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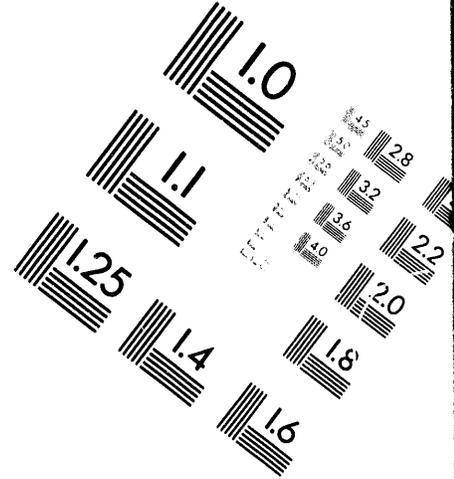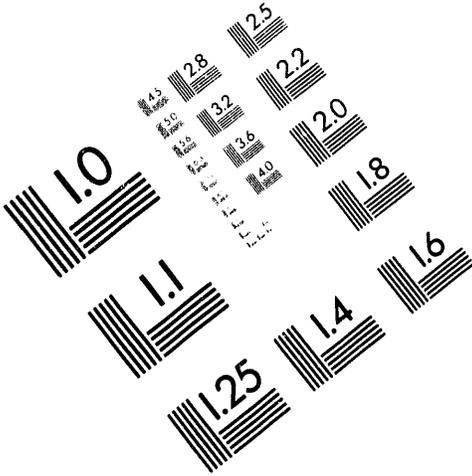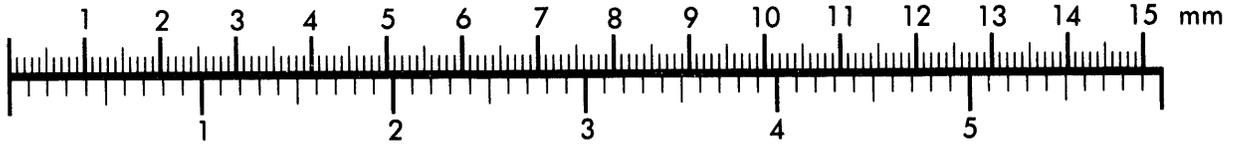
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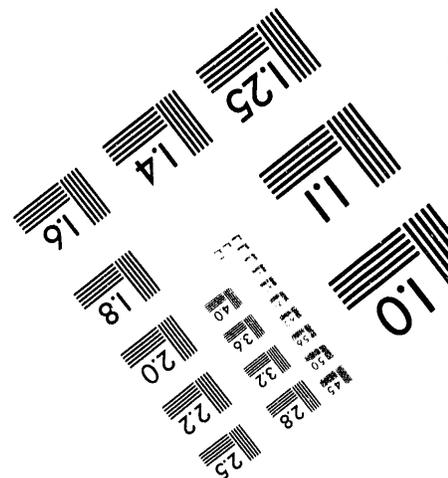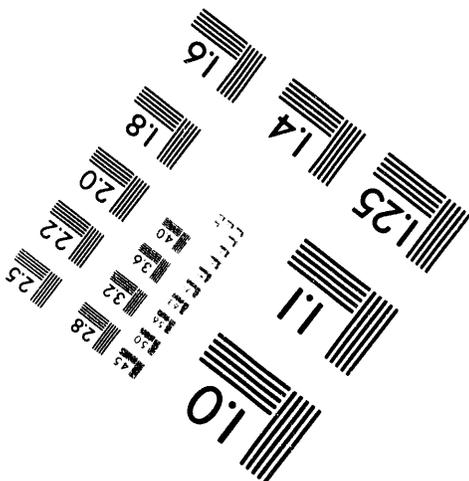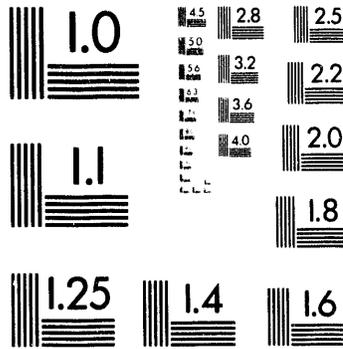
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Silver Spring, Maryland 20910

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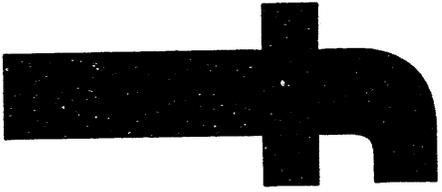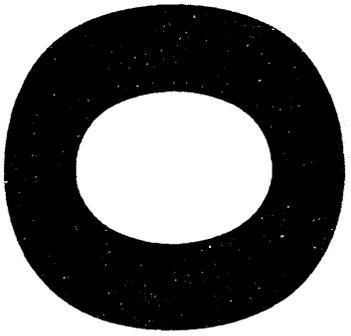
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The Sort On Radioactive Waste Type Model: A Method to Sort Single-Shell Tanks Into Characteristic Groups

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EXECUTIVE SUMMARY

The Sort on Radioactive Waste Type (SORWT) model presents a method to categorize Hanford Site single-shell tanks (SSTs) into groups of tanks expected to exhibit similar chemical and physical characteristics based on their major waste types and processing histories. This model has identified 29 different waste-type groups encompassing 135 of the 149 SSTs and 93% of the total waste volume in SSTs. The remaining 14 SSTs and associated wastes could not be grouped according to the established criteria and were placed in an ungrouped category. This letter report will detail the assumptions and methodologies used to develop the SORWT model and present the grouping results.

In the near future, the validity of the predicted groups will be statistically tested using analysis of variance of characterization data obtained from recent (post-1989) core sampling and analysis activities. In addition, the SORWT model will be used to project the nominal waste characteristics of entire waste type groups that have some recent characterization data available. These subsequent activities will be documented along with these initial results in a comprehensive, formal PNL report cleared for public release by September 1994.

CONTENTS

TABLES

LIST OF ACRONYMS

1C	first-cycle decontamination waste
224	lanthanum fluoride decontamination waste
2C	second-cycle decontamination waste
5-6	high-level B Plant waste
ANOVA	analysis of variance
BL	B Plant low-level waste
CC	complexant concentrate
CY	calendar year
CCPLX	complex concentrate
CW	cladding waste
DIA	diatomaceous earth
DOR	Daily Operating Records
DSSF	double-shell slurry feed
DST	double-shell tank
DSTATS	descriptive statistics
DW	decontamination waste
EB	evaporator bottoms
EF	evaporator feed
F	ferrocyanide-scavenged waste
HDRL	Hanford defense residual liquor
HS	hot semiworks waste
ICP	inductively coupled plasma
ITS	in-tank solidification
IX	ion exchange waste
MIX	mixture of several miscellaneous wastes
MW	metal waste
NCPLX	noncomplexed waste
OWW	organic wash waste
P	neutralized acid waste
PUREX	plutonium-uranium extraction
R	high-level REDOX waste
REDOX	reduction oxidation
RESD	residual liquor
RIX	REDOX ion exchange waste
S	sum of the squares
s^2	mean sum of the squares
SR-WASH	particulates from Sr wash of PUREX wastes in the AR-vault
SORWT	Sort On Radioactive Waste Type
SRS	strontium sludge
SST	single-shell tank
STD	standard deviation
TBP	tributyl phosphate
TL	terminal liquor
TRAC	Track Radioactive Components
UK	Unknown

1.0. INTRODUCTION

1.1 Purpose

This report presents a logical method of qualitatively grouping the 149 Hanford Site single-shell tanks (SSTs). The results of this grouping model will enhance the understanding of the contents of the tanks, project the nominal physical and chemical characteristics of an entire group of tanks based upon limited sampling and analysis, and to provide a basis to assess the leak potential of a group of tanks. This model may also provide a basis for sampling optimization.

1.2 Scope

The scope of this document is limited to the development of an SST qualitative grouping methodology according to the significant waste types, processing history, and best engineering judgement based on the available information. This letter report does not quantitatively validate the presented model. In the near future, the validity of the predicted groups will be statistically tested using analysis of variance of characterization data obtained from recent (post-1989) core sampling and analysis activities. In addition, the SORWT model will be used to project the nominal waste characteristics of entire waste type groups that have some recent characterization data available. These subsequent activities will be documented along with these initial results in a comprehensive, formal PNL report cleared for public release by September 1994.

1.3 Background

Between 1943 and 1964, 149 SSTs were built for the storage of liquid and solid radioactive wastes at the Hanford Site. These SSTs are located in 12 tank farms of 4 to 18 tanks each in the 200 East and 200 West Areas of the Hanford Site. These tanks have been removed from active service and have not received any additional wastes since November 1980. Before the tanks were removed from active service, various waste volume reduction programs were undertaken to minimize the amount of occupied tank volume. These programs involved inter-tank transfers, evaporation, and chemical alterations of the waste. These actions, combined with the ongoing chemical and radiolytic in-tank processes have changed the character of the waste in the SSTs over time, and now the actual composition of the wastes in the SST is not known well enough to make disposal decisions.

However, the wastes in the SSTs originated from a limited number of chemical processes and waste solidification schemes. Tanks which received similar wastes and underwent similar process histories should have a high degree of similarity in chemical content and physical characteristics. This thesis forms the basis of the grouping scheme. A limited number of tanks can provide sufficient information on which to base final processing and disposal decisions, if the tanks selected provide a representative sample of the waste types and conditions in the SSTs. The primary chemical processes at Hanford were the $BiPO_4$

plutonium recovery and purification process, the uranium recovery (TBP) process, the REDOX (reduction/oxidation with solvent extraction) process, and the PUREX (plutonium-uranium extraction) process. Each of these major processes also had several affiliated operations, such as the first and second cycle decontamination processes, the lanthanum fluoride process, fuel element decladding, ferrocyanide scavenging, fission product recovery, and several minor associated process wastes (Table 1.1). The waste solidification schemes generally involved processes that treated waste outside of the tanks, such as the

Table 1.1. A Brief List of Waste Type Abbreviations

Waste Acronym	Meaning of Acronym
R	High-level REDOX waste
EB	Evaporator bottoms
TBP	Tributyl phosphate waste
1C	First-cycle decontamination waste
2C	Second-cycle decontamination waste
224	Lanthanum fluoride decontamination waste
CW	Cladding waste
HS	Hot semiworks waste
SRS	Strontium leached sludge
5-6	High-level B-Plant waste
ITS	In-tank solidification
RIX	REDOX ion exchange waste
DIA	Diatomateous earth
DSSF	Double-shell slurry feed
CCPLX	Complex concentrate
F	Ferrocyanide-scavenged waste
NCPLX	Noncomplexed waste
SR-WASH	Particulates *from Sr wash of PUREX wastes in the AR-vault
MIX	Mixture of several miscellaneous wastes
IX	Ion Exchange Waste
UK	Unknown Waste Type
OWW	Organic Wash Waste

242-B and 242-T Concentrators and the 242-A and 242-S Evaporator/Crystallizers. These units took the dilute waste from the tank, evaporated the excess water in the waste, and returned the concentrated waste to the tank. However, the in-tank solidification processes removed the excess water directly from a tank using a hot-air sparge (ITS-1) or series of tanks using an in-tank electric heater (ITS-2).

There have been several previous attempts to group the tanks; however, there is no currently accepted method for tank grouping. These previous methods were unacceptable because of their reliance on the TRAC model as a basis (Jungfleisch 1984). The TRAC model can be shown to be internally inconsistent and inconsistent with other sources of reliable information regarding waste in the tanks (Adams et al. 1986; Morgan et al. 1988). The proposed method does not use the TRAC document's quantitative estimates regarding waste composition in the tanks for grouping. The grouping method is instead a qualitative judgement about the tanks that are similar in content and character based on the information in *A History of the 200 Area Tank Farms* (Anderson 1990) and several generic assumptions about the physical and chemical makeup of the wastes in the tanks. This grouping method then uses a database to sort the tanks on the basis of similarity in overall waste types and processing history.

The groups' similarity will then be tested statistically against quantitative information on a limited number of tank pairs. An analysis of variance (ANOVA) model will be used to compare the core composite results from four pairs of tanks from four different SORWT groups. Thus, this grouping methodology incorporates new information as it becomes available, so any necessary modifications or refinements to the tank grouping method can be made.

2.0 DEVELOPMENT OF THE SORWT MODEL

2.1 SORWT Model Background

The SORWT (Sort by Radioactive Waste Type) model has been developed to categorize tanks into groups expected to have similar physical characteristics and chemical compositions. In light of the complex physical and chemical history of the SSTs, especially when several different waste types have been mixed or processed together, the SORWT model does not attempt to predict the composition of a waste tank. Instead, the sorting method concentrates on the different types of waste introduced into each SST, each waste's distinct contribution to the known properties, and the individual significance of each waste type and the process history of each of the tanks. Although the actual chemical reactions and phase equilibria may be unknown when two waste types are combined in a SST, it can be assumed that similar reactions and equilibria occur in other SSTs when the same two waste types are mixed.

The fundamental premise of the SORWT model is that SSTs that received the same waste types in the same approximate proportion and had a similar processing history will be more similar to one another than SSTs that received several different waste types in varying amounts and had a relatively unique process history. In addition, largely supernatant waste types do not have as significant an effect on the character of the waste in the tank as solid-forming waste types. Therefore, if the primary and secondary solid-forming waste types can be identified for each SST, the tanks can be grouped based on this criteria. Thus information about the character of the waste in the rest of the members in the group can be deduced from the information obtained by the analysis of the samples from the representative tank, or from a selected number of representative tanks.

2.2 Data Sources for the SORWT Model

The principal source of SST waste-type information used by this model has been *A History of the 200 Area Tank Farms* (Anderson 1990). This document contains much of the available processing history for each of the 149 SSTs from 1944 until 1980. Although this source contains extensive information pertaining to waste types, volumes, and tank transfers, it is not comprehensive and contains many inconsistencies. The historical records used to generate Anderson (1990) were often inaccurate and/or incomplete. The methods utilized to measure accumulated solid and liquid volumes during the early history of the Hanford Site produced inconsistent inventories. Indeed, solids inventories were not routinely taken until the mid-1950s. Often, tank transfer information was missing. Despite these deficiencies, the Anderson document is the best source of SST historical information, and a qualitative assessment of the main solids-forming waste types contained in each SST can be accurately determined.

Often in the course of the process histories of the SSTs, the wastes in the tanks were given new names to reflect their suitability for further processing or the presence of complexing agents. Occasionally, the same waste types were assigned different names at

different times. For example, terminal liquor (TL), Hanford Defense Residual Liquor (HDRL), and residual liquor (RESD) all identify the same waste. Whenever possible these broad, non-specific waste category names were avoided, and the actual waste type from one of the process operations was used for the sorting criteria. In addition, the suffix F was added to some of the waste types to identify ferrocyanide-scavenged waste, and ITS was added to designate tanks that were in the In-Tank Solidification program.

The volumes of waste contained in each SST were obtained from the *Tank Farm Surveillance and Waste Status Summary Report* (Hanlon 1990). These values include, on a per tank basis, total waste volume, volume of salt cake, volume of sludge, and volume of supernate. It can be assumed that these values are more accurate than those final values found in Anderson (1990) because they were obtained more recently, however, it is understood that these values have deficiencies also because of the limited access to the tanks.

2.3 SORWT Model Assumptions

The underlying assumptions utilized by the SORWT model are as follows:

- The information contained within Anderson (1990) is sufficient to qualitatively identify and rank relative to one another the waste types which contributed to the accumulated solids in each individual SST.

- The SST process history, primary solids-forming, and secondary solids-forming waste types were responsible for the majority of the physical characteristics and chemical compositions of the waste remaining in each SST.

- Supernatant wastes that were not allowed to remain in a tank for a great period of time and later pumped out of the SST had less influence on the physical and chemical character of the waste than did the solid waste types.

- SSTs were often sluiced at some time during their processing history. Sluicing is the process of removing solids from waste tanks using high pressure water jets. Waste types present in the tank prior to the most recent sluicing were not considered relevant by this model.

- Use of a broad-ranging, less descriptive waste type, such as NCPLX, CCPLX, EVAP, and/or DSSF, were avoided whenever possible. The previous nomenclature for those waste types was preferred, if available. However, a broad category identifying the tank waste as either noncomplexed, complexed, or ferrocyanide scavenged waste has been included in the SORWT model to aid in evaluating the results of the model.

2.4 SORWT Model Input Data Sheets

SORWT Model input sheets were generated for each tank by thorough evaluation of the processing histories found in Anderson (1990) and Hanlon (1990). The waste type judged to be the most significant contributor to the solids volume in any specific SST was identified as the Primary Waste Type. This evaluation was made on the basis of waste volume introduced into each tank and the solids accumulation during the regime of that particular waste. The second most significant solids-forming waste type was identified as the Secondary Waste Type. When appropriate, a Tertiary and Other Waste Type was also identified.

Because waste prior to sluicing has been disregarded by the SORWT Model, the date of the most recent sluicing event for each tank has been included on the input sheets. The volume of waste remaining in the tank after sluicing has also been included to aid in the sorting and analysis. The data were obtained from Anderson (1990).

The waste volumes remaining in each SST, segregated into salt cake, sludge, supernate, and total, were collected from Hanlon (1990). Although the waste volume information was not used as a sorting criterion, it can be used as an indication of grouping feasibility. A realistic group, as predicted by the SORWT Model, exhibiting similar physical and chemical characteristics should not include tanks that have widely varying ratios between sludge and salt cake. If the majority of tanks in a group contain all sludge and one tank contains all salt cake, the membership of that tank in the group would be in question. The tank waste volume information provides valuable insight into those tanks in a group that have greater significance due to their higher volume.

2.5 SORWT Model DBASE File

A database file was created to store and manipulate the data from the input sheets. The field structure of this database can be seen in Table 2-1.

The information contained on the SORWT data input sheets was entered into the database. The SORWT database file was then indexed on the WASTE1, WASTE2, WASTE3, and WASTE4 fields, respectively.

Table 2.1. Sort On Radioactive Waste Type Database File Structure

Structure for Database: D:SORWT.DBF				
Number of Data Records: 149				
Data of Last Update: 04/12/91				
Field	Field Name	Type	Width	Dec
1	TANK_NAME	Character	6	
2	W_CATEGORY	Character	1	
3	WASTE1	Character	6	
4	WASTE2	Character	6	
5	WASTE3	Character	6	
6	WASTE4	Character	6	
7	DATE_SLUIC	Character	4	
8	VOL_REMAIN	Character	4	
9	SALT_CAKE	Numeric	4	
10	SLUDGE	Numeric	4	
11	SUPERNATE	Numeric	4	
12	TOTAL_VOL	Numeric	4	
Total			56	

3.0 PRESENTATION OF SORWT MODEL RESULTS

3.1 SORWT Model Report Format

A report presenting the SORWT model results was generated using a database software package. The report format was structured such that tanks possessing the same primary and secondary waste types were grouped together. The report output from the database package was imported into a word processor for additional editing. The different groups were listed in descending order of importance with the most significant group first. The number of tanks within each group has been included with the group heading. Following each group is a subtotal providing the volume of salt cake, sludge, and total waste represented by that particular waste group as reported in Hanlon 1990. The tank groups were then subdivided according to their safety watch list status. A full printout of the SORWT model report is presented in Appendix A.

The first column of the SORWT model report contains the group I.D. in Roman numerals. The lower the number, the more significant the group in terms of number of tanks and total waste volume. Column two contains the tank names of the individual tanks that make up each group. The third and fourth columns report the primary and secondary waste types, respectively. These are the waste types that contributed most significantly to the solids volume in that particular tank relative to other waste types introduced into that same tank and are the criteria for tank grouping. Within any given group, the primary and secondary waste types will always be identical. The fifth and sixth columns, respectively, contain the tertiary and other waste types. While the tertiary and other waste types are not actually used as grouping criteria, they are provided for further assistance in interpreting the results. The seventh column presents the safety watch list status of each tank. The codes used in this column are F, O, H, G, and N representing ferrocyanide, organic, high-heat, gas generating, and non-public law tanks, respectively. The eighth, ninth, and tenth columns contain, respectively, the salt cake volume, sludge volume, and total waste volume for each individual tank.

3.2 Summary of SORWT Model Waste Type Groups

The SORWT model has predicted two existence of 29 waste-type groups ranging from a high of 22 tanks per group to a low of two tanks per group. These 29 waste-type groups encompass 135 tanks and 93% of the total waste volume. A thirtieth group contains the 14 solitary SSTs that did not fall into any waste-type groups. Table 3.1 presents a summary of the SST waste type groups predicted by the SORWT model.

The first column of Table 3.1 identifies the group number. The second column contains the primary and secondary waste types that were used as the grouping criteria. Column three reports the number of tanks in each individual group. The fourth, fifth, and

Table 3.1. Summary of SORWT Model Results

GROUP NUMBER	PRIMARY & SECONDARY WASTE GROUP TYPE		NUMBER OF TANKS IN GROUP	% VOLUME SALT CAKE ALL TANKS	% VOLUME SLUDGE ALL TANKS	% TOTAL VOLUME ALL TANKS
I.	R	EB	22	38%	11%	28%
II.	EB	1C	10	20%	0%	13%
III.	TBP-F	EB-ITS	10	14%	5%	11%
IV.	TBP	CW	9	0%	5%	2%
V.	224		8	0%	2%	1%
VI.	R		7	0%	7%	2%
VII.	EB	R	5	8%	1%	6%
VIII.	TBP-F	1C	5	0%	4%	1%
IX.	DSSF	NCPLX	4	7%	3%	6%
X.	EB	CW	4	6%	1%	5%
XI.	1C	TBP	4	0%	6%	2%
XII.	1C	EB	4	0%	4%	2%
XIII.	HS		4	0%	0%	0%
XIV.	2C	224	3	0%	7%	2%
XV.	2C	5-6	3	0%	4%	1%
XVI.	R	RIX	3	0%	3%	1%
XVII.	1C	CW	3	0%	2%	1%
XVIII.	CW	EB	3	0%	2%	1%
XIX.	CW	MIX	3	0%	1%	1%
XX.	CW		3	0%	0%	0%
XXI.	TBP	EB-ITS	2	3%	1%	2%
XXII.	EB	TBP	2	2%	0%	1%
XXIII.	SRS	SLUICE	2	0%	3%	1%
XXIV.	1C	EB-ITS	2	1%	2%	1%
XXV.	TBP		2	0%	2%	1%
XXVI	TBP	EB	2	0%	2%	1%
XXVII.	TBP	1C-F	2	0%	2%	1%
XXVIII.	CCPLX	DSSF	2	0%	0%	0%
XXIX.	R	DIA	2	0%	1%	0%
	TOTAL		135	100%	81%	93%
XXX.	UNGROUPED TANKS		14	0%	19%	7%

sixth columns, respectively, contain the percentage by volume of salt cake, sludge, and total waste compared to all 149 SSTs represented by each SORWT waste type group. A total has been accumulated for columns three through nine encompassing the 29 waste type groups predicted by the SORWT model. The ungrouped tanks were not included in this total.

A review of Table 3.1 will quickly reveal that Group I is by far the most significant group. This group includes 22 tanks, 38% of the total salt cake volume, and over ¼ of the total waste in all 149 SSTs. The first three groups represent over ½ of the total waste volume in all 149 SSTs. This categorization demonstrates the potential usefulness of the SORWT model. Table 3.1 also identifies groups that have relatively no significance, such as Groups XII and XIX, which contain almost no waste. This information can be used in allocating time and resources for characterization activities as well as pretreatment and immobilization development.

There may exist larger families of related tank groups. An example of a potential family is Group I (R, EB) and Group VII (EB, R). These two groups have the same primary and secondary waste types. The relative differences between these two groups due to their respective designation of which of the two waste types is primary and secondary may be small when compared to the overall group variability. Identifying larger families of tanks will reduce the overall number of different groups being evaluated. The existence of families will be tested and reported in the formal report to be issued by the end of the fiscal year.

3.3 Description of SORWT Waste Type Groups

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

3.3.1 Group I - R, EB

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

3.3.2 Group II - EB, 1C

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

3.3.3 Group III - TBP-F, EB-ITS

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

3.3.4 Group IV - TBP, CW

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

3.3.5 Group V - 224

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

3.3.6 Group VI - R

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

3.3.7 Group VII - EB, R

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

3.3.8 Group VIII - TBP-F, 1C

This five-tank group contains 478,000 gallons of waste, and approximately 465,000 gallons of that is sludge. No salt cake has been observed in these tanks. The four C Farm tanks were used as the primary settling tanks during the In-Farm Scavenging campaign during the 1950s, and they were originally filled with 1C waste in the 1940s. The supernate was transferred out of the tanks to make room for the TBP-scavenged waste that was allowed to settle. These two wastes formed the vast majority of the solids located in these two tanks.

The other tank in this group (T-107) has a processing history similar to that of the rest of this group, except that it received its ferrocyanide-scavenged TBP waste from the U Plant scavenge test. These two TBP-F wastes may be slightly different. All of these tanks are on the watch list because of their ferrocyanide content.

3.3.9 Group IX - DSSF, NCPLX

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

3.3.10 Group X - EB, CW

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

3.3.11 Group XI - 1C, TBP

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

3.3.12 Group XII - 1C, EB

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

3.3.13 Group XIII - HS

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

3.3.14 Group XIV - 2C, 224

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

3.3.15 Group XV - 2C, 5-6

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

3.3.16 Group XVI - R, RIX

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

3.3.17 Group XVII - 1C, CW

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

3.3.18 Group XVIII - CW, EB

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

3.3.19 Group XIX - CW, MIX

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

3.3.20 Group XX - CW

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

3.3.21 Group XXI-TBP,EB-ITS

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

3.3.22 Group XXII - EB, TBP

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

3.3.23 Group XXIII - SRS, SL-WASH

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

3.3.24 Group XXIV - 1C, EB-ITS

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

3.3.25 Group XXV - TBP

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

3.3.26 Group XXVI - TBP, EB

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

3.3.27 Group XXVII - TBP

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

3.3.28 Group XVIII - CCPLX, DSSF

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

3.3.29 Group XXIX - R, DIA

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

3.3.30 Group XXX - Solitary Tanks (Ungrouped)

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

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APPENDIX A

SORT ON RADIOACTIVE WASTE TYPE (SORWT) MODEL RESULTS

SORT ON RADIOACTIVE WASTE TYPE MODEL RESULTS

GROUP NO.	TANK NAME	PRIMARY WASTE TYPE	SECONDARY WASTE TYPE	TERTIARY WASTE TYPE	OTHER WASTE TYPES	WTS CAT	VOLUME OF SALT CAKE (KGAL)	VOLUME OF SLUDGE (KGAL)	TOTAL WASTE VOLUME (KGAL)
I.	R	EB			22 TANKS				

Gas Generating Subgroup

	TANK	PRIMARY	SECONDARY	TERTIARY	OTHER	WTS	SALT CAKE	SLUDGE	TOTAL
	SX-101	R	EB	RIX		G	343	112	456
	SX-105	R	EB	RIX	HLO	G	610	73	683
	S-111	R	EB			G	447	139	596
	S-112	R	EB			G	631	6	637
	SX-104	R	EB	RIX		G	478	136	614
	SX-103	R	EB	CW	OWW	G	523	112	667
	SX-102	R	EB	RIX		G	426	117	543

Organic Tank Subgroup

	TX-105	R	EB	MIX		O	609	0	609
	SX-106	R	EB	RIX	HLO-MX	OG	465	12	538
	S-102	R	EB	DSSF		OG	545	4	549

Non-Public Law 101-510 Subgroup

	S-110	R	EB	MIX		N	561	131	692
	S-108	R	EB			N	600	4	604
	S-107	R	EB	CW	IX-MIX	N	69	293	368
	S-106	R	EB			N	511	32	543
	S-105	R	EB			N	454	2	456
	S-103	R	EB	DSSF		N	221	10	248
	S-101	R	EB	IX	MIX	N	171	244	427
	S-109	R	EB			N	555	13	568
	TX-106	R	EB	MIX		N	453	0	453
	TX-104	R	EB	MIX		N	64	0	65
	TX-107	R	EB			N	35	0	36
	TX-102	R	EB	MIX		N	113	0	113
	Group Subtotal						8884	1440	10465

II.	EB	1C			10 TANKS				

	TX-117	EB	1C			N	626	0	626
	TX-116	EB	1C			N	631	0	631
	TY-102	EB	1C	MIX		N	64	0	64
	TX-113	EB	1C			N	607	0	607
	B-105	EB	1C			N	266	40	306
	TX-112	EB	1C			N	649	0	649
	TX-111	EB	1C	TBP		N	370	0	370
	TX-114	EB	1C			N	535	0	535
	TX-110	EB	1C	TBP		N	462	0	462
	TX-109	EB	1C	TBP		N	384	0	384
	Group Subtotal						4594	40	4634

SORT ON RADIOACTIVE WASTE TYPE MODEL RESULTS

GROUP NO.	TANK NAME	PRIMARY WASTE TYPE	SECONDARY WASTE TYPE	TERTIARY WASTE TYPE	OTHER WASTE TYPES	WTS CAT	VOLUME OF SALT CAKE (KGAL)	VOLUME OF SLUDGE (KGAL)	TOTAL WASTE VOLUME (KGAL)
III.	TBP-F EB-ITS			10 TANKS					
	BY-105	TBP-F	EB-ITS	CW		F	459	44	503
	BY-104	TBP-F	EB-ITS	CW	IX	F	366	40	406
	BY-103	TBP-F	EB-ITS	P	CW-OWW	F	395	5	400
	BY-106	TBP-F	EB-ITS	CW		F	547	95	642
	BY-108	TBP-F	EB-ITS	1C	CW	F	74	154	228
	BY-110	TBP-F	EB-ITS	1C	CW	F	295	103	398
	BY-101	TBP-F	EB-ITS	CW	1C	F	278	109	387
	BY-107	TBP-F	EB-ITS	CW		F	206	60	266
	BY-112	TBP-F	EB-ITS	CW		F	286	5	291
	BY-111	TBP-F	EB-ITS	OWW	CW	F	438	21	459
	Group Subtotal						3344	636	3980
IV.	TBP CW			9 TANKS					
	Non-Public Law 101-510 Subgroup								
	BX-102	TBP	CW	BL	DIA	F	0	96	96
	BX-106	TBP	CW	EB-IX	BL	F	0	31	46
	BX-101	TBP	CW	BL	IX	N	0	42	43
	BX-104	TBP	CW	IX	R	N	0	96	99
	C-101	TBP	CW	P	OWW	N	0	88	88
	BX-103	TBP	CW	OWW	MIX	N	0	62	66
	BX-105	TBP	CW	IX	EB	N	3	43	51
	BX-109	TBP	CW	1C	IX	N	0	193	193
	BX-108	TBP	CW	1C	IX	N	0	5	5
	Group Subtotal						3	656	687
V.	224			8 TANKS					
	T-201	224				N	0	28	29
	T-203	224				N	0	35	35
	T-202	224				N	0	21	21
	B-201	224				N	0	28	28
	B-202	224				N	0	28	28
	B-203	224				N	0	50	51
	B-204	224				N	0	49	50
	T-204	224				N	0	38	38
	Group Subtotal						0	277	280

SORT ON RADIOACTIVE WASTE TYPE MODEL RESULTS

GROUP NO.	TANK NAME	PRIMARY WASTE TYPE	SECONDARY WASTE TYPE	TERTIARY WASTE TYPE	OTHER WASTE TYPES	WTS CAT	VOLUME OF SALT CAKE (KGAL)	VOLUME OF SLUDGE (KGAL)	TOTAL WASTE VOLUME (KGAL)
VI.	R				7 TANKS				
	High Heat Subgroup								
	SX-112	R				H	0	92	92
	SX-108	R				H	0	115	115
	SX-107	R				H	0	104	104
	Gas Generating Subgroup								
	SX-109	R				GH	0	250	250
	Non-Public Law 101-510 Subgroup								
	SX-115	R				N	0	12	12
	U-101	R				N	0	22	25
	S-104	R				N	0	293	294
	Group Subtotal						0	888	892
VII.	EB R				5 TANKS				
	Gas Generating Subgroup								
	U-103	EB	R	MIX		G	423	32	468
	Organic Tank Subgroup								
	U-106	EB	R	BL	PL	0	185	26	226
	U-111	EB	R	1C		0	303	26	329
	Non-Public Law 101-510 Subgroup								
	U-102	EB	R			N	313	43	374
	TX-115	EB	R	CW	DW	N	640	0	640
	Group Subtotal						1864	127	2037
VIII.	TBP-F 1C				5 TANKS				
	C-111	TBP-F	1C	CW	HS	F	0	57	57
	C-112	TBP-F	1C	CW	IX	F	0	109	109
	T-107	TBP-F	1C	CW	IX	F	0	171	180
	C-109	TBP-F	1C	CW	IX	F	0	62	66
	C-108	TBP-F	1C	CW	OWW	F	0	66	66
	Group Subtotal						0	465	478

SORT ON RADIOACTIVE WASTE TYPE MODEL RESULTS

GROUP NO.	TANK NAME	PRIMARY WASTE TYPE	SECONDARY WASTE TYPE	TERTIARY WASTE TYPE	OTHER WASTE TYPES	WTS CAT	VOLUME OF SALT CAKE (KGAL)	VOLUME OF SLUDGE (KGAL)	TOTAL WASTE VOLUME (KGAL)
IX.	DSSF	NCPLX			4 TANKS				
	A-101	DSSF	NCPLX	EVAP		G	950	3	953
	AX-101	DSSF	NCPLX	EVAP		G	745	3	748
	A-103	DSSF	NCPLX	EVAP		N	0	366	371
	A-102	DSSF	NCPLX	EVAP		N	22	15	41
	Group Subtotal						1717	387	2113
X.	EB	CW			4 TANKS				
	U-105	EB	CW	R		G	349	32	418
	U-108	EB	CW	MIX		G	415	29	468
	U-109	EB	CW	R		G	396	48	463
	U-107	EB	CW	MIX		0	360	15	406
	Group Subtotal						1520	124	1755
XI.	1C	TBP			4 TANKS				
	C-110	1C	TBP	OWW	EB-IX	N	0	196	201
	BX-107	1C	TBP	CW	IX	N	0	348	348
	T-108	1C	TBP	EB	HLO	N	0	44	44
	B-106	1C	TBP	HLO	MIX	N	0	116	117
	Group Subtotal						0	704	710
XII.	1C	EB			4 TANKS				
	B-108	1C	EB	CW	IX-TBP	N	0	94	94
	B-107	1C	EB	CW	TBP	N	0	164	165
	B-109	1C	EB	CW	IX	N	0	127	127
	BX-112	1C	EB	CW	IX	N	0	167	167
	Group Subtotal						0	552	553

SORT ON RADIOACTIVE WASTE TYPE MODEL RESULTS

GROUP NO.	TANK NAME	PRIMARY WASTE TYPE	SECONDARY WASTE TYPE	TERTIARY WASTE TYPE	OTHER WASTE TYPES	WTS CAT	VOLUME OF SALT CAKE (KGAL)	VOLUME OF SLUDGE (KGAL)	TOTAL WASTE VOLUME (KGAL)
XIII.	HS				4 TANKS				
	C-204	HS				N	0	3	3
	C-202	HS				N	0	1	1
	C-201	HS				N	0	2	2
	C-203	HS				N	0	5	5
	Group Subtotal						0	11	11
XIV.	2C	224			3 TANKS				
	T-110	2C	224			G	0	376	379
	T-112	2C	224	DW	MIX	N	0	60	67
	Organic Tank Subgroup								
	T-111	2C	224		0		0	456	458
	Group Subtotal						0	892	904
XV.	2C	5-6			3 TANKS				
	B-112	2C	5-6	FP	EB-ITS	N	0	30	33
	B-110	2C	5-6	FP	IX	N	0	245	246
	B-111	2C	5-6	FP	IX	N	0	236	237
	Group Subtotal						0	511	516
XVI.	R	RIX			3 TANKS				
	SX-110	R	RIX	MIX		H	0	62	62
	SX-111	R	RIX			H	0	125	125
	SX-114	R	RIX	EB		H	0	181	181
	Group Subtotal						0	368	368
XVII.	1C	CW			3 TANKS				
	U-110	1C	CW	R	LW	N	0	186	186
	T-105	1C	CW	2C	BL-IX	N	0	98	98
	T-106	1C	CW	2C	MIX	N	0	19	21
	Group Subtotal						0	303	305

SORT ON RADIOACTIVE WASTE TYPE MODEL RESULTS

GROUP NO.	TANK NAME	PRIMARY WASTE TYPE	SECONDARY WASTE TYPE	TERTIARY WASTE TYPE	OTHER WASTE TYPES	WTS CAT	VOLUME OF SALT CAKE (KGAL)	VOLUME OF SLUDGE (KGAL)	TOTAL WASTE VOLUME (KGAL)
XVIII.	CW	EB			3 TANKS				
	B-102	CW	EB	BL	IX	N	10	18	32
	B-101	CW	EB	BL		N	0	113	113
	B-103	CW	EB	IX	MIX	O	0	59	59
	Group Subtotal						10	190	204
XIX.	CW	MIX			3 TANKS				
	T-101	CW	MIX	TBP-F	EVAP	F	0	103	133
	T-103	CW	MIX			N	0	23	27
	T-102	CW	MIX	IX		N	0	19	32
	Group Subtotal						0	145	192
XX.	CW				3 TANKS				
	U-201	CW				N	0	4	5
	U-203	CW				N	0	2	3
	U-202	CW				N	0	4	5
	Group Subtotal						0	10	13
XXI.	TBP	EB-ITS			2 TANKS				
	BY-102	TBP	EB-ITS	CW	1C	N	417	0	432
	BY-109	TBP	EB-ITS	CW	MW	N	354	87	475
	Group Subtotal						771	87	907
XXII.	EB	TBP			2 TANKS				
	TX-118	EB	TBP	CW	1C	FO	347	0	347
	TX-108	EB	TBP	R		N	134	0	134
	Group Subtotal						481	0	481
XXIII.	SRS	SLUICE			2 TANKS				
	C-106	SRS	SR-WASH	P	TBP	H	0	197	229
	C-103	SRS	SR-WASH	P	TBP-CW	O	0	175	200
	Group Subtotal						0	372	429

SORT ON RADIOACTIVE WASTE TYPE MODEL RESULTS

GROUP NO.	TANK NAME	PRIMARY WASTE TYPE	SECONDARY WASTE TYPE	TERTIARY WASTE TYPE	OTHER WASTE TYPES	WTS CAT	VOLUME OF SALT CAKE (KGAL)	VOLUME OF SLUDGE (KGAL)	TOTAL WASTE VOLUME (KGAL)
XXIV.	1C	EB-ITS			2 TANKS				
	BX-111	1C	EB-ITS	CW	IX	F	143	68	230
	BX-110	1C	EB-ITS	CW	IX	F	9	189	199
	Group Subtotal						152	257	429
XXV.	TBP				2 TANKS				
	TY-106	TBP				N	0	17	17
	TY-105	TBP				N	0	231	231
	Group Subtotal						0	248	248
XXVI.	TBP	EB			2 TANKS				
	T-109	TBP	EB	MIX		N	0	58	58
	TX-103	TBP	EB			N	0	157	157
	Group Subtotal						0	215	215
XXVII.	TBP	1C-F			2 TANKS				
	TY-104	TBP	1C-F	DW	MIX-R	F	0	43	46
	TY-103	TBP	1C-F	CW	R-MIX	F	0	162	162
	Group Subtotal						0	205	208
XXVIII.	CCPLX	DSSF			2 TANKS				
	AX-103	CCPLX	DSSF	EVAP		G	11	2	112
	AX-102	CCPLX	DSSF	EVAP		N	29	7	39
	Group Subtotal						40	9	151
XXIX.	R	DIA			2 TANKS				
	U-104	R	DIA			N	0	122	122
	SX-113	R	DIA			N	0	26	26
	Group Subtotal						0	148	148

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SORT ON RADIOACTIVE WASTE TYPE MODEL RESULTS

GROUP NO.	TANK NAME	PRIMARY WASTE TYPE	SECONDARY WASTE TYPE	TERTIARY WASTE TYPE	OTHER WASTE TYPES	WTS CAT	VOLUME OF SALT CAKE (KGAL)	VOLUME OF SLUDGE (KGAL)	TOTAL WASTE VOLUME (KGAL)
XXX.	**SOLITARY TANKS (UNGROUPED) 14 TANKS**								
	T-104	1C				N	0	442	445
	C-107	1C	SRS	CW	IX	N	0	337	337
	TY-101	1C-F	EB	TBP	R	F	0	118	118
	B-104	2C	EB	TBP	1C	N	69	301	371
	A-106	CCPLX	NCPLX	EVAP	B	N	0	125	125
	C-104	CW	OWW	SR-WASH	SRS-MX	N	0	295	295
	C-102	CW	TBP	OWW		N	0	424	427
	AX-104	EVAP	NCPLX	P		N	0	7	7
	A-105	P	IX			H	0	19	19
	A-104	SLUICE	P	H20	B	H	0	28	28
	U-204	R	2C	CW		N	0	2	3
	TX-101	R	MIX	MIX		N	0	84	87
	C-105	TBP	SR-WASH	CW	P	H	0	150	150
	U-112	UK				N	0	45	49
	Ungrouped Subtotal						69	2377	2461
	GRAND TOTAL						23449	12644	36774

END

DATE FILMED
7/20/94