	6	0.562	NA	950815	rotary_mode	upper.1/2	use	NA	NA
by110	7	6	0.582	NA	950815	rotary_mode	lower.1/2	use	NA	NA
by110	7	7	NA	25.07	950815	rotary_mode	upper.1/2	use	NA	NA
by110	7	7	NA	30.42	950815	rotary_mode	lower.1/2	use	NA	NA
by110	7	7	NA	31.11	950815	rotary_mode	upper.1/2	use	NA	NA
by110	7	7	NA	33.36	950815	rotary_mode	upper.1/2	use	NA	NA
by110	7	7	NA	33.82	950815	rotary_mode	lower.1/2	use	NA	NA
by110	7	7	NA	39.43	950815	rotary_mode	total	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by110	7	7	NA	43.53	950815	rotary_mode	total	use	NA	NA
by110	7	7	NA	43.71	950815	rotary_mode	upper.1/2	use	NA	NA
by110	7	7	0.304	NA	950815	rotary_mode	upper.1/2	use	NA	NA
by110	7	7	0.364	NA	950815	rotary_mode	total	use	NA	NA
by110	7	7	0.423	NA	950815	rotary_mode	lower.1/2	use	NA	NA
by110	7	7	0.434	NA	950815	rotary_mode	upper.1/2	use	NA	NA
by110	7	7	0.553	NA	950815	rotary_mode	total	use	NA	NA
by110	7	7	0.634	NA	950815	rotary_mode	lower.1/2	use	NA	NA
by110	7	8	NA	31.09	950815	rotary_mode	subsegd	use	NA	NA
by110	7	8	NA	31.38	950815	rotary_mode	subsegd	use	NA	NA
by110	7	8	NA	32.96	950815	rotary_mode	subsegb	use	NA	NA
by110	7	8	NA	33.63	950815	rotary_mode	subsegb	use	NA	NA
by110	7	8	NA	34.06	950815	rotary_mode	subsegb	use	NA	NA
by110	7	8	NA	34.68	950815	rotary_mode	subsegb	use	NA	NA
by110	7	8	NA	34.68	950815	rotary_mode	subsega	use	NA	NA
by110	7	8	NA	39.79	950815	rotary_mode	subsega	use	NA	NA
by110	7	8	0.361	NA	950815	rotary_mode	subsegb	use	NA	NA
by110	7	8	0.4	NA	950815	rotary_mode	subsegb	use	NA	NA
by110	7	8	0.533	NA	950815	rotary_mode	subsega	use	NA	NA
by110	7	8	0.566	NA	950815	rotary_mode	subsega	use	NA	NA
by110	7	8	0.802	NA	950815	rotary_mode	subsegd	use	NA	NA
by110	7	8	0.862	NA	950815	rotary_mode	subsegd	use	NA	NA
by110	7	9	NA	24.17	950815	rotary_mode	subsegd	use	NA	NA
by110	7	9	NA	26.44	950815	rotary_mode	subsegd	use	NA	NA
by110	7	9	NA	28.13	950815	rotary_mode	subsegb	use	NA	NA
by110	7	9	NA	28.6	950815	rotary_mode	subsegc	use	NA	NA
by110	7	9	NA	31.44	950815	rotary_mode	subsegc	use	NA	NA
by110	7	9	NA	32.75	950815	rotary_mode	subsega	use	NA	NA
by110	7	9	NA	33.71	950815	rotary_mode	subsega	use	NA	NA
by110	7	9	NA	36.24	950815	rotary_mode	subsegb	use	NA	NA
by110	7	9	0.473	NA	950815	rotary_mode	subsega	use	NA	NA
by110	7	9	0.523	NA	950815	rotary_mode	subsega	use	NA	NA
by110	7	9	0.632	NA	950815	rotary_mode	subsegb	use	NA	NA
by110	7	9	0.643	NA	950815	rotary_mode	subsegb	use	NA	NA
by110	7	9	0.885	NA	950815	rotary_mode	subsegc	use	NA	NA
by110	7	9	0.91	NA	950815	rotary_mode	subsegd	use	NA	NA
by110	7	9	1	NA	950815	rotary_mode	subsegc	use	NA	NA
by110	7	9	1.02	NA	950815	rotary_mode	subsegd	use	NA	NA
by110	7	1	NA	9.17	950822	rotary_mode	upper.1/2	use	NA	NA
by110	7	1	NA	9.61	950822	rotary_mode	upper.1/2	use	NA	NA
by110	7	1	0.148	NA	950822	rotary_mode	upper.1/2	use	NA	NA
by110	7	1	0.233	NA	950822	rotary_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by110	7	1	NA	17.71	950822	rotary_mode	lower.1/2	use	NA	NA
by110	7	1	NA	19.52	950822	rotary_mode	lower.1/2	use	NA	NA
by110	7	1	0.264	NA	950822	rotary_mode	lower.1/2	use	NA	NA
by110	7	1	0.305	NA	950822	rotary_mode	lower.1/2	use	NA	NA
by110	7	2	NA	15.33	950822	rotary_mode	total	use	NA	NA
by110	7	2	NA	16.18	950822	rotary_mode	total	use	NA	NA
by110	7	2	0.2	NA	950822	rotary_mode	total	use	NA	NA
by110	7	2	0.227	NA	950822	rotary_mode	total	use	NA	NA
by110	7	1	NA	0.88	950824	rotary_mode	upper.1/2	use.dl	NA	NA
by110	7	1	NA	1.76	950824	rotary_mode	upper.1/2	use	NA	NA
by110	7	1	NA	24.1	950824	rotary_mode	lower.1/2	use	NA	NA
by110	7	1	NA	26.43	950824	rotary_mode	lower.1/2	use	NA	NA
by110	7	1	0.386	NA	950824	rotary_mode	lower.1/2	use	NA	NA
by110	7	1	0.388	NA	950824	rotary_mode	lower.1/2	use	NA	NA
by110	7	2	NA	23.19	950824	rotary_mode	upper.1/2	use	NA	NA
by110	7	2	NA	23.24	950824	rotary_mode	upper.1/2	use	NA	NA
by110	7	2	0.193	NA	950824	rotary_mode	upper.1/2	use	NA	NA
by110	7	2	0.236	NA	950824	rotary_mode	upper.1/2	use	NA	NA
by110	7	2	NA	20.82	950824	rotary_mode	lower.1/2	use	NA	NA
by110	7	2	NA	22.05	950824	rotary_mode	lower.1/2	use	NA	NA
by110	7	2	0.272	NA	950824	rotary_mode	lower.1/2	use	NA	NA
by110	7	2	0.332	NA	950824	rotary_mode	lower.1/2	use	NA	NA
by110	7	2	0.454	NA	950824	rotary_mode	lower.1/2	use	NA	NA
by110	7	3	NA	15.95	950824	rotary_mode	total	use	NA	NA
by110	7	3	NA	20.71	950824	rotary_mode	total	use	NA	NA
by110	7	3	0.659	NA	950824	rotary_mode	total	use	NA	NA
by110	7	3	0.713	NA	950824	rotary_mode	total	use	NA	NA
by110	7	4	NA	18.76	950824	rotary_mode	total	use	NA	NA
by110	7	4	NA	18.77	950824	rotary_mode	total	use	NA	NA
by110	7	4	0.892	NA	950824	rotary_mode	total	use	NA	NA
by110	7	4	0.984	NA	950824	rotary_mode	total	use	NA	NA
by110	7	5	NA	18.26	950824	rotary_mode	subsega	use	NA	NA
by110	7	5	NA	18.78	950824	rotary_mode	subsega	use	NA	NA
by110	7	5	NA	40.27	950824	rotary_mode	subsegb	use	NA	NA
by110	7	5	NA	40.65	950824	rotary_mode	subsegb	use	NA	NA
by110	7	5	0.192	NA	950824	rotary_mode	subsega	use	NA	NA
by110	7	5	0.278	NA	950824	rotary_mode	subsega	use	NA	NA
by110	7	5	0.749	NA	950824	rotary_mode	subsegb	use	NA	NA
by110	7	5	0.884	NA	950824	rotary_mode	subsegb	use	NA	NA
by110	7	6	NA	28.2	950824	rotary_mode	lower.1/2	use	NA	NA
by110	7	6	NA	29.73	950824	rotary_mode	upper.1/2	use	NA	NA
by110	7	6	NA	31.5	950824	rotary_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by110	7	6	NA	32.36	950824	rotary_mode	lower.1/2	use	NA	NA
by110	7	6	0.457	NA	950824	rotary_mode	lower.1/2	use	NA	NA
by110	7	6	0.512	NA	950824	rotary_mode	upper.1/2	use	NA	NA
by110	7	6	0.518	NA	950824	rotary_mode	lower.1/2	use	NA	NA
by110	7	6	0.617	NA	950824	rotary_mode	upper.1/2	use	NA	NA
by110	7	7	NA	25.61	950824	rotary_mode	subsegd	use	NA	NA
by110	7	7	NA	26.16	950824	rotary_mode	subsegd	use	NA	NA
by110	7	7	NA	26.18	950824	rotary_mode	subsegb	use	NA	NA
by110	7	7	NA	29.16	950824	rotary_mode	subsegb	use	NA	NA
by110	7	7	NA	32.56	950824	rotary_mode	subsega	use	NA	NA
by110	7	7	NA	33.67	950824	rotary_mode	subsega	use	NA	NA
by110	7	7	0.186	NA	950824	rotary_mode	subsegd	use	NA	NA
by110	7	7	0.221	NA	950824	rotary_mode	subsegd	use	NA	NA
by110	7	7	0.562	NA	950824	rotary_mode	subsega	use	NA	NA
by110	7	7	0.615	NA	950824	rotary_mode	subsegb	use	NA	NA
by110	7	7	0.626	NA	950824	rotary_mode	subsega	use	NA	NA
by110	7	7	0.708	NA	950824	rotary_mode	subsegb	use	NA	NA
by110	7	8	NA	10.32	950824	rotary_mode	subsegb	use	NA	NA
by110	7	8	NA	30.09	950824	rotary_mode	subsegb	use	NA	NA
by110	7	8	NA	30.77	950824	rotary_mode	subsega	use	NA	NA
by110	7	8	NA	34.72	950824	rotary_mode	subsega	use	NA	NA
by110	7	8	0.288	NA	950824	rotary_mode	subsegb	use	NA	NA
by110	7	8	0.617	NA	950824	rotary_mode	subsegb	use	NA	NA
by110	7	8	0.784	NA	950824	rotary_mode	subsega	use	NA	NA
by110	7	8	0.789	NA	950824	rotary_mode	subsega	use	NA	NA
by110	7	8	3.68	NA	950824	rotary_mode	subsegb	use	NA	NA
by110	7	9	NA	29.22	950824	rotary_mode	subsegb	use	NA	NA
by110	7	9	NA	29.55	950824	rotary_mode	subsegd	use	NA	NA
by110	7	9	NA	29.69	950824	rotary_mode	subsega	use	NA	NA
by110	7	9	NA	30.02	950824	rotary_mode	subsegc	use	NA	NA
by110	7	9	NA	30.65	950824	rotary_mode	subsegd	use	NA	NA
by110	7	9	NA	30.83	950824	rotary_mode	subsegb	use	NA	NA
by110	7	9	NA	31.21	950824	rotary_mode	subsegc	use	NA	NA
by110	7	9	NA	33.98	950824	rotary_mode	subsega	use	NA	NA
by110	7	9	0.797	NA	950824	rotary_mode	subsegd	use	NA	NA
by110	7	9	0.802	NA	950824	rotary_mode	subsegd	use	NA	NA
by110	7	9	0.82	NA	950824	rotary_mode	subsegb	use	NA	NA
by110	7	9	0.824	NA	950824	rotary_mode	subsegc	use	NA	NA
by110	7	9	0.841	NA	950824	rotary_mode	subsega	use	NA	NA
by110	7	9	0.876	NA	950824	rotary_mode	subsega	use	NA	NA
by110	7	9	0.903	NA	950824	rotary_mode	subsegc	use	NA	NA
by110	7	9	0.927	NA	950824	rotary_mode	subsegb	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by110	12b	1	NA	13.26	950913	rotary_mode	upper.1/2	use	NA	NA
by110	12b	1	NA	19.81	950913	rotary_mode	upper.1/2	use	NA	NA
by110	12b	1	0.342	NA	950913	rotary_mode	upper.1/2	use	NA	NA
by110	12b	1	0.384	NA	950913	rotary_mode	upper.1/2	use	NA	NA
by110	12b	3	NA	32.23	950913	rotary_mode	total	use	NA	NA
by110	12b	3	NA	33.64	950913	rotary_mode	total	use	NA	NA
by110	12b	3	NA	47.38	950913	rotary_mode	total	use	NA	NA
by110	12b	3	NA	47.7	950913	rotary_mode	total	use	NA	NA
by110	12b	3	0.512	NA	950913	rotary_mode	total	use	NA	NA
by110	12b	3	0.524	NA	950913	rotary_mode	total	use	NA	NA
by110	4	1	NA	17.69	951028	rotary_mode	total	use	NA	NA
by110	4	1	NA	18.31	951028	rotary_mode	total	use	NA	NA
by110	4	1	0.764	NA	951028	rotary_mode	total	use	NA	NA
by110	4	1	0.765	NA	951028	rotary_mode	total	use	NA	NA
by110	4	2	NA	24.89	951028	rotary_mode	total	use	NA	NA
by110	4	2	NA	26.18	951028	rotary_mode	total	use	NA	NA
by110	4	2	0.0368	NA	951028	rotary_mode	total	use	NA	NA
by110	4	2	0.109	NA	951028	rotary_mode	total	use	NA	NA
by110	4	2	0.225	NA	951028	rotary_mode	total	use	NA	NA
by110	4	3	NA	16.11	951028	rotary_mode	total	use	NA	NA
by110	4	3	NA	16.21	951028	rotary_mode	total	use	NA	NA
by110	4	3	0.139	NA	951028	rotary_mode	total	use	NA	NA
by110	4	3	0.404	NA	951028	rotary_mode	total	use	NA	NA
by110	4	3	0.668	NA	951028	rotary_mode	total	use	NA	NA
by110	4	4	NA	0.627	951028	rotary_mode	upper.1/2	use.dl	NA	NA
by110	4	4	NA	0.717	951028	rotary_mode	upper.1/2	use.dl	NA	NA
by110	4	4	NA	1.72	951028	rotary_mode	upper.1/2	use	NA	NA
by110	4	4	0.563	NA	951028	rotary_mode	upper.1/2	use	NA	NA
by110	4	4	0.577	NA	951028	rotary_mode	upper.1/2	use	NA	NA
by110	4	4	NA	29.37	951028	rotary_mode	subsegc	use	NA	NA
by110	4	4	NA	34.31	951028	rotary_mode	subsegc	use	NA	NA
by110	4	4	NA	41.14	951028	rotary_mode	subsegd	use	NA	NA
by110	4	4	NA	46.76	951028	rotary_mode	subsegd	use	NA	NA
by110	4	4	0.385	NA	951028	rotary_mode	subsegc	use	NA	NA
by110	4	4	0.416	NA	951028	rotary_mode	subsegd	use	NA	NA
by110	4	4	0.419	NA	951028	rotary_mode	subsegc	use	NA	NA
by110	4	4	0.444	NA	951028	rotary_mode	subsegd	use	NA	NA
by110	4	5	NA	30.57	951028	rotary_mode	subsega	use	NA	NA
by110	4	5	NA	35.53	951028	rotary_mode	subsega	use	NA	NA
by110	4	5	NA	36.53	951028	rotary_mode	subsegb	use	NA	NA
by110	4	5	NA	37.96	951028	rotary_mode	subsegb	use	NA	NA
by110	4	5	0.545	NA	951028	rotary_mode	subsega	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by110	4	5	0.554	NA	951028	rotary_mode	subsegb	use	NA	NA
by110	4	5	0.579	NA	951028	rotary_mode	subsega	use	NA	NA
by110	4	5	0.604	NA	951028	rotary_mode	subsegb	use	NA	NA
by110	4	5	NA	40.86	951028	rotary_mode	lower.1/2	use	NA	NA
by110	4	5	NA	41.1	951028	rotary_mode	lower.1/2	use	NA	NA
by110	4	5	0.518	NA	951028	rotary_mode	lower.1/2	use	NA	NA
by110	4	5	0.554	NA	951028	rotary_mode	lower.1/2	use	NA	NA
by110	4	6	NA	19.29	951028	rotary_mode	subsegc	use	NA	NA
by110	4	6	NA	27.28	951028	rotary_mode	subsegd	use	NA	NA
by110	4	6	NA	28.97	951028	rotary_mode	subsegd	use	NA	NA
by110	4	6	NA	33.26	951028	rotary_mode	subsegc	use	NA	NA
by110	4	6	NA	36.02	951028	rotary_mode	subsega	use	NA	NA
by110	4	6	NA	41.32	951028	rotary_mode	subsegb	use	NA	NA
by110	4	6	NA	43.24	951028	rotary_mode	subsega	use	NA	NA
by110	4	6	NA	43.49	951028	rotary_mode	subsegc	use	NA	NA
by110	4	6	NA	44.93	951028	rotary_mode	subsegb	use	NA	NA
by110	4	6	0.347	NA	951028	rotary_mode	subsegd	use	NA	NA
by110	4	6	0.352	NA	951028	rotary_mode	subsegc	use	NA	NA
by110	4	6	0.386	NA	951028	rotary_mode	subsegc	use	NA	NA
by110	4	6	0.397	NA	951028	rotary_mode	subsegb	use	NA	NA
by110	4	6	0.403	NA	951028	rotary_mode	subsegd	use	NA	NA
by110	4	6	0.443	NA	951028	rotary_mode	subsega	use	NA	NA
by110	4	6	0.454	NA	951028	rotary_mode	subsega	use	NA	NA
by110	4	6	0.456	NA	951028	rotary_mode	subsegb	use	NA	NA
by110	4	7	NA	31.62	951028	rotary_mode	subsega	use	NA	NA
by110	4	7	NA	31.69	951028	rotary_mode	subsegd	use	NA	NA
by110	4	7	NA	32.73	951028	rotary_mode	subsegc	use	NA	NA
by110	4	7	NA	33.42	951028	rotary_mode	subsegc	use	NA	NA
by110	4	7	NA	34.17	951028	rotary_mode	subsega	use	NA	NA
by110	4	7	NA	36.84	951028	rotary_mode	subsegb	use	NA	NA
by110	4	7	NA	38.26	951028	rotary_mode	subsegd	use	NA	NA
by110	4	7	NA	38.62	951028	rotary_mode	subsegb	use	NA	NA
by110	4	7	NA	46.59	951028	rotary_mode	total	use	NA	NA
by110	4	7	NA	48	951028	rotary_mode	total	use	NA	NA
by110	4	7	0.264	NA	951028	rotary_mode	subsega	use	NA	NA
by110	4	7	0.324	NA	951028	rotary_mode	subsega	use	NA	NA
by110	4	7	0.403	NA	951028	rotary_mode	subsegb	use	NA	NA
by110	4	7	0.404	NA	951028	rotary_mode	subsegb	use	NA	NA
by110	4	7	0.412	NA	951028	rotary_mode	subsegc	use	NA	NA
by110	4	7	0.448	NA	951028	rotary_mode	subsegc	use	NA	NA
by110	4	7	0.648	NA	951028	rotary_mode	subsegd	use	NA	NA
by110	4	7	0.674	NA	951028	rotary_mode	subsegd	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by110	4	8	NA	29.94	951028	rotary_mode	subsegc	use	NA	NA
by110	4	8	NA	31.03	951028	rotary_mode	subsegb	use	NA	NA
by110	4	8	NA	31.24	951028	rotary_mode	subsegd	use	NA	NA
by110	4	8	NA	31.83	951028	rotary_mode	subsega	use	NA	NA
by110	4	8	NA	31.89	951028	rotary_mode	subsegc	use	NA	NA
by110	4	8	NA	31.91	951028	rotary_mode	subsega	use	NA	NA
by110	4	8	NA	32.37	951028	rotary_mode	subsegb	use	NA	NA
by110	4	8	NA	32.67	951028	rotary_mode	subsegd	use	NA	NA
by110	4	8	0.516	NA	951028	rotary_mode	subsegb	use	NA	NA
by110	4	8	0.654	NA	951028	rotary_mode	subsegb	use	NA	NA
by110	4	8	0.691	NA	951028	rotary_mode	subsegb	use	NA	NA
by110	4	8	0.774	NA	951028	rotary_mode	subsega	use	NA	NA
by110	4	8	0.81	NA	951028	rotary_mode	subsega	use	NA	NA
by110	4	8	0.847	NA	951028	rotary_mode	subsegc	use	NA	NA
by110	4	8	0.864	NA	951028	rotary_mode	subsegc	use	NA	NA
by110	4	8	0.908	NA	951028	rotary_mode	subsegd	use	NA	NA
by110	4	8	0.977	NA	951028	rotary_mode	subsegd	use	NA	NA
by111	15	1	NA	28.33	960813	push_mode	subsega	use.new	NA	NA
by111	15	1	0.799	NA	960813	push_mode	subsega	use.new	NA	NA
by111	15	1	NA	31.73	960813	push_mode	subsega	use.new	NA	NA
by111	15	1	0.82	NA	960813	push_mode	subsega	use.new	NA	NA
by111	15	1	NA	33.76	960813	push_mode	subsegb	use.new	NA	NA
by111	15	1	1.13	NA	960813	push_mode	subsegb	use.new	NA	NA
by111	15	1	NA	38.56	960813	push_mode	subsegb	use.new	NA	NA
by111	15	1	1.16	NA	960813	push_mode	subsegb	use.new	NA	NA
by111	15	2	NA	24.11	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	2	1.16	NA	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	2	NA	24.74	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	2	1.12	NA	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	3	NA	17.67	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	3	0.896	NA	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	3	NA	12.04	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	3	0.937	NA	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	3	0	NA	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	4	NA	19.6	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	4	0.754	NA	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	4	NA	12.97	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	4	0.8	NA	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	4	0.869	NA	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	5	NA	26.39	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	5	1	NA	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	5	NA	27.8	960813	push_mode	lower.1/2	use.new	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by111	15	5	0.903	NA	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	5	NA	43.01	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	5	0.3	NA	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	5	NA	42.26	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	5	0.342	NA	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	6	NA	28.04	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	6	NA	30.82	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	6	0.175	NA	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	6	NA	29.91	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	6	NA	43.57	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	6	0.243	NA	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	6	0.168	NA	960813	push_mode	lower.1/2	use.new	NA	NA
by111	15	6	NA	54.28	960813	push_mode	total	use.new	NA	NA
by111	15	6	0.10385	NA	960813	push_mode	total	use.new	NA	NA
by111	15	6	NA	53.81	960813	push_mode	total	use.new	NA	NA
by111	15	6	0.11385	NA	960813	push_mode	total	use.new	NA	NA
by111	12a	1	NA	0.56	960829	push_mode	lower.1/2	use.dl	NA	NA
by111	12a	1	0.132	NA	960829	push_mode	lower.1/2	use.new	NA	NA
by111	12a	1	NA	0.58	960829	push_mode	lower.1/2	use.dl	NA	NA
by111	12a	1	0.112	NA	960829	push_mode	lower.1/2	use.new	NA	NA
by111	12a	3	NA	23.68	960829	push_mode	lower.1/2	use.new	NA	NA
by111	12a	3	0.982	NA	960829	push_mode	lower.1/2	use.new	NA	NA
by111	12a	3	NA	23.84	960829	push_mode	lower.1/2	use.new	NA	NA
by111	12a	3	1	NA	960829	push_mode	lower.1/2	use.new	NA	NA
by111	12a	4	NA	50.73	960829	push_mode	lower.1/2	use.new	NA	NA
by111	12a	4	0.487	NA	960829	push_mode	lower.1/2	use.new	NA	NA
by111	12a	4	NA	48.08	960829	push_mode	lower.1/2	use.new	NA	NA
by111	12a	4	0.379	NA	960829	push_mode	lower.1/2	use.new	NA	NA
by111	12a	5	NA	52.58	960829	push_mode	lower.1/2	use.new	NA	NA
by111	12a	5	0.513	NA	960829	push_mode	lower.1/2	use.new	NA	NA
by111	12a	5	NA	51.59	960829	push_mode	lower.1/2	use.new	NA	NA
by111	12a	5	0.515	NA	960829	push_mode	lower.1/2	use.new	NA	NA
by111	12a	5	NA	53.96	960829	push_mode	total	use.new	NA	NA
by111	12a	5	0.09308	NA	960829	push_mode	total	use.new	NA	NA
by111	12a	5	NA	53.79	960829	push_mode	total	use.new	NA	NA
by111	12a	5	0.09615	NA	960829	push_mode	total	use.new	NA	NA
by111	12a	6	NA	51.45	960829	push_mode	upper.1/2	use.new	NA	NA
by111	12a	6	0.212	NA	960829	push_mode	upper.1/2	use.new	NA	NA
by111	12a	6	NA	46.43	960829	push_mode	upper.1/2	use.new	NA	NA
by111	12a	6	0.236	NA	960829	push_mode	upper.1/2	use.new	NA	NA
by111	12a	6	0.004	NA	960829	push_mode	upper.1/2	use.new	NA	NA
by111	12a	6	NA	44.18	960829	push_mode	lower.1/2	use.new	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by111	12a	6	0.264	NA	960829	push_mode	lower.1/2	use.new	NA	NA
by111	12a	6	NA	40.4	960829	push_mode	lower.1/2	use.new	NA	NA
by111	12a	6	0.254	NA	960829	push_mode	lower.1/2	use.new	NA	NA
by111	12a	6	0.004	NA	960829	push_mode	lower.1/2	use.new	NA	NA
by111	12a	6	NA	53.56	960829	push_mode	total	use.new	NA	NA
by111	12a	6	0.08769	NA	960829	push_mode	total	use.new	NA	NA
by111	12a	6	NA	53.38	960829	push_mode	total	use.new	NA	NA
by111	12a	6	0.09538	NA	960829	push_mode	total	use.new	NA	NA
by111	12a	7	NA	46.03	960829	push_mode	upper.1/2	use.new	NA	NA
by111	12a	7	0.425	NA	960829	push_mode	upper.1/2	use.new	NA	NA
by111	12a	7	NA	46.51	960829	push_mode	upper.1/2	use.new	NA	NA
by111	12a	7	0.435	NA	960829	push_mode	upper.1/2	use.new	NA	NA
by111	12a	7	NA	50.14	960829	push_mode	lower.1/2	use.new	NA	NA
by111	12a	7	0.492	NA	960829	push_mode	lower.1/2	use.new	NA	NA
by111	12a	7	NA	48.3	960829	push_mode	lower.1/2	use.new	NA	NA
by111	12a	7	0.418	NA	960829	push_mode	lower.1/2	use.new	NA	NA
by112	18	1	NA	22.29	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	1	0.114	NA	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	1	NA	25.14	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	1	0.123	NA	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	2	NA	14.42	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	2	0.0378	NA	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	2	NA	14.39	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	2	0.0698	NA	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	3	NA	13.69	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	3	0.0913	NA	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	3	NA	15.65	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	3	0.128	NA	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	4	NA	23.17	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	4	3.07	NA	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	4	NA	23.4	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	4	3.43	NA	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	4	0	NA	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	5	NA	43.53	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	5	0.616	NA	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	5	NA	41.79	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	5	0.771	NA	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	5	0.536	NA	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	5	NA	33.78	961002	push_mode	upper.1/2	use.new	NA	NA
by112	18	5	1.42	NA	961002	push_mode	upper.1/2	use.new	NA	NA
by112	18	5	NA	34.17	961002	push_mode	upper.1/2	use.new	NA	NA
by112	18	5	1.41	NA	961002	push_mode	upper.1/2	use.new	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by112	18	5	NA	48.69	961002	push_mode	total	use.new	NA	NA
by112	18	5	0.14538	NA	961002	push_mode	total	use.new	NA	NA
by112	18	5	NA	48.06	961002	push_mode	total	use.new	NA	NA
by112	18	5	0.14923	NA	961002	push_mode	total	use.new	NA	NA
by112	18	6	NA	32.89	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	6	0.155	NA	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	6	NA	33.03	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	6	0.156	NA	961002	push_mode	lower.1/2	use.new	NA	NA
by112	18	6	NA	37.56	961002	push_mode	upper.1/2	use.new	NA	NA
by112	18	6	0.664	NA	961002	push_mode	upper.1/2	use.new	NA	NA
by112	18	6	NA	36.86	961002	push_mode	upper.1/2	use.new	NA	NA
by112	18	6	0.799	NA	961002	push_mode	upper.1/2	use.new	NA	NA
by112	18	6	0.77	NA	961002	push_mode	upper.1/2	use.new	NA	NA
by112	21	1	NA	39.43	961003	push_mode	lower.1/2	use.new	NA	NA
by112	21	1	NA	43.02	961003	push_mode	lower.1/2	use.new	NA	NA
by112	21	1	0.139	NA	961003	push_mode	lower.1/2	use.new	NA	NA
by112	21	1	NA	21.83	961003	push_mode	lower.1/2	use.new	NA	NA
by112	21	1	NA	39.42	961003	push_mode	lower.1/2	use.new	NA	NA
by112	21	1	0.126	NA	961003	push_mode	lower.1/2	use.new	NA	NA
by112	21	2	NA	15.73	961003	push_mode	lower.1/2	use.new	NA	NA
by112	21	2	0.0904	NA	961003	push_mode	lower.1/2	use.new	NA	NA
by112	21	2	NA	15	961003	push_mode	lower.1/2	use.new	NA	NA
by112	21	2	0.075	NA	961003	push_mode	lower.1/2	use.new	NA	NA
by112	21	3	NA	21.15	961003	push_mode	lower.1/2	use.new	NA	NA
by112	21	3	0.0516	NA	961003	push_mode	lower.1/2	use.new	NA	NA
by112	21	3	NA	15.94	961003	push_mode	lower.1/2	use.new	NA	NA
by112	21	3	0.0555	NA	961003	push_mode	lower.1/2	use.new	NA	NA
by112	21	4	NA	18.25	961003	push_mode	upper.1/2	use.new	NA	NA
by112	21	4	0.733	NA	961003	push_mode	upper.1/2	use.new	NA	NA
by112	21	4	NA	21.46	961003	push_mode	upper.1/2	use.new	NA	NA
by112	21	4	0.608	NA	961003	push_mode	upper.1/2	use.new	NA	NA
by112	21	4	NA	36.42	961003	push_mode	lower.1/2	use.new	NA	NA
by112	21	4	2.98	NA	961003	push_mode	lower.1/2	use.new	NA	NA
by112	21	4	NA	36.86	961003	push_mode	lower.1/2	use.new	NA	NA
by112	21	4	2.53	NA	961003	push_mode	lower.1/2	use.new	NA	NA
by112	21	5	NA	32.32	961003	push_mode	upper.1/2	use.new	NA	NA
by112	21	5	2.34	NA	961003	push_mode	upper.1/2	use.new	NA	NA
by112	21	5	NA	34.77	961003	push_mode	upper.1/2	use.new	NA	NA
by112	21	5	1.78	NA	961003	push_mode	upper.1/2	use.new	NA	NA
by112	21	5	NA	40.34	961003	push_mode	lower.1/2	use.new	NA	NA
by112	21	5	0.845	NA	961003	push_mode	lower.1/2	use.new	NA	NA
by112	21	5	NA	40.06	961003	push_mode	lower.1/2	use.new	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
by112	21	5	0.878	NA	961003	push_mode	lower.1/2	use.new	NA	NA
by112	21	5	NA	48.75	961003	push_mode	total	use.new	NA	NA
by112	21	5	0.11615	NA	961003	push_mode	total	use.new	NA	NA
by112	21	5	NA	48.6	961003	push_mode	total	use.new	NA	NA
by112	21	5	0.11769	NA	961003	push_mode	total	use.new	NA	NA
by112	21	6	NA	29.71	961003	push_mode	lower.1/2	use.new	NA	NA
by112	21	6	0.474	NA	961003	push_mode	lower.1/2	use.new	NA	NA
by112	21	6	NA	27.66	961003	push_mode	lower.1/2	use.new	NA	NA
by112	21	6	0.463	NA	961003	push_mode	lower.1/2	use.new	NA	NA
c101	8	1	NA	10.46	950329	auger	total	del.sp	NA	NA
c101	8	1	NA	19.8	950329	auger	total	del.sp	NA	NA
c101	8	1	NA	20.4	950329	auger	total	del.sp	NA	NA
c101	8	1	NA	21.8	950329	auger	upper.1/2	del.sp	NA	NA
c101	8	1	NA	23.35	950329	auger	upper.1/2	del.sp	NA	NA
c101	8	1	NA	33.63	950329	auger	lower.1/2	del.sp	NA	NA
c101	8	1	NA	34.2	950329	auger	lower.1/2	del.sp	NA	NA
c101	8	1	NA	73.8	950329	auger	drainable	del.sp	NA	NA
c101	8	1	NA	73.8	950329	auger	drainable	del.sp	NA	NA
c101	8	1	0.0977	NA	950329	auger	drainable	del.sp	NA	NA
c101	8	1	0.0954	NA	950329	auger	drainable	del.sp	NA	NA
c103	2	1	NA	88.29	941028	push_mode	drainable	del.sp	NA	NA
c103	2	1	NA	88.57	941028	push_mode	drainable	del.sp	NA	NA
c103	2	1	0.5869	NA	941028	push_mode	drainable	del.sp	NA	NA
c103	2	1	0.5854	NA	941028	push_mode	drainable	del.sp	NA	NA
c103	2	1	0.6008	NA	941028	push_mode	drainable	del.sp	NA	NA
c103	2	1	0.5469	NA	941028	push_mode	drainable	del.sp	NA	NA
c103	2	2	NA	54.05	941028	push_mode	lower.1/2	del.sp	NA	NA
c103	2	2	NA	56.63	941028	push_mode	lower.1/2	del.sp	NA	NA
c103	2	2	NA	61.3	941028	push_mode	upper.1/2	del.sp	NA	NA
c103	2	2	NA	63.09	941028	push_mode	upper.1/2	del.sp	NA	NA
c103	2	2	NA	81.66	941028	push_mode	drainable	del.sp	NA	NA
c103	2	2	NA	87.3	941028	push_mode	drainable	del.sp	NA	NA
c103	2	2	0.765	NA	941028	push_mode	upper.1/2	del.sp	NA	NA
c103	2	2	0.933	NA	941028	push_mode	upper.1/2	del.sp	NA	NA
c103	2	2	0.979	NA	941028	push_mode	lower.1/2	del.sp	NA	NA
c103	2	2	1.07	NA	941028	push_mode	lower.1/2	del.sp	NA	NA
c103	2	2	0.5669	NA	941028	push_mode	drainable	del.sp	NA	NA
c103	2	2	0.5708	NA	941028	push_mode	drainable	del.sp	NA	NA
c103	2	3	NA	27.2	941028	push_mode	lower.1/2	del.sp	NA	NA
c103	2	3	NA	30.82	941028	push_mode	lower.1/2	del.sp	NA	NA
c103	2	3	NA	43.23	941028	push_mode	lower.1/2	del.sp	NA	NA
c103	2	3	NA	44.04	941028	push_mode	lower.1/2	del.sp	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
c103	2	3	NA	49.75	941028	push_mode	upper.1/2	del.sp	NA	NA
c103	2	3	NA	51.26	941028	push_mode	upper.1/2	del.sp	NA	NA
c103	2	3	0.734	NA	941028	push_mode	upper.1/2	del.sp	NA	NA
c103	2	3	0.785	NA	941028	push_mode	upper.1/2	del.sp	NA	NA
c103	2	3	0.886	NA	941028	push_mode	lower.1/2	del.sp	NA	NA
c103	2	3	0.894	NA	941028	push_mode	lower.1/2	del.sp	NA	NA
c103	2	4	NA	13.47	941028	push_mode	upper.1/2	del.sp	NA	NA
c103	2	4	NA	25	941028	push_mode	upper.1/2	del.sp	NA	NA
c103	2	4	NA	25.3	941028	push_mode	upper.1/2	del.sp	NA	NA
c103	2	4	NA	26.37	941028	push_mode	upper.1/2	del.sp	NA	NA
c103	2	4	NA	29.7	941028	push_mode	upper.1/2	del.sp	NA	NA
c103	2	4	NA	77.85	941028	push_mode	drainable	del.sp	NA	NA
c103	2	4	NA	82.12	941028	push_mode	drainable	del.sp	NA	NA
c103	2	4	0.436	NA	941028	push_mode	upper.1/2	del.sp	NA	NA
c103	2	4	0.465	NA	941028	push_mode	upper.1/2	del.sp	NA	NA
c103	2	4	0.3508	NA	941028	push_mode	drainable	del.sp	NA	NA
c103	2	4	0.3492	NA	941028	push_mode	drainable	del.sp	NA	NA
c103	7	1	NA	87.79	950206	push_mode	drainable	del.sp	NA	NA
c103	7	1	NA	88.1	950206	push_mode	drainable	del.sp	NA	NA
c103	7	1	0.5538	NA	950206	push_mode	drainable	del.sp	NA	NA
c103	7	1	0.5646	NA	950206	push_mode	drainable	del.sp	NA	NA
c103	7	2	NA	87.28	950206	push_mode	drainable	del.sp	NA	NA
c103	7	2	NA	87.86	950206	push_mode	drainable	del.sp	NA	NA
c103	7	2	0.5485	NA	950206	push_mode	drainable	del.sp	NA	NA
c103	7	2	0.5231	NA	950206	push_mode	drainable	del.sp	NA	NA
c103	7	3	NA	69.13	950206	push_mode	upper.1/2	del.sp	NA	NA
c103	7	3	NA	79.15	950206	push_mode	upper.1/2	del.sp	NA	NA
c103	7	3	NA	86.99	950206	push_mode	drainable	del.sp	NA	NA
c103	7	3	NA	87.47	950206	push_mode	drainable	del.sp	NA	NA
c103	7	3	0.876	NA	950206	push_mode	upper.1/2	del.sp	NA	NA
c103	7	3	0.905	NA	950206	push_mode	upper.1/2	del.sp	NA	NA
c103	7	3	0.5192	NA	950206	push_mode	drainable	del.sp	NA	NA
c103	7	3	0.52	NA	950206	push_mode	drainable	del.sp	NA	NA
c103	7	4	NA	73.49	950206	push_mode	upper.1/2	del.sp	NA	NA
c103	7	4	NA	76.46	950206	push_mode	upper.1/2	del.sp	NA	NA
c103	7	4	NA	89.38	950206	push_mode	drainable	del.sp	NA	NA
c103	7	4	NA	89.5	950206	push_mode	drainable	del.sp	NA	NA
c103	7	4	0.846	NA	950206	push_mode	upper.1/2	del.sp	NA	NA
c103	7	4	0.993	NA	950206	push_mode	upper.1/2	del.sp	NA	NA
c103	7	4	0.4577	NA	950206	push_mode	drainable	del.sp	NA	NA
c103	7	4	0.4669	NA	950206	push_mode	drainable	del.sp	NA	NA
c104	3	1	NA	37.77	960816	push_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
c104	3	1	NA	40.59	960816	push_mode	lower.1/2	use	NA	NA
c104	3	1	NA	45.95	960816	push_mode	upper.1/2	use	NA	NA
c104	3	1	NA	53.73	960816	push_mode	lower.1/2	use	NA	NA
c104	3	1	1.01	NA	960816	push_mode	lower.1/2	use	NA	NA
c104	3	1	1.04	NA	960816	push_mode	upper.1/2	use	NA	NA
c104	3	1	1.07	NA	960816	push_mode	upper.1/2	use	NA	NA
c104	3	1	1.09	NA	960816	push_mode	lower.1/2	use	NA	NA
c104	3	2	NA	44.73	960816	push_mode	upper.1/2	use	NA	NA
c104	3	2	NA	50.58	960816	push_mode	lower.1/2	use	NA	NA
c104	3	2	NA	51.43	960816	push_mode	upper.1/2	use	NA	NA
c104	3	2	NA	52.44	960816	push_mode	lower.1/2	use	NA	NA
c104	3	2	1.01	NA	960816	push_mode	lower.1/2	use	NA	NA
c104	3	2	1.04	NA	960816	push_mode	lower.1/2	use	NA	NA
c104	3	2	1.91	NA	960816	push_mode	upper.1/2	use	NA	NA
c104	3	2	2.01	NA	960816	push_mode	upper.1/2	use	NA	NA
c104	3	3	NA	45.55	960816	push_mode	upper.1/2	use	NA	NA
c104	3	3	NA	46.15	960816	push_mode	upper.1/2	use	NA	NA
c104	3	3	NA	47.5	960816	push_mode	lower.1/2	use	NA	NA
c104	3	3	NA	52.95	960816	push_mode	lower.1/2	use	NA	NA
c104	3	3	NA	79.73	960816	push_mode	total	use	NA	NA
c104	3	3	NA	80.31	960816	push_mode	total	use	NA	NA
c104	3	3	0.46477	NA	960816	push_mode	total	use	NA	NA
c104	3	3	0.55055	NA	960816	push_mode	total	use	NA	NA
c104	3	3	1.18	NA	960816	push_mode	lower.1/2	use	NA	NA
c104	3	3	1.24	NA	960816	push_mode	lower.1/2	use	NA	NA
c104	3	3	1.28	NA	960816	push_mode	upper.1/2	use	NA	NA
c104	3	3	1.31	NA	960816	push_mode	upper.1/2	use	NA	NA
c104	3	4	NA	19.01	960816	push_mode	lower.1/2	use	NA	NA
c104	3	4	NA	20.8	960816	push_mode	lower.1/2	use	NA	NA
c104	3	4	NA	23.8	960816	push_mode	upper.1/2	use	NA	NA
c104	3	4	NA	25.7	960816	push_mode	upper.1/2	use	NA	NA
c104	3	4	NA	40.26	960816	push_mode	lower.1/2	use	NA	NA
c104	3	4	NA	71.64	960816	push_mode	lower.1/2	use	NA	NA
c104	3	4	NA	81.2	960816	push_mode	total	use	NA	NA
c104	3	4	NA	82	960816	push_mode	total	use	NA	NA
c104	3	4	0.106	NA	960816	push_mode	lower.1/2	use	NA	NA
c104	3	4	0.127	NA	960816	push_mode	lower.1/2	use	NA	NA
c104	3	4	0.158	NA	960816	push_mode	upper.1/2	use	NA	NA
c104	3	4	0.187	NA	960816	push_mode	upper.1/2	use	NA	NA
c104	3	4	0.40996	NA	960816	push_mode	total	use	NA	NA
c104	3	4	0.41087	NA	960816	push_mode	total	use	NA	NA
c104	14	1	NA	38.73	960730	push_mode	lower.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
c104	14	1	NA	38.78	960730	push_mode	lower.1/2	use	NA	NA
c104	14	1	0.749	NA	960730	push_mode	lower.1/2	use	NA	NA
c104	14	1	0.906	NA	960730	push_mode	lower.1/2	use	NA	NA
c104	14	2	NA	46.08	960730	push_mode	upper.1/2	use	NA	NA
c104	14	2	NA	50.67	960730	push_mode	upper.1/2	use	NA	NA
c104	14	2	NA	56.28	960730	push_mode	lower.1/2	use	NA	NA
c104	14	2	NA	59.87	960730	push_mode	lower.1/2	use	NA	NA
c104	14	2	0.843	NA	960730	push_mode	lower.1/2	use	NA	NA
c104	14	2	1.01	NA	960730	push_mode	lower.1/2	use	NA	NA
c104	14	2	1.38	NA	960730	push_mode	upper.1/2	use	NA	NA
c104	14	2	1.41	NA	960730	push_mode	upper.1/2	use	NA	NA
c104	14	3	NA	59.03	960730	push_mode	subsegb	use	NA	NA
c104	14	3	NA	59.61	960730	push_mode	subsegc	use	NA	NA
c104	14	3	NA	61.64	960730	push_mode	subsega	use	NA	NA
c104	14	3	NA	62	960730	push_mode	subsega	use	NA	NA
c104	14	3	NA	62.74	960730	push_mode	subsegc	use	NA	NA
c104	14	3	NA	72.05	960730	push_mode	subsegb	use	NA	NA
c104	14	3	0.613	NA	960730	push_mode	subsegc	use	NA	NA
c104	14	3	0.638	NA	960730	push_mode	subsegc	use	NA	NA
c104	14	3	0.832	NA	960730	push_mode	subsega	use	NA	NA
c104	14	3	0.946	NA	960730	push_mode	subsega	use	NA	NA
c104	14	3	0.972	NA	960730	push_mode	subsegb	use	NA	NA
c104	14	3	1.04	NA	960730	push_mode	subsegb	use	NA	NA
c104	14	4	NA	45.92	960730	push_mode	subsegc	use	NA	NA
c104	14	4	NA	49.42	960730	push_mode	subsega	use	NA	NA
c104	14	4	NA	53.85	960730	push_mode	subsegc	use	NA	NA
c104	14	4	NA	60.51	960730	push_mode	subsega	use	NA	NA
c104	14	4	NA	61.21	960730	push_mode	subsegb	use	NA	NA
c104	14	4	NA	61.57	960730	push_mode	subsegb	use	NA	NA
c104	14	4	0.669	NA	960730	push_mode	subsega	use	NA	NA
c104	14	4	0.714	NA	960730	push_mode	subsega	use	NA	NA
c104	14	4	0.829	NA	960730	push_mode	subsegb	use	NA	NA
c104	14	4	0.911	NA	960730	push_mode	subsegb	use	NA	NA
c104	14	4	3.09	NA	960730	push_mode	subsegc	use	NA	NA
c104	14	4	3.22	NA	960730	push_mode	subsegc	use	NA	NA
c104	14	5	NA	54.4	960730	push_mode	upper.1/2	use	NA	NA
c104	14	5	NA	54.93	960730	push_mode	upper.1/2	use	NA	NA
c104	14	5	NA	61.9	960730	push_mode	lower.1/2	use	NA	NA
c104	14	5	NA	62.3	960730	push_mode	lower.1/2	use	NA	NA
c104	14	5	1.26	NA	960730	push_mode	upper.1/2	use	NA	NA
c104	14	5	1.31	NA	960730	push_mode	upper.1/2	use	NA	NA
c104	14	5	1.51	NA	960730	push_mode	lower.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
c104	14	5	1.65	NA	960730	push_mode	lower.1/2	use	NA	NA
c104	14	6	NA	58.77	960730	push_mode	subsegb	use	NA	NA
c104	14	6	NA	58.79	960730	push_mode	subsegb	use	NA	NA
c104	14	6	NA	61.15	960730	push_mode	subsega	use	NA	NA
c104	14	6	NA	63.2	960730	push_mode	subsega	use	NA	NA
c104	14	6	NA	72.66	960730	push_mode	subsegc	use	NA	NA
c104	14	6	NA	79.04	960730	push_mode	subsegc	use	NA	NA
c104	14	6	NA	80.59	960730	push_mode	subsegd	use	NA	NA
c104	14	6	NA	81.07	960730	push_mode	subsegd	use	NA	NA
c104	14	6	0.198	NA	960730	push_mode	subsegd	use	NA	NA
c104	14	6	0.232	NA	960730	push_mode	subsegc	use	NA	NA
c104	14	6	0.241	NA	960730	push_mode	subsegd	use	NA	NA
c104	14	6	0.268	NA	960730	push_mode	subsegc	use	NA	NA
c104	14	6	0.494	NA	960730	push_mode	subsega	use	NA	NA
c104	14	6	0.511	NA	960730	push_mode	subsega	use	NA	NA
c104	14	6	0.863	NA	960730	push_mode	subsegb	use	NA	NA
c104	14	6	0.864	NA	960730	push_mode	subsegb	use	NA	NA
c105	2	1	NA	33.28	950314	push_mode	upper.1/2	use	NA	NA
c105	2	1	NA	34.65	950314	push_mode	upper.1/2	use	NA	NA
c105	2	1	NA	36.59	950314	push_mode	upper.1/2	use	NA	NA
c105	2	1	NA	59.4	950314	push_mode	drainable	use	NA	NA
c105	2	1	NA	59.88	950314	push_mode	drainable	use	NA	NA
c105	2	2	NA	36.54	950314	push_mode	upper.1/2	use	NA	NA
c105	2	2	NA	37.88	950314	push_mode	upper.1/2	use	NA	NA
c105	2	2	NA	72.2	950314	push_mode	drainable	use	NA	NA
c105	2	2	NA	72.27	950314	push_mode	drainable	use	NA	NA
c105	2	2	0.546	NA	950314	push_mode	upper.1/2	use	NA	NA
c105	2	2	0.676	NA	950314	push_mode	upper.1/2	use	NA	NA
c105	2	3	NA	12.91	950314	push_mode	upper.1/2	use	NA	NA
c105	2	3	NA	14.05	950314	push_mode	upper.1/2	use	NA	NA
c105	2	3	NA	19.48	950314	push_mode	lower.1/2	use	NA	NA
c105	2	3	NA	21.04	950314	push_mode	lower.1/2	use	NA	NA
c105	8	1	NA	41.64	950314	push_mode	lower.1/2	use	NA	NA
c105	8	1	NA	42.75	950314	push_mode	lower.1/2	use	NA	NA
c105	8	1	NA	61.84	950314	push_mode	drainable	use	NA	NA
c105	8	1	NA	62.01	950314	push_mode	drainable	use	NA	NA
c105	8	2	NA	4.33	950314	push_mode	lower.1/2	use	NA	NA
c105	8	2	NA	4.54	950314	push_mode	lower.1/2	use	NA	NA
c105	8	2	NA	12.5	950314	push_mode	upper.1/2	use	NA	NA
c105	8	2	NA	29.9	950314	push_mode	upper.1/2	use	NA	NA
c105	8	2	NA	30.71	950314	push_mode	upper.1/2	use	NA	NA
c105	8	2	NA	60.88	950314	push_mode	drainable	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
c105	8	2	NA	65.11	950314	push_mode	drainable	use	NA	NA
c105	8	3	NA	20.56	950314	push_mode	lower.1/2	use	NA	NA
c105	8	3	NA	21.54	950314	push_mode	lower.1/2	use	NA	NA
c105	8	3	NA	76.3	950314	push_mode	drainable	use	NA	NA
c105	8	3	NA	77.19	950314	push_mode	drainable	use	NA	NA
c105	8	3	NA	77.96	950314	push_mode	drainable	use	NA	NA
c106	1	1	NA	9.44	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	11.71	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	13.39	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	13.59	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	14	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	16.11	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	17	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	17.2	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	18.9	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	19.2	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	34.27	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	36.53	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	67.52	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	71.58	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	79.3	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	79.3	960223	grab	supernate	del.sup	NA	NA
c106	1	1	2.47	NA	960223	grab	supernate	del.sup	NA	NA
c106	1	1	2.92	NA	960223	grab	supernate	del.sup	NA	NA
c106	7	1	NA	8.43	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	9.63	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	10.9	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	12.4	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	28.37	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	31.29	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	31.34	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	32.54	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	34.1	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	34.1	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	39.47	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	40.05	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	44.37	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	48.47	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	78.2	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	78.3	960301	grab	supernate	del.sup	NA	NA
c106	7	1	0.13557	NA	960301	grab	supernate	del.sup	NA	NA
c106	7	1	0.13724	NA	960301	grab	supernate	del.sup	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
c106	7	1	0.17239	NA	960301	grab	supernate	del.sup	NA	NA
c106	7	1	0.17406	NA	960301	grab	supernate	del.sup	NA	NA
c106	7	1	1.73	NA	960301	grab	supernate	del.sup	NA	NA
c106	7	1	2	NA	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	79	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	79	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	79.05	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	79.49	960301	grab	supernate	del.sup	NA	NA
c106	7	1	0.16653	NA	960301	grab	supernate	del.sup	NA	NA
c106	7	1	0.17667	NA	960301	grab	supernate	del.sup	NA	NA
c106	7	1	0.21048	NA	960301	grab	supernate	del.sup	NA	NA
c106	7	1	0.21471	NA	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	9.24	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	9.48	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	19.3	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	21.28	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	22.4	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	25.9	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	26.12	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	26.7	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	30.11	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	30.91	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	31.29	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	72.4	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	74.92	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	76.6	960301	grab	supernate	del.sup	NA	NA
c106	7	1	1.35	NA	960301	grab	supernate	del.sup	NA	NA
c106	7	1	1.6	NA	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	54.56	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	56.03	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	63.26	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	65.05	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	83.85	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	85.53	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	90.16	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	93.4	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	95.08	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	95.69	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	95.78	960301	grab	supernate	del.sup	NA	NA
c106	7	1	NA	96.02	960301	grab	supernate	del.sup	NA	NA
c106	7	1	2.85	NA	960301	grab	supernate	del.sup	NA	NA
c106	7	1	2.97	NA	960301	grab	supernate	del.sup	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
c106	1	1	NA	2.82	960208	grab	supernate	del.sup	NA	NA
c106	1	1	NA	3.54	960208	grab	supernate	del.sup	NA	NA
c106	1	1	5.03	NA	960208	grab	supernate	del.sup	NA	NA
c106	1	1	6.05	NA	960208	grab	supernate	del.sup	NA	NA
c106	1	1	NA	3.54	960208	grab	supernate	del.sup	NA	NA
c106	1	1	NA	3.63	960208	grab	supernate	del.sup	NA	NA
c106	1	1	NA	5.6	960208	grab	supernate	del.sup	NA	NA
c106	1	1	NA	5.9	960208	grab	supernate	del.sup	NA	NA
c106	1	1	NA	22.14	960208	grab	supernate	del.sup	NA	NA
c106	1	1	NA	23.1	960208	grab	supernate	del.sup	NA	NA
c106	1	1	NA	26.07	960208	grab	supernate	del.sup	NA	NA
c106	1	1	NA	27.1	960208	grab	supernate	del.sup	NA	NA
c106	1	1	NA	32.71	960208	grab	supernate	del.sup	NA	NA
c106	1	1	NA	34.32	960208	grab	supernate	del.sup	NA	NA
c106	1	1	NA	57.09	960208	grab	supernate	del.sup	NA	NA
c106	1	1	NA	58.94	960208	grab	supernate	del.sup	NA	NA
c106	1	1	NA	76.7	960208	grab	supernate	del.sup	NA	NA
c106	1	1	NA	76.8	960208	grab	supernate	del.sup	NA	NA
c106	1	1	1.48	NA	960208	grab	supernate	del.sup	NA	NA
c106	1	1	1.64	NA	960208	grab	supernate	del.sup	NA	NA
c106	1	1	NA	80.84	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	80.91	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	81.4	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	81.4	960223	grab	supernate	del.sup	NA	NA
c106	1	1	0.18875	NA	960223	grab	supernate	del.sup	NA	NA
c106	1	1	0.19913	NA	960223	grab	supernate	del.sup	NA	NA
c106	1	1	0.28052	NA	960223	grab	supernate	del.sup	NA	NA
c106	1	1	0.29091	NA	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	8.04	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	8.51	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	9.8	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	10	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	25.27	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	26.22	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	26.3	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	27.3	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	29.76	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	32.47	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	34.16	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	35.78	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	59.37	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	61.32	960223	grab	supernate	del.sup	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
c106	1	1	NA	78.8	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	78.8	960223	grab	supernate	del.sup	NA	NA
c106	1	1	0.16876	NA	960223	grab	supernate	del.sup	NA	NA
c106	1	1	0.17293	NA	960223	grab	supernate	del.sup	NA	NA
c106	1	1	2.04	NA	960223	grab	supernate	del.sup	NA	NA
c106	1	1	2.49	NA	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	46.16	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	54.5	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	56.1	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	59.6	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	60.45	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	60.55	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	73.78	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	76.28	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	78.63	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	79.49	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	96.16	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	96.24	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	96.86	960223	grab	supernate	del.sup	NA	NA
c106	1	1	NA	97.03	960223	grab	supernate	del.sup	NA	NA
c106	1	1	0.932	NA	960223	grab	supernate	del.sup	NA	NA
c106	1	1	0.976	NA	960223	grab	supernate	del.sup	NA	NA
c106	1	1	1.34	NA	960223	grab	supernate	del.sup	NA	NA
c106	NA	999	0.462	NA	NA	NA	cc	use.old	NA	NA
c106	NA	NA	0.08	NA	NA	NA	NA	use.old	NA	NA
c107	7	1	NA	62.88	950302	push_mode	upper.1/2	use.new	NA	NA
c107	7	1	NA	64.05	950302	push_mode	upper.1/2	use.new	NA	NA
c107	7	1	NA	62.75	950302	push_mode	lower.1/2	use.new	NA	NA
c107	7	1	NA	61.84	950302	push_mode	lower.1/2	use.new	NA	NA
c107	7	2	NA	57.98	950302	push_mode	upper.1/2	use.new	NA	NA
c107	7	2	NA	57.67	950302	push_mode	upper.1/2	use.new	NA	NA
c107	7	2	NA	41.26	950302	push_mode	lower.1/2	use.new	NA	NA
c107	7	2	NA	41.46	950302	push_mode	lower.1/2	use.new	NA	NA
c107	7	3	NA	31.87	950302	push_mode	upper.1/2	use.new	NA	NA
c107	7	3	NA	31.98	950302	push_mode	upper.1/2	use.new	NA	NA
c107	7	3	NA	56.15	950302	push_mode	lower.1/2	use.new	NA	NA
c107	7	3	NA	48.1	950302	push_mode	lower.1/2	use.new	NA	NA
c107	7	4	NA	50.76	950302	push_mode	upper.1/2	use.new	NA	NA
c107	7	4	NA	49.74	950302	push_mode	upper.1/2	use.new	NA	NA
c107	7	4	NA	62.58	950302	push_mode	lower.1/2	use.new	NA	NA
c107	7	4	NA	63.87	950302	push_mode	lower.1/2	use.new	NA	NA
c107	7	5	NA	66.58	950302	push_mode	upper.1/2	use.new	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
c107	7	5	NA	66.9	950302	push_mode	upper.1/2	use.new	NA	NA
c107	7	5	NA	70.64	950302	push_mode	lower.1/2	use.new	NA	NA
c107	7	5	NA	68.69	950302	push_mode	lower.1/2	use.new	NA	NA
c107	3	1	NA	70.23	950307	push_mode	upper.1/2	use.new	NA	NA
c107	3	1	NA	70.28	950307	push_mode	upper.1/2	use.new	NA	NA
c107	3	1	NA	51.15	950307	push_mode	lower.1/2	use.new	NA	NA
c107	3	1	NA	50.66	950307	push_mode	lower.1/2	use.new	NA	NA
c107	3	2	NA	59.5	950307	push_mode	upper.1/2	use.new	NA	NA
c107	3	2	NA	58.89	950307	push_mode	upper.1/2	use.new	NA	NA
c107	3	2	NA	49.35	950307	push_mode	lower.1/2	use.new	NA	NA
c107	3	2	NA	48.76	950307	push_mode	lower.1/2	use.new	NA	NA
c107	3	3	NA	36.86	950307	push_mode	upper.1/2	use.new	NA	NA
c107	3	3	NA	38.52	950307	push_mode	upper.1/2	use.new	NA	NA
c107	3	3	NA	34.84	950307	push_mode	lower.1/2	use.new	NA	NA
c107	3	3	NA	35.84	950307	push_mode	lower.1/2	use.new	NA	NA
c107	3	3	NA	79.04	950307	push_mode	drainable	use.new	NA	NA
c107	3	3	NA	78.71	950307	push_mode	drainable	use.new	NA	NA
c107	3	4	NA	51.9	950307	push_mode	upper.1/2	use.new	NA	NA
c107	3	4	NA	51.76	950307	push_mode	upper.1/2	use.new	NA	NA
c107	3	4	NA	64.18	950307	push_mode	lower.1/2	use.new	NA	NA
c107	3	4	NA	62.89	950307	push_mode	lower.1/2	use.new	NA	NA
c107	3	5	NA	49.77	950307	push_mode	upper.1/2	use.new	NA	NA
c107	3	5	NA	54.92	950307	push_mode	upper.1/2	use.new	NA	NA
c107	3	5	NA	57.47	950307	push_mode	lower.1/2	use.new	NA	NA
c107	3	5	NA	57.84	950307	push_mode	lower.1/2	use.new	NA	NA
c108	3	1	NA	19.9	940602	push_mode	total	use	NA	NA
c108	3	1	NA	22.1	940602	push_mode	total	use	NA	NA
c108	3	1	0.34	NA	940602	push_mode	total	use	NA	NA
c108	3	1	0.355	NA	940602	push_mode	total	use	NA	NA
c108	7	1	NA	2.99	941118	auger	subsega	use	NA	NA
c108	7	1	NA	6.01	941118	auger	subsega	use	NA	NA
c108	7	1	NA	9.94	941118	auger	subsega	use	NA	NA
c108	7	1	NA	11.98	941118	auger	subsega	use	NA	NA
c108	7	1	NA	15.35	941118	auger	subsega	use	NA	NA
c108	7	1	NA	27.66	941118	auger	subsega	use	NA	NA
c108	7	1	0.0188	NA	941118	auger	upper.1/2	use	NA	NA
c108	7	1	0.0379	NA	941118	auger	upper.1/2	use	NA	NA
c108	4	1	NA	32.97	941118	auger	subsegb	use	NA	NA
c108	4	1	NA	39.15	941118	auger	subsegb	use	NA	NA
c108	4	1	NA	45.76	941118	auger	subsegc	use	NA	NA
c108	4	1	NA	46.28	941118	auger	subsegc	use	NA	NA
c108	4	1	0.154	NA	941118	auger	lower.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
c108	4	1	0.184	NA	941118	auger	lower.1/2	use	NA	NA
c108	4	1	NA	46.8	941212	auger	subsega	use	NA	NA
c108	4	1	NA	47.79	941212	auger	subsegd	use	NA	NA
c108	4	1	NA	48.57	941212	auger	subsegb	use	NA	NA
c108	4	1	NA	49.23	941212	auger	subsegd	use	NA	NA
c108	4	1	NA	50.45	941212	auger	subsegb	use	NA	NA
c108	4	1	NA	51.85	941212	auger	subsega	use	NA	NA
c108	4	1	NA	52.41	941212	auger	subsegc	use	NA	NA
c108	4	1	NA	52.97	941212	auger	subsegc	use	NA	NA
c108	4	1	0.0758	NA	941212	auger	lower.1/2	use	NA	NA
c108	4	1	0.0805	NA	941212	auger	upper.1/2	use	NA	NA
c108	4	1	0.0923	NA	941212	auger	lower.1/2	use	NA	NA
c108	4	1	0.113	NA	941212	auger	upper.1/2	use	NA	NA
c109	6	1	0.2	NA	920902	push_mode	subsegc	use	NA	NA
c109	6	1	0.2	NA	920902	push_mode	subsegc	use	NA	NA
c109	6	1	0.21	NA	920902	push_mode	subsegb	use	NA	NA
c109	6	1	0.22	NA	920902	push_mode	subsegb	use	NA	NA
c109	6	1	0.22	NA	920902	push_mode	subsegd	use	NA	NA
c109	6	1	0.22	NA	920902	push_mode	subsegd	use	NA	NA
c109	6	1	NA	19.3	920902	push_mode	NA	use	NA	NA
c109	6	1	NA	28.2	920902	push_mode	subsegb	use.new	NA	NA
c109	6	1	NA	28	920902	push_mode	subsegb	use.new	NA	NA
c109	6	1	NA	35.4	920902	push_mode	subsegc	use.new	NA	NA
c109	6	1	NA	35.9	920902	push_mode	subsegc	use.new	NA	NA
c109	6	1	NA	26.2	920902	push_mode	subsegd	use.new	NA	NA
c109	6	1	NA	26.7	920902	push_mode	subsegd	use.new	NA	NA
c109	7	1	0.3	NA	920904	push_mode	subsegd	use	NA	NA
c109	7	1	0.31	NA	920904	push_mode	subsegd	use	NA	NA
c109	7	1	0.32	NA	920904	push_mode	subsegd	use	NA	NA
c109	7	1	0.35	NA	920904	push_mode	subsegc	use	NA	NA
c109	7	1	0.38	NA	920904	push_mode	subsegd	use	NA	NA
c109	7	1	0.38	NA	920904	push_mode	subsegc	use	NA	NA
c109	7	1	NA	46.9	920904	push_mode	subsegd	use.new	NA	NA
c109	7	1	NA	49.6	920904	push_mode	subsegd	use.new	NA	NA
c109	2	1	0.17	NA	920906	push_mode	subsegb	use	NA	NA
c109	2	1	0.19	NA	920906	push_mode	subsegb	use	NA	NA
c109	2	1	0.21	NA	920906	push_mode	subsegc	use	NA	NA
c109	2	1	0.23	NA	920906	push_mode	subsegc	use	NA	NA
c109	2	1	0.25	NA	920906	push_mode	subsegd	use	NA	NA
c109	2	1	0.26	NA	920906	push_mode	subsegd	use	NA	NA
c109	8	1	NA	19.6	920906	push_mode	NA	use	NA	NA
c109	2	1	NA	31.3	920906	push_mode	subsegb	use.new	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
c109	2	1	NA	28.7	920906	push_mode	subsegb	use.new	NA	NA
c109	2	1	NA	44.7	920906	push_mode	subsegc	use.new	NA	NA
c109	2	1	NA	42.9	920906	push_mode	subsegc	use.new	NA	NA
c109	2	1	NA	38.7	920906	push_mode	subsegd	use.new	NA	NA
c109	2	1	NA	39	920906	push_mode	subsegd	use.new	NA	NA
c109	NA	999	0.25	NA	920902	push_mode	cc	del.cc	NA	NA
c109	NA	999	0.27	NA	920902	push_mode	cc	del.cc	NA	NA
c110	5	2	NA	50.1	920414	push_mode	total	use	NA	NA
c110	5	2	NA	59.6	920414	push_mode	total	use	NA	NA
c110	5	2	NA	61.1	920414	push_mode	total	use	NA	NA
c110	5	3	0.0405	NA	920414	push_mode	drainable	use	NA	NA
c110	5	3	0.041	NA	920414	push_mode	drainable	use	NA	NA
c110	5	4	NA	50.6	920414	push_mode	total	use	NA	NA
c110	5	4	NA	56.8	920414	push_mode	total	use	NA	NA
c110	5	4	NA	60.4	920414	push_mode	total	use	NA	NA
c110	7	1	NA	54.2	920415	push_mode	total	use	NA	NA
c110	7	1	NA	59.8	920415	push_mode	total	use	NA	NA
c110	7	1	NA	62.5	920415	push_mode	total	use	NA	NA
c110	7	4	NA	53.8	920415	push_mode	total	use	NA	NA
c110	7	4	NA	62.5	920415	push_mode	total	use	NA	NA
c110	7	4	NA	64.5	920415	push_mode	total	use	NA	NA
c110	7	4	0.05455	NA	920415	push_mode	drainable	use	NA	NA
c110	7	4	0.055	NA	920415	push_mode	drainable	use	NA	NA
c110	2	2	NA	53.2	920415	push_mode	total	use	NA	NA
c110	2	2	NA	56.6	920415	push_mode	total	use	NA	NA
c110	2	2	NA	61.9	920415	push_mode	total	use	NA	NA
c110	2	3	NA	52.6	920415	push_mode	total	use	NA	NA
c110	2	3	NA	60.3	920415	push_mode	total	use	NA	NA
c110	2	3	NA	60.9	920415	push_mode	total	use	NA	NA
c110	2	3	0.06498	NA	920415	push_mode	drainable	use	NA	NA
c110	2	3	0.06591	NA	920415	push_mode	drainable	use	NA	NA
c110	2	4	NA	49.3	920415	push_mode	total	use	NA	NA
c110	2	4	NA	60.4	920415	push_mode	total	use	NA	NA
c110	2	4	NA	60.4	920415	push_mode	total	use	NA	NA
c110	NA	999	0.03977	NA	920414	push_mode	cc	del.cc	NA	NA
c110	NA	999	0.04946	NA	920414	push_mode	cc	del.cc	NA	NA
c111	6	1	NA	30.8	940411	push_mode	total	use	NA	NA
c111	6	1	NA	32.5	940411	push_mode	total	use	NA	NA
c111	6	1	0.0709	NA	940411	push_mode	total	use	NA	NA
c111	6	1	0.0738	NA	940411	push_mode	total	use	NA	NA
c111	3	1	NA	0	940422	push_mode	total	use.dl	NA	NA
c111	3	1	NA	0	940422	push_mode	total	use.dl	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
c111	2	1	NA	22.15	950117	auger	total	use	NA	NA
c111	2	1	NA	26.54	950117	auger	total	use	NA	NA
c111	2	1	NA	35.5	950117	auger	total	use	NA	NA
c111	6	1	NA	28.01	950325	auger	subsegb	use	NA	NA
c111	6	1	NA	28.24	950325	auger	subsegb	use	NA	NA
c111	6	1	NA	38.47	950325	auger	subsegc	use	NA	NA
c111	6	1	NA	38.58	950325	auger	subsegc	use	NA	NA
c111	6	1	NA	44.23	950325	auger	lower.1/2	use	NA	NA
c111	6	1	NA	44.25	950325	auger	lower.1/2	use	NA	NA
c111	6	1	NA	44.74	950325	auger	subsegc	use	NA	NA
c111	6	1	0.0639	NA	950325	auger	subsegb	use	NA	NA
c111	6	1	0.0724	NA	950325	auger	subsegb	use	NA	NA
c111	6	1	0.0893	NA	950325	auger	lower.1/2	use	NA	NA
c111	6	1	0.0909	NA	950325	auger	lower.1/2	use	NA	NA
c111	6	1	0.122	NA	950325	auger	subsegc	use	NA	NA
c111	6	1	0.128	NA	950325	auger	subsegc	use	NA	NA
c111	3	1	NA	0	950325	auger	total	use.dl	NA	NA
c111	3	1	NA	0	950325	auger	total	use.dl	NA	NA
c111	3	1	NA	1.6	950325	auger	NA	del.qa	NA	NA
c111	3	1	NA	1.6	950325	auger	NA	del.qa	NA	NA
c112	2	1	0.39	NA	920319	push_mode	total	use	NA	NA
c112	2	1	0.59	NA	920319	push_mode	total	use	NA	NA
c112	2	2	0.28	NA	920319	push_mode	subsegb	use	NA	NA
c112	2	2	0.3	NA	920319	push_mode	subsegc	use	NA	NA
c112	2	2	0.32	NA	920319	push_mode	subsegb	use	NA	NA
c112	2	2	0.32	NA	920319	push_mode	subsegc	use	NA	NA
c112	2	2	0.38	NA	920319	push_mode	subsegd	use	NA	NA
c112	2	2	0.41	NA	920319	push_mode	subsegd	use	NA	NA
c112	7	2	0.1	NA	920322	push_mode	total	use	NA	NA
c112	7	2	0.13	NA	920322	push_mode	total	use	NA	NA
c112	7	2	0.22	NA	920322	push_mode	total	use	NA	NA
c112	7	2	0.29	NA	920322	push_mode	total	use	NA	NA
c112	7	2	NA	42.1	920322	push_mode	total	use.new	NA	NA
c112	7	2	NA	41.6	920322	push_mode	total	use.new	NA	NA
c112	8	1	0.48	NA	920324	push_mode	subsegd	use	NA	NA
c112	8	1	0.5	NA	920324	push_mode	subsegd	use	NA	NA
c112	8	1	0.77	NA	920324	push_mode	subsegc	use	NA	NA
c112	8	1	0.86	NA	920324	push_mode	subsegc	use	NA	NA
c112	8	1	NA	48.5	920324	push_mode	subsegc	use.new	NA	NA
c112	8	1	NA	51.6	920324	push_mode	subsegc	use.new	NA	NA
c112	8	1	NA	54.2	920324	push_mode	subsegd	use.new	NA	NA
c112	8	1	NA	53.4	920324	push_mode	subsegd	use.new	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
c112	8	2	0.21	NA	920324	push_mode	subsegd	use	NA	NA
c112	8	2	0.25	NA	920324	push_mode	subsegd	use	NA	NA
c112	8	2	0.27	NA	920324	push_mode	subsegb	use	NA	NA
c112	8	2	0.27	NA	920324	push_mode	subsegb	use	NA	NA
c112	8	2	0.28	NA	920324	push_mode	subsegc	use	NA	NA
c112	8	2	0.3	NA	920324	push_mode	subsegc	use	NA	NA
c112	8	2	0.38	NA	920324	push_mode	subsega	use	NA	NA
c112	8	2	0.39	NA	920324	push_mode	subsega	use	NA	NA
c112	8	2	NA	55.2	920324	push_mode	subsega	use.new	NA	NA
c112	8	2	NA	53.5	920324	push_mode	subsega	use.new	NA	NA
c112	8	2	NA	40.1	920324	push_mode	subsegb	use.new	NA	NA
c112	8	2	NA	42.4	920324	push_mode	subsegb	use.new	NA	NA
c112	8	2	NA	43.6	920324	push_mode	subsegc	use.new	NA	NA
c112	8	2	NA	46.7	920324	push_mode	subsegc	use.new	NA	NA
c112	8	2	NA	51.7	920324	push_mode	subsegd	use.new	NA	NA
c112	8	2	NA	49.8	920324	push_mode	subsegd	use.new	NA	NA
c201	7	1	NA	10.69	950615	auger	NA	del.sp	NA	NA
c201	7	1	3.77	NA	950615	auger	NA	del.sp	NA	NA
c201	7	1	NA	11.46	950615	auger	NA	del.sp	NA	NA
c201	7	1	4.57	NA	950615	auger	NA	del.sp	NA	NA
c201	7	1	NA	10.53	950615	auger	NA	del.sp	NA	NA
c201	7	1	4.1	NA	950615	auger	NA	del.sp	NA	NA
c202	7	1	NA	4.88	950505	auger	total	del.sp	NA	NA
c202	7	1	NA	5.39	950505	auger	total	del.sp	NA	NA
c202	7	1	2.96	NA	950505	auger	total	del.sp	NA	NA
c202	7	1	4.38	NA	950505	auger	total	del.sp	NA	NA
c202	7	1	NA	6.49	950505	auger	total	del.sp	NA	NA
c202	7	1	NA	6.96	950505	auger	total	del.sp	NA	NA
c202	7	1	2	NA	950505	auger	total	del.sp	NA	NA
c202	7	1	2.42	NA	950505	auger	total	del.sp	NA	NA
c203	7	1	NA	30.98	950405	auger	upper.1/2	del.sp	NA	NA
c203	7	1	NA	31.78	950405	auger	upper.1/2	del.sp	NA	NA
c203	7	1	NA	33.26	950405	auger	lower.1/2	del.sp	NA	NA
c203	7	1	NA	39.8	950405	auger	lower.1/2	del.sp	NA	NA
c203	7	1	NA	41.04	950405	auger	lower.1/2	del.sp	NA	NA
c203	7	1	NA	33.67	950405	auger	upper.1/2	del.sp	NA	NA
c203	7	1	NA	36.66	950405	auger	upper.1/2	del.sp	NA	NA
c203	7	1	NA	49.03	950405	auger	lower.1/2	del.sp	NA	NA
c203	7	1	NA	52.12	950405	auger	lower.1/2	del.sp	NA	NA
c204	7	1	NA	50.44	950502	auger	upper.1/2	del.sp	NA	NA
c204	7	1	NA	55.02	950502	auger	lower.1/2	del.sp	NA	NA
c204	7	1	NA	56.39	950502	auger	lower.1/2	del.sp	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
c204	7	1	NA	58.32	950502	auger	upper.1/2	del.sp	NA	NA
c204	7	1	NA	59.5	950502	auger	upper.1/2	del.sp	NA	NA
c204	7	1	13	NA	950502	auger	lower.1/2	del.sp	NA	NA
c204	7	1	14.8	NA	950502	auger	lower.1/2	del.sp	NA	NA
c204	7	1	NA	56.08	950502	auger	total	del.sp	NA	NA
c204	7	1	NA	59.92	950502	auger	total	del.sp	NA	NA
c204	7	1	9.18	NA	950502	auger	total	del.sp	NA	NA
c204	7	1	14.4	NA	950502	auger	total	del.sp	NA	NA
c204	7	1	1.38	NA	950905	auger	NA	del.sp	NA	NA
s101	6	1	NA	53.69	960326	push_mode	total	use	NA	NA
s101	6	1	NA	53.71	960326	push_mode	total	use	NA	NA
s101	6	2	NA	51.71	960326	push_mode	total	use	NA	NA
s101	6	2	NA	52.18	960326	push_mode	lower.1/2	use	NA	NA
s101	6	2	NA	52.46	960326	push_mode	total	use	NA	NA
s101	6	2	NA	52.57	960326	push_mode	lower.1/2	use	NA	NA
s101	6	3	NA	43.86	960326	push_mode	total	use	NA	NA
s101	6	3	NA	46.52	960326	push_mode	total	use	NA	NA
s101	6	3	NA	53.42	960326	push_mode	total	use	NA	NA
s101	6	3	NA	53.76	960326	push_mode	total	use	NA	NA
s101	6	5	NA	38.84	960326	push_mode	lower.1/2	use	NA	NA
s101	6	5	NA	39.07	960326	push_mode	lower.1/2	use	NA	NA
s101	6	5	NA	48.8	960326	push_mode	upper.1/2	use	NA	NA
s101	6	5	NA	49.14	960326	push_mode	upper.1/2	use	NA	NA
s101	6	6	NA	23.21	960326	push_mode	upper.1/2	use	NA	NA
s101	6	6	NA	36.38	960326	push_mode	lower.1/2	use	NA	NA
s101	6	6	NA	36.81	960326	push_mode	lower.1/2	use	NA	NA
s101	6	6	NA	37.11	960326	push_mode	lower.1/2	use	NA	NA
s101	6	6	NA	38.67	960326	push_mode	upper.1/2	use	NA	NA
s101	6	6	NA	38.84	960326	push_mode	upper.1/2	use	NA	NA
s101	6	6	NA	39.54	960326	push_mode	upper.1/2	use	NA	NA
s101	6	6	NA	68.84	960326	push_mode	lower.1/2	use	NA	NA
s101	6	7	NA	30.46	960326	push_mode	lower.1/2	use	NA	NA
s101	6	7	NA	32.36	960326	push_mode	lower.1/2	use	NA	NA
s101	6	7	NA	37.49	960326	push_mode	upper.1/2	use	NA	NA
s101	6	7	NA	38.19	960326	push_mode	upper.1/2	use	NA	NA
s101	6	8	NA	33.32	960326	push_mode	lower.1/2	use	NA	NA
s101	6	8	NA	34.18	960326	push_mode	lower.1/2	use	NA	NA
s101	6	8	NA	35.13	960326	push_mode	upper.1/2	use	NA	NA
s101	6	8	NA	35.34	960326	push_mode	upper.1/2	use	NA	NA
s101	6	9	NA	28.35	960326	push_mode	upper.1/2	use	NA	NA
s101	6	9	NA	32.84	960326	push_mode	upper.1/2	use	NA	NA
s101	6	9	NA	33.54	960326	push_mode	lower.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
s101	6	9	NA	33.54	960326	push_mode	upper.1/2	use	NA	NA
s101	6	9	NA	35.58	960326	push_mode	lower.1/2	use	NA	NA
s101	6	9	NA	54.08	960326	push_mode	total	use	NA	NA
s101	6	9	NA	54.85	960326	push_mode	total	use	NA	NA
s101	6	9	0.01852	NA	960326	push_mode	total	use	NA	NA
s101	6	9	0.02042	NA	960326	push_mode	total	use	NA	NA
s101	6	99	NA	99.13	960326	push_mode	total	del.99	NA	NA
s101	6	99	NA	99.8	960326	push_mode	total	del.99	NA	NA
s101	11	1	NA	44.6	960403	push_mode	upper.1/2	use	NA	NA
s101	11	1	NA	44.65	960403	push_mode	upper.1/2	use	NA	NA
s101	11	2	NA	42.27	960403	push_mode	lower.1/2	use	NA	NA
s101	11	2	NA	43.31	960403	push_mode	lower.1/2	use	NA	NA
s101	11	2	NA	44.08	960403	push_mode	upper.1/2	use	NA	NA
s101	11	2	NA	45.23	960403	push_mode	upper.1/2	use	NA	NA
s101	11	3	NA	40.5	960403	push_mode	upper.1/2	use	NA	NA
s101	11	3	NA	40.52	960403	push_mode	lower.1/2	use	NA	NA
s101	11	3	NA	41.38	960403	push_mode	lower.1/2	use	NA	NA
s101	11	3	NA	42.55	960403	push_mode	upper.1/2	use	NA	NA
s101	11	4	NA	39.9	960403	push_mode	upper.1/2	use	NA	NA
s101	11	4	NA	40.2	960403	push_mode	upper.1/2	use	NA	NA
s101	11	4	NA	40.88	960403	push_mode	lower.1/2	use	NA	NA
s101	11	4	NA	41.15	960403	push_mode	lower.1/2	use	NA	NA
s101	11	5	NA	37.09	960403	push_mode	lower.1/2	use	NA	NA
s101	11	5	NA	44.34	960403	push_mode	lower.1/2	use	NA	NA
s101	11	5	NA	47.77	960403	push_mode	upper.1/2	use	NA	NA
s101	11	5	NA	48.32	960403	push_mode	upper.1/2	use	NA	NA
s101	11	6	NA	35.97	960403	push_mode	lower.1/2	use	NA	NA
s101	11	6	NA	37.42	960403	push_mode	lower.1/2	use	NA	NA
s101	11	6	NA	38.87	960403	push_mode	upper.1/2	use	NA	NA
s101	11	6	NA	41.22	960403	push_mode	upper.1/2	use	NA	NA
s101	11	7	NA	20.74	960403	push_mode	upper.1/2	use	NA	NA
s101	11	7	NA	36.14	960403	push_mode	lower.1/2	use	NA	NA
s101	11	7	NA	36.99	960403	push_mode	lower.1/2	use	NA	NA
s101	11	7	NA	37.23	960403	push_mode	upper.1/2	use	NA	NA
s101	11	7	NA	41.1	960403	push_mode	upper.1/2	use	NA	NA
s101	11	7	NA	42.79	960403	push_mode	upper.1/2	use	NA	NA
s101	11	8	NA	27.86	960403	push_mode	upper.1/2	use	NA	NA
s101	11	8	NA	29.25	960403	push_mode	upper.1/2	use	NA	NA
s101	11	8	NA	32.27	960403	push_mode	lower.1/2	use	NA	NA
s101	11	8	NA	33.74	960403	push_mode	lower.1/2	use	NA	NA
s102	11	2	NA	14.73	960113	push_mode	upper.1/2	use	NA	NA
s102	11	2	NA	14.88	960113	push_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
s102	11	2	0.128	NA	960113	push_mode	upper.1/2	use	NA	NA
s102	11	2	0.129	NA	960113	push_mode	upper.1/2	use	NA	NA
s102	11	3	NA	8.02	960113	push_mode	upper.1/2	use	NA	NA
s102	11	3	NA	8.11	960113	push_mode	upper.1/2	use	NA	NA
s102	11	3	0.0968	NA	960113	push_mode	upper.1/2	use	NA	NA
s102	11	3	0.111	NA	960113	push_mode	upper.1/2	use	NA	NA
s102	11	4	NA	9.99	960113	push_mode	upper.1/2	use	NA	NA
s102	11	4	NA	10.34	960113	push_mode	upper.1/2	use	NA	NA
s102	11	4	NA	16.38	960113	push_mode	lower.1/2	use	NA	NA
s102	11	4	NA	17.54	960113	push_mode	lower.1/2	use	NA	NA
s102	11	4	0.124	NA	960113	push_mode	upper.1/2	use	NA	NA
s102	11	4	0.13	NA	960113	push_mode	upper.1/2	use	NA	NA
s102	11	4	0.231	NA	960113	push_mode	lower.1/2	use	NA	NA
s102	11	4	0.236	NA	960113	push_mode	lower.1/2	use	NA	NA
s102	11	5	NA	8.11	960113	push_mode	upper.1/2	use	NA	NA
s102	11	5	NA	8.5	960113	push_mode	upper.1/2	use	NA	NA
s102	11	5	NA	16.38	960113	push_mode	lower.1/2	use	NA	NA
s102	11	5	NA	17.8	960113	push_mode	lower.1/2	use	NA	NA
s102	11	5	0.149	NA	960113	push_mode	upper.1/2	use	NA	NA
s102	11	5	0.161	NA	960113	push_mode	upper.1/2	use	NA	NA
s102	11	5	0.207	NA	960113	push_mode	lower.1/2	use	NA	NA
s102	11	5	0.213	NA	960113	push_mode	lower.1/2	use	NA	NA
s102	11	6	NA	3.18	960113	push_mode	subsega	use	NA	NA
s102	11	6	NA	7.13	960113	push_mode	subsega	use	NA	NA
s102	11	6	NA	8.26	960113	push_mode	subsegc	use	NA	NA
s102	11	6	NA	12.16	960113	push_mode	subsegc	use	NA	NA
s102	11	6	NA	12.18	960113	push_mode	subsegc	use	NA	NA
s102	11	6	NA	14.2	960113	push_mode	subsegc	use	NA	NA
s102	11	6	NA	23.98	960113	push_mode	subsegb	use	NA	NA
s102	11	6	NA	24.99	960113	push_mode	subsegb	use	NA	NA
s102	11	6	0.0782	NA	960113	push_mode	subsega	use	NA	NA
s102	11	6	0.0789	NA	960113	push_mode	subsega	use	NA	NA
s102	11	6	0.147	NA	960113	push_mode	subsegc	use	NA	NA
s102	11	6	0.148	NA	960113	push_mode	subsegc	use	NA	NA
s102	11	6	0.311	NA	960113	push_mode	subsegb	use	NA	NA
s102	11	6	0.333	NA	960113	push_mode	subsegb	use	NA	NA
s102	11	7	NA	34.78	960113	push_mode	lower.1/2	use	0.38	0.22
s102	11	7	NA	36.4644	960113	push_mode	lower.1/2	use	0.38	0.22
s102	11	7	NA	37.238	960113	push_mode	upper.1/2	use	0.4	0.22
s102	11	7	NA	38.214	960113	push_mode	upper.1/2	use	0.4	0.22
s102	11	7	NA	52.83	960113	push_mode	drainable	del.dr	0.78	0.22
s102	11	7	NA	53.23	960113	push_mode	drainable	del.dr	0.78	0.22

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
s102	11	7	0.17829	NA	960113	push_mode	drainable	del.dr	0.78	0.22
s102	11	7	0.20848	NA	960113	push_mode	drainable	del.dr	0.78	0.22
s102	11	7	0.2932352	NA	960113	push_mode	lower.1/2	use	0.38	0.22
s102	11	7	0.2882696	NA	960113	push_mode	lower.1/2	use	0.38	0.22
s102	11	7	0.329258	NA	960113	push_mode	upper.1/2	use	0.4	0.22
s102	11	7	0.340096	NA	960113	push_mode	upper.1/2	use	0.4	0.22
s102	11	8	NA	35.07	960113	push_mode	upper.1/2	use	NA	NA
s102	11	8	NA	36.19	960113	push_mode	upper.1/2	use	NA	NA
s102	11	8	NA	39.62	960113	push_mode	lower.1/2	use	NA	NA
s102	11	8	NA	41.33	960113	push_mode	lower.1/2	use	NA	NA
s102	11	8	0.656	NA	960113	push_mode	upper.1/2	use	NA	NA
s102	11	8	0.682	NA	960113	push_mode	upper.1/2	use	NA	NA
s102	11	8	0.762	NA	960113	push_mode	lower.1/2	use	NA	NA
s102	11	8	0.827	NA	960113	push_mode	lower.1/2	use	NA	NA
s102	11	9	NA	39.11	960113	push_mode	upper.1/2	use	NA	NA
s102	11	9	NA	40.26	960113	push_mode	upper.1/2	use	NA	NA
s102	11	9	NA	42.05	960113	push_mode	lower.1/2	use	NA	NA
s102	11	9	NA	42.17	960113	push_mode	lower.1/2	use	NA	NA
s102	11	9	0.491	NA	960113	push_mode	lower.1/2	use	NA	NA
s102	11	9	0.498	NA	960113	push_mode	lower.1/2	use	NA	NA
s102	11	9	0.669	NA	960113	push_mode	upper.1/2	use	NA	NA
s102	11	9	0.705	NA	960113	push_mode	upper.1/2	use	NA	NA
s102	11	10	NA	41.46	960113	push_mode	upper.1/2	use	NA	NA
s102	11	10	NA	42.16	960113	push_mode	upper.1/2	use	NA	NA
s102	11	10	NA	42.45	960113	push_mode	lower.1/2	use	NA	NA
s102	11	10	NA	42.55	960113	push_mode	lower.1/2	use	NA	NA
s102	11	10	0.489	NA	960113	push_mode	upper.1/2	use	NA	NA
s102	11	10	0.492	NA	960113	push_mode	upper.1/2	use	NA	NA
s102	11	10	0.631	NA	960113	push_mode	lower.1/2	use	NA	NA
s102	11	10	0.742	NA	960113	push_mode	lower.1/2	use	NA	NA
s102	11	11	NA	18.764	960113	push_mode	upper.1/2	use	0.96	0.04
s102	11	11	NA	18.6134	960113	push_mode	upper.1/2	use	0.96	0.04
s102	11	11	NA	29.47	960113	push_mode	drainable	del.dr	0.96	0.04
s102	11	11	NA	44.96	960113	push_mode	drainable	del.dr	0.96	0.04
s102	11	11	NA	45.56	960113	push_mode	drainable	del.dr	0.96	0.04
s102	11	11	NA	46.32	960113	push_mode	drainable	del.dr	0.96	0.04
s102	11	11	0.21116	NA	960113	push_mode	upper.1/2	use	0.96	0.04
s102	11	11	0.2170176	NA	960113	push_mode	upper.1/2	use	0.96	0.04
s102	11	11	0.21744	NA	960113	push_mode	drainable	del.dr	0.96	0.04
s102	11	11	0.311	NA	960113	push_mode	drainable	del.dr	0.96	0.04
s102	14	2	NA	13.37	960308	push_mode	upper.1/2	use	NA	NA
s102	14	2	NA	14.72	960308	push_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
s102	14	2	0.145	NA	960308	push_mode	upper.1/2	use	NA	NA
s102	14	2	0.146	NA	960308	push_mode	upper.1/2	use	NA	NA
s102	14	3	NA	5.4	960308	push_mode	upper.1/2	use	NA	NA
s102	14	3	NA	6.19	960308	push_mode	upper.1/2	use	NA	NA
s102	14	3	0.112	NA	960308	push_mode	upper.1/2	use	NA	NA
s102	14	3	0.114	NA	960308	push_mode	upper.1/2	use	NA	NA
s102	14	4	NA	12.55	960308	push_mode	upper.1/2	use	NA	NA
s102	14	4	NA	12.69	960308	push_mode	upper.1/2	use	NA	NA
s102	14	4	0.172	NA	960308	push_mode	upper.1/2	use	NA	NA
s102	14	4	0.177	NA	960308	push_mode	upper.1/2	use	NA	NA
s102	14	5	NA	34.5916	960308	push_mode	subsega	use	0.14	0.11
s102	14	5	NA	34.662	960308	push_mode	subsega	use	0.14	0.11
s102	14	5	NA	15.0484	960308	push_mode	subsegb	use	0.39	0.11
s102	14	5	NA	15.42	960308	push_mode	subsegb	use	0.39	0.11
s102	14	5	NA	27.4144	960308	push_mode	subsegc	use	0.36	0.11
s102	14	5	NA	27.678	960308	push_mode	subsegc	use	0.36	0.11
s102	14	5	NA	47.01	960308	push_mode	drainable	del.dr	0.89	0.11
s102	14	5	NA	47.2	960308	push_mode	drainable	del.dr	0.89	0.11
s102	14	5	0.285494	NA	960308	push_mode	subsega	use	0.14	0.11
s102	14	5	0.2655332	NA	960308	push_mode	subsega	use	0.14	0.11
s102	14	5	0.2032082	NA	960308	push_mode	subsegb	use	0.39	0.11
s102	14	5	0.212999	NA	960308	push_mode	subsegb	use	0.39	0.11
s102	14	5	0.319136	NA	960308	push_mode	subsegc	use	0.36	0.11
s102	14	5	0.3287168	NA	960308	push_mode	subsegc	use	0.36	0.11
s102	14	5	0.33254	NA	960308	push_mode	drainable	del.dr	0.89	0.11
s102	14	5	0.3713	NA	960308	push_mode	drainable	del.dr	0.89	0.11
s102	14	6	NA	23.8	960308	push_mode	lower.1/2	use	NA	NA
s102	14	6	NA	24.44	960308	push_mode	upper.1/2	use	NA	NA
s102	14	6	NA	24.76	960308	push_mode	upper.1/2	use	NA	NA
s102	14	6	NA	30.36	960308	push_mode	lower.1/2	use	NA	NA
s102	14	6	0.255	NA	960308	push_mode	upper.1/2	use	NA	NA
s102	14	6	0.264	NA	960308	push_mode	upper.1/2	use	NA	NA
s102	14	6	0.276	NA	960308	push_mode	lower.1/2	use	NA	NA
s102	14	6	0.31	NA	960308	push_mode	lower.1/2	use	NA	NA
s102	14	6	NA	25.9787	960308	push_mode	upper.1/2	use	0.63	0.37
s102	14	6	NA	18.91	960308	push_mode	upper.1/2	use	0.63	0.37
s102	14	6	NA	29.9964	960308	push_mode	upper.1/2	use	0.63	0.37
s102	14	6	NA	47.72	960308	push_mode	drainable	del.dr	0.63	0.37
s102	14	6	NA	48.09	960308	push_mode	drainable	del.dr	0.63	0.37
s102	14	6	NA	51.85	960308	push_mode	liner	del.lin	NA	NA
s102	14	6	NA	51.9	960308	push_mode	liner	del.lin	NA	NA
s102	14	6	0.2839504	NA	960308	push_mode	upper.1/2	use	0.63	0.37

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
s102	14	6	0.2988912	NA	960308	push_mode	upper.1/2	use	0.63	0.37
s102	14	6	0.35172	NA	960308	push_mode	liner	del.lin	NA	NA
s102	14	6	0.38092	NA	960308	push_mode	drainable	del.dr	0.63	0.37
s102	14	6	0.38134	NA	960308	push_mode	liner	del.lin	NA	NA
s102	14	6	0.39576	NA	960308	push_mode	drainable	del.dr	0.63	0.37
s102	14	6	NA	12.38	960308	push_mode	lower.1/2	use	NA	NA
s102	14	6	NA	12.55	960308	push_mode	lower.1/2	use	NA	NA
s102	14	6	NA	12.66	960308	push_mode	lower.1/2	use	NA	NA
s102	14	6	NA	12.75	960308	push_mode	lower.1/2	use	NA	NA
s102	14	6	NA	13.06	960308	push_mode	lower.1/2	use	NA	NA
s102	14	6	NA	13.25	960308	push_mode	upper.1/2	use	NA	NA
s102	14	6	NA	14.7	960308	push_mode	upper.1/2	use	NA	NA
s102	14	6	0.133	NA	960308	push_mode	lower.1/2	use	NA	NA
s102	14	6	0.133	NA	960308	push_mode	upper.1/2	use	NA	NA
s102	14	6	0.136	NA	960308	push_mode	lower.1/2	use	NA	NA
s102	14	6	0.139	NA	960308	push_mode	upper.1/2	use	NA	NA
s102	14	7	NA	2.24	960308	push_mode	upper.1/2	use	NA	NA
s102	14	7	NA	21.72	960308	push_mode	upper.1/2	use	NA	NA
s102	14	7	NA	22.81	960308	push_mode	upper.1/2	use	NA	NA
s102	14	7	0.223	NA	960308	push_mode	upper.1/2	use	NA	NA
s102	14	7	0.281	NA	960308	push_mode	upper.1/2	use	NA	NA
s102	14	8	NA	20.75	960308	push_mode	upper.1/2	use	NA	NA
s102	14	8	NA	24.17	960308	push_mode	upper.1/2	use	NA	NA
s102	14	8	0.286	NA	960308	push_mode	upper.1/2	use	NA	NA
s102	14	8	0.314	NA	960308	push_mode	upper.1/2	use	NA	NA
s102	14	8	NA	32.74	960308	push_mode	subsega	use	NA	NA
s102	14	8	NA	34.31	960308	push_mode	subsega	use	NA	NA
s102	14	8	NA	37.59	960308	push_mode	subsegb	use	NA	NA
s102	14	8	NA	38.9	960308	push_mode	subsegb	use	NA	NA
s102	14	8	NA	38.94	960308	push_mode	subsegc	use	NA	NA
s102	14	8	NA	41.93	960308	push_mode	subsegc	use	NA	NA
s102	14	8	0.637	NA	960308	push_mode	subsegc	use	NA	NA
s102	14	8	0.656	NA	960308	push_mode	subsegc	use	NA	NA
s102	14	8	0.883	NA	960308	push_mode	subsega	use	NA	NA
s102	14	8	0.917	NA	960308	push_mode	subsega	use	NA	NA
s102	14	8	1.27	NA	960308	push_mode	subsegb	use	NA	NA
s102	14	8	1.33	NA	960308	push_mode	subsegb	use	NA	NA
s102	14	9	NA	41.23	960308	push_mode	upper.1/2	use	NA	NA
s102	14	9	NA	41.46	960308	push_mode	upper.1/2	use	NA	NA
s102	14	9	NA	42.15	960308	push_mode	lower.1/2	use	NA	NA
s102	14	9	NA	42.97	960308	push_mode	lower.1/2	use	NA	NA
s102	14	9	0.43	NA	960308	push_mode	lower.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
s102	14	9	0.446	NA	960308	push_mode	lower.1/2	use	NA	NA
s102	14	9	0.565	NA	960308	push_mode	upper.1/2	use	NA	NA
s102	14	9	0.582	NA	960308	push_mode	upper.1/2	use	NA	NA
s102	14	10	NA	45.1876	960308	push_mode	upper.1/2	use	0.44	0.1
s102	14	10	NA	45.2372	960308	push_mode	upper.1/2	use	0.44	0.1
s102	14	10	NA	45.9788	960308	push_mode	lower.1/2	use	0.46	0.1
s102	14	10	NA	46.3104	960308	push_mode	lower.1/2	use	0.46	0.1
s102	14	10	NA	65.63	960308	push_mode	drainable	del.dr	0.9	0.1
s102	14	10	NA	65.75	960308	push_mode	drainable	del.dr	0.9	0.1
s102	14	10	0.26688	NA	960308	push_mode	drainable	del.dr	0.9	0.1
s102	14	10	0.28258	NA	960308	push_mode	drainable	del.dr	0.9	0.1
s102	14	10	0.4316704	NA	960308	push_mode	lower.1/2	use	0.46	0.1
s102	14	10	0.4325496	NA	960308	push_mode	upper.1/2	use	0.44	0.1
s102	14	10	0.4403456	NA	960308	push_mode	upper.1/2	use	0.44	0.1
s102	14	10	0.4531664	NA	960308	push_mode	lower.1/2	use	0.46	0.1
s102	14	11	NA	21.77	960308	push_mode	lower.1/2	use	NA	NA
s102	14	11	NA	22.69	960308	push_mode	lower.1/2	use	NA	NA
s102	14	11	NA	40.25	960308	push_mode	upper.1/2	use	NA	NA
s102	14	11	NA	40.38	960308	push_mode	upper.1/2	use	NA	NA
s102	14	11	0.777	NA	960308	push_mode	lower.1/2	use	NA	NA
s102	14	11	0.813	NA	960308	push_mode	lower.1/2	use	NA	NA
s102	14	11	1.1	NA	960308	push_mode	upper.1/2	use	NA	NA
s102	14	11	1.12	NA	960308	push_mode	upper.1/2	use	NA	NA
s102	na16	-4261	2.42	NA	800101	NA	supernate	del.sup	NA	NA
s104	3	1	NA	39.3	920729	push_mode	total	use	NA	NA
s104	3	1	NA	40.6	920729	push_mode	total	use	NA	NA
s104	3	1	NA	43.4	920729	push_mode	total	use	NA	NA
s104	3	1	NA	43.5	920729	push_mode	total	use	NA	NA
s104	3	1	NA	55.4	920729	push_mode	total	use	NA	NA
s104	3	1	NA	55.71	920729	push_mode	total	use	NA	NA
s104	3	1	NA	56.94	920729	push_mode	total	use	NA	NA
s104	3	1	0.04978	NA	920729	push_mode	total	use	NA	NA
s104	3	1	NA	55.71	920729	push_mode	drainable	use.new	NA	NA
s104	3	1	NA	55.4	920729	push_mode	drainable	use.new	NA	NA
s104	3	1	NA	56.94	920729	push_mode	drainable	use.new	NA	NA
s104	3	1	0.05208	NA	920729	push_mode	drainable	use.new	NA	NA
s104	3	2	NA	35.2	920729	push_mode	total	use	NA	NA
s104	3	2	NA	38.5	920729	push_mode	total	use	NA	NA
s104	3	2	NA	45	920729	push_mode	total	use	NA	NA
s104	3	2	NA	50.1	920729	push_mode	total	use	NA	NA
s104	3	3	NA	42	920729	push_mode	total	use	NA	NA
s104	3	3	NA	42.3	920729	push_mode	total	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
s104	3	3	NA	42.8	920729	push_mode	total	use	NA	NA
s104	3	3	NA	43.3	920729	push_mode	total	use	NA	NA
s104	3	4	NA	21.6	920729	push_mode	total	use	NA	NA
s104	3	4	NA	23.8	920729	push_mode	total	use	NA	NA
s104	3	4	NA	34.5	920729	push_mode	total	use	NA	NA
s104	3	4	NA	43.3	920729	push_mode	total	use	NA	NA
s104	3	5	NA	29.4	920729	push_mode	total	use	NA	NA
s104	3	5	NA	29.5	920729	push_mode	total	use	NA	NA
s104	3	5	NA	29.6	920729	push_mode	total	use	NA	NA
s104	3	5	NA	31.6	920729	push_mode	total	use	NA	NA
s104	3	6	NA	20.9	920729	push_mode	total	use	NA	NA
s104	3	6	NA	27.1	920729	push_mode	total	use	NA	NA
s104	3	6	NA	30.32	920729	push_mode	total	use	NA	NA
s104	3	6	NA	30.6	920729	push_mode	total	use	NA	NA
s104	7	1	NA	31.1	920731	push_mode	total	use	NA	NA
s104	7	1	NA	32	920731	push_mode	total	use	NA	NA
s104	7	1	NA	42.9	920731	push_mode	total	use	NA	NA
s104	7	1	NA	43.4	920731	push_mode	total	use	NA	NA
s104	7	1	NA	44.2	920731	push_mode	total	use	NA	NA
s104	7	1	NA	44.8	920731	push_mode	total	use	NA	NA
s104	7	1	NA	54.29	920731	push_mode	total	use	NA	NA
s104	7	1	NA	56.24	920731	push_mode	total	use	NA	NA
s104	7	1	0.00676	NA	920731	push_mode	total	use	NA	NA
s104	7	1	0.04317	NA	920731	push_mode	total	use	NA	NA
s104	7	1	NA	54.29	920731	push_mode	drainable	use.new	NA	NA
s104	7	1	NA	56.24	920731	push_mode	drainable	use.new	NA	NA
s104	7	1	0.04615	NA	920731	push_mode	drainable	use.new	NA	NA
s104	7	1	0.00723	NA	920731	push_mode	drainable	use.new	NA	NA
s104	7	2	NA	29.3	920731	push_mode	total	use	NA	NA
s104	7	2	NA	33.9	920731	push_mode	total	use	NA	NA
s104	7	2	NA	41.3	920731	push_mode	total	use	NA	NA
s104	7	2	NA	41.6	920731	push_mode	total	use	NA	NA
s104	7	3	NA	41.6	920731	push_mode	total	use	NA	NA
s104	7	3	NA	42.3	920731	push_mode	total	use	NA	NA
s104	7	3	NA	52.4	920731	push_mode	total	use	NA	NA
s104	7	3	NA	53.8	920731	push_mode	total	use	NA	NA
s104	7	4	NA	30.3	920731	push_mode	total	use	NA	NA
s104	7	4	NA	30.8	920731	push_mode	total	use	NA	NA
s104	7	4	NA	34.9	920731	push_mode	total	use	NA	NA
s104	7	4	NA	36.3	920731	push_mode	total	use	NA	NA
s104	7	5	NA	26.3	920731	push_mode	total	use	NA	NA
s104	7	5	NA	26.4	920731	push_mode	total	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
s104	7	5	NA	30.8	920731	push_mode	total	use	NA	NA
s104	7	5	NA	34.6	920731	push_mode	total	use	NA	NA
s104	7	6	NA	17.99	920731	push_mode	total	use	NA	NA
s104	7	6	NA	22.9	920731	push_mode	total	use	NA	NA
s104	7	6	NA	25.6	920731	push_mode	total	use	NA	NA
s104	7	6	NA	26.3	920731	push_mode	total	use	NA	NA
s104	2	1	NA	7.66	920802	push_mode	total	use	NA	NA
s104	2	1	NA	9.1	920802	push_mode	total	use	NA	NA
s104	2	1	NA	29.7	920802	push_mode	total	use	NA	NA
s104	2	1	NA	36.2	920802	push_mode	total	use	NA	NA
s104	2	1	NA	55.13	920802	push_mode	total	use	NA	NA
s104	2	1	NA	56.85	920802	push_mode	total	use	NA	NA
s104	2	1	NA	63.3	920802	push_mode	total	use	NA	NA
s104	2	1	NA	67	920802	push_mode	total	use	NA	NA
s104	2	1	0.00691	NA	920802	push_mode	total	use	NA	NA
s104	2	1	0.03802	NA	920802	push_mode	total	use	NA	NA
s104	2	1	NA	55.13	920802	push_mode	drainable	use.new	NA	NA
s104	2	1	NA	56.85	920802	push_mode	drainable	use.new	NA	NA
s104	2	1	0.03977	NA	920802	push_mode	drainable	use.new	NA	NA
s104	2	1	0.00723	NA	920802	push_mode	drainable	use.new	NA	NA
s104	2	2	NA	37.8	920802	push_mode	total	use	NA	NA
s104	2	2	NA	38.3	920802	push_mode	total	use	NA	NA
s104	2	2	NA	41.3	920802	push_mode	total	use	NA	NA
s104	2	2	NA	43.9	920802	push_mode	total	use	NA	NA
s104	2	3	NA	23.7	920802	push_mode	total	use	NA	NA
s104	2	3	NA	25.2	920802	push_mode	total	use	NA	NA
s104	2	3	NA	30.4	920802	push_mode	total	use	NA	NA
s104	2	3	NA	37.7	920802	push_mode	total	use	NA	NA
s104	2	3	NA	64.6	920802	push_mode	total	use	NA	NA
s104	2	3	NA	80.3	920802	push_mode	total	use	NA	NA
s104	2	4	NA	35.2	920802	push_mode	total	use	NA	NA
s104	2	4	NA	36.2	920802	push_mode	total	use	NA	NA
s104	2	4	NA	53.1	920802	push_mode	total	use	NA	NA
s104	2	4	NA	58.1	920802	push_mode	total	use	NA	NA
s104	2	5	NA	20.5	920802	push_mode	total	use	NA	NA
s104	2	5	NA	25.3	920802	push_mode	total	use	NA	NA
s104	2	5	NA	25.7	920802	push_mode	total	use	NA	NA
s104	2	5	NA	31.6	920802	push_mode	total	use	NA	NA
s104	2	5	NA	31.9	920802	push_mode	total	use	NA	NA
s104	2	5	NA	34.9	920802	push_mode	total	use	NA	NA
s104	2	6	NA	23.7	920802	push_mode	partial	use	NA	NA
s104	2	6	NA	24.2	920802	push_mode	partial	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
s104	2	6	NA	24.9	920802	push_mode	partial	use	NA	NA
s104	2	6	NA	24.9	920802	push_mode	partial	use	NA	NA
s107	11	1	NA	65.45	950919	push_mode	total	use	NA	NA
s107	11	1	NA	69.55	950919	push_mode	total	use	NA	NA
s107	11	2	NA	50.38	950919	push_mode	lower.1/2	use	NA	NA
s107	11	2	NA	50.63	950919	push_mode	upper.1/2	use	NA	NA
s107	11	2	NA	52.79	950919	push_mode	lower.1/2	use	NA	NA
s107	11	2	NA	54.78	950919	push_mode	upper.1/2	use	NA	NA
s107	11	2	NA	68.96	950919	push_mode	total	use	NA	NA
s107	11	2	NA	69.04	950919	push_mode	total	use	NA	NA
s107	11	2	0.453	NA	950919	push_mode	lower.1/2	use	NA	NA
s107	11	2	0.468	NA	950919	push_mode	lower.1/2	use	NA	NA
s107	11	3	NA	17.43	950919	push_mode	lower.1/2	use	NA	NA
s107	11	3	NA	22.88	950919	push_mode	upper.1/2	use	NA	NA
s107	11	3	NA	24.26	950919	push_mode	lower.1/2	use	NA	NA
s107	11	3	NA	26.35	950919	push_mode	upper.1/2	use	NA	NA
s107	11	3	0.678	NA	950919	push_mode	upper.1/2	use	NA	NA
s107	11	3	0.738	NA	950919	push_mode	upper.1/2	use	NA	NA
s107	11	4	NA	36.31	950919	push_mode	lower.1/2	use	NA	NA
s107	11	4	NA	40.5	950919	push_mode	upper.1/2	use	NA	NA
s107	11	4	NA	40.77	950919	push_mode	upper.1/2	use	NA	NA
s107	11	4	NA	43.5	950919	push_mode	lower.1/2	use	NA	NA
s107	11	4	NA	43.7	950919	push_mode	lower.1/2	use	NA	NA
s107	11	4	NA	43.71	950919	push_mode	lower.1/2	use	NA	NA
s107	11	4	0.0832	NA	950919	push_mode	upper.1/2	use	NA	NA
s107	11	4	0.0978	NA	950919	push_mode	upper.1/2	use	NA	NA
s107	11	5	NA	34.52	950919	push_mode	lower.1/2	use	NA	NA
s107	11	5	NA	35.73	950919	push_mode	lower.1/2	use	NA	NA
s107	11	5	NA	40.86	950919	push_mode	upper.1/2	use	NA	NA
s107	11	5	NA	41.65	950919	push_mode	upper.1/2	use	NA	NA
s107	11	5	0.162	NA	950919	push_mode	lower.1/2	use	NA	NA
s107	11	5	0.18	NA	950919	push_mode	lower.1/2	use	NA	NA
s107	11	5	0.223	NA	950919	push_mode	lower.1/2	use	NA	NA
s107	11	6	NA	3.68	950919	push_mode	lower.1/2	use	NA	NA
s107	11	6	NA	6.44	950919	push_mode	lower.1/2	use	NA	NA
s107	11	6	NA	20.5	950919	push_mode	upper.1/2	use	NA	NA
s107	11	6	NA	20.6	950919	push_mode	upper.1/2	use	NA	NA
s107	11	6	NA	21.4	950919	push_mode	lower.1/2	use	NA	NA
s107	11	6	NA	22.8	950919	push_mode	lower.1/2	use	NA	NA
s107	11	6	NA	27.5	950919	push_mode	upper.1/2	use	NA	NA
s107	11	6	NA	28.82	950919	push_mode	upper.1/2	use	NA	NA
s107	11	7	NA	30.53	950919	push_mode	lower.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
s107	11	7	NA	31.9	950919	push_mode	lower.1/2	use	NA	NA
s107	11	7	NA	33.08	950919	push_mode	upper.1/2	use	NA	NA
s107	11	7	NA	38.16	950919	push_mode	upper.1/2	use	NA	NA
s107	11	8	NA	27.03	950919	push_mode	upper.1/2	use	NA	NA
s107	11	8	NA	30.65	950919	push_mode	upper.1/2	use	NA	NA
s107	11	8	NA	30.94	950919	push_mode	lower.1/2	use	NA	NA
s107	11	8	NA	31.1	950919	push_mode	lower.1/2	use	NA	NA
s107	11	8	0.0305	NA	950919	push_mode	lower.1/2	use	NA	NA
s107	11	8	0.0354	NA	950919	push_mode	lower.1/2	use	NA	NA
s107	16	1	NA	70.38	950925	push_mode	total	use	NA	NA
s107	16	1	NA	70.96	950925	push_mode	total	use	NA	NA
s107	16	2	NA	51.47	950925	push_mode	lower.1/2	use	NA	NA
s107	16	2	NA	65.37	950925	push_mode	total	use	NA	NA
s107	16	2	NA	65.5	950925	push_mode	lower.1/2	use	NA	NA
s107	16	2	NA	66.05	950925	push_mode	total	use	NA	NA
s107	16	2	0.586	NA	950925	push_mode	lower.1/2	use	NA	NA
s107	16	2	0.697	NA	950925	push_mode	lower.1/2	use	NA	NA
s107	16	3	NA	21.38	950925	push_mode	lower.1/2	use	NA	NA
s107	16	3	NA	22.1	950925	push_mode	lower.1/2	use	NA	NA
s107	16	3	NA	41.05	950925	push_mode	upper.1/2	use	NA	NA
s107	16	3	NA	45.99	950925	push_mode	upper.1/2	use	NA	NA
s107	16	3	0.37	NA	950925	push_mode	upper.1/2	use	NA	NA
s107	16	3	0.389	NA	950925	push_mode	upper.1/2	use	NA	NA
s107	16	3	NA	19.24	950925	push_mode	upper.1/2	use	NA	NA
s107	16	3	NA	25.93	950925	push_mode	upper.1/2	use	NA	NA
s107	16	3	NA	35.52	950925	push_mode	lower.1/2	use	NA	NA
s107	16	3	NA	39.17	950925	push_mode	lower.1/2	use	NA	NA
s107	16	4	NA	1.58	950925	push_mode	lower.1/2	use	NA	NA
s107	16	4	NA	18.1	950925	push_mode	lower.1/2	use	NA	NA
s107	16	4	NA	19.1	950925	push_mode	lower.1/2	use	NA	NA
s107	16	4	NA	20.22	950925	push_mode	lower.1/2	use	NA	NA
s107	16	4	NA	38.98	950925	push_mode	upper.1/2	use	NA	NA
s107	16	4	NA	39.4	950925	push_mode	upper.1/2	use	NA	NA
s107	16	4	0.0589	NA	950925	push_mode	upper.1/2	use	NA	NA
s107	16	4	0.0715	NA	950925	push_mode	upper.1/2	use	NA	NA
s107	16	4	0.101	NA	950925	push_mode	upper.1/2	use	NA	NA
s107	16	5	NA	21.47	950925	push_mode	lower.1/2	use	NA	NA
s107	16	5	NA	22.42	950925	push_mode	lower.1/2	use	NA	NA
s107	16	5	NA	22.69	950925	push_mode	upper.1/2	use	NA	NA
s107	16	5	NA	24.42	950925	push_mode	upper.1/2	use	NA	NA
s107	16	5	0.0847	NA	950925	push_mode	lower.1/2	use	NA	NA
s107	16	5	0.086	NA	950925	push_mode	lower.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
s107	16	6	NA	27.29	950925	push_mode	lower.1/2	use	NA	NA
s107	16	6	NA	27.33	950925	push_mode	lower.1/2	use	NA	NA
s107	16	6	NA	46.59	950925	push_mode	upper.1/2	use	NA	NA
s107	16	6	NA	48.74	950925	push_mode	upper.1/2	use	NA	NA
s107	16	7	NA	31.02	950925	push_mode	upper.1/2	use	NA	NA
s107	16	7	NA	31.46	950925	push_mode	lower.1/2	use	NA	NA
s107	16	7	NA	32.71	950925	push_mode	lower.1/2	use	NA	NA
s107	16	7	NA	35.34	950925	push_mode	upper.1/2	use	NA	NA
s107	16	8	NA	0.24	950925	push_mode	lower.1/2	use.dl	NA	NA
s107	16	8	NA	0.59	950925	push_mode	lower.1/2	use.dl	NA	NA
s107	16	8	NA	28.3	950925	push_mode	upper.1/2	use	NA	NA
s107	16	8	NA	29	950925	push_mode	lower.1/2	use	NA	NA
s107	16	8	NA	29.25	950925	push_mode	upper.1/2	use	NA	NA
s107	16	8	NA	29.4	950925	push_mode	lower.1/2	use	NA	NA
s107	16	8	0.0349	NA	950925	push_mode	lower.1/2	use	NA	NA
s107	16	8	0.0397	NA	950925	push_mode	lower.1/2	use	NA	NA
s107	2	1	NA	71.24	950925	push_mode	total	use	NA	NA
s107	2	1	NA	71.72	950925	push_mode	total	use	NA	NA
s107	2	2	NA	33.79	950925	push_mode	lower.1/2	use	NA	NA
s107	2	2	NA	51.21	950925	push_mode	lower.1/2	use	NA	NA
s107	2	2	NA	64.67	950925	push_mode	total	use	NA	NA
s107	2	2	NA	65.14	950925	push_mode	total	use	NA	NA
s107	2	2	0.368	NA	950925	push_mode	lower.1/2	use	NA	NA
s107	2	2	0.389	NA	950925	push_mode	lower.1/2	use	NA	NA
s107	2	3	NA	37.34	950925	push_mode	lower.1/2	use	NA	NA
s107	2	3	NA	39.37	950925	push_mode	lower.1/2	use	NA	NA
s107	2	3	NA	53.49	950925	push_mode	upper.1/2	use	NA	NA
s107	2	3	NA	53.75	950925	push_mode	upper.1/2	use	NA	NA
s107	2	4	NA	33.44	950925	push_mode	upper.1/2	use	NA	NA
s107	2	4	NA	36.08	950925	push_mode	lower.1/2	use	NA	NA
s107	2	4	NA	36.92	950925	push_mode	lower.1/2	use	NA	NA
s107	2	4	NA	37.4	950925	push_mode	upper.1/2	use	NA	NA
s107	2	4	0.147	NA	950925	push_mode	upper.1/2	use	NA	NA
s107	2	4	0.151	NA	950925	push_mode	upper.1/2	use	NA	NA
s107	2	5	NA	30.35	950925	push_mode	lower.1/2	use	NA	NA
s107	2	5	NA	31.43	950925	push_mode	lower.1/2	use	NA	NA
s107	2	5	NA	38.89	950925	push_mode	upper.1/2	use	NA	NA
s107	2	5	NA	39.14	950925	push_mode	upper.1/2	use	NA	NA
s107	2	5	0.0977	NA	950925	push_mode	lower.1/2	use	NA	NA
s107	2	5	0.118	NA	950925	push_mode	lower.1/2	use	NA	NA
s107	2	6	NA	23.66	950925	push_mode	upper.1/2	use	NA	NA
s107	2	6	NA	24.08	950925	push_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
s107	2	6	NA	27.18	950925	push_mode	lower.1/2	use	NA	NA
s107	2	6	NA	30.02	950925	push_mode	lower.1/2	use	NA	NA
s107	2	7	NA	31.9	950925	push_mode	lower.1/2	use	NA	NA
s107	2	7	NA	33.19	950925	push_mode	lower.1/2	use	NA	NA
s107	2	7	NA	33.63	950925	push_mode	upper.1/2	use	NA	NA
s107	2	7	NA	33.85	950925	push_mode	upper.1/2	use	NA	NA
s107	2	8	NA	22.72	950925	push_mode	subsegc	use	NA	NA
s107	2	8	NA	25.78	950925	push_mode	subsegc	use	NA	NA
s107	2	8	NA	32.19	950925	push_mode	upper.1/2	use	NA	NA
s107	2	8	NA	35.19	950925	push_mode	upper.1/2	use	NA	NA
s107	2	8	NA	43.88	950925	push_mode	subsegd	use	NA	NA
s107	2	8	NA	44.22	950925	push_mode	subsegd	use	NA	NA
s107	2	8	0.0167	NA	950925	push_mode	lower.1/2	use	NA	NA
s107	2	8	0.0189	NA	950925	push_mode	lower.1/2	use	NA	NA
s109	14	1	NA	7.19	960627	push_mode	lower.1/2	use	NA	NA
s109	14	1	NA	7.21	960627	push_mode	lower.1/2	use	NA	NA
s109	14	1	NA	18.9	960627	push_mode	upper.1/2	use	NA	NA
s109	14	1	NA	27.27	960627	push_mode	upper.1/2	use	NA	NA
s109	14	1	0.0919	NA	960627	push_mode	lower.1/2	use	NA	NA
s109	14	1	0.106	NA	960627	push_mode	lower.1/2	use	NA	NA
s109	14	1	0.179	NA	960627	push_mode	upper.1/2	use	NA	NA
s109	14	1	0.192	NA	960627	push_mode	upper.1/2	use	NA	NA
s109	14	2	NA	5.26	960627	push_mode	lower.1/2	use	NA	NA
s109	14	2	NA	7.09	960627	push_mode	lower.1/2	use	NA	NA
s109	14	2	0.0775	NA	960627	push_mode	lower.1/2	use	NA	NA
s109	14	2	0.0816	NA	960627	push_mode	lower.1/2	use	NA	NA
s109	14	2	NA	7.41	960627	push_mode	lower.1/2	use	NA	NA
s109	14	2	NA	7.79	960627	push_mode	lower.1/2	use	NA	NA
s109	14	2	0.0633	NA	960627	push_mode	lower.1/2	use	NA	NA
s109	14	2	0.0713	NA	960627	push_mode	lower.1/2	use	NA	NA
s109	14	2	0.107	NA	960627	push_mode	lower.1/2	use	NA	NA
s109	14	2	NA	10.44	960627	push_mode	upper.1/2	use	NA	NA
s109	14	2	NA	10.5	960627	push_mode	lower.1/2	use	NA	NA
s109	14	2	NA	11.03	960627	push_mode	upper.1/2	use	NA	NA
s109	14	2	NA	12.08	960627	push_mode	lower.1/2	use	NA	NA
s109	14	2	0.0374	NA	960627	push_mode	lower.1/2	use	NA	NA
s109	14	2	0.0379	NA	960627	push_mode	lower.1/2	use	NA	NA
s109	14	2	0.04	NA	960627	push_mode	lower.1/2	use	NA	NA
s109	14	2	0.0472	NA	960627	push_mode	upper.1/2	use	NA	NA
s109	14	2	0.0562	NA	960627	push_mode	upper.1/2	use	NA	NA
s109	14	3	NA	6.69	960627	push_mode	upper.1/2	use	NA	NA
s109	14	3	NA	7.15	960627	push_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
s109	14	3	NA	10.74	960627	push_mode	lower.1/2	use	NA	NA
s109	14	3	NA	12.79	960627	push_mode	lower.1/2	use	NA	NA
s109	14	3	0.0357	NA	960627	push_mode	upper.1/2	use	NA	NA
s109	14	3	0.0408	NA	960627	push_mode	upper.1/2	use	NA	NA
s109	14	3	0.0724	NA	960627	push_mode	lower.1/2	use	NA	NA
s109	14	3	0.0784	NA	960627	push_mode	lower.1/2	use	NA	NA
s109	14	3	NA	8.7	960627	push_mode	lower.1/2	use	NA	NA
s109	14	3	NA	9.2	960627	push_mode	lower.1/2	use	NA	NA
s109	14	3	0.0461	NA	960627	push_mode	lower.1/2	use	NA	NA
s109	14	3	0.0532	NA	960627	push_mode	lower.1/2	use	NA	NA
s109	14	4	NA	6	960627	push_mode	lower.1/2	use	NA	NA
s109	14	4	NA	6.1	960627	push_mode	lower.1/2	use	NA	NA
s109	14	4	0.0659	NA	960627	push_mode	lower.1/2	use	NA	NA
s109	14	4	0.0684	NA	960627	push_mode	lower.1/2	use	NA	NA
s109	16	1	NA	0.94	960708	push_mode	lower.1/2	use.dl	NA	NA
s109	16	1	NA	4.31	960708	push_mode	lower.1/2	use	NA	NA
s109	16	1	0.0334	NA	960708	push_mode	lower.1/2	use	NA	NA
s109	16	1	0.0396	NA	960708	push_mode	lower.1/2	use	NA	NA
s109	16	2	NA	1	960708	push_mode	lower.1/2	use	NA	NA
s109	16	2	NA	1.56	960708	push_mode	lower.1/2	use	NA	NA
s109	16	2	0.0241	NA	960708	push_mode	lower.1/2	use	NA	NA
s109	16	2	0.0256	NA	960708	push_mode	lower.1/2	use	NA	NA
s109	16	2	NA	6.87	960708	push_mode	lower.1/2	use	NA	NA
s109	16	2	NA	8.86	960708	push_mode	lower.1/2	use	NA	NA
s109	16	2	0.0192	NA	960708	push_mode	lower.1/2	use	NA	NA
s109	16	2	0.0239	NA	960708	push_mode	lower.1/2	use	NA	NA
s109	16	2	NA	5.95	960708	push_mode	upper.1/2	use	NA	NA
s109	16	2	NA	6.1	960708	push_mode	upper.1/2	use	NA	NA
s109	16	2	NA	18.57	960708	push_mode	lower.1/2	use	NA	NA
s109	16	2	NA	20.04	960708	push_mode	lower.1/2	use	NA	NA
s109	16	2	0.0324	NA	960708	push_mode	upper.1/2	use	NA	NA
s109	16	2	0.0343	NA	960708	push_mode	lower.1/2	use	NA	NA
s109	16	2	0.0352	NA	960708	push_mode	upper.1/2	use	NA	NA
s109	16	2	0.0975	NA	960708	push_mode	lower.1/2	use	NA	NA
s109	16	2	0.0978	NA	960708	push_mode	lower.1/2	use	NA	NA
s109	16	2	NA	52.07	960708	push_mode	total	use	NA	NA
s109	16	2	NA	52.78	960708	push_mode	total	use	NA	NA
s110	na17	-4262	1.25	NA	800101	NA	supernate	del.sup	NA	NA
s111	8	1	NA	53.4	960520	push_mode	total	use	NA	NA
s111	8	1	NA	53.49	960520	push_mode	total	use	NA	NA
s111	8	1	0.09656	NA	960520	push_mode	total	use	NA	NA
s111	8	1	0.10607	NA	960520	push_mode	total	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
s111	8	2	NA	53.22	960520	push_mode	total	use	NA	NA
s111	8	2	NA	53.36	960520	push_mode	total	use	NA	NA
s111	8	2	0.1046	NA	960520	push_mode	total	use	NA	NA
s111	8	2	0.1046	NA	960520	push_mode	total	use	NA	NA
s111	8	3	NA	50.59	960520	push_mode	total	use	NA	NA
s111	8	3	NA	51.24	960520	push_mode	total	use	NA	NA
s111	8	3	NA	52.7	960520	push_mode	total	use	NA	NA
s111	8	3	NA	52.9	960520	push_mode	total	use	NA	NA
s111	8	3	0.09919	NA	960520	push_mode	total	use	NA	NA
s111	8	3	0.11021	NA	960520	push_mode	total	use	NA	NA
s111	8	3	0.235	NA	960520	push_mode	total	use	NA	NA
s111	8	3	0.396	NA	960520	push_mode	total	use	NA	NA
s111	8	3	0.411	NA	960520	push_mode	total	use	NA	NA
s111	8	4	NA	35.23	960520	push_mode	lower.1/2	use	NA	NA
s111	8	4	NA	41.19	960520	push_mode	lower.1/2	use	NA	NA
s111	8	4	NA	43.02	960520	push_mode	upper.1/2	use	NA	NA
s111	8	4	NA	43.02	960520	push_mode	upper.1/2	use	NA	NA
s111	8	4	0.309	NA	960520	push_mode	upper.1/2	use	NA	NA
s111	8	4	0.37	NA	960520	push_mode	lower.1/2	use	NA	NA
s111	8	4	0.379	NA	960520	push_mode	lower.1/2	use	NA	NA
s111	8	4	0.424	NA	960520	push_mode	upper.1/2	use	NA	NA
s111	8	5	NA	26.76	960520	push_mode	upper.1/2	use	NA	NA
s111	8	5	NA	29.4	960520	push_mode	upper.1/2	use	NA	NA
s111	8	5	NA	34.1	960520	push_mode	lower.1/2	use	NA	NA
s111	8	5	NA	38.87	960520	push_mode	lower.1/2	use	NA	NA
s111	8	5	0.195	NA	960520	push_mode	upper.1/2	use	NA	NA
s111	8	5	0.214	NA	960520	push_mode	lower.1/2	use	NA	NA
s111	8	5	0.237	NA	960520	push_mode	lower.1/2	use	NA	NA
s111	8	5	0.247	NA	960520	push_mode	upper.1/2	use	NA	NA
s111	8	6	NA	26.7	960520	push_mode	upper.1/2	use	NA	NA
s111	8	6	NA	26.7	960520	push_mode	upper.1/2	use	NA	NA
s111	8	6	NA	29.41	960520	push_mode	lower.1/2	use	NA	NA
s111	8	6	NA	29.48	960520	push_mode	lower.1/2	use	NA	NA
s111	8	6	0.227	NA	960520	push_mode	lower.1/2	use	NA	NA
s111	8	6	0.251	NA	960520	push_mode	lower.1/2	use	NA	NA
s111	8	6	0.265	NA	960520	push_mode	upper.1/2	use	NA	NA
s111	8	6	0.269	NA	960520	push_mode	upper.1/2	use	NA	NA
s111	8	7	NA	20.61	960520	push_mode	lower.1/2	use	NA	NA
s111	8	7	NA	22.7	960520	push_mode	lower.1/2	use	NA	NA
s111	8	7	NA	27.03	960520	push_mode	upper.1/2	use	NA	NA
s111	8	7	NA	27.89	960520	push_mode	upper.1/2	use	NA	NA
s111	8	7	0.173	NA	960520	push_mode	lower.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
s111	8	7	0.174	NA	960520	push_mode	lower.1/2	use	NA	NA
s111	8	7	0.253	NA	960520	push_mode	upper.1/2	use	NA	NA
s111	8	7	0.294	NA	960520	push_mode	upper.1/2	use	NA	NA
s111	8	8	NA	22.45	960520	push_mode	lower.1/2	use	NA	NA
s111	8	8	NA	22.73	960520	push_mode	upper.1/2	use	NA	NA
s111	8	8	NA	23.05	960520	push_mode	upper.1/2	use	NA	NA
s111	8	8	NA	27.67	960520	push_mode	lower.1/2	use	NA	NA
s111	8	8	0.158	NA	960520	push_mode	upper.1/2	use	NA	NA
s111	8	8	0.169	NA	960520	push_mode	upper.1/2	use	NA	NA
s111	8	8	0.179	NA	960520	push_mode	lower.1/2	use	NA	NA
s111	8	8	0.211	NA	960520	push_mode	lower.1/2	use	NA	NA
s111	8	8	0.212	NA	960520	push_mode	upper.1/2	use	NA	NA
s111	8	9	NA	29.69	960520	push_mode	upper.1/2	use	NA	NA
s111	8	9	NA	30.11	960520	push_mode	upper.1/2	use	NA	NA
s111	8	9	NA	34.54	960520	push_mode	lower.1/2	use	NA	NA
s111	8	9	NA	37.55	960520	push_mode	lower.1/2	use	NA	NA
s111	8	9	0.136	NA	960520	push_mode	lower.1/2	use	NA	NA
s111	8	9	0.157	NA	960520	push_mode	lower.1/2	use	NA	NA
s111	8	9	0.237	NA	960520	push_mode	upper.1/2	use	NA	NA
s111	8	9	0.245	NA	960520	push_mode	upper.1/2	use	NA	NA
s111	8	10	NA	11.42	960520	push_mode	upper.1/2	use	NA	NA
s111	8	10	NA	11.82	960520	push_mode	upper.1/2	use	NA	NA
s111	8	10	0.0738	NA	960520	push_mode	upper.1/2	use	NA	NA
s111	8	10	0.0764	NA	960520	push_mode	upper.1/2	use	NA	NA
s111	8	11	NA	10.25	960520	push_mode	upper.1/2	use	NA	NA
s111	8	11	NA	10.91	960520	push_mode	upper.1/2	use	NA	NA
s111	8	11	0.0404	NA	960520	push_mode	upper.1/2	use	NA	NA
s111	8	11	0.0514	NA	960520	push_mode	upper.1/2	use	NA	NA
s111	8	11	0.0687	NA	960520	push_mode	upper.1/2	use	NA	NA
s111	na19	-4264	0.10158	NA	NA	NA	NA	use	NA	NA
s111	na18	-4263	NA	10.7	NA	NA	NA	use	NA	NA
s111	na23	-4268	1.54	NA	780825	NA	NA	del.date	NA	NA
s111	na22	-4267	NA	17.4	780825	NA	NA	del.date	NA	NA
s111	na21	-4266	2.33528	NA	780825	NA	NA	del.date	NA	NA
s111	na20	-4265	NA	18.1	780825	NA	NA	del.date	NA	NA
sx102	NA	NA	0.198	NA	NA	NA	NA	use.old	NA	NA
sx102	NA	NA	0.81672	NA	NA	NA	NA	use.old	NA	NA
sx106	na25	-4270	5.96117	NA	780418	NA	supernate	del.sup	NA	NA
sx106	na24	-4269	NA	46.1	780418	NA	supernate	del.sup	NA	NA
sx108	16	1	NA	0.4	950915	auger	lower.1/2	use.dl	NA	NA
sx108	16	1	NA	0.5	950915	auger	lower.1/2	use.dl	NA	NA
sx108	16	1	NA	0.5	950915	auger	upper.1/2	use.dl	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
sx108	16	1	NA	0.5	950915	auger	upper.1/2	use.dl	NA	NA
sx108	16	1	NA	2.7	950915	auger	lower.1/2	use	NA	NA
sx108	16	1	NA	2.86	950915	auger	upper.1/2	use	NA	NA
sx108	16	1	NA	3.48	950915	auger	upper.1/2	use	NA	NA
sx108	16	1	NA	3.56	950915	auger	lower.1/2	use	NA	NA
sx108	16	1	0.00554	NA	950915	auger	lower.1/2	use	NA	NA
sx108	16	1	0.0126	NA	950915	auger	lower.1/2	use	NA	NA
sx108	16	1	0.0142	NA	950915	auger	upper.1/2	use	NA	NA
sx108	16	1	0.0154	NA	950915	auger	upper.1/2	use	NA	NA
sx108	7	1	NA	0.535	950919	auger	lower.1/2	use.dl	NA	NA
sx108	7	1	NA	0.591	950919	auger	upper.1/2	use.dl	NA	NA
sx108	7	1	NA	0.897	950919	auger	lower.1/2	use.dl	NA	NA
sx108	7	1	NA	1.62	950919	auger	upper.1/2	use	NA	NA
sx108	7	1	0.152	NA	950919	auger	lower.1/2	use	NA	NA
sx108	7	1	0.183	NA	950919	auger	lower.1/2	use	NA	NA
sx113	7	1	NA	42.71	950509	auger	lower.1/2	use	NA	NA
sx113	7	1	NA	46.07	950509	auger	lower.1/2	use	NA	NA
sx113	7	1	NA	52.11	950509	auger	upper.1/2	use	NA	NA
sx113	7	1	NA	53.8	950509	auger	upper.1/2	use	NA	NA
sx113	6	1	NA	36.01	950510	auger	lower.1/2	use	NA	NA
sx113	6	1	NA	37.15	950510	auger	lower.1/2	use	NA	NA
sx113	6	1	NA	46.41	950510	auger	upper.1/2	use	NA	NA
sx113	6	1	NA	46.81	950510	auger	lower.1/2	use	NA	NA
sx113	6	1	NA	47.77	950510	auger	upper.1/2	use	NA	NA
t102	2	999	0.066	NA	NA	NA	cc	use.old	NA	NA
t102	2	999	0.068	NA	NA	NA	cc	use.old	NA	NA
t103	2	1	NA	67.02	960501	grab	supernate	del.sup	NA	NA
t103	2	1	NA	72.85	960501	grab	supernate	del.sup	NA	NA
t103	2	1	NA	73.26	960501	grab	supernate	del.sup	NA	NA
t103	2	1	NA	73.27	960501	grab	supernate	del.sup	NA	NA
t104	3	1	NA	9.52	920820	push_mode	total	use	NA	NA
t104	3	1	NA	9.72	920820	push_mode	total	use	NA	NA
t104	3	1	NA	40.9	920820	push_mode	total	use	NA	NA
t104	3	1	NA	54.5	920820	push_mode	total	use	NA	NA
t104	3	2	NA	40.6	920820	push_mode	total	use	NA	NA
t104	3	2	NA	41.1	920820	push_mode	total	use	NA	NA
t104	3	2	NA	48.7	920820	push_mode	total	use	NA	NA
t104	3	2	NA	52.5	920820	push_mode	total	use	NA	NA
t104	3	2	NA	63.9	920820	push_mode	total	use	NA	NA
t104	3	2	NA	64.2	920820	push_mode	total	use	NA	NA
t104	3	3	NA	65.1	920820	push_mode	total	use	NA	NA
t104	3	3	NA	66.3	920820	push_mode	total	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
t104	3	3	NA	68.7	920820	push_mode	total	use	NA	NA
t104	3	3	NA	69.3	920820	push_mode	total	use	NA	NA
t104	3	3	NA	70.1	920820	push_mode	total	use	NA	NA
t104	3	3	NA	70.2	920820	push_mode	total	use	NA	NA
t104	3	4	NA	42.7	920820	push_mode	total	use	NA	NA
t104	3	4	NA	43.8	920820	push_mode	total	use	NA	NA
t104	3	4	NA	48.6	920820	push_mode	total	use	NA	NA
t104	3	4	NA	52.7	920820	push_mode	total	use	NA	NA
t104	3	4	NA	70.1	920820	push_mode	total	use	NA	NA
t104	3	4	NA	70.4	920820	push_mode	total	use	NA	NA
t104	3	5	NA	53.8	920820	push_mode	total	use	NA	NA
t104	3	5	NA	54.2	920820	push_mode	total	use	NA	NA
t104	3	5	NA	54.5	920820	push_mode	total	use	NA	NA
t104	3	5	NA	56.1	920820	push_mode	total	use	NA	NA
t104	3	5	NA	69.5	920820	push_mode	total	use	NA	NA
t104	3	5	NA	70.1	920820	push_mode	total	use	NA	NA
t104	3	6	NA	57.5	920820	push_mode	total	use	NA	NA
t104	3	6	NA	58.1	920820	push_mode	total	use	NA	NA
t104	3	6	NA	62.7	920820	push_mode	total	use	NA	NA
t104	3	6	NA	64	920820	push_mode	total	use	NA	NA
t104	3	6	NA	71.4	920820	push_mode	total	use	NA	NA
t104	3	6	NA	71.5	920820	push_mode	total	use	NA	NA
t104	3	7	NA	52.9	920820	push_mode	total	use	NA	NA
t104	3	7	NA	57.7	920820	push_mode	total	use	NA	NA
t104	3	7	NA	64.8	920820	push_mode	total	use	NA	NA
t104	3	7	NA	65.5	920820	push_mode	total	use	NA	NA
t104	3	7	NA	70.4	920820	push_mode	total	use	NA	NA
t104	3	7	NA	71.1	920820	push_mode	total	use	NA	NA
t104	3	8	NA	59.6	920820	push_mode	total	use	NA	NA
t104	3	8	NA	60.2	920820	push_mode	total	use	NA	NA
t104	3	8	NA	60.5	920820	push_mode	total	use	NA	NA
t104	3	8	NA	62.5	920820	push_mode	total	use	NA	NA
t104	3	8	NA	72.5	920820	push_mode	total	use	NA	NA
t104	3	8	NA	72.5	920820	push_mode	total	use	NA	NA
t104	3	9	NA	63.6	920820	push_mode	total	use	NA	NA
t104	3	9	NA	64.2	920820	push_mode	total	use	NA	NA
t104	3	9	NA	64.9	920820	push_mode	total	use	NA	NA
t104	3	9	NA	66.9	920820	push_mode	total	use	NA	NA
t104	3	9	NA	71	920820	push_mode	total	use	NA	NA
t104	3	9	NA	71.5	920820	push_mode	total	use	NA	NA
t104	6	2	NA	55.4	920827	push_mode	total	use	NA	NA
t104	6	2	NA	58.9	920827	push_mode	total	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
t104	6	2	NA	60.7	920827	push_mode	total	use	NA	NA
t104	6	2	NA	62.5	920827	push_mode	total	use	NA	NA
t104	6	2	NA	64.5	920827	push_mode	total	use	NA	NA
t104	6	2	NA	66.3	920827	push_mode	total	use	NA	NA
t104	6	3	NA	57.2	920827	push_mode	total	use	NA	NA
t104	6	3	NA	60.2	920827	push_mode	total	use	NA	NA
t104	6	3	NA	61.6	920827	push_mode	total	use	NA	NA
t104	6	3	NA	68.1	920827	push_mode	total	use	NA	NA
t104	6	3	NA	73.6	920827	push_mode	total	use	NA	NA
t104	6	3	NA	74.7	920827	push_mode	total	use	NA	NA
t104	6	4	NA	67.4	920827	push_mode	total	use	NA	NA
t104	6	4	NA	68.3	920827	push_mode	total	use	NA	NA
t104	6	4	NA	68.8	920827	push_mode	total	use	NA	NA
t104	6	4	NA	69	920827	push_mode	total	use	NA	NA
t104	6	4	NA	69.7	920827	push_mode	total	use	NA	NA
t104	6	4	NA	73.62	920827	push_mode	total	use	NA	NA
t104	6	5	NA	66.4	920827	push_mode	total	use	NA	NA
t104	6	5	NA	69.4	920827	push_mode	total	use	NA	NA
t104	6	5	NA	69.8	920827	push_mode	total	use	NA	NA
t104	6	5	NA	69.9	920827	push_mode	total	use	NA	NA
t104	6	5	NA	73.1	920827	push_mode	total	use	NA	NA
t104	6	5	NA	76.3	920827	push_mode	total	use	NA	NA
t104	6	6	NA	51.6	920827	push_mode	total	use	NA	NA
t104	6	6	NA	53.7	920827	push_mode	total	use	NA	NA
t104	6	6	NA	67	920827	push_mode	total	use	NA	NA
t104	6	6	NA	68.9	920827	push_mode	total	use	NA	NA
t104	6	6	NA	71	920827	push_mode	total	use	NA	NA
t104	6	6	NA	71.1	920827	push_mode	total	use	NA	NA
t104	6	7	NA	61	920827	push_mode	total	use	NA	NA
t104	6	7	NA	62.6	920827	push_mode	total	use	NA	NA
t104	6	7	NA	63.6	920827	push_mode	total	use	NA	NA
t104	6	7	NA	65.1	920827	push_mode	total	use	NA	NA
t104	6	7	NA	70.9	920827	push_mode	total	use	NA	NA
t104	6	7	NA	71.4	920827	push_mode	total	use	NA	NA
t104	6	8	NA	59.7	920827	push_mode	total	use	NA	NA
t104	6	8	NA	67.6	920827	push_mode	total	use	NA	NA
t104	6	8	NA	68.4	920827	push_mode	total	use	NA	NA
t104	6	8	NA	70.6	920827	push_mode	total	use	NA	NA
t104	6	8	NA	73.3	920827	push_mode	total	use	NA	NA
t104	6	8	NA	73.9	920827	push_mode	total	use	NA	NA
t104	6	9	NA	60.4	920827	push_mode	total	use	NA	NA
t104	6	9	NA	61.9	920827	push_mode	total	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
t104	6	9	NA	69.7	920827	push_mode	total	use	NA	NA
t104	6	9	NA	69.9	920827	push_mode	total	use	NA	NA
t104	6	9	NA	70.1	920827	push_mode	total	use	NA	NA
t104	6	9	NA	70.1	920827	push_mode	total	use	NA	NA
t104	3	999	0.0706	NA	NA	NA	cc	use.old	NA	NA
t104	NA	999	0.076	NA	NA	NA	cc	use.old	NA	NA
t104	NA	999	0.076	NA	NA	NA	cc	use.old	NA	NA
t104	NA	999	0.055	NA	NA	NA	cc	use.old	NA	NA
t104	NA	999	0.055	NA	NA	NA	cc	use.old	NA	NA
t104	NA	999	0.055	NA	NA	NA	cc	use.old	NA	NA
t104	6	999	0.03639	NA	920827	push_mode	cc	del.cc	NA	NA
t104	6	999	0.033	NA	920827	push_mode	cc	del.cc	NA	NA
t104	6	999	NA	83.4	920827	push_mode	cc	del.cc	NA	NA
t104	6	999	NA	83.7	920827	push_mode	cc	del.cc	NA	NA
t104	NA	NA	0.01	NA	NA	NA	NA	use.old	NA	NA
t104	NA	NA	0.29	NA	NA	NA	NA	use.old	NA	NA
t104	NA	NA	NA	62.2	NA	NA	NA	use.old	NA	NA
t105	8	1	NA	51.97	930319	push_mode	total	use	NA	NA
t105	8	1	0.396	NA	930319	push_mode	total	use	NA	NA
t105	8	1	0.429	NA	930319	push_mode	total	use	NA	NA
t105	8	2	NA	91.36	930319	push_mode	total	use.dl	0.05	0.95
t105	8	2	NA	91.42	930319	push_mode	total	use.dl	0.05	0.95
t105	8	2	0.09269	NA	930319	push_mode	drainable	use.dl	0.05	0.95
t105	8	2	0.09492	NA	930319	push_mode	drainable	use.dl	0.05	0.95
t105	2	1	0.244	NA	930319	push_mode	seg	use	0.81	0.19
t105	2	1	0.279	NA	930319	push_mode	seg	use	0.81	0.19
t105	2	1	0.51371	NA	930319	push_mode	seg	use	0.81	0.19
t105	2	1	0.51371	NA	930319	push_mode	seg	use	0.81	0.19
t105	2	2	NA	35.52	930319	push_mode	total	use	NA	NA
t105	5	1	0.518	NA	930601	push_mode	total	use	NA	NA
t105	5	1	0.538	NA	930601	push_mode	total	use	NA	NA
t105	5	2	0.163	NA	930601	push_mode	total	use	NA	NA
t105	5	2	0.163	NA	930601	push_mode	total	use	NA	NA
t106	5	1	NA	11.85	950726	auger	total	use	NA	NA
t106	5	1	NA	12.06	950726	auger	total	use	NA	NA
t106	5	1	NA	14.18	950726	auger	total	use	NA	NA
t106	5	1	NA	14.59	950726	auger	total	use	NA	NA
t106	5	1	NA	17.48	950726	auger	total	use	NA	NA
t106	5	1	NA	21.24	950726	auger	total	use	NA	NA
t106	5	1	NA	22.57	950726	auger	total	use	NA	NA
t106	5	1	NA	23.28	950726	auger	total	use	NA	NA
t106	3	1	NA	14.08	950811	auger	total	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
t106	3	1	NA	14.27	950811	auger	total	use	NA	NA
t106	3	1	NA	14.45	950811	auger	total	use	NA	NA
t106	3	1	NA	15.62	950811	auger	total	use	NA	NA
t106	3	1	NA	17.83	950811	auger	total	use	NA	NA
t106	3	1	NA	18.38	950811	auger	total	use	NA	NA
t106	3	1	NA	18.56	950811	auger	total	use	NA	NA
t106	3	1	NA	19.39	950811	auger	total	use	NA	NA
t106	3	1	NA	19.91	950811	auger	total	use	NA	NA
t106	3	1	NA	20.49	950811	auger	total	use	NA	NA
t107	2	-4274	0.0655	NA	930310	push_mode	NA	use	NA	NA
t107	2	-4273	NA	18	930310	push_mode	NA	use	NA	NA
t107	2	1	NA	5.65	921110	push_mode	subseg	use	NA	NA
t107	2	1	NA	5.87	921110	push_mode	subseg	use	NA	NA
t107	2	1	NA	25.4	921110	push_mode	subseg	use	NA	NA
t107	2	1	NA	27	921110	push_mode	subseg	use	NA	NA
t107	2	1	0.05	NA	921110	push_mode	subseg	use	NA	NA
t107	2	1	0.051	NA	921110	push_mode	subseg	use	NA	NA
t107	2	2	NA	29.6	921110	push_mode	total	use	NA	NA
t107	2	2	NA	29.9	921110	push_mode	total	use	NA	NA
t107	2	2	NA	40.3	921110	push_mode	total	use	NA	NA
t107	2	2	NA	45.8	921110	push_mode	total	use	NA	NA
t107	2	2	0.06	NA	921110	push_mode	total	use	NA	NA
t107	2	2	0.071	NA	921110	push_mode	total	use	NA	NA
t107	2	3	NA	42.1	921110	push_mode	total	use	NA	NA
t107	2	3	NA	44.4	921110	push_mode	total	use	NA	NA
t107	2	4	NA	57.2	921110	push_mode	total	use	NA	NA
t107	2	4	NA	59	921110	push_mode	total	use	NA	NA
t107	5	2	NA	58.5	930218	push_mode	total	use	NA	NA
t107	5	2	NA	60.1	930218	push_mode	total	use	NA	NA
t107	5	2	0.096	NA	930218	push_mode	total	use	NA	NA
t107	5	2	0.123	NA	930218	push_mode	total	use	NA	NA
t107	5	3	NA	54.2	930218	push_mode	lower.1/2	use	NA	NA
t107	5	3	NA	54.3	930218	push_mode	lower.1/2	use	NA	NA
t107	5	3	NA	59.4	930218	push_mode	upper.1/2	use	NA	NA
t107	5	3	NA	59.9	930218	push_mode	upper.1/2	use	NA	NA
t107	5	3	0.081	NA	930218	push_mode	lower.1/2	use	NA	NA
t107	5	3	0.1	NA	930218	push_mode	lower.1/2	use	NA	NA
t107	5	3	0.12	NA	930218	push_mode	upper.1/2	use	NA	NA
t107	5	3	0.133	NA	930218	push_mode	upper.1/2	use	NA	NA
t107	5	4	NA	52.8	930218	push_mode	lower.1/2	use	NA	NA
t107	5	4	NA	53.4	930218	push_mode	lower.1/2	use	NA	NA
t107	5	4	NA	54.6	930218	push_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
t107	5	4	NA	54.8	930218	push_mode	upper.1/2	use	NA	NA
t107	5	4	0.024	NA	930218	push_mode	upper.1/2	use	NA	NA
t107	5	4	0.026	NA	930218	push_mode	lower.1/2	use	NA	NA
t107	5	4	0.028	NA	930218	push_mode	lower.1/2	use	NA	NA
t107	5	4	0.029	NA	930218	push_mode	upper.1/2	use	NA	NA
t107	3	-4271	NA	16.7	930310	push_mode	NA	use	NA	NA
t107	3	1	NA	15.2	930310	push_mode	total	use	NA	NA
t107	3	1	NA	15.3	930310	push_mode	total	use	NA	NA
t107	3	1	0.19	NA	930310	push_mode	total	use	NA	NA
t107	3	1	0.2	NA	930310	push_mode	total	use	NA	NA
t107	3	1	0.363	NA	930310	push_mode	total	use	NA	NA
t107	3	2	NA	55.4	930310	push_mode	total	use	NA	NA
t107	3	2	NA	55.6	930310	push_mode	total	use	NA	NA
t107	3	2	0.091	NA	930310	push_mode	total	use	NA	NA
t107	3	2	0.103	NA	930310	push_mode	total	use	NA	NA
t107	3	2	0.097	NA	930310	core	NA	del.qa	NA	NA
t107	3	3	NA	49.7	930310	push_mode	lower.1/2	use	NA	NA
t107	3	3	NA	54.6	930310	push_mode	upper.1/2	use	NA	NA
t107	3	3	NA	54.6	930310	push_mode	upper.1/2	use	NA	NA
t107	3	3	NA	54.8	930310	push_mode	lower.1/2	use	NA	NA
t107	3	3	0.022	NA	930310	push_mode	lower.1/2	use	NA	NA
t107	3	3	0.031	NA	930310	push_mode	lower.1/2	use	NA	NA
t107	3	3	0.065	NA	930310	push_mode	upper.1/2	use	NA	NA
t107	3	3	0.072	NA	930310	push_mode	upper.1/2	use	NA	NA
t107	3	4	NA	57.7	930310	push_mode	total	use	NA	NA
t107	3	4	NA	59.3	930310	push_mode	total	use	NA	NA
t107	2	999	NA	96.5	921110	push_mode	cc	del.cc	NA	NA
t107	2	999	NA	93.7	921110	push_mode	cc	del.cc	NA	NA
t107	2	999	0.08462	NA	921110	push_mode	cc	del.cc	NA	NA
t107	2	999	0.09231	NA	921110	push_mode	cc	del.cc	NA	NA
t107	5	999	NA	73.4	930218	push_mode	cc	del.cc	NA	NA
t107	5	999	NA	74	930218	push_mode	cc	del.cc	NA	NA
t107	5	999	0.08077	NA	930218	push_mode	cc	del.cc	NA	NA
t107	5	999	0.08308	NA	930218	push_mode	cc	del.cc	NA	NA
t107	3	999	NA	83.2	930310	push_mode	cc	del.cc	NA	NA
t107	3	999	NA	82.6	930310	push_mode	cc	del.cc	NA	NA
t107	3	999	0.02615	NA	930310	push_mode	cc	del.cc	NA	NA
t107	3	999	0.02839	NA	930310	push_mode	cc	del.cc	NA	NA
t108	5	1	NA	0.54	950719	auger	total	use.dl	NA	NA
t108	5	1	NA	0.56	950719	auger	total	use.dl	NA	NA
t108	5	1	NA	0.77	950719	auger	total	use.dl	NA	NA
t108	5	1	NA	0.83	950719	auger	total	use.dl	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
t108	5	1	NA	1.12	950719	auger	total	use	NA	NA
t108	5	1	NA	2.43	950719	auger	total	use	NA	NA
t108	5	1	NA	2.48	950719	auger	total	use	NA	NA
t108	5	1	NA	4.32	950719	auger	total	use	NA	NA
t108	2	1	NA	1.68	950721	auger	total	use	NA	NA
t108	2	1	NA	19.66	950721	auger	total	use	NA	NA
t108	2	1	NA	24.44	950721	auger	total	use	NA	NA
t108	2	1	NA	35.93	950721	auger	total	use	NA	NA
t108	2	1	NA	38.68	950721	auger	total	use	NA	NA
t108	2	1	NA	39.36	950721	auger	total	use	NA	NA
t109	6	1	NA	12.21	950818	auger	total	use	NA	NA
t109	6	1	NA	12.7	950818	auger	total	use	NA	NA
t109	6	1	NA	15.57	950818	auger	total	use	NA	NA
t109	6	1	NA	16.87	950818	auger	total	use	NA	NA
t109	6	1	NA	47.6	950818	auger	total	use	NA	NA
t109	6	1	NA	49.3	950818	auger	total	use	NA	NA
t109	6	1	NA	50.4	950818	auger	total	use	NA	NA
t109	6	1	NA	50.7	950818	auger	total	use	NA	NA
t109	2	1	NA	39.37	950821	auger	lower.1/2	use	NA	NA
t109	2	1	NA	44.35	950821	auger	total	use	NA	NA
t109	2	1	NA	45.5	950821	auger	total	use	NA	NA
t109	2	1	NA	45.6	950821	auger	total	use	NA	NA
t109	2	1	NA	45.7	950821	auger	lower.1/2	use	NA	NA
t109	2	1	NA	45.76	950821	auger	lower.1/2	use	NA	NA
t109	2	1	NA	46.5	950821	auger	total	use	NA	NA
t109	2	1	NA	46.6	950821	auger	lower.1/2	use	NA	NA
t109	2	1	NA	47.3	950821	auger	upper.1/2	use	NA	NA
t109	2	1	NA	48.1	950821	auger	upper.1/2	use	NA	NA
t109	2	1	NA	48.87	950821	auger	upper.1/2	use	NA	NA
t109	2	1	NA	48.9	950821	auger	total	use	NA	NA
t109	2	1	NA	49.11	950821	auger	total	use	NA	NA
t109	2	1	NA	49.2	950821	auger	total	use	NA	NA
t109	2	1	NA	49.3	950821	auger	upper.1/2	use	NA	NA
t109	2	1	NA	51.95	950821	auger	total	use	NA	NA
t111	6	1	NA	79.8	911022	push_mode	total	use	NA	NA
t111	6	1	NA	80.8	911022	push_mode	total	use	NA	NA
t111	6	1	NA	86.9	911022	push_mode	total	use	NA	NA
t111	6	1	NA	87	911022	push_mode	total	use	NA	NA
t111	6	2	NA	52.6	911022	push_mode	total	use	NA	NA
t111	6	2	NA	82.4	911022	push_mode	total	use	NA	NA
t111	6	2	NA	87	911022	push_mode	total	use	NA	NA
t111	6	3	NA	85	911022	push_mode	total	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
t111	6	3	NA	87.2	911022	push_mode	total	use	NA	NA
t111	6	3	NA	97.3	911022	push_mode	total	use	NA	NA
t111	6	4	NA	59.6	911022	push_mode	total	use	NA	NA
t111	6	4	NA	72.3	911022	push_mode	total	use	NA	NA
t111	6	4	NA	82.8	911022	push_mode	total	use	NA	NA
t111	6	5	NA	78.4	911022	push_mode	total	use	NA	NA
t111	6	5	NA	88	911022	push_mode	total	use	NA	NA
t111	6	5	NA	88.4	911022	push_mode	total	use	NA	NA
t111	6	7	NA	76.4	911022	push_mode	total	use	NA	NA
t111	6	7	NA	77.2	911022	push_mode	total	use	NA	NA
t111	6	7	NA	84.4	911022	push_mode	total	use	NA	NA
t111	6	7	NA	85.1	911022	push_mode	total	use	NA	NA
t111	6	8	NA	76.4	911022	push_mode	total	use	NA	NA
t111	6	8	NA	76.7	911022	push_mode	total	use	NA	NA
t111	6	8	NA	85.6	911022	push_mode	total	use	NA	NA
t111	6	9	NA	69.5	911022	push_mode	lower.1/2	use	NA	NA
t111	6	9	NA	71	911022	push_mode	upper.1/2	use	NA	NA
t111	6	9	NA	71.2	911022	push_mode	lower.1/2	use	NA	NA
t111	6	9	NA	72	911022	push_mode	lower.1/2	use	NA	NA
t111	6	9	NA	72.1	911022	push_mode	lower.1/2	use	NA	NA
t111	6	9	NA	74.7	911022	push_mode	upper.1/2	use	NA	NA
t111	6	9	NA	76.9	911022	push_mode	upper.1/2	use	NA	NA
t111	3	1	NA	77.8	911105	push_mode	total	use	NA	NA
t111	3	1	NA	79.6	911105	push_mode	total	use	NA	NA
t111	3	1	NA	81.1	911105	push_mode	total	use	NA	NA
t111	3	2	NA	80.5	911105	push_mode	total	use	NA	NA
t111	3	2	NA	80.6	911105	push_mode	total	use	NA	NA
t111	3	2	NA	85.6	911105	push_mode	total	use	NA	NA
t111	3	2	NA	85.8	911105	push_mode	total	use	NA	NA
t111	3	3	NA	2	911105	push_mode	total	use	NA	NA
t111	3	3	NA	81.7	911105	push_mode	total	use	NA	NA
t111	3	3	NA	88.5	911105	push_mode	total	use	NA	NA
t111	3	4	NA	79.3	911105	push_mode	total	use	NA	NA
t111	3	4	NA	80.4	911105	push_mode	total	use	NA	NA
t111	3	4	NA	89.5	911105	push_mode	total	use	NA	NA
t111	3	5	NA	77	911105	push_mode	total	use	NA	NA
t111	3	5	NA	79.3	911105	push_mode	total	use	NA	NA
t111	3	5	NA	88.8	911105	push_mode	total	use	NA	NA
t111	3	6	NA	78.3	911105	push_mode	total	use	NA	NA
t111	3	6	NA	78.6	911105	push_mode	total	use	NA	NA
t111	3	6	NA	84	911105	push_mode	total	use	NA	NA
t111	3	6	NA	84.7	911105	push_mode	total	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
t111	3	7	NA	68.6	911105	push_mode	total	use	NA	NA
t111	3	7	NA	74.7	911105	push_mode	total	use	NA	NA
t111	3	7	NA	85.8	911105	push_mode	total	use	NA	NA
t111	3	8	NA	75.4	911105	push_mode	total	use	NA	NA
t111	3	8	NA	84.8	911105	push_mode	total	use	NA	NA
t111	3	9	NA	74.9	911105	push_mode	total	use	NA	NA
t111	3	9	NA	77	911105	push_mode	total	use	NA	NA
t111	3	9	NA	85.2	911105	push_mode	total	use	NA	NA
t111	6	999	0.33	NA	NA	NA	cc	use.old	NA	NA
t111	6	999	0.412	NA	NA	NA	cc	use.old	NA	NA
t111	3	999	0.2	NA	NA	NA	cc	use.old	NA	NA
t111	3	999	0.3	NA	NA	NA	cc	use.old	NA	NA
t111	NA	999	0.368	NA	NA	NA	cc	use.old	NA	NA
t111	NA	999	0.33	NA	NA	NA	cc	use.old	NA	NA
t111	NA	999	0.385	NA	NA	NA	cc	use.old	NA	NA
t111	NA	999	0.412	NA	NA	NA	cc	use.old	NA	NA
t111	NA	999	0.2	NA	NA	NA	cc	use.old	NA	NA
t111	NA	999	0.3	NA	NA	NA	cc	use.old	NA	NA
t204	NA	NA	0.67346	NA	NA	NA	NA	use.old	NA	NA
t204	NA	NA	NA	73	NA	NA	NA	use.old	NA	NA
tx102	NA	NA	0.19087	NA	NA	NA	NA	use.old	NA	NA
tx102	NA	NA	NA	44.51	NA	NA	NA	use.old	NA	NA
tx107	9a	1	NA	15.09	960109	auger	total	use	NA	NA
tx107	9a	1	NA	18.24	960109	auger	total	use	NA	NA
tx107	9a	1	NA	25.71	960109	auger	total	use	NA	NA
tx107	9a	1	NA	29.91	960109	auger	total	use	NA	NA
tx118	NA	NA	1.06	NA	NA	NA	NA	use.old	NA	NA
tx118	na26	-4275	3.22	NA	800101	NA	supernate	del.sup	NA	NA
ty101	NA	999	0.0663	NA	NA	NA	cc	use.old	NA	NA
ty102	NA	999	0.0327	NA	NA	NA	cc	use.old	NA	NA
ty102	NA	NA	0.236	NA	NA	NA	NA	use.old	NA	NA
ty102	NA	NA	NA	58	NA	NA	NA	use.old	NA	NA
ty103	NA	999	0.0715	NA	NA	NA	cc	use.old	NA	NA
ty103	NA	999	0.149	NA	NA	NA	cc	use.old	NA	NA
ty103	NA	999	NA	51.2	NA	NA	cc	use.old	NA	NA
ty103	NA	NA	0.11	NA	NA	NA	NA	use.old	NA	NA
ty103	NA	NA	NA	52.67	NA	NA	NA	use.old	NA	NA
ty104	18	1	NA	49.95	950228	auger	lower.1/2	use	NA	NA
ty104	18	1	NA	53.23	950228	auger	lower.1/2	use	NA	NA
ty104	18	1	0.0774	NA	950228	auger	lower.1/2	use	NA	NA
ty104	18	1	0.0895	NA	950228	auger	lower.1/2	use	NA	NA
ty104	18	1	0.652	NA	950228	auger	lower.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
ty104	18	1	0.652	NA	950228	auger	lower.1/2	use	NA	NA
ty104	15	1	NA	49.75	950228	auger	lower.1/2	use	NA	NA
ty104	15	1	NA	51.42	950228	auger	subsegc	use	NA	NA
ty104	15	1	NA	51.67	950228	auger	subsegc	use	NA	NA
ty104	15	1	NA	55.23	950228	auger	lower.1/2	use	NA	NA
ty104	15	1	0.0826	NA	950228	auger	lower.1/2	use	NA	NA
ty104	15	1	0.0971	NA	950228	auger	lower.1/2	use	NA	NA
ty104	15	1	0.551	NA	950228	auger	lower.1/2	use	NA	NA
ty104	15	1	0.694	NA	950228	auger	lower.1/2	use	NA	NA
ty105	NA	999	0.0805	NA	NA	NA	cc	use.old	NA	NA
ty105	NA	999	NA	39.4	NA	NA	cc	use.old	NA	NA
ty106	7	1	NA	30.28	950303	auger	total	use	NA	NA
ty106	7	1	NA	30.8	950303	auger	total	use	NA	NA
ty106	6	1	NA	32.2	950302	auger	upper.1/2	use	NA	NA
ty106	6	1	NA	37.17	950302	auger	upper.1/2	use	NA	NA
ty106	6	1	NA	39.16	950302	auger	lower.1/2	use	NA	NA
ty106	6	1	NA	39.18	950302	auger	lower.1/2	use	NA	NA
ty106	NA	999	0.248	NA	NA	NA	cc	use.old	NA	NA
ty106	NA	999	0.078	NA	NA	NA	cc	use.old	NA	NA
ty106	NA	999	0.17	NA	NA	NA	cc	use.old	NA	NA
ty106	NA	999	0.209	NA	NA	NA	cc	use.old	NA	NA
ty106	NA	999	NA	39.2	NA	NA	cc	use.old	NA	NA
ty106	NA	999	NA	39.2	NA	NA	cc	use.old	NA	NA
ty106	NA	NA	0.092	NA	NA	NA	NA	use.old	NA	NA
ty106	NA	NA	NA	35.5	NA	NA	NA	use.old	NA	NA
u101	7	1	NA	29.93	960530	grab	supernate	del.sup	NA	NA
u101	7	1	NA	33.94	960530	grab	supernate	del.sup	NA	NA
u101	7	1	NA	65.25	960530	grab	supernate	del.sup	NA	NA
u101	7	1	NA	78.4	960530	grab	supernate	del.sup	NA	NA
u101	7	1	NA	19.06	960530	grab	supernate	del.sup	NA	NA
u101	7	1	NA	21.9	960530	grab	supernate	del.sup	NA	NA
u101	7	1	NA	77.7	960530	grab	supernate	del.sup	NA	NA
u101	7	1	NA	77.77	960530	grab	supernate	del.sup	NA	NA
u101	1	1	NA	36.68	960529	grab	supernate	del.sup	NA	NA
u101	1	1	NA	37.61	960529	grab	supernate	del.sup	NA	NA
u101	1	1	NA	76.86	960529	grab	supernate	del.sup	NA	NA
u101	1	1	NA	77.63	960529	grab	supernate	del.sup	NA	NA
u101	1	1	NA	27.7	960529	grab	supernate	del.sup	NA	NA
u101	1	1	NA	31.36	960529	grab	supernate	del.sup	NA	NA
u101	1	1	NA	77.7	960529	grab	supernate	del.sup	NA	NA
u101	1	1	NA	78.12	960529	grab	supernate	del.sup	NA	NA
u102	19	1	NA	40.3	960416	push_mode	upper.1/2	use	0.5	0.32

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
u102	19	1	NA	41.5	960416	push_mode	upper.1/2	use	0.5	0.32
u102	19	1	NA	50.28	960416	push_mode	drainable	del.dr	0.68	0.32
u102	19	1	NA	50.93	960416	push_mode	drainable	del.dr	0.68	0.32
u102	19	1	NA	50.601	960416	push_mode	lower.1/2	use	0.15	0.32
u102	19	1	NA	51.188	960416	push_mode	lower.1/2	use	0.15	0.32
u102	19	1	0.768092	NA	960416	push_mode	lower.1/2	use	0.15	0.32
u102	19	1	0.768232	NA	960416	push_mode	lower.1/2	use	0.15	0.32
u102	19	1	0.6831744	NA	960416	push_mode	upper.1/2	use	0.53	0.32
u102	19	1	0.7819264	NA	960416	push_mode	upper.1/2	use	0.53	0.32
u102	19	1	0.90976	NA	960416	push_mode	drainable	del.dr	0.68	0.32
u102	19	1	0.92456	NA	960416	push_mode	drainable	del.dr	0.68	0.32
u102	19	2	NA	48.92	960416	push_mode	lower.1/2	use	NA	NA
u102	19	2	NA	50.3	960416	push_mode	upper.1/2	use	NA	NA
u102	19	2	NA	50.52	960416	push_mode	lower.1/2	use	NA	NA
u102	19	2	NA	51.41	960416	push_mode	upper.1/2	use	NA	NA
u102	19	2	0.712	NA	960416	push_mode	upper.1/2	use	NA	NA
u102	19	2	0.771	NA	960416	push_mode	lower.1/2	use	NA	NA
u102	19	2	0.776	NA	960416	push_mode	upper.1/2	use	NA	NA
u102	19	2	0.867	NA	960416	push_mode	lower.1/2	use	NA	NA
u102	19	3	NA	31.61	960416	push_mode	lower.1/2	use	NA	NA
u102	19	3	NA	33.17	960416	push_mode	lower.1/2	use	NA	NA
u102	19	3	NA	42.94	960416	push_mode	upper.1/2	use	NA	NA
u102	19	3	NA	43.6	960416	push_mode	upper.1/2	use	NA	NA
u102	19	3	0.941	NA	960416	push_mode	lower.1/2	use	NA	NA
u102	19	3	0.952	NA	960416	push_mode	lower.1/2	use	NA	NA
u102	19	3	1.01	NA	960416	push_mode	upper.1/2	use	NA	NA
u102	19	3	1.03	NA	960416	push_mode	upper.1/2	use	NA	NA
u102	19	4	NA	14.78	960416	push_mode	upper.1/2	use	NA	NA
u102	19	4	NA	22.44	960416	push_mode	upper.1/2	use	NA	NA
u102	19	4	NA	28.1	960416	push_mode	upper.1/2	use	NA	NA
u102	19	4	NA	31.81	960416	push_mode	upper.1/2	use	NA	NA
u102	19	4	NA	43.2	960416	push_mode	lower.1/2	use	NA	NA
u102	19	4	NA	46.82	960416	push_mode	lower.1/2	use	NA	NA
u102	19	4	0.944	NA	960416	push_mode	upper.1/2	use	NA	NA
u102	19	4	0.965	NA	960416	push_mode	upper.1/2	use	NA	NA
u102	19	4	1.03	NA	960416	push_mode	lower.1/2	use	NA	NA
u102	19	4	1.11	NA	960416	push_mode	lower.1/2	use	NA	NA
u102	19	5	NA	15.72	960416	push_mode	total	use	NA	NA
u102	19	5	NA	16.48	960416	push_mode	total	use	NA	NA
u102	19	5	0.436	NA	960416	push_mode	total	use	NA	NA
u102	19	5	0.442	NA	960416	push_mode	total	use	NA	NA
u102	19	5	NA	17.11	960416	push_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
u102	19	5	NA	17.19	960416	push_mode	upper.1/2	use	NA	NA
u102	19	5	0.409	NA	960416	push_mode	upper.1/2	use	NA	NA
u102	19	5	0.42	NA	960416	push_mode	upper.1/2	use	NA	NA
u102	19	5	NA	32.66	960416	push_mode	upper.1/2	use	NA	NA
u102	19	5	NA	40.24	960416	push_mode	upper.1/2	use	NA	NA
u102	19	5	NA	42.96	960416	push_mode	lower.1/2	use	NA	NA
u102	19	5	NA	46.26	960416	push_mode	lower.1/2	use	NA	NA
u102	19	5	0.918	NA	960416	push_mode	upper.1/2	use	NA	NA
u102	19	5	0.924	NA	960416	push_mode	upper.1/2	use	NA	NA
u102	19	5	1.02	NA	960416	push_mode	lower.1/2	use	NA	NA
u102	19	5	1.16	NA	960416	push_mode	lower.1/2	use	NA	NA
u102	19	6	NA	40.7	960416	push_mode	upper.1/2	use	NA	NA
u102	19	6	NA	41.68	960416	push_mode	upper.1/2	use	NA	NA
u102	19	6	0.865	NA	960416	push_mode	upper.1/2	use	NA	NA
u102	19	6	0.913	NA	960416	push_mode	upper.1/2	use	NA	NA
u102	9	1	NA	39.8849	960429	push_mode	lower.1/2	use	0.17	0.83
u102	9	1	NA	40.23	960429	push_mode	drainable	del.dr	0.17	0.83
u102	9	1	NA	50.3316	960429	push_mode	lower.1/2	use	0.17	0.83
u102	9	1	NA	52.29	960429	push_mode	drainable	del.dr	0.17	0.83
u102	9	1	1.1874211	NA	960429	push_mode	lower.1/2	use	0.17	0.83
u102	9	1	1.2007168	NA	960429	push_mode	lower.1/2	use	0.17	0.83
u102	9	1	1.30917	NA	960429	push_mode	drainable	del.dr	0.17	0.83
u102	9	1	1.32396	NA	960429	push_mode	drainable	del.dr	0.17	0.83
u102	9	2	NA	12.51	960429	push_mode	upper.1/2	use	NA	NA
u102	9	2	NA	33.09	960429	push_mode	upper.1/2	use	NA	NA
u102	9	2	NA	33.61	960429	push_mode	lower.1/2	use	NA	NA
u102	9	2	NA	33.69	960429	push_mode	upper.1/2	use	NA	NA
u102	9	2	NA	33.85	960429	push_mode	lower.1/2	use	NA	NA
u102	9	2	NA	38.93	960429	push_mode	upper.1/2	use	NA	NA
u102	9	2	0.539	NA	960429	push_mode	lower.1/2	use	NA	NA
u102	9	2	0.573	NA	960429	push_mode	lower.1/2	use	NA	NA
u102	9	2	0.711	NA	960429	push_mode	upper.1/2	use	NA	NA
u102	9	2	0.719	NA	960429	push_mode	upper.1/2	use	NA	NA
u102	9	3	NA	7.68	960429	push_mode	upper.1/2	use	NA	NA
u102	9	3	NA	10.25	960429	push_mode	upper.1/2	use	NA	NA
u102	9	3	NA	10.46	960429	push_mode	upper.1/2	use	NA	NA
u102	9	3	NA	11.59	960429	push_mode	upper.1/2	use	NA	NA
u102	9	3	NA	11.72	960429	push_mode	lower.1/2	use	NA	NA
u102	9	3	NA	12.63	960429	push_mode	lower.1/2	use	NA	NA
u102	9	3	NA	12.66	960429	push_mode	lower.1/2	use	NA	NA
u102	9	3	NA	37.05	960429	push_mode	lower.1/2	use	NA	NA
u102	9	3	0.361	NA	960429	push_mode	lower.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
u102	9	3	0.389	NA	960429	push_mode	lower.1/2	use	NA	NA
u102	9	3	0.393	NA	960429	push_mode	upper.1/2	use	NA	NA
u102	9	3	0.403	NA	960429	push_mode	upper.1/2	use	NA	NA
u102	9	4	NA	20.1	960429	push_mode	upper.1/2	use	NA	NA
u102	9	4	NA	24.47	960429	push_mode	upper.1/2	use	NA	NA
u102	9	4	NA	29.9	960429	push_mode	lower.1/2	use	NA	NA
u102	9	4	NA	30.1	960429	push_mode	lower.1/2	use	NA	NA
u102	9	4	0.678	NA	960429	push_mode	upper.1/2	use	NA	NA
u102	9	4	0.702	NA	960429	push_mode	upper.1/2	use	NA	NA
u102	9	4	0.892	NA	960429	push_mode	lower.1/2	use	NA	NA
u102	9	4	0.986	NA	960429	push_mode	lower.1/2	use	NA	NA
u102	9	5	NA	33.7	960429	push_mode	upper.1/2	use	NA	NA
u102	9	5	NA	35.9	960429	push_mode	upper.1/2	use	NA	NA
u102	9	5	NA	37.04	960429	push_mode	lower.1/2	use	NA	NA
u102	9	5	NA	40.04	960429	push_mode	lower.1/2	use	NA	NA
u102	9	5	0.857	NA	960429	push_mode	lower.1/2	use	NA	NA
u102	9	5	0.913	NA	960429	push_mode	lower.1/2	use	NA	NA
u102	9	5	1.16	NA	960429	push_mode	upper.1/2	use	NA	NA
u102	9	5	1.19	NA	960429	push_mode	upper.1/2	use	NA	NA
u102	9	6	NA	44.08	960429	push_mode	lower.1/2	use	NA	NA
u102	9	6	NA	44.9	960429	push_mode	lower.1/2	use	NA	NA
u102	9	6	NA	50.1	960429	push_mode	upper.1/2	use	NA	NA
u102	9	6	NA	55.46	960429	push_mode	upper.1/2	use	NA	NA
u102	9	6	0.743	NA	960429	push_mode	lower.1/2	use	NA	NA
u102	9	6	0.792	NA	960429	push_mode	lower.1/2	use	NA	NA
u102	9	6	1.11	NA	960429	push_mode	upper.1/2	use	NA	NA
u102	9	6	1.12	NA	960429	push_mode	upper.1/2	use	NA	NA
u102	9	6	NA	20.5	960429	push_mode	upper.1/2	use	NA	NA
u102	9	6	NA	28.09	960429	push_mode	upper.1/2	use	NA	NA
u102	9	6	0.544	NA	960429	push_mode	upper.1/2	use	NA	NA
u102	9	6	0.57	NA	960429	push_mode	upper.1/2	use	NA	NA
u102	9	99	NA	99.03	960429	push_mode	total	del.99	NA	NA
u102	9	99	NA	99.87	960429	push_mode	total	del.99	NA	NA
u103	NA	NA	0.68629	NA	NA	NA	NA	use.old	NA	NA
u103	NA	NA	NA	8.7	NA	NA	NA	use.old	NA	NA
u103	na28	-4277	0.68629	NA	781204	NA	NA	del.date	NA	NA
u103	na27	-4276	NA	8.7	781204	NA	NA	del.date	NA	NA
u105	20	1	NA	11.7	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	1	NA	33.53	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	1	NA	33.55	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	1	NA	40.44	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	1	1.05	NA	960213	rotary_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
u105	20	1	1.3	NA	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	1	1.31	NA	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	2	NA	36.26	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	2	NA	38.45	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	2	1.12	NA	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	2	1.13	NA	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	3	NA	29.11	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	3	NA	33.34	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	3	0.854	NA	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	3	0.912	NA	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	4	NA	24.94	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	4	NA	25.25	960213	rotary_mode	lower.1/2	use	NA	NA
u105	20	4	NA	25.67	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	4	NA	26.64	960213	rotary_mode	lower.1/2	use	NA	NA
u105	20	4	1.14	NA	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	4	1.17	NA	960213	rotary_mode	lower.1/2	use	NA	NA
u105	20	4	1.18	NA	960213	rotary_mode	lower.1/2	use	NA	NA
u105	20	4	1.2	NA	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	5	NA	25.78	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	5	NA	28.68	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	5	0.668	NA	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	5	0.874	NA	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	6	NA	2.09	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	6	NA	19.05	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	6	NA	21.44	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	6	0.849	NA	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	6	0.886	NA	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	7	NA	25.09	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	7	NA	25.69	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	7	NA	35.68	960213	rotary_mode	lower.1/2	use	NA	NA
u105	20	7	NA	39.37	960213	rotary_mode	lower.1/2	use	NA	NA
u105	20	7	0.948	NA	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	7	0.953	NA	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	7	1.22	NA	960213	rotary_mode	lower.1/2	use	NA	NA
u105	20	7	1.28	NA	960213	rotary_mode	lower.1/2	use	NA	NA
u105	20	8	NA	28.03	960213	rotary_mode	lower.1/2	use	NA	NA
u105	20	8	NA	28.94	960213	rotary_mode	lower.1/2	use	NA	NA
u105	20	8	NA	30.69	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	8	NA	31.85	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	8	0.973	NA	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	8	0.998	NA	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	8	1.42	NA	960213	rotary_mode	lower.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
u105	20	8	1.63	NA	960213	rotary_mode	lower.1/2	use	NA	NA
u105	20	9	NA	21.6	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	9	NA	22.81	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	9	NA	30.17	960213	rotary_mode	lower.1/2	use	NA	NA
u105	20	9	NA	30.22	960213	rotary_mode	lower.1/2	use	NA	NA
u105	20	9	1.38	NA	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	9	1.4	NA	960213	rotary_mode	upper.1/2	use	NA	NA
u105	20	9	1.75	NA	960213	rotary_mode	lower.1/2	use	NA	NA
u105	20	9	1.85	NA	960213	rotary_mode	lower.1/2	use	NA	NA
u105	2	1	NA	95.47	960229	rotary_mode	total	del.qa	NA	NA
u105	2	1	NA	95.64	960229	rotary_mode	total	del.qa	NA	NA
u105	2	1	NA	96.36	960229	rotary_mode	total	del.qa	NA	NA
u105	2	1	NA	96.86	960229	rotary_mode	total	del.qa	NA	NA
u105	2	1	0.04615	NA	960229	rotary_mode	total	use	NA	NA
u105	2	1	0.10723	NA	960229	rotary_mode	total	use	NA	NA
u105	2	1	0.13252	NA	960229	rotary_mode	total	use	NA	NA
u105	2	1	0.14568	NA	960229	rotary_mode	total	use	NA	NA
u105	2	1	0.18681	NA	960229	rotary_mode	total	use	NA	NA
u105	2	1	0.22378	NA	960229	rotary_mode	total	use	NA	NA
u105	2	2	NA	15.42	960229	rotary_mode	total	use	NA	NA
u105	2	2	NA	32.11	960229	rotary_mode	total	use	NA	NA
u105	2	2	NA	38.69	960229	rotary_mode	total	use	NA	NA
u105	2	2	0.902	NA	960229	rotary_mode	total	use	NA	NA
u105	2	2	1.12	NA	960229	rotary_mode	total	use	NA	NA
u105	2	3	NA	35.16	960229	rotary_mode	total	use	NA	NA
u105	2	3	NA	37.79	960229	rotary_mode	total	use	NA	NA
u105	2	3	1.16	NA	960229	rotary_mode	total	use	NA	NA
u105	2	3	1.17	NA	960229	rotary_mode	total	use	NA	NA
u105	2	4	NA	27.52	960229	rotary_mode	total	use	NA	NA
u105	2	4	NA	28.18	960229	rotary_mode	total	use	NA	NA
u105	2	4	1.06	NA	960229	rotary_mode	total	use	NA	NA
u105	2	4	1.11	NA	960229	rotary_mode	total	use	NA	NA
u105	2	5	NA	22.67	960229	rotary_mode	total	use	NA	NA
u105	2	5	NA	24.34	960229	rotary_mode	total	use	NA	NA
u105	2	5	1.29	NA	960229	rotary_mode	total	use	NA	NA
u105	2	5	1.29	NA	960229	rotary_mode	total	use	NA	NA
u105	2	6	NA	35.42	960229	rotary_mode	total	use	NA	NA
u105	2	6	NA	37.77	960229	rotary_mode	total	use	NA	NA
u105	2	6	1.54	NA	960229	rotary_mode	total	use	NA	NA
u105	2	6	1.54	NA	960229	rotary_mode	total	use	NA	NA
u105	2	8	NA	16.23	960229	rotary_mode	lower.1/2	use	NA	NA
u105	2	8	NA	16.88	960229	rotary_mode	lower.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
u105	2	8	NA	19.37	960229	rotary_mode	upper.1/2	use	NA	NA
u105	2	8	NA	20.27	960229	rotary_mode	upper.1/2	use	NA	NA
u105	2	8	1.02	NA	960229	rotary_mode	upper.1/2	use	NA	NA
u105	2	8	1.03	NA	960229	rotary_mode	upper.1/2	use	NA	NA
u105	2	8	1.26	NA	960229	rotary_mode	lower.1/2	use	NA	NA
u105	2	8	1.28	NA	960229	rotary_mode	lower.1/2	use	NA	NA
u105	2	9	NA	4	960229	rotary_mode	upper.1/2	use	NA	NA
u105	2	9	NA	12.91	960229	rotary_mode	upper.1/2	use	NA	NA
u105	2	9	NA	13.75	960229	rotary_mode	upper.1/2	use	NA	NA
u105	2	9	NA	14.52	960229	rotary_mode	upper.1/2	use	NA	NA
u105	2	9	NA	15.2	960229	rotary_mode	upper.1/2	use	NA	NA
u105	2	9	NA	16.01	960229	rotary_mode	upper.1/2	use	NA	NA
u105	2	9	NA	17	960229	rotary_mode	upper.1/2	use	NA	NA
u105	2	9	NA	29.71	960229	rotary_mode	lower.1/2	use	NA	NA
u105	2	9	NA	34.46	960229	rotary_mode	lower.1/2	use	NA	NA
u105	2	9	0.848	NA	960229	rotary_mode	upper.1/2	use	NA	NA
u105	2	9	0.947	NA	960229	rotary_mode	upper.1/2	use	NA	NA
u105	2	9	1.37	NA	960229	rotary_mode	lower.1/2	use	NA	NA
u105	2	9	1.45	NA	960229	rotary_mode	lower.1/2	use	NA	NA
u105	7	3	NA	43.12	960318	rotary_mode	upper.1/2	use	NA	NA
u105	7	3	NA	46.1	960318	rotary_mode	upper.1/2	use	NA	NA
u105	7	3	0.784	NA	960318	rotary_mode	upper.1/2	use	NA	NA
u105	7	3	1.11	NA	960318	rotary_mode	upper.1/2	use	NA	NA
u105	7	4	NA	29.22	960318	rotary_mode	upper.1/2	use	NA	NA
u105	7	4	NA	33.39	960318	rotary_mode	upper.1/2	use	NA	NA
u105	7	4	NA	33.57	960318	rotary_mode	lower.1/2	use	NA	NA
u105	7	4	NA	33.68	960318	rotary_mode	lower.1/2	use	NA	NA
u105	7	4	0.964	NA	960318	rotary_mode	upper.1/2	use	NA	NA
u105	7	4	1.05	NA	960318	rotary_mode	upper.1/2	use	NA	NA
u105	7	4	1.3	NA	960318	rotary_mode	lower.1/2	use	NA	NA
u105	7	4	1.35	NA	960318	rotary_mode	lower.1/2	use	NA	NA
u105	7	5	NA	31.31	960318	rotary_mode	lower.1/2	use	NA	NA
u105	7	5	NA	34.83	960318	rotary_mode	lower.1/2	use	NA	NA
u105	7	5	NA	41.48	960318	rotary_mode	upper.1/2	use	NA	NA
u105	7	5	NA	41.66	960318	rotary_mode	upper.1/2	use	NA	NA
u105	7	5	1.21	NA	960318	rotary_mode	upper.1/2	use	NA	NA
u105	7	5	1.25	NA	960318	rotary_mode	upper.1/2	use	NA	NA
u105	7	5	1.37	NA	960318	rotary_mode	lower.1/2	use	NA	NA
u105	7	5	1.48	NA	960318	rotary_mode	lower.1/2	use	NA	NA
u105	7	6	NA	19.53	960318	rotary_mode	total	use	NA	NA
u105	7	6	NA	21.38	960318	rotary_mode	total	use	NA	NA
u105	7	6	1.07	NA	960318	rotary_mode	total	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
u105	7	6	1.23	NA	960318	rotary_mode	total	use	NA	NA
u105	7	7	NA	28.33	960318	rotary_mode	lower.1/2	use	NA	NA
u105	7	7	NA	29.77	960318	rotary_mode	upper.1/2	use	NA	NA
u105	7	7	NA	29.83	960318	rotary_mode	upper.1/2	use	NA	NA
u105	7	7	NA	31.33	960318	rotary_mode	lower.1/2	use	NA	NA
u105	7	7	1.85	NA	960318	rotary_mode	lower.1/2	use	NA	NA
u105	7	7	1.97	NA	960318	rotary_mode	lower.1/2	use	NA	NA
u105	7	7	2.26	NA	960318	rotary_mode	upper.1/2	use	NA	NA
u105	7	7	2.35	NA	960318	rotary_mode	upper.1/2	use	NA	NA
u105	7	9	NA	20.47	960318	rotary_mode	upper.1/2	use	NA	NA
u105	7	9	NA	21.4	960318	rotary_mode	upper.1/2	use	NA	NA
u105	7	9	1.4	NA	960318	rotary_mode	upper.1/2	use	NA	NA
u105	7	9	1.41	NA	960318	rotary_mode	upper.1/2	use	NA	NA
u105	7	9	NA	22.22	960318	rotary_mode	lower.1/2	use	NA	NA
u105	7	9	NA	22.54	960318	rotary_mode	lower.1/2	use	NA	NA
u105	7	9	NA	24.18	960318	rotary_mode	upper.1/2	use	NA	NA
u105	7	9	NA	28.27	960318	rotary_mode	upper.1/2	use	NA	NA
u105	7	9	0.97	NA	960318	rotary_mode	lower.1/2	use	NA	NA
u105	7	9	0.997	NA	960318	rotary_mode	lower.1/2	use	NA	NA
u105	7	9	1.59	NA	960318	rotary_mode	upper.1/2	use	NA	NA
u105	7	9	1.66	NA	960318	rotary_mode	upper.1/2	use	NA	NA
u105	na30	-4279	2.75	NA	771006	NA	NA	del.date	NA	NA
u105	na32	-4281	2.75	NA	781204	NA	NA	del.date	NA	NA
u105	na31	-4280	NA	20.8	781204	NA	NA	del.date	NA	NA
u105	na29	-4278	2.8	NA	781204	NA	NA	del.date	NA	NA
u106	19	1	NA	49.68	960509	push_mode	total	use	NA	NA
u106	19	1	NA	49.88	960509	push_mode	total	use	NA	NA
u106	19	1	2.58473	NA	960509	push_mode	total	use	NA	NA
u106	19	1	2.60708	NA	960509	push_mode	total	use	NA	NA
u106	19	1	3.52328	NA	960509	push_mode	total	use	NA	NA
u106	19	1	3.60521	NA	960509	push_mode	total	use	NA	NA
u106	19	2	NA	40.85	960509	push_mode	upper.1/2	use	NA	NA
u106	19	2	NA	42.63	960509	push_mode	upper.1/2	use	NA	NA
u106	19	2	NA	47.59	960509	push_mode	total	use	NA	NA
u106	19	2	NA	48.2	960509	push_mode	total	use	NA	NA
u106	19	2	2.4842	NA	960509	push_mode	total	use	NA	NA
u106	19	2	2.49163	NA	960509	push_mode	total	use	NA	NA
u106	19	2	2.63	NA	960509	push_mode	upper.1/2	use	NA	NA
u106	19	2	2.67	NA	960509	push_mode	upper.1/2	use	NA	NA
u106	19	2	3.0569	NA	960509	push_mode	total	use	NA	NA
u106	19	2	3.09409	NA	960509	push_mode	total	use	NA	NA
u106	19	3	NA	39.37	960509	push_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
u106	19	3	NA	40.13	960509	push_mode	lower.1/2	use	NA	NA
u106	19	3	NA	40.43	960509	push_mode	lower.1/2	use	NA	NA
u106	19	3	NA	42.12	960509	push_mode	upper.1/2	use	NA	NA
u106	19	3	1.21	NA	960509	push_mode	lower.1/2	use	NA	NA
u106	19	3	1.5	NA	960509	push_mode	lower.1/2	use	NA	NA
u106	19	3	1.92	NA	960509	push_mode	lower.1/2	use	NA	NA
u106	19	3	2.61	NA	960509	push_mode	upper.1/2	use	NA	NA
u106	19	3	2.65	NA	960509	push_mode	upper.1/2	use	NA	NA
u106	19	4	NA	41.77	960509	push_mode	lower.1/2	use	NA	NA
u106	19	4	NA	41.96	960509	push_mode	lower.1/2	use	NA	NA
u106	19	4	NA	44.21	960509	push_mode	upper.1/2	use	NA	NA
u106	19	4	NA	46.39	960509	push_mode	upper.1/2	use	NA	NA
u106	19	4	2.44	NA	960509	push_mode	lower.1/2	use	NA	NA
u106	19	4	2.57	NA	960509	push_mode	upper.1/2	use	NA	NA
u106	19	4	2.58	NA	960509	push_mode	lower.1/2	use	NA	NA
u106	19	4	2.59	NA	960509	push_mode	upper.1/2	use	NA	NA
u106	19	5	NA	33.78	960509	push_mode	upper.1/2	use	NA	NA
u106	19	5	NA	33.8	960509	push_mode	upper.1/2	use	NA	NA
u106	19	5	NA	42.87	960509	push_mode	lower.1/2	use	NA	NA
u106	19	5	NA	46.27	960509	push_mode	lower.1/2	use	NA	NA
u106	19	5	0.87	NA	960509	push_mode	lower.1/2	use	NA	NA
u106	19	5	0.939	NA	960509	push_mode	lower.1/2	use	NA	NA
u106	19	5	1.46	NA	960509	push_mode	upper.1/2	use	NA	NA
u106	19	5	1.63	NA	960509	push_mode	upper.1/2	use	NA	NA
u106	2	1	NA	48.52	960510	push_mode	total	use	NA	NA
u106	2	1	NA	49.1	960510	push_mode	total	use	NA	NA
u106	2	1	2.4184	NA	960510	push_mode	total	use	NA	NA
u106	2	1	2.54451	NA	960510	push_mode	total	use	NA	NA
u106	2	1	2.95994	NA	960510	push_mode	total	use	NA	NA
u106	2	1	3.02671	NA	960510	push_mode	total	use	NA	NA
u106	2	2	NA	40.33	960510	push_mode	upper.1/2	use	NA	NA
u106	2	2	NA	42.19	960510	push_mode	lower.1/2	use	NA	NA
u106	2	2	NA	42.2	960510	push_mode	lower.1/2	use	NA	NA
u106	2	2	NA	43.8	960510	push_mode	upper.1/2	use	NA	NA
u106	2	2	NA	47.68	960510	push_mode	total	use	NA	NA
u106	2	2	NA	48.11	960510	push_mode	total	use	NA	NA
u106	2	2	2.29	NA	960510	push_mode	upper.1/2	use	NA	NA
u106	2	2	2.36	NA	960510	push_mode	upper.1/2	use	NA	NA
u106	2	2	2.45	NA	960510	push_mode	lower.1/2	use	NA	NA
u106	2	2	2.50749	NA	960510	push_mode	total	use	NA	NA
u106	2	2	2.51497	NA	960510	push_mode	total	use	NA	NA
u106	2	2	2.54	NA	960510	push_mode	lower.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
u106	2	2	3.06138	NA	960510	push_mode	total	use	NA	NA
u106	2	2	3.18862	NA	960510	push_mode	total	use	NA	NA
u106	2	3	NA	43.77	960510	push_mode	upper.1/2	use	NA	NA
u106	2	3	NA	44.78	960510	push_mode	upper.1/2	use	NA	NA
u106	2	3	NA	46.92	960510	push_mode	lower.1/2	use	NA	NA
u106	2	3	NA	47.63	960510	push_mode	lower.1/2	use	NA	NA
u106	2	3	2.55	NA	960510	push_mode	upper.1/2	use	NA	NA
u106	2	3	2.56	NA	960510	push_mode	lower.1/2	use	NA	NA
u106	2	3	2.57	NA	960510	push_mode	upper.1/2	use	NA	NA
u106	2	3	2.6	NA	960510	push_mode	lower.1/2	use	NA	NA
u106	2	4	NA	43.77	960510	push_mode	upper.1/2	use	NA	NA
u106	2	4	NA	43.88	960510	push_mode	lower.1/2	use	NA	NA
u106	2	4	NA	45.08	960510	push_mode	lower.1/2	use	NA	NA
u106	2	4	NA	46.51	960510	push_mode	upper.1/2	use	NA	NA
u106	2	4	2.45	NA	960510	push_mode	upper.1/2	use	NA	NA
u106	2	4	2.5	NA	960510	push_mode	lower.1/2	use	NA	NA
u106	2	4	2.55	NA	960510	push_mode	lower.1/2	use	NA	NA
u106	2	4	2.69	NA	960510	push_mode	upper.1/2	use	NA	NA
u106	2	5	NA	16.36	960510	push_mode	lower.1/2	use	NA	NA
u106	2	5	NA	16.83	960510	push_mode	lower.1/2	use	NA	NA
u106	2	5	NA	25.2	960510	push_mode	upper.1/2	use	NA	NA
u106	2	5	NA	28.49	960510	push_mode	upper.1/2	use	NA	NA
u106	2	5	0.893	NA	960510	push_mode	lower.1/2	use	NA	NA
u106	2	5	0.895	NA	960510	push_mode	lower.1/2	use	NA	NA
u106	2	5	1.44	NA	960510	push_mode	upper.1/2	use	NA	NA
u106	2	5	1.67	NA	960510	push_mode	upper.1/2	use	NA	NA
u106	na34	-4283	9.96	NA	800101	NA	supernate	del.sup	NA	NA
u106	na33	-4282	NA	61.91	800101	NA	supernate	del.sup	NA	NA
u107	9	1	NA	51.6058	960209	push_mode	lower.1/2	use	0.01	0.99
u107	9	1	NA	54.1586	960209	push_mode	lower.1/2	use	0.01	0.99
u107	9	1	NA	51.94	960209	push_mode	drainable	del.dr	0.01	0.99
u107	9	1	NA	54.51	960209	push_mode	drainable	del.dr	0.01	0.99
u107	9	1	0.22375	NA	960209	push_mode	drainable	use.dl	0.01	0.99
u107	9	1	0.2281	NA	960209	push_mode	drainable	use.dl	0.01	0.99
u107	9	2	NA	43.9178	960209	push_mode	lower.1/2	use	0.09	0.73
u107	9	2	NA	44.6258	960209	push_mode	lower.1/2	use	0.09	0.73
u107	9	2	NA	48.7102	960209	push_mode	upper.1/2	use	0.19	0.73
u107	9	2	NA	49.3264	960209	push_mode	upper.1/2	use	0.19	0.73
u107	9	2	NA	49.55	960209	push_mode	drainable	del.dr	0.27	0.73
u107	9	2	NA	49.79	960209	push_mode	drainable	del.dr	0.27	0.73
u107	9	2	0.3123374	NA	960209	push_mode	lower.1/2	use	0.09	0.73
u107	9	2	0.3108898	NA	960209	push_mode	lower.1/2	use	0.09	0.73

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
u107	9	2	0.33589	NA	960209	push_mode	drainable	del.dr	0.27	0.73
u107	9	2	0.34007	NA	960209	push_mode	drainable	del.dr	0.27	0.73
u107	9	2	0.3959034	NA	960209	push_mode	upper.1/2	use	0.19	0.73
u107	9	2	0.3986318	NA	960209	push_mode	upper.1/2	use	0.19	0.73
u107	9	3	NA	16.78	960209	push_mode	lower.1/2	use	NA	NA
u107	9	3	NA	17.43	960209	push_mode	lower.1/2	use	NA	NA
u107	9	3	NA	22.19	960209	push_mode	upper.1/2	use	NA	NA
u107	9	3	NA	26.84	960209	push_mode	upper.1/2	use	NA	NA
u107	9	3	0.117	NA	960209	push_mode	upper.1/2	use	NA	NA
u107	9	3	0.127	NA	960209	push_mode	upper.1/2	use	NA	NA
u107	9	3	0.137	NA	960209	push_mode	lower.1/2	use	NA	NA
u107	9	3	0.139	NA	960209	push_mode	lower.1/2	use	NA	NA
u107	9	3	NA	4.96	960209	push_mode	upper.1/2	use	NA	NA
u107	9	3	NA	6.36	960209	push_mode	upper.1/2	use	NA	NA
u107	9	3	NA	7.87	960209	push_mode	upper.1/2	use	NA	NA
u107	9	3	0.0843	NA	960209	push_mode	upper.1/2	use	NA	NA
u107	9	3	0.0921	NA	960209	push_mode	upper.1/2	use	NA	NA
u107	7	2	NA	6.94	960226	push_mode	upper.1/2	use	NA	NA
u107	7	2	NA	7.6	960226	push_mode	upper.1/2	use	NA	NA
u107	7	2	0.0639	NA	960226	push_mode	upper.1/2	use	NA	NA
u107	7	2	0.0836	NA	960226	push_mode	upper.1/2	use	NA	NA
u107	7	2	0.0895	NA	960226	push_mode	upper.1/2	use	NA	NA
u107	7	3	NA	12.26	960226	push_mode	upper.1/2	use	NA	NA
u107	7	3	NA	13.12	960226	push_mode	upper.1/2	use	NA	NA
u107	7	3	0.189	NA	960226	push_mode	upper.1/2	use	NA	NA
u107	7	3	0.192	NA	960226	push_mode	upper.1/2	use	NA	NA
u107	7	3	0.213	NA	960226	push_mode	upper.1/2	use	NA	NA
u107	7	4	NA	22.76	960226	push_mode	subsega	use	NA	NA
u107	7	4	NA	23.61	960226	push_mode	subsega	use	NA	NA
u107	7	4	NA	27.64	960226	push_mode	subsegb	use	NA	NA
u107	7	4	NA	28.65	960226	push_mode	subsegb	use	NA	NA
u107	7	4	NA	34.53	960226	push_mode	lower.1/2	use	NA	NA
u107	7	4	NA	39.23	960226	push_mode	lower.1/2	use	NA	NA
u107	7	4	0.305	NA	960226	push_mode	subsegb	use	NA	NA
u107	7	4	0.367	NA	960226	push_mode	subsega	use	NA	NA
u107	7	4	0.368	NA	960226	push_mode	subsega	use	NA	NA
u107	7	4	0.39	NA	960226	push_mode	subsegb	use	NA	NA
u107	7	4	0.422	NA	960226	push_mode	subsegb	use	NA	NA
u107	7	4	0.512	NA	960226	push_mode	lower.1/2	use	NA	NA
u107	7	4	0.521	NA	960226	push_mode	lower.1/2	use	NA	NA
u107	7	5	NA	28.19	960226	push_mode	subsegb	use	NA	NA
u107	7	5	NA	37.14	960226	push_mode	subsegb	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
u107	7	5	NA	38.28	960226	push_mode	subsega	use	NA	NA
u107	7	5	NA	43.35	960226	push_mode	subsega	use	NA	NA
u107	7	5	NA	44.21	960226	push_mode	subsegb	use	NA	NA
u107	7	5	0.511	NA	960226	push_mode	subsegb	use	NA	NA
u107	7	5	0.519	NA	960226	push_mode	subsegb	use	NA	NA
u107	7	5	0.856	NA	960226	push_mode	subsega	use	NA	NA
u107	7	5	0.952	NA	960226	push_mode	subsega	use	NA	NA
u107	7	5	NA	21.25	960226	push_mode	subsega	use	NA	NA
u107	7	5	NA	21.26	960226	push_mode	subsega	use	NA	NA
u107	7	5	NA	98.14	960226	push_mode	total	del.lin	NA	NA
u107	7	5	NA	98.17	960226	push_mode	total	del.lin	NA	NA
u107	7	5	0.187	NA	960226	push_mode	subsega	use	NA	NA
u107	7	5	0.193	NA	960226	push_mode	subsega	use	NA	NA
u107	7	5	NA	51.01	960226	push_mode	drainable	use.dl	0	1
u107	7	5	NA	51.14	960226	push_mode	drainable	use.dl	0	1
u107	7	5	0.257	NA	960226	push_mode	drainable	use.dl	0	1
u107	7	5	0.2598	NA	960226	push_mode	drainable	use.dl	0	1
u107	7	5	0.0507	NA	960226	push_mode	total	del.lin	NA	NA
u107	7	5	0.0532	NA	960226	push_mode	total	del.lin	NA	NA
u107	7	6	NA	89.1	960226	push_mode	total	del.lin	NA	NA
u107	7	6	NA	89.27	960226	push_mode	total	del.lin	NA	NA
u107	7	6	NA	91.02	960226	push_mode	total	del.lin	NA	NA
u107	7	6	NA	91.44	960226	push_mode	total	del.lin	NA	NA
u107	7	6	NA	91.7	960226	push_mode	total	del.lin	NA	NA
u107	7	6	NA	92.22	960226	push_mode	total	del.lin	NA	NA
u107	7	6	0.09759	NA	960226	push_mode	total	del.lin	NA	NA
u107	7	6	0.10811	NA	960226	push_mode	total	del.lin	NA	NA
u107	7	6	0.121	NA	960226	push_mode	total	del.lin	NA	NA
u107	7	6	0.124	NA	960226	push_mode	total	del.lin	NA	NA
u107	7	6	0.13858	NA	960226	push_mode	total	del.lin	NA	NA
u107	7	6	0.16315	NA	960226	push_mode	total	del.lin	NA	NA
u107	7	6	0.1887	NA	960226	push_mode	total	del.lin	NA	NA
u107	2	1	NA	52.3236	960328	push_mode	upper.1/2	use	0.02	0.98
u107	2	1	NA	51.979	960328	push_mode	upper.1/2	use	0.02	0.98
u107	2	1	NA	52.28	960328	push_mode	drainable	del.dr	0.02	0.98
u107	2	1	NA	52.73	960328	push_mode	drainable	del.dr	0.02	0.98
u107	2	1	0.22572	NA	960328	push_mode	drainable	use.dl	0.02	0.98
u107	2	1	0.22572	NA	960328	push_mode	drainable	use.dl	0.02	0.98
u107	2	1	NA	16.45	960328	push_mode	total	use.dl	0.01	0.99
u107	2	1	NA	18.55	960328	push_mode	total	use.dl	0.01	0.99
u107	2	1	NA	47.02	960328	push_mode	drainable	use.dl	0.01	0.99
u107	2	1	NA	47.03	960328	push_mode	drainable	use.dl	0.01	0.99

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
u107	2	1	0.22107	NA	960328	push_mode	drainable	use.dl	0.01	0.99
u107	2	1	0.22176	NA	960328	push_mode	drainable	use.dl	0.01	0.99
u107	2	2	NA	49.74	960328	push_mode	upper.1/2	use	NA	NA
u107	2	2	NA	49.9	960328	push_mode	upper.1/2	use	NA	NA
u107	2	2	NA	93.93	960328	push_mode	total	del.lin	NA	NA
u107	2	2	NA	94.44	960328	push_mode	total	del.lin	NA	NA
u107	2	2	0.08291	NA	960328	push_mode	total	del.lin	NA	NA
u107	2	2	0.09903	NA	960328	push_mode	total	del.lin	NA	NA
u107	2	2	NA	28.6792	960328	push_mode	seg	use	0.64	0.36
u107	2	2	NA	29.3652	960328	push_mode	seg	use	0.64	0.36
u107	2	2	NA	52.18	960328	push_mode	drainable	del.dr	0.64	0.36
u107	2	2	NA	52.45	960328	push_mode	drainable	del.dr	0.64	0.36
u107	2	2	0.1828564	NA	960328	push_mode	seg	use	0.64	0.36
u107	2	2	0.194044	NA	960328	push_mode	seg	use	0.64	0.36
u107	2	2	0.30349	NA	960328	push_mode	drainable	del.dr	0.64	0.36
u107	2	2	0.3239	NA	960328	push_mode	drainable	del.dr	0.64	0.36
u107	2	2	NA	0.73	960328	push_mode	lower.1/2	use.dl	NA	NA
u107	2	2	NA	0.92	960328	push_mode	lower.1/2	use.dl	NA	NA
u107	2	2	NA	4.15	960328	push_mode	upper.1/2	use	NA	NA
u107	2	2	NA	4.67	960328	push_mode	upper.1/2	use	NA	NA
u107	2	2	0.0477	NA	960328	push_mode	upper.1/2	use	NA	NA
u107	2	2	0.0493	NA	960328	push_mode	upper.1/2	use	NA	NA
u107	2	2	0.0518	NA	960328	push_mode	upper.1/2	use	NA	NA
u107	2	2	0.0919	NA	960328	push_mode	lower.1/2	use	NA	NA
u108	7	1	NA	45.08	960423	push_mode	lower.1/2	use	NA	NA
u108	7	1	NA	45.92	960423	push_mode	lower.1/2	use	NA	NA
u108	7	1	NA	47.33	960423	push_mode	total	use	NA	NA
u108	7	1	NA	51.08	960423	push_mode	total	use	NA	NA
u108	7	1	0.48955	NA	960423	push_mode	total	use	NA	NA
u108	7	1	0.49791	NA	960423	push_mode	total	use	NA	NA
u108	7	1	0.6	NA	960423	push_mode	lower.1/2	use	NA	NA
u108	7	1	0.656	NA	960423	push_mode	lower.1/2	use	NA	NA
u108	7	2	NA	23.05	960423	push_mode	upper.1/2	use	NA	NA
u108	7	2	NA	24.43	960423	push_mode	upper.1/2	use	NA	NA
u108	7	2	0.306	NA	960423	push_mode	upper.1/2	use	NA	NA
u108	7	2	0.347	NA	960423	push_mode	upper.1/2	use	NA	NA
u108	7	3	NA	26.98	960423	push_mode	upper.1/2	use	NA	NA
u108	7	3	NA	33.54	960423	push_mode	upper.1/2	use	NA	NA
u108	7	3	0.266	NA	960423	push_mode	upper.1/2	use	NA	NA
u108	7	3	0.268	NA	960423	push_mode	upper.1/2	use	NA	NA
u108	7	3	NA	19.44	960423	push_mode	upper.1/2	use	NA	NA
u108	7	3	NA	32.04	960423	push_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
u108	7	3	0.295	NA	960423	push_mode	upper.1/2	use	NA	NA
u108	7	3	0.298	NA	960423	push_mode	upper.1/2	use	NA	NA
u108	7	4	NA	28.59	960423	push_mode	lower.1/2	use	NA	NA
u108	7	4	NA	31.19	960423	push_mode	lower.1/2	use	NA	NA
u108	7	4	NA	32.57	960423	push_mode	upper.1/2	use	NA	NA
u108	7	4	NA	33.04	960423	push_mode	upper.1/2	use	NA	NA
u108	7	4	0.275	NA	960423	push_mode	upper.1/2	use	NA	NA
u108	7	4	0.443	NA	960423	push_mode	upper.1/2	use	NA	NA
u108	7	4	0.46	NA	960423	push_mode	upper.1/2	use	NA	NA
u108	7	4	0.475	NA	960423	push_mode	lower.1/2	use	NA	NA
u108	7	4	0.495	NA	960423	push_mode	lower.1/2	use	NA	NA
u108	7	4	NA	0.986	960423	push_mode	upper.1/2	use.dl	NA	NA
u108	7	4	NA	38.73	960423	push_mode	lower.1/2	use	NA	NA
u108	7	4	NA	39.46	960423	push_mode	lower.1/2	use	NA	NA
u108	7	4	NA	44.42	960423	push_mode	upper.1/2	use	NA	NA
u108	7	4	NA	44.53	960423	push_mode	upper.1/2	use	NA	NA
u108	7	4	0.435	NA	960423	push_mode	lower.1/2	use	NA	NA
u108	7	4	0.444	NA	960423	push_mode	upper.1/2	use	NA	NA
u108	7	4	0.456	NA	960423	push_mode	upper.1/2	use	NA	NA
u108	7	4	0.457	NA	960423	push_mode	lower.1/2	use	NA	NA
u108	7	5	NA	24.85	960423	push_mode	upper.1/2	use	NA	NA
u108	7	5	NA	28.4	960423	push_mode	lower.1/2	use	NA	NA
u108	7	5	NA	29.17	960423	push_mode	upper.1/2	use	NA	NA
u108	7	5	NA	35.74	960423	push_mode	lower.1/2	use	NA	NA
u108	7	5	0.383	NA	960423	push_mode	lower.1/2	use	NA	NA
u108	7	5	0.385	NA	960423	push_mode	lower.1/2	use	NA	NA
u108	7	5	0.438	NA	960423	push_mode	upper.1/2	use	NA	NA
u108	7	5	0.49	NA	960423	push_mode	upper.1/2	use	NA	NA
u108	7	6	NA	15.68	960423	push_mode	lower.1/2	use	NA	NA
u108	7	6	NA	21.21	960423	push_mode	lower.1/2	use	NA	NA
u108	7	6	NA	21.32	960423	push_mode	upper.1/2	use	NA	NA
u108	7	6	NA	23.06	960423	push_mode	upper.1/2	use	NA	NA
u108	7	6	0.26	NA	960423	push_mode	lower.1/2	use	NA	NA
u108	7	6	0.303	NA	960423	push_mode	lower.1/2	use	NA	NA
u108	7	6	0.328	NA	960423	push_mode	upper.1/2	use	NA	NA
u108	7	6	0.338	NA	960423	push_mode	upper.1/2	use	NA	NA
u108	7	7	NA	38.2	960423	push_mode	upper.1/2	use	NA	NA
u108	7	7	NA	39.52	960423	push_mode	upper.1/2	use	NA	NA
u108	7	7	NA	40.15	960423	push_mode	lower.1/2	use	NA	NA
u108	7	7	NA	40.3	960423	push_mode	lower.1/2	use	NA	NA
u108	7	7	0.526	NA	960423	push_mode	lower.1/2	use	NA	NA
u108	7	7	0.527	NA	960423	push_mode	lower.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
u108	7	7	0.608	NA	960423	push_mode	upper.1/2	use	NA	NA
u108	7	7	0.655	NA	960423	push_mode	upper.1/2	use	NA	NA
u108	7	8	NA	37.9	960423	push_mode	lower.1/2	use	NA	NA
u108	7	8	NA	38.04	960423	push_mode	upper.1/2	use	NA	NA
u108	7	8	NA	41.31	960423	push_mode	lower.1/2	use	NA	NA
u108	7	8	NA	42.04	960423	push_mode	upper.1/2	use	NA	NA
u108	7	8	NA	42.06	960423	push_mode	upper.1/2	use	NA	NA
u108	7	8	0.366	NA	960423	push_mode	lower.1/2	use	NA	NA
u108	7	8	0.438	NA	960423	push_mode	lower.1/2	use	NA	NA
u108	7	8	0.548	NA	960423	push_mode	upper.1/2	use	NA	NA
u108	7	8	0.565	NA	960423	push_mode	lower.1/2	use	NA	NA
u108	7	8	0.617	NA	960423	push_mode	upper.1/2	use	NA	NA
u108	7	9	NA	30.76	960423	push_mode	upper.1/2	use	NA	NA
u108	7	9	NA	33.88	960423	push_mode	upper.1/2	use	NA	NA
u108	7	9	0.229	NA	960423	push_mode	upper.1/2	use	NA	NA
u108	7	9	0.263	NA	960423	push_mode	upper.1/2	use	NA	NA
u108	9	1	NA	49.25	960426	push_mode	total	use	NA	NA
u108	9	1	NA	49.66	960426	push_mode	total	use	NA	NA
u108	9	1	0.50433	NA	960426	push_mode	total	use	NA	NA
u108	9	1	0.50794	NA	960426	push_mode	total	use	NA	NA
u108	9	2	NA	31.9	960426	push_mode	upper.1/2	use	NA	NA
u108	9	2	NA	34.42	960426	push_mode	upper.1/2	use	NA	NA
u108	9	2	0.261	NA	960426	push_mode	upper.1/2	use	NA	NA
u108	9	2	0.276	NA	960426	push_mode	upper.1/2	use	NA	NA
u108	9	3	NA	39.27	960426	push_mode	upper.1/2	use	NA	NA
u108	9	3	NA	45.56	960426	push_mode	lower.1/2	use	NA	NA
u108	9	3	NA	45.98	960426	push_mode	lower.1/2	use	NA	NA
u108	9	3	NA	47.71	960426	push_mode	upper.1/2	use	NA	NA
u108	9	3	NA	69.61	960426	push_mode	upper.1/2	use	NA	NA
u108	9	3	0.306	NA	960426	push_mode	lower.1/2	use	NA	NA
u108	9	3	0.317	NA	960426	push_mode	upper.1/2	use	NA	NA
u108	9	3	0.319	NA	960426	push_mode	upper.1/2	use	NA	NA
u108	9	3	0.346	NA	960426	push_mode	lower.1/2	use	NA	NA
u108	9	4	NA	25.56	960426	push_mode	lower.1/2	use	NA	NA
u108	9	4	NA	25.88	960426	push_mode	lower.1/2	use	NA	NA
u108	9	4	NA	39.96	960426	push_mode	upper.1/2	use	NA	NA
u108	9	4	NA	41.97	960426	push_mode	upper.1/2	use	NA	NA
u108	9	4	0.292	NA	960426	push_mode	upper.1/2	use	NA	NA
u108	9	4	0.295	NA	960426	push_mode	upper.1/2	use	NA	NA
u108	9	4	0.386	NA	960426	push_mode	lower.1/2	use	NA	NA
u108	9	4	0.387	NA	960426	push_mode	lower.1/2	use	NA	NA
u108	9	5	NA	17.3	960426	push_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
u108	9	5	NA	18.15	960426	push_mode	upper.1/2	use	NA	NA
u108	9	5	NA	28.41	960426	push_mode	lower.1/2	use	NA	NA
u108	9	5	NA	33.46	960426	push_mode	lower.1/2	use	NA	NA
u108	9	5	0.37	NA	960426	push_mode	upper.1/2	use	NA	NA
u108	9	5	0.372	NA	960426	push_mode	upper.1/2	use	NA	NA
u108	9	5	0.553	NA	960426	push_mode	lower.1/2	use	NA	NA
u108	9	5	0.558	NA	960426	push_mode	lower.1/2	use	NA	NA
u108	9	6	NA	27.5	960426	push_mode	upper.1/2	use	NA	NA
u108	9	6	NA	28.67	960426	push_mode	upper.1/2	use	NA	NA
u108	9	6	NA	29.39	960426	push_mode	lower.1/2	use	NA	NA
u108	9	6	NA	38.89	960426	push_mode	lower.1/2	use	NA	NA
u108	9	6	0.398	NA	960426	push_mode	lower.1/2	use	NA	NA
u108	9	6	0.423	NA	960426	push_mode	lower.1/2	use	NA	NA
u108	9	6	0.485	NA	960426	push_mode	upper.1/2	use	NA	NA
u108	9	6	0.492	NA	960426	push_mode	upper.1/2	use	NA	NA
u108	9	7	NA	42.24	960426	push_mode	lower.1/2	use	NA	NA
u108	9	7	NA	42.33	960426	push_mode	lower.1/2	use	NA	NA
u108	9	7	NA	42.45	960426	push_mode	upper.1/2	use	NA	NA
u108	9	7	NA	45.85	960426	push_mode	upper.1/2	use	NA	NA
u108	9	7	0.45	NA	960426	push_mode	upper.1/2	use	NA	NA
u108	9	7	0.471	NA	960426	push_mode	upper.1/2	use	NA	NA
u108	9	7	0.524	NA	960426	push_mode	lower.1/2	use	NA	NA
u108	9	7	0.536	NA	960426	push_mode	lower.1/2	use	NA	NA
u108	9	8	NA	40.04	960426	push_mode	lower.1/2	use	NA	NA
u108	9	8	NA	41.17	960426	push_mode	lower.1/2	use	NA	NA
u108	9	8	NA	41.5	960426	push_mode	upper.1/2	use	NA	NA
u108	9	8	NA	42.92	960426	push_mode	upper.1/2	use	NA	NA
u108	9	8	0.288	NA	960426	push_mode	upper.1/2	use	NA	NA
u108	9	8	0.29	NA	960426	push_mode	upper.1/2	use	NA	NA
u108	9	8	0.453	NA	960426	push_mode	lower.1/2	use	NA	NA
u108	9	8	0.465	NA	960426	push_mode	lower.1/2	use	NA	NA
u108	9	9	NA	38.34	960426	push_mode	upper.1/2	use	NA	NA
u108	9	9	NA	40.1	960426	push_mode	upper.1/2	use	NA	NA
u108	9	9	NA	48.86	960426	push_mode	lower.1/2	use	NA	NA
u108	9	9	NA	49.67	960426	push_mode	lower.1/2	use	NA	NA
u108	9	9	0.273	NA	960426	push_mode	lower.1/2	use	NA	NA
u108	9	9	0.286	NA	960426	push_mode	lower.1/2	use	NA	NA
u108	9	9	0.509	NA	960426	push_mode	upper.1/2	use	NA	NA
u108	9	9	0.535	NA	960426	push_mode	upper.1/2	use	NA	NA
u108	2	1	NA	46.2824	960430	push_mode	upper.1/2	use	0.36	0.64
u108	2	1	NA	47.7804	960430	push_mode	upper.1/2	use	0.36	0.64
u108	2	1	NA	51.11	960430	push_mode	drainable	del.dr	0.36	0.64

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
u108	2	1	NA	51.15	960430	push_mode	drainable	del.dr	0.36	0.64
u108	2	1	0.4759168	NA	960430	push_mode	upper.1/2	use	0.36	0.64
u108	2	1	0.4663104	NA	960430	push_mode	upper.1/2	use	0.36	0.64
u108	2	1	0.50361	NA	960430	push_mode	drainable	del.dr	0.36	0.64
u108	2	1	0.52312	NA	960430	push_mode	drainable	del.dr	0.36	0.64
u108	2	2	NA	9.59	960430	push_mode	lower.1/2	use	NA	NA
u108	2	2	NA	14.94	960430	push_mode	lower.1/2	use	NA	NA
u108	2	2	NA	23.66	960430	push_mode	upper.1/2	use	NA	NA
u108	2	2	NA	29.51	960430	push_mode	upper.1/2	use	NA	NA
u108	2	2	0.171	NA	960430	push_mode	lower.1/2	use	NA	NA
u108	2	2	0.178	NA	960430	push_mode	lower.1/2	use	NA	NA
u108	2	2	0.279	NA	960430	push_mode	upper.1/2	use	NA	NA
u108	2	2	0.282	NA	960430	push_mode	upper.1/2	use	NA	NA
u108	2	3	NA	19.2	960430	push_mode	lower.1/2	use	NA	NA
u108	2	3	NA	21.63	960430	push_mode	lower.1/2	use	NA	NA
u108	2	3	NA	29.49	960430	push_mode	upper.1/2	use	NA	NA
u108	2	3	NA	41.56	960430	push_mode	upper.1/2	use	NA	NA
u108	2	3	0.214	NA	960430	push_mode	lower.1/2	use	NA	NA
u108	2	3	0.225	NA	960430	push_mode	lower.1/2	use	NA	NA
u108	2	3	0.26	NA	960430	push_mode	upper.1/2	use	NA	NA
u108	2	3	0.263	NA	960430	push_mode	lower.1/2	use	NA	NA
u108	2	3	0.274	NA	960430	push_mode	upper.1/2	use	NA	NA
u108	2	3	0.296	NA	960430	push_mode	upper.1/2	use	NA	NA
u108	2	3	NA	17.24	960430	push_mode	upper.1/2	use	NA	NA
u108	2	3	NA	23.12	960430	push_mode	upper.1/2	use	NA	NA
u108	2	3	0.262	NA	960430	push_mode	upper.1/2	use	NA	NA
u108	2	3	0.273	NA	960430	push_mode	upper.1/2	use	NA	NA
u108	2	3	0.393	NA	960430	push_mode	upper.1/2	use	NA	NA
u108	2	4	NA	17.21	960430	push_mode	upper.1/2	use	NA	NA
u108	2	4	NA	17.89	960430	push_mode	upper.1/2	use	NA	NA
u108	2	4	NA	40.32	960430	push_mode	lower.1/2	use	NA	NA
u108	2	4	NA	41.34	960430	push_mode	lower.1/2	use	NA	NA
u108	2	4	0.26	NA	960430	push_mode	upper.1/2	use	NA	NA
u108	2	4	0.264	NA	960430	push_mode	upper.1/2	use	NA	NA
u108	2	4	0.415	NA	960430	push_mode	lower.1/2	use	NA	NA
u108	2	4	0.427	NA	960430	push_mode	lower.1/2	use	NA	NA
u108	2	5	NA	31.17	960430	push_mode	lower.1/2	use	NA	NA
u108	2	5	NA	36.72	960430	push_mode	upper.1/2	use	NA	NA
u108	2	5	NA	38.38	960430	push_mode	lower.1/2	use	NA	NA
u108	2	5	NA	41.13	960430	push_mode	upper.1/2	use	NA	NA
u108	2	5	0.385	NA	960430	push_mode	lower.1/2	use	NA	NA
u108	2	5	0.433	NA	960430	push_mode	lower.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
u108	2	5	0.465	NA	960430	push_mode	upper.1/2	use	NA	NA
u108	2	5	0.508	NA	960430	push_mode	upper.1/2	use	NA	NA
u108	2	6	NA	29.48	960430	push_mode	upper.1/2	use	NA	NA
u108	2	6	NA	35.35	960430	push_mode	upper.1/2	use	NA	NA
u108	2	6	NA	44.3	960430	push_mode	lower.1/2	use	NA	NA
u108	2	6	NA	45.61	960430	push_mode	lower.1/2	use	NA	NA
u108	2	6	0.418	NA	960430	push_mode	upper.1/2	use	NA	NA
u108	2	6	0.422	NA	960430	push_mode	upper.1/2	use	NA	NA
u108	2	6	0.443	NA	960430	push_mode	lower.1/2	use	NA	NA
u108	2	6	0.444	NA	960430	push_mode	lower.1/2	use	NA	NA
u108	2	7	NA	33.3	960430	push_mode	upper.1/2	use	NA	NA
u108	2	7	NA	33.55	960430	push_mode	upper.1/2	use	NA	NA
u108	2	7	NA	40.96	960430	push_mode	lower.1/2	use	NA	NA
u108	2	7	NA	41.14	960430	push_mode	lower.1/2	use	NA	NA
u108	2	7	0.496	NA	960430	push_mode	upper.1/2	use	NA	NA
u108	2	7	0.575	NA	960430	push_mode	upper.1/2	use	NA	NA
u108	2	7	0.631	NA	960430	push_mode	lower.1/2	use	NA	NA
u108	2	7	0.743	NA	960430	push_mode	lower.1/2	use	NA	NA
u108	2	8	NA	40.07	960430	push_mode	lower.1/2	use	NA	NA
u108	2	8	NA	40.39	960430	push_mode	lower.1/2	use	NA	NA
u108	2	8	NA	41.25	960430	push_mode	upper.1/2	use	NA	NA
u108	2	8	NA	41.28	960430	push_mode	upper.1/2	use	NA	NA
u108	2	8	0.323	NA	960430	push_mode	lower.1/2	use	NA	NA
u108	2	8	0.335	NA	960430	push_mode	lower.1/2	use	NA	NA
u108	2	8	0.52	NA	960430	push_mode	upper.1/2	use	NA	NA
u108	2	8	0.598	NA	960430	push_mode	upper.1/2	use	NA	NA
u108	2	8	0.601	NA	960430	push_mode	upper.1/2	use	NA	NA
u108	2	9	NA	38.46	960430	push_mode	subsega	use	NA	NA
u108	2	9	NA	38.62	960430	push_mode	subsega	use	NA	NA
u108	2	9	NA	47.83	960430	push_mode	lower.1/2	use	NA	NA
u108	2	9	NA	48.59	960430	push_mode	lower.1/2	use	NA	NA
u108	2	9	0.518	NA	960430	push_mode	lower.1/2	use	NA	NA
u108	2	9	0.554	NA	960430	push_mode	lower.1/2	use	NA	NA
u108	2	9	1.11	NA	960430	push_mode	subsega	use	NA	NA
u108	2	9	1.12	NA	960430	push_mode	subsega	use	NA	NA
u108	7	1	NA	50.2	960531	grab	supernate	del.sup	NA	NA
u108	7	1	NA	50.35	960531	grab	supernate	del.sup	NA	NA
u108	7	1	0.53166	NA	960531	grab	supernate	del.sup	NA	NA
u108	7	1	0.53885	NA	960531	grab	supernate	del.sup	NA	NA
u109	2	1	NA	20.56	951228	push_mode	total	use	NA	NA
u109	2	1	NA	21.76	951228	push_mode	total	use	NA	NA
u109	2	1	0.263	NA	951228	push_mode	total	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
u109	2	1	0.275	NA	951228	push_mode	total	use	NA	NA
u109	2	2	NA	15.78	951228	push_mode	total	use	NA	NA
u109	2	2	NA	17.33	951228	push_mode	total	use	NA	NA
u109	2	2	0.222	NA	951228	push_mode	total	use	NA	NA
u109	2	2	0.248	NA	951228	push_mode	total	use	NA	NA
u109	2	3	NA	6	951228	push_mode	upper.1/2	use	NA	NA
u109	2	3	NA	6.76	951228	push_mode	upper.1/2	use	NA	NA
u109	2	3	0.13	NA	951228	push_mode	upper.1/2	use	NA	NA
u109	2	3	0.131	NA	951228	push_mode	upper.1/2	use	NA	NA
u109	2	3	NA	8.35	951228	push_mode	lower.1/2	use	NA	NA
u109	2	3	NA	8.62	951228	push_mode	lower.1/2	use	NA	NA
u109	2	3	0.109	NA	951228	push_mode	lower.1/2	use	NA	NA
u109	2	3	0.117	NA	951228	push_mode	lower.1/2	use	NA	NA
u109	2	4	NA	8.43	951228	push_mode	total	use	NA	NA
u109	2	4	NA	9.43	951228	push_mode	total	use	NA	NA
u109	2	4	0.2	NA	951228	push_mode	total	use	NA	NA
u109	2	4	0.204	NA	951228	push_mode	total	use	NA	NA
u109	2	5	NA	10.79	951228	push_mode	total	use	NA	NA
u109	2	5	NA	13.06	951228	push_mode	total	use	NA	NA
u109	2	5	0.233	NA	951228	push_mode	total	use	NA	NA
u109	2	5	0.262	NA	951228	push_mode	total	use	NA	NA
u109	2	6	NA	23.63	951228	push_mode	upper.1/2	use	NA	NA
u109	2	6	NA	23.69	951228	push_mode	upper.1/2	use	NA	NA
u109	2	6	NA	26.55	951228	push_mode	lower.1/2	use	NA	NA
u109	2	6	NA	37.41	951228	push_mode	lower.1/2	use	NA	NA
u109	2	6	0.408	NA	951228	push_mode	lower.1/2	use	NA	NA
u109	2	6	0.421	NA	951228	push_mode	lower.1/2	use	NA	NA
u109	2	6	0.469	NA	951228	push_mode	upper.1/2	use	NA	NA
u109	2	6	0.483	NA	951228	push_mode	upper.1/2	use	NA	NA
u109	2	7	NA	15.24	951228	push_mode	lower.1/2	use	NA	NA
u109	2	7	NA	19.21	951228	push_mode	upper.1/2	use	NA	NA
u109	2	7	NA	19.84	951228	push_mode	upper.1/2	use	NA	NA
u109	2	7	NA	20.01	951228	push_mode	lower.1/2	use	NA	NA
u109	2	7	0.259	NA	951228	push_mode	lower.1/2	use	NA	NA
u109	2	7	0.314	NA	951228	push_mode	lower.1/2	use	NA	NA
u109	2	7	0.364	NA	951228	push_mode	upper.1/2	use	NA	NA
u109	2	7	0.417	NA	951228	push_mode	upper.1/2	use	NA	NA
u109	2	8	NA	17.54	951228	push_mode	lower.1/2	use	NA	NA
u109	2	8	NA	20.29	951228	push_mode	lower.1/2	use	NA	NA
u109	2	8	NA	22.27	951228	push_mode	upper.1/2	use	NA	NA
u109	2	8	NA	24.96	951228	push_mode	upper.1/2	use	NA	NA
u109	2	8	0.344	NA	951228	push_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
u109	2	8	0.36	NA	951228	push_mode	lower.1/2	use	NA	NA
u109	2	8	0.365	NA	951228	push_mode	lower.1/2	use	NA	NA
u109	2	8	0.391	NA	951228	push_mode	upper.1/2	use	NA	NA
u109	2	8	0.435	NA	951228	push_mode	lower.1/2	use	NA	NA
u109	2	9	NA	16.8	951228	push_mode	subsegc	use	NA	NA
u109	2	9	NA	17.38	951228	push_mode	subsegc	use	NA	NA
u109	2	9	NA	17.91	951228	push_mode	subsegb	use	NA	NA
u109	2	9	NA	23.86	951228	push_mode	subsegb	use	NA	NA
u109	2	9	NA	37.02	951228	push_mode	subsega	use	NA	NA
u109	2	9	NA	38.33	951228	push_mode	subsega	use	NA	NA
u109	2	9	0.205	NA	951228	push_mode	subsegc	use	NA	NA
u109	2	9	0.206	NA	951228	push_mode	subsegc	use	NA	NA
u109	2	9	0.282	NA	951228	push_mode	subsegb	use	NA	NA
u109	2	9	0.34	NA	951228	push_mode	subsegb	use	NA	NA
u109	2	9	0.925	NA	951228	push_mode	subsega	use	NA	NA
u109	2	9	0.989	NA	951228	push_mode	subsega	use	NA	NA
u109	19	2	NA	15.85	960104	push_mode	total	use	NA	NA
u109	19	2	NA	19.64	960104	push_mode	total	use	NA	NA
u109	19	2	0.129	NA	960104	push_mode	total	use	NA	NA
u109	19	2	0.168	NA	960104	push_mode	total	use	NA	NA
u109	19	3	NA	41.08	960104	push_mode	total	use	NA	NA
u109	19	3	NA	42.89	960104	push_mode	total	use	NA	NA
u109	19	3	NA	53.03	960104	push_mode	total	use	NA	NA
u109	19	3	NA	53.37	960104	push_mode	total	use	NA	NA
u109	19	3	0.16601	NA	960104	push_mode	total	use	NA	NA
u109	19	3	0.16887	NA	960104	push_mode	total	use	NA	NA
u109	19	3	0.228	NA	960104	push_mode	total	use	NA	NA
u109	19	3	0.264	NA	960104	push_mode	total	use	NA	NA
u109	19	4	NA	10.33	960104	push_mode	total	use	NA	NA
u109	19	4	NA	11.69	960104	push_mode	total	use	NA	NA
u109	19	4	0.155	NA	960104	push_mode	total	use	NA	NA
u109	19	4	0.217	NA	960104	push_mode	total	use	NA	NA
u109	19	5	NA	19.66	960104	push_mode	lower.1/2	use	NA	NA
u109	19	5	NA	20.73	960104	push_mode	upper.1/2	use	NA	NA
u109	19	5	NA	23.16	960104	push_mode	lower.1/2	use	NA	NA
u109	19	5	NA	24.35	960104	push_mode	upper.1/2	use	NA	NA
u109	19	5	0.39	NA	960104	push_mode	upper.1/2	use	NA	NA
u109	19	5	0.411	NA	960104	push_mode	upper.1/2	use	NA	NA
u109	19	5	0.455	NA	960104	push_mode	lower.1/2	use	NA	NA
u109	19	5	0.46	NA	960104	push_mode	lower.1/2	use	NA	NA
u109	19	6	NA	26.65	960104	push_mode	upper.1/2	use	NA	NA
u109	19	6	NA	30.97	960104	push_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
u109	19	6	NA	35.57	960104	push_mode	lower.1/2	use	NA	NA
u109	19	6	NA	36.39	960104	push_mode	lower.1/2	use	NA	NA
u109	19	6	0.543	NA	960104	push_mode	upper.1/2	use	NA	NA
u109	19	6	0.59	NA	960104	push_mode	upper.1/2	use	NA	NA
u109	19	6	0.607	NA	960104	push_mode	lower.1/2	use	NA	NA
u109	19	6	0.627	NA	960104	push_mode	lower.1/2	use	NA	NA
u109	19	7	NA	15.78	960104	push_mode	upper.1/2	use	NA	NA
u109	19	7	NA	15.98	960104	push_mode	upper.1/2	use	NA	NA
u109	19	7	NA	17.25	960104	push_mode	lower.1/2	use	NA	NA
u109	19	7	NA	20.84	960104	push_mode	lower.1/2	use	NA	NA
u109	19	7	0.234	NA	960104	push_mode	lower.1/2	use	NA	NA
u109	19	7	0.271	NA	960104	push_mode	upper.1/2	use	NA	NA
u109	19	7	0.296	NA	960104	push_mode	lower.1/2	use	NA	NA
u109	19	7	0.359	NA	960104	push_mode	upper.1/2	use	NA	NA
u109	19	7	0.379	NA	960104	push_mode	upper.1/2	use	NA	NA
u109	19	8	NA	33.06	960104	push_mode	lower.1/2	use	NA	NA
u109	19	8	NA	34.01	960104	push_mode	upper.1/2	use	NA	NA
u109	19	8	NA	34.9	960104	push_mode	lower.1/2	use	NA	NA
u109	19	8	NA	35.18	960104	push_mode	upper.1/2	use	NA	NA
u109	19	8	0.401	NA	960104	push_mode	upper.1/2	use	NA	NA
u109	19	8	0.417	NA	960104	push_mode	upper.1/2	use	NA	NA
u109	19	8	0.544	NA	960104	push_mode	lower.1/2	use	NA	NA
u109	19	8	0.574	NA	960104	push_mode	lower.1/2	use	NA	NA
u109	19	9	NA	34.41	960104	push_mode	upper.1/2	use	NA	NA
u109	19	9	NA	35.87	960104	push_mode	upper.1/2	use	NA	NA
u109	19	9	NA	39.73	960104	push_mode	lower.1/2	use	NA	NA
u109	19	9	NA	44.54	960104	push_mode	lower.1/2	use	NA	NA
u109	19	9	NA	45.62	960104	push_mode	lower.1/2	use	NA	NA
u109	19	9	0.457	NA	960104	push_mode	upper.1/2	use	NA	NA
u109	19	9	0.493	NA	960104	push_mode	lower.1/2	use	NA	NA
u109	19	9	0.493	NA	960104	push_mode	lower.1/2	use	NA	NA
u109	19	9	0.547	NA	960104	push_mode	upper.1/2	use	NA	NA
u109	19	9	0.607	NA	960104	push_mode	lower.1/2	use	NA	NA
u109	7	1	NA	27.24	960119	push_mode	total	use	NA	NA
u109	7	1	NA	31.04	960119	push_mode	total	use	NA	NA
u109	7	1	NA	31.75	960119	push_mode	total	use	NA	NA
u109	7	1	0.487	NA	960119	push_mode	total	use	NA	NA
u109	7	1	0.505	NA	960119	push_mode	total	use	NA	NA
u109	7	2	NA	15.14	960119	push_mode	total	use	NA	NA
u109	7	2	NA	18.33	960119	push_mode	total	use	NA	NA
u109	7	2	NA	25.6	960119	push_mode	total	use	NA	NA
u109	7	2	0.251	NA	960119	push_mode	total	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
u109	7	2	0.267	NA	960119	push_mode	total	use	NA	NA
u109	7	3	NA	12.93	960119	push_mode	total	use	NA	NA
u109	7	3	NA	15.21	960119	push_mode	total	use	NA	NA
u109	7	3	0.266	NA	960119	push_mode	total	use	NA	NA
u109	7	3	0.271	NA	960119	push_mode	total	use	NA	NA
u109	7	4	NA	17.67	960119	push_mode	upper.1/2	use	NA	NA
u109	7	4	NA	19.72	960119	push_mode	upper.1/2	use	NA	NA
u109	7	4	NA	45.55	960119	push_mode	lower.1/2	use	NA	NA
u109	7	4	NA	47.87	960119	push_mode	lower.1/2	use	NA	NA
u109	7	4	0.261	NA	960119	push_mode	upper.1/2	use	NA	NA
u109	7	4	0.268	NA	960119	push_mode	upper.1/2	use	NA	NA
u109	7	4	0.59	NA	960119	push_mode	lower.1/2	use	NA	NA
u109	7	4	0.682	NA	960119	push_mode	lower.1/2	use	NA	NA
u109	7	5	NA	34.06	960119	push_mode	total	use	NA	NA
u109	7	5	NA	35.97	960119	push_mode	total	use	NA	NA
u109	7	5	0.427	NA	960119	push_mode	total	use	NA	NA
u109	7	5	0.446	NA	960119	push_mode	total	use	NA	NA
u109	7	6	NA	33.26	960119	push_mode	lower.1/2	use	NA	NA
u109	7	6	NA	33.37	960119	push_mode	lower.1/2	use	NA	NA
u109	7	6	NA	34.45	960119	push_mode	upper.1/2	use	NA	NA
u109	7	6	NA	35.4	960119	push_mode	upper.1/2	use	NA	NA
u109	7	6	0.514	NA	960119	push_mode	lower.1/2	use	NA	NA
u109	7	6	0.514	NA	960119	push_mode	upper.1/2	use	NA	NA
u109	7	6	0.516	NA	960119	push_mode	upper.1/2	use	NA	NA
u109	7	6	0.538	NA	960119	push_mode	lower.1/2	use	NA	NA
u109	7	7	NA	30.05	960119	push_mode	upper.1/2	use	NA	NA
u109	7	7	NA	39.18	960119	push_mode	lower.1/2	use	NA	NA
u109	7	7	NA	39.27	960119	push_mode	upper.1/2	use	NA	NA
u109	7	7	NA	41.96	960119	push_mode	lower.1/2	use	NA	NA
u109	7	7	0.421	NA	960119	push_mode	upper.1/2	use	NA	NA
u109	7	7	0.439	NA	960119	push_mode	upper.1/2	use	NA	NA
u109	7	7	0.574	NA	960119	push_mode	lower.1/2	use	NA	NA
u109	7	7	0.579	NA	960119	push_mode	lower.1/2	use	NA	NA
u109	7	8	NA	23.85	960119	push_mode	upper.1/2	use	NA	NA
u109	7	8	NA	24.26	960119	push_mode	upper.1/2	use	NA	NA
u109	7	8	NA	30.68	960119	push_mode	lower.1/2	use	NA	NA
u109	7	8	NA	31.35	960119	push_mode	lower.1/2	use	NA	NA
u109	7	8	0.335	NA	960119	push_mode	upper.1/2	use	NA	NA
u109	7	8	0.341	NA	960119	push_mode	upper.1/2	use	NA	NA
u109	7	8	0.482	NA	960119	push_mode	lower.1/2	use	NA	NA
u109	7	8	0.512	NA	960119	push_mode	lower.1/2	use	NA	NA
u109	7	9	NA	34.27	960119	push_mode	total	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
u109	7	9	NA	34.7	960119	push_mode	total	use	NA	NA
u109	7	9	0.351	NA	960119	push_mode	total	use	NA	NA
u109	7	9	0.385	NA	960119	push_mode	total	use	NA	NA
u110	na41	1	NA	4.16	NA	core	NA	use	NA	NA
u110	na42	1	0.074	NA	NA	core	NA	use	NA	NA
u110	na43	1	NA	3.08	NA	core	NA	use	NA	NA
u110	na44	1	0.0605	NA	NA	core	NA	use	NA	NA
u110	na35	1	NA	8.04	NA	core	NA	use	NA	NA
u110	na36	1	0.0828	NA	NA	core	NA	use	NA	NA
u110	na45	1	NA	8.73	NA	core	NA	use	NA	NA
u110	na46	1	0.0878	NA	NA	core	NA	use	NA	NA
u110	na37	1	NA	5.59	NA	core	NA	use	NA	NA
u110	na38	1	0.0494	NA	NA	core	NA	use	NA	NA
u110	na39	1	NA	4.75	NA	core	NA	use	NA	NA
u110	na40	1	0.0361	NA	NA	core	NA	use	NA	NA
u111	NA	NA	0.52	NA	NA	NA	NA	use.old	NA	NA
u111	NA	NA	0.54	NA	NA	NA	NA	use.old	NA	NA
u111	NA	NA	NA	39.12	NA	NA	NA	use.old	NA	NA
u111	na47	-4296	3.65	NA	800101	NA	supernate	del.sup	NA	NA
u201	6	1	NA	35.74	950317	push_mode	total	use	NA	NA
u201	6	1	NA	36.29	950317	push_mode	total	use	NA	NA
u201	6	1	NA	70.31	950317	push_mode	drainable	use	NA	NA
u201	6	1	NA	70.54	950317	push_mode	drainable	use	NA	NA
u201	6	2	NA	33.8	950317	push_mode	total	use	NA	NA
u201	6	2	NA	37.71	950317	push_mode	total	use	NA	NA
u201	6	2	NA	38.99	950317	push_mode	total	use	NA	NA
u201	6	2	NA	69.88	950317	push_mode	drainable	use	NA	NA
u201	6	2	NA	70.26	950317	push_mode	drainable	use	NA	NA
u202	2	1	NA	25.49	950322	push_mode	total	use	NA	NA
u202	2	1	NA	26.24	950322	push_mode	total	use	NA	NA
u202	2	1	NA	72.6	950322	push_mode	drainable	use	NA	NA
u202	2	1	NA	73.24	950322	push_mode	drainable	use	NA	NA
u202	2	2	NA	22.87	950322	push_mode	upper.1/2	use	NA	NA
u202	2	2	NA	22.9	950322	push_mode	upper.1/2	use	NA	NA
u202	2	2	NA	36.88	950322	push_mode	lower.1/2	use	NA	NA
u202	2	2	NA	38.71	950322	push_mode	lower.1/2	use	NA	NA
u202	2	2	NA	43.64	950322	push_mode	lower.1/2	use	NA	NA
u202	2	2	NA	72.23	950322	push_mode	drainable	use	NA	NA
u202	2	2	NA	73.29	950322	push_mode	drainable	use	NA	NA
u202	2	1	NA	18.9	950322	push_mode	lower.1/2	use	NA	NA
u202	2	1	NA	19.27	950322	push_mode	lower.1/2	use	NA	NA
u202	2	1	NA	22.24	950322	push_mode	upper.1/2	use	NA	NA

Table F-8. All Available Water and Total Organic Carbon Data for the SSTs.

Tank	Riser	Seg	TOC (wt%)	Water (wt%)	Date	Method	Subdivision	Status	Solid Frac	Liquid Fract
u202	2	1	NA	24.11	950322	push_mode	lower.1/2	use	NA	NA
u202	2	1	NA	24.45	950322	push_mode	upper.1/2	use	NA	NA
u202	2	1	NA	73.42	950322	push_mode	drainable	use	NA	NA
u202	2	1	NA	73.6	950322	push_mode	drainable	use	NA	NA
u202	2	2	NA	23.96	950322	push_mode	upper.1/2	use	NA	NA
u202	2	2	NA	24.43	950322	push_mode	upper.1/2	use	NA	NA
u202	2	2	NA	34.8	950322	push_mode	lower.1/2	use	NA	NA
u202	2	2	NA	36.24	950322	push_mode	lower.1/2	use	NA	NA
u202	2	2	NA	41.5	950322	push_mode	lower.1/2	use	NA	NA
u202	2	2	NA	72.23	950322	push_mode	drainable	use	NA	NA
u202	2	2	NA	72.27	950322	push_mode	drainable	use	NA	NA
u203	6	1	NA	22.94	950403	push_mode	upper.1/2	use	NA	NA
u203	6	1	NA	24.5	950403	push_mode	upper.1/2	use	NA	NA
u203	6	1	NA	31.51	950403	push_mode	lower.1/2	use	NA	NA
u203	6	1	NA	33.25	950403	push_mode	lower.1/2	use	NA	NA
u204	2	1	NA	29.12	950405	push_mode	upper.1/2	use	NA	NA
u204	2	1	NA	29.56	950405	push_mode	upper.1/2	use	NA	NA
u204	2	1	NA	86.46	950405	push_mode	drainable	use	NA	NA
u204	2	1	NA	86.89	950405	push_mode	drainable	use	NA	NA
u204	2	1	0.0807	NA	950405	push_mode	upper.1/2	use	NA	NA
u204	2	1	0.0823	NA	950405	push_mode	upper.1/2	use	NA	NA
u204	2	1	0.007	NA	950405	push_mode	drainable	use.new	NA	NA
u204	2	1	0.0056	NA	950405	push_mode	drainable	use.new	NA	NA
u204	6	1	NA	21.84	950405	push_mode	upper.1/2	use	NA	NA
u204	6	1	NA	24.18	950405	push_mode	upper.1/2	use	NA	NA
u204	6	1	NA	86.18	950405	push_mode	drainable	use	NA	NA
u204	6	1	NA	87.18	950405	push_mode	drainable	use	NA	NA
u204	6	1	0.012	NA	950405	push_mode	upper.1/2	use	NA	NA
u204	6	1	0.0128	NA	950405	push_mode	upper.1/2	use	NA	NA
u204	6	1	0.0062	NA	950405	push_mode	drainable	use.new	NA	NA
u204	6	1	0.0062	NA	950405	push_mode	drainable	use.new	NA	NA

7.0 REFERENCES

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APPENDIX G

CALCULATION NOTES FOR ACCIDENT FREQUENCY

This Appendix estimates the accident frequency for the organic complexant hazard at the Hanford Site. Four events must happen simultaneously for an organic complexant combustion event to occur: (1) there must be combustible (high fuel and low water) waste; (2) an ignition source must be present; (3) the ignition source must contact the fraction of waste that is combustible; and (4) the ignitor must successfully initiate propagation once in contact with the combustible waste. Accident frequencies are based on "order-of-magnitude" estimates obtained from the best available information and informed engineering judgement. Estimates are made for both unmitigated and mitigated conditions.

1.0 POSTULATED NUMBER OF AT RISK (*UNSAFE*) TANKS

None of the tanks evaluated to date are at risk (*unsafe*) tanks, and extrapolation of the results thus far to the indeterminate tanks suggests that no tanks will be categorized as *unsafe*. Historical records of processing and waste transfers (Agnew 1996) also suggest none of the indeterminate tanks would be categorized as *unsafe*. However, additional work is still required to ensure that the bounding (worst case) tanks have been sampled and analyzed.

A bounding estimate of the number of tanks at risk can be made using simple statistics (Dixon and Massey 1957). There are 149 single-shell tanks, and 87 of these tanks have been evaluated and do not pose a point source ignition hazard. Because 87 of the 149 are not at risk, at 95% confidence, no more than four of the remaining 62 tanks should be at risk. This estimate is believed to be conservative, however, uncertainties about the waste character in the indeterminate tanks suggest that this conservatism is prudent. Therefore, the number of tanks that are vulnerable is taken to be four for the purpose of risk calculations.

2.0 IGNITION SOURCE FREQUENCIES

2.1 FREQUENCY OF HOT FILAMENTS

Video and still cameras are periodically placed into waste storage tanks to photograph the waste or internal structures in the tanks. The camera and lights represent potential sources of electrical and thermal energy that could apply enough energy to the waste surface to initiate an organic-nitrate combustion. The cameras and lights are typically placed in the tank through a riser and are suspended above the waste surface.

Three possible mechanisms were postulated that result in the camera or light contacting the waste surface: (1) the light impacts against the riser or other installed equipment during installation, the housing breaks, the bulb breaks and a hot filament from the light source falls onto the waste surface; (2) the structural support for the camera or light fails, the light falls to the waste surface breaking the housing and the bulb, the hot filament drops to the waste surface; and (3) the power cable to the camera or light fails, falls onto the waste surface, and electrical shorts create hot molten metal or arcs which contact the waste surface. All three are judged to be unlikely events with a frequency of about 1.0 E-3 $tank^{-1}$ $year^{-1}$ (Bajwa and Farley 1994).

The frequency of these scenarios can be reduced by: (1) de-energizing the lights and camera during installation or using an impact resistant housing for the light, (2) using a light support system that can not fall through the riser (e.g., use a "top hat" which seats against the riser flange), (3) limit the length of the power cables so that they can not extend to the waste surface and still be energized. Administrative controls would bring the estimated event frequency down by about 1.0 E-2 (Swain and Guttmann 1983); therefore, the mitigated frequency would be extremely unlikely or about 1.0 E-5 $tank^{-1}$ $year^{-1}$.

2.2 FREQUENCY OF WELDING AND TORCH CUTTING

Occasionally, tank farm operators are required to weld or cut material on or near a riser. This introduces an opportunity to allow welding slag or hot metal pieces to enter the tank, thereby creating the conditions necessary to initiate an organic-nitrate combustion. Three conditions must be met for weld slag or hot metal to enter a riser and contact the waste surface. First, the riser must be open. Second, weld slag or hot metal must be directed towards the open riser, although the riser cover is assumed to be ineffective in stopping hot material created when working directly on the riser. Third, the slag or hot metal must be large enough that it will not cool down to below the ignition energy requirement as it falls to the waste surface 6 to 12 meters below. The unmitigated scenario is judged to be at the borderline between anticipated and unlikely (1.0 E-2 $tank^{-1}$ $year^{-1}$) (Bajwa and Farley 1994).

The frequency of welding slag or hot metal reaching the waste surface can be reduced by restricting welding activities such that (1) welding is not performed near an open riser or pit drain, and (2) welding that must be performed directly on a riser has a barrier installed to prevent slag and hot metal from falling to the waste surface. Administrative controls would decrease the estimated frequency by about 1.0 E-2 (Swain and Guttmann 1983), bringing the mitigated frequency down to the high side of unlikely, 1.0 E-4 $tank^{-1}$ $year^{-1}$.

2.3 FREQUENCY OF VEHICLE FUEL FIRES

Vehicles often enter the tank farms for various support activities. Although perimeter roads around the tanks exist, trucks may need to drive over the top of a tank for a variety of reasons (access to risers, pump pits, etc.). This introduces an opportunity for vehicle accidents and, of most concern, fuel leaks and subsequent fires.

The accident scenario examined here involves the following sequence of events. First, a vehicle backs into or strikes a riser. This causes the fuel tank to rupture, resulting in a fuel spill into the riser (either the riser fails or is uncovered, allowing fuel to enter the tank). Next, the fuel is assumed to ignite and the burning fuel enters the riser. Finally, the burning fuel ignites the organic-nitrate waste. The frequencies and conditional probabilities of these events are evaluated below.

The frequency of vehicular accidents resulting in fuel tank ruptures was evaluated based on two off normal (ON) reports in two subsequent years as described below.

- ON #WHC-TANKFARM-1992-29 -- In this event a drywell monitoring van backed over a riser at 104-SX and punctured its gas tank. Two gallons of gas spilled onto the ground and five more gallons were caught in a bucket while spilling. It is important to note that the driver did a 360 degree walk-around prior to backing up and noticed the riser, but still hit the riser anyway. The riser was not opened in the accident.

- ON #WHC-TANKFARM-1993-76 -- In this event, a drywell monitoring vehicle backed into a riser at 108-S. A pinhole leak in the vehicle's gas tank resulted, but the riser was not opened in the accident.

Frequencies for vehicle accidents that could cause fuel fires in SSTs were evaluated in Lindberg (1996). Two possible scenarios were considered in assessing the safety of the waste tanks with respect to fuel spills from vehicles. The first scenario modeled accounted for a leak from a ruptured fuel tank due to an accident. The accident also breaks a riser that enters the waste tank, allowing an opening in the top of the waste tank. The fuel leaking from the fuel tank enters the waste tank through the broken riser. The fuel vapor in the waste tank then builds to the lower flammability limit and is ignited by an ignition source in the tank. This ignition results in a rapid burn or deflagration. The second scenario describes a leak from the vehicle similar to that described above, except that the leaking fuel would ignite due to a source of sparks from the accident or contact with hot elements of the vehicle's engine or exhaust system. The burning fuel would enter the waste tank through the broken riser and ignite the contents of the tank.

An event tree analysis for this scenario in SSTs indicated the frequency of a gasoline fire in any of the single-shell tanks (the sum of vapor phase fires and gasoline pool fires for the SSTs) was 3.5 E-4 $year^{-1}$ (Lindberg 1996). A per-tank unmitigated estimate is this number divided by 149 SSTs or 2.3E-6 $tank^{-1}$ $year^{-1}$.

The frequency of these condensed-phase organic combustion events can be reduced by following vehicle access controls including:

- Protecting the fuel tanks (e.g., skid plates)

- Using a spotter to reduce the likelihood of running the vehicle into the riser

- Placing barriers around risers to prevent vehicle approach

With increased administrative controls, the mitigated frequency for vehicle fuel fires is 5.2 E-6 $tank^{-1}$ $year^{-1}$ (Linberg 1996). A per-tank unmitigated estimate is this number divided by 149 SSTs or 3.5 E-8 $tank^{-1}$ $year^{-1}$.

2.5 FREQUENCY OF LIGHTNING

Thunderstorms can produce lightning strikes that discharge the electrical potential between the atmosphere and the ground. Although rare, ash fall, range fires, and dust storms can also produce lightning. Lightning strikes at the tank farms are a safety concern because they could cause an in-tank ignition of flammable gases, or a fire involving organic solvents or organic nitrates. In addition, lightning strikes may cause the conduction of large electrical currents through systems, structures or components important to safety, putting personnel and operations at risk. Operational records report no incidence of lightning strikes on a tank riser or appurtenance during the 50-year history of the Hanford Site, whereas a number of lightning strikes have hit 200 Area structures, power poles, and transformers.

Recent research on mitigation of natural phenomena hazards has led to a better focus of the issues surrounding lightning at the tank farms as reported in Zach (1996). The report discusses a number of factors necessary for a fire to result from a lightning strike including the following:

- Lightning must strike a tank riser, appurtenance, or the ground in the immediate vicinity of a tank farm.
- At the time of the strike, the tank must contain a flammable gas above the lower flammability limit (LFL) or a concentration of organic nitrate sufficient to support combustion.
- The discharge must pass from the riser or appurtenance into the tank through conduction paths such as instrumentation lines or other equipment connected to the tank riser or by arcing across non-conductive segments.
- The discharge must have sufficient energy to create an arc or cause ohmic heating to temperatures high enough to ignite the materials.

As discussed below, analyses of these factors resulted in a determination that significant waste heating as a result of a lightning strike is an extremely unlikely event for a given tank.

A number of studies have been performed to assess the likelihood of lightning striking the ground or facilities at the Hanford Site. The most appropriate methodology for determining lightning frequency is to use data from the National Lightning Detection Network and the Bureau of Land Management for the region around the tank farms. This was done for the ten years ending in January 1996. After accounting for detection frequency and uncertainties, the observed rate was conservatively determined to be 0.06 strikes $year^{-1}$ km^{-2} (Zach 1996).

Assuming lightning strikes the vicinity of a tank farm, the outcome is uncertain. Because the tanks are interconnected with instrument, ventilation, and transfer lines, the entire farm may act as a grounding electrode. However, for those strikes that are not direct on a riser (e.g., a ventilation duct), the energy would be dispersed throughout the farm and it is incredible that a path would exist to the waste that would carry sufficient energy to cause an organic combustion. To ignite organic waste forms, an electrical arc must occur in or near combustible materials. For SSTs, the path of the electrical currents depends on factors such as whether the riser is grounded (to rebar in the dome or to the earth), and whether the riser has conductive equipment reaching to or near the waste surface.

For the ignition of organic nitrates in tanks, the lightning must strike a tank that can sustain an organics fire. Using the observed 0.06 strikes/yr/km^2 as a best estimate of lightning strike frequency, and considering the cross-sectional area of a large underground tank to be bounded by 500 m^2, the likelihood of a direct strike over a particular tank is 3 x 10^{-5}/yr (one strike in 33,000 yr) and can be characterized as extremely unlikely. This value is considered appropriate for use as a condensed phase organic combustion initiator where a comparatively high energy is required to ignite the material. The value may be conservative for the following reasons:

- The average strike frequency in the tank farms is less than 0.06 strikes/yr/km^2 because the study area included higher elevations where observed frequencies were higher than the immediate vicinity of the tank farms.

- It is assumed that a strike anywhere over a tank will hit a riser or appurtenance, and there are no other nearby preferential paths such as light poles that could dissipate the energy outside of the tank wastes.

- The equivalent target area of the zone immediately around the riser of a typical tank is less than 50 m^2 or one tenth the tank area. Strikes outside the 50 m^2 may dissipate without causing an ignition.

A direct strike over a particular tank is conservatively assessed as extremely unlikely, and the unmitigated frequency is 2.8 E-5 $tank^{-1}$ $year^{-1}$ (Zach 1996).

Lightning mitigation activities are currently be performed in the Tank Farms. These prudent engineered control measures include grounding and bounding of all the tank risers, and installation of air terminals and grounding rods on all the light poles surrounding the Tank Farms. However, it is difficult to quantify the effect of these mitigative measures, and the mitigated frequency of a lightning strike on a tank is conservatively taken to be the same as the unmitigated frequency, 2.8 E-5 $tank^{-1}$ $year^{-1}$.

2.6 FLAMMABLE GAS DEFLAGRATIONS

A postulated scenario for organic-nitrate ignition is a flammable gas deflagration that heats the waste to ignition temperatures. Two potential mechanisms for ignition of flammable gas followed by ignition of organic-nitrate salts were investigated. The first involves the release and ignition of the flammable gas by various spontaneous or operational waste disturbing mechanisms. The second involves a seismic event, rotary mode core sampling (RMCS) or salt well pumping, which results in liberation of flammable gases plus an ignition source for the gases. Not all flammable gas burns would deliver enough energy to the waste surface to initiate an organic-nitrate reaction. Preliminary calculations of the likelihood of saltcake being ignited by a flammable gas burn were performed to support this study. It was determined that a threshold gas temperature for this event (headspace temperature) is about 1400°K (1130°C) (Plys 1996). Very few flammable gas burns would be expected to produce 1130 °C at the waste surface. It is highly unlikely that the tank suffering the flammable gas burn would also contain dry reactive waste.

No scenario has been postulated for such a large gas release, where a relatively dry waste surface (i.e., potentially combustible and ignitable) could exist following the release. Scenarios that allow for a large amount of gas bearing, wet waste to release its gas (e.g., rollovers, and seismic events) are not consistent with a dry post-gas release event waste surface. Therefore, it is judged that a flammable gas induced condensed phase organic propagating reaction is significantly less likely than a large flammable gas deflagration itself. Therefore such a scenario is judged to have a frequency of no more than extremely unlikely, and is not a significant factor in establishing the frequency of condensed phase organic propagating reactions. However, controls that have been imposed to address flammable gas hazards (Leach and Grigsby 1996), and those that will be proposed for technical safety requirements (TSRs) are also effective in reducing the risk of flammable gas induced condensed phase organic combustion events.

RMCS accidents leading to flammable gas fires are evaluated in Pasamehmetoglu (1996). Salt well pumping accidents leading to flammable gas fires are discussed in Meader (1996)

3.0 IGNITION SOURCE CONTACT WITH COMBUSTIBLE WASTE

All ignitors described for this accident have access to the surface of the waste. Only lightning and rotary core drilling (which is discussed in Kubic 1996) would have access to the waste below the surface. The probability that an ignition source comes in contact with the fraction of waste that is combustible is a function of how much combustible waste is present in a tank, and the area covered by the postulated ignition source. The hot light filament, welding slag, and hot metal object from torch cutting would only heat a very localized area of waste to ignition temperatures. Lightning strikes might contact more tank waste area, however, there are several mitigating factors:

- The SSTs are underground and the tank geometry must be such that a spark gap (for electrical arcing) exists between the object conducting lightning and the reactive waste (which would most likely be drier and less electrically conductive); and

- Most of the energy would preferentially dissipate through the comparatively conductive concrete and rebar.

From the analysis of variance model in Appendix F, the maximum postulated fraction of combustible waste (at 95% confidence) for the indeterminate tanks 1.2 E-2 (for Tank TX-104). Therefore, the frequency that point sources such as hot filaments, welding slag, hot metal from torching, and lightning contact this waste (for all at risk tanks) is taken to be equal to this fraction, i.e., 1.2 E-2. Because vehicle fuel fires could spread out over a significant area (but would only occur at the surface), the frequency of ignition source contact is taken to be an order of magnitude higher, 1.2 E-1.

4.0 IGNITOR SUCCESS

Hot filaments or hot metal ignition sources (from welding or torch cutting operations) would cool as they fell to the waste surface 6 to 12 meters below, reducing the frequency of ignitor success. Ignition tests also show that about 5 wt% moisture suppresses ignition of an organic-nitrate combustion (see Section 3.2.2 in main text). Experiments with waste simulants and actual waste samples indicate that about 8 wt% moisture would be retained even if the waste were exposed to dry Hanford Site air (Scheele et al. 1996, 1997). Therefore, the frequency of ignitor success is estimated to be 1.0 E-1 for hot filaments, welding, and torch cutting.

A gasoline spill could only enter through a riser and would burn on the waste surface. As a result, most of the heat from a gasoline burn is generated above the liquid pool and only a relatively small fraction of the thermal energy is directed towards the liquid pool. Therefore, there is some question about whether or not the temperature rise in the pool would exceed the ignition temperature for an organic-nitrate combustion. Without detailed modeling of the gasoline fire and spill volumes, it is difficult to predict the severity of the gasoline fire and subsequent thermal input to the waste surface, and the frequency of ignitor success is taken to be unity.

An electrical arc resulting from a lightning strike would still contain considerable energy even after passing through the tank structure. Therefore, the frequency of ignitor success is taken to be unity for lightning.

5.0 ESTIMATED ACCIDENT FREQUENCY

To calculate accident frequency, the number of vulnerable tanks, frequency of ignition sources, frequency of ignition source contact, and frequency of ignitor success must be multiplied and summed for all the events identified in this Appendix. For the unmitigated scenario, the accident frequency is the following:

Hot Filament:	(4 tanks) (1.0 E-3 $tank^{-1}$ $year^{-1}$) (1.2 E-2) (1.0 E-1)	=	4.8 E-6 $year^{-1}$
Welding/Torching:	(4 tanks) (1.0 E-2 $tank^{-1}$ $year^{-1}$) (1.2 E-2) (1.0 E-1)	=	4.8 E-5 $year^{-1}$
Vehicle Fuel Fire:	(4 tanks) (2.3 E-6 $tank^{-1}$ $year^{-1}$) (1.2 E-1) (1.0)	=	1.1 E-6 $year^{-1}$
Lightning Strike:	(4 tanks) (2.8 E-5 $tank^{-1}$ $year^{-1}$) (1.2 E-2) (1.0)	=	1.3 E-6 $year^{-1}$
	Facility Wide Accident Frequency (unmitigated)	=	5.5 E-5 $year^{-1}$

For the mitigated scenario, the accident frequency is the following:

Hot Filament:	(4 tanks) (1.0 E-5 $tank^{-1}$ $year^{-1}$) (1.2 E-2) (1.0 E-1)	=	4.8 E-8 $year^{-1}$
Welding/Torching:	(4 tanks) (1.0 E-4 $tank^{-1}$ $year^{-1}$) (1.2 E-2) (1.0 E-1)	=	4.8 E-7 $year^{-1}$
Vehicle Fuel Fire:	(4 tanks) (3.5 E-8 $tank^{-1}$ $year^{-1}$) (1.2 E-1) (1.0)	=	1.7 E-8 $year^{-1}$
Lightning Strike:	(4 tanks) (2.8 E-5 $tank^{-1}$ $year^{-1}$) (1.2 E-2) (1.0)	=	1.3 E-6 $year^{-1}$
	Facility Wide Accident Frequency (mitigated)	=	1.8 E-6 $year^{-1}$

The facility wide unmitigated accident frequency is judged to be extremely unlikely (5.5 E-5 $year^{-1}$) and the mitigated accident frequency is judged to be extremely unlikely (1.8 E-6 $year^{-1}$).

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APPENDIX H

CALCULATION NOTES FOR ACCIDENT CONSEQUENCES

1.0 OBJECTIVE

This package summarizes accident calculations performed to determine the consequences of burning bounding quantities of combustible waste for two cases: a 50% estimate of combustible waste fraction and a 95% estimate of combustible waste fraction. Tank SX-106 combustible waste quantities were estimated to be highest for unmeasured tanks using ANOVA (Appendix F), so SX-106 was used for the bounding accident analysis cases. A transient analysis which evaluates the combustion event and calculates release of radionuclides and toxic materials from the tank was performed with the computer program ORNATE (Plys, 1996). Based on these releases, the onsite and offsite radiological and toxicological dose consequences as a function of amount of waste burned were calculated for both the best estimate and worst case combustible waste fractions.

2.0 RELEASES OF RADIONUCLIDES AND TOXIC CHEMICALS

The key results from ORNATE calculations (which are required inputs for the radiological and toxicological consequences of the accident) include the release fractions and release rates of significant radionuclides and toxic chemicals. The release of sodium hydroxide, which is classified as a corrosive substance is also calculated. The release fractions of the principal combustion products are provided in Table H-1.

Tables H-2 and H-3 present the peak release rates for all of the tracked combustion products, while Table H-4 provides the appropriate time averaged values of the peaks.

Table H-1 Release Fractions for Tank SX-106

Analyte	Release Fraction (0.0091 m^3 Burned.)	Release Fraction (12.38 m^3 Burned.)
Cs-137	1.1E-08	1.9E-03
Sr-90	5.1E-16	8.4E-11
Y-90	1.6E-17	2.8E-12
Co-60	5.2E-16	8.7E-11
Tc-99	1.7E-15	2.8E-10
Sb-125	1.2E-09	1.9E-04
Eu-154	1.2E-10	2.1E-05
Pu-239	1.8E-17	3.0E-12
Cd	3.9E-12	6.7E-7
Hg	3.1E-8	5.1E-3
NaOH	7.1E-12	1.2E-06

Table H -2 Peak Instantaneous Release Rates for Principle Combustion Products, 50th Percentile of Waste Burned (0.009 $m^{3)}$

Chemical Element	Peak Release Rate (kg/sec)	Time Peak Occurs (Sec)
Na	1.50E-08	222.5
Cs	5.30E-09	222.5
Sr	3.90E-15	222.5
Co	1.70E-19	222.5
Tc	2.80E-21	222.5
Sb	1.60E-13	222.5
Pu	7.80E-17	222.5
Eu	3.50E-12	222.5
Y	3.70E-20	222.5
Ru	2.10E-18	222.5
Cd	1.50E-10	222.5
Hg	2.80E-05	222.5

Table H -3 Peak Instantaneous Release Rates for Principle Combustion Products, 95th Percentile of Waste Burned (12.4 m^3)

Chemical Element	Peak Release Rate (kg/sec)	Time Peak Occurs (sec)
Na	4.30E-04	2347.5 (~39 min)
Cs	1.60E-04	2347.5
Sr	1.10E-10	2347.5
Co	5.10E-15	2347.5
Tc	8.10E-17	2347.5
Sb	4.70E-09	2347.5
Pu	2.30E-12	2347.5
Eu	1.00E-07	2347.5
Y	1.10E-15	2347.5
Ru	6.30E-14	2347.5
Cd	4.50E-06	2347.5
Hg	8.40E-01	2347.5

Table H-4 Peak Interval Time Averaged Release Rates

Constituent	50th Percentile Rate (kg/sec) 6 min Peak Average	95th Percentile Rate (kg/sec) 15 min Peak Average
NaOH	8.35E-09	4.85E-04
Cd	4.96E-11	2.89E-06
Hg	9.34E-06	5.42E-01

3.0 DOSE CONSEQUENCES CALCULATIONS

3.1 DOSE CALCULATION METHODOLOGY

Radiological and toxicological dose calculations were performed according to standard methods based upon the quantities of released radionuclides and toxicological chemicals. These methods are briefly described below.

3.1.1 Radiological Dose Calculation Process

The dose to an onsite or offsite receptor for an isotope is given by the equation:

$$Dose = \frac{X}{Q} * BR * V * (RF_i * Q_i * DCF_i) * 1000 \frac{L}{m^3} * 1000 \frac{mSv}{Sv} \quad \text{(H-1)}$$

where,

X/Q = atmospheric dispersion coefficient (0.0341 s/m^3 for the onsite receptor; 2.83E-05 s/m^3 for the offsite receptor). These X/Q values are calculated for the tank farm areas relative to the site boundary, now taken as the Columbia River to the north of the tank farms.

BR = breathing rate (3.3E-04 m^3/s),

V = volume of waste in tank (m^3),

Rf_i = Release fraction for i^{th} isotope,

Q_i = Activity concentration for i^{th} isotope in Bq/L based on the bounding tank source term for all SST solids,

DCF_i = dose conversion factor for i^{th} isotope (Sv/Bq).

3.1.2 Toxicological Exposure Calculation Process

A method of comparison to guidelines for individual toxic chemicals is given by the equation:

$$FC = MRR * \frac{X}{Q} * \frac{10^6}{ERPG} \quad \text{(H-2)}$$

where,

FC = Fraction of risk acceptance guideline (dimensionless)

RR = rate of material being released from tank (kg/s)

X/Q = atmospheric dispersion coefficient (s/m^3)

ERPG = Emergency Response Planning Guideline (mg/m^3)

The 10^6 is a unit conversion (mg/kg).

Each toxic chemical has three ERPGs: ERPG-1, ERPG-2 and ERPG-3; plus a fourth limit PEL-TWA. The limit used depends on the frequency class of the receptor and the whether the onsite or offsite receptor is being considered. ERPG-1 is a level at which most people will experience no permanent effects, exceeding ERPG-2 can result in permanent damage, and exceeding ERPG-3 can result in life threatening effects.

The toxic evaluation added the sum of the concentration of toxics (cadmium-Cd and mercury-Hg) to the corrosive (sodium hydroxide-NaOH) divided by the appropriate limits. The procedure requires that the largest sum of fractions in each of the three categories corresponding to accident frequencies be examined. If the largest sum of fractions is less than 1, the Risk Guidelines are met. The appropriate toxicological limits for each frequency category are provided in Table H-5 :

Table H-5. Evaluation Guideline Limits for Accident Frequency Categories

Accident Frequency	Onsite	Offsite
ANTICIPATED (10^{-2} to 10^{0} per year)	ERPG-1	PEL-TWA
UNLIKELY (10^{-4} to 10^{-2} per year)	ERPG-2	ERPG-1
EXTREMELY UNLIKELY (10^{-6} to 10^{-4} per year)	ERPG-3	ERPG-2

3.2 DOSE CALCULATION ASSUMPTIONS

Two reference cases were analyzed for consequences. A best estimate (or 50th percentile) reference case was based upon analyzing 0.0091 m^3 of reacting waste in tank SX-106. A "worst" bounding case (or 95th percentile) was based upon analyzing 12.4 m^3 of reacting waste in tank SX-106 as the second case. Both reference cases specify the average TOC and moisture of the reacting waste as 7.9 wt % TOC and 20 wt% H_2O based upon ANOVA computations (Appendix E). SX-106 contains 2036 m^3 of total waste and has a headspace volume of 2795 m^3.

(1) The respirable fraction is the fraction of the material which is released that is in the respirable range. Because this material is formed as a vapor at temperature and will eventually condense to form aerosols as it leaves the tank, or shortly thereafter, it is expected that a majority of the material will be in the respirable particle size range. For the purposes of this dose calculation, the respirable fraction is taken as 1.0. That is, it is assumed that all of the radionuclides of interest reach the maximum exposed individual as respirable particles.

(2) The doses given are based on an onsite receptor X/Q of 0.0341 s/m^3 and an offsite receptor X/Q of 2.83E-05 s/m^3 (Cowley 1996b). Values are given for bounding conditions (99.5% meteorology). These X/Q values are calculated for the tank farm areas relative to the nearest boundary, now taken as the Columbia River to the north of the tank farms.

(3) The assumed breathing rate of the exposed individual is 3.3E-04 m^3/s.

3.3 DOSE CALCULATION INPUT DATA

The release fractions for toxic and radiological species were summarized in Table H-1. It should be noted that the release fraction is based on the inventory of each specie in the total waste volume, not on the reacted portion of the waste.

Bounding radionuclide and toxic concentrations were assumed for SX-106 (Tables H-6 and H-7, respectively). The radionuclide concentrations are from Cowley (1996a), and the toxic concentrations are from Van Keuren (1996).

Table H-6. Bounding Radionuclide Concentrations and Conversion Factors.

Isotope	Dose Conversion Factor (Sv/Bq)	Concentration (Bq/L)	Sv/L
Cs-137	8.63E-09	1.01E+11	8.72E+02
Sr-90	6.47E-08	1.63E+12	1.05E+05
Y-90	2.28E-09	1.63E+12	3.72E+03
Co-60	5.91E-08	4.18E+08	2.47E+01
Tc-99	2.25E-09	1.20E+10	2.70E+01
Sb-125	3.30E-09	2.80E+08	9.24E-01
Eu-154	7.73E-08	5.75E+09	4.44E+02
Pu-239	1.16E-04	4.40E+08	5.10E+04

Table H-7. Bounding Toxic Concentrations.

Analyte	Concentration (g/L)
Cadmium	1.7
Mercury	54
Sodium Hydroxide	210

Additional dose from HEPA failure (Cowley 1996a):

Onsite	15 mSv
Offsite	0.013 mSv

The doses calculated are based on an onsite receptor X/Q of 0.0341 s/m3 and an offsite receptor X/Q of 2.83E-05 s/m^3 (Cowley 1996b). Values are given for bounding conditions (99.5% meteorology). These X/Q values are calculated for the tank farm areas relative to the nearest boundary, now taken as the Columbia River to the north of the tank farms.

3.4 DOSE CONSEQUENCE CALCULATIONS

An example radiological dose calculation follows for Cs-137 (the dominant radiological dose contribution) follows:

The dose contribution for Cs-137 in Tank SX-106 is calculated to be:

Dose = TWV * X/Q * BR * RF * Qi * DCF * 10^3 * 10^3

TWV = 2036 m^3 (total volume of waste in the tank)
X/Q = 0.034 s/m^3 (onsite atmospheric dispersion)
BR = 3.3 E-04 m^3/s (standard breathing rate)
RF = 1.9E-03 (release fraction for burning 12.38 m^3 of combustible waste)
Qi = 1.01 E+11 Bq/L (bounding concentration of Cs-137 in SST solids)
DCF = 8.63 E-09 Sv/Bq (dose conversion factor for Cs-137)

Dose = 2036 m^3 x 0.034 s/m^3 x 3.3 E-04 m^3/s x 1.9E-03 x 1.01 E+11 Bq/L x 8.63 E-09 Sv/Bq x 1000 L/m^3 x 1000 mSv/Sv

Dose = 3.78E+04 mSv (dose contribution of Cs-137 for Tank SX-106.)

This identical calculation is performed for each of the other 7 isotopes of interest. The contributions are then summed to produce an onsite dose of 3.8E+04 mSv for burning 12.4 m^3 of combustible waste in SX-106.

The offsite calculation is performed the same way, except that the atmospheric dispersion coefficient (X/Q) used is 2.83E-05 s/m^3. The dose due to the Cs-137 is shown to dominate the results, as has been shown in previous reports and dose calculations.

The dose contributions from the HEPA filter blowout are then added to the inhalation/dispersion dose calculated in the second (12.4 m^3 combustible waste) case. The HEPA filter is not calculated to fail for the first reference case (0.0091 m^3 of waste burned). The HEPA filter is calculated to fail for the second reference case (12.4 m^3 of waste burned). The additional dose due to the HEPA blowout has been estimated (Cowley 1996a) to be 15 mSv onsite and 0.013 mSv offsite. Internal pressures and temperatures in the dome for the second reference case are not expected to cause a dome collapse, and therefore, no additional dose was computed for such a collapse. The summary columns in the Summary Table 3-4 indicate dose due to dispersion/inhalation only and combined dispersion/inhalation dose plus mechanical HEPA filter failure dose adder for the second case.

For toxicological doses, a sample calculation is given below for mercury (Hg):

$$FC = MRR * \frac{X}{Q} * \frac{10^6}{ERPG} \qquad \text{(H-2)}$$

FC (Hg) = 0.542 * 3.41E-02 * 10^6 / 7.5E-02 = 246,429 for 12.38 m^3, onsite, compared to ERPG-1

Summing up the toxics of concern, mercury dominates the other species; i.e.,

$$0.49 + 8.27 + 246429 = 246{,}438$$

$$Cd + NaOH + Hg = \text{for the total toxic and corrosives dose result.}$$

This dose result is seen to be far above the acceptance criterion of unity (1), and therefore the toxic dose from this event would far exceed evaluation limits. The total is equal to the mercury dose contribution, for practical purposes. The fallout of mercury particles from the atmosphere was not computed. Actual fallout would probably lower this value by about two orders of magnitude, but the limit would still be exceeded by a factor of more than 2,000 times.

3.5 DOSE CONSEQUENCE RESULTS

The pertinent summary dose consequences are summarized in Tables H-8 and H-9. The peak headspace pressures (about 1 kPa overpressure) are only about 10% of HEPA failure pressures, and therefore no HEPA adder dose is appropriate in Table H-8 for the first reference case (0.009 m^3 combustible waste burned). HEPA adder dose is appropriate for the second case but the HEPA adder is overwhelmed by the much larger combustion release doses.

Table H-8. Summary of Radiological Dose Consequences for Tank SX-106.

Combustible Waste Volume (m^3)	Radiological Dose: Dispersion Only		Radiological Dose: Dispersion + HEPA Adder Dose	
	Onsite (mSv)	Offsite (mSv)	Onsite (mSv)	Offsite (mSv)
0.0091	0.22	0.00018	Not Applicable	Not Applicable
12.38	3.82E+04	31.7	3.82E+04	31.7

Table H-9. Toxic and Corrosive Dose Sum of Fractions, Hg + Cd + NaOH

Waste Burned, (m^3)	Limit Category	Onsite	Limit Category	Offsite
0.0091	ERPG-1	4.3	PEL-TWA	0.005
	ERPG-2	3.2	ERPG-1	0.004
	ERPG-3	0.022	ERPG-2	2.6E-03
12.38	ERPG-1	2.5E+05	PEL-TWA	306.8
	ERPG-2	1.9E+05	ERPG-1	204.5
	ERPG-3	1.3E+03	ERPG-2	153.4

4.0 ACCIDENT ANALYSIS CONCLUSIONS

The onsite and offsite radiological dose consequences (Table H-9) are acceptable for the first reference case (50th%, 0.0091 m^3 combustible waste). The onsite radiological dose consequences are excessive for the second reference case (95th%, 12.4 m^3 combustible waste). The offsite radiological dose consequences for the second reference case would be marginally acceptable if controls can assure that the frequency of the accident could be controlled to less than 10^{-4} per year.

The toxicological exposures (Table H-10) are excessive for onsite but acceptable for offsite for the first reference case (50th%, 0.0091 m^3 combustible waste). The toxicological exposures are excessive for both onsite and offsite for the second reference case (95th%, 12.4 m^3 combustible waste).

The consequences reported above are considered to be bounding for the SSTs. If an organic salt-nitrate reaction occurs in a tank other than SX-106, its dose consequences are expected to be less than those reported for SX-106.

5.0 REFERENCES

Cowley, W. L., 1996a, *Development of Radiological Concentrations and Unit Liter Doses for TWRS FSAR Radiological Consequence Calculations,* WHC-SD-WM-SARR-037, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

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