S

ENGINEERING CHANGE NOTICE

1. ECN 657291

Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	4. USQ Required?	5. Date
Supplemental [] Direct Revision [X] Change ECN [] Temporary [] Standby [] Supersedure [] Cancel/Void []	James N. Strode, Models and Inventory, R2-11, 373-1280	[] Yes [X] No	08/22/00
	6. Project Title/No./Work Order No.	7. Bldg./Sys./Fac. No.	8. Approval Designator
	Operational Waste Volume Projection	N/A	N/A
	9. Document Numbers Changed by this ECN (includes sheet no. and rev.)	10. Related ECN No(s).	11. Related PO No.
	HNF-SD-WM-ER-029, Rev. 25	See Block 12	N/A

12a. Modification Work	12b. Work Package No.	12c. Modification Work Complete	12d. Restored to Original Condition (Temp. or Standby ECN only)
[] Yes (fill out Blk. 12b) [X] No (NA Blks. 12b, 12c, 12d)	N/A	N/A Design Authority/Cog. Engineer Signature & Date	N/A Design Authority/Cog. Engineer Signature & Date

13a. Description of Change — 13b. Design Baseline Document? [] Yes [X] No

This document updates Revision 25 by incorporating changed facility schedule assumptions, as well as waste generation rates and volumes which have occurred since the publication of Revision 25. All the values in this document will be updated several times per year.

Continued from Block 10: ECN-603360, ECN-189210, ECN-166505, ECN-606102, ECN-631389, and ECN-635540, ENC-643820, and ECN-644164.

14a. Justification (mark one)

Criteria Change	[X]	Design Improvement	[]	Environmental	[]	Facility Deactivation	[]
As-Found	[]	Facilitate Const	[]	Const. Error/Omission	[]	Design Error/Omission	[]

14b. Justification Details

See Block 13a above.

15. Distribution (include name, MSIN, and no. of copies)

See attached distribution.

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ENGINEERING CHANGE NOTICE	Page 2 of 2	1. ECN (use no. from pg. 1) ECN-657291

16. Design Verification Required	17. Cost Impact						18. Schedule Impact (days)	
	ENGINEERING			CONSTRUCTION				
[] Yes	Additional	[]	$	Additional	[]	$	Improvement	[]
[X] No	Savings	[]	$	Savings	[]	$	Delay	[]

19. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 13. Enter the affected document number in Block 20.

SDD/DD	[]	Seismic/Stress Analysis	[]	Tank Calibration Manual	[]
Functional Design Criteria	[]	Stress/Design Report	[]	Health Physics Procedure	[]
Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
Criticality Specification	[]	Calibration Procedure	[]	Test Procedures/Specification	[]
Conceptual Design Report	[]	Installation Procedure	[]	Component Index	[]
Equipment Spec.	[]	Maintenance Procedure	[]	ASME Coded Item	[]
Const. Spec.	[]	Engineering Procedure	[]	Human Factor Consideration	[]
Procurement Spec.	[]	Operating Instruction	[]	Computer Software	[]
Vendor Information	[]	Operating Procedure	[]	Electric Circuit Schedule	[]
OM Manual	[]	Operational Safety Requirement	[]	ICRS Procedure	[]
FSAR/SAR	[]	IEFD Drawing	[]	Process Control Manual/Plan	[]
Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]	Tickler File	[]
Environmental Report	[]	Inspection Plan	[]		[]
Environmental Permit	[]	Inventory Adjustment Request	[]		[]

20. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision
N/A		

21. Approvals

	Signature	Date		Signature	Date
Design Authority	VCB		Design Agent		
Cog. Eng. J.N. Strode/V.C. Boyles		8/24/00	PE		
Cog. Mgr. K.M. Hodgson	K.M. Hodgson	8/24/00	QA		
QA			Safety		
Safety			Design		
Environ.			Environ.		
Other J.W. Hunt, Process Engineering	J.W. Hunt	8/25/00	Other		
W.E. Ross, Nuclear Operations Project Services		8/28/00			
J.G. Kristofzski, Double-Shell Tank Director		8/25/00			
R.E. Raymond, Single-Shell Tank Interim Closure	R.E. Raymond	8/25/00	DEPARTMENT OF ENERGY Signature or a Control Number that tracks the Approval Signature		
D.K. Smith, 200 Area Liquid Waste Processing Facilities		8/25/00			
B.G. Erlandson, Environmental Services		8/25/00	ADDITIONAL		

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Operational Waste Volume Projection

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U.S. Department of Energy Contract DE-AC06-96RL13200

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Abstract:

Waste receipts to the double-shell tank system are analyzed and wastes through the year 2015 are projected based on generation trends of the past 12 months. A computer simulation of site operations is performed, which results in projections of tank fill schedules, tank transfers, evaporator operations, tank retrieval, and aging waste tank usage.

This projection incorporates current budget planning and the clean-up schedule of the Tri-Party Agreement. Assumptions were current as of June, 2000.

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(2) Title
Operational Waste Volume Projection

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OPERATIONAL WASTE VOLUME PROJECTION

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CH2M HILL Hanford Group, Inc.

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AUGUST 2000

CH2MHILL
Hanford Group, Inc.

Prepared for the U.S. Department of Energy
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LIST OF TERMS

CHG	CH2M HILL Hanford Group, Inc.
DOE	U.S. Department of Energy
DST	double-shell tank
EIS	Environmental Impact Study
FFTF	Fast Flux Test Facility
FY	fiscal year
HLW	High Level Waste
Kgal	kilogallon (1000 gallons)
LAW	Low Activity Waste
Mgal	million gallons
ORP	Office of River Protetion
OWVP	Operational Waste Volume Projection
PFP	Plutonium Finishing Plant
PUREX	Plutonium-Uranium Extraction
RPP	River Protection Project
SST	single-shell tank
TPA	Tri-Party Agreement
TRU	transuranic

1.0 SUMMARY

The Operational Waste Volume Projection (OWVP) presents a basis for evaluating future double-shell tank (DST) space needs through fiscal year (FY) 2018. This report presents a projected range of tank needs that are used to generate recommendations regarding site activities, waste management activities, facility requirements, and the need to build additional double-shell tanks. In addition, a detailed list of projected waste transfers are forecasted from FY 2000-2018. This document presents the results of three distinct projection cases. Operating assumptions for the three cases were based on the best information available in June 2000. No funding constraints were considered.

In revision 25 of the OWVP document, 2.28 Mgal of emergency space was reserved in case of a double-shell leak per DOE Order 435.1. For revision 26 of the OWVP document, the emergency space has been reduced to 1.14 Mgal. However, the tank farm contractor has also been requested to provide the capability to receive up to one tank of either low-activity waste (LAW) or high-level waste (HLW) return from the waste treatment plant on an emergency basis (Taylor 1999). Accordingly, 1.14 million gallons of space has been reserved for the possibility of a LAW or HLW return (see Section 3.20 for more information on LAW/HLW Return).

Operating assumptions and results are summarized below:

- Case 1 presents projected DST needs based on Tri-Party Agreement (TPA) milestones, River Protection Project (RPP) project integration office guidance received in March 2000 (PIO 2000), and the current operational assumptions. The above assumptions were reviewed and approved by CH2M HILL Hanford Group, Inc. (CHG) management. With the TPA compliant single-shell tank (SST) retrieval schedule added, the tank space needs exceed the available space by four tanks in FY 2010; by up to thirteen tanks in FY 2011; by up to 23 tanks by the end of FY 2012; and by up to 87 tanks in FY 2018. The rough order of magnitude cost to build the 87 required tanks is $6.6 billion. However, if only the SST wastes are retrieved to meet Phase 1 extended order waste treatment needs, the projected space needs fits within available space through FY 2018.

- Case 2 presents projected DST needs based on the project planning guidance received in March 2000 (PIO 2000) with the SST Program Plan retrieval sequence. The projected space requirements for Case 2 with SST retrieval exceeds available space by one tank in FY 2010, by two tanks in FY 2011, by one tank in FY 2012, and by up to three tanks in FY 2013 (Figure 15). The tank space shortage continues to increase up to a total of fifteen tanks by the end of FY 2018. The rough order of magnitude cost to build the 15 required tanks is $1.2 billion.

- Case 3 presents projected DST needs and processing rates for a case requested by Washington State Department of Ecology (Ecology 2000). This case assumed that four additional double-shell tanks would be constructed and placed into service in FY 2010 and that the risk based SST Program Plan from Case 2 would be accelerated to complete SST retrieval in FY 2024. The accelerated LAW processing rate of 5740 units/year would be needed to process the SST waste retrieved and free up the DST space needed for use as intermediate feed staging tanks.

A comparison of the projected tank space needs required for the three projection cases is depicted in Figure 1. Key assumptions for the three projection cases are summarized in Table 1. Differences in assumptions have been highlighted. Detailed assumptions and space saving alternatives are presented later in this document. A brief summary of the risks associated with these projections is provided in Table 2. Additional information and references for Table 2 can be found later in this document by referring to the section listed under comments. At a minimum, this DST space forecast will be updated annually with the latest information available regarding the estimated volume of waste requiring storage in the DSTs.

Facility waste minimization requirements initiated by the Tank Space Management Board have helped to guarantee tank space availability. Due to the possibility of future tank space shortages, terminal clean-out and monthly waste generations need to be continually minimized. The DST Waste Inventory Control Group was chartered to control the inventory of the DSTs and meets on a monthly basis to review projected waste generations and waste transfers. Voting members of this group consist of representatives from Operations, Process Engineering, Environmental, and Tank Waste Retrieval.

Approximately 6 to 8 years are required to obtain funding, plan, and build additional DSTs. The Case 1 projection with only the SST wastes retrieved to meet Phase 1 extended order waste treatment (Kirkbride 2000) predicts that the available tank space will meet the needs for the RPP planned waste treatment assumptions. The Case 1 projection with the TPA compliant SST retrieval volumes added will exceed the available space by FY 2010 because the volume of SST wastes retrieved to meet the TPA milestones for SST retrieval will substantially exceed the space made available by the waste treatment schedule. Building additional tanks alone to meet this excess space requirement does not appear to be a realistic option due to the excessive amount of tanks required--approximately 23 additional tanks by FY 2012 or up to 87 additional tanks by FY 2018. Accelerating the waste treatment schedule and rate alone to meet the storage requirements of the TPA compliant SST retrieval schedule would require very high processing rates and expense. The projected tank space shortage maybe avoided by a combination of the following options (see Section 6.0 for a more complete listing):

- Delay retrieval of SST wastes (would require re-negotiation of TPA milestones)
- Do not allow the return of wastes from the waste treatment plant to double-shell tanks
- Allow addition of wastes to early feed tank headspace
- Accelerate the treatment and vitrification of waste
- Establish terms for waste treatment that will support the TPA Compliant SST retrieval volumes
- Delay the SST interim stabilization effort
- Construct new double-shell tanks

All projection cases would require either new double-shell tanks be built by FY 2010 or that some of the options above would have to be exercised to avoid a tank space shortage. All projection cases assumed that one DST would fail and be replaced in 2017 and one DST would fail and be replaced every five years thereafter. Therefore, all projection cases would require DSTs to be built at a rate of 1 tank every 5 years beginning in FY 2017 to maintain existing storage space.

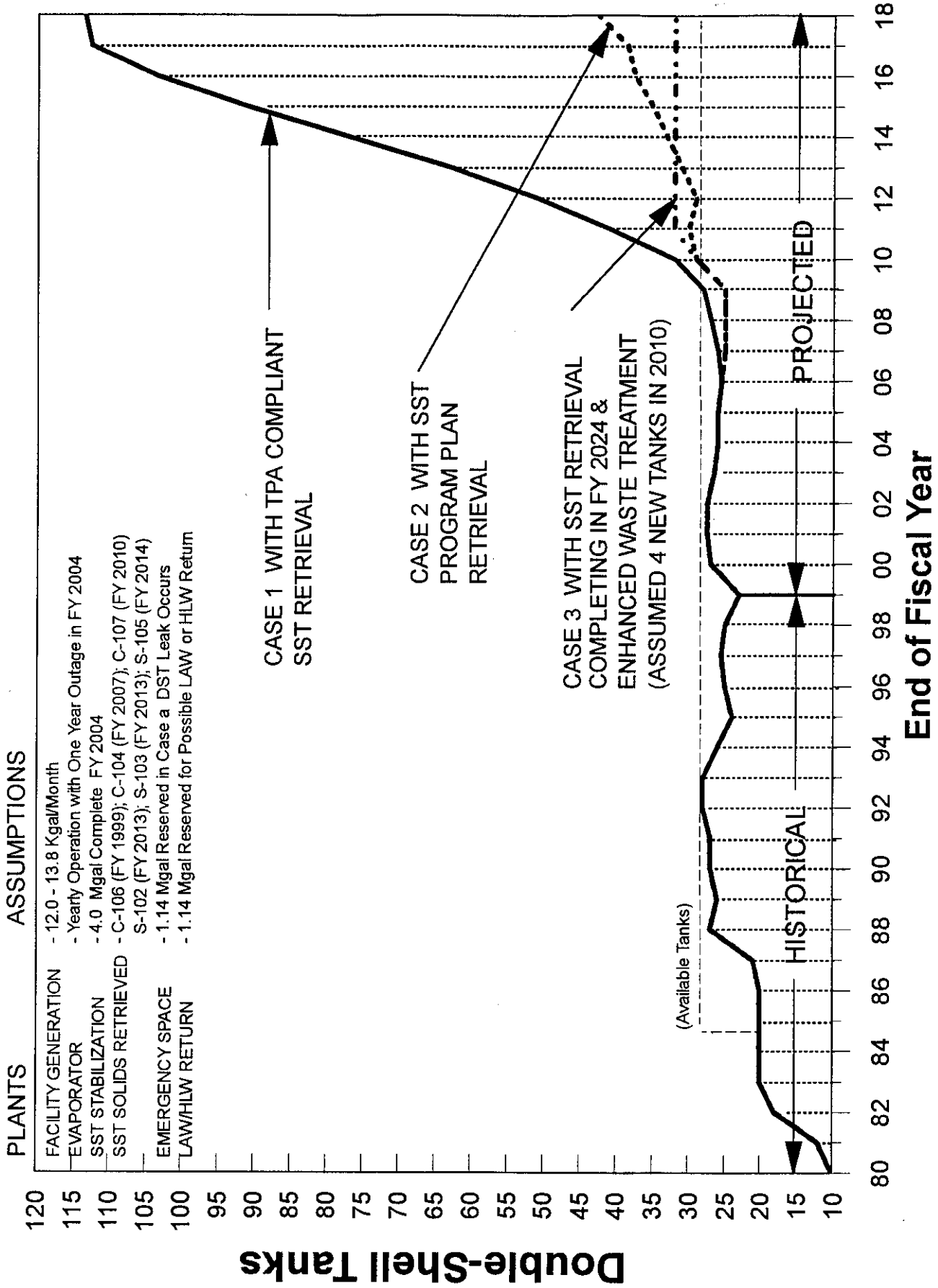

Figure 1. Comparison of Tank Requirements for the 2000 Projection Cases

OF1B

Table 1. Summary of Assumptions For the 2000 Projection Cases (references in Sect. 3)

Facility or Project	Case 1 Assumptions	Case 2 Assumptions	Case 3 Assumptions
Total Monthly Facility Generations (Tank Farms, Waste Encapsulation and Storage Facility, PUREX, T Plant, 222-S Laboratory, and 300 Area)	12.0-13.8 Kgal/month	12.0-13.8 Kgal/month	12.0-13.8 Kgal/month
PUREX	5 Kgal/year	5 Kgal/year	5 Kgal/year
B Plant	No additional waste	No additional waste	No additional waste
100N Area	Wastes sent to ERDF	Wastes sent to ERDF	Wastes sent to ERDF
100K Area	Wastes sent to T Plant	Wastes sent to T Plant	Wastes sent to T Plant
105 F & H Basin Cleanout	FY2001-2006 (0.24 Mgal)	FY2001-2006 (0.24 Mgal)	FY2001-2006 (0.24 Mgal)
Evaporator Operation Outage	Operates as required through 2018 except for one year outage in FY 2004	Operates as required through 2018 except for one year outage in FY 2004	Operates as required through 2018 except for one year outage in FY 2004
Liquid Effluent Treatment Facility Rate for condensate (Mgal/Year)	5	5	5
SST Interim Stabilization Porosity Saltcake/Sludge Complexed volume Volume Pumped	 25%/15% 0.6 Mgal 4.0 Mgal (1999-2004)	 25%/15% 0.6 Mgal 4.0 Mgal (1999-2004)	 25%/15% 0.6 Mgal 4.0 Mgal (1999-2004)
PFP Stabilization	33 Kgal (FY 2000-2012)	33 Kgal (FY 2000-2012)	33 Kgal (FY 2000-2012)
SST Retrieval C-106 solids (start; receiver tank) SST Retrieval Start Retrieved vol. 2004-2005 Retrieved vol. 2006-2007 SST Waste Retrieval Complete	TPA Compliant Completed FY 1999; Tank AY-102 12/2003 0.02 Mgal 0.08 Mgal FY 2018	SST Program Plan Completed FY 1999; Tank AY-102 1/2004 ~0.7 Mgal ~0.7 Mgal FY 2028	SST Program Plan Accelerated to complete 2024 Completed FY 1999; Tank AY-102 1/2004 ~0.7 Mgal ~0.7 Mgal FY 2024
Phase 1 LAW Waste Treatment LAW Vitrification start LAW Processing Schedule Phase 1 Extension LAW Intermediate Feed Staging Tanks LAW Vendor Feed Tanks Sr/TRU & Entrained Solids Receipt Tank Aging Waste Supernate Receipt Tank	 03/2008 Disposal Case 3S6E Modified (See Section 3.17 for details) Yes 1AN,2AN,5AN,4AP,1AP Waste Treatment Plant Provides Space Waste Treatment Plant Provides Space Waste Treatment Plant Provides Space	 03/2008 Disposal Case 3S6E Modified (See Section 3.17 for details) Yes AN-101, AN-102, AN-105, AP-104, AP-101 Waste Treatment Plant Provides Space Waste Treatment Plant Provides Space Waste Treatment Plant Provides Space	 03/2008 Disposal Case 3S6E Modified through 2010 then accelerated to match SST Retrieval Yes AN-101,AN-102,AN-105, AP-104, AP-101 Waste Treatment Plant Provides Space Waste Treatment Plant Provides Space Waste Treatment Plant Provides Space
HLW Vitrification start	9/2008	9/2008	9/2008
Evaporation Limit for Wastes	1.41 gram/milliliter	1.41 gram/milliliter	1.41 gram/milliliter
Emergency Space	1.14 Mgal	1.14 Mgal	1.14 Mgal
LAW/HLW Return	1.14 Mgal	1.14 Mgal	1.14 Mgal
Loss of DST Space	First failure and replacement in FY 2017; one tank every five years thereafter	First failure and replacement in FY 2017; one tank every five years thereafter	First failure and replacement in FY 2017; one tank every five years thereafter

DN = dilute non-complexed waste
ERDF = Environmental Restoration Disposal Facility
HLW = high-level waste
PFP = Plutonium Finishing Plant
SpG = specific gravity
TRU = transuranic
LAW = low-activity waste

Table 2. Risk Assessment Summary for Waste Volume Projections

RISK ASSESSMENT SUMMARY FOR WASTE VOLUME PROJECTIONS							
Technical/Program Basis for Waste Volume Projections	Confidence of Basis Being Accurate			Waste Volume Impact if Wrong			COMMENTS
	HIGH	MED	LOW	MAJOR	MINOR	QUANTITY	
Remaining salt well liquid pumping volume is 4 Mgal without flush or dilution		X		X		Dependent on magnitude of change	Could delay Consent Decree milestones; Large concentrated volume; see Section 3.8; Could prevent initial feed staging for Phase 1 LAW Waste Treatment
Evaporator available yearly through 2018 except for a one year outage in FY 2004	X			X		Dependent on magnitude of change	Tank Space Projections based on concentrated volumes; see Section 3.2
Evaporation limit for wastes will be a specific gravity of 1.41		X		X		Dependent on magnitude of change	Reduction in evaporation limit could be required by safety; see Section 3.2
Facility generations will not exceed assumed levels		X			X	Dependent on magnitude of change	Small concentrated volume; could delay site cleanup; see Section 3.0
Facility terminal clean-out volumes: 100 Areas <0.3 Mgal		X			X	Dependent on magnitude of change	Could delay site cleanup; see Section 3.0
No loss of DST space until 2017 when it is assumed that the first tank must be replaced; one tank is replaced every five years thereafter		X		X		1 mgal/tank	see Section 3.22
LAW Phase 1 vitrification starts FY 2008		X		X		Dependent on magnitude of change	Could delay SST retrieval; see Section 3.17
Cross-site transfer lines are available	X			X		Dependent on length of time not available	Could delay salt well liquid pumping and/or site cleanup; see Section 3.11
No volume set aside for upsets or new streams		X			X	Dependent on magnitude of change	Consequences depend on volume, composition, and timing; see Section 3.20

Notes:

DSSF = double-shell slurry feed
SpG = specific gravity
LAW = low-activity waste

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2.0 INTRODUCTION

2.1 PURPOSE

The purpose of the OWVP is to present a basis for evaluating future DST needs to meet TPA Milestones M-46-00 and M-46-01. Milestone M-46-00 states that an OWVP report shall be prepared and issued annually evaluating DST needs. Milestone M-46-01 requires the tank farm contractor to annually review and recommend whether or not to build additional DSTs. The OWVP also provides space information needed for Milestone M-45 (SST Retrieval).

This report presents a projected range of tank needs which is used to generate recommendations regarding site activities, waste management activities, facility requirements, and the need to build additional DSTs. This document presents the results of three projected cases which represent varying degrees of tank space demands. Case 1 includes the building and operation of new waste treatment and disposal facilities consistent with TPA Milestones. Case 1 projects tank space needs based on all TPA milestones, RPP project integration office guidance received in March 2000 (PIO 2000), and current operational assumptions. Differences in the above assumptions were resolved with the guidance of CHG management. Cases 2 is based on the same operational and processing assumptions as Case 1 but incorporates the SST Program Plan retrieval schedule. Case 3 uses the same SST retrieval sequence as Case 2 but accelerates the SST schedule to complete retrieval in 2024 and accelerates waste treatment. Operating assumptions for the three cases were established in June 2000. Need dates for new DST construction, tank retrievals, facility schedules, waste generation reductions, conflicts in meeting TPA milestones (WDOE 1994; WHC 1996a; WHC 1996b), and funding priorities can be reviewed in relation to tank space availability.

2.2 METHODOLOGY

The process followed in preparing an OWVP is shown in Figure 2, below.

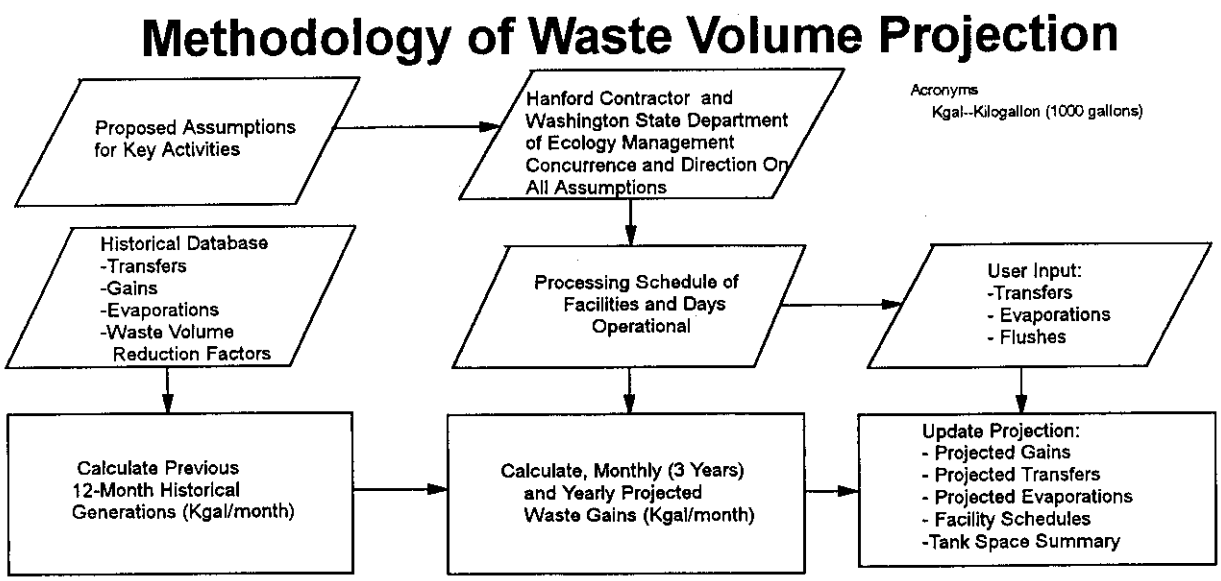

Figure 2. Methodology of the OWVP

The process of updating the OWVP begins with the request for updated facility or project assumptions from each of the operating facilities and projects that will contribute waste to DST inventory. The term "assumption" in this document refers to engineering inputs or bases supplied by the facilities based on their future operational plans (determined by budget, U.S. Department of Energy directive, TPA milestones, etc.). Typical assumptions include operating schedules, waste generation rates, stream compositions, modes of operation, etc. The operating facilities and projects provide estimates of volume, composition, and radionuclide content data for each distinct waste stream to be sent to the DSTs. In addition to the projected facility waste generation rates, the processing schedules of each of the plants are factored into the projection. For the Plutonium Finishing Plant (PFP) and 100 Area facilities the projected volumes of waste generated from terminal clean-out are estimated and entered. For the 300 Area and Tank Farms, monthly waste generations are entered from facility inputs and/or actual generation rates. These projected waste generation rates and plant schedules are used to project waste volumes that each plant will be producing per month or year. The composition data is used to calculate the waste volume reduction factors and to determine waste segregation requirements (due to chemical, radionuclide, or heat content). The waste volume reduction factor (Riley 1988) is defined as the percent of water (by volume) that can be removed from a waste stream to achieve a certain interim waste form such as double-shell slurry feed. From the facility assumptions, a matrix of basic assumptions for the three cases to be incorporated into the OWVP projections were prepared, presented to, and approved by Hanford contractor management and the program office. The U.S. Department of Energy has requested that the OWVP document should provide a list of all transfers for the next fiscal year (Kinzer 2000). Appendix A in this document lists all the gains, losses, and transfers for projection Cases 1 and 2 through FY 2001.

Once the projection cases have been approved by Hanford contractor management, the Washington State Department of Ecology, and the U. S. Department of Energy, the historical database of past waste gains, transfers, and evaporations is updated with data from the most recent twelve months of Tank Farm operations. The first three years of the projection are simulated in more detail than the later years. In the first three years of the projection, monthly waste volumes are predicted. For the subsequent years of the projection, yearly waste volumes are predicted.

The processing sequence in the simulation is designed to model the actual activities in the tank farms. After a dilute receiver tank is filled with waste, the contents are transferred to an available holding tank, sampled (sampling and analysis require four months), and transferred to the 242-A Evaporator feed tank (tank 241-AW-102[1]) for evaporation. After dilute waste is concentrated in the 242-A Evaporator, it is sent to a slurry receiver tank (tank AW-106) as Double-Shell Slurry Feed which will eventually be disposed of through the Low-Activity Waste (LAW) processing and vitrification facility.

The Neutralized Current Acid Waste and transuranic (TRU) solids will be processed at the waste treatment plant and the high-level waste (HLW) solids will be immobilized in the HLW vitrification plant into a glass matrix for disposal. It is anticipated that the HLW pretreatment will generate a LAW supernate stream that would be stored at the waste treatment plant and later sent to LAW vitrification for final disposal.

[1] Waste tanks are hereafter referred to in an abbreviated form; for example, tank AW-102.

3.0 GENERAL FACILITY DESCRIPTIONS AND ASSUMPTIONS

A brief description of the facilities and projects pertinent to the Case 1 projection are listed in the following section. Facility operating dates, waste generation volumes, waste volume reduction factors, flushes, and other pertinent assumptions are also described in this section. Assumptions unique to the Case 2 and Case 3 projections are described in Section 4. This information has been summarized for each of the three cases in Table 9, which is included at the end of this section. The spreadsheet for the Case 1 projection (Section 5.1) lists the waste generations for each year for facilities that presented a range of waste generation rates (e.g., the 222-S Laboratory varied from 0.83 to 1.0 Kgal/month during the period FY 2000-2018). Some waste additions to DSTs require a flush after the transfer has been completed. If a flush is required it is reported in the following sections and in Table 9.

This year the OWVP and Retrieval Engineering assumptions are integrated. Phase 1 processing assumptions, tank usage, and the order of processing were furnished by Retrieval Engineering (Kirkbride 2000) and are consistent between the two projects. The Case 1 projection uses the waste treatment schedule from Retrieval Engineering Case 3S6E with a new Tri-Party Agreement Compliant SST retrieval schedule (see Section 3.9). The Case 2 projection uses the same assumptions as Case 1 but uses the SST Program Plan retrieval schedule (Stokes 1999). Case 3 also uses the same assumptions as Case 2 except the SST Program Plan waste retrieval sequence has been accelerated to complete in 2024 and the waste treatment rate has been increased to match the SST waste retrieval volumes. It is assumed the waste treatment plant will supply the vendor feed staging tanks.

In revision 25 of the OWVP document, 2.28 Mgal of emergency space was reserved in case of a double-shell leak per DOE Order 435.1. For revision 26 of the OWVP document, the emergency space has been reduced to 1.14 Mgal. However, the tank farm contractor has also been requested to provide the capability to receive up to one tank of waste returns (either LAW or HLW) from the waste treatment plant on an emergency basis (Taylor 1999). Accordingly, 1.14 million gallons of space has been reserved for the possibility of a LAW or HLW return (this space is labeled as LAW/HLW Return in Section 3.20).

Polychlorinated biphenyl issues have not been included in this year's OWVP but will be included in future revisions.

3.1 B PLANT/WASTE ENCAPSULATION AND STORAGE FACILITY

B Plant was constructed in 1945 to recover plutonium by the bismuth phosphate process. B Plant deactivation was completed in FY 1998 and B Plant will not be sending any future waste to tank farms (McGuire 2000).

Waste Encapsulation and Storage Facility's current mission is to receive and store the cesium and strontium capsules that were manufactured at Waste Encapsulation and Storage Facility in a safe manner and in compliance with all applicable rules and regulations (Brist 2000). Waste projection estimates for the Waste Encapsulation and Storage Facility varied from 0 to 20 Kgal/year. If the integrity of a capsule is lost, up to 90 Kgal could be transferred to tank farms. For all three projection cases, it was assumed that the Waste Encapsulation and Storage Facility would generate 5 Kgal/year. No flushes were anticipated. The waste volume reduction

factor used to evaporate Waste Encapsulation and Storage Facility waste to double-shell slurry feed is 99% (Sederburg 1995).

3.2 242-A EVAPORATOR AND LIQUID EFFLUENT RETENTION FACILITY

The 242-A Evaporator was restarted on April 15, 1994. The 242-A Evaporator's mission is to concentrate dilute tank farm waste. To understand the projection model for the 242-A Evaporator, it is necessary to understand the waste flow during evaporator operation and the simulation model. Wastes from the dilute holding tanks are transferred into the evaporator feed tank (tank AW-102). Waste in the feed tank is then transferred to the 242-A Evaporator for boil-down. Major assumptions for the evaporator operation are listed below:

- This projection model assumed that the 242-A Evaporator would operate in a "Linked Run" process mode (Guthrie 1993). A "Linked Run" is continuous operation of the 242-A Evaporator, made possible by simultaneously transferring from the DST's to the Evaporator feed tank (tank AW-102).

- A period of four months is required from the time a holding tank is filled with dilute wastes before the waste can be evaporated (Von Bargen 1995). This period allows time for sampling and analysis per the Evaporator DQO, documentation, and facility preparation. All projections assumed that evaporator campaigns could be no less than four months apart. Several of the projected evaporator campaigns included two tanks of dilute waste for evaporation in a single campaign. Campaign scheduling should be limited to two campaigns per year with a maximum of two tanks per campaign. A six month outage in FY 2001 for condenser replacement will limit evaporator capacity to one campaign in FY 2001 (Smith 2000). A one year outage will occur in FY 2004 to complete facility life extension upgrades which will not allow any campaigns to be scheduled in FY 2004.

- The desired waste volume reduction for each 242-A Evaporator campaign is determined by boil-down studies, computer simulation, and/or process control sampling. The concentration of waste increases after each pass through the Evaporator until it reaches a concentration level consistent with engineering studies. The waste volume projection model of the 242-A Evaporator operation used in these projections cases produced double-shell slurry feed with a specific gravity of 1.41 (concentrated wastes with a specific gravity of 1.36-1.4 have been produced). After evaporation of about 50% of the volume, the concentrated waste is transferred to the evaporator receiver tank (tank AW-106). If additional evaporation is required, the waste in tank AW-106 is transferred back to the evaporator feed tank (tank AW-102). At the end of a campaign, the waste is in tank AW-106. At a later date the concentrated waste is transferred from tank AW-106 to another DST holding tank.

- The Liquid Effluent Retention Facility has a 7.8 million gallon storage capacity (Basin 42) for evaporator process condensate (Bowman 2000).

- The ratios of process condensate sent to the Liquid Effluent Retention Facility for every gallon of waste volume reduction for Evaporator Campaigns 99-1 and 00-1, was 1.15 and 1.14, respectively. This projection used a value of 1.15 gallon of condensate/gallon of waste volume reduction (Bowman 2000 and Smith 2000). Since the Effluent Treatment

Facility has a capacity of approximately 5 Mgal/year for condensate (Bowman 2000), it was assumed that the Effluent Treatment Facility capacity would not limit future evaporator operations.

- The maximum monthly waste volume reduction during Evaporator operation should be approximately 1400 kgal/month based on the new steam boiler capacity (Smith 2000).

- An average evaporation rate of 330 Kgal/month was used in this simulation taking in to consideration:
  - The 242-A Evaporator historical processing rates
  - Downtime between campaigns
  - Waste characterization
  - Staging and tank transfers

- The simulation used in this projection evaporates all dilute wastes to a concentrated interim storage form in the same year that a tank has been filled. This assumption is valid if the evaporator is operating and the yearly waste generation rate has not exceeded the annual waste volume reduction limit of the evaporator. Historically, dilute wastes were concentrated to near the aluminate boundary which would produce concentrated wastes with a specific gravity which could range from 1.3 to 1.67. However, it has been noted that all of the DSTs currently on the Flammable Gas Watch List (i.e., tanks with safety concerns related to hydrogen build-up) have specific gravities greater than 1.4 (Reynolds 1994). To avoid production of future Flammable Gas Watch List tanks, all future waste concentrations will be limited to a specific gravity of 1.41 unless additional technical evaluation shows flammable gas will not build-up (Fowler 1999 and Mulkey 1997).

  The waste volume projection model of the 242-A Evaporator operation used in earlier OWVP reports through 1994, typically produced double-shell slurry feed with a specific gravity of 1.50-1.55. Reducing these wastes to a specific gravity of 1.41 increases waste storage volumes by approximately 22%-35%, depending on the chemical composition of the waste. Although the evaporation limit for concentrated wastes is a specific gravity of 1.41, the first five evaporator campaigns in Table 3 (94-1 through 97-1) produced concentrated wastes with a specific gravity close to 1.3 (Guthrie 1997a). Evaporator campaign 97-2 did evaporate waste to a specific gravity of approximately 1.4. This document projects DST needs based on the evaporation of wastes to a specific gravity limit of 1.41.

- The waste volume reductions achieved by the 242-A Evaporator since its restart in 1994 are summarized in Table 3.

- Previous projections assumed that the 242-A Evaporator would require a one year outage for maintenance and or upgrades every ten years based on a 10 year design life of the 242-A Evaporator (Miskho 1990). All projection cases assumed that evaporation capability would be available annually to evaporate all dilute wastes except for the one-year outage in FY 2004 to complete facility life extension upgrades. A six month outage in FY 2001 for condenser replacement will limit evaporator capacity to one campaign in FY 2001 (Smith 2000). The annual evaporation of dilute waste minimizes tank space requirements and allows site cleanup activities to continue unabated. The life of the 242-A Evaporator will be

extended through the end of Phase 1 (2018). Evaporator upgrades will be completed by 2005. It is assumed that the Phase 2 waste treatment contractor will provide evaporator capability during Phase 2 Operations. (O'Toole 1998).

Table 3. Historical Evaporator Campaigns Since the 1994 Restart

Campaign	Start Date	Waste Source	Waste Feed Type	Approximate Waste Volume Reduction, Mgal
94-1	4/94	AW-102, AW-106, and AP-103	dilute non-complexed	2.42
94-2	9/94	AW-102, AW-106, AP-101, AP-107, and AP-108	dilute non-complexed	2.79
95-1	6/95	AW-102, AW-106, AP-107, and AP-108	dilute non-complexed	2.16
96-1	5/96	SY-102, AW-105, & AY-102	dilute non-complexed	1.12
97-1	3/97	AN-101	dilute non-complexed	0.4
97-2	9/97	AY-101 and AN-106	dilute complexed	0.7
	No evaporator campaign in FY 1998 (cold run completed)			
99-1	7/99	AY-102 and AP-108	dilute non-complexed	0.82
00-1	4/00	AP-107 and AP-108	dilute non-complexed	0.68

- Evaporator certification training runs prior to evaporator operation will add approximately 50 Kgal to tank farms and 50 Kgal to the Liquid Effluent Retention Facility and will occur on a bi-yearly basis (Guthrie 1997b). The training run in April 1995 added 57 Kgal to DSTs.

- Evaporator flushing after each campaign is projected to add 35 Kgal/campaign (Haigh 1992). Actual flushes for Campaigns 97-1, 99-1, and 00-1 were 30, 31, and 33 Kgal/campaign.

- For the years 2000-2003, it was estimated that 1 to 2 campaigns would be required each year based on waste generations, segregation requirements, and tank space availability. The additional yearly campaigns would be needed to evaporate the anticipated increased salt well liquid (complexed and non-complexed) and terminal clean-out wastes. The waste volume reduction for evaporation of these flushes to double-shell slurry feed was 99% (Sederburg 1995).

- In this projection, it was assumed that the pump in tank AW-104 would be replaced in time to support the transfer and evaporation of this waste in April 2001.

- Late Note—the evaporator is investigating the possibility of completing the upgrades in FY 2004 without a one year outage. This would require completion of the upgrades in stages.

3.3 GROUT

No additional Grout Vaults are scheduled to be poured at the Hanford site. River Protection Project (RPP) program planning requires that all tank wastes be separated into low-activity and high-activity fractions and each fraction be immobilized into suitable waste forms for ultimate disposal. Tanks that were originally designated and set aside as grout feed tanks were used for other purposes.

3.4 EFFLUENT TREATMENT FACILITY

The Effluent Treatment Facility started operation in November 1995 to process the stored evaporator condensate from the Liquid Effluent Retention Facility, newly generated evaporator condensate, and aqueous waste water containing low specific radioactivity (Wagner 1996). Treated effluent is discharged to the State Approved Land Disposal Site, north of the 200 West Area. This site was chosen to allow tritium to decay away before the groundwater migration reaches the Columbia River. The Effluent Treatment Facility does not remove tritium because no feasible production-scale tritium removal technology presently exists. Since the Effluent Treatment Facility has a capacity to treat 24 Mgal/year, including a capacity to treat 5 Mgal/year of condensate from the evaporator (Bowman 2000), Effluent Treatment Facility capacity should not limit future evaporator operations. The Effluent Treatment Facility should not send any streams to DSTs.

3.5 PLUTONIUM FINISHING PLANT

The Plutonium Finishing Plant (PFP) is a facility in the 200 West Area which houses the processes and supporting operations for (Hirzel 1999):

- Stabilization of reactive solid plutonium residues;
- Shipping, receiving and storage of special nuclear materials;
- Analytical and development laboratories;
- Treatment and handling of PFP liquid wastes destined for tank farms and the Effluent Treatment Facility.

An Environmental Impact Statement (EIS) was issued for public comment in November 1995 covering the PFP facility stabilization and clean out. The PFP EIS and Record of Decision (ROD) was published in May 1996. The waste volume projections are based on the preferred alternatives identified in the EIS for facility cleanout and stabilization. The volume of waste anticipated to be produced for the TPA Compliant Case is developed from the existing waste generation rate at PFP (100 untreated gallons/month), and the anticipated use of a direct denitration vertical calciner coupled with an ion exchange processing system currently planned for FY 2000 startup. The vertical calciner is the most promising technology for plutonium residue stabilization and facility clean out. All projection cases projected that PFP stabilization and clean out would generate a total of 33 Kgal of additional waste from 2000 through 2012 (Hirzel 1999 and Burk 2000). The waste volume reduction factor to evaporate PFP wastes to double-shell slurry feed is 81% (Sederburg 1995). Flush volumes for PFP stabilization waste streams is 22% (flushes of waste transfer lines from PFP to 244-TX and from 244-TX to tank SY-102).

The percent solids experienced in past PFP waste generations are listed below (Barrington 1991):

% Solids in Plutonium Reclamation Facility waste	3.5%
% Solids in Remote Mechanical C Line waste	4.4%
% Solids in lab waste	4.5%

3.6 PLUTONIUM URANIUM EXTRACTION FACILITY

The Plutonium Uranium Extraction (PUREX) Facility was used to separate irradiated N Reactor fuel into plutonium nitrate, uranyl nitrate hexahydrate, neptunium nitrate, and waste products. The main processing operations involved dissolution of cladding and irradiated fuel, solvent extraction and conversion of plutonium nitrate to plutonium oxide.. Acid recovery, solvent treatment systems, and off-gas treatment supported the major processes.

The deactivation of PUREX was completed in FY 1997 and the waste transfer system has been deactivated. However, condensate is collected in the PUREX main stack catch tank (216-A-TK-2) and the #2 Filter catch tank (V11-1). This accumulation could result in approximately 5 Kgal of dilute waste being transferred to tank farms once per year (Eiholzer 1997).

All three projection cases projected 5 Kgal/year of waste additions from PUREX. Based on the average waste composition presented for PUREX wastes, the waste volume reduction factor for evaporation of PUREX wastes to double-shell slurry feed is 99% (Sederburg 1995). Flush volumes for PUREX waste streams are 10%.

3.7 222-S Laboratory

The 222-S Laboratory is a dedicated laboratory facility. The 222-S Laboratory currently provides analytical chemistry services in support of Hanford processing plants and tank characterization. Emphasis is on waste management processing plant support, environmental monitoring programs, Tank Farms, 242-A Evaporator, Waste Encapsulation Storage Facility, Plutonium Finishing Plant (PFP), and research support activities. Most of the radioactive liquid waste generated at the laboratory complex originates from analytical activities performed within the 222-S Laboratory in support of tank characterization (Westcott 1998). Radioactive and radioactive hazardous (mixed) wastes generated by the 222-S Laboratory are discharged to the 219-S Waste Handling Facility. Dilute, non-complexed wastes are currently being transferred via pipeline to tank SY-102. Projected 222-S Laboratory monthly waste generation rates (Westcott 1998 and Porter 2000) were approximately 0.83 to 1.0 Kgal/month for FY 2000 through 2018 for all projection cases. Based on the waste composition presented for 222-S Laboratory wastes, the waste volume reduction factor for evaporation of 222-S Laboratory miscellaneous wastes to double-shell slurry feed is 99% (Sederburg 1995). Flush volumes for 222-S Laboratory waste streams is 22%.

3.8 SALT WELL LIQUID PUMPING

Salt well liquid pumping will occur for single-shell tanks (SSTs) which have 50,000 gallons or more of drainable interstitial liquid. Pumping is scheduled to stop when the output rate decreases to 0.05 gallons per minute. Salt well liquid pumping assumptions for all three projection cases are listed below:

- A re-evaluation of the drainable porosity has occurred based on actual pumping experience and core sample analytical results (Field and Vladimiroff 1999). This re-evaluation has reduced the average saltcake drainable porosity to 25 percent and the average sludge drainable porosity to 15 percent. These re-evaluations of the drainable porosity have decreased the estimated (as of June 1998) salt well liquid volume from 6.2 Mgal to 4.0 Mgal without flush and dilution. The pumping schedule (Harmsen 2000) used for all projections is covered later in this section. The waste volume reduction factor for evaporation of dilute non-complexed salt well liquid to double-shell slurry feed is 47% (Sederburg 1995). The waste volume reduction factor for evaporation of dilute complexed salt well liquid to complexant concentrate waste is 10% (Sederburg 1995).

- It was projected that dilution and flushing of the salt well liquid and transfer lines would generate approximately 1.5 Mgal (45%) of water. The waste volume reduction factor used for this flush is 99% (Sederburg 1995).

- Approximately 1 Mgal (25%) of the total salt well liquid volume is complexed based on available analytical information.

- Based on the latest salt well liquid pumping project plan (Vladimiroff 1999), tanks AN-101 and AP-108 were used as the 200 East Area receiver tanks.

- Pumping salt well liquid in West Area presents special problems due to the limited tank space available. Tanks SY-101 and SY-103 contain complexed waste and are also designated as Watch List Tanks. Addition of waste to Watch List Tanks is prohibited unless a safer alternative cannot be found. Steps are underway to remove tank SY-101 from the Watch List Tank category.

Therefore, tank SY-102 was designated as the West Area salt well liquid receiver for both non-complexed and complexed salt well liquid. Tank SY-102 contains approximately 88 Kgal of TRU solids (Table 8) that are not scheduled to be retrieved until after the completion of salt well liquid pumping. Historically, complexed waste and TRU wastes have been segregated to minimize the amount of waste requiring more expensive disposal and to comply with U.S. Department of Energy (DOE) Order 435.1. The Hanford Site has implemented this order by segregating waste that was considered complexed (greater than 10 grams/liter total organic carbon when concentrated; wastes with chelating agents are also designated as complexed) from TRU waste sludge (Reynolds 1995). The schedule presented in Table 4 would require pumping complexed salt well liquid over the sludge in tank SY-102 in order to meet TPA milestones for the years 2000-2003. Commingling studies completed in FY 1999 (Kirch 1999), indicate that no TRU will be solubilized by commingling complexed salt well liquid with the TRU solids in tank SY-102. Furthermore, the DOE has allowed the commingling of non-complexed and complexed

salt well liquid as necessary to allow the stabilization of single-shell tanks (Kinzer 1998). In this projection, the complexed wastes are shown being pumped to tank SY-102 to meet the current TPA schedule.

- For all projection cases, it was assumed that all salt well liquid would be pumped from FY 2000 through the end of FY 2004 to meet the Consent Decree milestones. Projected salt well liquid pumping volumes are based on the pumping sequence obtained from the latest project plan and updated on April 30, 2000 (Harmsen 2000). Historical pumping volumes and the projected pumping volumes for all projection cases are presented in Table 4.

Table 4. Salt Well Pumping Schedule for All Projections

Salt Well Pumping Schedule for 25% Saltcake/15% Sludge Porosity (Field and Vladimiroff, 1999)					
FISCAL YEAR	EAST AREA		WEST AREA		TOTALS
	DN	DC	DN	DC	
Historical Salt Well Liquid Pumping 1989-1999					
1989	55 KGAL	0 KGAL	0 KGAL	17 KGAL	72 KGAL
1990	44 KGAL	0 KGAL	0 KGAL	0 KGAL	44 KGAL
1991	227 KGAL	0 KGAL	0 KGAL	0 KGAL	227 KGAL
1992	121 KGAL	0 KGAL	0 KGAL	0 KGAL	121 KGAL
1993	0 KGAL	0 KGAL	37 KGAL	0 KGAL	37 KGAL
1994	189 KGAL	0 KGAL	32 KGAL	0 KGAL	221 KGAL
1995	194 KGAL	105 KGAL	18 KGAL	0 KGAL	317 KGAL
1996	22 KGAL	0 KGAL	218 KGAL	0 KGAL	240 KGAL
1997	23 KGAL	0 KGAL	140 KGAL	0 KGAL	163 KGAL
1998	0 KGAL	0 KGAL	98 KGAL	0 KGAL	98 KGAL
1999	1 KGAL	0 KGAL	872 KGAL	22 KGAL	895 KGAL
1989-1999 Total	876 KGAL	105 KGAL	1,415 KGAL	39 KGAL	2,435 KGAL
Projected Salt Well Liquid Pumping 2000-2004 (without flush)					
2000	775 KGAL	0 KGAL	237 KGAL	357 KGAL	1,369 KGAL
2001	455 KGAL	0 KGAL	648 KGAL	119 KGAL	1,222 KGAL
2002	31 KGAL	62 KGAL	610 KGAL	23 KGAL	725 KGAL
2003	0 KGAL	21 KGAL	35 KGAL	0 KGAL	57 KGAL
2004	0 KGAL	0 KGAL	0 KGAL	0 KGAL	0 KGAL
2000-2004 Total	1,261 KGAL	83 KGAL	1,530 KGAL	499 KGAL	3,373 KGAL
GRAND TOTAL	2,137 KGAL	188 KGAL	2,945 KGAL	538 KGAL	5,808 KGAL

Notes:

DC = dilute complexed waste
DN = dilute non-complexed waste

3.9 SINGLE-SHELL TANK WASTE RETRIEVAL

The waste volume projection values for SST retrieval assume 99% retrieval by volume of all waste estimated in each of the SSTs. The volume assumed in each tank was based on information obtained from Retrieval Engineering (Penwell, 1998a). A dilution factor of three is assumed to be necessary to remove the waste and transfer it to the DST system. This dilution factor is typical in previous sluicing activities (in both DSTs and SSTs). It is not unreasonable for other retrieval options under consideration, in that this level of dilution is required for pumping most of the SST wastes in the present piping system. Hence even a retrieval system that adds little water to the tank would likely dilute the waste when it was sent from the waste collection system via the piping system to the DSTs.

The 99% retrieval rate is based on the goal established in the M-45 series of the Tri Party Agreement of retrieving 99% or greater of the wastes from the SST system. The TPA requires the SST wastes to be retrieved to the limits of the technology applied. There is a formal process in the TPA for DOE to request a change to this limit, based on demonstrations of technology and retrieval performance risk assessments. Demonstrations are planned and will be evaluated for both saltcake and sludge-type SSTs. Once these demonstrations are completed, a more accurate retrieval effectiveness value can be selected.

The retrieval of tank C-106 solids to tank AY-102 was completed in FY 1999. Approximately 194 Kgal of solids were retrieved into tank AY-102. In retrieving the remainder of the wastes from the SSTs, approximately 11.5 Mgal of sludge and 20.7 Mgal of saltcake will be retrieved (Hanlon 2000). Dilution of these solids for retrieval and processing results in a total retrieved volume of approximately 108 Mgal (Penwell 1998a). Saltcake would be diluted to 5 M Na and sludge will be diluted to 10 weight percent solids (Kirkbride 2000). It is further assumed that all solids will be removed from the SSTs. Since the purpose of this document is to determine the space needed for fixed operational assumptions, all three projection models retrieve the SST wastes using minimum retrieval durations that are fixed. All projection cases determine the space needed for a defined retrieval sequence with minimum retrieval durations rather than extending the retrieval durations to prevent overfilling available space.

Case 1 (TPA Compliant) is meant to project DST needs based on established TPA milestones (Consent Decree milestones for salt well liquid pumping), RPP program planning, and the most realistic operational assumptions (described in Section 3). In Case 1 of the 1999 OWVP, the TPA compliant SST retrieval schedule retrieved waste from several tanks with larger volumes first which caused the projected tanks space need to exceed the available DST space by the end of 2004. In this year's projection cases, the volume impact (approximately 910 Kgal) caused by diluting tank SY-101 in FY 2000 coupled with a lower waste treatment rate means that even less volume will be available for SST retrieval. For projection Case 1, an new TPA Compliant SST retrieval schedule was created that would retrieve waste from SSTs with the smaller volumes first to meet the TPA milestones for number of tanks started each year while trying to stay within the available DST space for a longer period of time. Beginning in 2010, this schedule was merged with the SST Program Plan retrieval sequence.

The new TPA compliant SST retrieval schedule would start retrieval in December 2003 (M-45-03-T1) and be completed by the end of FY 2018 (TPA milestone). The as

retrieved volume of waste for this case is approximately 0.02 Mgal for FY 2004-2005 and an additional 0.08 Mgal for FY 2006-2007. The as retrieved volumes for the remaining SST wastes are shown in the spreadsheet for the TPA Compliant Case (Section 5.1) and are based on retrieval at 5 M Na. The retrieval sequence, durations, and volumes for this SST retrieval case are shown in Table 5. The volumes and retrieval durations for this case were obtained from Retrieval Engineering (Penwell 1998a). [Late Note—Updated volumes for SST retrieval (Kirkbride 2000) are approximately 7 % lower than the volumes used in this projection case. This change could lead to a change in sequence but will probably not affect the conclusions reached with this model.] Case 1 presents a basis for evaluating future DST space needs for the TPA Compliant case through the end of FY 2018.

Table 5. Single-Shell Tank Retrieval Sequence for Case 1 (4 Sheets)

Tank	Start Date	Duration (Days)	End Date	Retrieved Liquid Volume In Kgal	Retrieved Solids Volume in Kgal	Retrieved Total Volume in Kgal
C-202	12/31/2003	5	1/4/2004	2.89	0.25	3.14
C-204	3/31/2004	7	4/6/2004	3.87	0.17	4.04
C-201	6/30/2004	6	7/6/2004	5.78	0.50	6.28
SX-113	10/31/2004	98	2/5/2005	8.69	0.75	9.45
C-203	3/31/2005	7	4/7/2005	14.45	1.25	15.70
A-104	6/30/2005	101	10/8/2005	29.06	1.52	30.58
AX-104	10/10/2005	36	11/15/2005	28.76	2.50	31.26
SX-115	12/31/2005	62	3/2/2006	42.09	2.99	45.08
A-105	3/31/2006	84	6/23/2006	77.68	6.74	84.42
AX-102	6/30/2006	110	10/18/2006	87.62	1.99	89.61
A-102	10/1/2006	111	1/20/2007	101.14	1.41	102.55
C-108	1/21/2007	77	4/7/2007	106.89	9.28	116.17
SX-110	3/1/2007	125	7/4/2007	211.11	17.96	229.07
C-111	5/1/2007	73	7/12/2007	156.73	13.60	170.33
C-103	7/1/2007	75	9/13/2007	238.83	20.73	259.56
A-106	10/1/2007	145	2/23/2008	257.75	8.96	266.71
C-101	12/15/2007	87	3/11/2008	280.84	24.38	305.22
SX-112	3/1/2008	132	7/11/2008	365.08	31.69	396.77
AX-103	9/1/2008	139	1/18/2009	310.10	9.38	319.48
C-110	9/29/2008	129	2/5/2009	375.78	32.62	408.40
U-204	1/2/2009	6	1/8/2009	10.89	0.94	11.83
U-203	1/15/2009	6	1/21/2009	12.31	1.07	13.38
C-112	1/19/2009	95	4/23/2009	379.15	32.91	412.06
C-109	3/1/2009	75	5/14/2009	427.38	37.10	464.47
U-202	3/15/2009	7	3/22/2009	24.25	2.10	26.35
U-201	5/1/2009	7	5/8/2009	24.25	2.10	26.35
U-101	7/25/2009	61	9/23/2009	63.36	5.50	68.86
U-104	10/1/2009	103	1/12/2010	115.56	10.03	125.59
U-112	10/15/2009	69	12/23/2009	139.51	12.11	151.62

Table 5. Single-Shell Tank Retrieval Sequence for Case 1 (4 Sheets)

Tank	Start Date	Duration (Days)	End Date	Retrieved Liquid Volume In Kgal	Retrieved Solids Volume in Kgal	Retrieved Total Volume in Kgal
U-110	12/24/2009	134	5/7/2010	250.06	21.71	271.77
SX-111	1/13/2010	145	6/7/2010	444.98	38.63	483.61
SX-107	5/8/2010	135	9/20/2010	505.20	43.85	549.05
C-107	6/1/2010	158	11/5/2010	522.84	45.39	568.22
U-106	6/8/2010	145	10/31/2010	651.82	9.13	660.95
SX-108	10/1/2010	131	2/9/2011	552.63	47.97	600.60
C-104	10/15/2010	185	4/18/2011	1170.22	101.58	1271.80
U-109	11/1/2010	256	7/15/2011	1274.29	23.24	1297.53
U-111	12/1/2010	201	6/20/2011	925.73	10.92	936.65
SX-105	1/1/2011	409	2/14/2012	2143.33	32.68	2176.01
SX-103	2/10/2011	394	3/10/2012	1870.03	50.40	1920.44
C-105	3/1/2011	108	6/17/2011	727.74	63.17	790.91
C-102	5/1/2011	195	11/12/2011	2132.71	185.13	2317.84
U-107	6/10/2011	223	1/19/2012	931.40	32.56	963.96
U-105	7/16/2011	226	2/27/2012	1084.94	13.18	1098.12
AX-101	8/1/2011	440	10/13/2012	2143.62	20.30	2163.92
TX-112	10/1/2011	372	10/7/2012	2398.48	15.12	2413.60
TX-101	10/3/2011	105	1/15/2012	321.39	27.90	349.29
T-105	10/15/2011	92	1/14/2012	119.15	10.25	129.40
A-103	11/13/2011	259	7/29/2012	1045.52	9.06	1054.58
BY-102	12/1/2011	196	6/14/2012	1096.39	13.65	1110.04
T-102	1/1/2012	58	2/28/2012	105.41	9.15	114.56
TX-106	1/16/2012	280	10/22/2012	1670.76	8.09	1678.85
U-108	1/20/2012	256	10/2/2012	1299.69	19.68	1319.38
BX-106	2/15/2012	68	4/22/2012	137.12	11.90	149.03
BX-104	3/1/2012	91	5/31/2012	118.75	10.31	129.06
B-108	4/1/2012	90	6/30/2012	210.23	7.22	217.45
BY-111	8/1/2012	282	5/10/2013	1524.54	19.58	1544.12
U-102	10/1/2012	214	5/3/2013	1130.03	18.51	1148.54
TX-102	10/8/2012	168	3/25/2013	416.02	2.05	418.07
TX-118	10/23/2012	229	6/9/2013	1195.56	16.63	1212.19
BY-112	11/1/2012	203	5/22/2013	967.64	11.55	979.19
BX-103	11/15/2012	75	1/28/2013	203.40	17.66	221.05
U-103	12/1/2012	261	8/18/2013	1385.24	13.77	1399.01
BY-101	12/15/2012	248	8/20/2013	1249.36	19.89	1269.25
A-101	1/1/2013	537	6/21/2014	2747.30	19.21	2766.51
TY-102	1/15/2013	99	4/24/2013	211.50	1.38	212.88
SX-102	2/15/2013	343	1/23/2014	1637.77	33.96	1671.73
TX-111	3/26/2013	240	11/21/2013	1260.68	10.81	1271.50
S-103	6/1/2013	175	11/22/2013	710.89	3.09	713.98

Table 5. Single-Shell Tank Retrieval Sequence for Case 1 (4 Sheets)

Tank	Start Date	Duration (Days)	End Date	Retrieved Liquid Volume In Kgal	Retrieved Solids Volume in Kgal	Retrieved Total Volume in Kgal
TX-108	6/10/2013	129	10/17/2013	483.56	9.56	493.13
S-105	7/1/2013	281	4/7/2014	1519.68	7.15	1526.83
SX-106	10/1/2013	312	8/8/2014	1374.11	7.25	1381.36
BX-105	10/1/2013	70	12/9/2013	134.57	11.68	146.25
B-102	10/7/2013	64	12/10/2013	69.77	1.98	71.75
BY-109	10/15/2013	265	7/7/2014	1378.46	20.34	1398.80
TX-109	10/18/2013	247	6/22/2014	832.17	72.24	904.41
B-106	11/1/2013	100	2/9/2014	318.23	2.59	320.83
BX-107	11/15/2013	208	6/11/2014	699.95	60.76	760.71
TX-104	11/22/2013	99	3/1/2014	194.60	5.20	199.81
S-102	12/1/2013	325	10/21/2014	1635.54	8.98	1644.52
T-110	12/15/2013	224	7/26/2014	502.56	34.79	537.35
B-109	1/1/2014	106	4/16/2014	233.98	8.55	242.53
SX-101	2/1/2014	301	11/29/2014	1453.32	126.16	1579.48
TX-103	3/2/2014	140	7/20/2014	579.91	2.92	582.84
T-104	3/15/2014	236	11/5/2014	762.85	66.22	829.07
S-106	4/8/2014	290	1/23/2015	1718.61	24.04	1742.65
TX-105	6/23/2014	353	6/11/2015	2253.40	11.56	2264.95
TX-115	7/21/2014	368	7/24/2015	2363.72	11.92	2375.64
BY-110	10/1/2014	254	6/11/2015	1033.08	46.03	1079.11
SX-109	10/3/2014	201	4/22/2015	962.31	39.74	1002.04
BX-112	10/7/2014	123	2/7/2015	277.01	24.05	301.06
T-204	10/15/2014	23	11/6/2014	55.71	4.84	60.54
S-108	10/22/2014	351	10/9/2015	2004.44	10.94	2015.38
BX-109	11/1/2014	137	3/17/2015	1231.39	106.89	1338.28
B-202	11/15/2014	18	12/2/2014	39.72	3.45	43.17
T-203	11/15/2014	21	12/6/2014	51.30	4.45	55.75
B-104	12/15/2014	221	7/23/2015	459.77	31.06	490.83
T-201	12/25/2014	18	1/11/2015	41.09	3.57	44.66
S-109	1/24/2015	334	12/24/2015	1859.28	14.82	1874.10
B-101	2/1/2015	99	5/11/2015	245.63	21.32	266.96
T-202	2/15/2015	15	3/1/2015	30.89	2.68	33.57
BY-104	3/1/2015	257	11/13/2015	1147.58	43.66	1191.24
SX-104	3/15/2015	377	3/25/2016	1587.90	69.45	1657.34
BX-111	4/15/2015	122	8/14/2015	661.45	11.22	672.67
BX-110	5/1/2015	142	9/20/2015	356.76	28.79	385.55
SX-114	6/1/2015	172	11/19/2015	853.32	26.23	879.56
TX-114	6/12/2015	318	4/26/2016	1929.84	9.93	1939.76
TX-113	7/25/2015	352	7/11/2016	1827.89	42.57	1870.45
TY-103	10/1/2015	142	2/19/2016	401.70	17.36	419.06

Table 5. Single-Shell Tank Retrieval Sequence for Case 1 (4 Sheets)

Tank	Start Date	Duration (Days)	End Date	Retrieved Liquid Volume In Kgal	Retrieved Solids Volume in Kgal	Retrieved Total Volume in Kgal
B-105	10/4/2015	190	4/11/2016	798.57	10.28	808.85
S-112	10/10/2015	313	8/17/2016	2109.96	13.45	2123.40
BY-106	11/1/2015	369	11/3/2016	2039.13	38.32	2077.45
B-107	11/15/2015	123	3/17/2016	332.16	28.83	360.99
TY-106	12/1/2015	70	2/8/2016	23.42	2.03	25.45
S-111	12/15/2015	342	11/22/2016	1543.06	37.08	1580.14
BX-101	1/1/2016	69	3/9/2016	158.53	13.76	172.29
BY-103	2/1/2016	254	10/12/2016	1348.38	15.48	1363.85
TY-104	2/10/2016	93	5/13/2016	63.51	5.51	69.02
T-101	3/1/2016	93	6/2/2016	218.07	18.93	237.00
B-103	3/15/2016	74	5/27/2016	157.54	2.24	159.77
B-112	3/31/2016	65	6/4/2016	73.08	2.26	75.35
BX-108	4/1/2016	63	6/3/2016	52.36	4.55	56.91
TX-110	4/27/2016	284	2/5/2017	1625.67	15.12	1640.79
TY-101	5/1/2016	121	8/30/2016	327.99	15.96	343.95
T-112	5/15/2016	74	7/27/2016	56.80	4.93	61.73
T-103	6/3/2016	62	8/3/2016	103.81	9.01	112.82
TX-116	7/12/2016	364	7/11/2017	1972.71	13.44	1986.16
S-107	10/1/2016	237	5/25/2017	907.63	78.79	986.42
BY-107	10/13/2016	191	4/22/2017	696.58	26.68	723.27
BX-102	10/15/2016	91	1/14/2017	132.58	11.51	144.09
BY-108	11/4/2016	173	4/27/2017	510.29	37.61	547.90
S-110	11/23/2016	250	7/31/2017	993.92	46.06	1039.98
T-109	12/1/2016	73	2/12/2017	162.79	1.50	164.30
T-107	12/15/2016	127	4/21/2017	263.52	22.88	286.40
B-111	1/1/2017	157	6/7/2017	342.82	24.75	367.57
B-201	1/15/2017	18	2/1/2017	39.96	3.47	43.43
TX-117	2/6/2017	361	2/2/2018	2121.47	11.37	2132.84
T-108	2/13/2017	69	4/23/2017	92.67	4.15	96.81
B-204	2/15/2017	28	3/14/2017	71.98	6.25	78.23
B-110	3/15/2017	162	8/24/2017	340.26	23.25	363.51
T-106	4/22/2017	58	6/19/2017	66.46	5.77	72.23
BY-105	4/23/2017	303	2/20/2018	1434.60	48.03	1482.63
TY-105	5/1/2017	175	10/22/2017	231.21	20.07	251.28
S-101	5/26/2017	262	2/12/2018	986.08	85.60	1071.67
B-203	6/8/2017	28	7/6/2017	73.36	6.37	79.73
T-111	6/20/2017	257	3/4/2018	454.93	39.49	494.42
TX-107	7/12/2017	89	10/9/2017	111.94	3.52	115.46
S-104	8/1/2017	204	2/21/2018	1409.77	122.38	1532.15

3.10 T PLANT

T Plant's primary mission is decontamination and treatment of radiologically and chemically contaminated waste and equipment located throughout the Hanford site (McDonald, 1997). T Plant also provides inspection and repackaging services to various Hanford facilities. The 2706-T Low-Level Decontamination Facility (where low-level equipment decontamination is performed) is an approved decontamination facility that commenced operation in September 1994. Limited 221-T canyon decontamination activities (primarily Tank Farms long-length contaminated equipment) were initiated in 1995.

T Plant has adopted decontamination techniques (ice blasting and CO_2 decontamination systems) which have reduced liquid waste generations from those reported previously. Dilute, non-complexed wastes collected at T Plant during decontamination, repackaging, or condensate collection, are currently being transported to 204-AR vault via tanker truck. These wastes contain approximately 5 volume percent solids (McDonald, 1997). Projected T Plant monthly waste generations (McDonald, 1997) were based on a combination of anticipated work loads and actual observed generation rates. Based on information supplied by T Plant engineers (Barnes 2000), the projected volume for T Plant is 20 Kgal in FY 2001 and 2 Kgal/ year thereafter. The exact waste volume generation projected for each year is shown in the spreadsheet for the Case 1 in Section 5.1. All three projection cases used the same generation rates. The waste volume reduction factor for evaporation of T Plant miscellaneous wastes to double-shell slurry feed is 99% (Sederburg, 1995). Flush volumes for T Plant waste streams are 22%.

3.11 TANK FARMS

There are currently 28 DSTs used to receive, store, and evaporate the liquid wastes generated at the Hanford facilities to an interim waste form. The interim waste form (e.g., double-shell slurry feed) is currently stored in tank farms waiting processing and vitrification for final disposal. Tank Farm waste generation sources and operational considerations are listed below for the aging and non-aging waste tanks. Tank Farm waste generations are primarily from line, cross-site, and air-lift circulator flushes.

Double-Shell Tanks for Aging Waste

Four of the DSTs (AY and AZ farms) are designated as aging waste tanks and were designed to store high-heat wastes (e.g., neutralized current acid waste wastes or wastes containing high-heat loads due to the presence of ^{90}Sr or ^{137}Cs). The aging waste tanks are equipped with condensers and air-lift circulators. The purpose of the condensers is to handle the vapors from primary tank vent systems when hot liquid is present. Condensates are collected in catch tanks (e.g., AZ-151) and returned either to an aging waste tank or to a dilute receiver tank. The air-lift circulators aid in suspending neutralized current acid waste solids and in heat removal. Air-lift circulators require periodic flushing (approximately once/week) to prevent clogging when they are operating. When the air-lift circulators are not operating, flushing is less frequent.

Aging waste tank operation assumptions used in all three projections follow:

- Aging waste tanks can be used for storage of dilute non-aging waste.

- It is assumed that there will be no additional aging waste produced by the Hanford facilities. However, certain wastes containing high ^{90}Sr or ^{137}Cs contents may require storage in aging waste tanks due to their radioactivity. High-Level Waste returns to DSTs during Phase 2 processing will be stored in three aging waste tanks.

- SST solids retrieved from tank C-106 were stored in aging tank AY-102 in FY 1999 due to the high heat content of the solids.

- One aging waste tank space is kept available for receiving the contents of an aging waste tank, in the unlikely event of a tank leak (Department of Energy Order 435.1). In FY 2000, tank AY-101 is the designated emergency tank space.

- Tank AY-102 was designated as the 200 East Area dilute receiver for non-complexed wastes through mid FY 1996. Tank AY-102 is currently being used to store the solids retrieved from tank C-106.

Double-Shell Tanks for Non-Aging Waste

The remaining 24 DSTs are called non-aging waste tanks and are used to store wastes that do not contain high-heat loads in accordance with applicable operational and waste segregation policies. Non-aging waste tank operation assumptions are as follows:

- Approximately 66 Kgal of caustic will be added to tank AN-107 in FY 2001 to mitigate the low caustic condition in the tank for all projection cases (Carothers 2000). Approximately 15 Kgal of caustic will be added to tank AY-101 in FY 2001 to mitigate a low caustic condition.

- Current operational tank usage for this projection is summarized in Table 6. Projected tank usage will be covered in Section 5.

- It was assumed that the TRU solids in tank SY-102 would be retrieved to tank AW-105 starting in FY 2011. The neutralized cladding removal waste solids in tank AW-105 were not combined with the solids in tank AW-103 in this projection.

- Flushes are generated during the receipt of waste transfers either from tanker trucks or after tank to tank transfers. Percent flushes are included with a description of each of the facility generations in Section 3.

- Tank AP-108 is currently receiving tanker truck shipments via the 204-AR waste unloading facility from T Plant and 300 Area.

- Tanks AN-101 and AP-108 will be used to receive salt well liquid in 200 East Area (Vladimiroff 1999). Tank SY-102 will receive salt well liquid in 200 West Area.

- Wastes from PFP are transferred through the 244-TX double contained receiver tank to tank SY-102. Wastes from the 222-S Laboratory are transferred through the 244-S double contained receiver tank to tank SY-102.

Table 6. Current Operational Tanks and Usage

Operation	Designated Tank
Evaporator Feed Tank	Tank AW-102
Evaporator Receiver Tank	Tank AW-106
200 East Dilute Receiver Tank	Tank AW-105 (PUREX direct transfers; 100 Area wastes)
200 East Dilute Receiver Tank	Tank AP-108
200 West Dilute Receiver Tank	Tank SY-102 (FY 2000-2018)
200 East Salt Well Liquid Receivers	Tank AN-101 and AP-108 (FY 2000-2003)
200 West Salt Well Liquid Receiver	Tank SY-102
Waste Treatment Plant Feed Tanks	Waste treatment plant supplies feed tanks
Intermediate Staging Tanks	Tanks AN-101, AN-102, AN-105, AP-104, AP-101
Entrained Solids Return Waste	Waste treatment plant supplies space
Dilute Feed Staging	Tanks AP-106, AP-107; Tank AN-106 (~FY 2003)
Emergency Tank Space	Tank AY-101 in FY 2000

Projected waste generations for Tank Farms were based on a combination of previously observed waste generation rates, anticipated operational needs, and chemical additions that are explained below:

- Tank Farm water additions to Double-Shell Tanks. Tank Farms waste generation rates and flushing activities generally increase with the restart of the 242-A Evaporator due to the additional waste transfers. The 242-A Evaporator was restarted in April 1994. During the period April 1994 through May 1995, the average monthly waste generation rate for Tank Farms was 10.92 Kgal/month. The average monthly waste generation for Tank Farms during FY 1998, 1999, and 2000 (through June 2000) was 3.7, 4.8, and 7.6 Kgal/month, respectively. The target rate set for Tank Farms waste generations was 10 Kgal/month. All three projection cases estimated that Tank Farms would generate 10 Kgal/month or 120 Kgal/year to cover transfer line and air-lift circulator flushes and chemical additions. The waste volume reduction for evaporation of these flushes to double-shell slurry feed was 99% (Sederburg 1995).

- Cross-site Transfers. All projection cases assumed the cross-site transfer line would continue to be available to allow cross-site transfer of salt well liquid, facility generations, DST solids from tank SY-102 and/or SST solids. It was assumed that all wastes containing solids would be cross-sited via the new line which has inline pumps to tank AN-104. Without operable cross-site lines many of the TPA (and/or Consent Decree) milestones involving West area wastes could not be achieved.

  All three projection cases assumed that approximately 35 Kgal of water would be needed to flush after each cross-site transfer. During the period 2000-2003, approximately two to three cross-sites would be needed each year due to the volume of salt well liquid being pumped. Based on the projected cross-site testing and transfers anticipated, 70 Kgal/year was

projected for the period FY 2000-2003. All three projection cases used the same volumes for cross-site transfer line tests and flushes. The waste volume reduction for evaporation of these flushes to double-shell slurry feed was 99% (Sederburg 1995).

- Tank Fill Limits (except for special tank fill considerations):
  - AY, AZ Tanks: 980 Kgals
  - Tank AW-102: 1128 Kgal
  - All other DSTs: 1140 Kgals

- The special tank fill considerations used to simulate tank transfers in this projection are listed below:
  - Tank SY-102: 1082 Kgal maximum operational fill limit; minimum Drawdown level is 358 Kgal until TRU solids have been removed. Minimum practical drawdown level is 550 Kgal. The 550 Kgal minimum was used in the projection models.
  - Tank AY-102: Start transfer at 900 Kgal.
  - Dilute receivers are projected to be pumped down to 28 Kgal above solids.

3.12 URANIUM OXIDE FACILITY

Deactivation of the Uranium Oxide (UO_3) Facility is complete and therefore, no waste will be sent to DSTs.

3.13 WASTE SAMPLING AND CHARACTERIZATION FACILITY

The Waste Sampling and Characterization Facility was started in FY 1994. This projection assumed that the Waste Sampling and Characterization Facility would send its waste to Effluent Treatment Facility and not to DSTs (Collins 1996).

3.14 100 AREA

100-N Basin

The 100-N Basin was constructed in 1963 to receive irradiated fuel assemblies discharged from the N Reactor for the purpose of inspection, storage, and preparation for shipment. In 1988 the N Reactor was placed in a "cold standby" status (shutdown but capable of restarting). In 1989 all nuclear fuel was removed from N Basin and transferred to K Basin. In 1991, DOE directed Westinghouse to begin deactivation activities. It was assumed that deactivation of the N Basin would not send any wastes to DSTs but wastes would instead be transferred to the Environmental Restoration Disposal Facility (Logan 1998).

100-K Basin

Fuel handling operations have resulted in some cladding damage to N-Reactor fuel. Subsequent fuel oxidation resulted in fuel and fission products accumulating in fuel canisters and in K Basin where the fuel handling occurred. Aluminum oxide, iron oxide, concrete grit, and other debris has accumulated and mixed with the fuel corrosion products to form a sludge on the basin floor. Approximately 430 Kgal of water and sediment (approximately 98 Kgal of sediment) will need to be removed. Based on the latest studies, the wastes from 100-K cleanout will not be sent to

DSTs (Jones 2000). The sludge would be sent to T Plant for interim storage. Final treatment and disposal of the sludge would be coordinated with other transuranic waste at the site (Jones 2000). The sludge will not be sent to tank farms.

105-F & 105-H Basins

Plans to cleanout the 105-F and 105-H Basins are still being reviewed and the date of cleanout is uncertain due to funding. The projected plan is to clean out the 40,000 gallons in 105-F in the year 2001 and the 200,000 gallons from 105-H in the year 2006 (Griffin, 2000). It is assumed that these wastes will be transferred to AW-105. These assumptions for 105-F and 105-H Basin cleanout were used for all three projection cases.

The waste volume reduction factor for evaporation of all 100 Area Basin wastes to double-shell slurry feed is 99% (Sederburg 1995). Flush volume for 100 Area wastes is 44%.

3.15 300 AREA

Facilities in the 300 Area are used primarily for research and development activities or for analytical support. Wastes from the Pacific Northwest National Laboratory facilities will be collected at the Radioactive Liquid Waste Tank and then transferred to the DSTs. Liquid wastes collected in 300 Area will be shipped to the 204-AR vault via a tanker truck (LR-56) due to the cessation of rail service at Hanford.

The 324 Facility projected that it would not be sending any liquid wastes to tank farms through 2002 (Zinsli 2000). The 325 Facility projected that it would send 2 to 4 Kgal/year to tank farms for the baseline case (Faulk 2000). The 340 Facility projected it would send 2.64 Kgal to tank farms in FY 2001 (Stordeur 2000). Facilities in the 300 Area sent 15 Kgal of waste (includes flush) to DSTs (~1.3 Kgal/month) in FY 1998 and no waste in FY 1999. Based on the facility inputs, all three projection cases projected that 0.17 to 0.42 Kgal/month of miscellaneous waste would be sent from 300 Area Facilities to Tank Farms. See the spreadsheet in Section 5.1 for a listing of the volume of waste projected for each year for 300 Area Facilities. Based on the chemical composition supplied for 300 Area waste streams, the waste volume reduction factor for evaporation of 300 Area miscellaneous wastes to double-shell slurry feed is 94% (Sederburg 1995). Flush volume for 300 Area waste streams is 44%.

3.16 400 AREA

There are three major facilities in the 400 Area (Dillhoff 1997). These include the Fast Flux Test Facility, the Maintenance and Storage Facility, and the Fuel and Material Examination Facility. Radioactive liquid waste is primarily generated in conjunction with the removal of residual sodium from reactor components or with decontamination activities. Approximately 11 Kgal of wastes were received from 400 Area in FY 1994-1995 (~0.5 Kgal/month). The 400 Area facilities send their radioactive wastes to the Effluent Treatment Facility in 200 Area (Dahl 1999). All three projection cases projected no wastes would be sent from the 400 Area facilities to tank farms.

3.17 PHASE 1 PROCESSING

Final details of the waste treatment and vitrification will not be developed until later in the process and the assumptions listed below are subject to change. As currently proposed, waste treatment and vitrification would be divided into two phases. Phase 1 would include waste tank supernatant processing, Low-Activity Waste (LAW) immobilization, and High-Level Waste (HLW) immobilization (Washenfelder 1996b). The scale of processing during Phase 1 has been established to demonstrate the technical and commercial capability. Phase 2 processing would include additional tank waste retrieval, supernatant processing, sludge/solid processing, LAW immobilization, HLW immobilization, and interim storage of immobilized waste (Washenfelder 1996a and Kirkbride 2000). The schedule and assumptions listed below were used for the Case 1 and 2 projections and were based on Retrieval Engineering Case 3S6E (Kirkbride 2000). Cases 3 used a different waste treatment schedule than the schedule used for Cases 1 and 2. The waste treatment schedule used for Case 3 is presented in Section 4.0 along with the other assumptions unique to this projection case.

Phase 1 Schedule. The facility startup schedule for Phase 1 is summarized below (used for all three projections):

- HLW vitrification start date — September 2008
- LAW vitrification start date — March 2008

Intermediate Feed Staging Tanks. Tanks AN-101, AN-102, AN-105, AP-104, and AP-101 were used for intermediate staging of wastes by the tank farm contractor (Kirkbride 2000).

Waste Treatment Plant Feed Tanks. Wastes from the intermediate feed staging tanks will be transferred to feed tanks which will be built by the waste treatment plant (Taylor 1999).

High-Level Waste treatment and Immobilization. Phase 1 processing of tank waste sludges would involve sludges in tanks AZ-101, AZ-102, AY-102 (includes C-106 solids), AY-101 (includes C-104 solids), and SY-102 (retrieved to AZ-101). Phase 1 extended order would process sludges from C-107, AW-103, and AW-104 (Kirkbride 2000). All cases assumed that no in-tank washing of solids would occur.

In Revision 21 of this document, it was assumed that all neutralized current acid waste solids and the C-106 solids would be combined into one aging waste tank (tank AZ-102) and that all neutralized current acid waste supernates would be concentrated into one aging waste tank (tank AZ-101). Since that document was published, studies have been completed which looked at numerous sludge washing/combination options (Powell 1996a). The alternatives for consolidating high heat sludges have been reviewed by a decision board comprised of Hanford contractor management, a DOE representative, and a WDOE representative. It was concluded that consolidating all the high heat sludges into a single tank would require modifications to the tank farm safety basis. The preliminary decision reached was not to consolidate all the high heat sludges into a single tank.

High-Level Waste Treatment Rate. The HLW processing rate used for projection Cases 1 and 2 is based on Retrieval Engineering Case 3S6E (Kirkbride 2000) and is listed below by year:

Projection Cases 1 & 2

Yr	Canisters/yr
1	41 (40%)
2-12	120 (100%)

Low-Activity Waste (LAW) Treatment. The current DOE strategy calls for a demonstration of LAW treatment and immobilization at a rate dependent on the type of waste being processed. Envelope A feed is typically double-shell slurry feed, double-shell slurry, or dilute non-complexed waste. Envelope B feed is untreated neutralized current acid waste supernate. Envelope C feed is typically complexant concentrate waste. The processing schedule, sequence of waste processed, and the approximate sodium quantity processed for projection Cases 1 and 2 is listed in Table 7 (Kirkbride 2000). The LAW processing rate used for Cases 1 and 2 is listed below by year:

Projection Cases 1 & 2

Yr	units/yr
1	279 (37%)
2	830 (110%)
3	1011 (134%)
4on	1100 (146%)

Storage of Separated TRU and Entrained Solids. For all projection cases, the entrained solids and transuranic (TRU) elements removed from LAW waste by the waste treatment plant were not returned to tank farms.

Table 7. Projected LAW Processing Schedule for the Case 1 and 2 Projections

Tank	Waste Type	Envelope	Volume With solids (Kgal)	Approximate Quantity of Na Delivered (MT Na)	Existing or Future Waste	Modeled Delivery Dates
AP-101	DSSF	A	1114	~615	Existing	4/29/2006
Vendor	NCAW Supernate	B	~900	~503	Existing	7/08/2007
AN-102	CC	C	1056	~968	Existing	4/10/2008
AN-104	DSSF	A	1053	~845	Existing	9/29/2010
AN-107	CC	C	1042	~703	Existing	7/08/2011
AN-105	DSSF	A	1126	~839	Existing	4/01/2012
SY-101	CC	A	~2169	~827	Existing	1/16/2013
AN-103	DSS	A	956	~1084	Existing	10/08/2013
AW-101	DSSF	A	1126	~1070	Existing	10/04/2014
Start of Phase 1 extended order						
AW-104	DSSF	A	1118	~390	Future	9/25/2015
SY-103	CC	C	744	~258	Existing	2/02/2016

Notes:

CC = complexant concentrate waste
DSS = double-shell slurry
DSSF = double-shell slurry feed
NCAW = neutralized current acid waste

3.18 PHASE 2 PROCESSING

The scale of processing during Phase 1 has been established to demonstrate the technical and commercial capability. Phase 2 processing would include the remaining tank waste retrieval, supernatant processing, sludge/solid processing, LAW immobilization, HLW immobilization, disposition of encapsulated Cs/Sr, and interim storage of immobilized waste (Washenfelder 1996b).

3.19 WATCH LIST/SAFETY

Paperwork is being prepared that will eliminate the Watch List Category in FY 2002. However, removal of the Watch List designation alone will not allow use of all the headspace in the Watch List tanks. The existing waste in a Watch List tank may require dilution/treatment before the designation could be removed. The reclassification/treatment of Watch List Tank SY-103 could allow dilution of the tank with salt well liquid which would gain approximately 390 Kgal of storage space. The feasibility of similar actions with other tanks would need to be studied but could save tank space.

Tank SY-101 Remediation. Increases in the level in tank SY-101 led to a need to remediate the flammable gas buildup in tank SY-101 by retrieving and diluting the waste rather than relying on mitigation of the gas buildup by use of a mixer pump. The waste in tank SY-101 were diluted and retrieved to tank SY-102 in FY 2000 in three campaigns:

- Campaign 1--Completed in December, removed 89.5 Kgal of the original waste from tank SY-101 (Conner, 2000).
- Campaign 2--Completed in January 2000, removed 230 Kgal of the original waste from tank SY-101.
- Campaign 3--Completed in March 2000, removed approximately 206 Kgal of the original waste from SY-101.

The diluted waste transferred from the first two campaigns was stored in tank AP-104 to serve as contingency LAW feed. The waste from the third campaign was stored in AP-106. A total of 910 Kgal of water was added to the SY-101 waste during and after the retrieval.

Tank SY-103 Retrieval. Tank SY-103 will be diluted to approximately 7 M Na and transferred via tank AN-104 to tank AN-101. The transfer to tank AN-104 will occur in FY 2013.

All three projection cases assume that timely permission is obtained to remove waste from watch-list tanks used as LAW feed sources and to remove the watch-list designation from that tank immediately after retrieval/dilution.

All three cases assume that the authorization basis is amended to support all activities related to Phase 1 activities (for example, LAW feed staging and delivery, HLW feed staging and delivery, etc.

3.20 EMERGENCY SPACE/LAW AND HLW RETURN

Emergency space is space reserved in case of a leak in a double-shell tank per DOE Order 435.1. Contingency space has historically been set aside to account for possible inaccuracies in the WVP software when projecting waste generations and/or waste volume reduction factors.
In revision 25 of the OWVP document, 2.28 Mgal of emergency space was reserved in case of a double-shell leak per DOE Order 435.1. In revision 26 of the OWVP document, the emergency space has been reduced to 1.14 Mgal. However, the tank farm contractor has also been requested to provide the capability to receive up to one tank either LAW or HLW return from the waste treatment plant on an emergency basis (Taylor 1999). Accordingly, 1.14 million gallons of space has been reserved for the possibility of a LAW or HLW return. In order to meet the requirements for storing HLW returns, the space in tank AY-101 was designated as dedicated emergency space in all three projections (Strode 2000). In FY 2007, tank AY-101 is used to receive C-104 wastes and tank AZ-102 will be designated as the dedicated emergency tank through the end of the projection. The remaining one million gallons of emergency space is distributed primarily within the waste receiver tanks (AP-108, AW-105, and SY-102).

3.21 WASTE SEGREGATION

Waste segregation and compatibility are requirements of DOE Order 435.1 (DOE 1999) and WAC 173-303-395 (Dangerous Waste Regulations). The overriding purpose of waste segregation and compatibility are to ensure the safety of waste storage and tank farms operations; to minimize future processing costs; and to comply with DOE Order 435.1 and WAC 173-303-393. Wastes that are typically segregated include:

- Phosphate Wastes--dilute phosphate or concentrated phosphate.
- Wastes Containing High Organic Concentrations--dilute complexed or complexant concentrate waste.
- TRU containing wastes--Neutralized Cladding Removal Wastes or PFP solids.
- Watch list tank wastes to prevent inadvertent commingling with other wastes.
- Pretreated waste streams.
- Washed neutralized current acid waste solids, etc.
- Concentrated interim waste types--e.g., double-shell slurry feed or double-shell slurry need to be separated from dilute wastes to prevent the need to reconcentrate.
- Wastes exhibiting exothermic reactions.
- Wastes that have been characterized and designated as feed for the waste treatment plant are segregated by feed envelope type.

All three projections assume that current waste segregation practices are observed (if possible) with the exception of salt well liquid pumping in 200 West Area as discussed in Section 3.8. Waste segregation practices are summarized in Table 8. For all projection cases, non-complexed and complexed salt well liquid wastes in 200 East Area were mixed for evaporation purposes beginning in FY 2000. The U.S. Department of Energy has allowed the commingling of non-complexed and complexed salt well liquid wastes as necessary to allow the stabilization of single-shell tanks (Kinzer 1998).

Table 8. Waste Compatibility Matrix

SOURCE WASTE TYPE	Receiver Waste Type							
	DN	DSSF	DC	CC	(PD) NCRW	PT	NCAW	CP
DN	X	X	X	X	X	X	X	X
DSSF	X	X						
DC			X	X*				
CC			X*	X				
(PD) NCRW Solids	X				X	X		
(PT) PFP Solids	X				X	X		
NCAW							X	
CP								X

Notes:

(*) Adding CC to DC is permitted but would not ordinarily be done. The volume of combined waste which would need to be evaporated would be increased, resulting in increased evaporation costs.

CC = complexant concentrate waste
CP = concentrated phosphate waste
DC = dilute complexed waste
DN = dilute non-complexed waste
DSSF = double-shell slurry feed
NCAW = neutralized current acid waste
NCRW = neutralized cladding removal waste
PD = PUREX decladding sludge
PT = PFP TRU solids

3.22 LOSS OF DOUBLE-SHELL TANK SPACE

Corrosion studies completed to date (Anantatmula and Ohl 1996) show a 40%-60% chance of a pit corrosion failure occurring in a DST by FY 2028. Some of the corrosion potential could be mitigated by maintaining a corrosion control program for the DSTs. The River Protection Project (RPP) Key Planning Assumptions (Barrett 2000) have acknowledged that DSTs will reach the end of their design life and could fail at the rate of one for each five years past design life. Based on this information, it was assumed that one DST would fail and be replaced in 2017 and one DST would fail and be replaced every five years thereafter. It is assumed that additional DST space will be built to replace tanks removed from service in time to meet the failure without a loss of overall space.

3.23 NEW DOUBLE-SHELL TANK CONSTRUCTION ASSUMPTIONS

Projection Cases 1 and 2 assume that 28 DSTs will be available and then determine whether additional DSTs will be needed by the end of FY 2018. The results of this determination are presented in Section 5. Projection Case 3 assumed that four tanks would be built in 2010. For additional information on double-shell tank construction see Section 7.

3.24 DOUBLE-SHELL TANK SOLIDS LEVELS

Solids levels in the DSTs on September 30, 1999 are shown in Table 9 (Hanlon 1999). Tanks with no solids level listed have either not been measured or have a minimal solids volume. The total DST solids used for this projection was approximately 4.2 Mgal. The solids level in tank AY-102 reflects the addition of tank C-106 solids in FY 1999.

Table 9. Double-Shell Tank Solids Levels (Kgal)

TANK	SOLIDS	TANK	SOLIDS	TANK	SOLIDS	TANK	SOLIDS
AY-101	108	AN-101	33	AP-101		AW-101	306
AY-102	211	AN-102	89	AP-102		AW-102	40
AZ-101	47	AN-103	410	AP-103	1	AW-103	348
AZ-102	104	AN-104	449	AP-104		AW-104	231
SY-101	41	AN-105	489	AP-105	89	AW-105	280
SY-102	88	AN-106	17	AP-106		AW-106	228
SY-103	362	AN-107	247	AP-107			
				AP-108			

3.25 INACTIVE MISCELLANEOUS UNDERGROUND STORAGE TANK WASTES

Approximately 500 Kgal of wastes are projected to be received from Inactive Miscellaneous Underground Storage Tanks (IMUSTs) between FY 2011 and 2015 (Wacek 1996).

3.26 ASSUMPTION SUMMARY

Assumptions used for all cases are presented in Table 10. Differences in assumptions between the three cases have been highlighted.

Table 10. Assumption Matrix For the 2000 Operational Waste Volume Projection (All Years are Fiscal Years) (5 sheets)

	Case 1	Case 2	Case 3
Brief Description	New TPA Compliant SST waste retrieval schedule. Disposal Case 3S6E modified waste treatment schedule. Salt well liquid pumping complete 2004; (4 Mgal remaining)	SST Program Plan retrieval: completes retrieval in ~ 2028 Disposal Case 3S6E modified waste treatment schedule Salt well liquid pumping complete 2004; (4 Mgal remaining)	SST Program Plan Retrieval Accelerated to complete retrieval by end of 2024 Disposal Case 3S6E modified waste treatment schedule accelerated to match retrieval Salt well liquid pumping complete 2004; (4 Mgal remaining)
Facility Generations Total Limit	12.0-13.8 Kgal/month	12.0-13.8 Kgal/month	12.0-13.8 Kgal/month
PUREX Yearly Rate Terminal Clean-out Flush for PUREX wastes WVRF for TCO (to DSSF)	5 Kgal/year Completed --- 99	5 Kgal/year Completed --- 99	5 Kgal/year Completed --- 99
B Plant Yearly Rate, Kgal/yr Terminal Clean-out (TCO)	0 Completed 1998	0 Completed 1998	0 Completed
WESF Monthly Rate Flush for misc. waste WVRF, misc. waste (to DSSF)	0.5 Kgal/month 0% 99	0.5 Kgal/month 0% 99	0.5 Kgal/month 0% 99
222-S Laboratory Monthly Rate Flush for misc. waste WVRF, misc. waste (to DSSF)	0.83 to 1.0 Kgal/month 22% 99	0.83 to 1.0 Kgal/month 22% 99	0.83 to 1.0 Kgal/month 22% 99
T Plant Monthly Rate (FY 2001) Monthly Rate (FY 2002 on) Flush for misc. waste WVRF, misc. waste (to DSSF)	1.7 Kgal/month 0.2 Kgal/month 22% 99	1.7 Kgal/month 0.2 Kgal/month 22% 99	1.7 Kgal/month 0.2 Kgal/month 22% 99
300 Area Monthly Rate Flush for misc. waste WVRF, misc. waste (to DSSF)	0.17 to 0.42 Kgal/month 44% 94	0.17 to 0.42 Kgal/month 44% 94	0.17 to 0.42 Kgal/month 44% 94
400 Area Rate, Kgal Flush for misc. waste WVRF, misc. waste (to DSSF)	0 (to ETF) 44% 94	0 (to ETF) 44% 94	0 (to ETF) 44% 94

Table 10. Assumption Matrix For the 2000 Operational Waste Volume Projection (All Years are Fiscal Years) (5 sheets)

	Case 1	Case 2	Case 3
WSCF			
Monthly Rate, Kgal/mo	0 (to ETF)	0 (to ETF)	0 (to ETF)
Tank Farms			
Monthly Rate	10 Kgal/month	10 Kgal/month	10 Kgal/month
WVRF, flushes (to DSSF)	99	99	99
IMUST Wastes			
Total Volume (2011-15)	500 Kgal	500 Kgal	500 Kgal
100 Area			
100-N			
Terminal Clean-out	Completed	Completed	Completed
Waste Received	N/A-send to ERDF	N/A-send to ERDF	N/A-send to ERDF
Volume, Kgal	0	0	0
100-K Basin Cleanout			
Terminal Clean-out	Completed	Completed	Completed
Waste Received	N/A-send to ERDF	N/A-send to ERDF	N/A-send to ERDF
Volume, Kgal	0	0	0
105-F & 105-H Basin			
Waste Volume	40 Kgal (FY 2001)	40 Kgal (FY 2001)	40 Kgal (FY 2001)
Waste Volume	200 Kgal (FY 2006)	200 Kgal (FY 2006)	200 Kgal (FY 2006)
Flush, ALL 100 Area Waste	44%	44%	44%
WVRF, ALL waste (to DSSF)	99	99	99
Tank AN-107 Caustic Addition			
Addition in FY 2001 (Kgal)	66 (2001)	66 (2001)	66 (2001)
Salt Well Liquid Pumping	4/30/2000 Update	4/30/2000 Update	4/30/2000 Update
Volume remaining	4.0 Mgal	4.0 Mgal	4.0 Mgal
Pumping estimate for 2000	1.36 Mgal	1.36 Mgal	1.36 Mgal
West Area Receiver	Tank SY-102	Tank SY-102	Tank SY-102
Start Pumping Complexed Wastes in 200 West, FY	2000	2000	2000
Pumping Completion, FY	2004	2004	2004
Dilute Complexed	~0.6 Mgal	~0.6 Mgal	~0.6 Mgal
Porosity saltcake/sludge	25%/15%	25%/15%	25%/15%
Dilution/Flush for Pumping	45%	45%	45%
WVRF, non-complexed (to DSSF)	47	47	47
WVRF, complexed (to DSSF)	10	10	10

Table 10. Assumption Matrix For the 2000 Operational Waste Volume Projection (All Years are Fiscal Years) (5 sheets)

	Case 1	Case 2	Case 3
Single-Shell Tank (SST) Retrieval			
Tank C-106 Retrieval	Completed FY99	Completed FY99	Completed FY99
Tank C-104 Retrieval	2007	2009	2009
Start Remaining SST Retrieval	2004	2004	2004
Tank Farm Closure start	2018	2028	2024
Retrieved Volume 2004-2005	0.02 Mgal	~0.7 Mgal	~0.7 Mgal
Retrieved Volume 2006-2007	0.08 Mgal	~0.7 Mgal	~0.7 Mgal
Meets TPA Milestones	Yes	No	No
Number of SSTs Retrieved	149	149	149
Retrievable Sludge	12.2 Mgal	12.2 Mgal	12.2 Mgal
Retrievable Saltcake	23.4 Mgal	23.4 Mgal	23.4 Mgal
PFP Stabilization			
Dates	2000-2012	2000-2012	2000-2012
Volume	33 Kgal	33 Kgal	33 Kgal
Flush	22%	22%	22%
WVRF	81	81	81
Evaporator			
242-A Shutdown	2011	2011	2011
New Evaporator Available	Phase 2	Phase 2	Phase 2
Next Outage Date	2004 (1 Year)	2004 (1 Year)	2004 (1 Year)
Training Vol. (bi-yearly)	50 Kgal	50 Kgal	50 Kgal
Average Evaporation Rate	500 Kgal/month	500 Kgal/month	500 Kgal/month
Evaporation Product	dilute DSSF	dilute DSSF	dilute DSSF
Evaporation Limit (g/ml)	1.41 g/ml	1.41 g/ml	1.41 g/ml
LERF capacity	7.8 Mgal	7.8 Mgal	7.8 Mgal
Gal. Condensate/gal. WVR	1.15	1.15	1.15
Interval between campaigns	4 months	4 months	4 months
Yearly evaporation of DN (except for scheduled outage)	Yes	Yes	Yes
Effluent Treatment Facility			
Rate for condensate	5 Mgal/year	5 Mgal/year	5 Mgal/year
Emergency Space/LAW or HLW Waste Return Space			
Emergency Space	1.14 Mgal	1.14 Mgal	1.14 Mgal
LAW or HLW Return Space	1.14 Mgal	1.14 Mgal	1.14 Mgal
Contingency space	None	None	None
Waste Segregation/DST Solids			
Total DST solids	~4 Mgal	~4 Mgal	~4 Mgal
Store DSSF on NCRW solids	Yes	Yes	Yes
Store DSSF on NCAW solids	No	No	No
Segregate Complexed wastes	If Possible	If Possible	If Possible
Loss of DST Space			
Number tanks removed from service through Phase 1	None	None	None
Number tanks removed from service in Phase 2	first failure and replacement in 2017; one tank every five years thereafter	first failure and replacement in 2017; one tank every five years thereafter	first failure and replacement in 2017; one tank every five years thereafter

Table 10. Assumption Matrix For the 2000 Operational Waste Volume Projection (All Years are Fiscal Years) (5 sheets)

	Case 1	Case 2	Case 3
New Cross-Site Transfer Line New line operational	Yes	Yes	Yes
DST Retrieval SY-102 solids retrieved to 200 East Area	~11/2010	~11/2010	~11/2010
Consolidation of NCRW solids in AW-103 & AW-105	No	No	No
In-tank Washing In-tank Washing	No	No	No
Consolidation of NCAW solids	No	No	No
Waste Treatment	Disposal Case 3S6E modified	Disposal Case 3S6E modified	Disposal Case 3S6E modified; accelerate processing to match SST waste retrieval
LAW Vitrification start	3/2008	3/2008	3/2008
LAW Phase 1 Processing by year	Yr units/yr 1 279 (37%) 2 830 (110%) 3 1011 (134%) 4on 1100 (146%)	Yr units/yr 1 279 (37%) 2 830 (110%) 3 1011 (134%) 4on 1100 (146%)	Yr units/yr 1 279 (37%) 2 830 (110%) 3 TBD by projection 4on TBD by projection
Staging/Characterization Time per tank	100 days	100 days	100 days

Table 10. Assumption Matrix For the 2000 Operational Waste Volume Projection (All Years are Fiscal Years) (5 sheets)

	Case 1	Case 2	Case 3
LAW Retrieval Schedule (not processing dates)--First five waste sources:			
Source 1	AP-101(4/2006)	AP-101(4/2006)	AP-101(4/2006)
Source 2	NCAW Supernate (7/2007)	NCAW Supernate (7/2007)	NCAW Supernate (7/2007)
Source 3	AN-102 (7/2009)	AN-102 (7/2009)	AN-102 (7/2009)
Source 4	AN-104 (8/2010)	AN-104 (8/2010)	AN-104 (8/2010)
Source 5	AN-107 (5/2011)	AN-107 (5/2011)	AN-107 (5/2011)
Intermediate Feed Staging Tanks	(AN-101, AN-102, AN-105, AP-104, AP-101)	AN-101, AN-102, AN-105, AP-104, AP-101)	AN-101, AN-102, AN-105, AP-104, AP-101)
Vendor Feed Tanks	Waste Treatment Plant Provides Space	Waste Treatment Plant Provides Space	Waste Treatment Plant Provides Space
Pretreated NCAW Receipt Tanks	Waste Treatment Plant Provides Space	Waste Treatment Plant Provides Space	Waste Treatment Plant Provides Space
Entrained Solid Receipt Tanks	Waste Treatment Plant Provides Space	Waste Treatment Plant Provides Space	Waste Treatment Plant Provides Space
HLW Vitrification start	9/2008	9/2008	9/2008
HLW Phase 1 Processing by year	Yr / Canisters/Yr	Yr / Canisters/Yr	Yr / Canisters/Yr
	1 / 41 (40%)	1 / 41 (40%)	1 / 41 (40%)
	2-12 / 120 (100%)	2-12 / 120 (100%)	2-12 / See section 5.3
HLW Processing Sequence HLW wastes:	AZ-101, AZ-102, AY-102, C-106, AW-103, AY-101, SY-102	AZ-101, AZ-102, AY-102, C-106, AW-103, AY-101, SY-102	AZ-101, AZ-102, AY-102, C-106, AW-103, AY-101, SY-102

Notes:

CC = complexant concentrate waste
DN = dilute non-complexed waste
DSSF = double-shell slurry feed
ERDF = Environmental Restoration Disposal Facility
ETF = Effluent Treatment Facility
HLW = high-level waste
IMUST = inactive miscellaneous underground storage tanks
LAW = low-activity waste
LERF = Liquid Effluent Retention Facility
NCAW = neutralized current acid waste
NCRW = neutralized cladding removal waste
TCO = Terminal Clean-Out
TBD = to be determined
WSCF = Waste Sampling and Characterization Facility
WVR = waste volume reduction
WVRF = waste volume reduction factor

4.0 ASSUMPTIONS FOR PROJECTION CASES 2 AND 3

The Case 2 and Case 3 projections present a range of operational assumptions meant to determine the impact of changes in the SST retrieval schedule and processing schedule on DST needs. The Case 2 and Case 3 projections do not present a lower or an upper limit on double-shell tank needs which could vary significantly depending on the assumption changes. The following section describes assumptions specific to the Case 2 and Case 3 projections. These assumptions are also summarized in Table 10.

Projection Case 2 used the same operational and processing assumptions as Case 1 but incorporated the SST Program Plan retrieval schedule (Stokes 1999). Case 3 used the SST Program Plan retrieval schedule but accelerated the retrieval schedule to complete retrieval in 2024 and increased the processing rate to avoid overfilling the available tank space. Additional details of the assumptions for these projection cases are included in the following sections.

Note: Case 1 (TPA Compliant) is meant to project DST needs based on established TPA milestones (Consent Decree milestones for salt well liquid pumping), RPP program planning, and the most realistic operational assumptions (described in Section 3). Case 1 presents a basis for evaluating future DST space needs for the TPA compliant case through the end of FY 2018. The new TPA compliant SST retrieval schedule would start retrieval in December 2002 (M45-03-T1) and be completed by the end of FY 2018 (TPA milestone).

4.1 PROJECTION CASE 2 ASSUMPTIONS

Assumptions for projection Case 2 are the same as those for the projection Case 1 except for the use of the SST Program Plan retrieval sequence (Stokes 1999). Since the purpose of this document is to determine the space needed for fixed operational assumptions, the minimum retrieval duration was used in retrieving waste from each tank rather than extending the retrieval duration to avoid overfilling the available tank space.

This SST retrieval schedule would begin retrieving additional solids (solids beyond those needed as HLW feed in Phase 1) in FY 2004. The retrieval sequence for Case 2 is shown in Table 11 and the yearly retrieved SST waste volumes are shown in the spreadsheet for the Case 2 projection (Section 5.2) and are based on retrieval at 5 M Na. Volumes used for this sequence were supplied by Retrieval Engineering (Penwell 1998a). This sequence would complete SST retrieval in FY 2028 if the retrieval process were not delayed due to space or transfer constraints.

Table 11. Single-Shell Tank Retrieval Sequence for Case 2 (SST Program Plan) (4 Sheets)

Tank	Start Date	Duration (Days)	End Date	Retrieved Liquid Volume in Kgal	Retrieved Solids Volume in Kgal	Retrieved Total Volume in Kgal
S-103	1/1/2004	175	6/23/2004	710.89	3.09	713.98
C-104	1/1/2008	185	7/4/2008	1170.22	101.58	1271.80
U-201	1/1/2009	7	1/8/2009	24.25	2.10	26.35
U-203	1/1/2009	6	1/7/2009	12.31	1.07	13.38
U-202	1/7/2009	7	1/14/2009	24.25	2.10	26.35
U-204	1/8/2009	6	1/14/2009	10.89	0.94	11.83
SX-105	7/9/2009	409	8/22/2010	2143.33	32.68	2176.01
U-109	7/19/2009	256	3/31/2010	1274.29	23.24	1297.53
SX-103	7/19/2009	394	8/17/2010	1870.03	50.40	1920.44
TX-112	10/1/2011	372	10/7/2012	2398.48	15.12	2413.60
T-105	10/1/2011	92	12/31/2011	119.15	10.25	129.40
T-102	1/1/2012	58	2/28/2012	105.41	9.15	114.56
C-107	5/1/2012	158	10/5/2012	522.84	45.39	568.22
S-102	12/12/2013	325	11/1/2014	1635.54	8.98	1644.52
S-105	6/8/2014	281	3/15/2015	1519.68	7.15	1526.83
S-106	11/13/2014	290	8/29/2015	1718.61	24.04	1742.65
S-108	3/28/2015	351	3/13/2016	2004.44	10.94	2015.38
S-109	9/8/2015	334	8/6/2016	1859.28	14.82	1874.10
BY-102	3/15/2016	196	9/27/2016	1096.39	13.65	1110.04
S-112	4/29/2016	313	3/7/2017	2109.96	13.45	2123.40
BX-106	5/11/2016	68	7/17/2016	137.12	11.90	149.03
BX-104	7/18/2016	91	10/17/2016	118.75	10.31	129.06
BX-103	9/1/2016	75	11/14/2016	203.40	17.66	221.05
TX-101	10/18/2016	105	1/30/2017	321.39	27.90	349.29
BY-112	12/28/2016	203	7/18/2017	967.64	11.55	979.19
B-108	1/3/2017	90	4/3/2017	210.23	7.22	217.45
TY-102	1/23/2017	99	5/2/2017	211.50	1.38	212.88
SX-102	6/3/2017	343	5/11/2018	1637.77	33.96	1671.73
TX-106	11/18/2017	280	8/24/2018	1670.76	8.09	1678.85
U-108	11/23/2017	256	8/5/2018	1299.69	19.68	1319.38
S-111	1/26/2018	342	1/3/2019	1543.06	37.08	1580.14
A-101	3/11/2018	537	8/29/2019	2747.30	19.21	2766.51
AX-103	5/31/2018	139	10/17/2018	310.10	9.38	319.48
BY-111	9/12/2018	282	6/21/2019	1524.54	19.58	1544.12
TX-111	9/27/2018	240	5/25/2019	1260.68	10.81	1271.50
AX-101	10/28/2018	440	1/10/2020	2143.62	20.30	2163.92
SX-106	1/3/2019	312	11/10/2019	1374.11	7.25	1381.36
U-105	4/16/2019	226	11/27/2019	1084.94	13.18	1098.12
U-103	5/12/2019	261	1/27/2020	1385.24	13.77	1399.01
TX-102	5/26/2019	168	11/9/2019	416.02	2.05	418.07

Table 11. Single-Shell Tank Retrieval Sequence for Case 2 (SST Program Plan) (4 Sheets)

Tank	Start Date	Duration (Days)	End Date	Retrieved Liquid Volume in Kgal	Retrieved Solids Volume in Kgal	Retrieved Total Volume in Kgal
SX-101	6/22/2019	301	4/18/2020	1453.32	126.16	1579.48
C-109	9/24/2019	75	12/7/2019	427.38	37.10	464.47
TX-118	11/10/2019	229	6/26/2020	1195.56	16.63	1212.19
BY-101	11/29/2019	248	8/3/2020	1249.36	19.89	1269.25
U-102	12/16/2019	214	7/17/2020	1130.03	18.51	1148.54
C-108	12/24/2019	77	3/9/2020	106.89	9.28	116.17
U-107	2/19/2020	223	9/29/2020	931.40	32.56	963.96
C-102	2/25/2020	195	9/7/2020	2132.71	185.13	2317.84
BX-105	4/18/2020	70	6/26/2020	134.57	11.68	146.25
A-102	4/21/2020	111	8/10/2020	101.14	1.41	102.55
TX-108	6/27/2020	129	11/2/2020	483.56	9.56	493.13
B-102	6/27/2020	64	8/30/2020	69.77	1.98	71.75
BY-109	8/3/2020	265	4/25/2021	1378.46	20.34	1398.80
S-107	8/16/2020	237	4/9/2021	907.63	78.79	986.42
S-110	8/30/2020	250	5/6/2021	993.92	46.06	1039.98
U-106	9/13/2020	145	2/5/2021	651.82	9.13	660.95
TX-104	11/3/2020	99	2/10/2021	194.60	5.20	199.81
U-111	11/19/2020	201	6/8/2021	925.73	10.92	936.65
B-106	11/22/2020	100	3/2/2021	318.23	2.59	320.83
A-106	2/10/2021	145	7/5/2021	257.75	8.96	266.71
BX-107	3/2/2021	208	9/26/2021	699.95	60.76	760.71
C-105	4/10/2021	108	7/27/2021	727.74	63.17	790.91
B-109	4/15/2021	106	7/29/2021	233.98	8.55	242.53
BY-110	4/25/2021	254	1/3/2022	1033.08	46.03	1079.11
TX-103	5/15/2021	140	10/1/2021	579.91	2.92	582.84
C-112	7/5/2021	95	10/7/2021	379.15	32.91	412.06
T-110	7/30/2021	224	3/10/2022	502.56	34.79	537.35
T-104	8/16/2021	236	4/8/2022	762.85	66.22	829.07
BX-112	9/6/2021	123	1/7/2022	277.01	24.05	301.06
BX-109	10/2/2021	137	2/15/2022	1231.39	106.89	1338.28
T-204	11/13/2021	23	12/5/2021	55.71	4.84	60.54
T-203	12/3/2021	21	12/24/2021	51.30	4.45	55.75
T-201	12/6/2021	18	12/23/2021	41.09	3.57	44.66
T-202	12/24/2021	15	1/7/2022	30.89	2.68	33.57
B-202	12/24/2021	18	1/10/2022	39.72	3.45	43.17
TX-109	1/8/2022	247	9/11/2022	832.17	72.24	904.41
C-103	3/5/2022	75	5/18/2022	238.83	20.73	259.56
S-101	3/11/2022	262	11/27/2022	986.08	85.60	1071.67
B-104	3/11/2022	221	10/17/2022	459.77	31.06	490.83
BY-104	4/1/2022	257	12/14/2022	1147.58	43.66	1191.24
SX-109	4/9/2022	201	10/27/2022	962.31	39.74	1002.04

Table 11. Single-Shell Tank Retrieval Sequence for Case 2 (SST Program Plan) (4 Sheets)

Tank	Start Date	Duration (Days)	End Date	Retrieved Liquid Volume in Kgal	Retrieved Solids Volume in Kgal	Retrieved Total Volume in Kgal
B-101	4/25/2022	99	8/2/2022	245.63	21.32	266.96
B-103	5/19/2022	74	7/31/2022	157.54	2.24	159.77
SX-104	8/2/2022	377	8/13/2023	1587.90	69.45	1657.34
AX-102	8/18/2022	110	12/6/2022	87.62	1.99	89.61
TX-105	9/12/2022	353	8/31/2023	2253.40	11.56	2264.95
BX-111	10/31/2022	122	3/1/2023	661.45	11.22	672.67
BX-110	12/3/2022	142	4/24/2023	356.76	28.79	385.55
B-105	12/6/2022	190	6/14/2023	798.57	10.28	808.85
SX-114	12/8/2022	172	5/28/2023	853.32	26.23	879.56
BY-106	1/27/2023	369	1/30/2024	2039.13	38.32	2077.45
B-107	3/25/2023	123	7/26/2023	332.16	28.83	360.99
AX-104	5/28/2023	36	7/3/2023	28.76	2.50	31.26
U-104	7/3/2023	103	10/14/2023	115.56	10.03	125.59
C-110	7/20/2023	129	11/26/2023	375.78	32.62	408.40
SX-111	7/29/2023	145	12/21/2023	444.98	38.63	483.61
A-105	8/31/2023	84	11/23/2023	77.68	6.74	84.42
TX-115	9/1/2023	368	9/3/2024	2363.72	11.92	2375.64
TY-103	10/14/2023	142	3/3/2024	401.70	17.36	419.06
SX-110	11/20/2023	125	3/24/2024	211.11	17.96	229.07
B-112	11/23/2023	65	1/27/2024	73.08	2.26	75.35
TY-106	1/27/2024	70	4/5/2024	23.42	2.03	25.45
SX-112	2/13/2024	132	6/24/2024	365.08	31.69	396.77
A-104	3/4/2024	101	6/12/2024	29.06	1.52	30.58
TX-114	3/14/2024	318	1/26/2025	1929.84	9.93	1939.76
BY-103	3/25/2024	254	12/4/2024	1348.38	15.48	1363.85
BX-101	4/30/2024	69	7/7/2024	158.53	13.76	172.29
TY-104	7/25/2024	93	10/26/2024	63.51	5.51	69.02
SX-107	8/18/2024	135	12/31/2024	505.20	43.85	549.05
T-101	9/4/2024	93	12/6/2024	218.07	18.93	237.00
U-110	10/26/2024	134	3/8/2025	250.06	21.71	271.77
BY-107	12/4/2024	191	6/13/2025	696.58	26.68	723.27
TX-113	12/23/2024	352	12/10/2025	1827.89	42.57	1870.45
BX-108	2/26/2025	63	4/30/2025	52.36	4.55	56.91
SX-108	2/27/2025	131	7/8/2025	552.63	47.97	600.60
BX-102	4/30/2025	91	7/30/2025	132.58	11.51	144.09
BY-105	6/25/2025	303	4/24/2026	1434.60	48.03	1482.63
TY-101	7/30/2025	121	11/28/2025	327.99	15.96	343.95
SX-115	9/6/2025	62	11/6/2025	42.09	2.99	45.08
TX-110	9/23/2025	284	7/3/2026	1625.67	15.12	1640.79
T-112	10/1/2025	74	12/13/2025	56.80	4.93	61.73
T-103	1/5/2026	62	3/7/2026	103.81	9.01	112.82

Table 11. Single-Shell Tank Retrieval Sequence for Case 2 (SST Program Plan) (4 Sheets)

Tank	Start Date	Duration (Days)	End Date	Retrieved Liquid Volume in Kgal	Retrieved Solids Volume in Kgal	Retrieved Total Volume in Kgal
T-109	3/8/2026	73	5/20/2026	162.79	1.50	164.30
U-112	3/26/2026	69	6/3/2026	139.51	12.11	151.62
C-101	4/21/2026	87	7/17/2026	280.84	24.38	305.22
T-107	4/22/2026	127	8/27/2026	263.52	22.88	286.40
BY-108	4/25/2026	173	10/15/2026	510.29	37.61	547.90
T-108	6/16/2026	69	8/24/2026	92.67	4.15	96.81
TX-117	6/28/2026	361	6/24/2027	2121.47	11.37	2132.84
C-111	7/9/2026	73	9/19/2026	156.73	13.60	170.33
U-101	7/17/2026	61	9/15/2026	63.36	5.50	68.86
SX-113	8/25/2026	98	11/30/2026	8.69	0.75	9.45
T-106	9/2/2026	58	10/30/2026	66.46	5.77	72.23
C-203	9/16/2026	7	9/23/2026	14.45	1.25	15.70
C-204	9/22/2026	7	9/28/2026	3.87	0.17	4.04
B-111	10/15/2026	157	3/21/2027	342.82	24.75	367.57
TY-105	10/30/2026	175	4/22/2027	231.21	20.07	251.28
TX-116	11/14/2026	364	11/12/2027	1972.71	13.44	1986.16
S-104	12/1/2026	204	6/22/2027	1409.77	122.38	1532.15
B-110	3/21/2027	162	8/29/2027	340.26	23.25	363.51
C-201	4/18/2027	6	4/24/2027	5.78	0.50	6.28
C-202	5/12/2027	5	5/16/2027	2.89	0.25	3.14
T-111	5/24/2027	257	2/4/2028	454.93	39.49	494.42
A-103	7/19/2027	259	4/3/2028	1045.52	9.06	1054.58
B-201	7/24/2027	18	8/10/2027	39.96	3.47	43.43
B-203	8/11/2027	28	9/8/2027	73.36	6.37	79.73
B-204	8/30/2027	28	9/26/2027	71.98	6.25	78.23
TX-107	12/8/2027	89	3/6/2028	111.94	3.52	115.46

4.2 PROJECTION CASE 3 ASSUMPTIONS

Assumptions for the Case 3 projection are the same as those for Case 1 except for the following assumption changes which were requested by the Washington State Department of Ecology for Case 3 in a fax dated July 17, 2000:

1. Single-Shell Tank (SST) retrieval on risk-priority sequence
2. 4 million gallons additional tank space
3. Complete SST retrieval 2024
4. Vary the plant processing size to meet the above

Single-Shell Tank Retrieval Schedule

To meet assumption changes 1 and 3, the SST Program Plan Retrieval Sequence from Case 2 was used since it was risk based. The SST retrieval schedule was accelerated beginning in 2011 to allow completion of SST retrieval by the end of FY 2024 (the SST Program Plan used in Case 2 would complete retrieval in FY 2028 if the retrieval sequence was not delayed due to space or transfer restrictions). By the end of FY 2010, approximately 3.498 Mgal of waste had been retrieved in both Cases 2 and 3. If the total as retrieved SST waste volume is 108.024 Mgal, then 104.526 gallons of waste needs to be retrieved in the last fourteen years. If this waste was spread equally over the remaining fourteen years, the yearly volume of waste retrieved from 2011 through 2024 would be 7.466 Mgal. The 7.466 Mgal of SST waste retrieved each year was added to the model from 2011 through 2024 and the waste treatment rate needed to stay within the available space was determined. It was assumed that the 4 million gallons of additional tank space would be added in 2010 because of the time needed to obtain the budget and to build additional tank space (see Section 7 for a completed description of the time required to build additional tanks).

Note that this sequence is being adjusted slightly as part of TPA M-45 discussion in July-August 2000, but these adjustments are not finalized. Case 2 presents the sequence used to develop the FY 2000 Multi Year Work Plan. The revised sequence will be submitted under TPA M-45-01. The revisions discussed to date should not significantly affect the results presented in Case 2.

This projection will calculate the waste treatment rate required for the accelerated SST retrieval case. The technical/financial side of the proposal; additional infrastructure costs and lead times to acquire budget; number of retrievals/year; number of waste retrieval systems; as well as the technical challenges would need to be addressed in a separate study.

Low-Activity Waste (LAW) Treatment

The LAW processing for Case 3 will also begin in March 2008 using the same processing rate as in Cases 1 and 2 (3S6E Processing Schedule) but will be accelerated to a higher rate in 2011 and subsequent years to match the accelerated SST retrieval rate. The final accelerated LAW processing rate needed to offset the accelerated SST retrieval will be determined by the projection (see Section 5.3 for Case 3 results).

LAW Phase 1 processing for Case 3 compared to Cases 1 and 2 by year

Projection Cases 1 & 2		Projection Case 3	
Yr	units/yr	Yr	units/yr
1	279 (37%)	1	279 (37%)
2	830 (110%)	2	830 (110%)
3	1011 (134%)	3	See section 5.3 for projected results
4on	1100 (146%)	4on	See section 5.3 for projected results

High-Level Waste Treatment

The HLW processing for Case 3 also begins in September 2008 using the same processing rate as in Cases 1 and 2 (3S6E Processing Schedule) but is accelerated to a higher rate in 2011 and subsequent years to match the accelerated SST retrieval rate. The final accelerated HLW processing rate needed to offset the accelerated SST retrieval rate was to be determined by the projection.

HLW Processing by year

Projection Cases 1 & 2		Projection Case 3	
Yr	Canisters/yr	Yr	Canisters/yr
1	41 (40%)	1	41 (40%)
2-12	120 (100%)	2-12	See section 5.3 for projected results

5.0 PROJECTION RESULTS

The results of a waste volume projection can be used to forecast tank space needs versus time, forecast evaporator operation, forecast needed LAW processing and disposal rates, HLW processing and storage, analyze tank space issues for aging and non-aging waste tanks, predict tank usage, or to determine the need and schedule for retrievals or cross-site transfers. To predict tank space needs, a graphic is produced showing tank count versus time as compared to the available space. Generations and evaporations for the near term (through 2001) are modeled on a monthly basis whereas the remainder of the projection is typically modeled on an annual basis.

All projection cases assume that dilute waste will be evaporated to double-shell slurry feed in the year they are produced, provided an evaporator is operational and the waste volume reduction limit of the evaporator has not been exceeded. In later parts of the projections when tank space becomes tight due to processing needs and/or the amount of SST wastes being retrieved, the evaporator is assumed to operate yearly even if volumes are small in order to minimize waste storage needs. Long range projection graphics for the three projection cases are presented in Sections 5.1, 5.2, and 5.3. A tank space requirement graphic and a spreadsheet showing inputs/outputs have been included for all three projections. Short range graphics, tank usage graphics, evaporator waste volume reduction data, and a spreadsheet showing inputs/outputs have been included for the projection Cases 1 and 2 only.

The projection cases for this OWVP document incorporate several space saving assumptions. These space saving alternatives reduce the need to build additional DSTs but add additional risks to the RPP program. These actions and some of the risks are listed below:

- In revision 25 of the OWVP document, 2.28 Mgal of emergency space was reserved in case of a double-shell leak per DOE Order 435.1. For revision 26 of the OWVP document, the emergency space has been reduced to 1.14 Mgal. However, the tank farm contractor has also been requested to provide the capability to receive up to one tank of either LAW or HLW return from the waste treatment plant on an emergency basis (Taylor 1999). Accordingly, 1.14 million gallons of space has been reserved for the possibility of a LAW or HLW return (see Section 3.20 for more information on LAW/HLW Return).

- Waste generation rates and terminal clean-out volumes have been reduced compared to those used in last year's OWVP (Rev. 25).

- In this revision of the OWVP, it was assumed that double-shell slurry feed could be stored on top of the solids in tanks AW-103 and AW-104.

- These projections assumed that dilute non-complexed waste could be evaporated to a specific gravity of 1.41 rather than the previous 1.35 limit. Analysis has shown that as long as the specific gravity remains at 1.41 or less that there will not be a buildup of flammable gas in the DSTs (Fowler 1999). Evaporating the waste to a specific gravity of 1.41 would save approximately 2/3 of a tank by the end of the projection.

- All three projection cases assume that timely permission is obtained to remove waste from watch-list tanks used as LAW feed sources and to remove the watch-list designation from that tank immediately after retrieval/dilution. This means that emptied tanks are immediately available for unrestricted use.

Other assumptions in the projections that impact tank space are listed below:

- It was assumed that the tank farm contractor will need to use tanks AN-101, AN-106, AN-104, and AN-105 for waste management during the same time frame that Project W-211 is preparing them for use as intermediate feed staging tanks. If the tanks had to be emptied prior to the Project W-211 activities the impact would be over 3 Mgal.

- Some double-shell tanks are nearing the end of their design life. In the Rev. 26 projection cases, it was assumed that no tank failure occurred through Phase 1 waste treatment. Based on RPP guidance, it was assumed that one DST would fail and be replaced in 2017 and one DST would fail and be replaced every five years thereafter. If a DST should fail during Phase 1, the volume would be approximately one million gallons. Emergency space would be used if a loss of a double-shell tank should occur. Such a failure reduces the space available for return of waste streams to tank farms and could also impact waste feed delivery and processing.

- All three projections assumed that evaporator capacity would be available on an annual basis from FY 2000-2018 except for a one year outage in FY 2004. A reduction in evaporation capacity during years when space is tight or when waste receipts are high could result in a tank space shortage.

The space saving actions listed above reduce the need for construction of new DST space that was recommended based on a previous projection but introduce additional uncertainties and risks into the overall RPP program. If many of these items are not possible or if waste generations exceed those used in this projection, it may be necessary to either delay site cleanup activities, delay TPA milestones (e.g., salt well liquid pumping and/or SST retrieval), increase the waste treatment rate, or build additional tank space in order to avoid exceeding the available DST space. A special trade study was completed in FY 1999 to assess the space savings, costs, and risks associated with many of the space saving alternatives mentioned above (Garfield 1999).

5.1 PROJECTION CASE 1 RESULTS

Assumptions for the Case 1 projection represent the current planning basis for RPP programs to meet TPA commitments (Consent Decree milestones for salt well liquid pumping). The LAW and HLW waste treatment schedules (3S6E) used in Case 1 are based on the March 8, 2000 Planning Guidance (PIO 2000 and Kirkbride 2000). A new Tri-Party Agreement compliant SST retrieval schedule was created to retrieve the waste from tanks with the smaller volumes first to meet the TPA milestones for number of tanks started each year while trying to stay within available space for a longer period of time. The projected tank space needs for the Case 1 projection are shown in Figure 3. If SST wastes were retrieved to meet Phase 1 extended order waste treatment only, the projected space needs fit within available space through FY 2018. The required tank space for the Case 1 projection without additional SST retrieval is near the

available space for the period FY 2001-2005 due to the number of tanks required for salt well liquid pumping and storage. Two tanks (tanks AN-101 and AP-108) are projected to be used for salt well liquid pumping in the 200 East Area while only one tank (tank SY-102) is used for salt well liquid pumping in the 200 West Area. Last year's projections assumed that salt well liquid pumping in 200 East Area would require three tanks. The extra tank saved was partially offset by the extra space used to retrieve and dilute tank SY-101.

The required tank space for the Case 1 projection with the TPA compliant SST retrieval schedule exceeds available space by four tanks in FY 2010, by up to thirteen tanks in FY 2011, by up to 23 tanks by the end of FY 2012, and by up to 87 tanks by the end of FY 2018. The tank space shortage during the period FY 2004-2018 is the result of the delay in the start of waste treatment and the reduced waste treatment rates compared to the waste treatment assumptions that were used when the TPA milestones were initially negotiated. The waste treatment schedule used in Case 1 will not free up DST space fast enough to support the TPA compliant SST retrieval schedule. Options to reduce the tank space shortage would include adjusting the SST retrieval schedule to match available space, increasing the waste treatment rates, and/or building additional double-shell tank space. Costs and schedule estimates to build the additional tanks have been included in Section 7. The projected tank space shortage maybe avoided by a combination of the following options (see Section 6.0 for a more complete listing):

- Delay retrieval of SST wastes (would require re-negotiation of TPA milestones)
- Do not allow the return of wastes from the waste treatment plant to double-shell tanks
- Allow addition of wastes to early feed tank headspace
- Accelerate the treatment and vitrification of waste
- Establish terms for waste treatment that will support the TPA Compliant SST retrieval volumes
- Delay the SST interim stabilization effort
- Construct new double-shell tanks

A spreadsheet summarizing the waste generations, evaporator waste volume reduction, and processing requirements for the Case 1 projection has been added to this document and is included as Table 12. This spreadsheet is included to present a global view of how the various inputs and outputs affect tank space. This spreadsheet is useful to review waste inventories and waste receipts but cannot accurately predict the dynamics of tank usage or the full impact of partially filled tanks on tank space needs.

The Office of River Protection (ORP) has requested that the OWVP document should provide a list of all transfers for the next fiscal year (Kinzer 1999). Appendix A in this document lists all the gains, losses, and transfers for projection Cases 1 and 2 through FY 2001. For convenience--this listing has been broken into two parts—Appendix A-2 lists inventory records, historical transactions for FY 1998-1999, and projected transfers for FY 2000. Appendix A-3 lists transfers projected for FY 2001. Appendix A-1 lists the acronyms used in the transaction records.

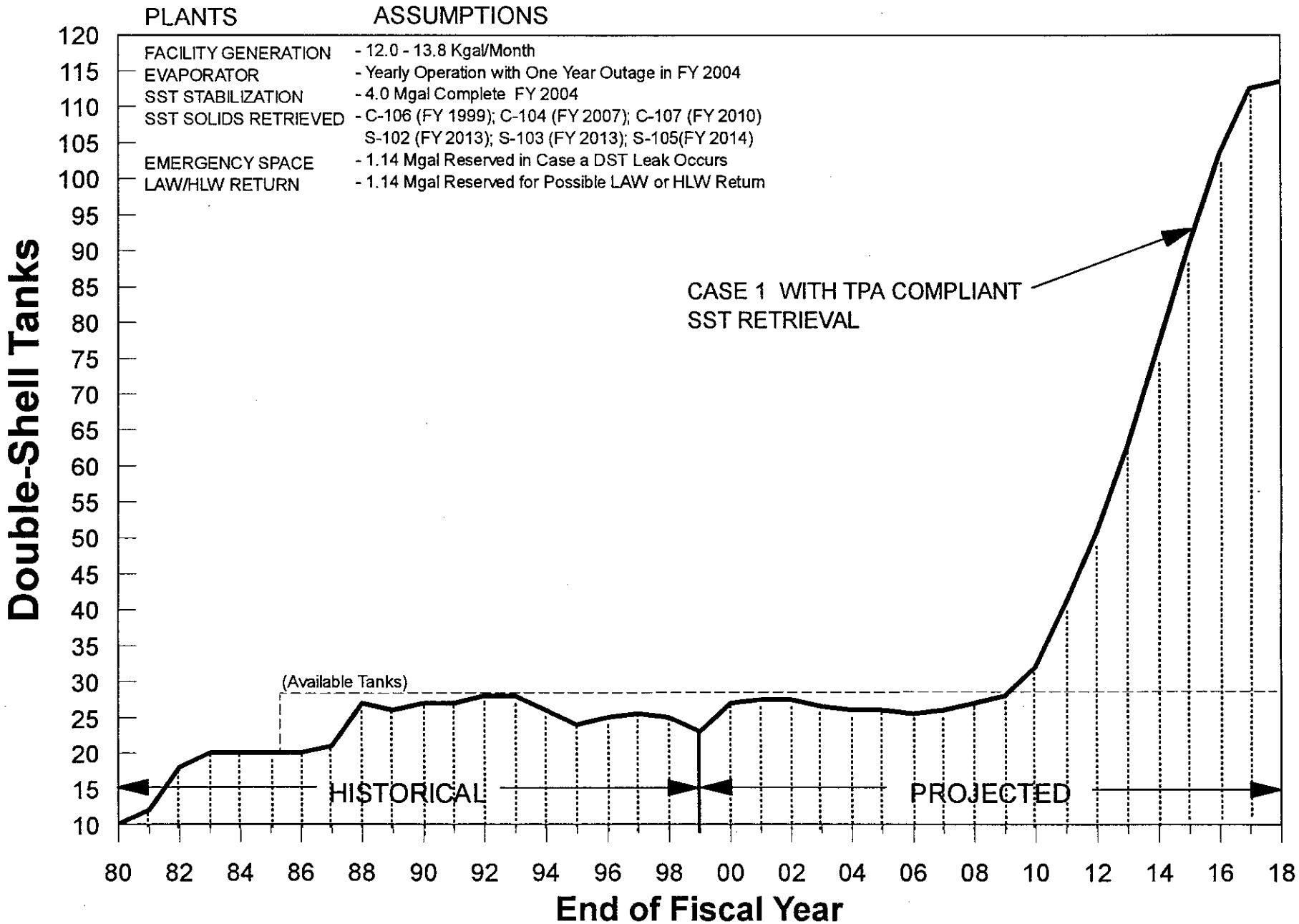

Figure 3. Double-Shell Tank Requirements for Case 1--TPA Compliant

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Table 12. Spreadsheet of Waste Additions and Reductions (Kgal) for Case 1 with SST Retrieval

FISCAL YEAR	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
STARTING INVENTORY	18598	18994	21523	22831	23234	21987	22200	21648	20390	20793	21537	23045	25318	35160	48363	59807	74340	90990	103911	113383
SPACE UTILIZATION																				
Emergency Space	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140
Watchlist Space	644	851	851	851	851	851	851	851	851	851	764	1264	1264	1040	1050	1369	0	0	0	0
Contingency Space	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Restricted Space	766	767	701	701	701	806	864	1480	1482	2666	2072	1913	1192	1192	1192	1462	1793	1172	1538	906
Priority/Operational Space	2523	4601	3373	3177	3687	2414	3288	3096	3523	3668	4730	5192	6532	5167	6880	7782	8553	8946	10795	10751
LAW or HLW Return Space	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140
NEW WASTE ADDITIONS																				
B Plant/WESF	4	0	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
S Plant/WSCF	2	8	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
T Plant	0	0	20	3	2	2	4	2	2	2	2	3	2	2	2	2	2	2	2	3
300/400 Areas	0	2	5	2	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4
PUREX	0	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
TCO	0	0	40	0	0	0	0	200	0	0	0	0	0	0	0	0	0	0	0	0
Flushes	466	988	535	261	64	6	542	105	104	105	105	385	105	105	245	105	105	245	107	105
SWL Pumping	625	1381	1223	724	57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tank Farms	30	99	155	155	190	170	190	205	155	205	155	205	155	205	155	205	155	205	155	205
SST Retrieval	194	0	0	0	0	115	52	247	1586	1097	1658	3217	11423	13334	13800	16588	18512	15167	11631	2825
PFP	0	2	5	8	2	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0
IMUST	0	0	0	0	0	0	0	0	0	0	0	0	100	100	100	100	100	0	0	0
Inventory	0	0	66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Retrieval Water	0	910	0	0	0	0	0	0	0	0	0	0	589	0	0	0	0	200	0	0
Everything Else	42	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pretreatment Dilution	0	0	0	0	0	0	0	0	0	0	816	488	231	1122	625	0	0	150	0	0
In-Tank Washing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NEW WASTE ADDITIONS TOTAL	1363	3405	2069	1173	338	318	812	783	1871	1433	2761	4323	12630	14893	14951	17024	18898	15993	11919	3162
TOTAL WASTE BEFORE EVAP	19961	22399	23593	24003	23572	22305	23013	22432	22261	22224	24298	27369	37946	50054	63313	76832	93235	106986	115827	116546
EVAPORATOR WVR	-847	-675	-762	-769	-1585	0	-1307	-340	-582	-387	-173	-515	-635	-316	-350	-351	-452	-284	-428	-287
CUM EVAPORATOR WVR	-847	-1522	-2284	-3053	-4638	-4638	-5945	-6285	-6867	-7254	-7427	-7942	-8577	-8893	-9243	-9594	-10046	-10330	-10758	-11045
Loss due to (Burp, Lance Evaporation, Surface	-120	-185	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Adjust waste layers due to new solids meas.	0	-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Low activity waste	0	0	0	0	0	0	0	-1086	0	0	-891	-1377	-1966	-1190	-2971	-1870	-1463	-2465	-1651	-1794
High Level Waste Contractor	0	0	0	0	0	-105	-58	-616	-886	-300	-189	-159	-185	-185	-185	-271	-330	-326	-365	-340
EVAP AND OUTFLOWS TOTAL:	-967	-876	-762	-769	-1585	-105	-1365	-2042	-1468	-687	-1253	-2051	-2786	-1691	-3506	-2492	-2245	-3075	-2444	-2421
NET INVENTORY CHANGE	396	2529	1307	404	-1247	213	-553	-1259	403	746	1508	2272	9844	13202	11445	14532	16653	12918	9475	741
END OF YEAR INVENTORY	18994	21523	22831	23234	21987	22200	21648	20390	20793	21537	23045	25318	35160	48363	59807	74340	90990	103911	113383	114125
TOTAL CAPACITY	25207	30022	30036	30243	29506	28551	28931	28097	28929	31002	32891	35967	46428	58042	71209	87233	103616	116309	127996	128062
	22	27	27	27	26	25	26	25	26	27	29	32	41	51	63	77	92	103	114	114

Interpretation of Short Range Projection Results

This section provides an interpretation of detailed short range projection results. The OWVP presents certain information in the form of graphics. A number of these graphics show 12 months of historical operations and 24 months of projected operations. Most of the vertical axis represent thousands of gallons of waste generated. An example of this type of graphic is the facility waste generation graphic. The volume generated per month for each facility is depicted on a facility waste generation graph. An example of the facility waste generation graph for tank farms waste is shown below (Figure 4).

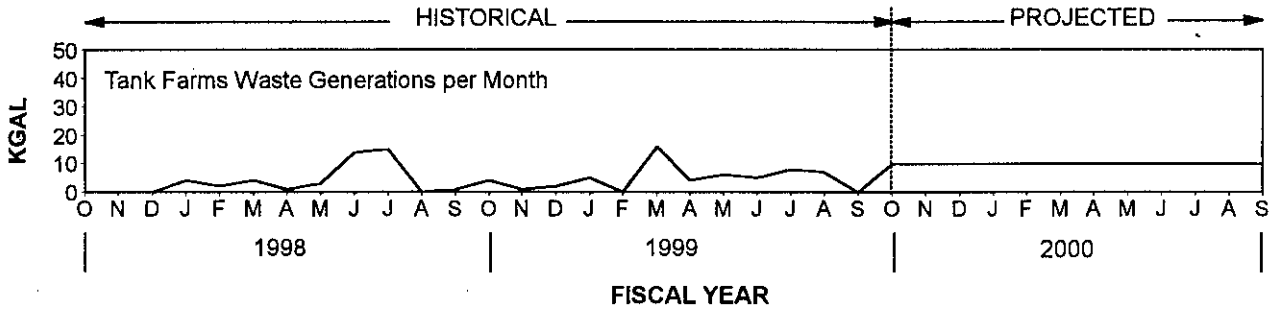


Figure 4. Facility Waste Generation Graphic

In the computer simulation, facility waste streams are routed to a receiver tank. A tank fill graphic shows the filling of the receiver tank and is on the same page as the facility waste generation graph of the waste stream it receives. The tank fill graphic shows the rate a specific tank is filled with waste. Usually when a receiver tank is full, waste is transferred to a holding tank. This waste is either evaporated or stored for future disposal. For every transfer out of a tank, there is a corresponding receipt of the same volume into another tank or facility. For every evaporation out of a tank there is a corresponding receipt of the more concentrated waste in the receiving tank and an increase in the condensate from the 242-A Evaporator being sent to the Liquid Effluent Retention Facility.

An example of this type of graph (a tank fill graphic) for tank SY-102 is shown below (Figure 5).

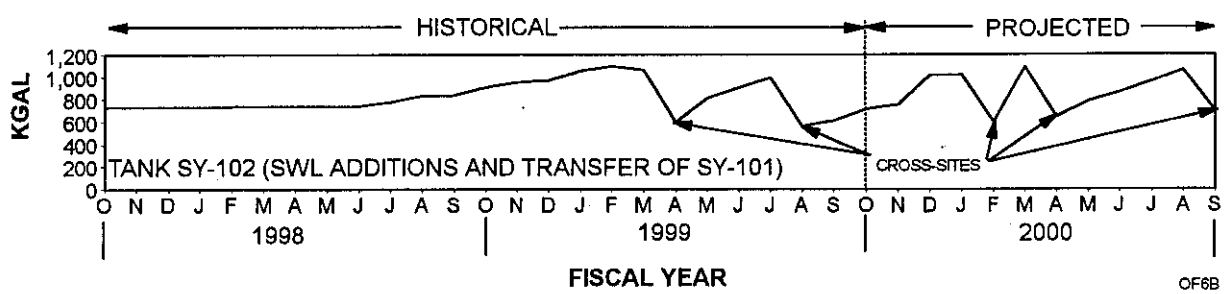


Figure 5. Tank Fill Graphic

The accuracy of this projection is directly related to the facility supplied assumptions. Some of the major assumptions are listed below:

- Process operating schedules define the planned dates of plant operations or deactivation activities. These assumptions are consistent with the RPP program planning. Volumes and schedules for the various Hanford facilities for the three projection cases are presented in Sections 3 and 4.

- Plant waste generation assumptions define the volume and type of waste that will be generated by the plants. These assumptions result from an analysis of recent waste generation history and future plans specified by the plants. Most waste streams volumes are projected based on historical data and/or facility supplied operating schedules. Section 5.4 includes a comparison of actual waste receipts to the facility waste generation targets for the last fiscal year (October 1998 to September 30, 1999).

Tank roles and waste routings define the use of tanks in the system. For example, a tank will be designated to act as receiver of the PUREX facility miscellaneous waste (tank AW-105), while other tanks will store concentrated waste.

The graphics depicted on the next few pages summarize the short range projection results for Projection Case 1. Figure 6 shows the role of each tank for a period of four years. It should be noted that if a tank has several transfers in or out of the tank in one month, no fluctuation in the tank level may appear. This is because the graphic program plots tank levels as of the last day of the month and any changes that occur during the month are not shown. The simplified routing schematic shown in Figure 7 depicts the assumptions that are made about the routing of waste from the plants to the tanks and from tanks to the facilities. The projected tank inventories and tank space usage for the Case 1 and 2 projections as of September 2001 are included in Table 13.

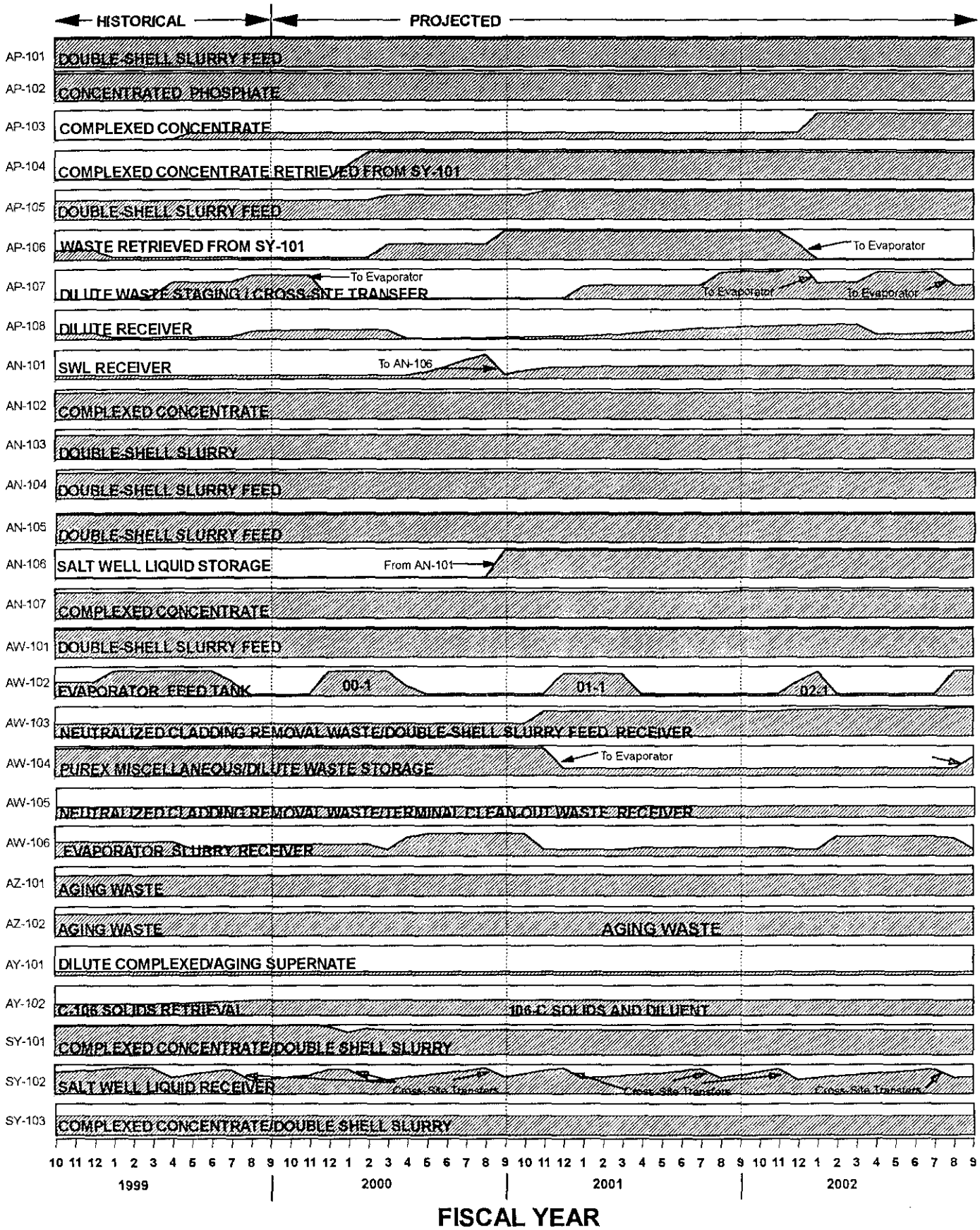


Figure 6. Tank Levels During the Short Range Projection

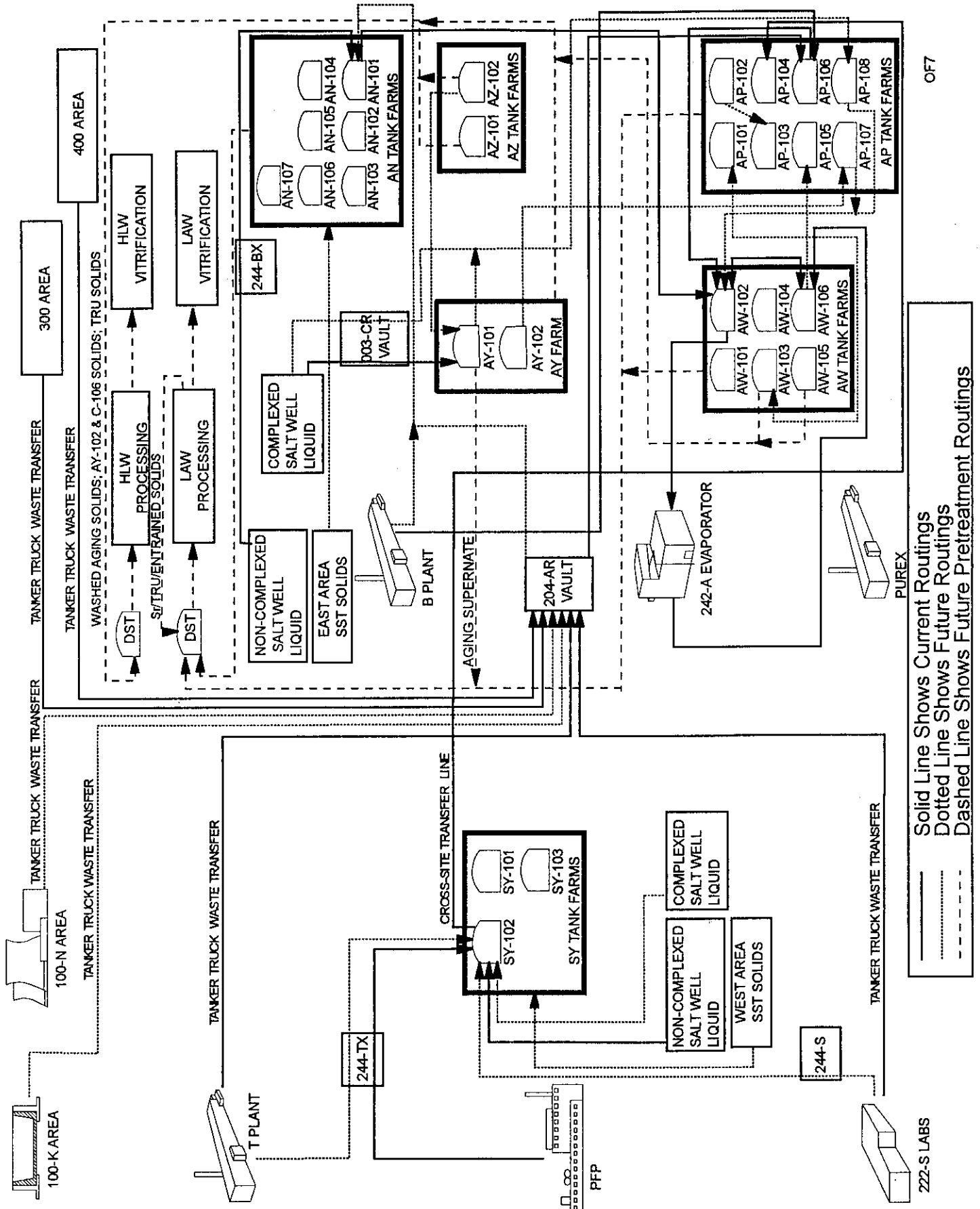


Figure 7. Simplified Schematic of Current and Planned Routings

Table 13. Projected Tank Usage on 9/2002 for the Case 1 and 2 Projections (2 Sheets)

Tank	Liquid (Kgal)	Solids (Kgal)	Total (Kgal)	Comment/Projected Usage for Tank as of 9/2002
AY-101	37	108	145	Emergency space; used to retrieve SST waste from FY 2007 on
AY-102	395	216	611	Received C-106 solids in FY 1999-2000; third HLW feed tank in all projection cases
AZ-101	802	47	849	NCAW/SL; first HLW feed tank in all projection cases
AZ-102	842	104	946	NCAW/SL; second HLW feed tank in all projection cases
SY-101	979	5	984	CC/SL inventory; retrieval/dilution completed in FY 2000
SY-102	613	88	701	DN/PT inventory; 200 West Area salt well liquid and dilute receiver
SY-103	382	362	744	CC/SL inventory; WL tank
AW-101	820	306	1126	DSSF/SL inventory; WL tank; third tank to be processed in Case 1 & 2 projections
AW-102	1005	40	1045	Evaporator feed tank
AW-103	792	348	1140	DN/PD solids; DSSF added to tank in FY 2000 and beyond
AW-104	550	231	781	DN/SL; DN evaporated in 9/2001; projected refill w/ DSSF started in FY 2002
AW-105	187	280	467	DN heel/PD solids; receives all 100 Area wastes & solids starting in 2001; dilute receiver starting in FY 2001; tank level will vary as waste is removed for evaporation
AW-106	28	228	256	Evaporator slurry receiver tank; tank level will vary as concentrated waste is added and removed
AN-101	497	33	530	Salt well liquid receiver; transfer approx. full tank to AN-106 in FY 2001; cleaned out for use as an intermediate staging tank in FY 2005
AN-102	967	89	1056	CC (TRU) inventory; third batch of LAW waste processed (NCAW supernate is second batch)
AN-103	546	410	956	DSS inventory; WL tank
AN-104	604	449	1053	DSSF inventory; WL tank; second tank to be processed in Case 1 & 2 projections
AN-105	637	489	1126	DSSF inventory; WL tank; used as intermediate staging tank
AN-106	1096	17	1113	DN/SL; received salt well liquid from tank AN-101 in FY 2001; used to stage dilute waste for evaporation in FY 2001-3
AN-107	860	247	1107	CC (TRU)/SL inventory; first tank to be processed in Case 1 & 2 projections
AP-101	1114		1114	DSSF; first LAW waste to be processed
AP-102	1090		1090	CP inventory; Late Note—may be transferred to another AP tank in FY 2000-2001 if AP-102 is needed to serve as a backup feed/staging tank
AP-103	1062	1	1063	CC/SL; received concentrated waste 2/1999 on
AP-104	1112		1112	CC; received cross-sited waste from SY-101 and SY-102 in FY 2000
AP-105	1047	89	1136	Filled w/ DSSF in June 2000
AP-106	28		28	In projections 1 & 2, used to store retrieved/diluted waste from SY-101 and SY-102 in FY 2000; used to store concentrated wastes from FY 2003 on
AP-107	581		581	DN/DC; used to receive cross-sited waste from SY-102 and to stage dilute for evaporation through FY 2004
AP-108	358	8	366	dilute receiver in E. Area until FY 2004; started filling with concentrated waste in FY 2004.

Table 13. Projected Tank Usage on 9/2001 for the Case 1 and 2 Projections

Notes:

CC = complexant concentrate waste
CC/SL = complexant concentrate/ solids
CC(TRU) = complexant concentrate transuranic waste
CP = concentrated phosphate waste
DN = dilute non-complexed waste
DN/DC = dilute non-complexed waste/dilute complexed waste
DN/PD = dilute non-complexed waste/ PUREX decladding sludge
DN/PT = dilute non-complexed waste/ PFP TRU solids
DN/SL = dilute non-complexed waste/ solids
DSS = double-shell slurry
DSSF = double-shell slurry feed
NCAW/SL = neutralized current acid waste/ solids
PD = PUREX decladding sludge

Evaporator Waste Volume Reduction and Liquid Effluent Retention Facility Condensate

Schedule and operational considerations presented in Section 3 result in the following Evaporator waste volume reduction and Liquid Effluent Retention Facility condensate production volumes for the Case 1 projection. The ratio of process condensate sent to the Liquid Effluent Retention Facility for every gallon of waste volume reduction for Evaporator Campaigns 94-1, 94-2, and 95-1 was 1.29, 1.24, and 1.26, respectively (Guthrie 1996). The evaporator seal water and demister spray upgrade could reduce future process condensate production to 1.15 gallons of condensate/gallon of waste volume reduction which would lower the value used for future projections. This projection used a value of 1.15 gallons of condensate/gallon of waste volume reduction (Bowman 2000 and Smith 2000) to project future condensate production recorded in Table 14. The waste sources, campaign schedule, and concentrated waste receiver tanks used in this projection are summarized Table 15. Table 15 shows evaporator campaigns through the start of FY 2005 only. Cross-site transfers through FY 2003 are shown in Table 16.

Table 14. *Evaporator Waste Volume Reduction and Liquid Effluent Retention Facility* Additions for Case 1 and 2 Projections

FISCAL YEAR	EVAPORATOR WASTE VOLUME REDUCTION (KGAL)	CONDENSATE TO LIQUID EFFLUENT RETENTION FACILITY(KGAL)
2000	680	790
2001	700	810
2002	770	890
2003	1590	1830
2004	Planned Evaporator Outage	
2005	1310	1510
2006	350	410
2007	590	680
2008	390	450
2009	180	210
2010	520	600
2011	640	740
2012	320	370
2013	360	420
2014	360	420
2015	460	530
2016	290	340
2017	430	500
2018	290	340

Table 15. Evaporator Campaign Schedule for the Case 1 and 2 Projections

Campaign	Start Date	Staging Tank(s)	Source	Waste Feed Type	Feed Volume (Kgal)	Receiver Tank
00-1	4/2000	AP-107	SY-102 to AP-107—4/1999 & 8/1999	DN	~950	AP-105,AW-103
	5/2000	AP-108	AP-108		~350	
01-1	4/2001	Direct to AW-102	AW-104 to AW-102—12/2000	DN	~800	AW-103
02-1	1/2002	AP-106	SY-102 to AP-106--- 3/2000 SY-102 to AP-106--- 9/2000	DC from SY-101 DN/DC	~950	AP-103
	2/2002	AP-107	SY-102 to AP-107--- 1/2001 SY-102 to AP-107--- 8/2001	DN/DC DN/DC	~950	AW-103,AW-104
03-1	10/2002	AP-107	SY-102 to AP-107--- 12/2001 AP-108 to AP-107--- 4/2002	DN/DC DN	~950	AW-104,AP-106
	11/2002	Direct to AW-102	AN-106 to AW-102--- 11/2002	DN	~950	AP-106
03-2	9/2003	AP-107	SY-102 to AP-107--- 8/2002 AP-108 to AP-107--- 3/2003	DN/DC DN/DC	~950	AP-106
FY-04	Evaporator outage is scheduled for FY 2004					
05-1	10/2004	AP-107	AN-101 to AP-107--- 9/2003 SY-102 to AP-107--- 12/2003 AW-105 to AP-107--- 4/2004 AP-108 to AP-107--- 4/2004	DN/DC DN/DC DN DN/DC	~950	AP-106,AN-106
05-2	6/2005	Direct to AW-102	AP-108 to AW-102--- 12/2004 AN-101 to AW-102--- 2/2005	DN DN/DC	~950	AN-106

Notes:

DC = dilute complexed waste
DN = dilute non-complexed waste
DN/DC = dilute non-complexed/dilute complexed waste

Table 16. Cross-site Transfer Schedule for the Case 1 and 2 Projections

Date for Cross-site	Receiver Tank	Volume (Kgal)	Comments
9/2000	AP-106	~480	Includes diluted waste from tank SY-101 transferred to tank SY-102 plus commingled DN/DC-salt well liquid and DN
1/2001	AP-107	~500	DN/DC-salt well liquid and DN
8/2001	AP-107	~500	DN/DC-salt well liquid and DN
12/2001	AP-107	~500	DN/DC-salt well liquid and DN
8/2002	AP-107	~500	DN/DC-salt well liquid and DN
12/2003	AP-107	~250	DN/DC-salt well liquid and DN. Partial transfer needed to remove dilute waste from tank SY-102 for evaporation prior to start of SST waste retrieval

Notes:

DN = dilute non-complexed waste
DN/DC = dilute non-complexed/dilute complexed waste

Additional Notes for Table 15 and 16:

1. Double-shell slurry feed waste is stored on top of the solids in tanks AW-103 and AW-104 to free up other tank space which is needed later in the projection for intermediate feed staging tanks.

2. Some evaporator campaigns could be accelerated.

3. The evaporator campaign and cross-site schedules are the same for projection Cases 1 and 2. Tank AP-107 is used to stage dilute waste for evaporation.

See Figure 8 for dilute receiver tanks, evaporator waste volume reduction, and the 242-A Evaporator operating schedules for the Case 1 and 2 projections.

Based on the 5 Mgal/year treatment capacity for the Effluent Treatment Facility, the Effluent Treatment Facility should have no problem processing the projected evaporator condensates through 2018. There should be sufficient Liquid Effluent Retention Facility and DST space for storage of Hanford facilities generated waste and condensates between FY 2000 and the end of 2018, provided:

- The 242-A Evaporator schedule is achieved
- The amount of condensate sent to the Liquid Effluent Retention Facility does not grossly exceed the 1.15 gallons condensate/gallon waste volume reduction factor
- Facilities stay within their respective generation limits
- No unexpected waste receipts are received in the DSTs

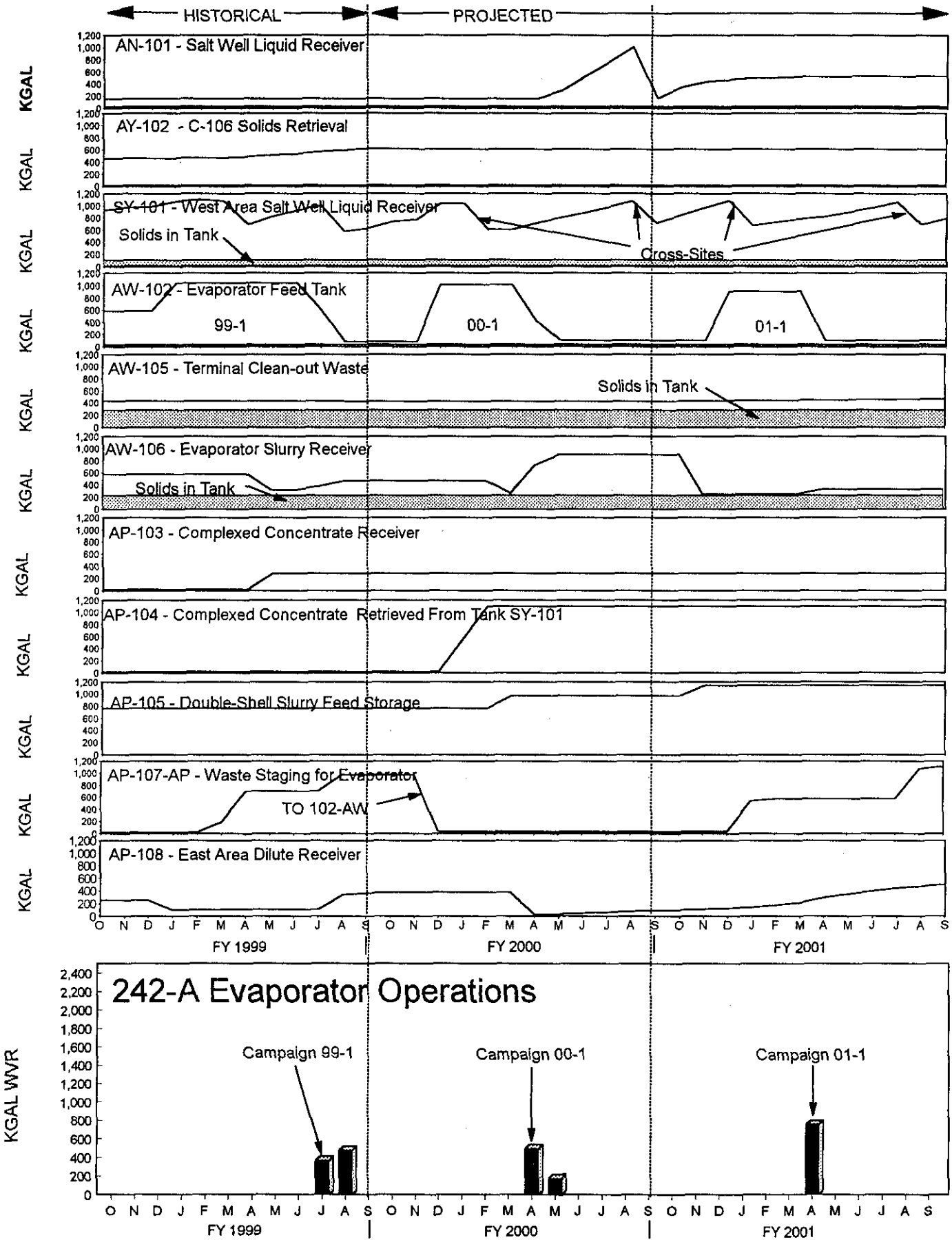


Figure 8. Dilute Receiver Tanks and 242-A Evaporator Operations

OF8

Non-Aging Tank Space

In later parts of the projections when tank space becomes tight due to processing needs and/or the amount of SST wastes being retrieved, the evaporator is assumed to operate yearly to minimize waste storage needs and to decrease the volume of retrieved SST waste. Tank space pinches occurring between FY 2000 and FY 2018 (Figure 3) are caused by a combination of factors, including:

- Salt well liquid pumping (SST interim stabilization) volumes pumped by the end of FY 2000 and the use of two tanks in 200 East Area to receive salt well liquid
- The number of intermediate staging tanks used to stage wastes for Phase 1 processing--tanks AN-101, AN-102, AN-105, AP-104, and AP-101
- The large volume of SST waste retrieved beginning in FY 2004
- The decision not to operate the Grout Facility has eliminated an early means of freeing up DST space
- The decision not to consolidate neutralized current acid waste solids has increased the DST space needs from 2001 on

Figures 9 through 12 show the detailed operation of all the DST waste tanks for the Case 1 and 2 projections during the near term.

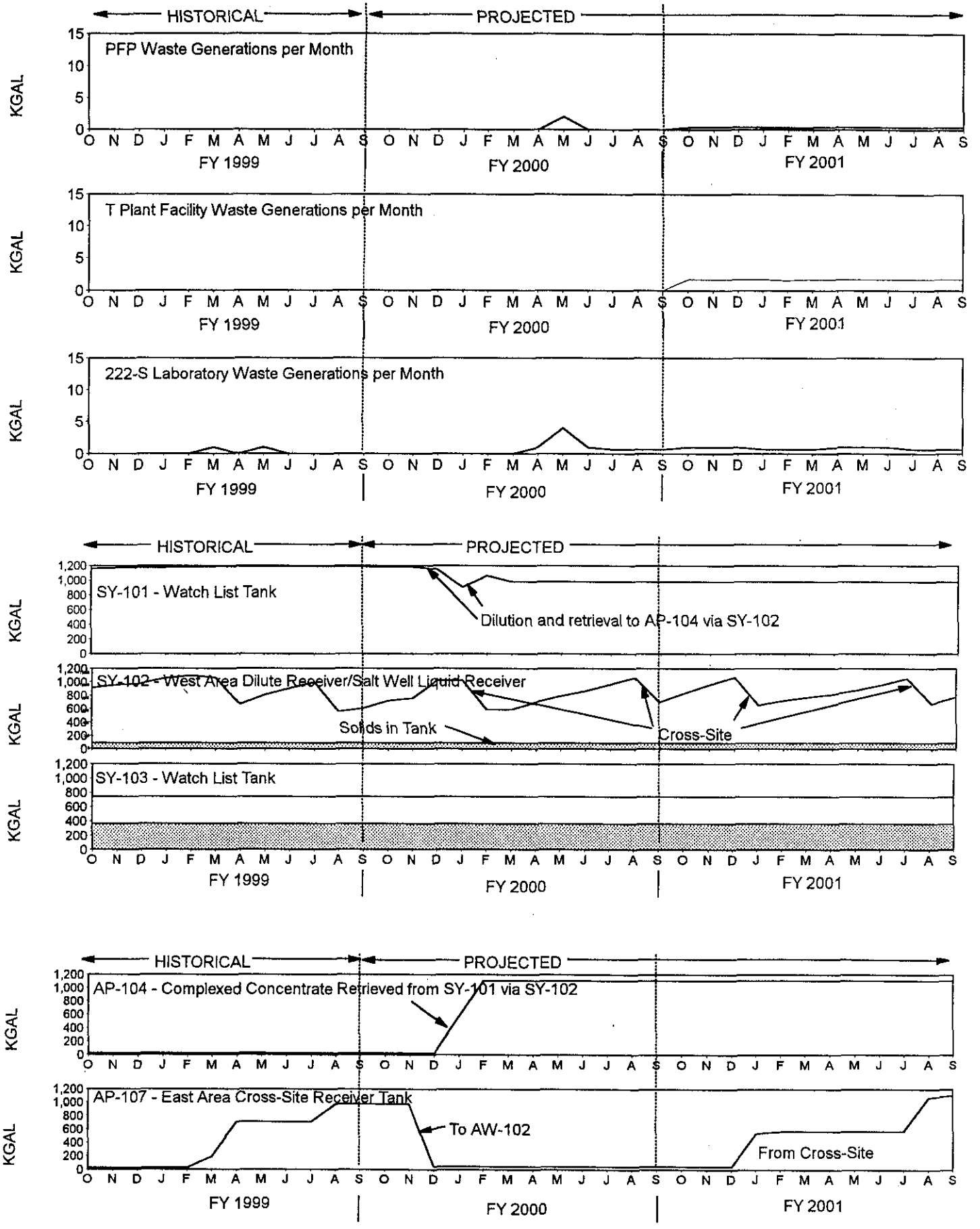


Figure 9. West Area Waste Generations and Tank Levels

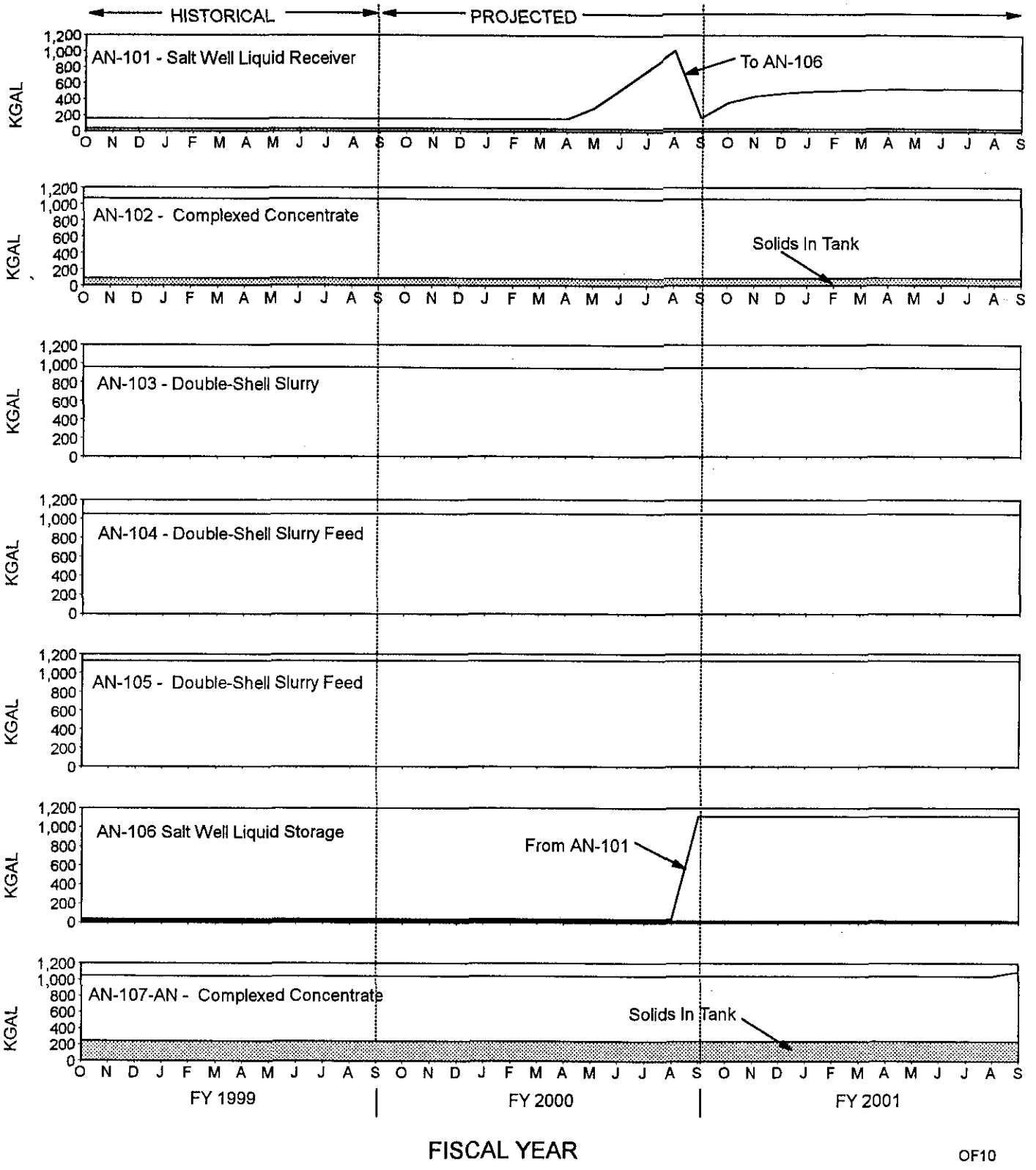


Figure 10. AN Tank Farm Levels

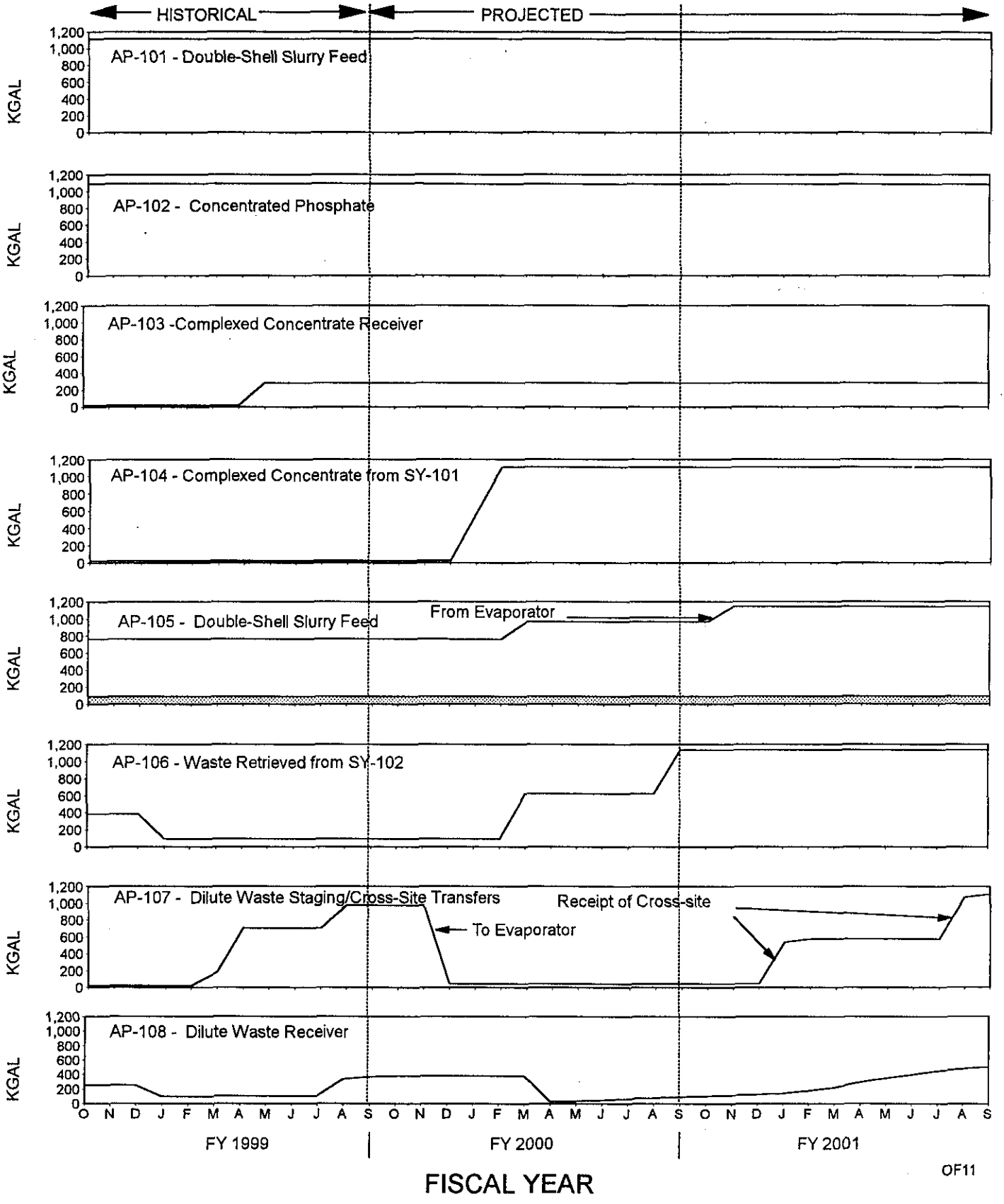


Figure 11. AP Tank Farm Levels

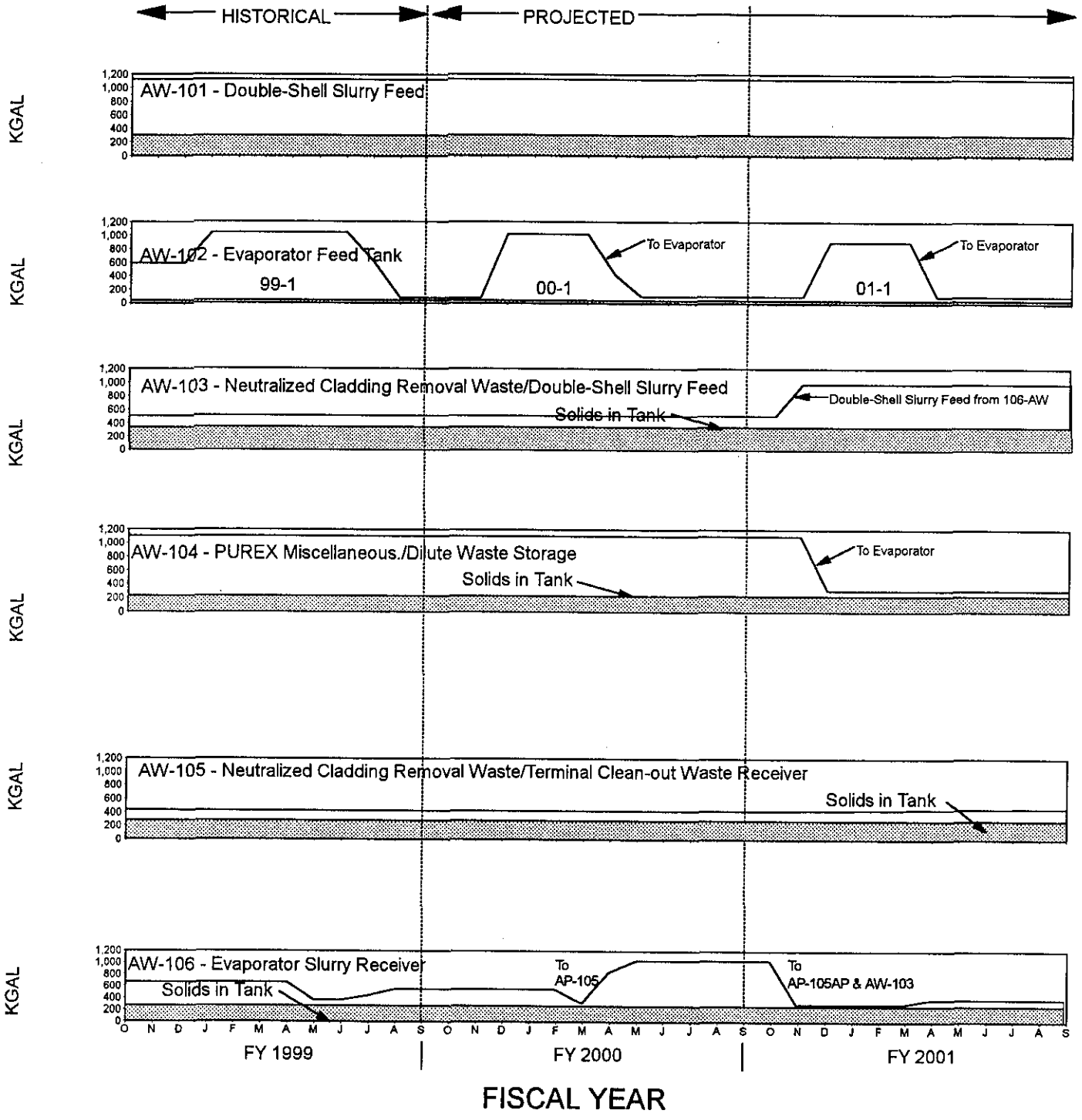


Figure 12. AW Tank Farm Levels

Aging Waste Tank Space

Since PUREX has been decommissioned, only two aging waste tanks (tanks AZ-101 and AZ-102) are required to store existing aging waste.

Waste from tank C-106 was retrieved to tank AY-102 in FY 1999. Tank AY-101 is also used to retrieve the SST wastes from tank C-104 starting in FY 2007.

In Revision 21 of this document, it was assumed that all neutralized current acid waste solids and the C-106 solids would be combined into one aging waste tank (tank AZ-102) and that all neutralized current acid waste supernates would be concentrated into one aging waste tank (tank AZ-101). Since that document was published, studies have been completed which looked at numerous sludge washing/combination options (Powell 1996a). The alternatives for consolidating high heat sludges have been reviewed by a decision board comprised of Hanford contractor management, an ORP representative, and a WDOE representative. It was concluded that consolidating all the sludges into a single tank would require modifications to the tank farm safety basis. The preliminary decision reached was not to consolidate all the high heat sludges into a single tank. The current HLW strategy will send all neutralized current acid waste wastes to the waste treatment plant for pretreatment and sludge washing within their facility. No streams will be routinely returned to DSTs from the HLW processing.

Space in one aging waste tank is kept available for receiving the contents of a DST in the unlikely event of a tank leak (Department of Energy Order 435.1). This tank could also be used to store a HLW (or LAW) return from the waste treatment facility. In FY 2000, tank AY-101 is the designated emergency tank space. In FY 2007, tank AY-101 is used to receive C-104 wastes and tank AZ-102 will be designated as the dedicated emergency tank through the end of the projection. See Section 3.20 for a detailed description of this space.

A graph of aging waste tank space requirements as a function of time is presented in Figure 13. The uses of each individual aging waste tank for the Case 1 projection are shown in Figure 14.

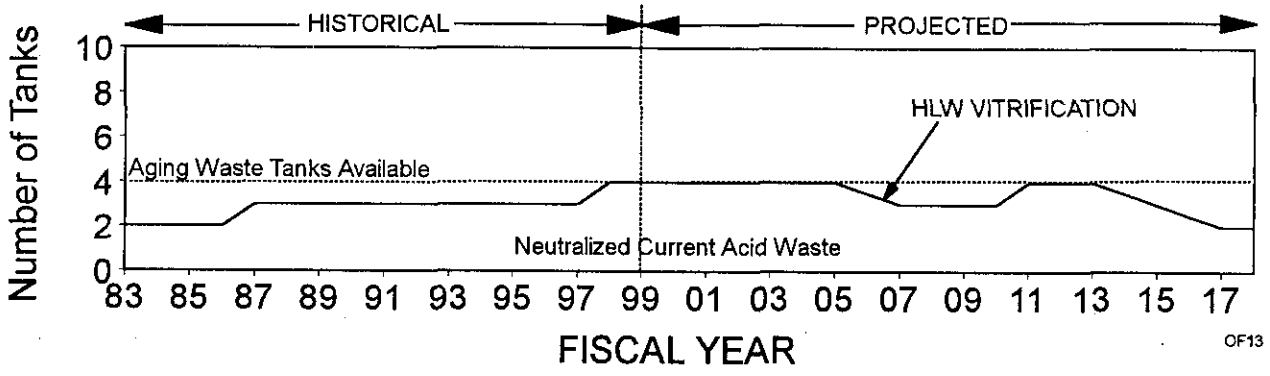


Figure 13. Aging Tank Requirements

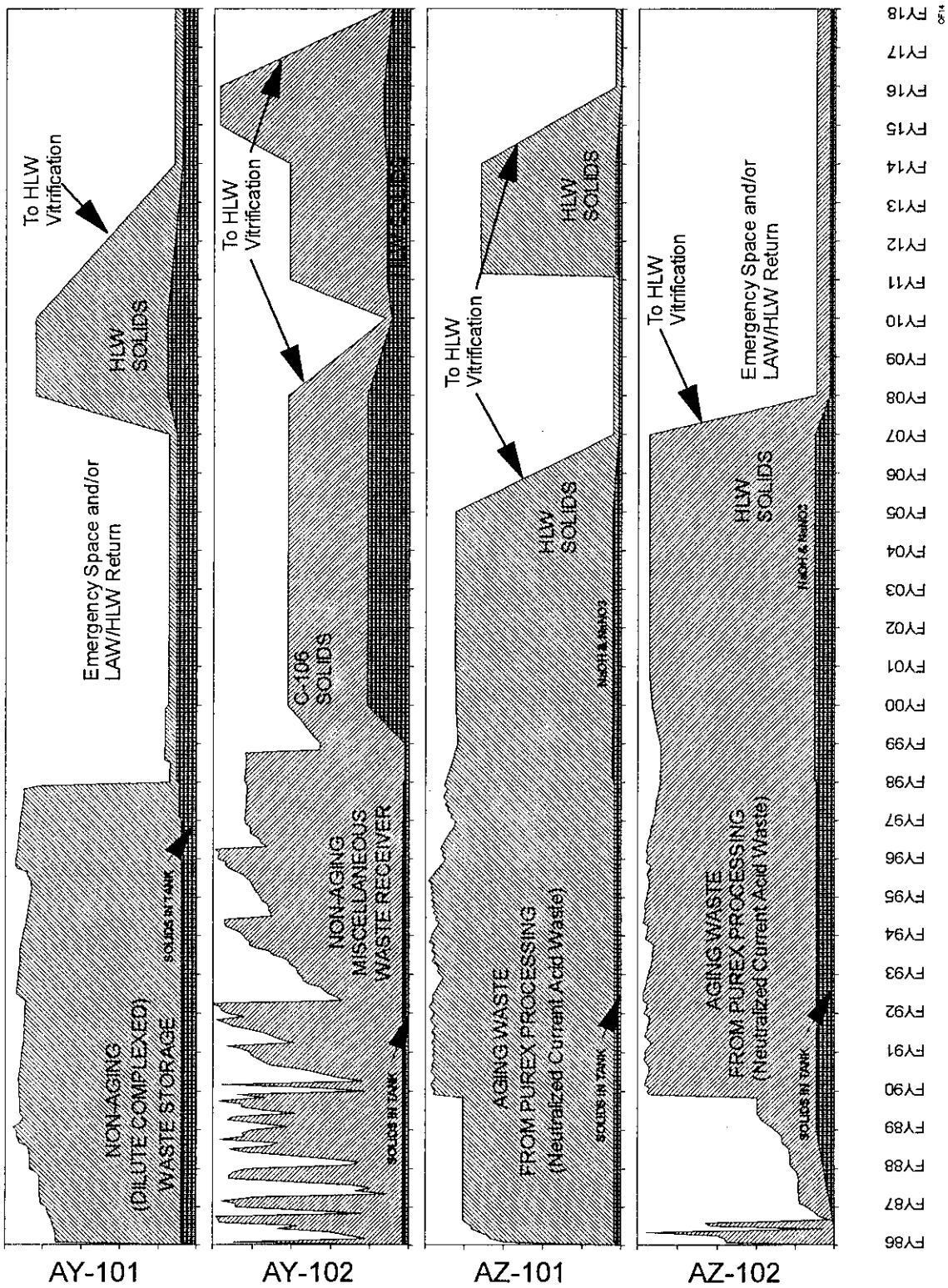


Figure 14. Aging Waste Tank Usage

5.2 PROJECTION CASE 2 RESULTS

Since the purpose of this document is to determine the space needed for fixed operational assumptions, all three projection models retrieve the SST wastes using minimum retrieval durations that are fixed. The Case 2 projection determines the space needed for a defined retrieval sequence with minimum retrieval durations rather than extending the retrieval duration to prevent overfilling available space. Tank space needs for the Case 2 projection are shown in Figure 15. The required tank space needs without additional SST retrieval is identical to Case 1 since both cases use the same processing schedule for Phase 1.

The required tank space for the Case 2 projection with the SST Program Plan retrieval schedule (Stokes, 1999), exceeds available space by one tank in FY 2010, by two tanks in FY 2011, by one tank in FY 2012, and by up to three tanks in FY 2013 in Figure 15. The tank space shortage continues to increase up to a total of fifteen tanks by the end of FY 2018.

A spreadsheet summarizing the waste generations, evaporator waste volume reduction, and processing requirements for the Case 2 projection is included in Table 17. The tank usage, evaporator, and cross-site transfer information for Case 2 are identical to those presented for Case 1 and were shown previously in Tables 13 through 16.

Figure 16 shows the waste additions and available space for Case 2 in a bar graph format to allow the user to more easily visualize the tank space usage. Numbered comments have been added to the bar graph explaining the inventory changes. These comments follow the figure. During the period when SST wastes are being retrieved and processed, some of the tanks could be filled and processed within the same fiscal year. These tanks will show up as "empty" in the graphic because they have been filled and processed within the same fiscal year and their inventory at the end of the year has been reduced to a heel. Thus, the bar graph misleads the user into believing that most of the space dedicated to SST retrieval is not needed. The space is actually needed to allow staging and processing of the SST retrieval wastes. Retrieval and processing rates are high enough in FY 2011-2018 that it is difficult to retrieve the wastes, allow the 100 days assumed for characterization, and process the waste at the specified rate.

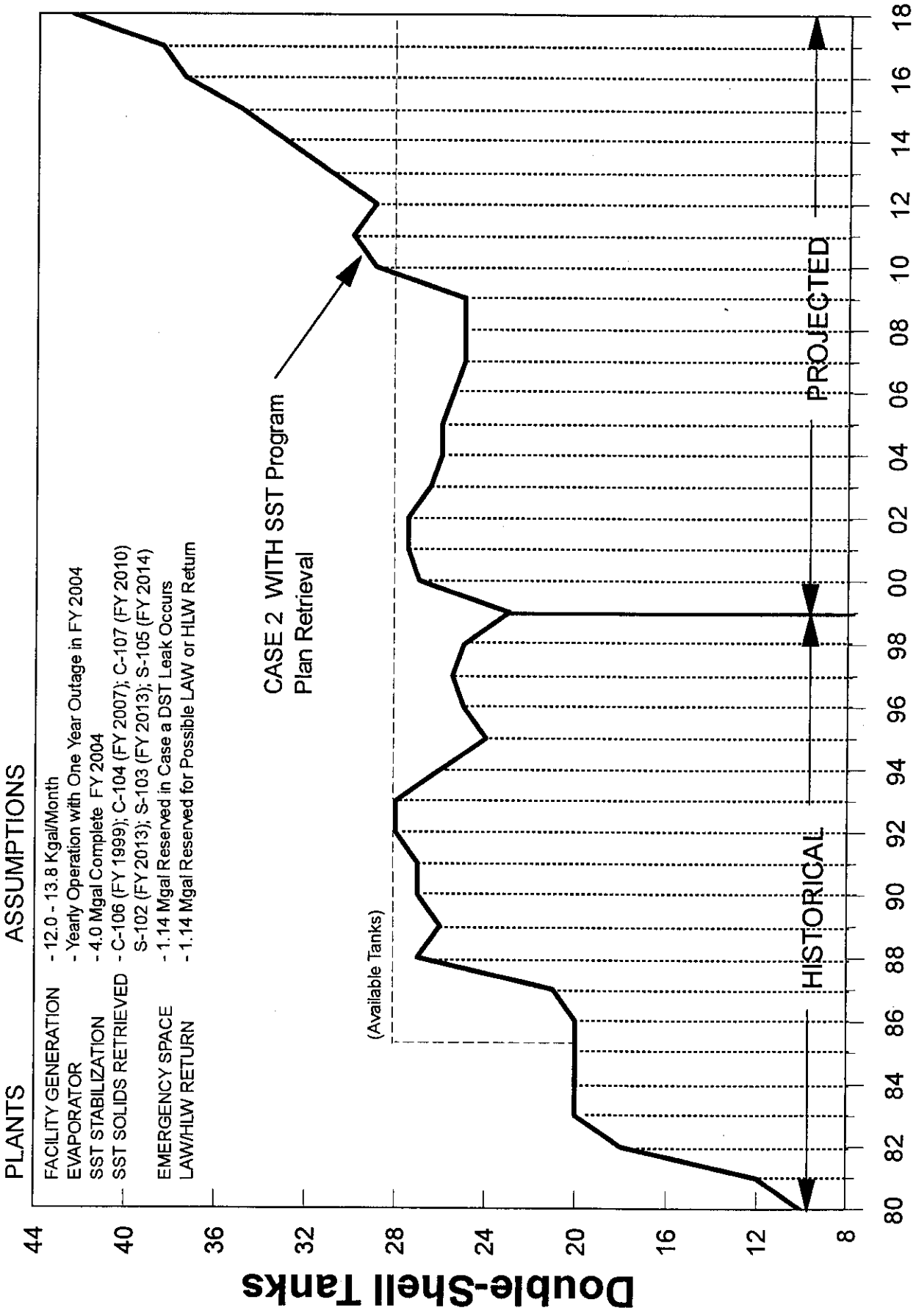


Figure 15. Double-Shell Tank Requirements for Case 2

OF15B

Table 17. Spreadsheet of Waste Additions and Reductions (Kgal) for Case 2 with SST Retrieval

FISCAL YEAR	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
STARTING INVENTORY	18598	18994	21523	22831	23234	21987	22899	22295	20790	20303	19950	19933	22134	22221	23259	23284	24370	27023	28731	28855
SPACE UTILIZATION																				
Emergency Space	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140
Watchlist Space	644	851	851	851	851	851	851	851	851	851	764	1264	1264	1040	1050	1369	0	0	0	0
Contingency Space	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Restricted Space	766	767	701	701	701	806	864	1480	1482	2666	2072	1913	1192	1192	1192	1462	1793	1172	1538	906
Priority/Operational Space	2523	4601	3373	3177	3687	2414	3288	3096	3523	3668	4730	5192	6532	5167	6880	7782	8553	8946	10795	10751
LAW or HLW Return Space	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140
NEW WASTE ADDITIONS																				
B Plant/WESF	4	0	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
S Plant/WSCF	2	8	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
T Plant	0	0	20	3	2	2	4	2	2	2	2	3	2	2	2	2	2	2	2	3
300/400 Areas	0	2	5	2	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4
PUREX	0	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
TCO	0	0	40	0	0	0	0	200	0	0	0	0	0	0	0	0	0	0	0	0
Flushes	466	988	535	261	64	6	542	105	104	105	105	385	105	105	245	105	105	245	107	105
SWL Pumping	625	1381	1223	724	57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tank Farms	30	99	155	155	190	170	190	205	155	205	155	205	155	205	155	205	155	205	155	205
SST Retrieval	194	0	0	0	0	814	0	0	696	0	133	3145	1668	1169	2381	3141	4515	3954	2283	6017
PFP	0	2	5	8	2	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0
IMUST	0	0	0	0	0	0	0	0	0	0	0	0	100	100	100	100	100	0	0	0
Inventory	0	0	66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Retrieval Water	0	910	0	0	0	0	0	0	0	0	0	0	589	0	0	0	0	200	0	0
Everything Else	42	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pretreatment Dilution	0	0	0	0	0	0	0	0	0	0	816	488	231	1122	625	0	0	150	0	0
In-Tank Washing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NEW WASTE ADDITIONS TOTAL	1363	3405	2069	1173	338	1017	760	536	981	336	1236	4251	2875	2728	3532	3577	4901	4780	2571	6354
TOTAL WASTE BEFORE EVAP	19961	22399	23593	24003	23572	23004	23660	22832	21771	20637	21186	24185	25007	24950	26790	26862	29268	31806	31299	35210
EVAPORATOR WVR	-847	-675	-762	-769	-1585	0	-1307	-340	-582	-387	-173	-515	-635	-316	-350	-351	-452	-284	-428	-287
CUM EVAPORATOR WVR	-847	-1522	-2284	-3053	-4638	-4638	-5945	-6285	-6867	-7254	-7427	-7942	-8577	-8893	-9243	-9594	-10046	-10330	-10758	-11045
Loss due to (Burp, Lance Evaporation, Surface	-120	-185	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Adjust waste layers due to new solids meas.	0	-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Low activity waste	0	0	0	0	0	0	0	-1086	0	0	-891	-1377	-1966	-1190	-2971	-1870	-1463	-2465	-1651	-1794
High Level Waste Contractor	0	0	0	0	0	-105	-58	-616	-886	-300	-189	-159	-185	-185	-185	-271	-330	-326	-365	-340
EVAP AND OUTFLOWS TOTAL:	-967	-876	-762	-769	-1585	-105	-1365	-2042	-1468	-687	-1253	-2051	-2786	-1691	-3506	-2492	-2245	-3075	-2444	-2421
NET INVENTORY CHANGE	*396*	*2529*	*1307*	*404*	*-1247*	*912*	*-605*	*-1506*	*-487*	*-351*	*-17*	*2200*	*89*	*1037*	*26*	*1085*	*2656*	*1705*	*127*	*3933*
END OF YEAR INVENTORY	18994	21523	22831	23234	21987	22899	22295	20790	20303	19950	19933	22134	22221	23259	23284	24370	27023	28731	28855	32789
TOTAL CAPACITY	25207	30022	30036	30243	29506	29250	29578	28497	28439	29415	29779	32783	33489	32938	34686	37263	39649	41129	43468	46726
	22	27	27	27	26	26	26	25	25	26	26	29	30	29	31	33	35	36	39	41

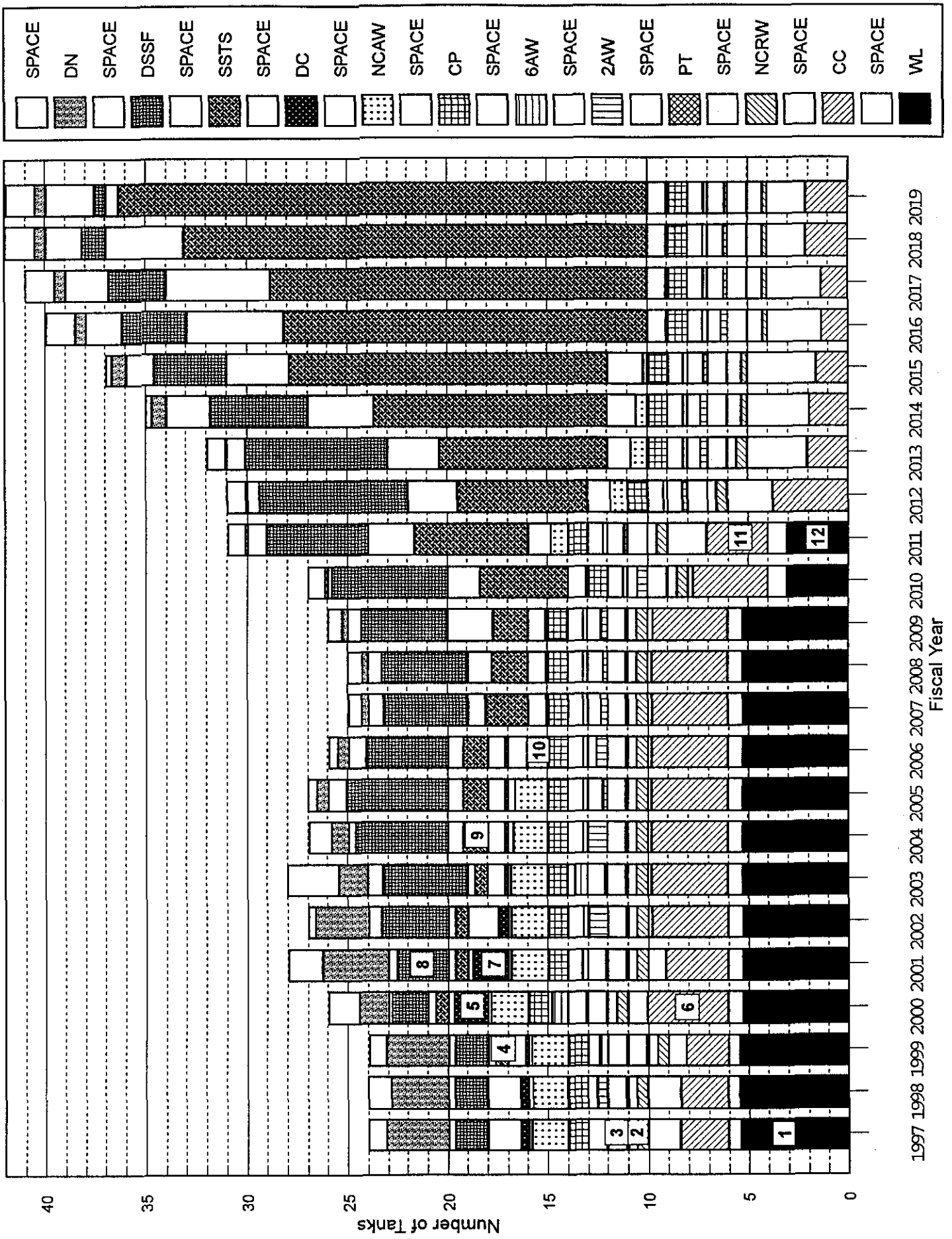


Figure 16. Double-Shell Tank Inventory and Space for Case 2 Projection

Comments for Figure 16--Double-Shell Tank Inventory and Space for the Case 2 Projection

This bar chart graphic is meant to show the increase and decrease in the various waste categories or waste types for this year's Case 2 projection. Emergency space and processing receipt tanks are not shown. Levels of Dilute Non-complexed waste (DN) in the dilute receiver and evaporator tanks will vary with time. The bar for each year depicts the tank space needs for the end of that fiscal year and may not show tank space changes occurring during the fiscal year, especially if the tank inventory has been removed prior to the end of the fiscal year.

Numbered Comments for "Tank Inventory and Space" Graphic

1. "Watch List" (WL) tank inventories remained relatively constant from 1997-2009. In late FY 2010, half of the contents of tank AN-104 will be staged to tank AN-101 for Phase 1 processing causing a decrease in WL inventory. Once the wastes are transferred from a watch list tank to an intermediate feed staging tank or to the vendor this category disappears from the graphic. Once the wastes are removed from the Watch List tank, the watch list designation is removed from the tank and it is reused for storage of other wastes.

2. Space above Neutralized Cladding Removal Waste (NCRW) solids is routinely used to store Dilute Non-complexed waste (DN). For clarity, the graph shows this DN inventory in with the other dilute non-complexed waste inventory toward the top of the graph (i.e., to ascertain "free" space, add the space shown in the NCRW group to that shown in the DN group).

3. Space above PFP TRU (PT) solids is used to store DN waste, (see note 2). Complexed salt well liquid pumping in 200 West Area is added to tank SY-102 before the PT (PFP TRU) solids are retrieved.

4. Appearance of the SSTS (single-shell tank solids) inventory in FY 1999 was caused by the retrieval of tank C-106 solids to tank AY-102. This category will also increase in future years due to the retrieval of SST wastes.

5. Increase in the dilute complexed (DC) category in FY 2000 was the result of both the dilution of tank SY-101 and the transfer of dilute complexed salt well liquid to tank SY-102. The waste in tank SY-102 was cross-sited to AP farm.

6. The increase in the complexant concentrate (CC) waste volume and tank count in FY 2000 was caused by the dilution and retrieval of tank SY-101 to tank SY-102. This waste was cross-sited to tank AP-104 to be held as feed for the waste treatment plant.

7. Increases and decreases in the DC category during the period FY 2001-2003 are due to the pumping of dilute complexed salt well liquid wastes and their re-evaporation to CC.

8. The increase in the double-shell slurry feed (DSSF) category in FY 2001 and beyond is due to the evaporation of dilute non-complexed miscellaneous and salt well liquid wastes.

9. The gradual increase in the SSTS category beginning in FY 2004 and the increase in headspace is due to the beginning of SST retrieval. The gradual decrease in the SSTS

category in FY 2009 is due to the HLW processing of wastes from tank AY-102 (tank C-106 solids will be processed). By FY 2010, the yearly retrieval of other SST wastes to DSTs causes the SSTS category to increase significantly. This category continues to increase and accounts for most of the waste stored by the end of FY 2018.

10. The neutralized current acid waste (NCAW) category decreases in volume because the solids in tanks AZ-101 and AZ-102 will have been sent to HLW vitrification.

11. The decrease in the CC waste category in FY 2011 is caused by the staging of CC waste for LAW processing. The increases in the inventory and tank count in FY 2012 is caused by the dilution of complexant concentrate waste for processing and the higher number of feed tanks occupied by the diluted waste. Beginning in FY 2013, the complexant concentrate waste inventory will decrease steadily due to LAW waste treatment.

12. The disappearance of the Watch List category in FY 2012 is caused by staging of wastes from Watch List tanks for LAW processing--see note 1 for greater detail. Once these tanks are removed from the Watch List category they will be used for other purposes—such as feed staging tanks or the storage of wastes from SST retrieval.

5.3 PROJECTION CASE 3 RESULTS

Projected tank space needs for the Case 3 projection with the accelerated SST retrieval schedule and accelerated processing is shown in Figure 17. The Case 3 projection incorporates the waste treatment schedule used in the Case 1 and 2 projections through 2010 and then accelerates processing to remain within available space as requested by the Washington State Department of Ecology (available space is 32 tanks because of the addition of four tanks in 2010). The projected processing rates for Case 3 compared to Cases 1 and 2 by year are shown below.

LAW processing by year

Projection Cases 1 & 2		Projection Case 3	
Yr	units/yr	Yr	units/yr
1	279 (37%)	1	279 (37%) – (FY 2007)
2	830 (110%)	2	830 (110%)
3	1011 (134%)	3	1011 (134%)
4on	1100 (146%)	4	1100 (146%)
		5	4320 (572%)
		6	5740 (760%)

HLW Processing by year

Projection Cases 1 & 2		Projection Case 3	
Yr	Canisters/yr	Yr	Canisters/yr
1	41 (40%)	1	41 (40%)
2-12	120 (100%)	2	120 (100%)
		3	920 (770%)
		4	1210 (1010%)

A LAW processing rate of 4640 units/year (614%) is needed to process the 7466 Kgal of SST waste retrieved each year assuming the SST waste is envelope A. The 4640 units/year processing rate would not free up additional DST space needed for additional intermediate staging tanks. The LAW processing rate of 5740 units/year would process the SST waste retrieved and free up DST space needed for use as intermediate feed staging tanks.

A spreadsheet summarizing the waste generations (Kgal), evaporator waste volume reduction, and processing requirements for the Case 3 is included in Table 18.

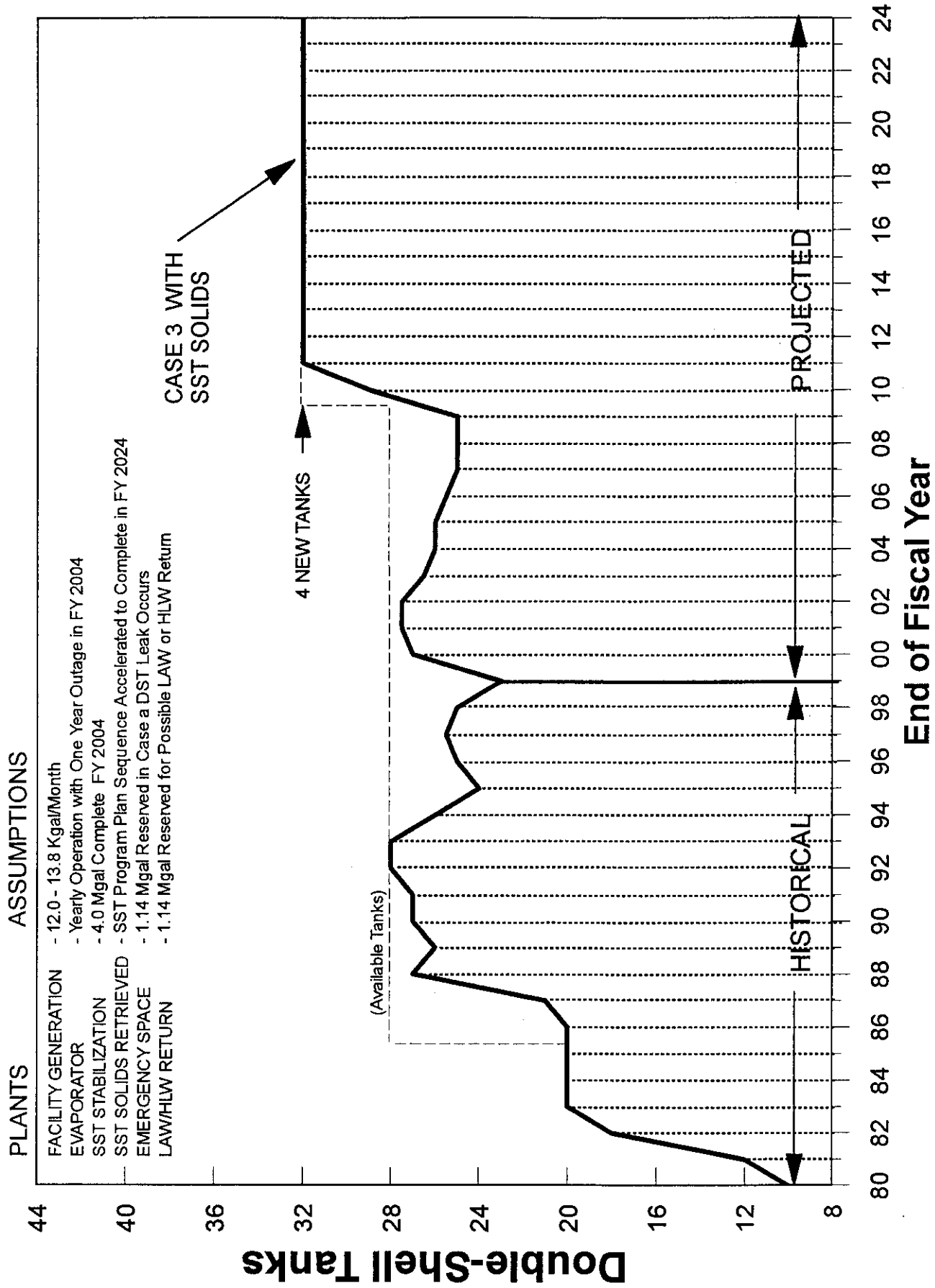


Figure 17. Double-Shell Tank Requirements for Case 3

OF17C

Table 18. Spreadsheet of Waste Additions and Reductions (Kgal) for Case 3 with SST Retrieval

FISCAL YEAR	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
STARTING INVENTORY	18598	18994	21524	22830	23234	21987	22900	22296	20790	20301	19950	19934	22132	23980	26384	24663	23168	23441	23663	21452
SPACE UTILIZATION																				
Emergency Space	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140
Watchlist Space	644	851	851	851	851	851	851	851	851	851	764	1264	1264	1040	1050	1369	0	0	0	0
Contingency Space	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Restricted Space	766	767	701	701	701	806	864	1480	1482	2666	2072	1913	1192	1192	1192	1462	1793	1172	1538	906
Priority/Operational Space	2523	4601	3373	3177	3687	2414	3288	3096	3523	3668	4730	5192	6532	5167	6880	7782	8553	8946	10795	10751
LAW or HLW Return Space	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140
NEW WASTE ADDITIONS																				
B Plant/WESF	4	0	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
S Plant/WSCF	2	8	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
T Plant	0	0	20	3	2	2	4	2	2	2	2	3	2	2	2	2	2	2	2	3
300/400 Areas	0	2	5	2	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4
TCO	0	0	40	0	0	0	0	200	0	0	0	0	0	0	0	0	0	0	0	0
Flushes	466	988	535	261	64	6	542	105	104	105	105	385	105	105	245	105	105	245	107	105
SWL Pumping	625	1381	1223	724	57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tank Farms	30	99	155	155	190	170	190	205	155	205	155	205	155	205	155	205	155	205	155	205
SST Retrieval	194	0	0	0	0	814	0	0	696	0	133	3145	7466	7466	7466	7466	7466	7466	7466	7466
PFP	0	2	5	8	2	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0
Inventory	0	0	66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Retrieval Water	0	910	0	0	0	0	0	0	0	0	0	0	589	0	0	0	0	200	0	0
Everything Else	42	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pretreatment Dilution	0	0	0	0	0	0	0	0	0	0	816	488	231	1122	625	0	0	150	0	0
In-Tank Washing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PUREX	0	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
IMUST	0	0	0	0	0	0	0	0	0	0	0	0	100	100	100	100	100	0	0	0
NEW WASTE ADDITIONS TOTAL	1363	3405	2069	1173	338	1017	760	536	981	336	1236	4251	8673	9025	8617	7902	7852	8292	7754	7803
TOTAL WASTE BEFORE EVAP	19961	22399	23593	24003	23572	23004	23660	22832	21771	20637	21186	24185	30805	33005	35001	32565	31020	31733	31417	29255
EVAPORATOR WVR	-847	-675	-762	-769	-1585	0	-1307	-340	-582	-387	-173	-515	-635	-316	-350	-351	-452	-284	-428	-287
CUM EVAPORATOR WVR	-847	-1522	-2284	-3053	-4638	-4638	-5945	-6285	-6867	-7254	-7427	-7942	-8577	-8893	-9243	-9594	-10046	-10330	-10758	-11045
Loss due to (Burp, Lance Evaporation, Surface	-120	-185	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Adjust waste layers due to new solids meas.	0	-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Low activity waste	0	0	0	0	0	0	0	-1086	0	0	-891	-1377	-6006	-6119	-9804	-8772	-6800	-7457	-9173	-6501
High Level Waste Contractor	0	0	0	0	0	-105	-58	-616	-886	-300	-189	-159	-185	-185	-185	-271	-330	-326	-365	-340
EVAP AND OUTFLOWS TOTAL:	-967	-876	-762	-769	-1585	-105	-1365	-2042	-1468	-687	-1253	-2051	-6826	-6620	-10339	-9394	-7582	-8067	-9966	-7128
NET INVENTORY CHANGE	396	2529	1307	404	-1247	912	-605	-1506	-487	-351	-17	2200	1847	2405	-1722	-1492	270	225	-2212	675
END OF YEAR INVENTORY	18994	21523	22831	23234	21987	22899	22295	20790	20303	19950	19933	22134	23979	26385	24662	23171	23438	23666	21451	22127
TOTAL CAPACITY	25207	30022	30036	30243	29506	29250	29578	28497	28439	29415	29779	32783	35247	36064	36064	36064	36064	36064	36064	36064
	22	27	27	27	26	26	26	25	25	26	26	29	31	32	32	32	32	32	32	32

5.4 ACTUAL WASTE GENERATION COMPARED TO MANAGEMENT LIMITS

During the Tank Space Management Board meeting on August 7, 1991, the need to establish new facility waste generation limits was discussed with the Hanford facility representatives based on additional delays in the 242-A Evaporator restart. A new total monthly waste generation rate of 64 Kgal/month was adopted based on: discussions with facility representatives, the average monthly waste generation rate for each facility during FY 1991, and the need to provide contingency space for potential delays in the 242-A Evaporator restart.

Facility generation limits were not established for high priority waste generations, which were assigned to "Priority Space". These generations included the PFP stabilization campaign (safety), salt well liquid pumping (TPA milestone), and the 242-A Evaporator (space necessary for the mini-run and restart).

New average monthly waste generation targets have been established for this projection with waste generations being reduced by the facilities (references and discussion in Section 3). Table 19 presents a comparison of the previous limits established for each facility, the newly established target rates for this projection, and the actual average monthly waste generation rate (Kgal/month) for the period October 1998 through September 30, 1999. Terminal clean-out was completed at B Plant in 1998 and no additional waste will be received from this facility. Terminal clean-out at the PUREX facility was completed but the facility could be sending ~5 Kgal/year of collected condensate to Tank Farms.

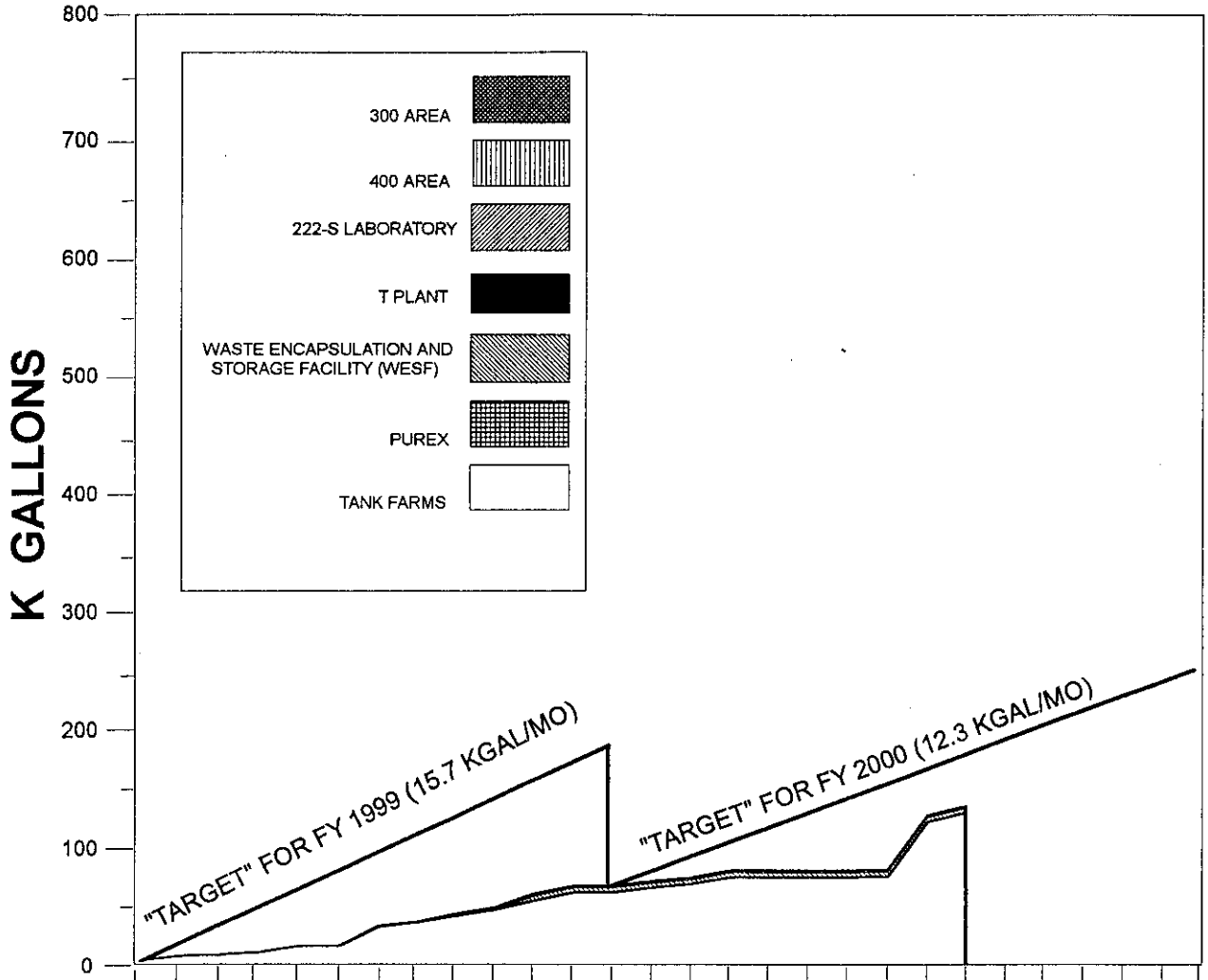
Table 19. Comparison of Average Monthly Waste Generation Rates (Kgal/month)

FACILITY	64 KGAL/MONTH MANAGEMENT LIMIT FROM OWVP REV. 20	FACILITY TARGET FOR REV. 26	AVERAGE MONTHLY FACILITY GENERATIONS (10/98 - 9/99)
TANK FARMS	10.0	10.0	4.8
WESF	N/A	0.5	0.33
PUREX	N/A	0.4	0.0
T PLANT	6.0	~0.2	0.0
222-S LABORATORY	5.0	~1.0	0.17
300 AREA	5.0	~0.2	0.0
400 AREA	0.0	0.0	0.0
TOTAL	64.0	12.3	5.3

Notes:

Monthly Total does not include terminal clean-out volumes or salt well liquid pumping
WESF = Waste Encapsulation and Storage Facility

All waste generators are at or below their new waste generation target for the period October 1998 through September 30, 1999. A comparison of the volumes of waste entering the DST tank space for that time period is compared graphically to the various targets or projected generations in Figures 18-21.



TARGET		10/98	11/98	12/98	1/99	2/99	3/99	4/99	5/99	6/99	7/99	8/99	9/99	10/99	11/99	12/99	1/00	2/00	3/00	4/00	5/00	6/00	7/00	8/00	9/00	10/00	11/00	12/00
300 AREA	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
400 AREA	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
222-S LAB	1.0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0						
T PLANT	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
WESF	0.5	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0						
PUREX	0.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
TANK FARMS	10.0	4	1	2	5	0	16	4	6	5	8	7	0	4	3	6	0	0	0	1	46	8						
TOTAL	12.3	4	1	2	5	0	17	4	7	5	12	7	0	4	3	6	0	0	0	1	46	8						

NOTE: THIS GRAPHIC DEPICTS CONTRIBUTIONS FROM FACILITY GENERATIONS; TERMINAL CLEAN-OUT AND SWL PUMPING IS NOT SHOWN

Figure 18. Comparison of Facility Generations to "TARGET"

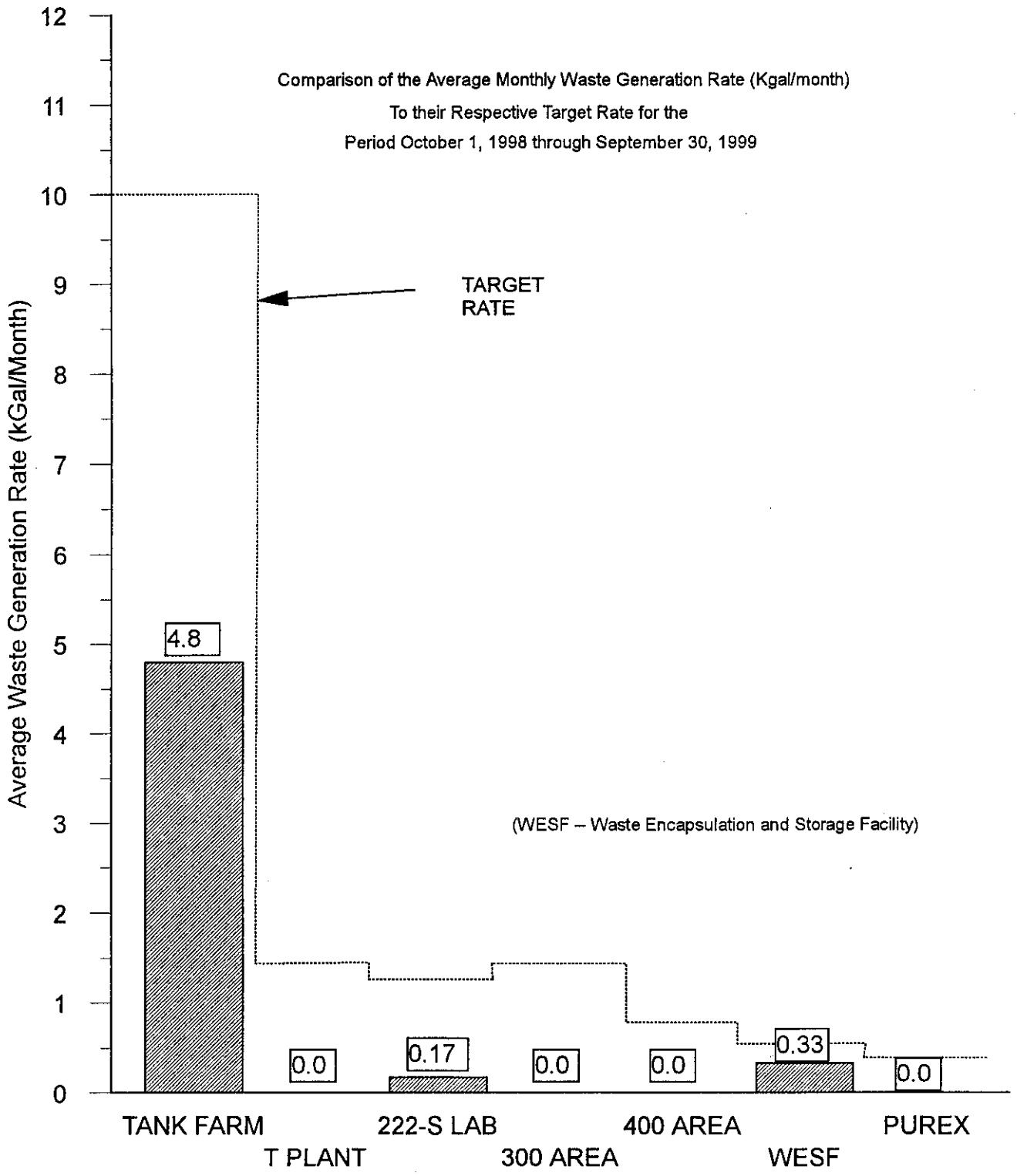
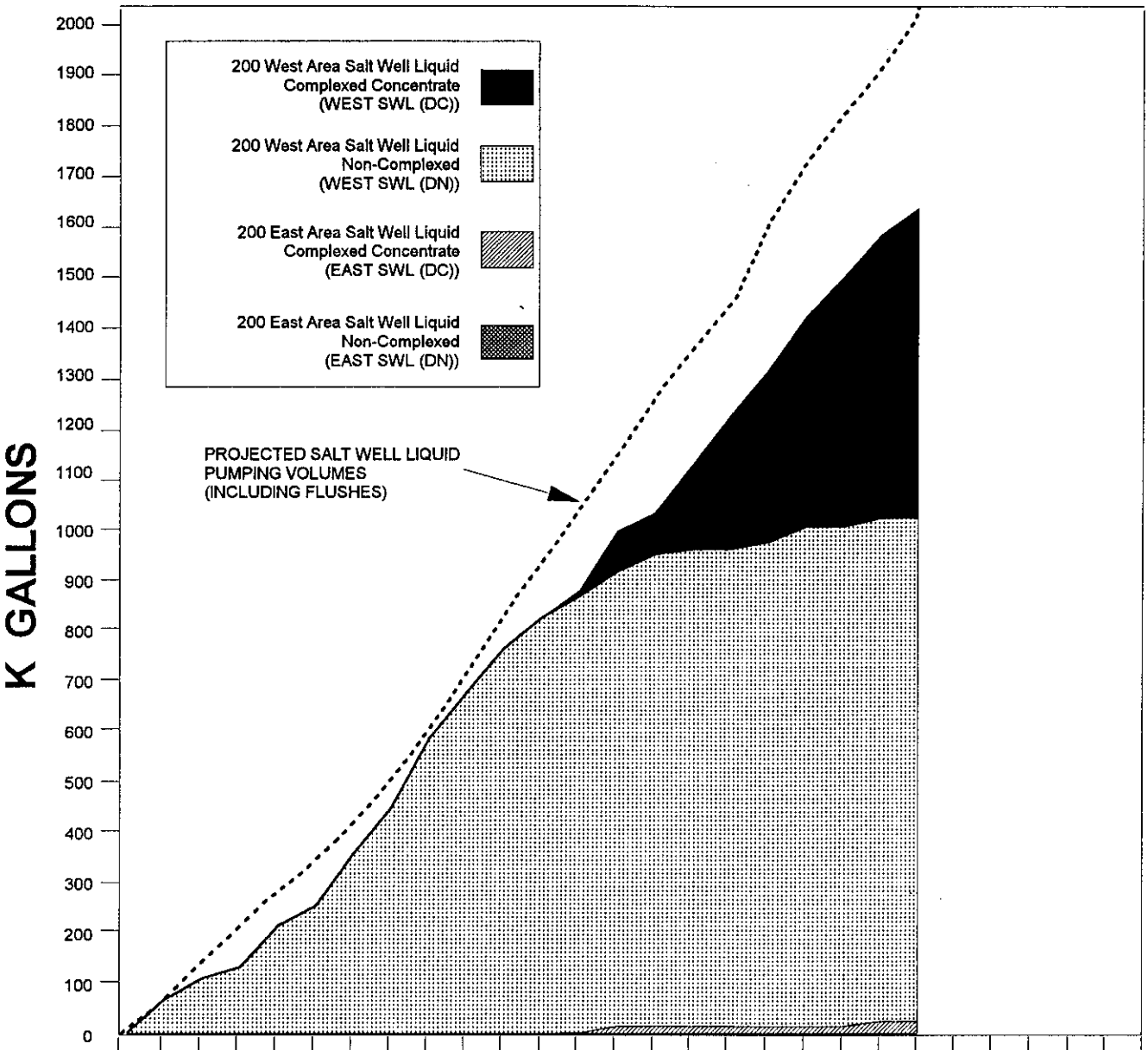


Figure 19. Comparison of Monthly Average Waste Generation To Target Rate



	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
WEST SWL (DC)	0	0	0	0	0	0	0	0	0	0	0	12	70	2	86	98	77	77	80	68	54						
WEST SWL (DN)	69	42	22	84	40	108	89	141	92	90	62	43	36	34	10	1	15	31	0	8	0						
EAST SWL (DC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
EAST SWL (DN)	0	0	0	0	0	0	0	0	0	0	0	1	14	0	0	0	0	0	0	10	0						

FY 1999 FY 2000

Figure 20. Contributions From Salt Well Liquid Pumping

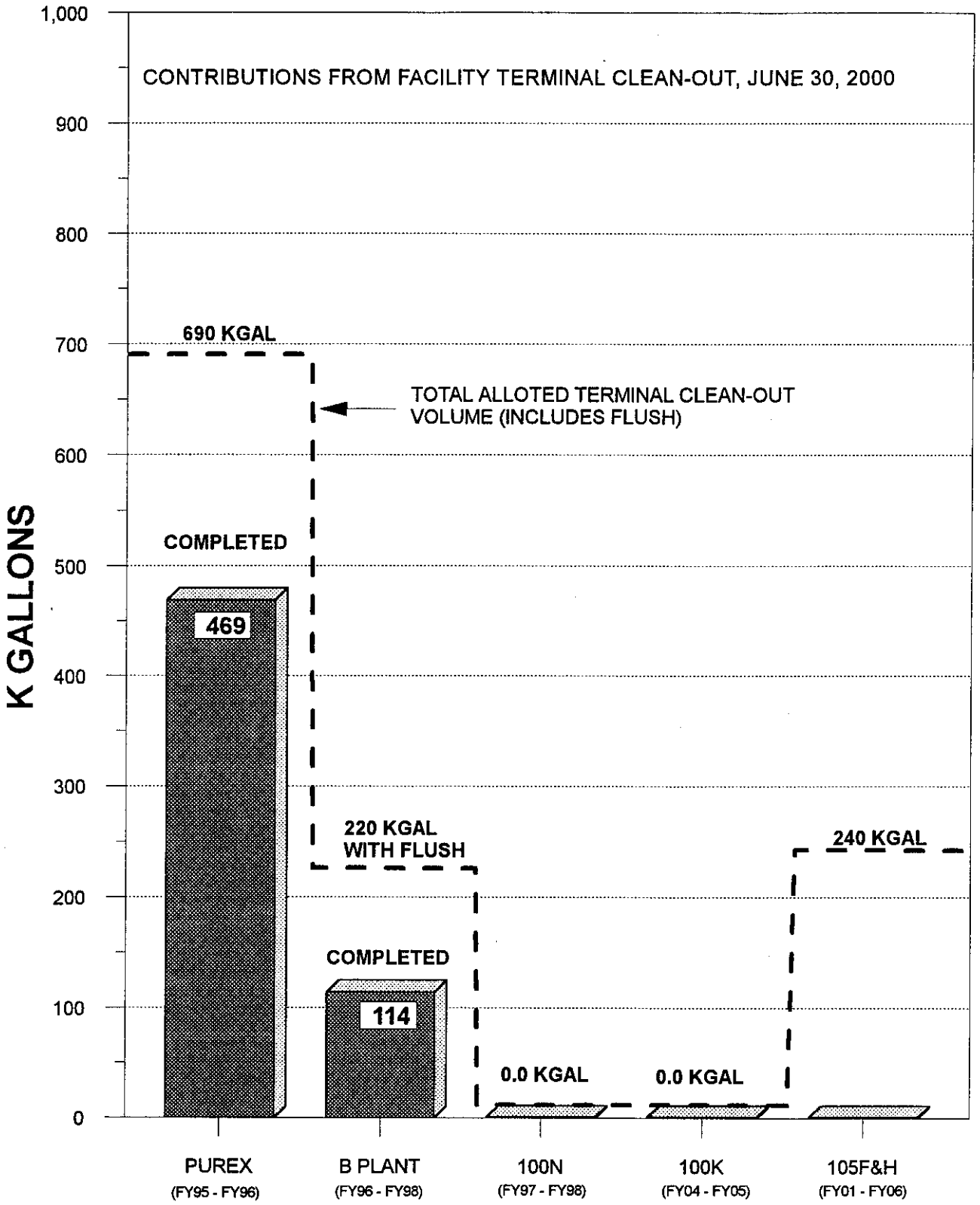


Figure 21. Contributions From Terminal Clean-Out (June 30, 2000)

6.0 SPACE SAVING ALTERNATIVES

In the near term, space saving alternatives include waste minimization, continued availability of the 242-A Evaporator, Liquid Effluent Retention Facility availability, and the operation of the Effluent Treatment Facility. These alternatives must be considered because new inputs to the system may develop (e.g., unexpected new waste streams or a leaking SST or DST).

Should a tank space shortage develop in the period 2000 through 2018, response to the shortage for the projection cases would most likely be in one of three areas. The inflows to the system must be reduced, the outflows to the system must be increased (or started earlier), or the available tank space increased. Inflows to the system include miscellaneous facility waste generations, terminal clean-out wastes, dilution of tank SY-103 (for processing), processing, salt well liquid pumping, and SST retrieval. Outflows include the 242-A Evaporator and waste disposal (processing and vitrification). Increasing the tank space available could be done by building more tanks (a six to eight year task), mixing segregated waste types (which would gain about half a million gallons of space), or operating without reserved emergency tank space.

In addition to minimizing waste generations, other actions could be pursued. The list below includes many actions which can result in tank space savings and can serve as a starting point in a tank space optimization program. A special trade study was completed in FY 1999 to assess the space savings, costs, and risks associated with some of the space saving alternatives mentioned below (Garfield, 1999).

PUREX Facility

- Terminal clean-out of PUREX was completed in FY 1997. Therefore, waste reductions for PUREX will not be a viable option.
- Continue to reduce waste being generated

Waste Encapsulation and Storage Facility, 222-S Laboratory, T Plant, 300 Area

- Continue to reduce waste being generated
- Reduce or eliminate flush volumes following low-level waste transfers to DSTs

Plutonium Finishing Plant

- Continue to reduce waste being generated at PFP (only 33 Kgal of total waste are scheduled to be generated from FY 2000-2012)

6.0 SPACE SAVING ALTERNATIVES (CONTINUED)

Tank Farms

- Reclassification/treatment of Watch List Tank SY-103 could allow dilution of the tank with salt well liquid (gain approximately 390 Kgal of storage)
- Develop treatment capabilities parallel with operations of the LAW plant to reduce the volume of waste remaining in the DSTs, to allow more SST backfill activities.
- Continue to reduce waste being added to DSTs
- Continue waste accountability and minimization controls
- Eliminate all waste receipts (total waste cutoff plan)
- Increase the 5 M Na limitation on aging waste tanks
- Use dilute waste for retrieval, air lift circulator flushes, line flushes, etc.
- Increase the waste volume reduction of the 242-A Evaporator
- Accelerate plans to consolidate solids from tanks SY-102 into tank AZ-101
- Do not allow the return of wastes from the waste treatment plant to DSTs
- Allow addition of wastes to early feed tank headspace
- Build new tanks
- Delay salt well liquid pumping
- Store waste receipts in designated emergency space (used in an extreme emergency)
- Solidify treated waste and dispose of as low level waste in burial grounds
- Consolidate neutralized current acid waste and tank C-106 solids in one aging tank with one additional aging tank being used to combine neutralized current acid waste supernates (requires modification of safety basis).
- Concentrate double-shell slurry feed to double-shell slurry. Experience with tank SY-101 makes this alternative highly unlikely.
- Store waste in single-shell tanks (would require approval by DOE, the U.S. Environmental Protection Agency, and Washington State Department of Ecology)
- Store waste in facility storage tanks or portable tanks such as railcars (used in an extreme emergency; total space available is small compared to the contents of a DST)
- Upgrade single-shell tanks by adding a liner to allow storage of waste

Grout

- Reinstate the Grout Disposal Program to grout the existing waste in tanks AP-102 and AW-101

7.0 CONCLUSIONS

The 1998 OWVP (Rev. 24) document stated in the risk assessment table (Table 2) that if the LAW Phase 1 waste treatment did not start in FY 2002 and process 2.2 Mgal per year or if Phase 2 processing did not start in FY 2011 and process 24.1 Mgal/yr, that the SST retrieval schedule would have to be delayed (due to lack of space). The 1999 OWVP (Rev. 25) Case 1 projection incorporated a TPA Compliant SST retrieval schedule that exceeded available space beginning in FY 2004.

Recent schedule slippages in the waste treatment and vitrification start date and decreases in the waste treatment rate in the RPP project integration office guidance received in March 2000 (PIO 2000) have impacted the amount of space in DSTs that will be available for SST retrieval. The delay in the start of LAW processing and the lower waste treatment rates have decreased the space available for SST retrieval. The retrieval and dilution of tank SY-101 in FY 2000 to resolve the safety issue has further decreased the space available for SST retrieval. This year the Case 1 projection incorporated a new TPA Compliant SST retrieval schedule that retrieved waste from SSTs with the smaller residual volumes first to meet the TPA milestones for number of tanks started each year while trying to stay within the available DST space for a longer period of time. A review of the space needs with and without SST retrieval follows:

Projected Tank Needs Without Additional Single-Shell Tank Retrieval

Without SST retrieval refers to no additional SST waste retrieval beyond those wastes scheduled to be retrieved for Phase 1 and extended order waste processing feed. Cases 1 and 2 would need to retrieve SST wastes from tanks C-106, C-104, C-107, S-102, S-103, and S-105 during Phase 1 and the extended order to meet feed requirements. A review of the Case 1 and 2 projections completed in this document indicate that tank space is available to meet the needs of waste feed delivery for Phase 1 and the extended order. In other words, no new tanks are required if SST retrieval is reduced to those tanks mentioned above.

The projected tank space need with only those SST wastes retrieved to support Phase 1 can be used to determine the space available for SST Retrieval. The number of tanks available for SST Retrieval must consider both the DST inventory and the future use of tanks as intermediate feed staging tanks. The space available for SST retrieval is shown in Table 20.

Table 20. Number of Double-Shell Tanks Available for Single-Shell Tank Retrieval Waste (numbers of tanks are not additive)

Fiscal Year	Number of Double-Shell Tanks Available
2004	2
2005	2
2006	2
2007	2
2008	2
2009	2
2010	2
2011	2
2012	4
2013	4
2014	4
2015	5
2016	6
2017	7
2018	8

Projected Tank Needs With Tri-Party Agreement Compliant Single-Shell Tank Retrieval (Projection Case 1)

The Case 1 TPA Compliant SST retrieval schedule will meet TPA milestones through 2009 without exceeding available space. By 2010 it was necessary to begin retrieving some of the SST tanks with larger volumes in order to meet the retrieval of all SST wastes by 2018. This caused the projected DST space need to exceed available space:

-by four tanks by the end of FY 2010
-by thirteen tanks total by the end of FY 2011
-by twenty-three tanks total by the end of FY 2012
-by eighty-seven tanks total by the end of FY 2018

In projection Cases 1 and 2, the Phase 1 extended order waste treatment will be processing DST waste until approximately 2017 and very little SST retrieval wastes could be processed which accounts for the large number of additional tanks that would be required. If the TPA compliant

SST retrieval schedule is to be met and the waste treatment schedule cannot be increased, additional DSTs will have to be built.

Need for Additional Double-Shell Tanks

Last year's OWVP identified the need for up to 79 new DSTs by 2018 if SST retrieval TPA milestones were to be met. Since the last revision a year ago, the number of DST's needed has grown to 87 new DSTs. Most of this increase is attributed to the reduced processing rate for vitrification and additional waste generated by resolution of the SY-101 safety issue during the last year. Table 21 shows the schedule, number of double shell tanks to be started and funding requirements. Four tanks are needed by the start of fiscal year 2010.

Cost estimates for building new DST's were completed during 1993-1994 to support new tank construction (project W-236A). Recent discussions about current estimates with some of the W-236A staff members resulted in a rough estimate of around $75 million in today's dollars to build a simplified version of the tank designed seven years ago for project W-236A. Project W-236A used six years from design to construction complete. The total cost using year 2000 dollars would be on the order of $6.5 billion dollars to build the 87 tanks needed by 2018. In order to calculate total cost for the job on a yearly cost basis, the Project W236A construction and cost schedule was used and was for year 1 (1%), year 2 (7%), year 3 (25%), year 4 (35%), year 5 (31%) and year 6 (1%).

The cost and schedule presented represent only the costs to design and procure new tanks (capital line item). The schedule represents the standard times for performing conceptual designs, title II design, and construction based on Project W-236A. It assumes that funding for this will be obtained when requested. In recent experience, for a project of this cost, it may take several years to obtain the authorization and funding necessary for a line item of this magnitude. The costs also do not reflect the life cycle costs of the additional tanks. Specifically, additional costs would be incurred for the following items:

- Readiness Review/acceptance of the new tanks
- Operations of the new tank farms (it is assumed that the tanks would be grouped in farms, rather than built on an 'as needed' basis as presented, to minimize operational expenses). These expenses include added surveillances and maintenance of the new tank farm facilities.
- Cleanout of the new tank systems at the end of their use
- Closure of the new tank systems, assuming clean closure cannot be achieved.
- Post closure monitoring of the new tank systems.

These additional costs will likely exceed the initial cost of construction of the new tanks. The presentation in this section is to present a general feel for the number of new tanks and relative construction costs associated with these. Should the decision be made to build new tanks, a complete life cycle cost estimate will be performed to assess the optimum number and grouping (e.g. number of new farms) that may be needed prior to proceeding with design.

The first four new tanks are required to be available for use by the start of fiscal year 2010. That means that funding would be needed to start this project by fiscal year 2003. It is expected that the funding request would start in FY 2001 so that design can be started by 2003 to meet the construction complete schedule of 2009. Project staff needs to start planning for this new work

next fiscal year. As can be seen from Table 21, significant funding will be needed prior to the need dates for the new tanks. Funding needs are shown in Table 21.

Table 21. Number of New Double-Shell To be Constructed and Funding Required ($M) to Meet Space Needs for the Case 1 Projection

Fiscal Year	New Double-Shell Tanks	Funding Required ($M)
2001		0
2002		0
2003		2
2004		3
2005		28
2006		130
2007		336
2008		591
2009	4	784
2010	9	990
2011	10	992
2012	12	994
2013	14	856
2014	14	586
2015	13	272
2016	9	53
2017	2	2

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APPENDIX A

Transfers for Projections in FY 1999-2001

Appendix A-1 Acronyms used in transaction list - Page 1 of 2

ZNL87	COMBINED PFP WASTE STREAM(NO TRUEX)
ZTL87	COMBINED PFP WASTE STREAM(TRUEX)
ZNS87	COMBINED PFP SOLIDS
ZTS87	COMBINED PFP SOLIDS
PAW88	PUREX NCAW FROM THE PROCESSINGOF NPR FUEL
PDL89	PUREX DECLADDING WASTE STREAM(FY 1989 ON)
PDS89	PUREX DECLADDING SOLIDS(FY 1989 ON - NON-TRU SOLIDS)
PML89	PUREX SPENT METHATHESIS WASTE(FY 1989 ON)
PMS89	PUREX SPENT METHATHESIS SOLIDS(FY 1989 ON - TRU SOLIDS)
PMW88	PUREX MISC. WASTEFROM PROCESSING NPR FUEL
PASF	PUREX AMMONIUM SCRUBBER FEED
PXTCO	PUREX TCO WASTES
AWSC	AGING WASTE STEAM CONDENSATE
AWPC	AGING WASTE PROCESS CONDENSATE
SPN87	S PLANT DILUTE NON-COMPLEXED
WNE88	SALT WELL LIQUIDDILUTE, NON-COMPLEXED
WCE88	SALT WELL LIQUIDCOMPLEXED
WNW88	SALT WELL LIQUIDDILUTE, NON-COMPLEXED
WCW88	SALT WELL LIQUIDCOMPLEXED
TAL88	T PLANT SUPERNATE(AS IS MODE)
TNS88	T PLANT SOLIDS(NO TRUEX - TRU SOLIDS)
1FL96	105-F, 105-H, & 100-N LIQUID TCOWASTE
1KL96	100-K LIQUID TCO WASTE
1NS96	100-AREA SOLID TCO WASTE
34L87	300/400 AREA LAB WASTE
PWAT	PRETREATMENT DILN. ENTERED AS SF
EVAPF	EVAPORATOR FLUSH AND TANK FARMWATER
ERD31	ENVIR. RESTOR. DISP. FAC. TRENCH31 LEACHATE
BPN89	B PLANT MISCELLANEOUS WASTE
BPTCO	B PLANT TCO WASTE
BVC87	B PLANT VESSEL CLEANOUT
BCD87	B PLANT CELL DRAINAGE
BPT89	B PLANT CATCH TANK WASTE
BPDCV	B PLANT DILUTE COMPLEXED VESSELCLEAN OUT
BNS7	B PLANT AGING WASTEFROM NCAW PROCESSING ALL TANKS
BNL7	B PLANT SUPERNATEFROM NCAW PROCESSING
PCWAT	PRETREATMENT DILN. COMPLEXED ENTERED AS CC
BCIS7	B PLANT SOLID STREAMFROM PROCESSING OF CC WASTE
BPL88	B PLANT LIQUID STREAMFROM PFP PROCESSING (COMBINED)
BPS88	B PLANT SOLIDS STREAMFROM PFP PROCESSING
BPCU7	B PLANT SOLID STREAMSUPERNATE
HWV87	HWVP WASTE
CCSL	CONCENTRATED COMPLEXANT SOLIDS
WATER	FLUSH WATER
XSWAT	CROSS-SITE TRANSFER WATER
RWAT	RETRIEVAL WATER FOR DST WASTE
SWAT	RETRIEVAL WATER FOR SST SOLIDS RETRIEVAL
SSTSL	SST SLUDGE
SSTSC	SST SALTCAKE
WSSTL	WASHED SST LIQUID
WSSTS	WASHED SST SOLID
PSSTL	PRETREATED SST LIQUID
PSSTS	PRETREATED SST SOLID
1ANDN	AN101 INVENTORY

Appendix A-1 Acronyms used in transaction list (continued)- Page 2 of 2

2ANCC	AN102 INVENTORY
3ANSF	AN103 INVENTORY
3ANSL	AN103 INVENTORY
4ANSF	AN104 INVENTORY
4ANSL	AN104 INVENTORY
5ANSF	AN105 INVENTORY
5ANSL	AN105 INVENTORY
6ANCC	AN106 INVENTORY
7ANCC	AN107 INVENTORY
7ANSL	AN107 INVENTORY
1APSF	AP101 INVENTORY
2APCP	AP102 INVENTORY
3APDN	AP103 INVENTORY
4APDN	AP104 INEVNTORY
5APSF	AP105 INVENTORY
5APSL	AP105 INVENTORY
6APDN	AP106 INVENTORY
7APDN	AP107 INVENTORY
8APDC	AP108 INVENTORY
8APDN	AP108 INVENTORY
1AWSF	AW101 INVENTORY
1AWSL	AW101 INVENTORY
2AWDC	AW102 INVENTORY
3AWDN	AW103 INVENTORY
3AWPD	AW103 INVENTORY
4AWDN	AW104 INVENTORY
4AWSL	AW104 INVENTORY
5AWDN	AW105 INVENTORY
5AWPD	AW105 INVENTORY
6AWCC	AW106 INVENTORY
1AYDC	AY101 INVENTORY
1AYAW	AY101 INVENTORY
2AYDN	AY102 INVENTORY
1AZAW	AZ101 INVENTORY
2AZAW	AZ102 INVENTORY
1SYCC	SY101 INVENTORY
2SYDN	SY102 INVENTORY
2SYPT	SY102 INVENTORY
3SYCC	SY103 INVENTORY
HCFIN	HIGH CONCENTRATION FACTOR INVENTORY
LCFIN	LOW CONCENTRATION FACTOR INVENTORY
DSSF	DOUBLE-SHELL SLURRY FEED
TCO	ESTIMATED WVRF FOR TCO WASTES
7ANDN	AN107 CAUSTIC
INTWA	IN TANK WASHING SOLNS.
IMUST	INDEP. MISC UNDERGR. STORAGE TANKWASTE
SRRTN	Sr Return Stream/Entrained Solids/TRU from Pretreatment
WESF	WESF WASTES
UNKN	CHANGE DUE TO GAS, SURFACE CHG.,INSTRUMENT,ETC
NAOH	CONCENTRATED NAOH
INST	CHANGE DUE TO INSTRUMENT
ADJUS	ADJUST WASTE MAKEUP USUALLY DUE TO NEW SOLIDS MEAS.
AWSOL	AGING WASTE OR HIGH HEAT SOLIDS
CAUST	Caustic Wash

Appendix A-2: Transactions for Projection Case 1 through Fiscal Year 2000 - Page 1 of 8
Transactions through 9/30/1999 are historical records.

		FROM	TO	START DATE	STOP DATE	QUANTITY	WASTE TYPE	TOTAL TANK INVENTORY
SUBFILE: AY101								
	GA	1AYDC	AY101	10/1/96	9/30/97	37	DC	37
	GA	1AWSL	AY101	10/1/96	9/30/97	108	SL	145
	LO	AY101	UNKN	10/2/97	9/30/98	-6	DC	139
	GA	WATER	AY101	4/5/98	4/6/98	31	DC	170
	LO	AY101	UNKN	10/1/98	12/30/99	-3	DC	167
	LO	AY101	UNKN	1/1/99	3/30/99	-4	DC	163
	LO	AY101	UNKN	4/1/99	6/30/99	-4	DC	159
	LO	AY101	UNKN	7/1/99	9/30/99	-5	DC	154
	LO	AY101	UNKN	10/1/99	11/30/99	-2	DC	152
	LO	AY101	UNKN	12/1/99	1/31/00	-3	DC	149
SUBFILE: AY102								
	GA	2AYDN	AY102	10/1/96	9/30/97	820	DN	820
	GA	1AWSL	AY102	10/1/96	9/30/97	22	SL	842
	LO	AY102	UNKN	10/2/97	5/31/98	-9	DN	833
	GA	NAOH	AY102	6/1/98	6/30/98	8	DN	841
	GA	NAOH	AY102	7/1/98	7/30/98	13	DN	854
	LO	AY102	UNKN	7/1/98	9/30/98	-6	DN	848
	TR	AY102	102AW	7/15/98	7/31/98	-389	DN	459
	LO	AY102	UNKN	10/1/98	12/31/98	-5	DN	454
	GA	SSTSL	AY102	10/2/98	12/30/98	9	SS	463
	LO	AY102	UNKN	1/1/99	3/31/99	-55	DN	408
	GA	SSTSL	AY102	1/1/99	3/30/99	61	SS	469
	GA	SSTSL	AY102	4/1/99	7/30/99	59	SS	528
	GA	WATER	AY102	4/1/99	6/30/99	23	DN	551
	GA	WATER	AY102	7/1/99	9/30/99	6	DN	557
	GA	SSTSL	AY102	7/2/99	9/30/99	65	SS	622
	LO	AY102	UNKN	10/1/99	10/31/99	-5	DN	617
	LO	AY102	UNKN	11/1/99	11/30/99	-2	DN	615
	LO	AY102	UNKN	12/1/99	12/31/99	-2	DN	613
	LO	AY102	UNKN	1/1/00	1/31/00	-2	DN	611
SUBFILE: AZ101								
	GA	1AWSL	AZ101	10/1/96	9/30/97	47	SL	47
	GA	1AZAW	AZ101	10/1/96	9/30/97	850	AW	897
	LO	AZ101	UNKN	10/1/97	9/30/98	-62	AW	835
	GA	WATER	AZ101	10/1/98	12/30/98	14	AW	849
	LO	AZ101	UNKN	1/1/99	3/30/99	-3	AW	846
	LO	AZ101	UNKN	3/1/99	6/30/99	-1	AW	845
	GA	WATER	AZ101	10/1/99	10/31/99	1	DN	846
	GA	WATER	AZ101	12/1/99	12/31/99	3	DN	849
SUBFILE: AZ102								
	GA	1AWSL	AZ102	10/1/96	9/30/97	104	SL	104
	GA	2AZAW	AZ102	10/1/96	9/30/97	784	AW	888
	GA	WATER	AZ102	10/3/97	9/30/98	1	AW	889
	GA	WATER	AZ102	10/1/98	12/31/98	9	AW	898
	GA	WATER	AZ102	1/1/99	3/30/99	10	AW	908
	GA	WATER	AZ102	4/1/99	6/30/99	11	AW	919
	GA	WATER	AZ102	7/1/99	9/30/99	12	AW	931
	GA	WATER	AZ102	10/1/99	10/31/99	5	DN	936
	GA	WATER	AZ102	11/1/99	11/30/99	5	DN	941

NOTES: GA = GAIN RECORD
TR = TRANSFER RECORD
LO = LOSS RECORD

Appendix A-2: Transactions for Projection Case 1 through Fiscal Year 2000 - Page 2 of 8
Transactions through 9/30/1999 are historical records.

		FROM	TO	START DATE	STOP DATE	QUANTITY	WASTE TYPE	TOTAL TANK INVENTORY
SUBFILE: AZ102 (continued)								
	LO	AZ102	UNKN	12/1/99	12/31/99	-1	DN	940
	GA	WATER	AZ102	1/1/00	1/31/00	7	DN	947
	LO	AZ102	UNKN	2/1/00	2/29/00	-1	DN	946
SUBFILE: SY101								
	GA	1AWSL	SY101	10/1/96	9/30/97	605	SL	605
	GA	1SYCC	SY101	10/1/96	9/30/97	516	CC	1121
	GA	UNKN	SY101	10/2/97	9/30/98	29	CC	1150
	GA	WATER	SY101	6/20/98	6/21/98	1	CC	1151
	GA	UNKN	SY101	10/1/98	12/1/98	19	CC	1170
	GA	UNKN	SY101	1/1/99	3/30/99	20	CC	1190
	LO	SY101	UNKN	7/1/99	9/30/99	-1	CC	1189
	LO	SY101	UNKN	10/1/99	10/31/99	-4	CC	1185
	LO	SY101	UNKN	11/1/99	11/30/99	-2	CC	1183
	GA	WATER	SY101	12/1/99	12/31/99	3	DN	1186
	TR	SY101	SY102	12/18/99	12/20/99	-89	CC	1097
	LO	SY101	ADJUS	12/19/99	12/21/99	-16	CC	1081
	GA	RWAT	SY101	12/19/99	12/31/99	62	CC	1143
	GA	UNKN	SY101	12/21/99	12/31/99	4	DN	1147
	TR	SY101	SY102	1/25/00	1/27/00	-241	CC	906
	LO	SY101	UNKN	1/26/00	1/31/00	-80	CC	826
	GA	RWAT	SY101	1/28/00	1/31/00	79	CC	905
	GA	UNKN	SY101	2/1/00	2/29/00	2	CC	907
	GA	RWAT	SY101	2/21/00	2/23/00	161	CC	1068
	TR	SY101	SY102	2/28/00	2/29/00	-162	CC	906
	TR	SY101	SY102	3/1/00	3/31/00	-124	CC	782
	GA	RWAT	SY101	3/2/00	3/31/00	223	CC	1005
	LO	SY101	UNKN	3/3/00	3/31/00	-21	CC	984
SUBFILE: SY102								
	GA	2SYPT	SY102	10/1/96	9/30/97	88	PT	88
	GA	2SYDN	SY102	10/1/96	9/30/97	645	DN	733
	LO	102SY	UNKN	1/1/98	5/31/98	-2	DN	731
	GA	XSWAT	SY102	2/1/98	2/28/98	5	DN	736
	GA	WNW88	SY102	6/1/98	6/30/98	7	DN	743
	GA	EVAPF	SY102	6/1/98	6/30/98	2	DN	745
	GA	SPN87	SY102	6/1/98	6/30/98	3	DN	748
	LO	SY102	UNKN	7/1/98	9/30/98	-2	DN	746
	GA	WNW88	SY102	7/1/98	7/31/98	24	DN	770
	GA	SPN87	SY102	7/1/98	7/31/98	3	DN	773
	GA	WATER	SY102	7/1/98	7/31/98	4	DN	777
	GA	WATER	SY102	8/1/98	8/31/98	7	DN	784
	GA	WNW88	SY102	8/1/98	8/31/98	50	DN	834
	GA	WNW88	SY102	9/1/98	9/30/98	8	DN	842
	GA	SPN87	SY102	9/1/98	9/30/98	1	DN	843
	GA	WATER	SY102	9/1/98	9/30/98	1	DN	844
	LO	102SY	UNKN	9/1/98	9/30/98	-1	DN	843
	GA	WNW88	SY102	10/1/98	10/31/98	50	DN	893
	GA	WATER	SY102	10/1/98	10/31/98	19	DN	912
	GA	WNW88	SY102	11/1/98	11/30/98	30	DN	942
	GA	WATER	SY102	11/1/98	11/30/98	11	DN	953
	GA	WNW88	SY102	12/1/98	12/31/98	15	DN	968
	GA	WATER	SY102	12/1/98	12/31/98	6	DN	974

Appendix A-2: Transactions for Projection Case 1 through Fiscal Year 2000 - Page 3 of 8
Transactions through 9/30/1999 are historical records.

	FROM	TO	START DATE	STOP DATE	QUANTITY	WASTE TYPE	TOTAL TANK INVENTORY
SUBFILE: SY102 (continued)							
GA	WATER	SY102	1/1/99	1/31/99	24	DN	998
GA	WNW88	SY102	1/1/99	1/31/99	60	DN	1058
GA	WATER	SY102	2/1/99	2/28/99	11	DN	1069
GA	WNW88	SY102	2/1/99	2/28/99	28	DN	1097
GA	WATER	SY102	3/1/99	3/31/99	30	DN	1127
GA	WNW88	SY102	3/1/99	3/31/99	78	DN	1205
GA	SPN87	SY102	3/8/99	3/9/99	1	DN	1206
TR	SY102	AP107	3/9/99	3/10/99	-141	DN	1065
GA	WNW88	SY102	4/1/99	4/30/99	68	DN	1133
GA	WATER	SY102	4/1/99	4/30/99	27	DN	1160
TR	SY102	AP107	4/1/99	4/9/99	-491	DN	669
GA	WNW88	SY102	5/1/99	5/31/99	102	DN	771
GA	WATER	SY102	5/1/99	5/31/99	39	DN	810
GA	SPN87	SY102	5/11/99	5/12/99	1	DN	811
GA	WATER	SY102	6/1/99	6/30/99	26	DN	837
GA	WNW88	SY102	6/1/99	6/30/99	66	DN	903
GA	WNW88	SY102	7/1/99	7/31/99	65	DN	968
GA	WATER	SY102	7/1/99	7/31/99	25	DN	993
GA	WATER	SY102	8/1/99	8/30/99	33	DN	1026
GA	WNW88	SY102	8/1/99	8/30/99	29	DN	1055
TR	SY102	AP107	8/26/99	8/29/99	-266	DN	789
TR	SY102	AP108	8/29/99	8/31/99	-228	DN	561
GA	WATER	SY102	9/1/99	9/30/99	25	DN	586
GA	WNW88	SY102	9/1/99	9/30/99	33	DN	619
TR	SY102	AP108	9/1/99	9/2/99	-7	DN	612
GA	WNW88	SY102	10/1/99	10/31/99	58	DN	670
GA	WATER	SY102	10/2/99	10/31/99	48	DN	718
GA	UNKN	SY102	11/1/99	11/30/99	2	DN	720
GA	WCW88	SY102	11/1/99	11/30/99	1	DC	721
GA	WNW88	SY102	11/1/99	11/30/99	13	DN	734
GA	WATER	SY102	11/2/99	11/30/99	1	DC	735
GA	WATER	SY102	11/2/99	11/30/99	21	DN	756
GA	WNW88	SY102	12/1/99	12/31/99	4	DN	760
LO	SY102	UNKN	12/1/99	12/31/99	-4	DN	756
GA	WCW88	SY102	12/1/99	12/31/99	38	DC	794
GA	WATER	SY102	12/2/99	12/31/99	6	DN	800
GA	WATER	SY102	12/2/99	12/31/99	48	DC	848
GA	RWAT	SY102	12/19/99	12/21/99	84	CC	1021
GA	WATER	SY102	1/1/00	1/31/00	54	DC	1075
LO	SY102	UNKN	1/1/00	1/31/00	-23	DN	1052
GA	WCW88	SY102	1/1/00	1/31/00	44	DC	1096
GA	WNW88	SY102	1/1/00	1/31/00	1	DN	1097
GA	WATER	SY102	1/2/00	3/30/00	1	DN	1098
TR	SY102	AP104	1/11/00	1/21/00	-513	CC	585
GA	RWAT	SY102	1/26/00	1/27/00	198	CC	1024
GA	WCW88	SY102	2/1/00	2/28/00	33	DC	1057
GA	RWAT	SY102	2/1/00	2/28/00	45	DC	1102
GA	WATER	SY102	2/1/00	2/28/00	11	DN	1113
GA	WNW88	SY102	2/1/00	2/28/00	3	DN	1116
LO	SY102	UNKN	2/3/00	2/29/00	-5	DN	1111
TR	SY102	AP104	2/10/00	2/19/00	-511	CC	600
GA	RWAT	SY102	2/28/00	2/29/00	58	CC	658
GA	WATER	SY102	3/1/00	3/31/00	54	DC	998

Appendix A-2: Transactions for Projection Case 1 through Fiscal Year 2000 - Page 4 of 8
Transactions through 9/30/1999 are historical records.

	FROM	TO	START DATE	STOP DATE	QUANTITY	WASTE TYPE	TOTAL TANK INVENTORY
SUBFILE: SY102 (continued)							
GA	WNW88	SY102	3/1/00	3/31/00	14	DN	1012
GA	WCW88	SY102	3/1/00	3/31/00	63	DC	1075
GA	WATER	SY102	3/1/00	3/31/00	17	DN	1092
TR	SY102	AP106	3/22/00	3/28/00	-504	DC	588
GA	WATER	SY102	4/1/00	4/30/00	7	DN	595
GA	WNW88	SY102	4/1/00	4/30/00	4	DN	599
GA	WATER	SY102	4/1/00	4/30/00	51	DC	650
GA	WCW88	SY102	4/1/00	4/30/00	49	DC	699
GA	SPN87	SY102	4/1/00	6/30/00	3	DN	702
GA	WATER	SY102	4/2/00	6/30/00	1	DN	703
GA	WATER	SY102	5/1/00	5/31/00	15	DC	718
GA	WNW88	SY102	5/1/00	5/31/00	16	DN	734
GA	WATER	SY102	5/1/00	5/31/00	30	DN	764
GA	SPN87	SY102	5/1/00	5/31/00	3	DN	767
GA	ZNL87	SY102	5/1/00	5/31/00	2	DN	769
GA	WCW88	SY102	5/1/00	5/31/00	18	DC	787
GA	WNW88	SY102	6/1/00	6/30/00	12	DN	799
GA	WATER	SY102	6/1/00	6/30/00	21	DN	820
GA	WCW88	SY102	6/1/00	6/30/00	30	DC	850
GA	WATER	SY102	6/1/00	6/30/00	17	DC	867
GA	WATER	SY102	7/1/00	7/31/00	18	DN	885
GA	WATER	SY102	7/1/00	7/31/00	21	DC	906
GA	SPN87	SY102	7/1/00	9/30/00	2	DN	908
GA	WCW88	SY102	7/1/00	7/31/00	42	DC	950
GA	WNW88	SY102	7/1/00	7/31/00	12	DN	962
GA	WATER	SY102	8/1/00	8/31/00	21	DN	983
GA	WCW88	SY102	8/1/00	8/31/00	28	DC	1011
GA	WATER	SY102	8/1/00	8/31/00	17	DC	1028
GA	WNW88	SY102	8/1/00	8/31/00	37	DN	1065
GA	WATER	SY102	9/1/00	9/30/00	14	DC	1079
GA	WATER	SY102	9/1/00	9/30/00	23	DN	1102
GA	WCW88	SY102	9/1/00	9/30/00	20	DC	1122
GA	WNW88	SY102	9/1/00	9/30/00	56	DN	1178
TR	SY102	AP106	9/3/00	9/10/00	-480	DC	698
SUBFILE: SY103							
GA	3SYCC	SY103	10/1/96	9/30/97	386	CC	386
GA	1AWSL	SY103	10/1/96	9/30/97	362	SL	748
LO	SY103	UNKN	10/2/97	9/30/98	-2	CC	746
LO	SY103	UNKN	10/1/98	9/30/99	-2	CC	744
SUBFILE: AW101							
GA	1AWSL	AW101	10/1/96	9/30/97	306	SL	306
GA	1AWSF	AW101	10/1/96	9/30/97	820	SF	1126
LO	AW101	UNKN	11/1/97	11/30/97	-1	SF	1125
GA	UNKN	AW101	10/1/98	9/30/99	1	SF	1126
SUBFILE: AW102							
GA	2AWDC	AW102	10/1/96	9/30/97	46	DC	46
GA	1AWSL	AW102	10/1/96	9/30/97	40	SL	86
GA	EVAPF	AW102	3/1/98	3/30/98	3	DN	89
GA	BPTCO	AW102	3/1/98	3/30/98	18	DN	107
GA	EVAPF	AW102	5/1/98	5/30/98	1	DN	108

Appendix A-2: Transactions for Projection Case 1 through Fiscal Year 2000 - Page 5 of 8
Transactions through 9/30/1999 are historical records.

	FROM	TO	START DATE	STOP DATE	QUANTITY	WASTE TYPE	TOTAL TANK INVENTORY
SUBFILE: AW102 (continued)							
GA	BPTCO	AW102	5/29/98	5/31/98	11	DN	119
GA	WATER	AW102	6/1/98	6/30/98	36	DN	155
GA	EVAPF	AW102	8/1/98	8/30/98	46	DN	590
GA	EVAPF	AW102	9/1/98	9/30/98	1	DN	591
GA	WATER	AW102	6/1/99	7/23/99	10	DN	1053
EV	SF155	106AW	7/24/99	7/31/99	-435	DN	618
EV	SF156	106AW	8/1/99	8/14/99	-568	DN	50
GA	EVAPF	AW102	8/14/99	8/15/99	30	DN	80
GA	WATER	AW102	11/18/99	11/21/99	2	DN	82
LO	AW102	UNKN	12/1/99	12/31/99	-1	DN	81
GA	EVAPF	AW102	4/7/00	4/19/00	14	DN	1030
EV	SF482	106AW	4/20/00	4/29/00	-962	DN	68
EV	SF500	106AW	5/5/00	5/8/00	-353	DN	68
GA	EVAPF	AW102	5/10/00	5/12/00	35	DN	103
SUBFILE: AW103							
GA	3AWDN	AW103	10/1/96	9/30/97	165	DN	165
GA	3AWPD	AW103	10/1/96	9/30/97	348	PD	513
LO	AW103	UNKN	1/1/98	1/31/98	-1	DN	512
LO	AW103	UNKN	10/1/98	9/30/99	-2	DN	510
GA	INST	AW103	12/22/99	12/23/99	2	DN	512
SUBFILE: AW104							
GA	4AWDN	AW104	10/1/96	9/30/97	888	DN	888
GA	4AWSL	AW104	10/1/96	9/30/97	231	SL	1119
LO	AW104	UNKN	12/1/97	12/31/97	-1	DN	1118
GA	EVAPF	AW104	4/1/98	4/30/98	1	DN	1119
LO	AW104	UNKN	1/1/00	1/31/00	-1	DN	1118
SUBFILE: AW105							
GA	5AWPD	AW105	10/1/96	9/30/97	280	PD	280
GA	5AWDN	AW105	10/1/96	9/30/97	157	DN	437
LO	AW105	UNKN	10/1/97	9/30/98	-3	DN	434
LO	AW105	UNKN	10/1/98	12/30/98	-2	DN	432
LO	AW105	UNKN	1/1/99	3/30/99	-2	DN	430
LO	AW105	UNKN	9/1/99	9/30/99	-1	DN	429
LO	AW105	UNKN	12/1/99	12/31/99	-1	DN	428
LO	AW105	UNKN	2/1/00	2/29/00	-1	DN	427
SUBFILE: AW106							
GA	1AWSL	AW106	10/1/96	9/30/97	228	SL	228
GA	6AWCC	AW106	10/1/96	9/30/97	353	CC	581
LO	AW106	UNKN	10/1/97	10/31/97	-1	CC	580
LO	AW106	UNKN	1/1/99	1/30/99	-1	CC	579
TR	AW106	AP103	5/2/99	5/3/99	-262	CC	317
EV	SF155	AW106	7/24/99	7/31/99	67	SF	384
EV	SF156	AW106	8/1/99	8/14/99	89	SF	473
LO	AW106	UNKN	3/1/00	3/31/00	-2	SF	471
TR	AW106	AP105	3/5/00	3/7/00	-203	SF	268
EV	SF482	AW106	4/20/00	4/29/00	464	SF	732
EV	SF500	AW106	5/5/00	5/8/00	176	SF	908

Appendix A-2: Transactions for Projection Case 1 through Fiscal Year 2000 - Page 6 of 8
Transactions through 9/30/1999 are historical records.

	FROM	TO	START DATE	STOP DATE	QUANTITY	WASTE TYPE	TOTAL TANK INVENTORY
SUBFILE: AN101							
GA	1AWSL	AN101	10/1/96	9/30/97	33	SL	33
GA	1ANDN	AN101	10/1/96	9/30/97	85	DN	118
GA	WATER	AN101	11/1/97	11/30/97	5	DN	123
GA	WATER	AN101	1/1/98	1/31/98	8	DN	131
GA	WATER	AN101	2/1/98	2/28/98	15	DN	146
GA	WATER	AN101	3/1/98	3/31/98	9	DN	155
GA	WATER	AN101	5/1/98	5/31/98	3	DN	158
GA	UNKN	AN101	10/1/98	9/30/99	2	DN	160
GA	WNE88	AN101	5/1/00	5/31/00	93	DN	253
GA	WATER	AN101	5/1/00	5/31/00	37	DN	290
GA	WATER	AN101	6/1/00	6/30/00	67	DN	357
GA	WNE88	AN101	6/1/00	6/30/00	168	DN	525
GA	WNE88	AN101	7/1/00	7/31/00	173	DN	698
GA	WATER	AN101	7/1/00	7/31/00	69	DN	767
GA	WNE88	AN101	8/1/00	8/31/00	173	DN	940
GA	WATER	AN101	8/1/00	8/31/00	69	DN	1009
GA	WNE88	AN101	9/1/00	9/30/00	168	DN	1177
GA	WATER	AN101	9/1/00	9/30/00	67	DN	1244
TR	AN101	AN106	9/12/00	9/16/00	-1075	DN	169
SUBFILE: AN102							
GA	1AWSL	AN102	10/1/96	9/30/97	89	SL	89
GA	2ANCC	AN102	10/1/96	9/30/97	984	CC	1073
LO	AN102	UNKN	10/1/97	9/30/97	-7	CC	1066
LO	AN102	UNKN	10/1/98	12/30/98	-2	CC	1064
LO	AN102	UNKN	1/1/99	3/30/99	-3	CC	1061
LO	AN102	UNKN	4/1/99	4/30/99	-1	CC	1060
LO	AN102	UNKN	10/1/99	1/31/00	-4	CC	1056
SUBFILE: AN103							
GA	3ANSF	AN103	10/1/96	9/30/97	549	SF	549
GA	3ANSL	AN103	10/1/96	9/30/97	410	SL	959
LO	AN103	UNKN	10/1/97	10/31/97	-1	SF	958
LO	AN103	UNKN	10/1/99	2/29/00	-2	SF	956
SUBFILE: AN104							
GA	4ANSL	AN104	10/1/96	9/30/97	449	SL	449
GA	4ANSF	AN104	10/1/96	9/30/97	606	SF	1055
LO	AN104	UNKN	11/1/97	11/30/97	-1	SF	1054
LO	AN104	UNKN	12/1/98	12/30/98	-1	SF	1053
SUBFILE: AN105							
GA	5ANSF	AN105	10/1/96	9/30/97	640	SF	640
GA	5ANSL	AN105	10/1/96	9/30/97	489	SL	1129
LO	AN105	UNKN	11/1/97	11/30/97	-1	SF	1128
LO	AN105	UNKN	12/1/98	12/30/98	-2	SF	1126
SUBFILE: AN106							
GA	1AWSL	AN106	10/1/96	9/30/97	17	SL	17
GA	6ANCC	AN106	10/1/96	9/30/97	25	CC	42
LO	AN106	UNKN	3/1/98	3/31/98	-3	CC	39
LO	AN106	UNKN	10/1/99	10/31/99	-1	CC	38

Appendix A-2: Transactions for Projection Case 1 through Fiscal Year 2000 - Page 7 of 8
Transactions through 9/30/1999 are historical records.

	FROM	TO	START DATE	STOP DATE	QUANTITY	WASTE TYPE	TOTAL TANK INVENTORY
SUBFILE: AN107							
GA	7ANSL	AN107	10/1/96	9/30/97	247	SL	247
GA	7ANCC	AN107	10/1/96	9/30/97	806	CC	1053
LO	AN107	UNKN	10/1/97	9/30/98	-5	CC	1048
LO	AN107	UNKN	11/1/98	11/30/98	-1	CC	1047
LO	AN107	UNKN	1/1/99	2/28/99	-2	CC	1045
LO	AN107	UNKN	4/1/99	4/30/99	-1	CC	1044
LO	AN107	UNKN	10/1/99	2/29/00	-3	CC	1041
SUBFILE: AP101							
GA	1APSF	AP101	10/1/96	9/30/97	1116	SF	1116
LO	AP101	UNKN	12/1/97	12/31/97	-1	SF	1115
LO	AP101	UNKN	12/1/99	12/31/99	-1	SF	1114
SUBFILE: AP102							
GA	2APCP	AP102	10/1/96	9/30/97	1096	CP	1096
LO	AP102	UNKN	10/1/97	10/31/97	-1	CP	1095
LO	AP102	UNKN	12/1/97	12/31/97	-1	CP	1094
LO	AP102	UNKN	10/1/98	12/30/98	-1	CP	1093
LO	AP102	UNKN	1/1/99	1/30/99	-1	CP	1092
LO	AP102	UNKN	10/1/99	2/29/00	-2	CP	1090
SUBFILE: AP103							
GA	3APDN	AP103	10/1/96	9/30/97	27	DN	27
GA	5APSL	AP103	10/1/96	9/30/97	1	SL	28
LO	AP103	UNKN	11/1/97	11/30/97	-3	DN	25
LO	AP103	UNKN	6/1/99	6/30/99	-1	CC	286
LO	AP103	UNKN	9/1/99	9/30/99	-1	CC	285
LO	AP103	UNKN	10/1/99	2/29/00	-2	CC	283
SUBFILE: AP104							
GA	4APDN	AP104	10/1/96	9/30/97	26	DN	26
LO	AP104	UNKN	11/1/97	11/30/97	-1	DN	25
LO	AP104	UNKN	10/1/98	10/31/98	-1	DN	24
GA	XSWAT	AP104	1/20/00	1/21/00	35	CC	572
GA	XSWAT	AP104	2/18/00	2/19/00	29	CC	1112
SUBFILE: AP105							
GA	5APSF	AP105	10/1/96	9/30/97	682	SF	682
GA	5APSL	AP105	10/1/96	9/30/97	89	SL	771
LO	AP105	UNKN	10/1/97	9/30/98	-4	SF	767
LO	AP105	UNKN	6/1/99	8/30/99	-2	SF	765
LO	AP105	UNKN	10/1/99	1/31/00	-2	SF	763
SUBFILE: AP106							
GA	6APDN	AP106	10/1/96	9/30/97	367	DN	367
GA	WATER	AP106	3/2/98	3/30/98	1	DN	368
GA	BPTCO	AP106	4/1/98	4/30/98	8	DN	376
GA	WATER	AP106	5/2/98	5/30/98	1	DN	377
GA	34L87	AP106	6/1/98	7/30/98	15	DN	392
GA	EVAPF	AP106	6/1/98	6/30/98	2	DN	394
LO	AP106	UNKN	6/2/98	9/30/98	-5	DN	389
TR	AP106	108AP	1/20/99	1/23/99	-519	DN	94
LO	AP106	UNKN	8/1/99	8/30/99	-1	DN	93
GA	XSWAT	AP106	3/28/00	3/29/00	29	DC	626
GA	XSWAT	AP106	9/11/00	9/12/00	34	DC	1140

Appendix A-2: Transactions for Projection Case 1 through Fiscal Year 2000 - Page 8 of 8
Transactions through 9/30/1999 are historical records.

		FROM	TO	START DATE	STOP DATE	QUANTITY	WASTE TYPE	TOTAL TANK INVENTORY
SUBFILE: AP107								
	GA	7APDN	AP107	10/1/96	9/30/97	28	DN	28
	LO	AP107	UNKN	10/1/97	9/30/98	-4	DN	24
	LO	AP107	UNKN	10/1/98	12/30/98	-2	DN	22
	LO	AP107	UNKN	3/1/99	3/31/99	-2	DN	20
	GA	WATER	AP107	3/9/99	3/10/99	26	DN	187
	GA	WATER	AP107	4/9/99	4/10/99	30	DN	708
	LO	AP107	UNKN	5/26/99	6/30/99	-4	DN	704
	GA	XSWAT	AP107	8/29/99	8/30/99	7	DN	977
	LO	AP107	UNKN	9/1/99	9/30/99	-1	DN	976
	TR	AP107	102AW	12/19/99	12/22/99	-935	DN	41
	LO	AP107	UNKN	12/20/99	2/29/00	-2	DN	39
SUBFILE: AP108								
	GA	8APDC	AP108	10/1/96	9/30/97	256	DC	256
	LO	AP108	UNKN	10/1/97	10/31/97	-1	DC	255
	LO	AP108	UNKN	1/1/98	1/31/98	-1	DC	254
	TR	AP108	AP106	1/15/99	1/18/99	-224	DC	30
	TR	AP108	AW102	1/25/99	1/28/99	-452	DN	97
	GA	WATER	AP108	3/1/99	3/31/99	9	DN	106
	GA	BPN89	AP108	7/1/99	7/30/99	4	DN	110
	GA	XSWAT	AP108	9/2/99	9/3/99	23	DN	368
	GA	WNE88	AP108	9/13/99	9/14/99	1	DN	369
	GA	WNE88	AP108	10/16/99	10/17/99	10	DN	379
	GA	WATER	AP108	10/17/99	10/18/99	4	DN	383
	LO	AP108	UNKN	1/1/00	2/29/00	-2	DN	381
	TR	AP108	AW102	4/29/00	4/30/00	-353	DN	28
	GA	EVAPF	AP108	5/1/00	5/30/00	10	DN	38
	GA	PXTCO	AP108	5/1/00	9/30/00	5	DN	43
	GA	EVAPF	AP108	6/1/00	6/30/00	10	DN	53
	GA	EVAPF	AP108	7/1/00	7/30/00	10	DN	63
	GA	34L87	AP108	7/1/00	7/30/00	2	DN	65
	GA	WATER	AP108	7/2/00	7/30/00	1	DN	66
	GA	WATER	AP108	7/2/00	9/30/00	4	DN	70
	GA	EVAPF	AP108	8/1/00	8/30/00	10	DN	80
	GA	EVAPF	AP108	9/1/00	9/28/00	10	DN	90

Appendix A-3: Transactions for Projection Case 1 through Fiscal Year 2001 - Page 1 of 3
Transactions through 9/30/1999 are historical records.

		FROM	TO	START DATE	STOP DATE	QUANTITY	WASTE TYPE	TOTAL TANK INVENTORY
SUBFILE: SY102								
	GA	SPN87	SY102	10/1/00	12/30/00	3	DN	701
	GA	WCW88	SY102	10/1/00	10/31/00	17	DC	718
	GA	WATER	SY102	10/1/00	10/31/00	27	DN	745
	GA	WATER	SY102	10/1/00	10/31/00	13	DC	758
	GA	ZNL87	SY102	10/1/00	9/30/01	5	DN	763
	GA	WNW88	SY102	10/1/00	10/31/00	75	DN	838
	GA	WATER	SY102	10/2/00	12/30/00	1	DN	839
	GA	WATER	SY102	11/1/00	11/30/00	11	DC	850
	GA	WCW88	SY102	11/1/00	11/30/00	14	DC	864
	GA	WNW88	SY102	11/1/00	11/30/00	74	DN	938
	GA	WATER	SY102	11/1/00	11/30/00	25	DN	963
	GA	WCW88	SY102	12/1/00	12/31/00	13	DC	976
	GA	WNW88	SY102	12/1/00	12/31/00	66	DN	1042
	GA	WATER	SY102	12/1/00	12/31/00	21	DN	1063
	GA	WATER	SY102	12/1/00	12/31/00	11	DC	1074
	GA	SPN87	SY102	1/1/01	3/30/01	2	DN	1076
	GA	WATER	SY102	1/1/01	1/31/01	10	DC	1086
	GA	WCW88	SY102	1/1/01	1/31/01	12	DC	1098
	GA	WNW88	SY102	1/1/01	1/31/01	48	DN	1146
	GA	WATER	SY102	1/1/01	1/31/01	15	DN	1161
	EV	DN100	SY102	1/2/01	1/3/01	-632	DC	529
	EV	DN100	SY102	1/2/01	1/3/01	632	DN	1161
	TR	SY102	AP107	1/7/01	1/14/01	-500	DN	661
	GA	WCW88	SY102	2/1/01	2/28/01	10	DC	671
	GA	WATER	SY102	2/1/01	2/28/01	9	DN	680
	GA	WNW88	SY102	2/1/01	2/28/01	31	DN	711
	GA	WATER	SY102	2/1/01	2/28/01	9	DC	720
	GA	WNW88	SY102	3/1/01	3/31/01	26	DN	746
	GA	WATER	SY102	3/1/01	3/31/01	7	DN	753
	GA	WCW88	SY102	3/1/01	3/31/01	10	DC	763
	GA	WATER	SY102	3/1/01	3/31/01	9	DC	772
	GA	SPN87	SY102	4/1/01	6/30/01	3	DN	775
	GA	WCW88	SY102	4/1/01	4/30/01	9	DC	784
	GA	WNW88	SY102	4/1/01	4/30/01	19	DN	803
	GA	WATER	SY102	4/1/01	4/30/01	8	DC	811
	GA	WATER	SY102	4/1/01	4/30/01	5	DN	816
	GA	WATER	SY102	4/2/01	6/30/01	1	DN	817
	GA	WCW88	SY102	5/1/01	5/31/01	9	DC	826
	GA	WNW88	SY102	5/1/01	5/31/01	38	DN	864
	GA	WATER	SY102	5/1/01	5/31/01	11	DN	875
	GA	WATER	SY102	5/1/01	5/31/01	8	DC	883
	GA	WNW88	SY102	6/1/01	6/30/01	45	DN	928
	GA	WATER	SY102	6/1/01	6/30/01	6	DC	934
	GA	WATER	SY102	6/1/01	6/30/01	13	DN	947
	GA	WCW88	SY102	6/1/01	6/30/01	7	DC	954
	GA	WCW88	SY102	7/1/01	7/30/01	6	DC	960
	GA	SPN87	SY102	7/1/01	9/30/01	2	DN	962
	GA	WATER	SY102	7/1/01	7/31/01	18	DN	980

NOTES: GA = GAIN RECORD
TR = TRANSFER RECORD
LO = LOSS RECORD

Appendix A-3: Transactions for Projection Case 1 through Fiscal Year 2001 - Page 2 of 3
Transactions through 9/30/1999 are historical records.

		FROM	TO	START DATE	STOP DATE	QUANTITY	WASTE TYPE	TOTAL TANK INVENTORY
SUBFILE: SY102 (continued)								
	GA	WNW88	SY102	7/1/01	7/31/01	65	DN	1045
	GA	WATER	SY102	7/1/01	7/30/01	5	DC	1050
	GA	WNW88	SY102	8/1/01	8/31/01	90	DN	1140
	GA	WCW88	SY102	8/1/01	8/30/01	6	DC	1146
	GA	WATER	SY102	8/1/01	8/30/01	5	DC	1151
	GA	WATER	SY102	8/1/01	8/31/01	25	DN	1176
	EV	DN100	SY102	8/2/01	8/3/01	-107	DC	1069
	EV	DN100	SY102	8/2/01	8/3/01	107	DN	1176
	TR	SY102	AP107	8/3/01	8/10/01	-500	DN	676
	GA	WCW88	SY102	9/1/01	9/30/01	5	DC	681
	GA	WATER	SY102	9/1/01	9/30/01	4	DC	685
	GA	WATER	SY102	9/1/01	9/30/01	20	DN	705
	GA	WNW88	SY102	9/1/01	9/30/01	71	DN	776
	GA	WCW88	SY102	1/1/02	2/30/2002	3	DC	668
SUBFILE: AW102								
	EV	SF9.0	AW106	4/5/01	4/30/01	-837	DN	68
	GA	EVAPF	AW102	4/29/01	4/30/01	35	DN	103
SUBFILE: AW104								
	TR	AW104	AW102	12/20/00	12/24/00	-802	DN	316
SUBFILE: AW105								
	GA	1FL96	AW105	10/1/00	12/30/00	10	DN	437
	GA	1FL96	AW105	1/1/01	3/30/01	10	DN	447
	GA	1FL96	AW105	4/1/01	6/30/01	10	DN	457
	GA	1FL96	AW105	7/1/01	9/30/01	10	DN	467
SUBFILE: AW106								
	TR	AW106	AP105	11/3/00	11/6/00	-174	SF	734
	TR	AW106	AW103	11/15/00	11/16/00	-478	SF	256
	EV	SF9.0	AW106	4/5/01	4/30/01	76	SF	332
SUBFILE: AN101								
	GA	WNE88	AN101	10/1/00	10/31/00	133	DN	302
	GA	WATER	AN101	10/1/00	10/31/00	53	DN	355
	GA	WNE88	AN101	11/1/00	11/30/00	59	DN	414
	GA	WATER	AN101	11/1/00	11/30/00	24	DN	438
	GA	WATER	AN101	12/1/00	12/31/00	10	DN	448
	GA	WNE88	AN101	12/1/00	12/31/00	25	DN	473
	GA	WNE88	AN101	1/1/01	1/31/01	16	DN	489
	GA	WATER	AN101	1/1/01	1/31/01	6	DN	495
	GA	WATER	AN101	2/1/01	2/28/01	4	DN	499
	GA	WNE88	AN101	2/1/01	2/28/01	9	DN	508
	GA	WNE88	AN101	3/1/01	3/30/01	7	DN	515
	GA	WATER	AN101	3/1/01	3/30/01	3	DN	518
	GA	WNE88	AN101	4/1/01	4/30/01	4	DN	522
	GA	WATER	AN101	4/1/01	4/30/01	2	DN	524

Appendix A-3: Transactions for Projection Case 1 through Fiscal Year 2001 - Page 3 of 3
Transactions through 9/30/1999 are historical records.

		FROM	TO	START DATE	STOP DATE	QUANTITY	WASTE TYPE	TOTAL TANK INVENTORY
SUBFILE: AN101 (continued)								
	GA	WATER	AN101	5/1/01	5/30/01	1	DN	525
	GA	WNE88	AN101	5/1/01	5/30/01	2	DN	527
	GA	WNE88	AN101	6/1/01	6/30/01	2	DN	529
	GA	WATER	AN101	6/1/01	6/30/01	1	DN	530
SUBFILE: AN107								
	GA	7ANCC	AN107	9/1/01	9/30/01	66	CC	1107
SUBFILE: AP107								
	GA	XSWAT	AP107	2/18/01	2/19/01	35	DN	574
	GA	XSWAT	AP107	9/29/01	9/30/01	35	DN	1109
SUBFILE: AP108								
	GA	EVAPF	AP108	10/1/00	10/30/00	10	DN	100
	GA	TAL88	AP108	10/1/00	9/30/01	19	DN	119
	GA	WESF	AP108	10/1/00	9/30/01	5	DN	124
	GA	TNS88	AP108	10/1/00	9/30/01	1	SL	125
	GA	PXTCO	AP108	10/1/00	9/30/01	5	DN	130
	GA	WATER	AP108	10/2/00	9/30/01	5	DN	135
	GA	WATER	AP108	10/2/00	9/30/01	1	DN	136
	GA	EVAPF	AP108	11/1/00	11/30/00	10	DN	146
	GA	EVAPF	AP108	12/1/00	12/30/00	10	DN	156
	GA	EVAPF	AP108	1/1/01	1/30/01	10	DN	166
	GA	EVAPF	AP108	2/1/01	2/28/01	10	DN	176
	GA	WNE88	AP108	2/1/01	2/28/01	18	DN	194
	GA	WATER	AP108	2/1/01	2/28/01	5	DN	199
	GA	EVAPF	AP108	3/1/01	3/30/01	10	DN	209
	GA	WNE88	AP108	3/1/01	3/31/01	24	DN	233
	GA	WATER	AP108	3/1/01	3/31/01	7	DN	240
	GA	WATER	AP108	4/1/01	4/30/01	13	DN	253
	GA	WNE88	AP108	4/1/01	4/30/01	46	DN	299
	GA	EVAPF	AP108	4/1/01	4/30/01	10	DN	309
	GA	WATER	AP108	5/1/01	5/31/01	10	DN	319
	GA	EVAPF	AP108	5/1/01	5/30/01	10	DN	329
	GA	WNE88	AP108	5/1/01	5/31/01	36	DN	365
	GA	WNE88	AP108	6/1/01	6/30/01	27	DN	392
	GA	WATER	AP108	6/1/01	6/30/01	7	DN	399
	GA	EVAPF	AP108	6/1/01	6/30/01	10	DN	409
	GA	WNE88	AP108	7/1/01	7/31/01	21	DN	430
	GA	WATER	AP108	7/1/01	7/31/01	6	DN	436
	GA	EVAPF	AP108	7/1/01	7/30/01	10	DN	446
	GA	34L87	AP108	7/1/01	7/30/01	5	DN	451
	GA	WATER	AP108	7/2/01	7/30/01	3	DN	454
	GA	WATER	AP108	8/1/01	8/31/01	4	DN	458
	GA	WNE88	AP108	8/1/01	8/31/01	16	DN	474
	GA	EVAPF	AP108	8/1/01	8/30/01	10	DN	484
	GA	EVAPF	AP108	9/1/01	9/30/01	10	DN	494
	GA	WNE88	AP108	9/1/01	9/30/01	12	DN	506
	GA	WATER	AP108	9/1/01	9/30/01	3	DN	509