Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

DEC 5 1995

95-CHD-090

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

Dear Mr. Conway:

TRANSMITTAL OF U.S. DEPARTMENT OF ENERGY, RICHLAND OPERATIONS OFFICE (RL), COMPLETE HISTORICAL TANK LAYERING MODELS - UPDATE OF DEFENSE NUCLEAR FACILITIES SAFETY BOARD (DNFSB) RECOMMENDATION 93-5, COMMITMENT 1.16

Attached is the latest update of the "Tank Layering Model Manual for the Northeast, Southwest and Northwest Quadrants of Hanford Tank Farms," and the latest update of the "Tank Layer Model, Rev. 1, for Southeast Quadrant." Note that these updates consolidate information previously sent to DNFSB.

As the DNFSB is aware, the Tank Layering Model is an ongoing process being conducted by Dr. Steve Agnew and his associates at Los Alamos National Laboratory. The data contained in the attachments is up-to-date. However, work will be performed in Fiscal Year 1996 that will validate and refine the model. RL will continue to keep DNFSB informed of any changes that come from the ongoing work process.

If you have any questions, you may contact me at (509) 376-7395 or your staff may contact Jackson Kinzer, Assistant Manager for Tank Waste Remediation System, at (509) 376-7591.

Sincerely,

John D. Wagoner
John D. Wagoner
Manager

CHD:NWW

Attachments

cc w/encls:
R. Guimond, EM-2
M. A. Hunemuller, EM-30
K. T. Lang, EM-36
S. L. Trine, RL DNFSB Liaison
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Tank Layer Model (TLM)

Rev. 1

for

SE Quadrant

by

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March 1995

ACKNOWLEDGMENTS

A project of this nature would not be possible were it not for the help of a great number of people. They are Todd Brown and Joseph Jones (WHC) for their help with data gathering and Richard Anema (Ogden Envir.) for data validation, as well as a great number of other people at WHC and PNL for their generous help.

This work was performed under the auspices of the Department of Energy.

Information Feedback Card

Tank Layer Model (TLM)

We would appreciate any feedback on this document. Please send to Stephen F. Agnew, Los Alamos National Laboratory, MS J586, P.O. Box 1663, Los Alamos, NM 87545.

Title of comment:

Text of comment:

Table of Contents

Appendices

Abstract

This report describes a model for solids accumulation in waste tanks at Hanford. This model is known as theTank Layer Model (TLM), and applies that model to 149 single-shell tanks in the 200-East and 200-West areas at Hanford. The TLM uses the information that has been obtained on the transaction history for each tank to predict solids accumulations by two fundamentally different strategies. The first strategy is used for primary waste additions, which are waste additions from process plants direct into the waste tanks. These primary transactions are used along with solids reports for each tank to derive an average volume per cent solids for each of wastes on the Defined Waste List. Solids accumulations are then assigned to a particular Defined Waste for tanks for which solids information is missing or inconsistent.

A second strategy is used for tanks where solids accumulate as a result of evaporative concentration of supernatants. All solids that accumulate in such tanks occur after they have been designated as "bottoms" receivers and are assigned to either salt cakes or salt slurries, depending on the particular evaporator campaign that resulted in the waste volume reduction. This approach leads to seven salt cakes and two salt slurries, each of which is specified as a Defined Wastes. Such concentrates are, then, inherently averaged over the tens of millions of gallons of supernatants that were involved in each evaporator campaign.

The results of the TLM analysis are a description of each tank's solids in terms of sludge layers, salt cake, and salt slurry. The composition of each layer is described in the Hanford Defined Waste report. Although interstitial liquid is incorporated within the composition for each solids type, any residual supernatants that reside in these tanks are not described by this model. The output of the TLM, then, can only be used to predict the inventory of the sludges and saltcakes that reside within each waste tank.

I. Introduction to the Strategy for Estimating Tank Chemical and Radionuclide Inventories

One of the more difficult tasks involving the Hanford waste tanks is the estimation of those tanks' contents. Nevertheless, such estimates are often necessary in order to establish safety limits during intrusive activities associated with these tanks, as well as needed for a planning basis for future disposal. The Tank Layer Model (TLM) is part of a three step strategy, as shown in Fig. 1, for estimation of tank inventories. Three fundamental steps need to be performed in order to provide such estimates.

The first step is to compile a spreadsheet of qualified fill records[1] with information extracted from Jungfleisch-83[2] and Anderson-91[3], and checked against quarterly summary reports by Ogden Environmental and LANL. These qualified transaction records are called the Waste Status and Transaction Record Summaries (WSTRS). The WSTRS reports, although largely representative of the waste histories of the tanks, are nevertheless incomplete in that there are many unrecorded transactions that have occurred for many tanks. Included within the WSTRS report, then, is a comparison of the tank volume that is calculated based on the fill records that are present in WSTRS with the measured volume of each tank. This comparison is made for each quarter to record any unknown waste additions or removals that may have occurred during each quarter.

Using these fill records, the second step used in this strategy is an analysis that provides a definition of the solids layers within each tank and is called the Tank Layer Model or TLM. The TLM[4] is a volumetric and chronological description of tank inventory based on a defined set of waste solids layers. Each solids layer is attributed to a particular waste addition or

[1] (a) Agnew, S. F., et al., "Waste Status and Transaction Record Summary for the NE Quadrant" WHC-SD-WM-TI-615, Rev. 1, October 1994. (b) Agnew, S. F., et al. "Waste Status and Transaction Record Summary for the SW Quadrant, " WHC-SD-WM-TI-614, Rev. 1, October 1994. (c) Agnew, S. F., et al. "Waste Status and Transaction Record Summary for the NW Quadrant, " WHC-SD-WM-TI-669, Rev. 1, October 1994.

[2](a) Jungfleisch, F. M. "Hanford High-Level Defense Waste Characterization—A Status Report," RH-CD-1019, July 1980. (b) Jungfleisch, F. M. "Supplementary Information for the Preliminary Estimation of Waste Tank Inventories in Hanford Tanks through 1980," SD-WM-TI-058, June 1983. (c) Jungfleisch, F. M. "Preliminary Estimation of Waste Tank Inventories in Hanford Tanks through 1980," SD-WM-TI-057, March 1984.

[3]Anderson, J. D. "A History of the 200 Area Tank Farms," WHC-MR-0132, June 1990.

[4](a) Brevick, C. H., et al., "Supporting Document for the Historical Tank Content Estimate for A Tank Farm," WHC-SD-WM-ER-308, Rev. 0, June 1994. Likewise, reports and numbers for each farm are as follows: AX is 309, B is 310, BX is 311, BY is 312, C is 313, S is 323, SX is 324, and U is 325. These supporting documents contain much of the detailed information for each tank farm in a concise format, all released as Rev. 0 in June 1994.

process, and any solids layers that have unknown origin are assigned as such and contribute to the uncertainty of that tank's inventory. The Tank Layer Model for each tank, then, simply associates layers of solids within each tank with a

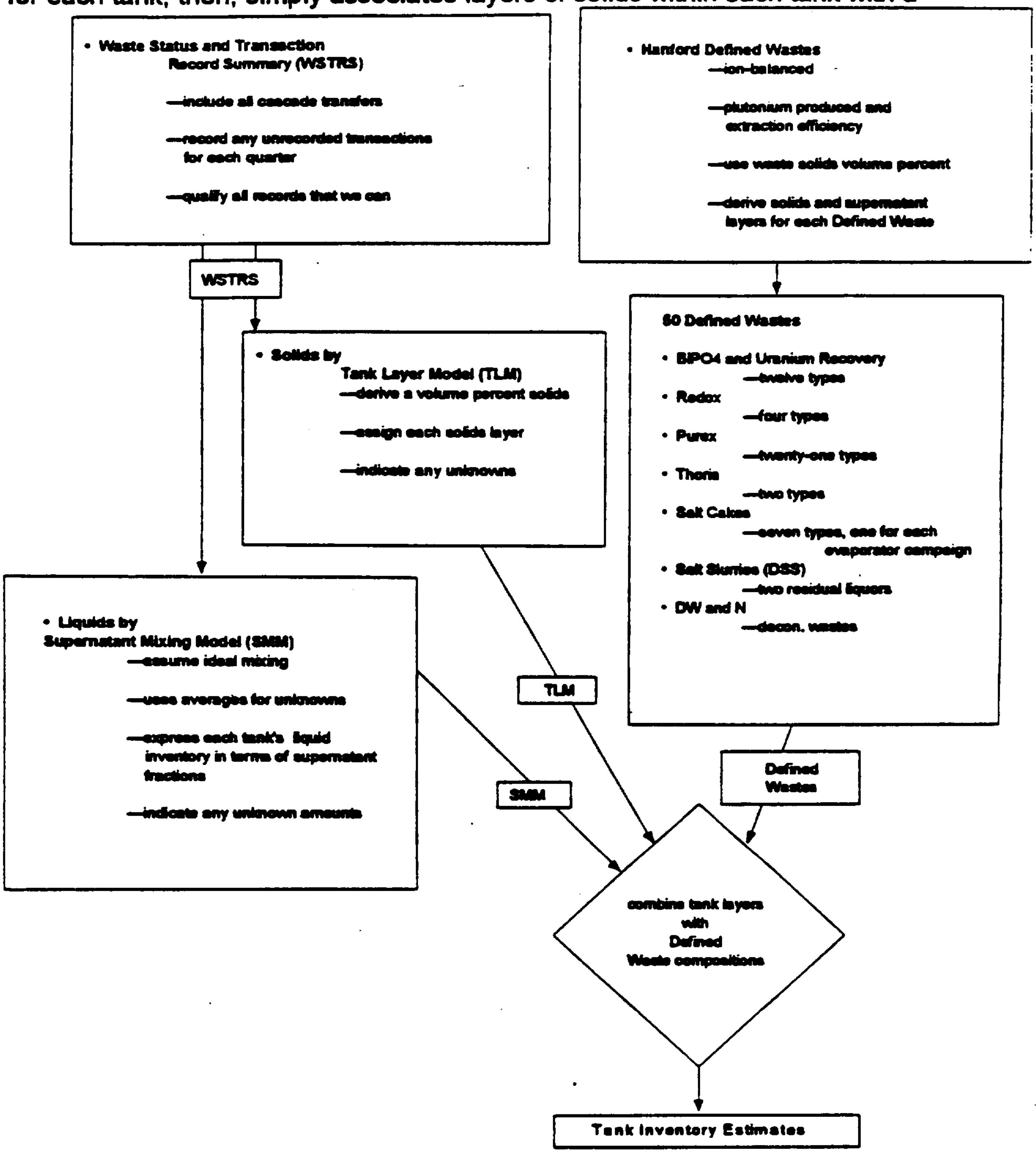

Fig. 1. Schematic of overall strategy

waste addition or a process campaign. In order to derive an inventory of tank chemicals and radionuclides, one must provide a composition for each of these defined wastes. The TLM provides only a chronology and an order to the waste layer volumes, and does not imply any other configuration for those layers. Thus, the lateral distribution of each layer may be and probably is quite complicated, but the TLM does not say anything about the configuration of those layers other than each layer's total volume and a chronological ordering to those volumes.

An ideal mixing model called the Supernatant Mixing Model[5] (SMM) has been developed to describe the composition of each supernatant in the tanks (note that interstitial liquid is part of the solids definition, not the supernatant). This model describes a supernatant in terms of fractions of each of the Defined Waste supernatants with a corresponding total volume reduction due to active evaporation. The SMM is primarily used for definition of waste in DST's.

The third step in the strategy is to provide chemical and radiochemical definitions[6] for each of the Defined Waste types. The Defined Waste compositions coupled with the tank layering information provide a basis for estimation of each tank's chemical and radionuclide inventories (see Fig. 1). The inventory estimates for each tank appear in the Historical Tank Content Estimate reports for each quadrant.[7]

II. Approach

The Tank Layer Model (TLM) is derived from the Waste Status and Transaction Record Summary (WSTRS) database. The purpose of the Tank Layer Model is to predict the waste types and solids' volumes in each tank.

We have developed a solids layer model that uses the past fill history of each tank to derive an estimate of the types of solids that reside within those tanks. The Tank Layer Model (TLM) is generated by reconciling the reported solids levels for each tank from WSTRS with the solids volume per cent expected for the primary waste additions from the Defined Waste Document.[8] (Note that a solid's model has already been extensively used at Hanford to estimate sludge and salt cake accumulation, the results of which are reported[9] monthly.)

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[5]Agnew, S. F.; Corbin, R. "Supernatant mixing model," in preparation

[6]Agnew, S.F. "Hanford Site Defined Wastes: Chemical and Radionuclide Compositions,"LA-UR-94-2657 September 1994.

[7](a) Brevick, C. H., et al., "Historical Tank Content Estimate of the Northeast Quadrant of the Hanford 200 East Area," WHC-SD-WM-ER-349, Rev. 0, June 1994. (b) Brevick, C. H., et al., "Historical Tank Content Estimate of the Southwest Quadrant of the Hanford 200 West Area," WHC-SD-WM-ER-352, Rev.0, June 1994. (c) Brevick, C. H., et al., "Historical Tank Content Estimate of the Northwest Quadrant of the Hanford 200 West Area," WHC-SD-WM-ER-351, Rev.0, in preparation.

[8] Agnew, S. F., et al., "Hanford Defined Wastes: Chemical and Radionuclide Compositions," LA-UR-94-2657

[9]Hanlon, B. M. "Tank Farm Surveillance and Waste Status and Summary Report for November 1993, "WHC-EP-0182-68, February 1994, published monthly.

Not all of the transactions that have occurred in the past are faithfully recorded by the WSTRS data set. Therefore, WSTRS is an incomplete document with many missing transactions. However, the two critical pieces of information that are used in the TLM analysis are the primary waste additions and the solids level measurements, which are well represented in WSTRS.

The missing transactions largely involve intertank transfers within WSTRS for the SST's. These missing transactions do lead to a larger uncertainty for the compositions of the concentrated products of evaporator operations, which are salt cake, salt slurry, and supernatant. We estimate that as many as 25% of all transactions are missing from this data set, with perhaps as many as 60-80% of these missing transactions being associated with the evaporator operations. Although we may be able to recover some of this information in the future, our strategy at this time incorporates these unknown transactions into uncertainties in the concentrated products of evaporator operations.

For the DST's, our WSTRS is a much better representation of all of the transactions. Therefore, we hope to resolve the solids unknowns for the DST's in terms of the SST's solids losses.

III. Description of the TLM Spreadsheets

We create tables (App. D) that describes the solids histories for each tank with the following columns:

Column Headings	Descriptions
Tank	tank number
Year	year of last primary addition and year of solid measurement
Qtr	quarter of last primary addition and qtr of solid measurement
Meas. solids	reported solids from Anderson-91 in kgal
Solids change	calculated solids based on primary fill record or difference between solids records
Pred layer	kgal predicted layer now in tank
Layer type	Defined Waste Type for that layer
Waste volume	sumation of primary waste additions calculated for this time period
Comments	various details of each calculation

Sludge Accumulation from Primary Waste

This uncertainty for inter-tank transactions means that we differentiate between primary waste additions on the one hand, to each of which we associate a solids vol%, and precipitated salts due to concentration by evaporation, where we simply assume that the reported solids volume represents those precipitates. We begin our analysis by associating a solids volume percent (vol%) with each primary waste stream. We derive these solids vol% by observing the solids volumes reported in Anderson-91 and comparing those solids accumulations with the primary waste additions that are recorded in WSTRS, as shown in Appendix B. The result of this analysis is a solids volume percent with a range of values that we associate with the inherent variability of the process, and are shown in Appendix C for the defined waste types that are described in the Defined Waste document.

Not all of the waste types have adequate solids reports associated with them. For these waste types, we assign a nominal value based on similarity to other waste types where there exists a solids vol%, and use that nominal value in our analysis. For example, a total of 810 kgal of Hot Semi-Works waste, HS, was added to several tanks in C Farm, but these additions only constituted a small fractions of the total solids present in any of these tanks. Therefore, and we have assumed a nominal 5 vol% solids for that waste type.

Each TLM spreadsheet table shows the primary waste additions and the solids that we expect from those additions based on the characteristic vol% for that waste type. We compare this prediction with the solids level reported for the tank and indicate either an unknown gain or loss for this tank. Once a layer is "set" in the tank, its volume appears in Pred. layer and type in Layer type, thus comprising a chronological layer order from the bottom of a tank to the top, where each layer is described in terms of a volume and a type. Note that lateral variations are not accounted in this model, and therefore this model only derives an average layer thickness. We make no claims about the lateral heterogeneity of those layers.

There are two main sources for variations in the solids vol% for each waste type. First, there is an inherent variability in each process stream, which we largely attribute to process variations. Second, solids can be added to or removed from tanks by inadvertent entrainment during other supernatant transfers. In addition to these sources of variation, there are a number of other minor sources of solids changes such as compaction, subsidence following removal of interstitial liquid, and dissolution of soluble salts by later dilute waste additions. Other solids variations may be due to metathesis and other chemical reactions, such as degradation of organic complexants over time in waste tanks.

We assign a solids change to variability when it falls within the range that we have established. If a change in solids falls outside of this range, then we attempt to associate the gain or loss of solids with a waste transfer to or from another tank, or to dissolution of soluble salts.

Diatomaceous Earth/Cement

Diatomaceous Earth an effective and efficient waste sorbent material was added to the following waste storage tanks BX-102 (1971), SX-113 (1972), TX-116 (1970), TX-117 (1970), TY-106 (1972) U-104 (1972). The additions of diatomaceous earth were used to immobilize residual supernatant liquid in tanks where the liquid removal by pumping was not feasible. The conversion factor in the TLM for Diatomaceous Earth (DE) is 0.16k gal/ton and Cement (CEM) or (CON) is 0.12k gal/ton. CON was added to the following BY-105 (1977), SX-103 (1965-66), SX-107 (1965), SX-108 (1965), and SX-110 (1965).

Salt Cake Accumulation

Once a tank becomes a "bottoms" receiver, we assume from that point on and to the end of the Evaporator Campaign that any solids that accumulate are salt cake or salt slurry. Salt cake can be any one of seven different types, depending on which evaporator campaign created it. These are BSltCk (242-B), T1SltCk (early 242-T), T2SltCk (later 242-T), BYSltCk (ITS #1 and #2 in BY Farm), RSltCk (SX self-concentration), SSltCk (first 242-S), and ASltCk (first 242-A) and Table 2 describes the various evaporator campaigns that resulted in concentration of waste and precipitation of solids at Hanford. For salt cake accumulation, we assume that all of the solids that are reported are salt cake. *Other evaporations included the self-concentration of* REDOX waste *in* SX-Farm, use of REDOX-plant evaporator for tank wastes, and use of B-Plant evaporator for tank wastes.

The two later campaigns for 242-S and 242-A evaporators we have assigned as salt slurries (S2SltSlry and A2SltSlry) to differentiate these highly concentrated liquors from those of previous evaporator campaigns. Our salt slurry definitions roughly correspond to what is known as double-shell slurry or DSS, but salt slurry in fact also includes other concentrates now identified as salt cakes. The details of the TLM analysis are shown in Appendix D for SE quadrant, and the spreadsheet format is also described.

Appendix A

Glossary of Hanford Terminology
March 1995

This is a glossary of Hanford terminology that has been compiled to aid in definition of Hanford tank "jargon". These definitions have come from so many different sources that it is difficult to name them all. A lot of these terms have come from Anderson-91, Jungfleisch-84, and from Strode-93. Where there have been conflicting uses of the same term, it is indicated, and where there is uncertainty as to an exact meaning, a "??" appears to indicate that uncertainty.

If you have any corrections/additions/deletions to this glossary, please send them to: Stephen F. Agnew, M/S J586 Los Alamos National Laboratory, Los Alamos, New Mexico 87545, or fax to 505-667-0851.

AC	air circulator (term located WHC-SD-WM-ER-204, Rev.0)
ACCEPTABLE	Thermocouples with measured resistance value within normal limits and an indicated temperature within expected range. (term located WHC-SD-WM-TI-553, Rev.0)
ACGIH	American Conference of Governmental Industrial Hygienists
ACL	air circulator lines (term located WHC-SD-WM-ER-204, Rev.0)
ACQ	acquisition (term located WHC-SD-WM-TI-553, Rev 0)
Active Drywell	Drywell in which radiation readings of greater than 50 counts/second are detected. To be considered "active", these readings must be consistent as to depth and radiation level for repeated readings.
ADD	Add primary waste from process.
ADJ	Adjustment to waste amount. See also CORR, COOL, and LEAK.
AG	above grade (term located WHC-SD-WM-ER-204, Rev.0)
AGE	Aging waste. See also AGING
AGING	Aging waste. See also AGE
AGING WASTE	High level, first cycle solvent extraction waste from the PUREX plant (NCAW) (term located Tank and Surveillance and Waste Status Summary Report)
AIHA	American Industrial Hygiene Association
AIR LIFT CIRCULATOR	The air lift circulators are installed in aging tanks to promote mixing of the supernate. By maintaining motion within the body of the liquid, the circulators minimize superheat buildup and, consequently, minimize bumping.
ALARA	as low as reasonably achievable (term located WHC-EP-0791)
ALE	Arbitrary-Lagrangian-Eulerian

ALE	Arbitrary-Lagrangian-Eulerian
ANL	Argonne National Laboratory (term located WHC-EP-0702, Rev 0)
ANNULUS	The annulus is the space between the inner and outer shells on DSTs. Drain channels in the insulating and/or supporting concrete carry any leakage to the annulus space where conductivity probes are installed. (term located Tank and Surveillance and Waste Status Summary Report)
ANSI	American National Standard Institute
A Plant	See also PUREX-Plant CARB, CWP, and OWW
APM	ammonium phosphomolybdate (term located WHC-EP-0791)
AQUELLW	Aqueous liquids (term located WHC-EP-0791)
ARM	area radiation monitor
AR Vault	PSL (PUREX sludge) was sluiced from A - and AX-Farms and placed here for caustic wash to remove Cesium and acid dissolution for feed to B-Plant. AR-002 (or TK-002) was slurry receiver in AR-Vault. Solids are then transferred to TK-004, acidified, and the PAS (PUREX Acidified Sludge) transferred to TK-003. Any solids left in TK-004 following acid dissolution are caustic digested and transferred to back TK-002 for the next cycle.
ASAP	As soon as possible
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AW	NEUTRALIZED CURRENT ACID WASTE
B	B-Plant HLW. Also identifies waste returned to tanks from Sr recovery. Also used as destination, B-Plant, for Cs/Sr recovery. $BiPO_4$ ran in B-PLANT from Apr. 1945 to Oct. 1952, while Cs/Sr recovery from tank farms ran from 1967 to 1976, and Cs/Sr recovery from NCAW and CAW ran from 1967-72, and then from 1983-91. B-Plant's mission from '67 was to take the acid stream from PUREX through Cesium and Strontium recovery operations.
CBUSTL	combustible solids and liquids (term located WHC-EP-0791)
BC	TRU Solids from B-Plant Processing of CC
BCD	binary code decimal
B86ON	DILUTE, NON-COMPLEXED WASTE FROM B-PLANT CELL DRAINAGE
BF	breather filter (term located WHC-SD-WM-ER-204, Rev.0)
BFSH	B-Plant Flush

BG	below grade (term located WHC-SD-WM-ER-204, Rev.0)
$BIPO_4$	First process for separating Pu, in B-222 and U-222, 1944-56. Left U in waste. See also MW, 1C, and 2C.
BIX	B-Plant Ion Exchange
BIXBN	??
BIXRI	??
BL	B-Plant low level. From '68-'76 added to AX-103, BX-101, B-101, and C-106. Wash(?) waste after concentration in cell 23 (i.e. low solids). 3.6 vol% solids.
BLANK SPACE	Blank space indicates riser contents unknown. See also Riser (term located WHC-SD-WM-TI-553, Rev.0)
BLEB	B-Plant low level evaporator bottoms
BLIX	B-Plant Low Level Ion Exchange?
BLIXB	B-Plant Low Level Ion Exchange bottoms?
BM	bench mark (term located WHC-SD-WM-ER-204, Rev.0)
BN	??
BNW	Battelle Northwest Laboratory Waste
BP	TRU SOLIDS FROM B-PLANT PROCESSING OF PFP
BPDCC	DILUTE, COMPLEXED WASTE FROM B-PLANT CESIUM PROCESSING. See also CSR and BPDCC.
BPDCS	DILUTE, COMPLEXED WASTE FROM B-PLANT STRONTIUM PROCESSING
BPDCV	DILUTE, COMPLEXED WASTE FROM B-PLANT VESSEL CLEAN-OUT
BPFPS	B-PLANT HIGH TRU SOLIDS FROM RETRIEVED PFP SOLIDS
BPLCS	DILUTE, NON-COMPLEXED WASTE FROM B-PLANT STRONTIUM PROCESSING
BPLDC	DILUTE, COMPLEXED WASTE FROM B-PLANT CESIUM PROCESSING
BPLDN	DILUTE, NON-COMPLEXED WASTE FROM B-PLANT CESIUM PROCESSING
BM	Benchmark (term located SD-RE-TI-053 Rev. 8)
BR	TRU Solids from B-Plant Processing - NCRW

BS	B-Plant Pretreated Solids
BUMPING, TANK BUMP	A tank bump occurs when solids overheat in the lower portion of the tank. The hot solids are mixed with the cooler fluid either by operation of the airlift circulators (ACLs) or by natural means. The hot solids rapidly transfer heat to the liquid, some of which quickly vaporizes. The sudden pressurization caused by vapor generation is called a "bump".
BVCLN	DILUTE, NON-COMPLEXED WASTE FROM B-PLANT VESSEL CLEAN-OUT
B/W	black and white
CAM	continuous air monitor
CARB	CARBONATED WASTE—same as OWW. See also A-Plant, PUREX Plant, CWP, and OWW.
CAS	Cascade, this process filled three or more tanks with one pump by using overflow lines. Normal use was with a sequence of tanks numbers 101, 102, 103, or 110, 111, 112. See also SET and END.
CASCADE	Eleven of the Single-Shell Tank Farms (all except the AX-Tank Farm), were equipped w/ overflow lines between tanks. The tanks were connected in series and were placed at different elevations creating a down hill gradient for liquids to flow from one tank to another. See also CAS, SET, and END. (See also WSTRS Doc.,Cascade Transfer Sect. IV, NE WHC-SD-WM 615, NW WHC-SD-WM-669, SW WHC-SD-WM-614)
CASS	Computer Automated Surveillance System (term located WHC-SD-WM-TI-553, Rev 0)
CAW	Current Acid Waste—this is PUREX acid waste, also called HAW or IWW. See also HAW, IWW, and PAW.
CB	??
CC	Complexant Concentrate. Term refers to concentrates of solutions that have TOC's greater than 10 g/L. Usually associated with EDTA and HEDTA salts. See also CCPLX and CPLX.
CCGL	B-PLANT HIGH TRU SOLIDS FROM RETRIEVED COMPLEXED CONCENTRATE
CCGR	DILUTE, NON-COMPLEXED WASTE FROM RETRIEVED COMPLEXED CONCENTRATE
CCPLX	Complexant Concentrate. See also CC and CPLX
CCW	Concentrated Customer Waste
CCW	counter-clockwise ref. LA-UR-92-3196
CD	??

CDE	committed effective dose equivalent (term located WHC-EP-0702, Rev 0)
CDF	TRAC Composition Data File or Transaction Flag Key—unit volume assumed to make stream active.
CE	Evaporator Concentrate
CE	crown ether (term located WHC-EP-0791)
Cell 23	Waste from cell 23 at B-Plant. Cell 23 contained an evaporator and was used not only during B-Plant operations, but to reduce tanked waste as well.
CEM	Concrete. See also CON.
CF	Cesium Feed
CH_4	methane (term located WHC-EP-0702, Rev 0)
CHP	cascade heel pit (term located WHC-SD-WM-ER-204, Rev.0)
CWHT	Concentrated Waste Holding Tank
C layer	convective layer
CLEAN 31	CLEAN Option HLW stream (term located WHC-EP-0791)
CLELLW	CLEAN Option LLW stream (term located WHC-EP-0791)
CMPO	N-diisobutylcarbamoylmethylphosphine oxide (term located WHC-EP-0791)
CON	Concrete. BY-105 (1977), SX-103 (1965-66), SX-107 (1965), SX-108 (1965), and SX-110 (1965). See also CEM.
COND	Condensate-see also EVAP, and EB.
COND	Condition (term located WHC-SD-WM-TI-553, Rev 0)
COOL	Change in waste volume due to cooling? See also ADJ, COOL, CORR, and LEAK.
CORR	Correction to waste amount. See also ADJ, COOL, and Leak.
CP	condenser pit (def from WHC-SD-WM-ER-204, Rev. 0)
CP	Concentrated Phosphate waste (from 100 N-Reactor decontamination). See also N.
C-Plant	Strontium Semi-Works. Called C-Plant or Hot Semi-Works earlier, was pilot for both REDOX and PUREX, Jul. 1952 to Jul. 1956. Then reconfigured for Strontium Recovery Pilot Plant from July 1960 to July 1967. See also SSW and HS.
CPLX	Complexed Waste. See also CC, and CCPLX

CPP	cascade pump pit (term located WHC-SD-WM-ER-204, Rev.0)
CPU	central processing unit (term located WHC-EP-0791)
CRIB	Ground site for low level supernatants (from tanks) or condensates (from evaporators). NW (T-105 - T-107, T-018, T-021 - T-023, T-025, T-026, T-032, TY-CRIB, TY-1) and NE (B-##, S-##, T-##, A-008, A-024, B-007, B-008, B-014, B-016, B-018, B-035, B-037, B-040, B-042, and B-049.
CRT	cathode ray tube
CR Vault	Facility located adjacent to C Farm, used for scavenging campaign following Uranium recovery, 1952-58. Ferrocyanide was added to tank supernatants in CR-Vault, and then the slurry was returned to C-Farm for settling, forming in-farm sediments.
CSFD	Cesium Feed?
CSIX	cesium ion exchange (term located WHC-EP-0791)
CSKW	??
CSP	cascade sluice pit (term located WHC-SD-WM-ER-204, Rev.0)
CSR	Tank supernatant was sent to B-Plant for Cesium recovery using C-105 as a staging tank. From 1967-76, 21,724 kgal was sent to and 26,290 kgal returned from B-Plant. See also IX, and BPDCC.
CST	Caustic Solution, 0.01 M NaOH.
CSWLE	COMPLEXED SALT WELL LIQUID EAST AREA
CSWLW	COMPLEXED SALT WELL LIQUID WEST AREA
CTW	??Caustic waste for makeup??
CVR	metal cover plate (term located SD-RE-TI-053 Rev. 8)
CVS	Compostion Variability Study (term located WHC-EP-0791)
CW	Cladding Waste
CWP	Cladding Waste PUREX. See also A-Plant, PUREX Plant, and OWW.
CWP/Zr	Cladding waste from PUREX 1966-70 that used Zirflex process on Zircaloy clad fuel elements. See also PD and NCRW.
CWR	Cladding Waste-REDOX. See also REDOX and R.
CX70	DILUTE, COMPLEXED (MIXTURE) HOT SEMI-WORKS TRU SOLIDS
1D	one-dimensional

2D	two-dimensional
3D	three-dimensional
D	TRAC Transaction Flag Key-Amount by difference.
DACS	data acquisition control system (term located WHC-SD-WM-TI-553, Rev 0)
DAS	data acquisition system
DBA	design basis accident
DC	Dilute Complexed waste characterized by a high content of organic carbon including organic complexants: see also, EDTA, HEDTS, and IDA
D & D	decontamination and decommissioning (term located WHC-EP-0791)
DCH 18-Cr-6	dicyclohexano 18-crown-6 ether (term located WHC-EP-0791)
DCS	Dilute Caustic Solution
DDT	deflagration to detonation transition
DE	Diatomaceous Earth added to BX-102 (1971), SX-113 (1972), TX-116 (1970), TX-117 (1970), TY-106 (1972) U-104 (1972).
DEF	??
DF	decontamination factor (term located WHC-EP-0791)
DIL	Dilute Feed for Evaporator input. Interstitial liquid that is not held in place by capillary forces, and will therefore migrate or move by gravity. See also DILFD
DILFD	Dilute Feed. See also DIL.
DISS	dissolver (term located WHC-EP-0791)
Diversion Box	A below-grade concrete enclosure containing the remotely maintained jumpers and spare nozzles for diversion of waste solution to storage tank farms.
DN	Dilute Non-Complexed Waste (i.e. contains no complexants) defined as waste with TOC <1wt% (10 g/L). See also DN/PD, DN/PT,PFP, PRF, TRU, Z, and 224
DN/PD	DN with P TRU solids. See also DN, DN/PT, P, PFP, PRF, TRU, Z, and 224.
DN/PT	DN with PFP TRU solids. See also DN, DN/PD, P, PFP, PRF, TRU, Z, and 224.
DOD	US Department of Defense
DOE	US Department of Energy

DOE/RL	DOE/Richland (Field Office)
Double-Shell Slurry (DSS)	Double-Shell Slurry (from EOFY 77 inventory?). This waste is a concentrate of DSSF, but with a TOC<10g/L (<1wt% TOC is NC). Waste that exceeds the sodium aluminate saturation boundary in the evaporator without exceeding receiver tank composition limits. DSS is considered a solid. See also DSS and DSSF (Double-Shell Slurry Feed)
Double-Shell Slurry Feed (DSSF)	Waste concentrated just before reaching the Sodium Aluminate saturation boundary in the evaporator without exceeding receiver tank composition limits. This form is not as concentrated as DSS. See also DSS and DSSF
DOUBLE-SHELL TANK	The newer one million gallon underground waste storage tanks consisting of a concrete shell and two concentric carbon steel liners with an annular space between the liners.
DP	Dilute Phosphate Waste
DP	differential pressure (term located LA-UR-92-3196 Rev 0)
DP	distributor pit (term located WHC-SD-WM-ER-204, Rev.0)
DRCVR	Dilute Receiver Tank
DRYWELL	A steel casing, generally 6 inches in diameter, drilled into the ground to various depths, and used to insert monitoring instruments for measuring the presence of radioactivity or moisture content. (term located Tank and Surveillance and Waste Status Summary Report)
DSS	Double Shell Slurry (from EOFY 77 inventory?). This waste is a concentrate of DSSF, but with a TOC<10g/L (<1wt% TOC is NC).
DSSF	Double Shell Slurry Feed
DST	double-shell tank (term located WHC-EP-0791)
DTPA	diethylene-triamine-penta-acetic acid (term located WHC-EP-0791)
DUMM	Dummy Waste. See also Dummy.
DUMMY	Dummy Waste. See also DUMM
DW	Decontamination Waste
DWBIX	DECONTAMINATION WASTE AND B-PLANT ION EXCHANGE
E	Transaction Flag Key-Waste transferred through evaporator.
E	emergency
E	east (term from WHC-SD-WM-ER-204, Rev.0)
E-Stop	emergency stop

EAC	energy absorption capacity
EB	Evaporator Bottoms. See also COND and EVAP.
EDE	effective dose equivalent
EDTA	ethylenediaminetetraacetic acid (term located WHC-EP-0791). See also, DC, HEDTA, and IDA
EF	Evaporator Feed
EFD	Evaporator Feed Dilute
EGR	episodic gas release (term located WHC-EP-0702, Rev 0)
ELEVATION	surveyed at riser flange (term located SD-RE-TI-053 Rev. 8)
END	Disconnect Cascaded Tanks. See also CAS, and SET.
EP	enclosure pit (term located WHC-SD-WM-ER-204, Rev.0)
EPRI	Electric Power Research Institute
ERPG	emergency response planning guideline
ERDA	Energy Research and Development Administration
ES&H	Environment, Safety, and Health
ESPIP	Efficient Separations and Process Integrated Program (term from WHC-EP-0791)
EV	Evaporation
EVAP	EVAPORATOR LOSSES
EVAP	Evaporator connected to tank. See also COND and EB.
EVAPF	DILUTE, NON-COMPLEXED WASTE FROM EVAPORATOR PAD FLUSH
EVFD	Evaporator Feed Tank
EVS	Partial neutralization in 242-S Evaporator.
EVT	HEDTA destruction in 242-B or 242-T evaporators.
F	Food Instrument Company (FIC) Automatic Surface Level Gauge (term located Tank and Surveillance and Waste Status Summary Report)
FAILED	Thermocouples with either open circuits or loop resistance. (term located WHC-SD-WM-TI-553, Rev.0)
F/B	flange with bale (term from WHC-SD-WM-ER-204, Rev.0)

FCT	flux-corrected transport
FD	Feed Dilute
FDC	functional design criteria
FeCN	Ferrocyanide wastes created during a scavenging campaign in 1953-57. See also SCAV, P00, T00, PFeCN1, PFeCN2, and TFeCN
FEM	finite-element method
FFTF	Fast Flux Test Facility
FIC	A Food Instrument Corporation Automatic Liquid Level Gauge based on a conductivity probe. At Hanford they are electrically connected to a computer for data transmission, analysis, and reporting. Local readings may also be obtained from a dial. (term located Tank and Surveillance and Waste Status Summary Report)
FIRST AND SECOND CYCLE DECONTAMINATIO N WASTES	Waste contained 10 percent of the original fission product activity and 2 percent of the product. By-product cake solution was mixed with product waste and neutralized with 50 percent caustic. This waste contained a mixture of suspended solids, hydroxides, carbonate and phosphate, scavenger metals, and chromium, iron and sodium, silicofluoride. See also 1C and 2C.
F/L	flange with lead (term fromWHC-SD-WM-ER-204, Rev.0)
FIC	Automatic liquid level Sensor - tape with weight (term located WHC-SD-WM-TI-553, Rev 0)
FLSH	Flush water.
FM	flow meter (term located LA-UR-92-3196 Revised)
FM-approved	factory mutual-approved (term located LA-UR-92-3196 Revised)
FP	Fission Product Waste. Cs and Sr recovery began in 222-B in 1967. Cs was removed from PUREX SU (PAW) and Sr from PUREX SL (PAS), and both from Acidic Waste.
FTIR	Fourier transform infrared (term located WHC-EP-0702, Rev 0)
FV	field verify
GA	Gain to tank
GAS	SLURRY GROWTH AS A RESULT OF GAS GENERATION
GC	gas chromatograph (term located LA-UR-92-3196 Revised)
GIT	Georgia Institute of Technology (term located WHC-EP-0702, Rev 0)

GOOD	Indicated temperature compares favorable to the temperature measured by another thermocouple in a Liquid Observation Well. (term located WHC-SD-WM-TI-553, Rev.0)
GRD	riser at grade (term located WHC-SD-WM-ER-204, Rev.0)
GRE	gas release event (term located WHC-EP-0702, Rev 0)
GROUP	A group of tanks where ITS averaged the supernatant phases. See also ITS.
GROUT	OUTFLOW TO THE GROUT FACILITY
GRTFD	Grout Feed Tank
GTCC	greater than Class C (term fromWHC-EP-0791)
GUNITE	A building material consisting f a mixture of cement, sand, and water that is sprayed onto a mold.
H_2	Hydrogen (term located WHC-EP-0702, Rev 0)
H_2O	Water. See also WTR.
HASP	Health and Safety Plan
HAW	Aging waste from PUREX/PFM Processing NPR Nuclear Fuel. See also CAW, IWW, NCAW, and PAW.
HazOP	hazards and operability study
HDRL	Hanford Defense Residual Liquid
HEAT	A tank correction. See also CORR, COOL, and LEAK.
HEDTA	N-(2-hydroxyethyl)ethylene (term located WHC-EP-0702, Rev 0)
HEPA	high-efficiency particulate air (term located WHC-EP-0702, Rev 0)
HHI	Health Hazard Index (term fromWHC-EP-0791)
HIGH LEVEL WASTE	Waste from the fuel reprocessing operations in separations plants. (term located LA-UR-92-3196 Revised)
HJ	heel jet (term fromWHC-SD-WM-ER-204, Rev.0)
HLO	Hanford Lab Operations Waste
HLW	High Level Waste—generic for all Hanford Tank Wastes.
HP	heel pit (term fromWHC-SD-WM-ER-204, Rev.0)
HMS	Hanford Meteorological Station

HMS/TRAC	hydrogen mixing study/transient reactor analysis code (term located LA-UR-92-3196 Revised)
HOT-SEMI	See also HS, and SSW.
HS	Hot Semi-Works. A pilot facility that had a variety of operations. See also C-Plant, and SSW.
HSA	Hanford Strategic Analysis (term located WHC-EP-0791)
HTWRS	Hanford tank Waste Remediation System
HVAC	heating, ventilating, and air conditioning
HWVP	DILUTE, NON-COMPLEXED WASTE FROM THE VITRIFICATION PLANT (term fromWHC-EP-0791)
I/O	input-output (term located LA-UR-92-3196 Revised)
I&S	Tank Isolated and Stabilized
IC	Synonym (misspelling?) for 1C-1st cycle decontamination waste-$BiPO_4$. See also MW, 2c, $BiPO_4$
ICE	Implicit Continuous Eulerian (term located LA-UR-92-3196 Revised)
ICEBC	?? (1st cycle evaporator bottoms concentrate??)
ICF	Consolidated Incinerator Facility (term located WHC-EP-0791)
ICO	DILUTE NON-COMPLEXED WASTE FROM TERMINAL CLEANOUT.
IDA	iminodiacetate. See also, DC, EDTA, and HEDTA.
IDEF	Integrated Computer-Aided Manufacturing (ICAM) Definition (Language) (term located WHC-EP-0791)
IDLH	imminently (or immediately) dangerous to life or health (term located LA-UR-92-3196 Revised)
IH	instrument house (term fromWHC-SD-WM-ER-204, Rev.0)
II	Interim Isolated. The 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. (term located Tank and Surveillance and Waste Status Summary Report)
INEL	Idaho National Engineering Laboratory (term located WHC-EP-0791)
INST	CHANGE IN TANK LEVEL DUE TO CHANGE IN INSTRUMENTATION

Interstitial Liquid Level (ILL)	Liquid that resides in the voids/interstices of the solids.
INTRUSION MODE FIC SETTING	The FIC probe is positioned a short distance above the waste surface. If the surface level of the waste in the tank increases, thereby touching the probe tip, a pointive indication is received.
INTRUSION PREVENTION (IP)	This is an administrative designation reflecting the completion of the physical effort required to minimize the addition of liquid into an inactive storage tank, process vault, catch tank, sump, or diversion box. (term located Tank and Surveillance and Waste Status Summary Report) See also IP.
IP	instrument house (term fromWHC-SD-WM-ER-204, Rev.0)
IP	Intrusion Prevention.
ISO	Tank is Interim-Isolated
ISV	in-situ vitrification (term located WHC-EP-0791)
ITS	In-Tank Solidification-Program using steam evaporators inside of certain tanks on BY-Farm. ITS#1 ran 1965-70 in BY-102 (a pilot demonstration was also run in BY-101) and ITS#2 ran 1968-74 in BY-112. During 1971-74, ITS#1 used as cooler instead of a heater. See also GROUP
IWW	INORGANIC WASH WASTE TO SST—same as P or NCAW. Refers to HAW or PAW. See also CAW, HAW, NCAW, and PAW
IX	Ion Exchange. Identifies waste returned from Cs recovery. See also CSR, and BPDCC.
IXROW	??Ion-Exchange REDOX Organic Wash??
JEG	joint evaluation group (term located LA-UR-92-3196 Revised)
JET PUMP	A modified commercially available low capacity jet pump used as a salt well pump.
KNUCKLE	Point where the side wall and the bottom curved surface of a tank meet.
LaF	Lanthanum Fluoride waste generated in Plutonium Finishing Plant Operation from 1945-??. See also 224-F.
LANCE	OUT FLOW DUE TO LANCING OF TANK
LANH	heavy lanthanides (term located WHC-EP-0791)
LANL	Los Alamos National Laboratory
LANL	light lanthanides (term located WHC-EP-0791)
LATERALS	Horizontal dry well under A-Farm and certain SX-Farm waste storage tanks. (term located Tank and Surveillance and Waste Status Summary Report)

LB	Iriser top has plate flange with lifting bale - possible concrete plug under (term located SD-RE-TI-053 Rev. 8)
LE	lead encasement (term fromWHC-SD-WM-ER-204, Rev.0)
LEAK	Tank leak volume. See also ADJ, COOL, and CORR.
LEAK DETECTOR	fixed liquid level sensor - tape with weight (term located SD-RE-TI-053 Rev. 8)
LEAK DETECTION PIT	Collection point for any leakage fro AM-Farm Tanks. The pits are equipped with radiation and liquid detection instruments.
LEL	lower explosive limit (term located WHC-EP-0702, Rev 0)
LETF	LIQUID EFFLUENT TREATMENT FACILITY FROM N REACTOR.
LFL	lower flammability limit (term located WHC-EP-0702, Rev 0)
LIQUID OBSERVATION WELL (LOW)	Tank Leak Volume. See also ADJ, COOL, and CORR.
LIT	automatic liquid indicator tape (term located SD-RE-TI-053 Rev. 8)
LLI	manual liquid level indicator (term located SD-RE-TI-053 Rev. 8)
LLR	liquid level reel (term located WHC-SD-WM-ER-204, Rev.0)
LLR	manual liquid level sensor - tape with weight (term located SD-RE-TI-053 Rev. 8)
LLW	low-level waste (term fromWHC-EP-0791)
LO	Loss from tank. (term fromWHC-SD-WM-ER-204, Rev.0)
LOW	liquid observation well
LUNC	DILUTE, NON-COMPLEXED WASTE FROM UNC FUELS FABRICATION FACILITY
LW	Laboratory Waste
L222S	222S Lab Dilute Non-Complexed Waste
L3A4A	Dilute Non-Complexed Laboratory Wastes from 300 and 400 areas.
M	Manual Tape Surface Level Gauge (term located Tank and Surveillance and Waste Status Summary Report)
MAB	maximum allowable burp (term located LA-UR-92-3196 Revised)

MARGINAL	Thermocouple with higher than normal (0.5 ohms to 20 ohms depending on length) loop resistance, higher than normal resistance in one lead to ground, or having some other abnormality, e.g. inconsistent resistance measurements. (term located WHC-SD-WM-TI-553, Rev.0)
MAWB	maximum allowable window burp (term located LA-UR-92-3196 Revised)
MAXSPD	maximum speed parameters (term located LA-UR-92-3196 Revised)
MCC	Motor Control Center (term located LA-UR-92-3196 Revised)
MEB	maximum expected burp (term located LA-UR-92-3196 Revised)
Metal Waste	Waste from the extraction containing all the Uranium, approximately 90% of the original fission product activity, and approximately 1% of the product. This waste was brought just to the neutral point with 50% caustic and then treated with and excess of sodium carbonate. This procedure yielded almost completely soluble waste at a minimum total volume. The exact composition minimum total volume. The exact composition of the carbonate compounds was not known but was assumed to be a Uranium Phosphate Carbonate mixture.
MIE	minimum ignition energy (term located WHC-EP-0702, Rev 0)
MIT	multifunction instrument tree (term located WHC-SD-WM-TI-553, Rev 0)
MJTG	Mitigation Joint Test Group (term located LA-UR-92-3196 Revised)
MOS	metal-oxide semiconductor (term located LA-UR-92-3196 Revised)
MPR	multiport riser (term located LA-UR-92-3196 Revised)
MS	mass spectrometer (term located LA-UR-92-3196 Revised)
MW	Metal Waste from $BiPO_4$. 90% of FP, all of U, 1% of Pu . See also1C, and 2C.
MW	maximum window (term located LA-UR-92-3196 Revised)
MWB	maximum window burp (term located LA-UR-92-3196 Revised)
MWF	Metal Waste Feed? Set to water in TRAC.
N	N-Reactor waste. See also CP.
N	north (term fromWHC-SD-WM-ER-204, Rev.0)
N2	Nitrogen
NCBUSTS	noncombustible solids (term located WHC-EP-0791)
NC layer	nonconvective layer (term located LA-UR-92-3196 Revised)

NCAW	Neutralized Current Acid Waste primary HLW stream from PUREX process. See also CAW, HAW, IWW, and PAW.
NCPLEX	Non-Complexed Waste. See also NCPLX
NCPLX	Non-Complexed Waste term applied to all Hanford Site liquors not identified as complexed.. See also NCPLEX
NCRW	Neutralized Cladding Removal Waste—Same as CWP/Zr. See also CWP/Zr, and PW.
NDAA	National Defense Authorization Act (term located WHC-EP-0702, Rev 0)
NE	northeast quadrant of tank (term fromWHC-SD-WM-ER-204, Rev.0)
NEC	National Electrical Code (term located LA-UR-92-3196 Revised)
NEPA	National Environmental Policy Act (term located WHC-EP-0702, Rev 0)
NFPA	National Fire Protection Association (term located LA-UR-92-3196 Revised)
Neutralized PUREX Acid Waste	The original plant in 1956 neutralized all of the high-level waste and sent it to the A-241 Tank Farm. As fission product recovery started, a portion of the waste was treated for Strontium Recovery and then neutralized. As of 1967 all of the High-Level Waste left PUREX as an acid solution for treatment at B-Plant. See also P, and PL
nf	does not show at surface, not in a pit - no surface access
NFAW	AGING WASTE FROM PUREX/PFM HIGH LEVEL WASTE (FFTF-NCAW)
NFPA	National Fire Protection Association
NHAW	AGING WASTE FROM PUREX/PFM PROCESSING OF NPR FUEL
NH_3	ammonia (term located WHC-EP-0702, Rev 0)
N_2O	Nitrous Oxide (term located WHC-EP-0702, Rev 0)
NIOSH	National Institute of Occupational Safety and Health (term located LA-UR-92-3196 Revised)
NIST	National Institute of Standards and Technology (term located LA-UR-92-3196 Revised)
NIT	HNO_3/$KMNO_4$ solution added during evaporator operation (Neutralization in Transit?) See also PNF.
NOx	oxides of nitrogen (term located WHC-EP-0791)
NPH	Normal Paraffinic Hydrocarbon, was diluent used in Uranium Recovery and PUREX processes, and is close to Dodecane, $C_{12}H_{26}$.

NRAW	AGING WASTE FROM PUREX/PFM RESIDUE ACID WASTE (FFTF-NCAW)
NRC	US Nuclear Regulatory Commission (term fromWHC-EP-0791)
NRP82	DILUTE, NON-COMPLEXED WASTE FROM FY82 100-N AREA WASTE TRANSFER
$NRPO_4$	DILUTE, PHOSPHATE WASTE FROM 100 N AREA
$NRSO_4$	DILUTE, NON-COMPLEXED WASTE FROM 100 N AREA
NSSFC	National Severe Storms Forecast Center (term located LA-UR-92-3196 Revised)
NW	northwest quadrant of tank (term fromWHC-SD-WM-ER-204, Rev.0)
OFFGAS	cell air and offgas (term located WHC-EP-0791)
OP	observation port (term fromWHC-SD-WM-ER-204, Rev.0)
Open Hole Salt Well	A well in which a pump is inserted in solid waste. Frequently used to remove the liquid from tanks containing less than 2 feet of sludge. See also Salt Well.
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 and then a Sodium Carbonate wash. See also OWW.
ORR	operational readiness review (term located WHC-EP-0702, Rev 0)
OSD	operational safety document
OSHA	Occupational Safety and Health Administration
OSR	Operational Safety Requirement
OTHHI	Other upper limit (term located WHC-EP-0791)
OUTX	Transfer from Tank_n out to either a secondary processing operation or to a crib. See also TR.
OVM	organic vapor monitor (term located WHC-EP-0702, Rev 0)
OWW	Organic Wash Waste from PUREX. Evidently, this was combined with P waste in 1960-61, but usually kept separate. See also A-Plant, PUREX Plant, and CWP-CARB.
P	PUREX HLW, 1956-72. Sometimes assumed to be 50% OWW. Used NPH/TBP to extract both Pu and U. Np was also extracted from 1963-72. See also DN, and PL.
P	Photo Evaluation (term located Tank and Surveillance and Waste Status Summary Report)

P&IDs	piping and instrument diagrams .
P00-P##	In-Plant scavenging with FeCN. See also SCAV, T00-T##
PADFG	PUREX AMMONIA DESTRUCTION WASTE, FROM FUELS GRADE FUEL
PADWG	PUREX AMMONIA DESTRUCTION WASTE, FROM WEAPONS GRADE FUEL
PAS	PUREX Acidified Sludge—refers to sludge that has been sluiced from waste tanks and acidified to 0.1 M HNO_3 (as part of Cs/Sr recovery) in AR-Vault.
PASF	PUREX AMMONIA SCRUBBER FEED. Waste that derives from the scrubber for the cladding dissolves off gas.
PAW	PUREX Acidified Waste. Also used to refer to Aluminum Cladded Fuel (as opposed to ZAW for Zirconium Cladded Fuel). See also CAW, HAW, IWW, NCAW, and PAW.
PCOND	PUREX condensate
PCONDCRIB	PUREX condensate to crib.
PD	PUREX decladding waste. See also CWP/Zr, NCRW, and PN.
PDBNG	DECLADDING SLUDGE (NON-TRU) FROM B-PLANT PROCESSING
PDBSU	DILUTE, NON-COMPLEXED WASTE FROM B-PLANT DECLADDING WASTE
PDBTG	B-PLANT AGING WASTE SOLIDS FROM PUREX DECLADDING WASTE
PDCSS	DILUTE NON-COMPLEXED PUREX DECLADDING WASTE, FY 1986 ONLY
PDL87	PUREX DECLADDING SUPERNATANT, 1987
PDL89	PUREX DECLADDING SUPERNATANT, NON TRU, SPENT METATHESIS REMOVED
PD/PN	Plutonium-Uranium Extraction (PUREX) Neutralized Cladding Removal Waste (NCRW), transuranic waste (TRU). See also (PUREX Decladding)
PDNSG	NON-TRU DECLADDING SLUDGE FROM PUREX
PDS87	PUREX DECLADDING SLUDGE
PDS89	PUREX DECLADDING SLUDGE AFTER FY89
PDSLG	PUREX DECLADDING SLUDGE SOL PUREX
PDSUP	DILUTE, NON-COMPLEXED WASTE PUREX DECLADDING WASTE
PFD	process flow diagram (term located WHC-EP-0791)

PFeCN1	Ferrocyanide sludge produced by in-plant scavenging of waste from Uranium recovery. Used 0.005 M Ferrocyanide. See also FeCN, TFeCN, UR, P00, T00.
PFeCN2	Same as PFeCN1, except used 0.0025 M Ferrocyanide.
PEL	permissible exposure limit
PFM	??? (See also NCAW, NFAW, NRAW, and NHAW).
PFMMS	DILUTE, NON-COMPLEXED WASTE FROM SHEAR/LEACH PROCESSING OF NPR FUEL
PFP	Pu Finishing Plant waste.. See also DN, DN/PD, DN/PT, P, PRF, TRU, Z, and 224
PFPGR	DILUTE, NON-COMPLEXED WASTE FROM RETRIEVED PFP SOLIDS
PFPNT	NON-TRU SLUDGE FROM THE PFP SOL Z-PLANT
PFPPT	DILUTE, NON-COMPLEXED WASTE FROM THE PFP (WITH TRUEX). See also TRUEX
PFPSL	HIGH-TRU SLUDGE FROM THE PFP SOL Z- PLANT
PI	Partially Interim Isolated. The administrative designation reflecting the completion of the physical effort required for Interim Isolation except for isolation of riser and piping that is required for jet pumping or for other methods of stabilization. (term located Tank and Surveillance and Waste Status Summary Report)
PL	PUREX Low-Level. See also P.
PLC	programmable logic controller
PML89	PUREX SPENT METATHESIS LIQUID AFTER FY89
PMS89	PUREX SPENT METATHESIS SOLIDS AFTER FY89
PN	PUREX, Neutralized cladding waste. See also CWP, NCRW and PD.
PNF	Partial Neutralization Feed. Indicates addition of nitric acid at an evaporator in an attempt to produce more salt cake during volume reduction. See also NIT.
PNL	Pacific Northwest Laboratory
PP	pump pit (term located WHC-SD-WM-ER-204, Rev.0)
PRA	probabilistic risk assessment
PRF	Plutonium Reclamation Facility—Type of waste generated in Z-Plant for "finishing wastes". Solvent based extraction process using CCl4/TBP. See also DN, DN/PD, DN/PT, P, PFP, TRU, Z, and 224.

PSA	probabilistic safety assessment
PSICSF	pump system installation containment seal fixture
PSL	PUREX sludge sluiced during recovery of Sr.
PSS	PUREX Sludge Supernatant.
PSSF	PUREX Sludge Supernatant Feed?
PT	Plutonium Finishing Plant (PFP) TRU Solids. TRU solids from 200W.
PT100	TRU waste from ??
PUREX	Also called A-Plant where PUREX process ran from Jan.1952-Jun. 1972, then was in standby and ran again from Nov. 1983 to 1991, and is now shutdown (see also P, CWP, OWW). See also A-Plant, CWP, CARB, and OWW
PUREX Decladding	
PWM	pulse width modulated
PX86S	DILUTE, NON-COMPLEXED WASTE FROM PUREX MISC. STREAMS (NPR FUEL) FY 86
PXBAW	B-PLANT AGING WASTE SUPERNATANT FROM RETRIEVED AGING WASTE
PXBSG	B-PLANT AGING WASTE SOLIDS FROM RETRIEVED AGING WASTE
PXFTF	DILUTE, NON-COMPLEXED WASTE FROM PUREX MISC. STREAMS (FFTF)
PXLOW	PUREX LOW LEVEL WASTE THAT WENT TO SST
PXMET	PUREX DILUTE, NON-COMPLEXED DECLADDING: SPENT METATHESIS
PXMSC	DILUTE, NON-COMPLEXED WASTE FROM PUREX MISC. STREAMS (NPR FUEL)
PXNAW	AGING WASTE FROM PUREX HIGH LEVEL WASTE
QA	quality assurance
R	REDOX waste was generated from 1952 to 1966. It used methylisobutylketone (hexone) as a solvent, and extracted both uranium and plutonium. (S-Plant) Ran from Jan. 1952 to Dec. 1967.
RADIUS	distance of riser center from tank center (term located SD-RE-TI-053 Rev. 8)
RAM	random access memory
RCC	??REDOX CC??

RCOND	REDOX Condensate.
RCONDCRIB	REDOX Condensate to Crib.
REC	Receive from Trans_tank and are always positive. Trans_tank will always be one of the primary 177 waste tanks. See also SEND, TR, and XFER.
REDOX	Also know as S-Plant where REDOX process ran 1952-66? See also R, and CWR.
RESD	Residual Evaporator Liquor
RISER	pipe leading into tank dome See also Blank Space.(term located SD-RE-TI-053 Rev. 8)
Riser ( )	riser is within a pit
Riser P/CP	riser is recessed below a cement pad with an access plate at grade (term located SD-RE-TI-053 Rev. 8)
RIX	REDOX Ion Exchange. See also RTX, and SIX
RP	receiving pit (term located WHC-SD-WM-ER-204, Rev.0)
RMC	Remote Mechanical C-Line—Process used in Z-Plant.
RSN	REDOX Supernatant
RSS	REDOX Sludge Supernatant
RSS	remote supervisory station
RTD	Resistance Temperatue Detector (term located WHC-SD-WM-TI-553, Rev 0)
RTX	REDOX Ion Exchange. See also SIX, and RIX
S	Transaction Flag Key-Partial Neutralization (PNF).
S	south (term located WHC-SD-WM-ER-204, Rev.0)
S	Sludge Level Measurement Device (term located Tank and Surveillance and Waste Status Summary Report)
SA	safety assessment
Salt Cake	Crystallized Nitrate and other salts deposited in waste tanks, usually after active measures are taken to remove moisture. (term located Tank and Surveillance and Waste Status Summary Report)
Salt Well	A hole drilled or sluiced into a salt cake and lined with a cylindrical screen to permit drainage and jet pumping of interstitial liquors.
SAR	safety analysis report

SC	safety class
SCAV	Scavenging campaign with FeCN on TBP, 1952-57. See also T00-T##, P00-P##, and Scavenged.
Scavenged	Waste which has been treated with Ferrocyanide to remove Cesium for the supernatant by precipitating it into the sludge. See also SCAV
SCBA	self-contained breathing apparatus
scf	standard cubic feet (term located WHC-EP-0702, Rev 0)
SCH	schedule
SCO	safety condition for operation
SCWO	supercritical water oxidation (term located WHC-EP-0791)
SD	standard deviations (term located WHC-EP-0702, Rev 0)
SD	slurry distributor (term located WHC-SD-WM-ER-204, Rev.0)
SDRCSF	slurry distributor removal containment seal fixture
SE	southeast quadrant tank (term located WHC-SD-WM-ER-204, Rev.0)
SE	solvent extract (term located WHC-EP-0791)
SEND	Transfer from Tank_n to Trans_tank and is always negative. Trans_tank will always be one of the primary 177 waste tanks. See also TR and XFER.
SET	Connect cascaded tanks together. See also CAS and END.
SF	Slurry feed?
SIZE	Nominal pipe diameter of riser (in inches) (term located SD-RE-TI-053 Rev. 8)
SIX	REDOX Ion Exchange. See also RTX, and RIX.
SL	Sludge (Solids formed during sodium hydroxide additions to waste. Sludge usually was in the form of suspended solids when the waste was originally received in the tank from the waste generator. In-tank photographs may be used to estimate the volume.
SLS	solid/liquid separation (term located WHC-EP-0791)
SLT	sludge level tape (term located WHC-SD-WM-ER-204, Rev.0)
SL3SY	DOUBLE-SHELL SLURRY FROM EOFY 80 SY-103 INVENTORY
SLUD31	Sludge Wash C HLW stream (term located WHC-EP-0791)

Slugs	An early term for Uranium Fuel Elements which had been machined or extruded into short cylinders which were then clad or encased in corrosion-resistant metals.
SLULLW	Sludge Wash C LLW stream
SMP	sludge measurement port (term located WHC-SD-WM-ER-204, Rev.0 & SD-RE-TI-053 Rev. 8)
SN	sluicing nozzle (term located WHC-SD-WM-ER-204, Rev.0)
SOE	safe operating envelope
SOLEX	Solvent Extraction Option (term located WHC-EP-0791)
SP	sluice pit (term located WHC-SD-WM-ER-204, Rev.0)
SPARE	spare riser with no current function or planned use - possible concrete plug underneath plate (term located SD-RE-TI-053 Rev. 8)
SpG	Specific Gravity(term located SD-RE-TI-053 Rev. 8)
S-PLANT	See REDOX
SREX	Strontium extraction (term located WHC-EP-0791)
SPRG	Sparge-transfer of water or volume?
SR	SST Solids Retrieved
SR	sluicing riser (term located WHC-SD-WM-ER-204, Rev.0)
SRCVR	Slurry Receiver Tank
SREX	Strontium extraction
SRR	Slurred PUREX sludge from A and AX-Farms was sent to B-Plant for strontium recovery from 1967-76. Some 801 kgal was sent to and 2810 kgal returned from B-Plant with AX-103? and A-102? as a staging tanks?
SRS	Strontium Recovery Supernatant. The sludges sluiced for SRR were washed in AR vault with supernatant from C-105. The resulting supernatants were sent to CSR.
SRS	shock response system
SRS	Savannah River Site (term located WHC-EP-0791)
SRSS	square root of the sum of the squares
S.S.	Evidently refers to a direct addition from plant, bypassing the first tank in a cascade series.

SS	stainless steel
SSC	stainless steel carbon
SST	single-shell tank (term located WHC-SD-WM-ER-204, Rev.0)
ST	short term
Strontium Semi-Works (SSW)	Strontium Semi-Works. Called C-Plant or Hot Semi-Works earlier, was pilot for both REDOX and PUREX, Jul. 1952 to Jul. 1956. Then reconfigured for Strontium recovery pilot plant from July 1960 to July 1967. See also C-Plant and HS.
STAB	Tank stabilized by removal of liquid. Both floating suction and salt-well jet pumps are used to remove liquid.
STAT	Tank level measurement for each quarter in kgal (1 kgal = 1,000 gallons) as reported by Anderson.
SU	Supernatant (Drainable Liquid Remaining minus Drainable Interstitial. Supernate is usually derived by subtracting the solids level measurement from the liquid level measurement.
SURFACE LEVELS	The surface level measurements in all waste storage tanks are monitored by manual or automatic conductivity probes, and recorded and transmitted or inputted to the Computer Automated Surveillance System (CASS). (term located Tank and Surveillance and Waste Status Summary Report)
SUPERNATE	The liquid above the solids in waste storage tanks. (term located Tank and Surveillance and Waste Status Summary Report)
SV	Transaction Flag Key-Amount by difference in solids.
SW	SST Washed Solids
SW	southwest quadrant of tank (term located WHC-SD-WM-ER-204, Rev.0)
SWA	Sludge Wash A (term located WHC-EP-0791)
SWB	Sludge Wash B (term located WHC-EP-0791)
SWC	Sludge Wash C (term located WHC-EP-0791)
SWLIQ	DILUTE, NON-COMPLEXED WASTE FROM EAST AREA SINGLE-SHELL TANKS
SWLQW	DILUTE, NON-COMPLEXED WASTE FROM WEST AREA SSTs
SWP	salt well pump (term located WHC-SD-WM-ER-204, Rev.0)
SW RCR	Salt well receiver
SWPS	salt well pump and screen (term located WHC-SD-WM-ER-204, Rev.0)

SWS	salt well screen (term located WHC-SD-WM-ER-204, Rev.0)
Tank Farm	An area containing a number of storage tanks; i.e., a chemical tank farm for storage of chemicals used in a plant, or underground waste tank storage or radioactive waste.
TBD	to be determined (term located WHC-SD-WM-TI-553, Rev 0)
TBP	Tri-Butyl Phosphate-waste from solvent based Uranium Recovery operation in '50's. Renamed to UR waste in the Defined Waste report. More usually refers to the chemical Tributyl Phosphate, $OP(OC_4H_9)_3$, which was used in Uranium Recovery and in PUREX.
TBX	instrument leads of several kinds - usually on annulus of tank (term located SD-RE-TI-053 Rev. 8)
TC	thermocouple (term located WHC-SD-WM-TI-553, Rev 0)
TCIX	technetium ion exchange (term located WHC-EP-0791)
TCT	thermocouple tree
TEMP	temperature probe (term located SD-RE-TI-053 Rev. 8)
Terminal Liquor	The liquid product from the Evaporation-Crystallization Process which, upon further concentration, forms an unacceptable solid for storage in single-shell tanks. Terminal liquor is characterized by caustic concentration of approximately 5.5 M (the caustic molarity will be lower if the Aluminum Salt Saturation is reached first). See also HDRL.
TGA	thermal gravimetric analysis
TFeCN	Ferrocyanide sludge produced by in-tank or in-farm scavenging. See also FeCN, PFeCN, UR, P00, T00.
TH	Thoria HLW or Cladding waste
THFTCA	tetrahydrofurantetracarboxylic acid (term located WHC-EP-0791)
THL	Thoria Low Level
TL	Terminal Liquor
TLV	threshold limit value
TLV-C	threshold limit value-ceiling
TLV-STEL	threshold limit value-short-term exposure limit
TLV-TWA	threshold limit value-time weighted average
TMACS	tank monitor and control system (term located WHC-SD-WM-TI-553, Rev 0)

TOC	total organic carbon (term located WHC-EP-0791)
T00-##	In-Tank scavenging with FeCN-see also SCAV, P##
TP	temperature probe (term located WHC-SD-WM-ER-204, Rev.0)
TPA	Tri-Party Agreement includes DOE, Washington State Dept. of Ecology, and the EPA
TPLAL	DILUTE, NON-COMPLEXED WASTE FROM T PLANT
TPLAN	DILUTE, NON-COMPLEXED WASTE FROM T PLANT
T-Plant	Decontamination plant for various equipment. Originally built for $BiPO_4$ process, but since only used for decontamination. $BiPO_4$ ran from Dec. 1944 to Aug. 1956.
TPLAS	SLUDGE FROM T PLANT OPERATIONS
TR	Transfer from tank. See also REC, SEND, and XFER
TRAC	transient reactor analysis code
trFlag	Transaction Flag Keys—used by W-TRAC—See also CDF,D,E,S,SV,1,3,6,.17,.33.
TRG	test review group
TRU	Transuranic. See also DN, DN/PD, DN/PT, P, PFP, PRF, Z, and 224.
TRUEX	Transuranic Extraction. See also PFPPT.
TRUEX-C	Transuranic Extraction Option C (term located WHC-EP-0791)
TRULLW	TRUEX-C LLW stream (term located WHC-EP-0791)
TRUX31	TRUEX-C HLW stream (term located WHC-EP-0791)
TSR	technical safety requirement
TTL	transistor-transistor logic
TWA	time-weighted logic
TXR Vault	Vault in TX-Farm used in FeCN scavenging in TX-Farm.
U1U2	DILUTE, NON-COMPLEXED WASTE FROM U1/U2 GROUNDWATER PUMPING
UFL	upper flammability limit (term located WHC-EP-0702, Rev 0)
UOR	unusual occurrence report

U-Plant	Uranium Recovery plant (see also UR, TBP) from Mar. 1952 to Jan. 1958, UO_3-plant from then until Sept. 1972. Restarted in Mar. 1984, and is now shutdown.
UPS	uninterruptible power supply
UREX	uranium extraction (term located WHC-EP-0791)
USNRC	US Nuclear Regulatory Commission
UNKN	UNKNOWN WASTE ORIGIN SINK
UR	Uranium Recovery Operation in 222-U, 1952-57. Created TBP (primary waste) and FeCN (scavenging wastes). TBP waste called UR waste in Defined Waste report. See also, TFeCN, PFeCN, P00, T00, FeCN.
UREX	Uranium extraction
USBM	US Bureau of Mines (term located WHC-EP-0702, Rev 0)
USQ	Unreviewed Safety Question (term located WHC-EP-0702, Rev 0)
UT	ultrasonic transducer
UX-241	???
V & V	validation and verification
VAQUELLW	varied aqueous liquids (term located WHC-EP-0791)
VCBUSTL	varied combustible solids and liquids (term located WHC-EP-0791)
VDTT	velocity, density, thermocouple tree
VM	vapor manifold (term located WHC-SD-WM-ER-204, Rev.0)
VOF	volume of fluid
VOFFGAS	varied cell air and offgas (term located WHC-EP-0791)
VNCBUSTS	varied noncombustible solids (term located WHC-EP-0791)
VSD	variable speed drive
W	west (term located WHC-SD-WM-ER-204, Rev.0)
WASHF	OUTFLOW TO SST WASH FACILITY
Waste Tank Safety Issue	A potentially unsafe condition in the handling of waste material in underground storage tanks that requires corrective action to reduce or eliminate the unsafe condition. (term located Tank and Surveillance and Waste Status Summary Report)

Watch List Tank	An underground storage tank containing waste that requires special safety precautions because it may have a serious potential for release of high-level radioactive waste because of uncontrolled increases in temperatures or pressure. Special restrictions have been placed on these tanks by "Safety Measures for Waste Tanks at Hanford Nuclear Reservation," Section 3137 of the National Defense Authorization Act for Fiscal Year 1991, November 5, 1990, Public Law 101-501 (Also known as the Wyden Amendment) (term located Tank and Surveillance and Waste Status Summary Report)
WATER	FLUSH WATER FROM MISCELLANEOUS SOURCES. See also WTR, and H_2O
WC	weather cover (polyurethane foam) (term located WHC-SD-WM-ER-204, Rev.0)
WHC	Westinghouse Hanford Company
WIPP	Waste Isolation Pilot Plant (term located WHC-EP-0791)
WMIS	Waste Management Information System (term located WHC-EP-0791)
WTR	Water. See also WATER and H_2O
WVDP	West Valley Demonstration Project (term located WHC-EP-0791)
WVP	Waste Volume Projections
XFER	Transfer of waste out of tank. See also REC, SEND, and TR.
XIN	Addition of primary waste from plant (always positive). This transaction also covers waste returning from secondary processing operations.
Z	234-5Z waste/Z-Plant Pu Finishing. See also DN, DN/PD, DN/PT, P, PFP, PRF, TRU, and 224.
ZAW	Zirconium Acidified Waste (PUREX waste stream from Zirconium (Zircaloy II) cladded fuel.
ZPA	zero period acceleration
Z-Plant	Pu Finishing plant. See also DN, DN/PD, DN/PT, P, PFP, PRF, TRU, Z, and 224. Operated from 1949 to 1991, and is now in standby
ZHIGH	DILUTE, NON-COMPLEXED WASTE FROM THE PFP (WITHOUT TRUEX)
ZLAB	DILUTE, NON-COMPLEXED WASTE FROM PFP LABORATORIES
ZLOW	DILUTE, NON-COMPLEXED WASTE FROM PRE-FY85 Z PLANT OPERATIONS
ZPRFL	DILUTE, NON-COMPLEXED WASTE FROM PRF PROCESSING
ZPRFS	PFP TRU SOLIDS FROM PRF PROCESSING

ZRMCL	DILUTE, NON-COMPLEXED WASTE FROM PFP RMC PROCESSING
ZRMCS	PFP TRU SOLIDS FROM PFP RMC PROCESSING
0.17	TRAC code transaction flag key—monthly volumes derived from semi-annual reports.
0.33	TRAC code transaction flag key—monthly volumes derived from quarterly reports.
1	TRAC-transactions based on monthly report
3	TRAC-transactions based on quarterly report.
6	TRAC-transactions based on semi-annual report.
5-6#	Cells 5&6 from B-Plant
1AYIN	CONCENTRATED COMPLEX WASTE FROM AY-101 INVENTORY
1AZIN	PRE 2-81 AZ-101 INVENTORY
6AWIN	CONCENTRATED PHOSPHATE WASTE IN AW-106 INVENTORY
1C	1st cycle decontamination-BiPO4 process. Often included cladding waste. Held 10% of FP, 1% of Pu. See also BiO_4, MW, and 2 C.
1CEB	1st cycle evaporator bottoms
1CF	??1st cycle feed?? Set to WATER in TRAC.
1CS	1st Cycle Scavenging waste. TY-101 and TY-103 received 1C waste that was scavenged with FeCN before it was added to the tanks. Termed 1CFeCN.
2C	2nd Cycle Waste from BiO_4 process. Supernatant often cribbed, 0.1% of FP, 1% of Pu. See also BiO_4 MW, and 1C.
222-B	B-Plant used for $BiPO_4$ 1944-52, then for FP recovery.
222-T	T-Plant used for $BiPO_4$ 1944-52.
222-U	One of the three original Bismuth Phosphate Processing Facilities. Later converted to a Uranium Recovery Plant.
224	224-U Waste. See also DN, DN/PD, DN/PT, P, PFP, PRF, TRU, and Z
224-F	224-U Waste. LaF Pu Finishing Plant. Same as Z-Plant? See also LaF.
224-2	Same as 224?
224-U	See also 224-F.

231-Z	DILUTE, PHOSPHATE WASTE FROM Z-231 LABORATORIES
242-A	Reduced pressure evaporator in East Area designed for 30% solids. A-102 was feed 1977-1980. AW-102 was feed 1981-present.
242-B	Atmospheric evaporator used for concentrating wastes, 1952-56. B-106 was feed tank.
242-S	Reduced pressure evaporator designed for 30% solids 1973-80. S-102 was feed '73-'77. SY-102 was feed '77-'81.
242-T	Atmospheric evaporator used to concentrate wastes. 1952-56 and 1965-76. TX-118 was feed tank.
2AYIN	PRE 2-81 AY-102 INVENTORY
2AZIN	PRE 2-81 CONCENTRATED COMPLEX WASTE FROM AZ-102 INVENTORY
2C	2nd Cycle Decontamination Waste from $BiPO_4$ process. Supernatant often cribbed, 0.1% of FP, 1% of Pu.
2SYIN	PRE 2-81 SY-102 INVENTORY
3AWIN	PRE 2-81 AW-103 INVENTORY
5AWIN	PRE 2-81 AW-105 INVENTORY
6AWIN	CONCENTRATED PHOSPHATE WASTE IN AW-106 INVENTORY

Note on transactions involving:

CAS-Cascades that "overfill" are assumed to have been directed to low-level "sites" (cribs or trenches?). No MW or R was cascaded to low-level sites.

EVAP-Operations involving evaporators are assumed to change the waste by the difference in the transaction and status reports.

R-REDOX plant used concentrator 1967-72.

B-B-PLANT used concentrator 1967-68.

All definitions in caps were taken from the Waste Volume Projection Data Set.

Capacities and Tanks

55 kgal	530 kgal/SST	758 kgal/SST	1,000 kgal/SST	1,000 kgal/DST	1,160 kgal/DST
B-200 C-200 T-200 U-200	B-100 BX-100 C-100 T-100 U-100	BY-100 S-100 TX-100 TY-100	A-100 AX-100 SX-100	AY-100 AZ-100	AN-100 AP-100 AW-100 SY-100
NE Quadrant B-200 C-200	B-100 BX-100 C-100	BY-100	A-100 AX-100		
SW Quadrant U-200	U-100	S-100	SX-100		
NW Quadrant T-200	T-100	TX-100 TY-100			
SE and DST Quadrant				AY-100 AZ-100	AN-100 AP-100 AW-100 SY-100

Appendix B

Solids Volume Per Cent

Table B1
1C Waste vol% Solids.

tank	start	qtr.	end	qtr.	waste type	pri.vol.	acc.sol.	vol%
BX-107	1948	3	1951	2	1C	1590	437	27.5
C-107	1947	1	1947	4	1C	1588	399	25.1
TX-109	1949	1	1950	2	1C	3032	722	23.8
U-110	1946	3	1951	1	1C	1394	336	24.1
avg.	**1947**	**1**	**1951**	**2**	**1C**	**7604**	**1894**	**24.9**
B-107	1945	2	1946	2	1C	1590	220	13.8
C-110	1946	2	1947	4	1C	1589	231	14.5
T-107	1945	1	1947	4	1C	1590	201	12.6
avg.	**1945**	**1**	**1947**	**4**	**1C**	**4769**	**652**	**13.7**

Table B2
REDOX Solids.

tank_n	year	qtr	lineal date	kgal CWR	kgal REDOX	acc. solids	vol%	comments
S-101	1954	2	1954.3	349	2082	186	8.9337	310 CWR
S-104	1954	2	1954.3	284	2429	218	8.9749	284 CWR
S-107	1972	1	1972	2895	2157	194	8.994	at least 663 CWR
S-110	1952	3	1952.5	152	1983	101	5.0933	152 CWR
SX-101	1955	3	1955.5		3743	447	11.942	seems high
SX-104	1956	3	1956.5		2668	191	7.1589	
SX-105	1967	2	1967.3		372	23	6.1828	
SX-107	1964	2	1964.3	5	2364	146	6.176	
SX-108	1964	2	1964.3		2618	145	5.5386	
SX-109	1962	3	1962.5		1756	250	14.237	seems high
SX-110	1966	2	1966.3		1621	62	3.8248	
SX-111	1965	4	1965.8		2863	125	4.366	
SX-112	1966	4	1966.8		2352	112	4.7619	
SX-113	1958	2	1958.3		487	10	2.0534	
SX-114	1965	2	1965.3		3575	200	5.5944	
SX-115	1960	3	1960.5		967	10	1.0341	
U-110	1954	2	1954.3	814	1192	??		814 CWR
					REDOX total	REDOX solids	% solids	
					34037	2420	7.1099	

Table B3
In Plant PFeCN/1 and PFeCN/2 Ferrocyanide Sludges.

	PFeCN/1	PFeCN/2	units	my totals	B&S totals	units
FeCN M	0.005	0.0025	M			
pri. vol.	10901	22460	kgal	33361	33861	kgal
acc.sed.	403	718	kgal	1115	1393	kgal
vol% sed.	3.70	3.20	vol%	3.36	4.11	vol%
FeCN sed.	0.14	0.078	M			
density	1.45	1.45	g/cm3			
pred. wet exotherm	42	24	cal/g			
pred. dry exotherm	106	61	cal/g			

Table B4
In-Tank (or in-farm) TFeCN Waste vol% Solids.

waste type	tank	primary volume	accumul. solids	vol% solids
TFeCN	C-108	1034	15	1.5
	C-109	2954	44	1.5
	C-111	2732	35	1.3
	C-112	4442	67	1.5
TFeCN	avg.	11162	161	1.4

Table B5
PUREX P Waste vol% Solids.

tank	start	qtr.	end	qtr.	waste type	pri.vol.	acc.sol.	vol%
A-101	1956	1	1973	4	P	4545	83	1.83
A-102	1956	1	1961	3	P	7138	102	1.43
A-103	1956	2	1960	3	P	3813	102	2.68
A-104	1959	3	1961	4	P	6765	171	2.53
AX-104	1966	3	1969	2	P	1202	47	3.91
avg.	**1956**	**1**	**1973**	**4**	**P**	**23463**	**505**	**2.15**
A-106	1960	4	1962	2	P	1460	118	8.08
AX-101	1968	2	1969	2	P	40	??	??
AY-101	1971	2	1971	4	P	14	??	??
C-104	1970	4	1976	2	P	91	??	??

Table B6
PUREX Cladding Waste (CWP) Waste vol% Solids.

tank	start	qtr.	end	qtr.	waste type	pri.vol.	acc.sol.	vol%
C-101	1960	4	1962	2	CWP/Al	660	56	8.5
C-103	1960	2	1960	4	CWP/Al	479	35	7.3
C-104	1956	1	1957	2	CWP/Al	1118	90	8.1
C-105	1957	3	1960	2	CWP/Al	3130	262	8.4
C-106	1958	2	1960	2	CWP/Al	420	28	6.7
avg.	**1956**	**1**	**1965**	**2**	**CWP/Al**	**5807**	**471**	**8.1**
C-102	1960	3	1965	2	CWP/Al	5355	184	3.4
C-104	1969	4	1970	1	CWP/Zr	535		
C-104	1970	2	1972	3	CWP/Al	3816	108	2.5
C-102	1965	3	1969	4	CWP/Al&Zr	6448	??	??
C-107	1961	3	1962	2	CWP/Al	1364	??	??
C-108	1961	2	1961	2	CWP/Al	502	??	??
C-111	1957	1	1960	4	CWP/Al	347	??	??
C-112	1960	3	1961	2	CWP/Al	254	??	??

Appendix C

Defined Waste List Solids Vol%

August 1994

This Defined Waste List is a set of wastes that can be used to define all of Hanford's waste types. Implicit within this list is a solids and a supernatant fraction for each waste type. Note that some Defined Wastes are derived from other Defined Wastes, as Salt Slurry, for example, is actually a mixture of supernatants from other waste types that have been concentrated by removal of water.

$BiPO_4$ and Uranium Recovery Wastes 1944-56

no.	waste type	vol %	comments
1.	MW44-51	12	
2.	MW52-56	12	
3.	1C44-51	13.7	includes CW
4.	1C52-56	24.9	
5.	2C44-51	6.8	
6.	2C52-56	3.4	includes supernatants formerly cribbed at T-plant
7.	224	3.9	LaF finishing waste
8.	UR/TBP	2.8	same as TBP waste
9.	PFeCN1	3.7	Ferrocyanide scavenged UR supernatants in Plant
10.	PFeCN2	3.2	Ferrocyanide scavenged UR supernatants in Plant
11.	TFeCN	1.4	Ferrocyanide scavenged CR Vault
12.	1CFeCN	6.5	Ferrocyanide scavenged 1C supernatants

REDOX Wastes 1952-62

no.	waste type	vol %	comments
13.	R52-58	8.9	
14.	R59-67	2.3	
15.	CWR/Al52-60	8.1	
16.	CWR/Al61-72	2.9	

PUREX Wastes 1956-76

no.	waste type	vol %	comments
17.	P56-62	2.2	
18.	P63-67/IWW, FP	3.9	also called IWW, FP
19.	P68-72/IWW, FP		same as p63-67
20.	PL	2.2	
21.	CWP/Al56-60	8.1	Al cladding

22.	CWP/Al61-72	4	Al cladding
23.	CW/Zr66-72	4	Zr cladding
24.	OWW56-62	0.6	also called CARB
25.	OWW63-67	1.1	
26.	OWW68-72	0.6	
27.	Z/PFP	8	derived from analysis of SY-102, 1,910 kgal from1976-80 sent to TX-118, 1,656 kgal from 19.
28.	HS/SSW	2	Strontium semi-works waste definition taken from Lucas.
29.	TH66/Thoria	5.8	
30.	TH70/Thoria	5.8	
31.	AR Solids	4	"washed" P sludge. Also used to derive SRR.
32.	B	0.5	waste from PAW, processed through B-PLANT for Sr extraction.
33.	BL	2.5	low level waste from all operations
34.	SRR	5	strontium recovery waste from sluiced P sludge—based on washed PUREX sludge plus added EDTA, HEDTA, and glycolate.
35.	CSR	1	waste from cesium recovery from supernatants—not a characteristic waste type, but rather a supernatant from which the 137Cs has been removed. Need only to add citrate to supernatants to track this component.

Terminal Liquors and Concentrates (not HDW's)

CC	derived from analysis of AN-107. This waste, like DSS, derives from B-Plant addition of organic complexants during the Cs and Sr recovery operation. Therefore, its composition is related to the origin of those wastes.
CC	
Salt Slurry	same as DSS, estimated from chemical model by precipitation (via evaporator). Once again, DSS derives from the supernatants of a variety of wastes following evaporation of water..
DSSF	supernatant of Salt Slurry (or DSS)

Decontamination Waste

36.	DW	1	decontamination waste, from D&D of plants, but mainly from T Plant operations, mostly Turco residues (phenol, alkyl phosphate esters, hydroxy alkyl amines) with neutralized phosphoric acid.
37.	N	1	N-Reactor decontamination waste, mainly neutralized phosphoric acid. Concentrates of N are CP (Concentrated Phosphate) waste, which are in AN-106 and AP-102.

Salt Cakes and Salt Slurries

38.	BSltCk		
39.	T1SltCk		
40.	RSltCk		
41.	T2SltCk		
42.	BYSltCk		Allen, 1976.
43.	S1SltCk		Allen, 1976
44.	S2SltSlr		Salt Slurry
45.	A1SltCk		
46.	A2SltSlr		Salt Slurry

PUREX Wastes from 1983-88 Campaign

47.	P83-88	3.9	now called PXNAW or NCAW.
48.	PL83-88	2.2	now called PXMSC, among other things.
49.	CWP/Zr83-88	4	now called PD or NCRW.
	BP/Cplx83-88	?	was SSR, CSR, B, BL now it's all in AY-101.
	BP/NCplx83-88	?	don't know what this was, now in AY-102
50.	PASF83-88	?	PUREX Ammonia Scrubber Feed, never before seen.

Appendix D

Spreadsheet SE Tank Layer Model
March 1995

Appendix D include spreadsheet tables for the Double Shell Tanks (DSTs) in the SE Quadrant: *AN, AP, AW, AY, AZ, and SY.* Each TLM spreadsheet table shows the primary waste additions and the solids that we expect from those additions based on the characteristic vol% for that waste type. We compare this prediction with the solids level reported for the tank and indicate either an unknown gain or loss for this tank.The spreadsheets for the Tank Layer Model (TLM) is derived from the Waste Status and Transaction Record Summary (WSTRS) database. The purpose of the TLM is to predict the waste types and solids' volumes in each tank.

Once a tank becomes a "bottoms" receiver, we assume from that point on that any solids that accumulate are salt cake or salt slurry. Salt cake can be any one of seven different types, depending on which evaporator campaign created it. For additional information refer to Section III, pg 6, Salt Cake Accumulation:

Column Headings	Descriptions
Tank	tank number
Year	year of last primary addition and year of solid measurement
Qtr	quarter of last primary addition and qtr of solid measurement
Meas. solids	reported solids from Anderson-91 in kgal
Solids change	calculated solids based on primary fill record or difference between solids records
Pred layer	kgal predicted layer now in tank
Layer type	Defined Waste Type for that layer
Waste volume	sumation of primary waste additions calculated for this time period
Comments	various details of each calculation

Tank_n	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
AN-101	1981	1	0					
	1983	2		6		PL2	281	2.2%, Sent to AW-102.
	1984	2		1		BL	57	2.5%, Sent to AW-102.
	1985	2		3		PL2	143	2.2%, Sent to AY-102
	1985	3		0		N	50	0.1%, Sent to AY-102.
	1993	4	0	-10				unk loss

SE TLM Rev. 1

Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
1981	1	0					
1984	1		0		PL2	3	2.20%
1984	4	24					
1989	3	89	0				
1992	3				PL2	15	2.20%
1993	4	89	89				unk, assign A2SltSlry, SU from tanks throughout SE quad.

Tank_n	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
AN-103	1981	1	0	0				
	1984	1		2	2	BL	63	2.50%
	1984	3	63	61				REC from AN-104.
	1985	1	132					
	1986	2	912					
	1987	1	1285					ignore, bad measurement
	1988	2	937					
	1993	4	937	876				

n	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
AN-104	1981	1						
	1983	4		0		PL2	5	2.20%
	1984	3	19					Receive from AW-102.
	1984	4	18					
	1985	1	322	322				
	1987	1	264					
	1993	4	264	-58				Loss of gas due to venting.

Tank_n	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
AN-105	1981	1	0	0				
	1993	4	0	0				

	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
AN-106	1981	1	0	0				
	1987	1	17	17				Receive from AW-102
	1987	2	6	-11				unk loss
	1989	3	17					
	1993	4	17	11				unk gain

Tank_n	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
AN-107	1981	1	0	0				
	1987	1	92					
	1989	3	134					
	1993	4	134	134				solids due to salt slurry, some receives from AN-102 and AZ-102.

	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
AP-101	1986	3	0	0				
	1987	3		0		CW/ZR2	1	2.30%
	1989	4		19		PASF	1929	1%
	1993	4	0	-19				Sent to AW-102 and AP-103.

Tank_n	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
AP-102	1986	3	0	0		PASF	5	1%
	1993	4	0	0				Some sent to AW-102 and Grout.

	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
AP-103	1986	3		11		PASF	1068	1%
	1993	4	0	-11				Sent to AW-102 and AP-101.

Tank_n	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
AP-104	1986	3	0	2		N	794	1%
	1993	4	0	-2				Sent to AP-102

T	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
AP-105	1986	3	0	0				
	1993	4	0	0				Sent to AW-102.

Tank_n	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
AP-106	1986	3	0	0				
	1993	4	0	0				Sent to AP-105 and AW-102.

[illegible]	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
[illegible]	1986	3	0	0				
	1990	1		11		PASF	1115	1%
	1993	4	0	-11				unk loss

Tank_n	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
AP-108	1986	3	0	0				
	1990	1		1		PASF	110	1%
	1992	2		2		PL2	92	2.20%
	1993	4	0	-3				unk loss

	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
W-101	1980	3	0	0				
	1983	4		1		N	9	1%
	1986	1		61	61	PL2	2761	2.20%
	1987	3	84					
	1993	4	84	23				

Tank n	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
AW-102	1981	1	0	0				
	1982	2		0		BL	3	2.50%
	1983	2		0		PL2	21	2.20%
	1984	1	3	3				
	1984	4	1	-2				
	1986	3		20		PL2	898	2.20%
	1993	4	1	-22				Sent throughout SE quad.

n	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
AW-103	1980	3	0	0				
	1980	4	959	959				SU REC from AX-101 and A-101.
	1981	4	0					ignore
	1983	4		28		CW/ZR2	265	10.50%
	1983	4	3	-984				sent to AW-105 and AW-106
	1984	1		43		CW/ZR2	405	10.50%
	1984	1	47	1				
	1984	3		43		CW/ZR2	406	10.50%
	1984	3	340	250				unk gain
	1984	4	47					ignore
	1986	3		161		CW/ZR2	1535	10.50%
	1987	1	371	-130				
	1988	2		77		CW/ZR2	729	10.50%
	1988	3	330	-118				
	1988	4		13		CW/ZR2	122	10.50%
	1989	1	363	20				
	1991	1		1		PL2	10	10.50%
	1993	4	363	-1	363	CW/ZR2		

Tank_n	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
AW-104	1980	3	0	0				
	1982	4		0		PL2	13	2.20%
	1983	1		5	5	CW/ZR2	47	10.50%
	1984	1	13	8				
	1984	4	32	19			8558	unk gain, REC from AW-102
	1985	1	111	67				
	1986	1					270	REC from AW-102.
	1986	4		19		PL2	863	2.20%
	1987	1	381	251				
	1987	3		17		PL2	775	2.20%
	1987	3	290	-108			11200	Sent to AW-102.
	1991	2		61	98	PL2	2792	2.20%
	1993	4	290	-61			2317	Sent to AW-102

n	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
AW-105	1981	1	0	0				
	1983	1		0		BL	13	2.50%
	1984	1		30	14	PL2	1383	2.20%
	1984	1	14	-16				Sent to AW-101,AW-102, AZ-102 and AN-101.
	1984	3		10	24	PL2	474	2.20%
	1984	3		33		CW/ZR2	313	10.50%
	1984	3	223	166				
	1984	4	14					ignore
	1987	1		139	172	CW/ZR2	1322	10.50%
	1987	1	297	-65				
	1988	1					784	from A2EVAP
	1990	1		43	43	CW/ZR2	410	10.50%
	1992	4	-	1	1	PL2	58	2.20%
	1993	4	297	-44				unk loss

Tank_n	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
AW-106	1980	3	0					
	1982	4		1	1	BL	33	2.50%
	1984	1	53					Start receiving from AW-102.
	1985	1	85					
	1987	1	258					
	1989	2	283					
	1992	1	296					
	1993	4	296	296				

	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
AY-101	1971	2		0		P2	3	3.90%
	1971	2		2		B	318	0.50%
	1971	2	0	-2				unk loss
	1971	4		0		P2	11	3.90%
	1972	2		10		B	1979	0.50%
	1972	2	33	23				unk gain
	1972	3		3	13	B	582	0.50%
	1972	4		0		AR	4	4%
	1972	4	0					ignore, bad measurement
	1974	4	52	16	32	UNK (No Assign.)		unk gain (unk, no assignment)
	1975	2		1		SRR	17	5%, combined with1986 qtr.3 layer.
	1980	3	61	8				unk gain, rec from A-103 and AX-102.
	1981	4		5	5	BL	203	2.50%
	1982	2	50	-16				unk loss
	1984	3		7	7	CSR	711	1%
	1984	4		2		SRR	47	5%, combined with 1986 qtr.3 layer.
	1984	4		0		PL2	3	2.20%
	1984	4	71	12				unk gain
	1985	3		0		CSR	3	1%
	1986	3		5	8	SRR	101	5%
	1987	1	84	6				unk gain
	1987	2	83	-1				unk loss
	1988	4		0		BL	10	2.50%
	1991	4					37	from A2EVAP
	1993	4	83	0				

Tank n	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
AY-102	1971	2	0	0				
	1978	4	6	6				unk gain, possibly SltCk
	1980	2	21	15				REC from A-103.
	1982	2		0		PL2	20	2.20%
	1982	2		15	2	BL	594	2.50%
	1982	2	23	-13				unk loss, sent to AW-102 and A-102.
	1983	2		6	4	PL2	263	2.20%
	1987	1		65		BL	2589	2.50%
	1987	1	27	-67				unk loss, sent to AW-102, AZ-101, AN-102 and AN-101.
	1987	2		5	5	BL	183	2.50%
	1987	2	28	1				
	1988	1		25		BL	993	2.50%
	1988	1	32	-21				Sent to AW-102.
	1988	4		1		PL2	35	2.20%
	1992	4		1		DW	96	1%
	1992	4		41	26	BL	1630	2.50%
	1993	4	32	-41				Distributed throughout SE quad.

	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
AZ-101	1976	4	0	0				
	1978	1	3	3				REC from C-104 and C-106
	1978	3	1	-2				unk loss, sent to A-102.
	1980	2	52	51				unk gain
	1980	3	72	20				REC from AX-101.
	1981	4		1	1	PL2	46	2.20%
	1981	4	64	-9				Sent to AW-102.
	1982	2	17	-47				unk loss
	1982	4		1	1	BL	21	2.50%
	1982	4		0		PL2	16	2.20%
	1984	1	8	-11	6	UNK (No Assign.)		unk, no assignment
	1984	4		3		P3	82	3.9 %, combined with 1985 qtr 4 layer.
	1984	4	20	10				unk gain poss BL from AY-102.
	1985	1		7		P3	172	3.9% , combined with 1985 qtr 4 lalyer.
	1985	1	16	-4				unk loss
	1985	3		0		PL2	8	2.20%
	1985	4		17	27	P3	427	3.90%
	1985	4	27	-6				unk loss
	1986	1		2		P3	46	3.90%
	1987	1	48					
	1987	2	46					
	1987	4	54	25				unk gain
	1988	1	49					
	1988	2	47					
	1989	1	41					
	1989	2	37					
	1990	3	35					
	1993	4	35	-19				Sent to AY-102 and AZ-102.

Tank_n	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
AZ-102	1976	1	0	0				
	1978	1	30	30				
	1978	3	23	-7				Sent to A-102
	1980	2	2					ignore
	1980	4	6					unk loss
	1982	2	26		26	UNK (SRR)		unk gain, probably SRR
	1983	3		2				
	1983	4		2		PL2	100	2.20%
	1984	1	30	30				
	1984	3		1	3	PL2	34	2.20%
	1984	4	32	1	1	Z		Secondary transfers of Z from SY-102.
	1985	1	39	7				unk gain
	1985	4		2		BL	75	2.50%
	1985	4	18	-23				Sent to AW-102.
	1986	4		7		P3	185	3.90%
	1987	1	27	2				unk gain, REC from AN-101
	1987	2		0		P3	10	3.90%
	1987	2	61	34				unk gain
	1987	3		1		P3	32	3.90%
	1987	3	66	4				unk gain
	1987	4		0		P3	6	3.90%
	1987	4	62	-4				unk gain
	1988	1		1		P3	34	3.90%
	1988	1	74	11				unk gain
	1988	2		1		P3	21	3.90%
	1988	2	65	-10				unk loss
	1988	3		0		PL2	8	2.20%
	1988	3		2		P3	56	3.90%
	1988	3	77	10				unk gain
	1988	4		2	13	P3	46	3.90%
	1989	1	90	11				unk gain
	1989	2		0		P3	3	3.90%
	1989	2	88	-2				Sent to AY-102 and AZ-101.
	1990	1		0		P3	12	3.90%
	1990	3	91	3				unk gain
	1991	1		0		PL2	4	2.20%
	1992	2	95	4				unk gain
	1993	4	95	0	50	UNK (No Assign.)		unk, no assignment

	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
SY-101	1977	2	13	13		SltSlry		from 242S S2EVAP
	1977	3	26					Slurry Receiver
	1977	4	114					
	1978	3	135					
	1979	3	696					
	1984	4	1126	1113				
	1985	4	1121					
	1991	4	1090	-23				loss due to vent
	1993	4	1090					solids due to salt slurry

Tank_n	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
SY-102	1977	2	0	0				
	1977	4				NIT	52	
	1977	4	21	21				EVAP feed tank
	1978	1	87	66				unk gain, REC from S-103, U-102, U-105 and U-107
	1978	3	77	-10				unk loss, Sent to S-103, S-107 and U-107
	1978	4	83	6				unk gain, REC from S-107, S-102, SX-106 and U-111
	1979	3	105	22				unk gain
	1979	4	83	-22				unk loss
	1980	1	105	22	41	S2SltSlry		unk gain
	1984	3		64		Z	796	8%
	1984	4		18		DW	1786	1%
	1984	4	41	-146				pumped throughout SE
	1985	1		7		Z	86	8%
	1985	1		1		DW	77	1%
	1985	1	52	3				unk gain
	1987	1		4		Z	370	8%
	1987	1		7		DW	671	1%
	1987	1	54	-9				Sent to AY-102 and AZ-102
	1987	2		1	25	Z	11	8%
	1987	2		1	5	DW	96	1%
	1987	2	71	15				unk gain
	1990	1		5		DW	495	1%
	1992	1		14		Z	179	8%
	1993	4	71	-19				unk loss, sent to AY-102

n	Year	Qtr	Meas. solids	Solids change	Pred layer	Layer Type	Waste Volume	Comments
[illegible]03	1977	2	0	0				
	1980	4	135					XIN from S2EVAP
	1981	1	534					
	1981	2	523					
	1981	4	517					
	1984	4	521					
	1985	4	577					
	1993	4	577	577				solids due to salt slurry

Appendix E

Graphs Tank Layer Model (TLM)

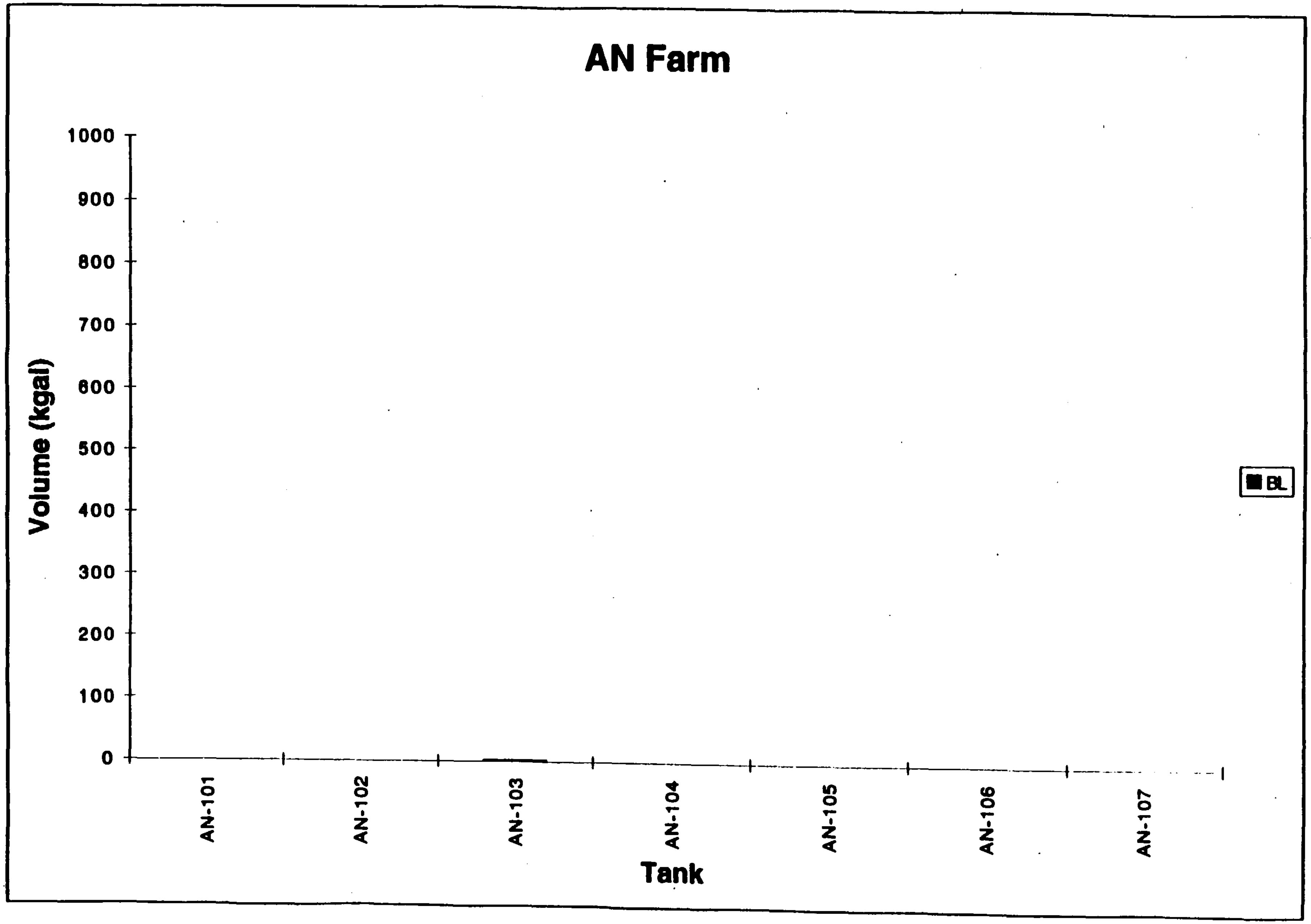
March 1995

Graphs

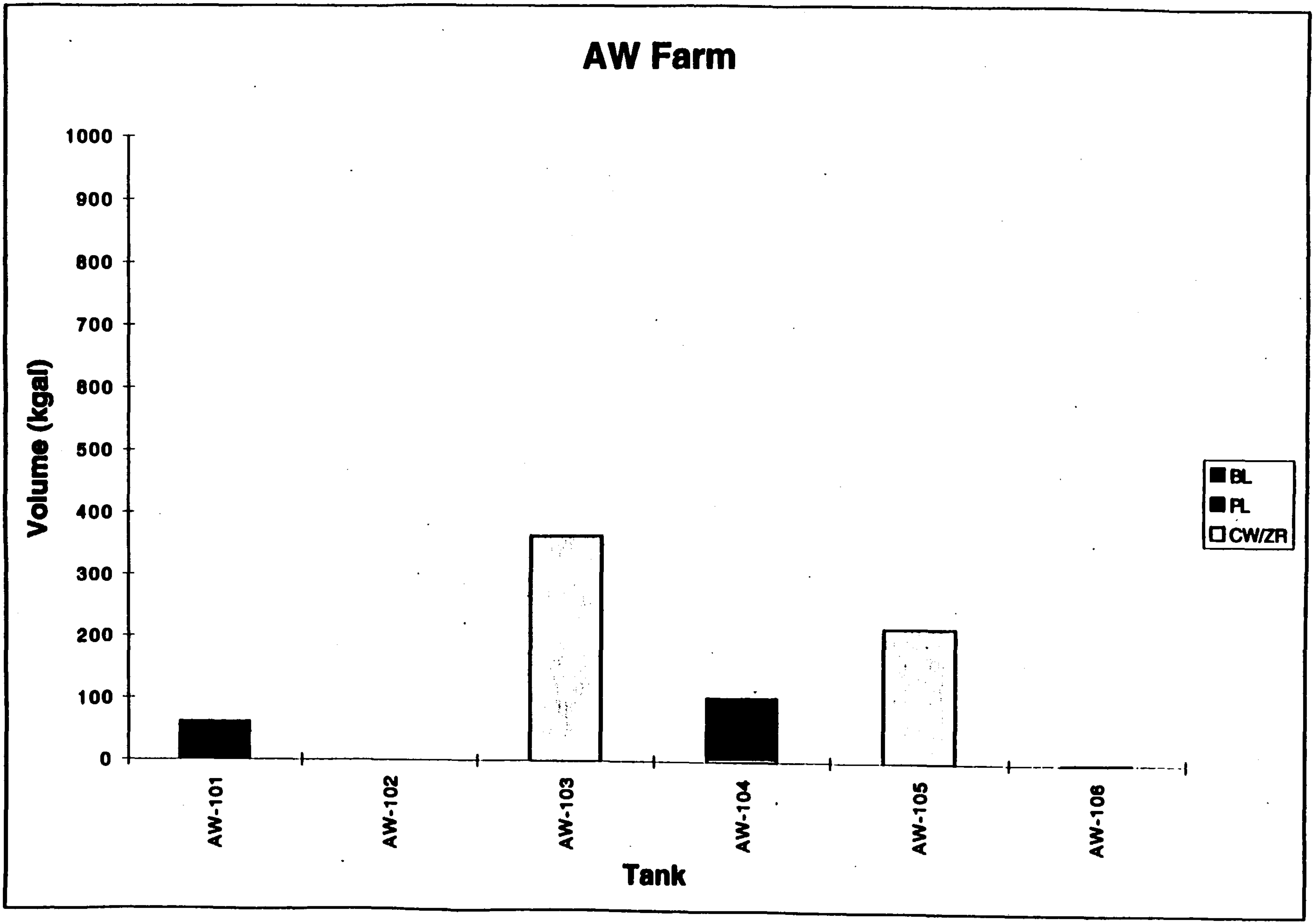
Included are bar graphs for the following:

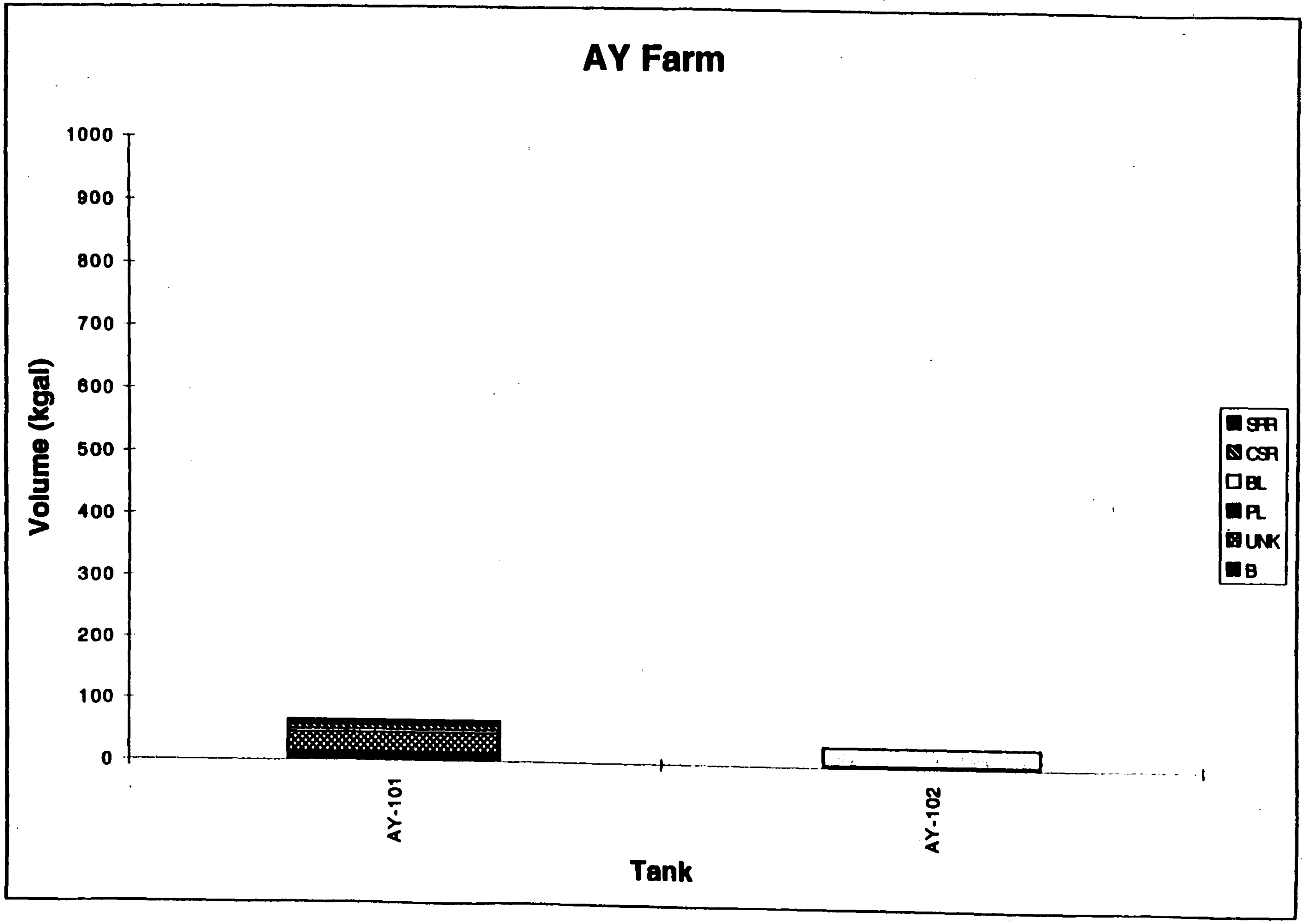
- SE Quadrant: AN, AP, AW, AY, AZ, SY

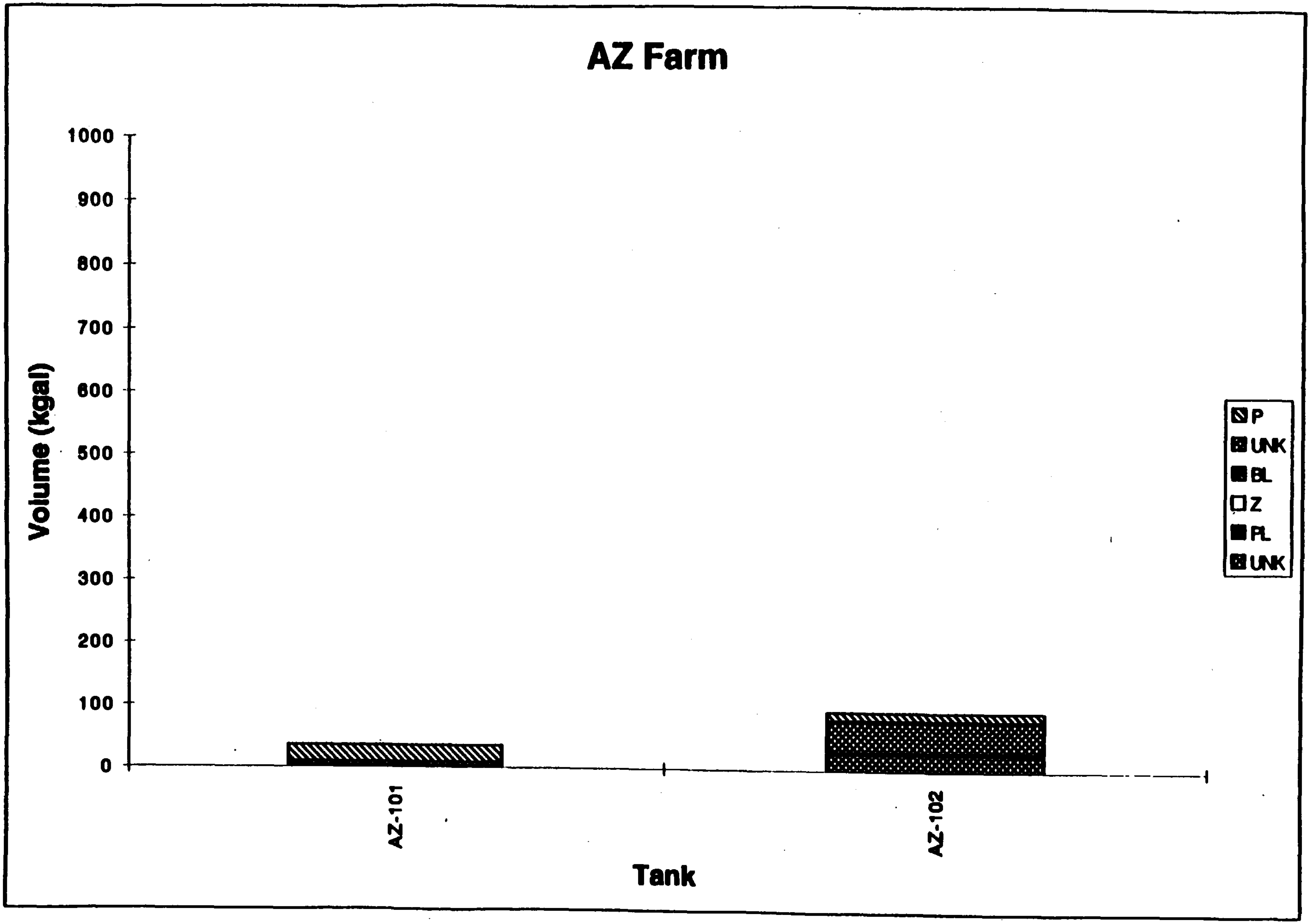
These graphs show the relative amounts of each sludge, salt cake, and salt slurry associated with waste types from the Defined Waste List. The volumes reported represent estimated volumes of particular types of solids, which we recognize are not necessarily laterally homogeneous. The waste layers are chronologically ordered in each graph, the bottom being oldest.

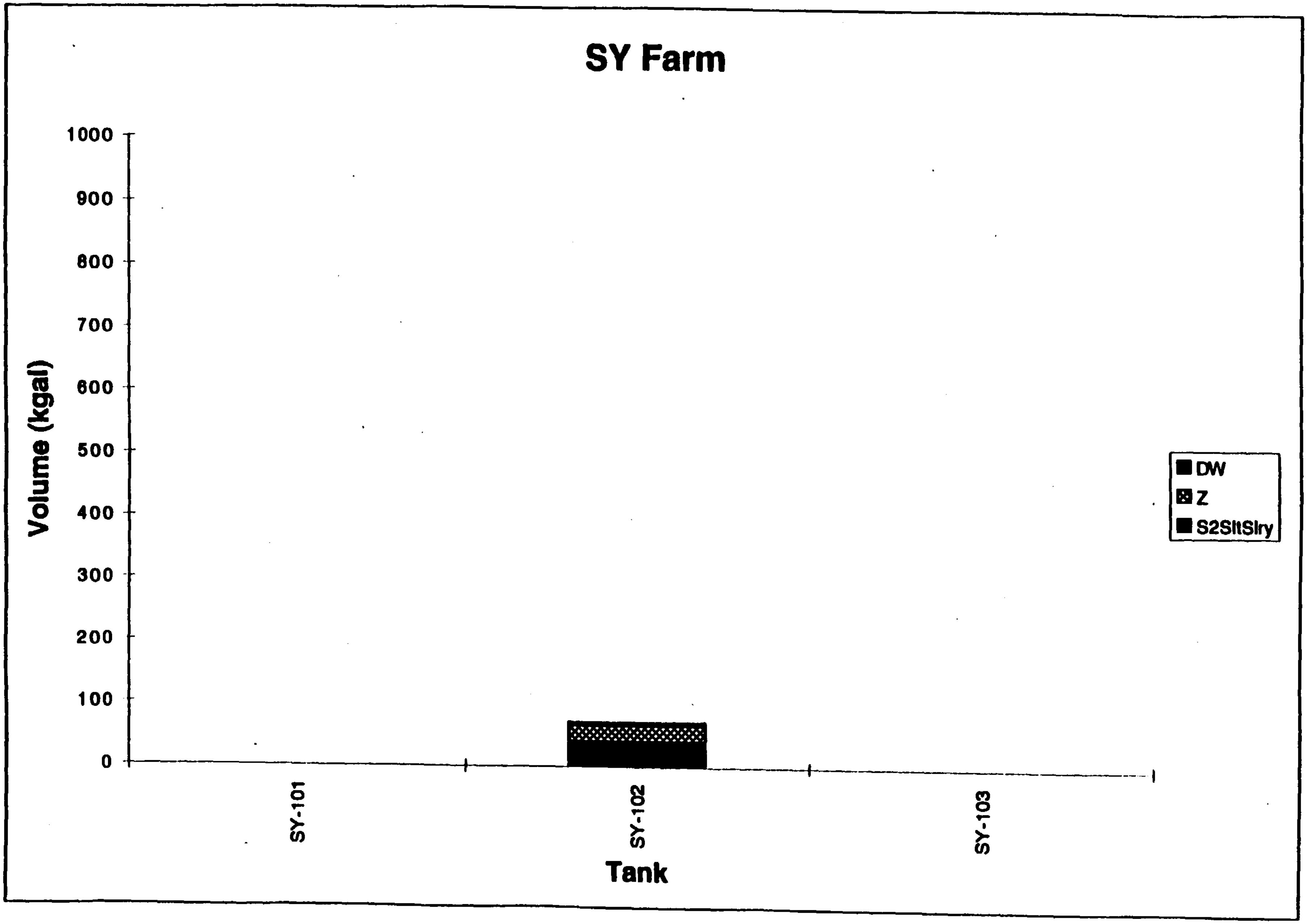


AN Farm
Volume (kgal)
1000
900
800
700
600
500
400
300
200
100
0
AN-101
AN-102
AN-103
AN-104
AN-105
AN-106
AN-107
Tank
BL


AW Farm
1000
900
800
700
600
500
400
300
200
100
0
Volume (kgal)
BL
PL
CW/ZR
AW-101
AW-102
AW-103
AW-104
AW-105
AW-106
Tank


AY Farm
1000
900
800
700
600
500
400
300
200
100
0
Volume (kgal)
SFR
CSR
BL
PL
UNK
B
AY-101
AY-102
Tank


AZ Farm
Volume (kgal)
1000
900
800
700
600
500
400
300
200
100
0
AZ-101
AZ-102
Tank
P
UNK
BL
Z
PL
UNK


SY Farm
Volume (kgal)
1000
900
800
700
600
500
400
300
200
100
0
DW
Z
S2SltSlry
SY-101
SY-102
SY-103
Tank

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CST-4: 95-037/109

April 19, 1995

David Forehand
P.O. Box 1970
MSIN S7-31
Richland, WA. 99352

Dear Mr. Forehand,

Enclosed are clarifications which have been made to the SE quadrant Tank Layer Model (TLM) and revised inventory estimates for tank AW-101. The 61 kgal of PL2 waste for AW-101 was incorrectly assigned to CW/ZR waste in our spreadsheet calculations. Please replace the old inventory estimates for tank AW-101 with these new tables.

If there are any questions or problems, please feel free to call me at (505) 667-0838.

Sincerely,

Kenneth A. Jurgensen

Kenneth A. Jurgensen

Enc: a/s

Cy: S. J. Eberlein, WHC w/enc.
T.M. Brown, WHC, w/enc.
Louis Shelton, WHC, w/enc.
C.H. Brevick, ICF Kaiser, w/enc.
L.A. Gaddis, ICF Kaiser, w/enc.
R. Anema, Ogden, w/enc.
T. Hirons, J591, w/enc.
D. MacFarland, K557, w/enc.
K. Pasamehmetoglu, K555, w/enc.
S. Wagner, LANL c/o PNL w/enc.
S.F. Agnew, CST-4, J586, w/enc.
CIC-DO, A150, w/o enc.
File, CST-4, J586

Additions or changes for Tank Layer Model (TLM)

Date	Page	Row	Column	Current Reading	Additions or Changes
4/17/95	D-3	8	7		No TLM assignment.
4/17/95	D-3	8	9	unk, assign A2SltSlry, SU from tanks throughout SE quad	solids from concentrate
4/17/95	D-4	10	7		No TLM assignment
4/17/95	D-4	10	9		solids from concentrate
4/17/95	D-5	10	7		No TLM assignment.
4/17/95	D-5	10	9		solids from concentrate
4/17/95	D-7	7	7		No TLM assignment
4/17/95	D-7	7	9		solids from concentrate
4/17/95	D-8	6	7		No TLM assignment
4/17/95	D-8	6	9		solids from concentrate
4/17/95	D-17	7	7		No TLM assignment
4/17/95	D-17	7	9		solids from concentrate
4/17/95	D-22	10	7		No TLM assignment
4/17/95	D-22	10	9		solids from concentrate
4/17/95	D-27	8	7		No TLM assignment
4/17/95	D-27	8	9		solids from concentrate
4/17/95	D-28	11	9	unk gain	solids from concentrate
4/17/95	D-29	10	7		No TLM assignment
4/17/95	D-29	10	9	solids due to salt slurry	solids from concentrate
4/17/95	D-18	9	7		No TLM assignment
4/17/95	D-18	9	9	Sent throughout SE quad.	Sent throughout SE quad., solids from concentrate
4/17/95	D-20	15	7		No TLM assignment
4/17/95	D-20	15	9	Sent to Aw-102	Sent to AW-102, solids from concentrate
4/17/95	D-21	13	7		No TLM assignment

4/17/95	D-21	13	9	from A2EVAP	from A2EVAP, solids from concentrate
4/17/95	D-23	26	7		No TLM assignment
4/17/95	D-23	26	9	from A2EVAP	from A2EVAP, solids from concentrate
4/17/95	D-26	9	7		No TLM assignment
4/17/95	D-26	9	9		solids from concentrate
4/17/95	D-28	11	9	unk gain	unk gain, solids from concentrate

Additions or changes for the Inventory Estimates and Supernatant Mixing Model (SMM)

Replace tables of Total Inventory Estimate, TLM Solids Composite Inventory Estimate and SMM Composite Inventory Estimate for Double-Shell Tank 241-AW-101.

Double-Shell Tank 241-AW-101			
Total Inventory Estimate*			
Physical Properties			
Total Waste	5.95E+06 kg	(1.14E+03 kgal)	
Heat Load	6.82 kW	(2.33E+04 BTU/hr)	
Bulk Density†	1.38 (g/cc)		
Water wt%†	51.1		
TOC wt% C (wet)†	0.907		
Chemical Constituents	mole/L	ppm	kg
Na^{+}	8.26	1.38E+05	8.18E+05
Al^{3+}	0.946	1.85E+04	1.10E+05
Fe^{3+} (total Fe)	0.108	4.39E+03	2.61E+04
Cr^{3+}	2.97E-02	1.12E+03	6.65E+03
Bi^{3+}	8.62E-04	131	776
La^{3+}	5.34E-06	0.538	3.20
Hg^{2+}	1.03E-05	1.49	8.88
Zr (as $ZrO(OH)_2$)	1.97E-03	130	773
Pb^{2+}	9.26E-05	13.9	82.6
Ni^{2+}	1.09E-02	462	2.75E+03
Sr^{2+}	5.65E-06	0.358	2.13
Mn^{4+}	1.08E-02	431	2.56E+03
Ca^{2+}	5.67E-02	1.65E+03	9.79E+03
K^{+}	0.131	3.71E+03	2.21E+04
OH^{-}	4.58	5.65E+04	3.36E+05
$NO3^{-}$	3.26	1.47E+05	8.72E+05
$NO2^{-}$	1.43	4.78E+04	2.84E+05
$CO3^{2-}$	0.481	2.09E+04	1.24E+05
$PO4^{3-}$	0.162	1.12E+04	6.63E+04
$SO4^{2-}$	0.206	1.43E+04	8.52E+04
Si (as SiO_3^{2-})	3.87E-02	788	4.69E+03
F^{-}	0.172	2.37E+03	1.41E+04
Cl^{-}	0.141	3.62E+03	2.15E+04
$C_6H_5O_7^{3-}$	2.78E-02	3.81E+03	2.27E+04
$EDTA^{4-}$	1.21E-02	2.53E+03	1.51E+04
$HEDTA^{3-}$	1.98E-02	3.94E+03	2.34E+04
glycolate^{-}	0.135	7.32E+03	4.35E+04
acetate^{-}	1.42E-02	608	3.62E+03
oxalate^{2-}	2.02E-05	1.29	7.64
DBP	1.51E-02	1.78E+03	1.06E+04
butanol	1.51E-02	812	4.83E+03
NH_3	0.406	5.00E+03	2.97E+04
$Fe(CN)_6^{4-}$	0	0	0
Radiological Constituents			
Pu		4.30E-02 (µCi/g)	4.26 (kg)
U	6.72E-03 (M)	1.16E+03 (µg/g)	6.89E+03 (kg)
Cs	0.240 (Ci/L)	174 (µCi/g)	1.03E+06 (Ci)
Sr	6.80E-02 (Ci/L)	49.2 (µCi/g)	2.93E+05 (Ci)

*Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

† Volume average for density, mass average Water wt% and TOC wt% C.

Double-Shell Tank 241-AW-101			
TLM Solids Composite Inventory Estimate[a]			
Physical Properties			
Total Solid Waste	2.68E+05 kg	(61 kgal)	
Heat Load	1.52 kW	(5.19E+03 BTU/hr)	
Bulk Density	1.16 (g/cc)		
Void Fraction	0.918		
Water wt%	79.1		
TOC wt% C (wet)	0.036		
Chemical Constituents	mole/L	ppm	kg
Na^{+}	0.589	1.17E+04	3.12E+03
Al^{3+}	0	0	0
Fe^{3+} (total Fe)	1.90	9.15E+04	2.45E+04
Cr^{3+}	7.35E-03	329	88.3
Bi^{3+}	0	0	0
La^{3+}	0	0	0
Hg^{2+}	0	0	0
Zr (as $ZrO(OH)_2$)	0	0	0
Pb^{2+}	3.99E-05	7.13	1.91
Ni^{2+}	0.112	5.66E+03	1.52E+03
Sr^{2+}	0	0	0
Mn^{4+}	5.51E-03	261	70.0
Ca^{2+}	0.215	7.41E+03	1.99E+03
K^{+}	5.51E-03	186	49.8
OH^{-}	5.94	8.69E+04	2.33E+04
$NO3^{-}$	0.232	1.24E+04	3.32E+03
$NO2^{-}$	1.29E-02	510	137
$CO3^{2-}$	0.308	1.59E+04	4.27E+03
$PO4^{3-}$	6.39E-02	5.23E+03	1.40E+03
$SO4^{2-}$	3.72E-03	308	82.4
Si (as SiO_3^{2-})	0	0	0
F^{-}	0	0	0
Cl^{-}	3.59E-03	110	29.4
$C_6H_5O_7^{3-}$	0	0	0
$EDTA^{4-}$	0	0	0
$HEDTA^{3-}$	0	0	0
glycolate^{-}	0	0	0
acetate^{-}	0	0	0
oxalate^{2-}	0	0	0
DBP	2.89E-03	663	178
butanol	2.89E-03	185	49.5
NH_3	4.86E-06	7.12E-02	1.91E-02
$Fe(CN)_6^{4-}$	0	0	0
Radiological Constituents			
Pu		0.147 (µCi/g)	0.656 (kg)
U	4.25E-04 (M)	87.1 (µg/g)	23.3 (kg)
Cs	2.76E-02 (Ci/L)	23.8 (µCi/g)	6.37E+03 (Ci)
Sr	0.957 (Ci/L)	825 (µCi/g)	2.21E+05 (Ci)

[a]Unknowns in tank solids inventory are assigned by Tank Layering Model (TLM).

Double-Shell Tank 241-AW-101			
SMM Composite Inventory Estimate			
Physical Properties			
Total Supernatant Waste	5.68E+06 kg	(1.08E+03 kgal)	
Heat Load	5.30 kW	(1.81E+04 BTU/hr)	
Bulk Density*	1.39 (g/cc)		
Water wt%†	49.5		
TOC wt% C (wet)	0.956		
Chemical Constituents	**mole/L**	**ppm**	**kg**
Na^+	8.70	1.44E+05	8.15E+05
Al^{3+}	1.000	1.94E+04	1.10E+05
Fe^{3+} (total Fe)	6.83E-03	274	1.55E+03
Cr^{3+}	3.10E-02	1.16E+03	6.56E+03
Bi^{3+}	9.11E-04	137	776
La^{3+}	5.64E-06	0.563	3.20
Hg^{2+}	1.09E-05	1.56	8.88
Zr (as $ZrO(OH)_2$)	2.08E-03	136	773
Pb^{2+}	9.56E-05	14.2	80.7
Ni^{2+}	5.14E-03	216	1.23E+03
Sr^{2+}	5.97E-06	0.375	2.13
Mn^{4+}	1.11E-02	439	2.49E+03
Ca^{2+}	4.78E-02	1.38E+03	7.81E+03
K^+	0.138	3.88E+03	2.20E+04
OH^-	4.51	5.50E+04	3.12E+05
$NO3^-$	3.44	1.53E+05	8.68E+05
$NO2^-$	1.51	5.00E+04	2.84E+05
$CO3^{2-}$	0.491	2.12E+04	1.20E+05
$PO4^{3-}$	0.168	1.14E+04	6.49E+04
$SO4^{2-}$	0.217	1.50E+04	8.51E+04
Si (as SiO_3^{2-})	4.09E-02	826	4.69E+03
F^-	0.182	2.48E+03	1.41E+04
Cl^-	0.149	3.78E+03	2.15E+04
$C_6H_5O_7^{3-}$	2.94E-02	3.99E+03	2.27E+04
$EDTA^{4-}$	1.28E-02	2.65E+03	1.51E+04
$HEDTA^{3-}$	2.10E-02	4.13E+03	2.34E+04
glycolate$^-$	0.142	7.67E+03	4.35E+04
acetate$^-$	1.50E-02	637	3.62E+03
oxalate^{2-}	2.13E-05	1.35	7.64
DBP	1.58E-02	1.83E+03	1.04E+04
butanol	1.58E-02	841	4.78E+03
NH_3	0.429	5.24E+03	2.97E+04
$Fe(CN)_6^{4-}$	0	0	0
Radiological Constituents			
Pu	53.1 (μCi/L)		3.61 (kg)
U	7.08E-03 (M)	1.21E+03 (μg/g)	6.87E+03 (kg)
Cs	0.252 (Ci/L)	181 (μCi/g)	1.03E+06 (Ci)
Sr	1.76E-02 (Ci/L)	12.6 (μCi/g)	7.17E+04 (Ci)

*Density is calculated based on Na, OH^-, and AlO_2^-.

†Water wt% derived from the difference of density and total dissolved species.

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April 21, 1995

David Forehand
P.O. Box 1970
MSIN S7-31
Richland, WA 99352

Dear Mr. Forehand,

Enclosed are the corrections for page V and E-1 of the SE quadrant Tank Layer Model (TLM) which we discussed on April 20, 1995.

If there are any questions or problems, please feel free to call me at (505) 667-0838.

Sincerely,

Kenneth A Jurgensen

Kenneth A. Jurgensen

Enc: a/s

Cy: CIC-DO, A150, w/o enc.
File, CST-4, J586

Abstract

This report describes a model for solids accumulation in waste tanks at Hanford. This model is known as the Tank Layer Model (TLM), and applies that model to 149 single-shell tanks and 28 double-shell tanks in the 200-East and 200-West areas at Hanford. The TLM uses the information that has been obtained on the transaction history for each tank to predict solids accumulations by two fundamentally different strategies. The first strategy is used for primary waste additions, which are waste additions from process plants direct into the waste tanks. These primary transactions are used along with solids reports for each tank to derive an average volume per cent solids for each of wastes on the Defined Waste List. Solids accumulations are then assigned to a particular Defined Waste for tanks for which solids information is missing or inconsistent.

A second strategy is used for tanks where solids accumulate as a result of evaporative concentration of supernatants. All solids that accumulate in such tanks occur after they have been designated as "bottoms" receivers and are assigned to either salt cakes or salt slurries, depending on the particular evaporator campaign that resulted in the waste volume reduction. This approach leads to seven salt cakes and two salt slurries, each of which is specified as a Defined Wastes. Such concentrates are, then, inherently averaged over the tens of millions of gallons of supernatants that were involved in each evaporator campaign.

The results of the TLM analysis are a description of each tank's solids in terms of sludge layers, salt cake, and salt slurry. The composition of each layer is described in the Hanford Defined Waste report. Although interstitial liquid is incorporated within the composition for each solids type, any residual supernatants that reside in these tanks are not described by this model. The output of the TLM, then, can only be used to predict the inventory of the sludges and saltcakes that reside within each waste tank.

Appendix E

Graphs Tank Layer Model (TLM)

March 1995

Graphs

Included are bar graphs for the following:

- SE Quadrant: AN, AW, AY, AZ, SY

These graphs show the relative amounts of each sludge, salt cake, and salt slurry associated with waste types from the Defined Waste List. The volumes reported represent estimated volumes of particular types of solids, which we recognize are not necessarily laterally homogeneous. The waste layers are chronologically ordered in each graph, the bottom being oldest.