Tank Farm Surveillance and Waste Status Summary Report for September 1993

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

Westinghouse
Hanford Company Richland, Washington

Hanford Operations and Engineering Contractor for the
U.S. Department of Energy under Contract DE-AC06-87RL10930

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**TANK FARM SURVEILLANCE AND WASTE STATUS
SUMMARY REPORT FOR SEPTEMBER 1993**

B. M. Hanlon

ABSTRACT

This report is the official inventory for radioactive waste stored in underground tanks in the 200 Areas at the Hanford Site. Data that depict the status of stored radioactive waste and tank vessel integrity are contained within the report. This report provides data on each of the existing 177 large underground waste storage tanks and 49 smaller catch tanks and special surveillance facilities, and supplemental information regarding tank surveillance anomalies and ongoing investigations. This report is intended to meet the requirement of U. S. Department of Energy-Richland Operations Office Order 5820.2A, Chapter I, Section 3.e. (3) (DOE-RL, 1990, Radioactive Waste Management, U. S. Department of Energy-Richland Operation Office, Richland, Washington) requiring the reporting of waste inventories and space utilization for Hanford Tank Farm Tanks.

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METRIC CONVERSION CHART		
1 inch	=	2.54 centimeters
1 foot	=	30.48 centimeters
1 gallon	=	3.80 liters
1 ton	=	0.90 metric tons
$^{\circ}\text{F} = \left(\frac{9}{5} ^{\circ}\text{C}\right) + 32$		
1 Btu/h = 2.930711 E-01 watts (International Table)		

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**TANK FARM SURVEILLANCE AND WASTE STATUS SUMMARY
REPORT FOR SEPTEMBER 1993
SUMMARY**

Note: Changes from the previous month are in bold print.

I. WASTE TANK STATUS

Category	Quantity	Date of Last Change
In-Service Tanks ^c	28 double-shell	10/86
Out-of-Service Tanks ^a	149 single-shell	07/88
Assumed Leaker Tanks ^f	67 single-shell	7/93
Sound Tanks	28 double-shell 82 single-shell	1986 7/93
Interim Stabilized Tanks ^{b,d}	106 single-shell	04/93
Not Interim Stabilized ^f	43 single-shell	04/93
Intrusion Prevention Completed ^e	98 single-shell	09/91
Watch List Tanks ^g	45 single-shell 6 double-shell	8/93 ^h 6/93
Total	51 tanks	8/93

^a Although all 149 single-shell tanks were removed from service (i.e., no longer authorized to receive waste) as of November 21, 1980, the category of "Out-of-Service" was not established until July 1988.

^b Of the 106 tanks classified as interim stabilized, 59 are listed as assumed leakers. The total of 106 interim stabilized tanks includes seven tanks that do not meet current established supernatant and interstitial liquid stabilization criteria: B-104, B-107, B-110, B-111, T-102, T-112, and U-110. (These tanks did meet the criteria in existence when they were declared interim stabilized; B-107, B-110, B-111, and U-110 are assumed leakers but surveillance data do not show an indication of a continuing leak.)

^c Six double-shell tanks listed as "in service" are currently included on the Hydrogen Watch List and are thus prohibited from receiving waste in accordance with "Safety Measures for Waste Tanks at Hanford Nuclear Reservation," Section 3137 of the National Defense Authorization Act for Fiscal Year 1991, November 5, 1990, Public Law 101-510.

^d Of the 45 single-shell tanks on Watch Lists, 19 have been Interim Stabilized.

^e Of the 45 single-shell tanks on Watch Lists, 28 have completed Intrusion Prevention (this category replaced Interim Isolation). See Appendix C, Tank and Equipment Codes and Status Definitions, for "Intrusion Prevention" definition.

^f Eight of the tanks are both assumed leakers and not Interim Stabilized. See Appendix I, Leak Volume Estimates, for more details. Tank SX-102 was declared an assumed leaker in May, and reclassified as Sound in July, 1993. See "Waste Tank Investigations" section of the July 1993 report for more details.

^g See Tables A-1 through A-5 for more information on Watch List Tanks. Three tanks are currently on more than one Watch List.

^h Dates for the Watch List tanks are "officially added to the Watch List" dates. See Table A-1, Watch List Tanks, for further information.

II. WASTE TANK INVESTIGATIONS

This section includes all single-shell tanks or catch tanks which are showing surface level or interstitial liquid level (ILL) decreases, or drywell/lateral radiation level increases.

There were no tanks under investigation for surface or ILL decreases or for drywell/lateral radiation increases during September 1993.

A. Assumed Leakers or Assumed Re-leakers: (See Appendix C for definition of "Re-leaker")

This section includes all single- or double-shell tanks or catch tanks for which an off-normal or unusual occurrence report has been issued for assumed leaks or re-leaks. Tanks/catch tanks will remain on this list until either a) completion of Interim Stabilization, or b) the updated occurrence report indicates that the tank/catch tank is not an assumed leaker.

Tank 241-BX-111. The surface level showed a slow erratic increasing trend since 1986. The level had increased approximately 1.00 inch from the reference baseline of 79.00 inches. A decreasing trend was observed during February 1993, but has remained stable, fluctuating between 78.75 and 79.00 inches. The decrease criteria for this tank is 1.00 inch from the reference baseline. In-tank photographs were taken July 16, 1993. There appears to be approximately 90% liquid surface with about 10% floating solids. On August 10, 1993, the manual tape measurement device was removed as part of the emergency pumping operations and to replace the tape, because in-tank photographs showed the manual tape donut plummet to be missing. Because the reading was a daily requirement, Discrepancy Report S&DA-93-578 was issued August 12, 1993. The new manual tape was installed on September 10, 1993. The reading was 79.75 inches, and has fluctuated between 79.75 and 80.00 inches to September 30, 1993. The liquid observation well (LOW) interstitial liquid level (ILL) has remained constant at the baseline as of September 24, 1993.

Resolution status: When this tank was under investigation, preliminary notifications were made to regulatory agencies on March 24 and April 16, 1993. Preparations to begin emergency pumping were initiated in late March. This tank was declared an assumed re-leaker on April 30, 1993. Upon completion of pumping, the surface level baseline for the tank will be adjusted. Tanks 241-BX-110 and 111 were removed from the ferrocyanide Watch List on July 9, 1993, on the basis that the tanks contain <1000 gm moles of ferrocyanide.

BX-110/111 Emergency Pumping activities in the month of September were focused primarily on restarting field work and retraining personnel after the administrative hold in August 1993. Work Plans and a Work Package was approved by the Plant Implementation committee, and by the review committee, to begin work in the field. Field work restarted on September 24, 1993.

Transfer procedures went through extensive reviews and upgrades, and were in the sign-off phase by month end. Fresh air restrictions around these tanks were removed and modified to only strategic spots at vents and exhausters. Training to higher standards of performance and safety are ongoing with the Operations personnel.

B. Tanks with increases indicating possible intrusions:

This section includes all single-shell tanks for which the surveillance data show that the surface level or ILL has met or exceeded the increase criteria, or are still being investigated.

Tank 241-B-202. A steady increase in the surface level measurement has been observed since December 1984. The manual tape pencil plummet is contacting liquid. When the quarterly reading was obtained on October 6, 1992, the level was recorded as 144.75 inches, thus exceeding the 2.00-inch increase criteria from the established baseline of 142.50 inches. The surface level measurement was rechecked on October 9, 1992, (145.50 inches) and October 13 (145.00 inches), verifying the increase and that the criteria had been exceeded. The surface level continues to show an increase and is at 145.50 inches for September 1993. The monitoring frequency has been increased from quarterly to monthly. Occurrence Report RL-WHC-TANKFARM-1993-0024 was issued February 13, 1993. This tank is Sound, and Interim Stabilized/Intrusion Prevention completed.

Resolution status: A photo package was initiated on May 11, 1993, to investigate the possibility of an intrusion. Review of previous photos was inconclusive. New photos are required to determine the actual supernatant increase, if any. A temporary baseline was established at 145.25 inches, until the new photos are available.

Tank 241-BX-101. On September 2, 1993, the surface level increased from 10.00 to 12.00 inches and remained stable during September, fluctuating between 11.75 and 13.00 inches. In-tank photographs show the manual tape donut plummet contacting liquid in a shallow pool. This tank is an Assumed Leaker, and Interim Stabilized/Intrusion Prevention completed.

Resolution Status: Comparison of October 1986 photos with November 1988 photos shows evidence of an ongoing intrusion. A work package to obtain in-tank photographs will be initiated to inspect the area under the plummet and investigate the possible intrusion.

Tank 241-BX-103. On January 18, 1993, the surface level measurement in 103-BX exceeded the 0.50-inch increase criteria from the reference baseline of 19.50 inches, and was verified on January 20, 1993. The surface level measurement is currently at 20.50 inches. This tank has shown an erratic increase in surface level measurements since January 6, 1986. Discrepancy Report S&DA 93-522 was issued January 21, 1993. Occurrence Report RL-WHC-TANKFARM-1993-0036 was issued March 25, 1993. The FIC plummet is contacting liquid as indicated by in-tank photographs taken October 31, 1986. This tank is Sound, and Interim Stabilized/Intrusion Prevention completed.

Resolution status: The current level is greater than that prior to stabilization in November 1983. The tank was previously determined to have experienced an intrusion from 1977 to March 1983 (prior to stabilization). Subsequent isolation was expected to halt the intrusion, however, the intrusion is apparently ongoing. A work package was initiated on May 11, 1993, to re-seal pits and risers and to obtain in-tank photos. The photos will be used to assess the current stabilization status of the tank. A visual survey of the area was performed to determine possible paths for precipitation to enter the tank. The weather covering on the pits and risers was found in place and undamaged. The existing grade is level and revealed no obvious draining problems. Ongoing design/isolation drawing review revealed that nozzles, floor drains and some transfer lines entering the heel pit have been left open. Whether precipitation can enter these lines or condensation can form in sufficient quantities is yet to be determined. These possibilities

will be investigated. Photos are expected to be available for review by March 1994.

Tank 241-BY-105. The LOW ILL has shown a slow increasing trend since 1986. The ILL is 13.80 feet as of September 7, 1993. The baseline is 13.50 feet, with a 0.4-foot increase criteria, and the temporary baseline is 13.90 feet. The monitoring frequency has been increased from quarterly to monthly. The manual tape surface level measurement does not show an increase. Discrepancy Report S&DA-93-561 was issued June 15, 1993. This tank is on the ferrocyanide Watch List, an Assumed Leaker, and not yet Interim Stabilized.

Resolution Status: The surface level and ILL are displaying behavior similar to TX-113 and TX-115. The ILL is showing an increase, while the surface level measurement is showing a decrease. This phenomena could be due to either solids dissolution or formation of a depression in the solids beneath the plummet in conjunction with an intrusion. Review of previous photos indicates the liquid volume is increasing, although it cannot be verified that the solids level is decreasing. A photo package was initiated to investigate the possibility of intrusion, or solids dissolution. Photos are expected to be available for review by July 1994.

Tank 241-S-103. The FIC was out of service from March 8 to May 14, 1993. The surface level increased from 104.15 inches on March 8 to 104.80 inches after FIC repair on May 14, 1993. On August 20, 1993, a temporary baseline of 104.80 inches was established. The surface level measurement is at the increase criteria and remained stable during September 1993, fluctuating between 104.80 and 105.00 inches. The LOW, last scanned July 22, 1993, has shown no increase in the ILL from the reference baseline. This tank is Sound, and not yet Interim Stabilized.

Resolution status: After recalibration of the FIC on June 7, 1993, the surface level (SL) remained stable at approximately 104.65 inches. The SL shows a general increase since 1981. Review of tank level history has also shown the SL to show sudden increases following calibration. Recalibration has normally returned the SL to previous levels. Since the SL currently remains high after recalibration, it is possible that the SL has indeed reached the action criterion for this tank. A photo package for in-tank photos was initiated to investigate the possibility of an intrusion. Photos are expected to be available for review by September 1994.

Tank 241-TX-113. The LOW ILL has shown a slow increase since March 12, 1986, with both the neutron and gamma probes. The scan data on February 5, 1993, showed the ILL to be 5.5 foot and at the 0.4-foot increase criteria from the reference baseline. S&DA Discrepancy Report 93-534 was issued March 10, 1993. On September 3, 1993, the ILL exceeded the 0.4-foot increase criteria from the reference baseline of 5.1 feet. A revision to Discrepancy Report S&DA 93-534 was issued September 9, 1993. This tank is an Assumed Leaker, and Interim-Stabilized/Intrusion Prevention completed.

Resolution status: The technical evaluation of this tank was completed April 14, 1993. The results were inconclusive, with recommendation to accelerate the October 1997 waste characterization of the tank. This characterization is expected to confirm that solids are dissolving, causing an increase in ILL. Acceleration of waste characterization is not possible. Watch List tanks have first priority for core sampling. In-tank photos are expected to be available for review by February 1994. LOW scans and surface level readings have been increased from a quarterly to a monthly frequency.

Tank 241-TX-115. The LOW ILL is exceeding the 0.4-foot increase criteria from the reference baseline. This tank has been on report since 1988, when the increase criteria was first exceeded. Comparison of past and present in-tank photographs show no significant change in surface conditions or obvious evidence of intrusion. Surveillance Deviation Report #88-08 was issued on May 18, 1988, and Event Fact Sheet #TF-EFS-88-140 was issued October 27, 1988. The ILL continues to show an increase with both the neutron and gamma probes. The LOW was last scanned September 30, 1993, and now shows a 1.5-foot increase from the baseline. This tank is an Assumed Leaker, and Interim Stabilized/Intrusion Prevention completed.

Resolution status: The technical evaluation of the alert condition in this tank was completed April 14, 1993. The results were inconclusive, with recommendation to accelerate the October 1997 waste characterization. Waste characterization is expected to confirm that solids are dissolving, causing an increase in ILL. Acceleration of waste characterization is not possible for non-Watch List tanks. The 1981 photos show evidence of rain intrusion through a central pump pit riser. However, it cannot be concluded from the 1988 photos that the intrusion is ongoing. In-tank photos are expected to be available for review by February 1994. This tank will be included in the waste characterization with TX-113. LOW scans and surface level readings have been increased from a quarterly to a monthly frequency.

Tank 241-TY-102. On November 8, 1992, the automatic FIC surface level measurement of 32.10 inches exceeded the 0.50-inch increase criteria from the reference baseline of 31.40 inches. Discrepancy Report S&DA-92-489 was issued November 9, 1992. The tank has a history of icicle buildup on the FIC plummet and intrusions. The surface level measurement was 31.75 inches for September 1993. The increase criteria of 0.50 inch is considered to be an extremely tight tolerance for this tank. The FIC readings are erratic, causing the tank to go on alert unnecessarily. The increase criteria has been revised to 1.00 inch, which is more in line with other tanks that exhibit similar erratic surface level behavior. This tank is Sound, and Interim Stabilized/Intrusion Prevention completed.

Resolution status: This tank is experiencing an ongoing intrusion as is evident by comparison of November 1984 photos with July 1987 photos and an increasing trend in surface level data. A visual survey was conducted to determine possible paths for precipitation to enter the tank. The grade around the tank is level and weather covering is on the pits and intact. The photo package, initiated on May 17, 1993, will be required to assess the current stabilization status of the tank, and to assist in determining the possible paths of intrusion. Ongoing design/isolation drawing review revealed that nozzles, floor drains and some transfer lines entering the pump pit have been left open. Whether precipitation can enter these lines or condensation can form in sufficient quantities is yet to be determined. Photo verification of the intrusion will determine the need to provide additional isolation measures. In-tank photos are expected to be available by April 1994.

241-E/W-151 Vent Station Catch Tank. The zip cord surface level reading exceeds the maximum operating limit of 36.00 inches. The manual tape has been out of service since July 7, 1992. A temporary zip cord was installed December 16, 1992. The level was 45.50 inches which exceeded the active tank limit of 50% volume of 40 inches (400 gallons). Transfers are not permitted until the tank is pumped and the level is within limits. Discrepancy Report S&DA-92-511 was issued December 24, 1992. A new calibrated zip cord was installed May 26, 1993. The surface level reading as of September 30, 1993, is 68.00 inches.

Resolution status: Work packages are out to repair the manual tape and pump the catch tank. Extensive surface contamination in the surrounding area is hampering efforts to perform the needed activities. Sampling of the solution in the tank is necessary before pumping can begin. Because of the current stand down of work in tank farms, the resolution to pumping this vent station is on hold. Efforts to resolve this issue will resume as priority allows and transfers are required through this facility.

UX-302-A Catch Tank. Surface level measurement exceeds the maximum operating limit of 50.00 inches. Discrepancy report S&DA-92-465 was issued May 12, 1992. The level is 64.85 inches as of September 30, 1993, which exceeds the 50% volume of 54 inches (8840 gallons). The FIC plummet is contacting liquid.

Resolution status: Work packages for the transfer of waste from UX-302-A and the repair of necessary instrumentation are being prepared, and the transfer of waste is being scheduled as a prestart item for the Cross Site Transfer. A work package has been prepared to sample/pump this catch tank. Because of the current stand down of work in tank farms, the resolution to pumping UX-302-A is on hold. Efforts to resolve this issue will resume as priority allows.

III. SURVEILLANCE AND WASTE TANK STATUS HIGHLIGHTS

1. Tank Farms Stand Down (Administrative Hold)

On August 12, 1993, non-essential work activities in the tank farms were put on administrative hold by WHC senior management until operators, supervisors and managers are retrained to perform their duties in a safe and accountable manner. Minimal essential activities required for safety, monitoring and compliance, including the daily "bump-pumping" of the SY-101 mixer pump, will continue. The administrative hold has impacted several programmatic goals for Tank Waste Remediation System (TWRS). A letter from WHC senior management has been submitted to DOE-RL addressing these programmatic delays. Further corrective actions are addressed in the Tank Waste Remediation System Resumption of Work Plan, dated September 13, 1993. See Occurrence Report RL-WHC-TANKFARM-1993-0073 below for further information.

2. Tank 241-SY-101 Mixer Pump

The SY-101 hydrogen mitigation mixer pump continued to be bump pumped five minutes each day at 1000 rpm through September 1993. The Acceptance Test Procedure is still in progress.

3. Tank Being Reviewed for Potential Addition to Watch List

Tank T-107 continues to be reviewed for inclusion on the Hydrogen Watch List.

4. Criticality Safety Issues

On April 30, 1992, an Unreviewed Safety Question (USQ) concerning criticality safety issues in the Tank Farms was declared to be a reportable event. Unusual Occurrence report RL-WHC-TANKFARM-1992-0037 was issued. A prohibition was placed on all waste transfers into and between the tank farm facilities which is negatively affecting various Hanford programs. On September 1, 1992, the approved Justification For Continued Operations (JCO) was received. This establishes the limitations for all tanks receiving

transfers and also excludes any interim stabilization of single-shell tanks until further evaluations are completed and approved by DOE-HQ. On December 15, 1992, the approved JCO was issued as WHC-SD-WM-JCO-001, "Justification for Continued Operations of Hanford High Level Waste Tanks Resulting From the Criticality USQ, 492-CRITSAS."

5. Occurrence Reports

RL-WHC-TANKFARM-1993-0071 (OFF NORMAL) - INADEQUATE WORK CONTROL RESULTS IN PERSONNEL SKIN CONTAMINATION AT 241-C-106, PIT (10-Day Report, 9/24/93)

On August 10, 1993, a Kaiser Engineers Hanford (KEH) crafts person entered pit "B" of Tank 241-C-106 to perform a survey and configuration assessment of drains, risers and cover plates. This was in preparation of flushing and decontamination of the pit which required the use of an open, clear drain. In an attempt to locate a drain that was unplugged, the workers taped a rock to a 40-foot rope and lowered it into an open nozzle. After lowering the rope approximately 28 feet, it became slack. Personnel assumed the pipe was plugged and pulled the rope up, resulting in a spread of contamination. There were no supervisory or Health Physics Technician (HPT) personnel overseeing. The craftsman was being surveyed out of the farm when the contamination was detected. Approximately 1500-2000 disintegrations per minute (DPM) of beta/gamma contamination was detected on the right shoulder and elbow of the craftsman. This event had little or no effect on the facility, system or operations. However, combined with previous events at Tank Farms, it resulted in the declaration of an administrative hold of non-essential work in the Tank Farms.

Direct cause of this personnel contamination event was a violation of procedure. Personnel entered a glovebag containment contrary to the requirements of the procedure in use. Although all planning meetings clearly indicated this job was to be conducted as a glovebag job, and all personnel "understood" this glovebag technique, the procedure did not make this concept clear. Also, the general work scope was not well understood. The Health Physics Technician understood the job was finished once the drain was located, and left the area, knowing that the protective clothing being used was not in accordance with established practices for entry into containment tents. Kaiser Engineering Hanford (KEH) personnel understood they were to see if there were any plates or covers over a drain. Once the drain pipe had been located and verified as being plugged, the KEH personnel continued searching for a means to drain the pit. Another contributing cause was a violation of requirements. KEH personnel lowered a rock on a string into the outlet nozzle of the tank sludge (jet) pump assembly. This action was contrary to the verbal instructions provided by the job supervisor.

The root cause was inadequate administrative control:

- a) lack of a sense of safety for personnel
- b) inadequate procedural documentation
- c) inadequate procedure compliance
- d) inadequate job supervision

RL-WHC-TANKFARM-1993-0073 (OFF NORMAL) - WHC DECLARED AN ADMINISTRATIVE HOLD ON NON-ESSENTIAL FIELD WORK IN THE TANK FARMS AS A RESULT OF LESS THAN ADEQUATE OPERATIONAL PERFORMANCE (10-Day Report, 9/30/93)

On August 12, 1993, WHC senior management ordered an administrative hold on all non-essential activities in the Tank Farms. The action was imposed as a result of a series of occurrences which indicated a lapse in management and employee accountability for work control, safety, and conduct of operations in tank farm facilities.

The only continuing activities are those which are required to ensure safety, health and the environment are not degraded. Additionally, continued testing of the 101-SY mixer pump will be conducted, as this is a vital part of the safety program chartered to mitigate hydrogen build up in the tank. Additional controls are being established for activities necessary to continue during the hold to ensure safe operations of plant facilities.

All-manager and all-employee meetings have been held to emphasize the need for increased safety and Conduct of Operations awareness in Tank Farm facilities. Intensive appropriate retraining is being conducted. An investigative team was established to review recent events, determine root causes, and provide appropriate recommendations.

No adverse impacts on the environment, safety or health is expected as a result of the administrative hold. The administrative hold was initiated to prevent such incidents from occurring. The hold has impacted several programmatic goals for Tank Waste Remediation System (TWRS). A letter from WHC senior management has been submitted to DOE-RL addressing these programmatic delays. Further corrective actions are addressed in a Tank Waste Remediation System Resumption of Work Plan, dated September 13, 1993.

RL-WHC-TANKFARM-1993-0078 (OFF NORMAL) - INTERRUPTION IN CONTINUOUS TEMPERATURE MONITORING OF THREE WYDEN BILL TANKS DUE TO ADMINISTRATIVE OVERSIGHT (Final Report, 9/10/93)

On August 26, 1993, it was discovered that continuous monitoring of tank temperatures in Tanks 241-S-111, S-112 and T-101 were not taken. WHC committed to take weekly tank temperatures to satisfy requirements of continuous monitoring as set forth in the "Safety Measures for Waste Tanks at Hanford Nuclear Reservation," Section 3137 of the *National Defense Authorization Act for Fiscal Year 1991*, November 5, 1990, Public Law 101-510 (the Wyden Amendment). Temperature readings for S-111 and S-112 were missed during the week of August 9 - 15, 1993. Readings for tank T-101 were missed during the week of August 16 - 22, 1993 (although T-101 was removed from the Watch List in July 1993, it is still required to be monitored weekly).

Temperature readings at or near established baselines were obtained on August 19 in S-111 and S-112, and on August 27 in T-101.

Direct cause of the missed readings is equipment failure. The thermocouples were not in a state of operation which would have readily allowed operators to retrieve the weekly readings. Instead, the

thermocouples were in a state of repair which required instrumentation technicians to take the readings, and work packages to be prepared.

The root cause for the delay in obtaining temperature readings which resulted in exceeding a weekly commitment is WHC management determination that a delay in the weekly temperature surveillances on several Watch List tanks was necessary to ensure the careful planning, understanding and proper conduct of operations while performing the surveillances. Management decided it was safer to delay for a few days the weekly temperature readings for several Watch List tanks. The rationale was based on an evaluation of the tank waste temperature trend, knowledge of the tank contents, and current condition of conduct of operations in the field.

6. Changes to the Report

Appendix A. Waste Tank Surveillance Monitoring Tables

Three new charts have been added to show information on Discrepancy Reports:

- Figure 1. Discrepancy Report Status
- Figure 2. Discrepancy Report Cumulative Total
- Figure 3. Discrepancy Report Status by Age

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APPENDIX A

WASTE TANK SURVEILLANCE MONITORING TABLES

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TABLE A-1. WATCH LIST TANKS (Sheet 1 of 2)

These tanks have been identified as Watch List Tanks in accordance with Public Law 101-510, Section 3137, "Safety Measures for Waste Tanks at Hanford Nuclear Reservation," (1990). These tanks have been identified as the Priority 1 Hanford Site Tank Farm Safety Issues: "Issues/situations that contain most necessary conditions that could lead to worker (onsite) or offsite radiation exposure through an uncontrolled release of fission products, e.g., Tank SY-101."

September 30, 1993

Single-Shell Tanks				Single-Shell Tanks				Single-Shell Tanks			
Tank No.		Category	Officially Added to Watch List	Tank No.		Category	Officially Added to Watch List	Tank No.		Category	Officially Added to Watch List
A-101	(2)	Hydrogen	1/91	S-102	(2)	Hydrogen,	1/91	TY-101	(2)	Ferrocyanide	1/91
AX-101	(2)	Hydrogen	1/91		(2)	Organic Salts	1/91	TY-103	(2)	Ferrocyanide	1/91
AX-103	(2)	Hydrogen	1/91	S-111	(2)	Hydrogen	1/91	TY-104	(2)	Ferrocyanide	1/91
B-103	(2)	Organic Salts	1/91	S-112	(2)	Hydrogen	1/91	U-103	(2)	Hydrogen	1/91
BX-102	(2)	Ferrocyanide	1/91	SX-101	(1)(2)	Hydrogen	1/91	U-105	(2)	Hydrogen	1/91
BX-106	(2)	Ferrocyanide	1/91	SX-102	(1)(2)	Hydrogen	1/91	U-106	(2)	Organic Salts	1/91
BY-103	(2)	Ferrocyanide	1/91	SX-103	(1)(2)	Hydrogen	1/91	U-107	(2)	Organic Salts	1/91
BY-104	(2)	Ferrocyanide	1/91	SX-104	(1)(2)	Hydrogen	1/91	U-108	(2)	Hydrogen	1/91
BY-105	(2)	Ferrocyanide	1/91	SX-105	(1)(2)	Hydrogen	1/91	U-109	(2)	Hydrogen	1/91
BY-106	(2)	Ferrocyanide	1/91	SX-106	(1)(2)	Hydrogen,	1/91	U-111	(6)	Organic Salts	8/93
BY-107	(2)	Ferrocyanide	1/91		(1)(2)	Organic Salts	1/91	45 Tanks			
BY-108	(2)	Ferrocyanide	1/91	SX-109	(1)(2)	Hydrogen because other tanks vent thru it	1/91	Double-Shell Tanks			
BY-110	(2)	Ferrocyanide	1/91	T-107	(3)	Ferrocyanide	2/91	Tank No.		Category	Officially Added to Watch List
BY-111	(2)	Ferrocyanide	1/91	T-110	(2)	Hydrogen	1/91	AN-103	(1)(2)	Hydrogen	1/91
BY-112	(2)	Ferrocyanide	1/91	TX-105	(2)	Organic Salts	1/91	AN-104	(1)(2)	Hydrogen	1/91
C-103	(2)(4)	Organic Salts	1/91	TX-118	(2)	Ferrocyanide,	1/91	AN-105	(1)(2)	Hydrogen	1/91
C-106	(2)	High Heat Load	1/91		(2)	Organic Salts	1/91	AW-101	(1)(5)	Hydrogen	6/93
C-108	(2)	Ferrocyanide	1/91								
C-109	(2)	Ferrocyanide	1/91								
C-111	(2)	Ferrocyanide	1/91								
C-112	(2)	Ferrocyanide	1/91								
								SY-101	(1)(2)	Hydrogen	1/91
								SY-103	(1)(2)	Hydrogen	1/91
								6 Tanks			

See footnotes next page

A-3

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TABLE A-1 WATCH LIST TANKS (Sheet 2 of 2)

Footnotes:

- (1) These eight single-shell tanks and the six double-shell tanks on the Watch List are actively ventilated.

Although on various dates beginning in March 1990, WHC identified tanks containing ferrocyanide, organic salts, etc., which were then added to this report as Watch List tanks, the following official notifications were made to DOE-RL:

- (2) Letter 9059124, H. D. Harmon, WHC, to R. E. Gerton, DOE-RL, "Safety Measures for Waste Tanks at Hanford Site, Richland, Washington," dated January 8, 1991, identified 23 ferrocyanide tanks, 23 tanks with potential for accumulation of flammable gas, eight organic tanks, and one high heat load tank, as being Watch List tanks. (52 tanks)

The ferrocyanide and hydrogen tanks were declared Unresolved Safety Questions (USQ); the organic tanks and the high heat load tank were within the safety envelope as defined by the safety analysis reports and were not designated as USQs.

- (3) Letter 9059124.1 (revision to 9059124 above), dated February 8, 1991, added T-107 to the Ferrocyanide Watch List. (53 tanks)

- (4) Tank C-103 was declared a USQ per Unusual Occurrence Report RL-WHC-TANKFARM-1992-0069, issued September 1992, because of an organic layer covering the surface. This tank was previously identified as a Watch List tank in footnote (2) above.

- (5) Letter 9354700, J. C. Fulton, WHC, to R. E. Gerton, DOE-RL, "Addition of Tank 241-AW-101 to Flammable Gas Watch List," dated June 3, 1993, added this double-shell tank to the Watch List. (54 tanks)

- (6) Letter 9353957, J. C. Fulton, WHC, to R. E. Gerton, DOE-RL, "Single-Shell Waste Tank 241-U-111," dated May 24, 1993, recommended this tank be included on the Organic Tanks Watch List. This tank was added to the Watch List on August 31, 1993.

Notes: BX-110, BX-111, BY-101 and T-101 were removed from the Ferrocyanide Watch List in July 1993, per letter 93-CAB-223, John H. Anttonen, DOE-RL, to T. M. Anderson, WHC, "Resolution of Unreviewed Safety Question for Four Ferrocyanide Tanks," dated July 9, 1993.

TABLE A-2. TANKS CONTAINING >1000 GRAM MOLE OF FERROCYANIDE (Watch List Tanks) (Sheet 1 of 2)

These tanks have been declared an Unreviewed Safety Question (USQ) because their explosion potential exceeds previously reported safety analysis consequences (1). Tanks containing ferrocyanide are required to be monitored for temperatures at least weekly.

Temperatures in these tanks did not exceed the maximum temperature criteria or surveillance frequency limits for September 1993.

All Watch List tanks are reviewed for increasing temperature trends. Tanks connected to TMACS are required to be monitored continuously; those not connected are required to be monitored weekly. Temperatures are taken in the waste unless indicated otherwise.

Tank No.		Highest Temperature Reading in Waste (F.)	Date of Reading	Monitored by TMACS (5)	Total Waste (inches) (6)	FeCN (2) (x1000 g mol)	Estimated Heat Load (3) (Btu/h) (kW)	Date Declared Assumed Leaker	Interim Stabilized Date	
BX-102		69	09/30/93	No	42	<1	<10000	<2.93	1971	11/78
BX-106		70	09/26/93	No	24	<1	<10000	<2.93	Sound	N/A
BY-103		81	09/26/93	Yes	153	66	8600	2.52	1973	N/A
BY-104	Riser 1	128	09/26/93	Yes	155	83	5500	1.61	Sound	1/85
BY-104	Riser 10B	115	09/26/93	Yes	155	83	5500	1.61	Sound	1/85
BY-105	Riser 10C	114	09/26/93	Yes	190	36	3400	0.97	1984	N/A
BY-105	Riser 1	121	09/26/93	Yes	190	36	3400	0.97	1984	N/A
BY-106		129	09/26/93	Yes	241	70	3300	0.97	1984	N/A
BY-107		96	09/06/93	Yes	104	42	14500	4.25	1984	7/79
BY-108		109	09/26/93	Yes	90	58	23000	6.74	1972	2/85
BY-110	Riser 1	119	09/09/93	No	152	71	25200	7.39	Sound	1/85
BY-110	Riser 10A	108	09/03/93	No	152	71	25200	7.39	Sound	1/85
BY-111	LOW	88	09/19/93	Yes	174	6	34200	10.02	Sound	1/85
BY-111	Riser 14	84	09/26/93	Yes	174	6	34200	10.02	Sound	1/85
BY-112	LOW	83	09/26/93	Yes	113	2	<10000	<2.93	Sound	5/85
BY-112	Riser 5	90	09/26/93	Yes	113	2	<10000	<2.93	Sound	5/85
C-108		78	09/26/93	No	31	25	10000	<2.93	Sound	3/84
C-109	Riser 8	80	09/08/93	No	31	30	3800	1.11	Sound	11/83
C-109	Riser 3	80	09/30/93	No	31	30	3800	1.11	Sound	11/83
C-111		76	09/30/93	No	28	33	<10000	<2.93	1968	3/84
C-112	Riser 1	82	09/09/93	No	45	31	<10000	<2.93	Sound	9/90
C-112	Riser 8	83	09/30/93	No	45	31	<10000	<2.93	Sound	9/90
T-107		66	09/03/93	No	73	5	<10000	<2.93	1984	N/A
TX-118 (4)		76	09/26/93	Yes	134	<1	4900	1.44	Sound	4/83
TY-101		71	09/26/93	Yes	50	23	<10000	<2.93	1973	8/83
TY-103		72	09/26/93	Yes	66	28	<10000	<2.93	1973	2/83
TY-104		70	09/26/93	Yes	24	12	<10000	<2.93	1981	11/83
20 Tanks			Legend: TMACS = Tank Monitoring & Control System							

Note: Tanks BX-110, BX-111, BY-101 and T-101 were removed from this Watch List in July 1993, per letter 93-CAB-223, John H. Anttonen, DOE-RL, to T. M. Anderson, WHC, "Resolution of Unreviewed Safety Question for Four Ferrocyanide Tanks," dated July 9, 1993.

FOOTNOTES: See next page

TABLE A-2. TANKS CONTAINING >1000 GRAM MOLE OF FERROCYANIDE (Watch List Tanks) (Sheet 2 of 2)

FOOTNOTES:

- (1) This Priority 1 Waste Tank Safety Issue is stated as follows: "Could the concentrations and distribution of ferrocyanide and nitrate/nitrite in the tanks lead to an explosion if allowed to heat up or if an uncontrolled exothermic reaction could occur?"
- (2) The amount of FeCN reported in the tanks is based on WHC-SD-WM-ER-133-REV 0, "An Assessment of the Inventories of the FeCN Watch List Tanks," (Table 3-7), October 1991.
- (3) The estimated heat generation rates are from WHC-EP-0474-4, "Quarterly Report on Defense Nuclear Facilities Safety Board Recommendation 90-7 for the Period Ending March 31, 1992," Table 1-A, dated January 1992. Tank 104-BY only estimated per WHC-EP-0521, "SST 104-BY Thermal Hydraulic Analysis," October 1991 (kW = 3412 Btu/h). A new thermal hydraulic analysis of several tanks is currently being updated and is expected to be processed for external release by the end of FY1993. This document analyzes six tanks, BY-105, 106, 108, 110, and 111, and C-109. Information from this document will be incorporated in future monthly reports as soon as the clearance process is completed.
- (4) This tank also contains a high concentration (>3% wt TOC) of organic salts.
- (5) This column indicates which tanks are being monitored by the Tank Monitoring & Control System (TMACS); automatic temperature readings are taken continuously. Temperatures in tanks connected to TMACS but temporarily not being monitored by TMACS are taken manually. Temperatures in BY-110 are currently being taken manually.
- (6) Total waste in Kgal taken from Table E-5, Inventory and Status by Tanks for SSTs. Kgal/inches calculations for the temperature tables are as follows:

$$\frac{\text{Kgal waste} - 12.5 \text{ Kgal waste}^*}{2.75 \text{ Kgal/inch}} + 12 \text{ inches}^*$$

* The bottom 12 inches in dish bottom tanks contain 12.5 Kgal. All tanks are calculated as dish bottom tanks for the temperature tables, although A and AX farms have flat bottoms. Inches are from centerline tank bottom.

**TABLE A-3. TANKS WITH POTENTIAL FOR HYDROGEN OR FLAMMABLE GAS ACCUMULATION
ABOVE THE FLAMMABILITY LIMIT (Watch List Tanks)**

These tanks have been declared an Unreviewed Safety Question (USQ) because of the potential consequences of a radiological release resulting from a flammable gas burn, an event not analyzed in previous safety analyses.

Temperatures in these tanks did not exceed the applicable maximum temperature criteria or surveillance frequency limits for the month of September 1993. All Watch List tanks are reviewed for increasing temperature trends. Temperatures are taken in the waste unless indicated otherwise.

Tank No.		Highest Temperature Reading (F.) in Waste	Date of Reading	Total Waste (3) (inches)	Monitoring Frequency	Assumed Leaked Date	Interim Stabilized Date
A-101		154	09/30/93	354	Weekly	SOUND	N/A
AX-101		137	09/23/93	279	Weekly	SOUND	N/A
AX-103		115	09/23/93	48	Weekly	SOUND	8/87
S-102 (2)		109	09/12/93	207	Weekly	SOUND	N/A
S-111		93	09/12/93	224	Weekly	SOUND	N/A
S-112		85	09/20/93	239	Weekly	SOUND	N/A
SX-101		138	09/03/93	173	Weekly	SOUND	N/A
SX-102		148	09/20/93	205	Weekly	1993	N/A
SX-103		180	09/12/93	245	Weekly	SOUND	N/A
SX-104		172	09/12/93	231	Weekly	1988	N/A
SX-105		184	09/12/93	256	Weekly	SOUND	N/A
SX-106 (2)		112	09/12/93	203	Weekly	SOUND	N/A
SX-109 (1)	Riser 2	149	09/12/93	98	Weekly	1965	5/81
SX-109	Riser 8	152	09/12/93	98	Weekly	1965	5/81
T-110		66	09/20/93	145	Weekly	SOUND	N/A
U-103		86	09/04/93	178	Weekly	SOUND	N/A
U-105		89	09/04/93	159	Weekly	SOUND	N/A
U-108		87	09/04/93	178	Weekly	SOUND	N/A
U-109		84	09/04/93	176	Weekly	SOUND	N/A
AN-103	Double-shell tank	115	09/27/93		Weekly	SOUND	N/A
AN-104	Double-shell tank	115	09/27/93		Weekly	SOUND	N/A
AN-105	Double-shell tank	113	09/27/93		Weekly	SOUND	N/A
AW-101 (4)	Double-shell tank	107	09/27/93		Weekly	SOUND	N/A
SY-101	Riser 17b	123	09/27/93		Daily	SOUND	N/A
SY-101	Riser 17c	126	09/18/93		Daily	SOUND	N/A
SY-103	Double-shell tank	99	09/27/93		Weekly	SOUND	N/A
24 Tanks							Legend: N/A = Not Applicable

(1) Tank SX-109 has the potential for flammable gas accumulation only because other SX tanks vent through it

(2) Tanks S-102 and SX-106 also contain potentially high concentrations of organic salts

(3) See footnote (6) in Table A-2 (Ferrocyanide Tanks) for Total Waste/Inches calculations

(4) Tank 241-AW-101 was added to this list per letter 9354700, J. C. Fulton, WHC, To R. E. Gerton, DOE-RL, "Addition of Tank 241-AW-101 to Flammable Gas Watch List," dated June 3, 1993.

**TABLE A-4. SINGLE-SHELL TANKS CONTAINING CONCENTRATIONS OF ORGANIC SALTS
>3 WEIGHT % TOC (Watch List Tanks)**

These tanks have organic chemicals which are potentially flammable and mixtures of organic materials mixed with nitrate and nitrate salts can deflagrate. They are listed here because of their "potential for release of high level waste because of uncontrolled increases in the temperature or pressure." Double-Shell tanks having >3 Weight % TOC are not on the Watch List because they contain mostly liquid and there is no credible organic safety concern for tanks which contain mostly liquid. The safety concern is with tanks that primarily contain solids because they could dry out and heat up, and "high organic concentrations in the tanks could support an exothermic reaction at elevated temperatures (350 degrees F/180 degrees C)." These tanks (with the exception of C-103), do not have an associated USQ because the presence of organic material was reviewed in the SST Safety Analysis Report.

Temperatures in these tanks did not exceed the applicable maximum temperature criteria or surveillance frequency limits for the month of September 1993. These tanks are monitored weekly. All Watch List tanks are reviewed for increasing temperature trends.

Temperatures are taken in the waste unless indicated otherwise.

Tank No.	Temperature Reading (F.) in Waste	Date of Reading	Total Waste Inches (4)	Assumed Leaked Date	Interim Stabilized Date
B-103	67	09/30/93	29	1978	2/85
C-103 (3)	121	09/17/93	78	SOUND	N/A
S-102 (1)	109	09/12/93	207	SOUND	N/A
SX-106 (1)	112	09/12/93	203	SOUND	N/A
TX-105	98	09/20/93	228	1977	9/83
TX-118 (2)	76	09/26/93	134	SOUND	4/83
U-106	80	09/04/93	90	SOUND	N/A
U-107	76	09/04/93	155	SOUND	N/A
U-111 (5)	80	09/11/93	127	SOUND	N/A
9 Tanks					

- (1) These tanks also have the potential for hydrogen or flammable gas accumulation
- (2) Tank TX-118 also contains ferrocyanide
- (3) Tank C-103 was declared a USQ per Unusual Occurrence Report RL-WHC-TANKFARM-1992-0069, issued September 1992, because of an organic layer covering the surface.
- (4) See footnote (6) in Table A-2 (Ferrocyanide Tanks) for Total Waste/Inches calculations
- (5) Tank U-111 was added August 31, 1993. See August 1993 Summary Highlights for information and Table A.1 "Watch List Tanks" footnotes for applicable reference.

TABLE A-5. SINGLE-SHELL TANKS WITH HIGH HEAT LOADS (>40,000 Btu/h)(Sheet 1 of 2)

High heat load tanks have temperature surveillance requirements established by SD-WM-SAR-006 REV 1, "SST Isolation Safety Analysis Report," dated January 1986, and OSD-T-151-00013 REV D-O, "Operating Specifications for Single-Shell Waste Storage Tanks," dated August 1990. While all of these tanks are considered high heat load tanks per SAR definition, only one (241-C-106) is on the High Heat Watch List.

Temperatures in these tanks did not exceed SAR or OSD requirement limits for the month of September 1993. All high heat load tanks are on active ventilation. These high heat tanks are reviewed for increasing temperature trends.

Temperatures are taken in the waste unless indicated otherwise.

Temperatures are taken in the waste unless indicated otherwise.								Date	
	Location	Temperature	Date	Total	Monitoring	Estimated Heat Load (1)		Declared	Interim
Tank No.	(6)	Reading (F.)	of	Waste	Frequency	(Btu/h)	(kW)	Assumed	Stabilized
		in Waste	Reading	Inches (7)				Leaker	Date
A-104 (4)	R-12	192	09/20/93	18	Weekly	50000	15	1975	9/78
A-105 (4)	R-16	154	09/06/93	14	Weekly	50000	15	1963	7/79
C-106 (2)(3)	Riser 8	160	09/25/93	91	Weekly	150000	44	SOUND	N/A
C-106 (2)(3)	Riser 14	138	09/09/93	91	Weekly	150000	44	SOUND	N/A
SX-107	Tree 2	168	09/04/93	45	Monthly	42000	12	1964	10/79
SX-107	Tree 8	166	09/04/93	45	Monthly	42000	12	1964	10/79
SX-108	Tree 2	192	09/04/93	49	Monthly	45000	13	1962	8/79
SX-108	Tree 8	196	09/04/93	49	Monthly	45000	13	1962	8/79
SX-109 (3)	Tree 2	149	09/12/93	98	Weekly	50000	15	1965	5/81
SX-109 (3)	Tree 8	152	09/12/93	98	Weekly	50000	15	1965	5/81
SX-110	Tree 2	170	09/04/93	30	Monthly	42000	12	1976	8/79
SX-110	Tree 8	166	09/04/93	30	Monthly	42000	12	1976	8/79
SX-111	Tree 2	186	09/04/93	53	Monthly	44000	13	1974	7/79
SX-111	Tree 8	159	09/04/93	53	Monthly	44000	13	1974	7/79
SX-112	Tree 2	150	09/04/93	41	Monthly	43000	13	1969	7/79
SX-112	Tree 8	156	09/04/93	41	Monthly	43000	13	1969	7/79
SX-114	Tree 2	184	09/04/93	73	Monthly	58000	17	1972	7/79
SX-114	Tree 8	182	09/04/93	73	Monthly	58000	17	1972	7/79
10 Tanks						Legend: Tree = Thermocouple Tree			
A-105 Laterals		243	09/13/93	Weekly					
Temperatures are taken in 34 thermocouples located in the laterals beneath A-105. SAR requirements (see top of table) do not apply to these temperatures; however, Westinghouse Hanford has voluntarily chosen to apply the waste temperature limits to the soil temperature for surveillance reporting.									

Footnotes - see next page

TABLE A-5. SINGLE-SHELL TANKS WITH HIGH HEAT LOADS (>40,000 Btu/h)(Sheet 2 of 2)

Footnotes:

- (1) High heat loads as of 1988, evaluation completed April 20, 1989 (kW = 3412 Btu/h). The predominant heat load for these tanks is from CS 137 (half life of 30 years) and SR 90 (half life of 28.1 years). Tank C-105 was re-evaluated in WHC-SD-WM-ER-178, "Thermal Analysis of Tank 241-C-105 in Support of Process Test," January 1993. Engineering Change Notice #196834, June 24, 1993, changed the status of C-105 from High Heat Load to Normal, effective July 1, 1993.
- (2) Periodic water additions are required in C-106 to maintain evaporative cooling and thus prevent overheating. This tank is scheduled for partial retrieval starting in 1997, at which time cooling water additions will be discontinued.
- (3) Watch List Tanks: C-106 is on the Watch List because "without water additions (in the event of a leak) the tank could exceed structural temperature limits resulting in unacceptable structural damage." SX-109 is on the hydrogen Watch List because it has the potential for flammable gas accumulation due to other SX tanks venting through it.
- (4) A-104/105/106 exhaustor has been out of service from October 1, 1991, until August 20, 1992, when it was briefly restarted. Problems exist which must be resolved before the exhaustor is operational. Temperatures in A-104 and A-105 are monitored weekly.
- (5) Maximum lateral temperatures under A-105 increased 20 degrees F. by January 1992, but then dropped a few degrees and have remained fairly stable at current temperature. These temperatures are monitored weekly.
- (6) Tanks A-104 and A-105
Two temperature probes are installed in risers in A-104, and six are installed in risers in A-105. These are individual probes. In A-104, the probes are in contact with the sludge; in A-105, they are in contact with the bottom of the tank (A-105 has a bulged bottom).

Tank C-106

Tank C-106 has six functioning thermocouples (#1 through 6).

Tanks SX-107, 108, 109, 110, 111, 112, and 114

Each of these tanks has eight thermocouple trees, with eight thermocouples on each tree, with the exception of SX-108, which has four operational thermocouples on each of two trees. Tree #2 and Tree #8 are monitored in each of these SX tanks..

- (8) Calculations for Total Waste Inches: see footnote (6), Table A-2 (Ferrocyanide Tanks)
- (9) There are 19 single-shell tanks with active ventilation (eight are on the Watch List as indicated by an asterisk):

A-104	SX-101 *	SX-107
A-105	SX-102 *	SX-108
A-106	SX-103 *	SX-109 *
C-104	SX-104 *	SX-110
C-105	SX-105 *	SX-111
C-106 *	SX-106 *	SX-112
		SX-114

TABLE A-6. NON-WATCH LIST LOW HEAT LOAD TANKS (<40,000 Btu/h)

(Page 1 of 3)

Temperatures are taken semiannually in January and July, unless otherwise indicated, in the following 96 single-shell tanks. Legend follows table.

	Tank No.	Highest Temperatures taken in waste		Total Waste (1)		Comments
		Jan. 93	Jul. 93	Kgal	Inches	
1	A-102	92	92	41	15	
2	A-103	117	117	370	135	
3	A-106	138	137	125	50	
4	AX-102	O/S	76	39	10	Only TC#5 working on 7/93, reading in vapor space Control box contaminated inside
5	AX-104	97	98	7	3	
6	B-101	110	108	113	48	
7	B-102	62	63	32	19	TC#1 O/S, reading in vapor space
8	B-104	68	66	371	142	
9	B-105	68	66	306	50	
10	B-106	61	62	117	67	TC#1 & 2 O/S
11	B-107	62	62	165	41	TC#1 thru 3 O/S, reading in vapor space
12	B-108	62	62	94	54	
13	B-109	62	61	127	97	
14	B-110	O/S	68	246	94	TC#1 thru 4 O/S. Reading in vapor space
15	B-111	O/S	86	237	19	TC#1 & 2 O/S, work order issued, historical readings erratic
16	B-112	62	63	33	7	
17	B-201	58	60	29	151	
18	B-202	59	61	27	141	
19	B-203	62	62	51	263	
20	B-204	59	62	50	258	
21	BX-101	O/S	O/S	43	27	All TCs O/S, work order issued, last reading 74 F. in 11/92
22	BX-103	O/S	O/S	66	31	All TCs O/S, last reading 77 F. in 10/92
23	BX-104	O/S	O/S	99	43	(2) No TC tree per Riser Configuration document Last reading 87 F. in 10/80
24	BX-105	66	63	51	26	
25	BX-107	O/S	O/S	345	133	All TCs O/S, work order issued, last reading 69 F. in 10/82
26	BX-108	O/S	63	26	17	No relay box in 1/93
27	BX-109	O/S	77	193	78	No relay box in 1/93, no historical readings available
28	BX-110	-	68	199	80	Monitored weekly, formerly on ferrocyanide Watch List
29	BX-111	-	65	230	91	Monitored weekly, formerly on ferrocyanide Watch List
30	BX-112	O/S	62	165	67	No relay box in 1/93
31	BY-101	-	75	387	148	Monitored weekly, formerly on ferrocyanide Watch List
32	BY-102	O/S	O/S	341	131	(2) No TC tree per Riser Configuration document. Last reading 72 F. in 4/79
33	BY-109	O/S	O/S	423	161	(2) No TC tree per Riser Configuration document.

TABLE A-6. NON-WATCH LIST LOW HEAT LOAD TANKS (<40,000 Btu/h)

(Page 2 of 3)

Temperatures are taken semiannually in January and July, unless otherwise indicated, in the following 96 single-shell tanks. Legend follows table.

	Tank No.	Highest Temperatures taken in waste		Total Waste (1)		Comments
		Jan. 93	Jul. 93	Kgal	Inches	
34	C-101	91	88	88	39	
35	C-102	O/S	O/S	423	161	Broken coupling, work order issued, last reading 96 F. in 11/92
36	C-104	88	87	295	115	TC#1 thru 5 O/S, reading in vapor space
37	C-105	-	92	150	63	Monitored weekly, formerly on High Heat Load list
38	C-107	-	111	275	107	Monthly reading requirement per procedure, monitored weekly
39	C-110	65	65	187	75	TC#1 thru 4 O/S, reading in vapor space
40	C-201	60	61	2	13	
41	C-202	58	61	1	8	
42	C-203	58	60	5	29	
43	C-204	O/S	O/S	3	18	No hookup to tree, last reading prior to '91.
44	S-101	O/S	115	427	162	TC#1, 3, 5, & 6 O/S, work order issued
45	S-103	88	85	248	98	
46	S-104	108	104	294	114	
47	S-105	77	73	456	173	
48	S-106	81	78	543	205	
49	S-107	106	107	368	129	
50	S-108	87	85	604	227	
51	S-109	83	O/S	568	214	All TCs O/S
52	S-110	117	116	390	149	
53	SX-113	75	73	26	15	
54	SX-115	O/S	O/S	12	10	(2) No TC junction box, last reading prior 12/91
55	T-101	-	66	102	45	Monitored weekly, formerly on ferrocyanide Watch List
56	T-102	O/S	O/S	32	19	(2) No TC tree per Riser Configuration document, last reading 68 F. in 2/81
57	T-103	58	59	27	17	
58	T-104	62	O/S	445	169	All TCs O/S, work order issued
59	T-105	O/S	O/S	98	43	(2) No TC tree per Riser Configuration document
60	T-106	58	59	21	15	
61	T-108	O/S	O/S	180	73	All TCs O/S, TC tree laying on ground, J-3 issued 1/92 and again 7/93, last reading 63 F. in 11/91
62	T-109	O/S	O/S	58	29	All TCs O/S, work order issued, last reading 75 F. in 2/91
63	T-111	62	59	458	174	TCs #1, 2, 5, 6 O/S
64	T-112	62	58	67	32	
65	T-201	61	59	29	150	
66	T-202	61	58	21	110	
67	T-203	61	75	35	182	
68	T-204	62	60	38	197	

TABLE A-6. NON-WATCH LIST LOW HEAT LOAD TANKS (<40,000 Btu/h)

(Page 3 of 3)

Temperatures are taken semiannually in January and July, unless otherwise indicated, in the following 96 single-shell tanks. Legend follows table.

Tank No.	Highest Temperatures taken in waste		Total Waste (1)		Comments
	Jan. 93	Jul. 93	Kgal	Inches	
69	TX-101	O/S	O/S	87 39	(2) No TC tree per Riser Configuration document
70	TX-102	O/S	O/S	113 49	Cable cut from tree
71	TX-103	71	55	157 54	Cable cut from tree, readings taken by Instrument Technician
72	TX-104	64	60	65 31	Cable cut from tree, readings taken by Instrument Technician
73	TX-106	80	59	453 172	Cable cut from tree, readings taken by Instrument Technician
74	TX-107	67	60	36 21	Cable cut from tree, readings taken by Instrument Technician
75	TX-108	65	61	134 56	Cable cut from tree, readings taken by Instrument Technician
76	TX-109	97	64	384 147	Cable cut from tree, readings taken by Instrument Technician
77	TX-110	81	O/S	462 175	Cable cut from tree, readings taken by Instrument Technician
78	TX-111	73	61	370 142	Cable cut from tree, readings taken by Instrument Technician
79	TX-112	72	72	649 243	Cable cut from tree, readings taken by Instrument Technician
80	TX-113	73	65	607 228	Dial pushed inside housing, readings taken by Instr. Tech.
81	TX-114	O/S	O/S	535 202	Cable cut from TC tree
82	TX-115	70	67	640 240	Dial pushed inside housing, readings taken by Instr. Tech.
83	TX-116	O/S	O/S	631 237	(2) Tree cut off in riser per Riser Configuration document
84	TX-117	O/S	O/S	626 235	All TCs O/S, cable cut from tree
85	TY-102	O/S	O/S	64 31	No selector switch, last reading 64 F. in 12/91
86	TY-105	75	77	231 91	
87	TY-105	60	60	17 14	
88	U-101	66	61	25 17	
89	U-102	88	81	374 143	
90	U-104	O/S	O/S	122 52	(2) No TC tree per Riser Configuration document
91	U-110	81	72	186 75	
93	U-112	62	61	49 25	
93	U-102	O/S	O/S	5 29	All TCs O/S, work order written, last reading 66 F. in 11/92
94	U-202	60	59	5 29	
95	U-203	59	O/S	3 18	
97	U-204	O/S	80	3 18	Selector knob not working 1/93, 7/93 readings suspect

(1) See Table A-2 (footnote 6) for waste gallons/inches calculations.

(2) Thermocouples in nine tanks (BX-104, BY-102, BY-109, SX-115, T-102, T-105, TX-101, TX-116, and U-104) are out of service due to no TC trees in these tanks, or the thermocouples have been cut off, covered over, or are otherwise unable to function, per the Riser Configuration document. (Also see comment section above)

LEGEND:	
TC - Thermocouple	
O/S - Out of service	
Riser Configuration document - WHC-SD-RE-TI-053, REV 8, "Riser Configuration Document for Single-Shell Tanks," September 1991	
SUMMARY:	
Readings obtained in July 1993	72
No readings (TC trees O/S - includes nine tanks with no trees - see footnote above)	24
Total low heat load tanks	96 (U-111 was added to Organics Watch List, August 1993)

TABLE A-7. SINGLE-SHELL TANKS MONITORING COMPLIANCE STATUS

149 TANKS (Sheet 1 of 5)

The following table indicates whether Single-Shell tank monitoring was in compliance with the requirements as specified in the applicable documents as of the last day of the applicable month:

NOTE:

All Watch List and High Heat tank temperature monitoring is in compliance. (5)

All Dome Elevation Survey monitoring is in compliance.

All Drywell monitoring is in compliance.

Psychrometrics (2)

In-tank Photographs (3)

Pressure Monitoring (6)

CAM/RAMP Monitoring (7)

Vapor Monitoring (8)

LEGEND:

(Shaded)	= In compliance with all applicable documentation
O/C	= Out of compliance with documentation
-357	= WHC-SD-WM-TI-357, "Waste Storage Tank Status and Leak Detection Criteria"
POP	= Plant Operating Procedure TO-040-650, "Obtain/Record SST Temperatures"
M.T.	= Manual Tape
FIC	= Food Instrument Company
OSR/SAR	= Operations Safety Requirements/Safety Analysis Report, SD-WM-SAR-006, Rev 2, 2/86; -SAR-034, Rev 0, 6/81
OSD	= Operating Specifications Doc., OSD-T-151-00013, Rev D-O, 8/90
N/A	= Not Applicable (i.e., no LOW, M.T., FIC installed)
O/S	= Out of Service
Gamma	= LOW readings taken by Gamma probe
Neutron	= LOW readings taken by Neutron probe

Information as of 9/30/93

Tank Number	Category		Temperature Readings (5)(6)	Surface Level Readings (1) (-357)		LOW Readings (-357)		Radiation Readings		Dome Elevation Surveys (OSR/SAR)
	Watch List(6)	High Heat		M.T.	FIC	Gamma	Neutron	Lateral Readings (-357)	Drywell Readings (OSR/SAR)	
A-101	X			N/A	N/A	N/A	N/A	O/C		
A-102				N/A		N/A	N/A	O/C		
A-103				N/A				O/C		
A-104		X			N/A	N/A	N/A			
A-105		X			N/A	N/A	N/A			
A-106				N/A		N/A	N/A			
AX-101	X			N/A						
AX-102					N/A	N/A	N/A			
AX-103	X			N/A		N/A	N/A			
AX-104					N/A	N/A	N/A			
B-101				N/A		N/A	N/A			
B-102				N/A		N/A	N/A			
B-103	X			N/A		N/A	N/A			
B-104					N/A					
B-105					N/A					
B-106				N/A		N/A	N/A			
B-107					N/A	N/A	N/A			
B-108				N/A		N/A	N/A			
B-109					N/A	N/A	N/A			
B-110				O/C	N/A	N/A	N/A			
B-111				N/A		N/A	N/A			
B-112				N/A		N/A	N/A			
B-201					N/A	N/A	N/A			
B-202					N/A	N/A	N/A			
B-203					N/A	N/A	N/A			
B-204					N/A	N/A	N/A			
BX-101			O/C		N/A	N/A	N/A			
BX-102	X				N/A	N/A	N/A			
BX-103			O/C	N/A		N/A	N/A			
BX-104			O/S-O/C	N/A		N/A	N/A			
BX-105				N/A		N/A	N/A			
BX-106	X			N/A		N/A	N/A			
BX-107			O/C	N/A	O/C	N/A	N/A			

TABLE A-7. SINGLE-SHELL TANKS MONITORING COMPLIANCE STATUS

149 TANKS (Sheet 2 of 5)

Information as of 9/30/93

Tank Number	Category		Temperature Readings (5)(6)	Surface Level Readings (1) (-357)		LOW Readings (-357)		Radiation Readings		Dome Elevation Surveys (OSR/SAR)
	Watch List(6)	High Heat		M.T.	FIC	Gamma	Neutron	Lateral Readings (-357)	Drywell Readings (OSR/SAR)	
BX-108					N/A	N/A	N/A	N/A		
BX-109				N/A		N/A	N/A	N/A		
BX-110 (4)					N/A	N/A	N/A	N/A		
BX-111 (4)					N/A			N/A		
BX-112				N/A		N/A	N/A	N/A		
BY-101 (4)				O/C	N/A			N/A		
BY-102			O/S-O/C		N/A			N/A		
BY-103	X				N/A			N/A		
BY-104	X				N/A			N/A		
BY-105	X				N/A			N/A		
BY-106	X				N/A			N/A		
BY-107	X				N/A			N/A		
BY-108	X				N/A	N/A	N/A	N/A		
BY-109			O/S-O/C	N/A				N/A		
BY-110	X				N/A			N/A		
BY-111	X				N/A			N/A		
BY-112	X				N/A	O/C	O/C	N/A		
C-101					N/A	N/A	N/A	N/A		
C-102			O/C	N/A		N/A	N/A	N/A	N/A	
C-103	X			N/A		N/A	N/A	N/A		
C-104				N/A		N/A	N/A	N/A		
C-105				N/A		N/A	N/A	N/A		
C-106 (4)	X	X		N/A		N/A	N/A	N/A		
C-107				N/A		N/A	N/A	N/A		
C-108	X				N/A	N/A	N/A	N/A		
C-109	X				N/A	N/A	N/A	N/A		
C-110					N/A	N/A	N/A	N/A		
C-111	X				N/A	N/A	N/A	N/A		
C-112	X				N/A	N/A	N/A	N/A		
C-201					N/A	N/A	N/A	N/A		
C-202					N/A	N/A	N/A	N/A		
C-203					N/A	N/A	N/A	N/A		
C-204			O/C		N/A	N/A	N/A	N/A		
S-101				N/A				N/A		
S-102	X			N/A				N/A		
S-103				N/A				N/A		
S-104					N/A	N/A	N/A	N/A		
S-105				N/A				N/A		
S-106				N/A				N/A		
S-107				N/A		N/A	N/A	N/A		
S-108								N/A		
S-109			O/C	N/A				N/A		
S-110				N/A				N/A		
S-111	X			N/A				N/A		
S-112	X			N/A				N/A		
SX-101	X			N/A				N/A		
SX-102	X			N/A				N/A		
SX-103	X			N/A				N/A		
SX-104	X			N/A		O/S-O/C	O/S-O/C	N/A		
SX-105	X			N/A				O/C		
SX-106	X			N/A				N/A		
SX-107		X			N/A	N/A	N/A	O/C		
SX-108		X			N/A	N/A	N/A	O/C		

TABLE A-7. SINGLE-SHELL TANKS MONITORING COMPLIANCE STATUS

149 TANKS (Sheet 3 of 5)

Information as of 9/30/93

Tank Number	Category		Temperature Readings (5)(6)	Surface Level Readings (1) (-357)		LOW Readings (-357)		Radiation Readings		Dome Elevation Surveys (OSR/SAR)
	Watch List(6)	High Heat		M.T.	FIC	Gamma	Neutron	Lateral Readings (-357)	Drywell Readings (OSR/SAR)	
SX-109 (4)	X	X			N/A	N/A	N/A	O/C		
SX-110		X			N/A	N/A	N/A	O/C		
SX-111		X			N/A	N/A	N/A	O/C		
SX-112		X			N/A	N/A	N/A	O/C		
SX-113					N/A	N/A	N/A	N/A		
SX-114		X			N/A	N/A	N/A	O/C		
SX-115			O/S - O/C		N/A	N/A	N/A	O/C		
T-101 (4)						N/A	N/A	N/A		
T-102			O/S - O/C	N/A	O/C	N/A	N/A	N/A		
T-103				N/A	O/C	N/A	N/A	N/A		
T-104			O/C		N/A			N/A		
T-105			O/S - O/C	N/A		N/A	N/A	N/A		
T-106				N/A		N/A	N/A	N/A		
T-107	X			N/A		N/A	N/A	N/A		
T-108			O/C		N/A	N/A	N/A	N/A		
T-109			O/C	N/A	O/C	N/A	N/A	N/A		
T-110	X			N/A				N/A		
T-111				N/A				N/A		
T-112				N/A		N/A	N/A	N/A		
T-201					N/A	N/A	N/A	N/A		
T-202				O/C	N/A	N/A	N/A	N/A		
T-203					N/A	N/A	N/A	N/A		
T-204					N/A	N/A	N/A	N/A		
TX-101			O/S - O/C	N/A		N/A	N/A	N/A		
TX-102			O/C		N/A			N/A		
TX-103				N/A		N/A	N/A	N/A		
TX-104				N/A		N/A	N/A	N/A		
TX-105	X				N/A	O/S-O/C	O/S-O/C	N/A		
TX-106					N/A			N/A		
TX-107				N/A		N/A	N/A	N/A		
TX-108				N/A				N/A		
TX-109				N/A				N/A		
TX-110			O/C		N/A			N/A		
TX-111					N/A			N/A		
TX-112					N/A			N/A		
TX-113					N/A			N/A		
TX-114			O/C		N/A			N/A		
TX-115					N/A			N/A		
TX-116			O/S O/C		N/A	N/A	N/A	N/A		
TX-117			O/C		N/A			N/A		
TX-118	X			N/A				N/A		
TY-101	X			N/A		N/A	N/A	N/A		
TY-102			O/C	N/A		N/A	N/A	N/A		
TY-103	X			N/A				N/A		
TY-104	X			N/A		N/A	N/A	N/A		
TY-105					N/A	N/A	N/A	N/A		
TY-106					N/A	N/A	N/A	N/A		
U-101				O/C	N/A	N/A	N/A	N/A		
U-102				N/A				N/A		
U-103	X			N/A				N/A		
U-104			O/S - O/C		N/A	N/A	N/A	N/A		
U-105	X			N/A				N/A		
U-106	X			N/A				N/A		

TABLE A-7. SINGLE-SHELL TANKS MONITORING COMPLIANCE STATUS

149 TANKS (Sheet 4 of 5)

Information as of 9/30/93

Tank Number	Category		Temperature Readings (5)(6)	Surface Level Readings (1) (-357)		LOW Readings (-357)		Radiation Readings		Dome Elevation Surveys (OSR/SAR)
	Watch List(6)	High Heat		M.T.	FIC	Gamma	Neutron	Lateral Readings (-357)	Drywell Readings (OSR/SAR)	
U-107	X			N/A				N/A		
U-108	X			N/A	O/C			N/A		
U-109	X			N/A				N/A		
U-110				N/A		N/A	N/A	N/A		
U-111	X			N/A				N/A		
U-112					N/A	N/A	N/A	N/A		
U-201			O/C		N/A	N/A	N/A	N/A		
U-202					N/A	N/A	N/A	N/A		
U-203			O/C		N/A	N/A	N/A	N/A		
U-204					N/A	N/A	N/A	N/A		
Catch Tanks and Special Surveillance Facilities										
A-302-A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A
A-302-B	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
311-ER	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A
182-AX	N/A	N/A	N/A		N/A					
151-AZ	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A
154-AZ	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A
BX-TK/SMP	N/A	N/A	N/A		N/A					
A-TK/SMP	N/A	N/A	N/A		N/A					
204-AR	N/A	N/A	N/A							
417-A	N/A	N/A	N/A							
Vent Sta.	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
S-302	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A
S-302-A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A
S-304	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
TX-302-B	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
TX-302-C	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A
U-301-B	N/A	N/A	N/A	N/A	O/C	N/A	N/A	N/A	N/A	N/A
UX-302-A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A
141-S	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
142-S	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
Totals: 149 tanks	45 Watch List Tanks (4)	10 High Heat Tanks (4)	O/C: 25 tanks -- (semiannual monitoring frequency) (5)	O/C: 4 tanks 0 catch tank	O/C: 5 tanks 1 catch tank	O/C: 3 tanks 58 tanks have LOWs (2 are O/S)	O/C: 3 tanks	O/C: 12 tanks	0	0

See Footnotes on next page

TABLE A-7. SINGLE-SHELL TANKS MONITORING COMPLIANCE STATUS
149 TANKS (Sheet 5 of 5)

Footnotes:

1. All SSTs have either manual tape or FIC, with the exception of S-108 and T-101, which have both. Tank 101-T also has a zip cord. All SST FICs are connected to CASS, with the exception of BX-106; however, the connection for many tanks is broken. For such cases, manual readings are taken. Manual surface level readings include readings taken by manual tape, manual FIC (not connected to CASS; BX-106), manual readings of automatic FIC (if CASS is printing "0"), or automatic FIC. In some cases, the surface level readings are taken using a zip cord. While less accurate, such readings are acceptable for meeting the surface level reading requirements.
2. Psychrometric readings are only taken on tanks with active exhausters; high heat load tanks A-104/105, C-105/106 (effective July 1, 1993, C-105 is no longer a high heat load tank), SX-107, 108, 109, 110, 111, 112, and 114. The exhausters on A-104/105 have been down since October 1991; no readings are being taken. The frequency of psychrometric readings in SSTs is determined by the Cognizant Engineers for the applicable tank farms on an "as needed" basis, with the exception of Tanks C-105/106. Hanford Federal Facility Agreement and Consent Order, "Washington State Department of Ecology, U. S. Environmental Protection Agency, and U. S. Department of Energy, 1992 (Tri-Party Agreement) requires psychrometric readings to be taken in C-105/106 on a monthly frequency. Tanks C-105/106 psychrometric readings were not obtained during the month of August 1993. Discrepancy Report S&DA 93-605 was issued September 30, 1993.
3. In-tank photographs are requested on an "as needed" basis. No in-tank photographs were taken between September 1990 and March 1993.
4. Two tanks are on both category lists (C-106 and SX-109). In July 1993, C-105 was removed from the High Heat Load list and BX-110, BX-111, BY-101 and T-101 were removed from the ferrocyanide Watch List; these tanks continue to be monitored weekly. Temperatures in BX-110 continue to be erratic. Maintenance on a selector switch was performed in June 1993, and in July the instrument was suspected of not functioning properly. Operations personnel state that cables in the junction box may be the cause of the erratic readings. This tank is scheduled for connection to the TMACS late 1993.
5. Temperature readings may be regulated by OSD, -357, or POP. Additionally, high heat load tanks are regulated by OSR/SAR. Thermocouples in the nine tanks designated O/S-O/C are out of service; there are either no thermocouple trees in these tanks, or trees have been cut off, covered over, or are otherwise unable to function. The OSD does not require readings or repair of out-of service thermocouples for the 97 low heat load (<40,000 Btu/h) tanks. However, the POP requires that attempts are to be made semiannually in January and July to obtain readings for these tanks. Temperatures were taken in July 1993; a total of 25 tanks are O/C because either no attempt to obtain the temperature was made, or a reading could not be obtained.
6. "Safety Measures for Waste Tanks at Hanford Nuclear Reservation, Section 3137 of the National Defense Authorization Act for Fiscal Year 1991," November 5, 1990, Public Law 101-510, (the "Widen Amendment") requires continuous pressure monitoring and temperature monitoring in Watch List tanks. WHC-EP-0422 REV 1, "A Plan to Implement Remediation of Waste Tank Safety Issues at the Hanford Site," December 1991, addresses these monitoring issues. WHC-EP-0600, "Status Report on Resolution of Waste Tank Safety Issues at the Hanford Site," issued August 1993, describes the resolution strategy for these safety issues.
7. Continuous Air Monitoring (CAM) compliance and Radiation Area Monitoring Panel (RAMP) compliance are not addressed in this table.
8. Double-shell tank farm SY has the only tanks with continuous vapor/flammable gas monitoring; not addressed in this table.

TABLE A-8. DOUBLE-SHELL TANKS MONITORING COMPLIANCE STATUS
28 TANKS (Sheet 1 of 2)

The following table indicates whether Double-Shell tank monitoring was in compliance with the requirements as specified in the applicable documents as of the last day of the applicable month:

NOTE:

Dome Elevation Surveys are not required for DSTs.
 Psychrometrics (2)
 In-tank Photographs (3)
 Pressure Monitoring (6)
 CAM/RAMP Monitoring (7)
 Vapor Monitoring (8)

LEGEND:

(Shaded)	= In compliance with all applicable documentation
O/C	= Out of compliance with documentation
-357	= WHC-SD-WM-TI-357, "Waste Storage Tank Status and Leak Detection Criteria"
M.T.	= Manual Tape
FIC	= Food Instrument Company
OSR/SAR	= Operations Safety Requirements/Safety Analysis Report WHC-SD-WM-SAR-016, Rev 1, 5/86 WHC-SD-HS-SAR-010, Rev 1, 8/83 (Aging Waste)
OSD	= Operations Safety Doc., OSD-T-151-0007, Rev H-5, 1/92
N/A	= Not Applicable (i.e., no M.T., FIC installed)
O/S	= Out of Service
W.F.	= Weight Factor
Rad.	= Radiation

Information as of 9/30/93

Tank Number	Watch List	Temperature Readings (4) (OSD)	Surface Level Readings (1) (-357, OSR/SAR)		Radiation Readings		
					Leak Detection Pits (5) (-357, OSR/SAR)		Annulus (-357)
			M.T.	FIC	W.F.	Rad.	
AN-101			N/A			O/C	
AN-102			N/A			O/C	
AN-103	X		N/A				
AN-104	X		N/A			O/C	
AN-105	X		N/A				
AN-106			N/A				
AN-107			N/A				
AP-101						O/C	
AP-102				O/S		O/C	
AP-103						O/C	
AP-104			O/S			O/C	
AP-105						O/C	
AP-106						O/C	
AP-107						O/C	
AP-108						O/C	
AW-101	X			O/S			
AW-102				O/S			
AW-103						O/C	
AW-104						O/C	
AW-105				O/S		O/C	
AW-106						O/C	
AY-101				O/S			O/C
AY-102						O/C	O/C
AZ-101				O/S		O/C (9)	O/C
AZ-102				O/S		O/C	O/C
SY-101	X						
SY-102				O/S			
SY-103	X			O/S			
Totals: 28 tanks	6 Watch List Tanks	O/C: 0	O/C: 0	O/C: 0	O/C: 0	O/C: 18 tanks	O/C: 4 tanks

See footnotes next page:

TABLE A-8. DOUBLE-SHELL TANKS MONITORING COMPLIANCE STATUS
28 TANKS (Sheet 2 of 2)

Footnotes:

1. All DSTs have both manual tape and FIC, with the exception of the AN Tank Farm which has only FICs. The manual tape is used when the FIC is out of service. O/C will be shown when no readings are obtained.
2. Psychrometric readings are only taken on tanks with active exhausters; all DSTs have active exhausters. The frequency of psychrometric readings in DSTs is determined by the Cognizant Engineers for the applicable tank farms on an "as needed" basis. Currently, monthly readings are being taken on the SY-101 annulus exhaust, SY-102 tank and annulus exhaust, and SY-103 tank and annulus exhaust. SY-101 tank exhaust readings are not being taken until a port on the tank exhaust header becomes available for exhauster readings. No other psychrometric readings are currently being taken monthly.
3. In-tank photographs are requested on an "as needed" basis. Last in-tank photographs in DSTs were taken in April 1989.
4. OSD specifies DST temperature limits, gradients, etc. Tank SY-101 temperatures are obtained shiftwise with increased readings taken prior to and following gas venting.
5. Failure of both lead detection systems requires repair of at least one system within 5 working days. Failure of one system only, repair must be within 10 workdays. Per -357. If repair of out-of-service system exceeds these timeframes, all systems are O/C. Out-of-service systems which have not exceeded these timeframes will be shown as O/S.
6. "Safety Measures for Waste Tanks at Hanford Nuclear Reservation, Section 3137 of the National Defense Authorization Act for Fiscal Year 1991," November 5, 1990, Public Law 101-510, (the "Widen Amendment") requires continuous pressure monitoring and temperature monitoring in Watch List tanks. WHC-EP-0422 REV 1, "A Plan to Implement Remediation of Waste Tank Safety Issues at the Hanford Site," December 1991, addresses these monitoring issues. A status report on resolution of Waste Tank Safety Issues at the Hanford Site has been prepared but has not yet been cleared for public release.
7. Continuous Air Monitoring (CAM) compliance and Radiation Area Monitoring Panel (RAMP) compliance are not addressed in this table.
8. Double-shell tank farm SY has the only tanks with continuous vapor/flammable gas monitoring; not addressed in this table.
9. Although data are being received for AZ-101, this information is considered questionable.

TABLE A-9. AUTOMATIC FOOD INSTRUMENT CORPORATION (FIC) GAUGES OUT OF SERVICE

September 30, 1993

Tank No.	SST/DST	Date of Last Automatic FIC Reading	Reading Status	Comments	Required Monitoring Frequency(-357)
BX-107	SST	12/30/92	No reading taken since 04/19/93	Out of compliance as of 04/26/93	Daily
T-102	SST	09/06/93	No reading taken since 09/07/93	Out of compliance as of 09/07/93	Daily
T-103	SST	08/11/93	No reading taken since 08/11/93	Out of compliance as of 08/12/93	Daily
T-109	SST	08/23/93	No reading taken since 08/24/93	Out of compliance as of 09/07/93	Monthly
U-108	SST	08/20/93	No reading taken since 08/20/93	Out of compliance as of 08/23/93	Weekly
B-Farm	SST	07/06/93	Taking manual FIC readings	In compliance	Quarterly
BY-109	SST	07/17/93	Taking manual FIC readings	In compliance	Daily
C-Farm	-	08/10/93	Taking manual FIC readings	In compliance	Daily/Weekly
C-105	SST	06/09/93	Taking manual FIC readings	In compliance	Daily
T-Substation	-	05/28/93	Taking manual FIC readings	In compliance	Weekly/Monthly
SY-101	DST	08/23/91	Taking manual FIC readings	In compliance	Daily
U-105	SST	11/17/92	Taking manual FIC readings	In compliance	Daily
AP-102	DST	01/27/93	Taking manual tape readings	In compliance	Daily
AW-101	DST	10/23/92	Taking manual tape readings	In compliance	Daily
AW-102	DST	06/16/93	Taking manual tape readings	In compliance	Daily
AW-105	DST	06/18/93	Taking manual tape readings	In compliance	Daily
AY-101	DST	08/31/90	Taking manual tape readings	In compliance	Daily
AZ-101	DST	02/02/90	Taking manual tape readings	In compliance	Daily
AZ-102	DST	02/15/90	Taking manual tape readings	In compliance	Daily
SY-102	DST	08/25/93	Taking manual tape readings	In compliance	Daily
SY-103	DST	07/05/93	Taking manual tape readings	In compliance	Daily
Catch Tanks					
A-302-A		04/16/91	Taking manual reading	In compliance	Daily
151-AZ		07/29/93	Taking Manual FIC reading	In compliance	Shift
U-301-B		03/23/93	No reading taken since 04/29/93	Out of compliance as of 04/30/93	Daily
Frequency reading requirements: Daily - Must be taken by 2 pm each day Weekly - Must be taken by 2 pm each Monday Quarterly - Must be taken by 2 pm on the seventh day of each quarter				LEGEND SST = Single-Shell Tank DST = Double-Shell Tank -357 = WHC-SD-WM-TI-357, Waste Storage Tank Status and Leak Detection Criteria

Figure 1. Discrepancy Report Status

Figure 2. Discrepancy Report Cumulative Total

S&DA 09/30/1993

WMC-EP-0182-66

Figure 3. Discrepancy Report Status by Age

APPENDIX B

**DOUBLE SHELL TANK WASTE TYPE
AND SPACE ALLOCATION**

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**TABLE B-1. DOUBLE-SHELL TANK WASTE TYPE AND SPACE ALLOCATION
SEPTEMBER 1993**

DOUBLE-SHELL TANK INVENTORY BY WASTE TYPE		SPACE DESIGNATED FOR SPECIFIC USE	
Complexant Concentrate (102-AN, 107-AN, 101-AY, 101-SY, 103-SY)	4.94 Mgal	Spare Tanks (3) (1 Aging & 1 Non-Aging Waste Tank)	2.28 Mgal
Concentrate Phosphate (102-AP, 106-AN)	1.13 Mgal	Segregated Tank Space (105-AP, 101-AY, 102-AN, 107-AN, 103-AW)	1.05 Mgal
Double-Shell Slurry and Slurry Feed (103-AN, 104-AN, 105-AN, 105-AP, 101-AW)	5.12 Mgal	Watch List Tank Space (103-AN, 104-AN, 105-AN, 101-SY, 103-SY, 101-AW)	0.67 Mgal
Neutralized Current Acid Waste (101-AZ, 102-AZ)	1.22 Mgal	Priority Tank Space (2) (101-AN, 102-AW, 106-AW, 102-SY)	1.17 Mgal
Dilute Waste (1) (101-AN, 101-AP, 103-AP, 106-AP, 107-AP, 108-AP, 102-AW, 103-AW, 104-AW, 105-AW, 106-AW, 101-AY, 102-AY, 101-AZ, 102-AZ, 102-SY, 102-AP, 104-AP)	12.09 Mgal	Miscellaneous Head Space	0.19 Mgal
NCR and PFP Settled Solids (103-AW, 105-AW, 102-SY)	1.01 Mgal		5.36 Mgal
		TOTAL DOUBLE-SHELL TANK SPACE	
		24 Tanks at 1140 Kgal	27.36 Mgal
		4 Tanks at 980 Kgal	3.92 Mgal
			31.28 Mgal
	Total Inventory=		
	25.51 Mgal		
		Total Available Space	31.28 Mgal
		Double-Shell Tank Inventory	25.51 Mgal
		Space Designated for Specific Use	5.36 Mgal
		Remaining Unallocated Space	0.41 Mgal

(1) Easily reduced in volume by Evaporator/LERF

(2) Reduced by Saltwell Liquid pumping, Mini Run and PFP Operations

(3) 241-101-AY: A minimum liquid level is set to provide extra protection against any bottom uplifting of the tank's steel liner. WHC-SD-WM-TI-357, "Waste Storage Tank Status and Leak Detection Criteria," specifies 64 in. as the minimum surface level measurement when the annulus system is in operation, and 18 in. if the annulus ventilation system is shut down. See also OSD-T-151-0007, "Unclassified Operation Specifications for the 241 AN, 241AP, 241AW, 241AY and 241SY Tank Farms." Because of space availability, waste is stored in 102-AY, the aging waste spare tank. In case of a leak, the contents of 102-AY will be distributed to any other DST(s) having available space.

Note: Net change in DSTs since last month: 23 Kgal.

WVPTOT

Note: Graphic does not Depict Waste Receipts or Depletions to Specific Use Tank Space

FIGURE B-1., CURRENT STATUS AND CONTINGENCY SPACE FOR THE 242-A EVAPORATOR RESTART

NOTE: THIS GRAPHIC DEPICTS "USABLE SPACE" DEPLETION AND NOT THE TOTAL RECEIPTS TO DSTs.

WVPFACE

FIGURE B-2. TOTAL AVAILABLE USABLE TANK SPACE

100 K GALLONS

FIGURE B-3. PRIORITY SPACE AVAILABILITY AND USAGE

Comparison of the Average Monthly Waste Generation Rate (Kgal/month)
To their Respective Management Limit for the
Period July 1, 1991 through September 30, 1993
(Total Monthly Limit is 64 Kgal/month)

Figure B-4. Comparison of Monthly Average Waste Generation
to Management Limit by Facility

FIGURE B-5. PUREX MONTHLY WASTE GENERATIONS

FIGURE B-6. TANK FARM MONTHLY WASTE GENERATIONS

B-10

K GALLONS

MHC-EP-0182-66

FIGURE B-7. B PLANT MONTHLY WASTE GENERATIONS

FIGURE B-8. T PLANT MONTHLY WASTE GENERATIONS

FIGURE B-9. S PLANT MONTHLY WASTE GENERATIONS

K GALLONS

FIGURE B-10. 300 AREA MONTHLY WASTE GENERATIONS

Table B-2. Double Shell Tank Waste Inventory for September 30, 1993 (page 1 of 2)

TANKS	INVENTORY	SOLIDS	TYPE	LEFT
101AW=	1152	84	DSSF	-12
102AW=	938	3	DN	202
103AW=	648	487	PD/DN	492
104AW=	1124	267	DN	16
105AW=	1002	388	PD/DN	138
106AW=	1084	211	DN	56
101AY=	901	83	DC	79
102AY=	901	32	DN	79
101AZ=	953	35	NCAW	27
102AZ=	952	95	NCAW	28
101AN=	639	0	DN	501
102AN=	1098	89	CC	42
103AN=	953	373	DSS	187
104AN=	1060	264	DSSF	80
105AN=	1128	0	DSSF	12
106AN=	22	17	CP	1118
107AN=	1067	134	CC	73
101SY=	1110	560	CC	30
102SY=	725	133	PT/DN	415
103SY=	764	4	CC	376
101AP=	1061	0	DN	79
102AP=	1106	0	CP	34
103AP=	1133	0	DN	7
104AP=	19	0	DN	1121
105AP=	822	0	DSSF	318
106AP=	1129	0	DN	11
107AP=	1114	0	DN	26
108AP=	902	0	DN	238
TOTAL=	25507		TOTAL	5773

SEGREGATED SPACE	
* 101AW=	-12
103AW=	492
102AP=	34
105AP=	318
* 101SY=	30
* 103SY=	376
101AY=	79
102AN=	42
* 103AN=	187
* 104AN=	80
* 105AN=	12
107AN=	73
TOTAL=	1711

* WATCHLIST TANKS

PRIORITY SPACE	
102SY=	415
101AN=	501
102AW=	202
106AW=	56
TOTAL=	1174

MISC. HEADSPACE	
101AP=	79
103AP=	7
106AP=	11
107AP=	26
104AW=	16
101AZ=	27
102AZ=	28
TOTAL=	194

USEABLE SPACE	
104AP=	1121
108AP=	238
105AW=	138
102AY=	79
106AN=	1118
TOTAL=	2694
SPARES	-2280
USEABLE	414

TOTAL SPACE AVAILABLE	
NON-AGING	27360
AGING =	3920
TOTAL=	31280

TOTAL INVENTORY	
08/93 TOTAL	25484
09/93 TOTAL	25507
INCREASE	23

USEABLE SPACE	
08/93 TOTAL	453
09/93 TOTAL	414
DEPLETION	-39

PRIORITY SPACE	
08/93 TOTAL	1172
09/93 TOTAL	1174
DEPLETION	2

Inventory Calculation by Waste Type:

COMPLEXED CONCENTRATE (CC)		
102AN=	1098	(CC)
107AN=	1067	(CC)
101SY=	1110	(CC & DSS)
103SY=	764	(CC, DSS & SWL)
101AY=	901	(DC)
TOTAL=	4940	

NCRW		
103AW=	161	SOLIDS= 487
105AW=	614	SOLIDS= 388
TOTAL=	775	TOTAL= 875

WEST AREA WASTE (DN/PD)		
102SY=	592	SOLIDS= 133
TOTAL=	592	TOTAL= 133

CONC. PHOSPHATE (CP)		
106AN=	22	
102AP=	1106	
TOTAL=	1128	

DILUTE WASTE (DN)	
101AP=	1061
103AP=	1133
106AP=	1129
107AP=	1114
108AP=	902
101AN=	639
102AW=	938
104AW=	1124
106AW=	1084
102AY=	901
104AP=	19
TOTAL=	12091

NCAW (AGING WASTE @ 5M Na)	
101AZ=	791
102AZ=	434
TOTAL=	1225
DN=	680

DSS/DSSF	
105AP=	822
103AN=	953
104AN=	1060
105AN=	1128
101AW=	1152
TOTAL=	5115

GRAND TOTALS	
CC=	4039
DC=	901
NCRW=	875
CP=	1128
NCAW=	1225
DSS/DSS	5115
PFP=	133
DILUTE=	12091
TOTAL=	25507

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NOTE: All Values are in Kilogallons.

Table B-2. Double Shell Tank Waste Inventory for September 30, 1993 (page 2 of 2)

TOTAL AVAILABLE SPACE AS OF SEPTEMBER 30, 1993:			5773 KGALS
SEGREGATED TANK SPACE:			
	TANK	WASTE TYPE	AVAILABLE SPACE
(*) Watch List Tanks	* 101-AW	DSSF	-12 KGALS (#)
	103-AW	NCRW	492 KGALS
	102-AP	CP	34 KGALS
(#) Tank 101-AW shows negative available space because it exceeds the 1140 Kgal for waste volume projections of available space (but does not exceed the operating limit criteria)	105-AP	DSSF	318 KGALS
	* 101-SY	CC/DSS	30 KGALS
	* 103-SY	CC/DSS	376 KGALS
	101-AY	DC	79 KGALS
	102-AN	CC	42 KGALS
	* 103-AN	DSS	187 KGALS
	* 104-AN	DSSF	80 KGALS
	* 105-AN	DSSF	12 KGALS
	107-AN	CC	73 KGALS
	TOTAL=		1711 KGALS
AVAILABLE TANK SPACE=			5773 KGALS
MINUS SEGREGATED SPACE=			-1711 KGALS
TOTAL AVAILABLE SPACE AFTER SEGREGATION=			4062 KGALS
PRIORITY TANK SPACE:			
	TANK	WASTE TYPE	AVAILABLE SPACE
SWL/PFP	102-SY	DN	415 KGALS
NON-COMPLEXED SWL RECEIVER	101-AN	DN	501 KGALS
EVAPORATOR START-UP	102-AW	DN	202 KGALS
EVAPORATOR START-UP	106-AW	DN	56 KGALS
TOTAL=		1174 KGALS	
AVAILABLE SPACE AFTER SEGREGATION=			4062 KGALS
MINUS PRIORITY SPACE=			-1174 KGALS
TOTAL AVAILABLE SPACE AFTER PRIORITY=			2888 KGALS
MISCELLANEOUS HEADSPACE:			
	TANK	WASTE TYPE	AVAILABLE SPACE
	101-AP	DN	79 KGALS
	103-AP	DN	7 KGALS
	106-AP	DN	11 KGALS
	107-AP	DN	26 KGALS
	104-AW	DN	16 KGALS
	101-AZ	AW	27 KGALS
	102-AZ	AW	28 KGALS
TOTAL=		194 KGALS	
AVAILABLE SPACE AFTER PRIORITY=			2888 KGALS
MINUS MISCELLANEOUS HEADSPACE=			-194 KGALS
TOTAL AVAILABLE SPACE AFTER HEADSPACE=			2694 KGALS
REALISTIC USABLE TANK SPACE:			
	TANK	WASTE TYPE	AVAILABLE SPACE
	104-AP	DN	1121 KGALS
	108-AP	DN	238 KGALS
	105-AW	DN	138 KGALS
	102-AY	NCRW	79 KGALS
	106-AN	CP	1118 KGALS
TOTAL=		2694 KGALS	
TOTAL AVAILABLE SPACE AFTER UNUSABLE DEPLETION=			2694 KGALS
MINUS SPARE TANK SPACE=			-2280 KGALS
TOTAL TANK SPACE AVAILABLE AFTER SPARE SPACE=			414 KGALS

WYTB029

APPENDIX C

TANK AND EQUIPMENT CODE AND STATUS DEFINITIONS

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C. TANK AND EQUIPMENT CODE/STATUS DEFINITIONS
September 1993

1. TANK STATUS CODES

WASTE TYPE

AGING	Aging Waste (Neutralized Current Acid Waste [NCAW])
CC	Complexant Concentrate Waste
CP	Concentrated Phosphate Waste
DC	Dilute Complexed Waste
DN	Dilute Non-Complexed Waste
DSS	Double-Shell Slurry
DSSF	Double-Shell Slurry Feed
NCPLX	Non-Complexed Waste
PD/PN	Plutonium-Uranium Extraction (PUREX) Neutralized Cladding Removal Waste (NCRW), transuranic waste (TRU)
PT	Plutonium Finishing Plant (PFP) TRU Solids

TANK USE (DOUBLE-SHELL TANKS ONLY)

CWHT	Concentrated Waste Holding Tank
DRCVR	Dilute Receiver Tank
EVFD	Evaporate Feed Tank
GRTFD	Grout Feed Tank
SRCVR	Slurry Receiver Tank

2. SOLID AND LIQUID VOLUME DETERMINATION METHODS

F	Food Instrument Company (FIC) Automatic Surface Level Gauge
M	Manual Tape Surface Level Gauge
P	Photo Evaluation
S	Sludge Level Measurement Device

3. DEFINITIONS

WASTE TANKS - GENERAL

Waste Tank Safety Issue	A potentially unsafe condition in the handling of waste material in underground storage tanks that requires corrective action to reduce or eliminate the unsafe condition.
Watch List Tank	An underground storage tank containing waste that requires special safety precautions because it may have a serious potential for release of high level radioactive waste because of uncontrolled increases in temperature or pressure. Special restrictions have been placed on these tanks by "Safety Measures for Waste Tanks at Hanford Nuclear Reservation," Section 3137 of the <i>National Defense Authorization Act for Fiscal Year 1991</i> , November 5, 1990, Public Law 101-510, (also known as the Wyden Amendment).

WASTE TYPES

Aging Waste (AGING)	High level, first cycle solvent extraction waste from the PUREX plant (NCAW)
Concentrated Complexant (CC)	Concentrated product from the evaporation of dilute complexed waste.
Concentrated Phosphate Waste (CP)	Waste originating from the decontamination of the N Reactor in the 100 N Area. Concentration of this waste produces concentrated phosphate waste.
Dilute Complexed Waste (DC)	<p>Characterized by a high content of organic carbon including organic complexants:</p> <p>ethylenediaminetetra-acetic acid (EDTA), citric acid, hydroxyethyl-ethylenediaminetriacetic acid (HEDTA), and iminodiacetate (IDA) being the major complexants used. Main sources of DC waste in the DST system are saltwell liquid inventory (from SSTs).</p>
Dilute Non-Complexed Waste (DN)	Low activity liquid waste originating from T and S Plants, the 300 and 400 Areas, PUREX facility (decladding supernatant and miscellaneous wastes), 100 N Area (sulfate waste), B Plant, saltwells, and PFP (supernate).
Double-Shell Slurry (DSS)	Waste that exceeds the sodium aluminate saturation boundary in the evaporator without exceeding receiver tank composition limits. For reporting purposes, DSS is considered a solid.
Double-Shell Slurry Feed (DSSF)	Waste concentrated just before reaching the sodium aluminate saturation boundary (of 6.5 molar hydroxide) in the evaporator without exceeding receiver tank composition limits. This form is not as concentrated as DSS.
Non-complexed (NCPLX)	General waste term applied to all Hanford Site liquors not identified as complexed.
PUREX Decladding (PD/PN)	PUREX Neutralized Cladding Removal Waste (NCRW) is the solids portion of the PUREX plant neutralized cladding removal waste stream; received in Tank Farms as a slurry. NCRW solids are classified as transuranic (TRU) waste.
PFP TRU Solids (PT)	TRU solids fraction from PFP Plant operations.

Drainable Interstitial Liquid (DIL)	Interstitial liquid that is not held in place by capillary forces, and will therefore migrate or move by gravity.
Supernate	The liquid above the solids in waste storage tanks.
Ferrocyanide	A compound of iron and cyanide commonly expressed as FeCN. The actual formula for the ferrocyanide anion is $[\text{Fe}(\text{CN})_6]^{-4}$.

WASTE STATUS

In-Service Tank	The waste classification of a tank being used, or planned for use, for the storage of liquid (in excess of a minimum supernatant liquid heel) in conjunction with production and/or waste processing.
Out-of-Service Tank	A tank which does not meet the definition of an in-service tank. Before September 1988, these tanks were defined as inactive in this report. [Note: All single-shell tanks (SST) are out of service.]

STABILIZATION (Single-Shell Tanks only)

Interim Stabilized (IS)	A tank which contains less than 50,000 gal of drainable interstitial liquid and less than 5,000 gal of supernatant liquid. If the tank was jet pumped to achieve interim stabilization, then the jet pump flow must also have been at or below 0.05 gpm before interim stabilization criteria is met.
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INTRUSION PREVENTION (ISOLATION) Single-Shell Tanks only

Partially Interim Isolated (PI)	The administrative designation reflecting the completion of the physical effort required for Interim Isolation except for isolation of risers and piping that is required for jet pumping or for other methods of stabilization.
Interim Isolated (II)	The administrative designation reflecting the completion of the physical effort required to minimize the addition of liquids into an inactive storage tank, process vault, sump, catch tank, or diversion box. In June 1993, Interim Isolation was replaced by Intrusion Prevention.
Intrusion Prevention (IP)	Intrusion Prevention is the administrative designation reflecting the completion of the physical effort required to minimize the addition of liquids into an inactive storage tank, process vault, sump, catch tank, or diversion box. Under no circumstances are electrical or instrumentation devices disconnected or disabled during the

intrusion prevention process (with the exception of the electrical pump), in accordance with WHC-SD-WM-SAR-006 REV 2, *Single-Shell Tank Isolation Safety Analysis Report*, March 1986.

TANK INTEGRITY

Sound	The integrity classification of a waste storage tank for which surveillance data indicate no loss of liquid attributed to a breach of integrity.
Assumed Leaker	The integrity classification of a waste storage tank for which surveillance data indicate a loss of liquid attributed to a breach of integrity.
Assumed Re-Leaker	A condition that exists after a tank has been declared as an "assumed leaker" and then the surveillance data indicates a <u>new</u> loss of liquid attributed to a breach of integrity.

TANK INVESTIGATION

Intrusion	A term used to describe the infiltration of liquid into a waste tank.
-----------	---

SURVEILLANCE INSTRUMENTATION

Drywells	Drywells are vertical boreholes with 6-in. (internal diameter) carbon steel casings positioned radially around SSTs. Periodic monitoring is done by gamma radiation or neutron sensors to obtain scan profiles of radiation or moisture in the soil as a function of well depth, which could be indicative of tank leakage. These wells range between 50 and 250 ft in depth, and are monitored between the range of 50 to 150 ft. The wells are sealed when not in use. They are called drywells because they do <u>not</u> penetrate to the water table and are therefore usually "dry." The drywell frequency monitoring schedule calls for 105 drywells weekly, 91 biweekly, 41 monthly, 151 quarterly, and 371 annually.
Laterals	Laterals are horizontal drywells positioned under single-shell waste storage tanks to detect radionuclides in the soil which could be indicative of tank leakage. These drywells are monitored by radiation detection probes. Laterals are 4-in. inside diameter steel pipes located 8 to 10 ft below the tank's concrete base. There are three laterals per tank. Laterals are located only in A and SX farms.

Surface Levels	The surface level measurements in all waste storage tanks are monitored by manual or automatic conductivity probes, and recorded and transmitted or inputted to the Computer Automated Surveillance System (CASS).
Automatic FIC	An automatic waste surface level measurement device is manufactured by the Food Instrument Company (FIC). The instrument consists of a conductivity electrode (plummet) connected to a calibrated steel tape, a steel tape reel housing and a controller that automatically raises and lowers the plummet to obtain a waste surface level reading. The controller can provide a digital display of the data and also transmit the reading to the CASS. Some tanks have gauges connected to CASS and others are read manually.
Annulus	The annulus is the space between the inner and outer shells on DSTs. Drain channels in the insulating and/or supporting concrete carry any leakage to the annulus space where conductivity probes are installed. Alarms from the annunciators are received by CASS. Continuous Air Monitoring (CAM) alarms are also located in the annulus. The annulus conductivity probes and radiation detectors are the primary means of leak detection for all DSTs.
Liquid Observation Well (LOW)	In-tank liquid observation wells are used for monitoring the interstitial liquid level (ILL) in single-shell waste storage tanks. The wells are constructed of fiberglass or TEFZEL*-reinforced epoxy-polyester resin, sized to extend to within 1 in. of the bottom of the tank steel liner. They are sealed at their bottom ends and have a nominal outside diameter of 3.5 in. Two probes are used to monitor changes in the ILL: gamma and neutron, which can indicate intrusions or leakage by increases or decreases in the ILL. There are 58 LOWs (56 are in operation) installed in SSTs that contain or are capable of containing greater than 50,000 gal of drainable interstitial liquid, and in two DSTs only. The LOWs installed in two DSTs, (102-SY and 103-AW Tanks), are constructed of steel and are used for special surveillance purposes only.

 *TEFZEL, a trademark of E. I. du Pont de Nemours & Company

Thermocouple (TC)	A thermocouple is a thermoelectric device used to measure temperature. More than one thermocouple on a device (probe) is called a thermocouple tree. In DSTs there may be one or more thermocouple trees in risers in the primary tank. In addition, in DSTs only, there are thermocouple elements installed in the insulating concrete, the lower primary tank knuckle, the secondary tank concrete foundation, and in the outer structural concrete. These monitor temperature gradients within the concrete walls, installed in a riser, or lowered down an existing bottom of the tank, and the domes. In SSTs, there may be one or more thermocouple trees installed directly in a tank, although some SSTs do not have any trees installed. A single thermocouple may be in ariser or LOW. There are also four thermocouple laterals beneath Tank 105-A in which temperature readings are taken in 34 thermocouples.
In-tank Photography	In-tank photographs may be taken to aid in resolving in-tank measurement anomalies and determine tank integrity. Photographs help determine sludge and liquid levels by visual examination.

4. INVENTORY AND STATUS BY TANK - COLUMN CALCULATIONS (SINGLE-SHELL TANKS)

COLUMN HEADING

Total Waste	Solids Volume plus Supernatant liquid.
Supernatant Liquid	Drainable Liquid Remaining minus Drainable Interstitial. Supernate is usually derived by subtracting the solids level measurement from the liquid level measurement.
Drainable Interstitial	Drainable Liquid Remaining minus Supernate. Drainable Interstitial Liquid is calculated based on the saltcake and sludge volumes, using average porosity values or actual data for each tank, when available.
Total Jet Pumped	Cumulative total pumped 1979 to date.
Drainable Liquid Remaining	Supernate plus Drainable Interstitial.
Pumpable Liquid Remaining	Drainable Liquid Remaining less undrainable heel volume.

MHC-EP-0182-66

Sludge

Solids formed during sodium hydroxide additions to waste. Sludge usually was in the form of suspended solids when the waste was originally received in the tank from the waste generator. In-tank photographs may be used to estimate the volume.

Saltcake

Results from crystallization and precipitation after concentration of liquid waste, usually in an evaporator. If saltcake is layered over sludge, it is only possible to measure total solids volume. In-tank photographs may be used to estimate the saltcake volume.

Solids Volume Update Indicates the latest update of any change in the solids volume.

Solids Update Source - See Indicates the source or basis of the latest solids volume update.

Footnote

Last Photo Date Date of latest in-tank photographs taken.

Change Since Last Monthly Report Indicates any change made since the previous month. Explanation for the change follows the Inventory and Status by Tank section.

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APPENDIX D

TANK FARM CONFIGURATION, STATUS, AND FACILITY CHARTS

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D-3

75 ft Diameter Double-Shell Tank
Tank Farms: AN, AP, AW, AY, AZ, SY

* AY and AZ Have a Tank Capacity
of 1,000,000 gal

75 ft Diameter Single-Shell Tank
Tank Farms: A*, AX*, SX

* A and AX have flat bottoms

75 ft Diameter Single-Shell Tank
Tank Farms: BY, S, TX, TY

75 ft Diameter Single-Shell Tank
Tank Farms: B, BX, C, T, U

20 ft Diameter Single-Shell Tank
Tank Farms: B, C, T, U

Figure D-1. High-Level Waste Tank Configuration

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WHC-EP-0182

Figure D-2. Double-Shell Tank Instrumentation Configuration

Figure D-3. Single-Shell Tank Instrumentation Configuration

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Op's limit 1,140,000 gal. Constructed 1974-76

200 West Tank Farms
Double-Shell Tank Status

Op's limit 1,140,000 gal. Constructed 1980-81

Op's Limit 1,140,000 gal. Constructed 1983-86

Op's limit 1,140,000 gal. Constructed 1978-80

Op's limit 980,000 gal. Constructed 1968-70

Op's limit 980,000 gal. Constructed 1971 & 1977

200 East Tank Farms
Double-Shell Tank Status

Updated Quarterly 09/30/93

DST-LVL/S.G.SPENCER/10-88

Figure D-4. Double-Shell Tank Status

1,000,000 gal. tanks Constructed 1954-55

1,000,000 gal. tanks Constructed 1963-64

500,000 gal. tanks Constructed 1943-44

55,000 gal. tanks

500,000 gal. tanks Constructed 1946-47

750,000 gal. tanks Constructed 1948-49

500,000 gal. tanks Constructed 1943-44

55,000 gal. tanks

XXX = Total Waste Volume (Solids+Supernatant)(in K gal.)
 XXX = Total liquid (in K gal.)
 [Dremable Interstitial + Supernatant]
 XXX = Sludge (in K gal.)
 (Solids Total Not Shown)

AL = Assumed Leaker
 H = High Heat Tanks
 F = Ferrocyanide
 (WHC-EP-0089)
 O = Organics
 H = Potential Flammable Gases
 (Hydrogen)(WHC-EP-0018)

IP = Intrusion Prevention
 IS = Interim Stabilized
 PI = Partially Interim Isolated

Updated Quarterly 09/30/93

SST-ALL/S.G. SPENCER/10-93

Figure D-5. 200E Single-Shell Tank Status

750,000 gal. tanks Constructed 1950-51

1,000,000 gal. tanks Constructed 1953-54

500,000 gal. tanks Constructed 1943-44

55,000 gal. tanks

750,000 gal. tanks Constructed 1947-48

750,000 gal. tanks Constructed 1951-52

500,000 gal. tanks Constructed 1943-44

55,000 gal. tanks

Sludge

Solids

XXX = Total Waste Volume (Solids+Supernatant) (in K gal.)
 XXX = Total Sludge (in K gal.)
 (Drainable Interstitial + Supernatant)
 XXX = Sludge (in K gal.)
 (Settleable Solids Not Shown)

AL = Assumed Leaker
 H = High Head Tank
 F = Ferrocyanide
 (WHC-EP-005)
 O = Organic
 H = Potential Flammable Gases
 (Hydrogen) (WHC-EP-001)

IP = Intrusion Prevention
 IS = Interim Stabilized
 PI = Partially Interim Isolated

Updated Quarterly 09/30/93

SST-ALL/SLG, SPENCER/10-00

Fig. D-6. 200W Single-Shell Tank Status

Hanford Tank Farm Facilities

200 West

Note: All single-shell tanks were removed from service (not allowed to receive waste) on or before November 21, 1980

Double Walled Pipe
Single Walled Pipe Direct Buried

All Tanks 75 Foot Diameter
(Except 55,000 gal 20 foot dia.)

Issued by: WHC/PE

Tank Number

Radiation Monitoring
Dry Well - Approx Location
(● = Active ○ = Inactive)

Radiation Monitoring
Laterals Under Tank
(X = not used)

Drainable Liquid
Remaining (1000 gal)
(Inactive Tanks)

Liquid Level Gauges
▼ = FIC Read Manually
Y = Tape Read Manually
▽ = Auto FIC on CASS
▽ = Intrusion Mode FIC

Airlift Circulators

Liquid Observation
Well (Low)

Screen - Jet Pump

Assumed
Leaker

Total Solids
(1000 gal)
Salt Cake/
Sludge/DSS
(Inactive Tanks)

Operating
Exhauster

Watch List and
High Heat Load
Tanks

Temperature Reading
Automatic Readings:
● By CASS for DSTs
○ By TMACS for SSTs

Assumed
Leaked Date

Watch List Tanks

- Ferrocyanide**
- H₂/Flammable gases (109-SX has potential only-other tanks vent thru it)**
- Organics**
- High Heat - 1000 gal only on Watch List (no water added)**

Status as of September 30, 1993 - Updated Quarterly
Issued by WHC/TWRS/PE

Hanford Tank Farm Facilities

200 East

Note: All single-shell tanks were removed from service (not allowed to receive waste) on or before November 21, 1980

Single Walled Pipe Direct Buried

All Tanks 75 Foot Diameter
(Except 55,000 gal 20 foot dia.)

Single-Shell

Double-Shell

Interim
Stabilized

Sound

DCRT = Double Contained
Receiver Tank
NHW = Neutralized
High Level Waste
PAW = PUREX Acid Waste

Issued by: WHC/PE

Isolated
PI= Partial
Interim
IP= Intrusion
Prevention
Completed

Tank
Number

Radiation Monitoring
Dry Well - Approx Location
(▲ = Active) (○ = Inactive)

BY-Tank Farm
1948-49
12 @ 758,000 gal

BX-Tank Farm
1946-47
12 @ 530,000 gal

244-BX
DCRT

B-Tank Farm
1943-44
12 @ 530,000 gal
4 @ 55,000 gal

C-Tank Farm
1943-44
12 @ 530,000 gal
4 @ 55,000 gal

AN-Tank Farm
1980-81
7 @ 1,160,000 gal

Radiation Monitoring
Laterals Under Tank
(X = not used)

Drainable Liquid
Remaining (1000 gal)
(Inactive Tanks)

Liquid Level Gauges
▼ = FIC Read Manually
Y = Tape Read Manually
▽ = Auto FIC on CASS
▽ = Intrusion Mode FIC

Airlift Circulators
(107-AN and 102-AW
are inoperative)

Liquid Observation
Well (Low)

Screen - Jet Pump -

Assumed
Leaker

Total Solids
(1000 gal)
Salt Cakes/
Sludge/DSS
(Inactive Tanks)

Operating
Exhauster

Watch List and
High Heat Load
Tanks

Temperature Reading
Automatic Readings:
● By CASS for DSTs
○ By TMACS for SSTs

Assumed
Leaked
Date

Watch List Tanks

- Ferrocyanide**
- H2/Flammable gases (109-SX
has potential only-other tanks
vent thru it)**
- Organics**
- High Heat - 106-C only on
Watch List (cooling water added)**

Status as of September 30, 1993 - Updated Quarterly
Issued by WHC/TWRS/PE

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APPENDIX E

**MONTHLY SUMMARY
TANK USE SUMMARY
INVENTORY SUMMARY BY TANK FARM
INVENTORY AND STATUS BY TANK**

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TABLE E-1. MONTHLY SUMMARY

TANK STATUS
September 1993

	200	200	
	<u>EAST AREA</u>	<u>WEST AREA</u>	<u>TOTAL</u>
IN SERVICE	25	3	28 (2)
OUT OF SERVICE	66	83	149
SOUND	59	51	110
ASSUMED LEAKER	32	35	67
INTERIM STABILIZED	51	55	106 (1)
ISOLATED			
PARTIAL INTERIM	21	30	51
INTRUSION PREVENTION COMPLETED	45	53	98

WASTE VOLUMES (Kgallons)

	200	200				
	<u>EAST AREA</u>	<u>WEST AREA</u>	<u>TOTAL</u>	<u>SST TANKS</u>	<u>DST TANKS</u>	<u>TOTAL</u>
<u>SUPERNATANT</u>						
AGING Aging waste	1775	0	1775	0	1775	1775
CC Complexant concentrate waste	1945	207	2152	3	2149	2152
CP Concentrated phosphate waste	5	0	5	0	5	5
DC Dilute complexed waste	818	1	819	1	818	819
DN Dilute non-complexed waste	10531	0	10531	0	10531	10531
DN/PD Dilute non-complex/PUREX TRU solids	990	0	990	0	990	990
DN/PT Dilute non-complex/PFP TRU solids	0	654	654	0	654	654
DSSF Double-shell slurry feed	3838	48	3886	56	3830	3886
NCPLX Non-complexed waste	234	281	515	515	0	515
TOTAL SUPERNATANT	20136	1191	21327	575	20752	21327
<u>SOLIDS</u>						
Double-shell slurry	937	1103	2040	0	2040	2040
Sludge	8206	5963	14169	12214	1955	14169
Saltcake	6577	17602	24179	23419	760	24179
TOTAL SOLIDS	15720	24668	40388	35633	4755	40388
TOTAL WASTE	35856	25859	61715	36208	25507	61715
AVAILABLE SPACE IN TANKS	4964	821	5785	0	5785 (2)	5785
DRAINABLE INTERSTITIAL	2253	4516	6769	6330	439	6769
DRAINABLE LIQUID REMAINING	22384	5707	28091	6900	21191	28091

(1) Includes tanks that do not meet current established supernatant and interstitial liquid stabilization criteria, B-104, B-107, B-110, B-111, BX-110, T-102, T-112, and U-110.

(2) Includes six double-shell tanks on Hydrogen Watch List not currently allowed to receive waste, 103-AN, 104-AN, 105-AN, 101-AW, 101-SY, and 103-SY.

Note: +/- 1 Kgal differences are the result of computer rounding

TABLE E-2. TANK USE SUMMARY

September 1993

TANK FARMS	IN SERVICE	OUT OF SERVICE	SOUND	ASSUMED LEAKER	ISOLATED TANKS		INTERIM STABILIZED TANKS
					PARTIAL INTERIM	INTRUSION PREVENTION	
EAST							
A	0	6	3	3	2	4	5
AN	7 (2)	0	7	0	0	0	0
AP	8	0	8	0	0	0	0
AW	6 (2)	0	6	0	0	0	0
AX	0	4	2	2	1	3	3
AY	2	0	2	0	0	0	0
AZ	2	0	2	0	0	0	0
B	0	16	6	10	0	16	16 (1)
BX	0	12	7	5	6	6	10 (1)
BY	0	12	7	5	5	7	7
C	0	16	9	7	7	9	10
Total	25	66	59	32	21	45	51
WEST							
S	0	12	11	1	10	2	2
SX	0	15	5	10	6	9	9
SY	3 (2)	0	3	0	0	0	0
T	0	16	9	7	5	11	12 (1)
TX	0	18	10	8	0	18	18
TY	0	6	1	5	0	6	6
U	0	16	12	4	9	7	8 (1)
Total	3	83	51	35	30	53	55
TOTAL	28	149	110	67	51	98	106

(1) Includes tanks that do not meet current established supernatant and interstitial liquid stabilization criteria (104, 107, 110, and 111-B, 110-BX, 102 and 112-T, and 110-U).

(2) Six Double-Shell Tanks on the Hydrogen Tank Watch List are not currently in service (103, 104, 105-AN, 101-AW, 101 and 103-SY).

TABLE E-3. INVENTORY SUMMARY BY TANK FARM

WASTE VOLUMES (Kgallons)

September 1993

SUPERNATANT LIQUID VOLUMES

SOLIDS VOLUME

TANK FARM	TOTAL WASTE	AVAIL SPACE	AGING	CC	CP	DC	DN	DN/PD	DN/PT	DSSF	NCPLX	TOTAL	DSS	SLUDGE	SALT CAKE	TOTAL
EAST																
A	1536	0	0	0	0	0	0	0	0	8	0	8	0	556	972	1528
AN	5967	2013	0	1942	5	0	639	0	0	1940	0	4526	937	504	0	1441
AP	7286	1834	0	0	0	0	6464	0	0	822	0	7286	0	0	0	0
AW	5948	904	0	0	0	0	2559	990	0	1068	0	4617	0	1135	196	1331
AX	906	0	0	3	0	0	0	0	0	0	0	3	0	19	884	903
AY	1802	158	0	0	0	818	869	0	0	0	0	1687	0	115	0	115
AZ	1905	55	1775	0	0	0	0	0	0	0	0	1775	0	130	0	130
B	2057	0	0	0	0	0	0	0	0	0	15	15	0	1697	345	2042
BX	1559	0	0	0	0	0	0	0	0	0	50	50	0	1354	155	1509
BY	4744	0	0	0	0	0	0	0	0	0	0	0	0	719	4025	4744
C	2146	0	0	0	0	0	0	0	0	0	169	169	0	1977	0	1977
Total	35856	4964	1775	1945	5	818	10531	990	0	3838	234	20136	937	8206	6577	15720
WEST																
S	5680	0	0	0	0	0	0	0	0	17	29	46	0	1171	4463	5634
SX	4453	0	0	0	0	1	0	0	0	0	62	63	0	1532	2858	4390
SY	2599	821	0	207	0	0	0	0	654	0	0	861	1103	71	564	1738
T	2034	0	0	0	0	0	0	0	0	0	45	45	0	1989	0	1989
TX	6905	0	0	0	0	0	0	0	0	0	5	5	0	241	6659	6900
TY	638	0	0	0	0	0	0	0	0	0	3	3	0	571	64	635
U	3550	0	0	0	0	0	0	0	0	31	137	168	0	638	2744	3382
Total	25859	821	0	207	0	1	0	0	654	48	281	1191	1103	6213	17352	24668
TOTAL	61715	5785	1775	2152	5	819	10531	990	654	3886	515	21327	2040	14419	23929	40388

Note: +/- 1 Kgal differences are the result of computer rounding

TABLE E-4. INVENTORY AND STATUS BY TANK
DOUBLE-SHELL TANKS
September 1993

TANK STATUS				LIQUID VOLUME								SOLIDS VOLUME			VOLUME DETERMINATION				
TANK	WASTE MATL	TANK INTEGRTY	TANK USE	EQUIVA-	TOTAL WASTE (Kgal)	AVAIL SPACE (Kgal)	SUPER- NATANT LIQUID (Kgal)	DRAIN- ABLE INTER- STIT. (Kgal)	PUMPED THIS MONTH	TOTAL PUMPED	DRAIN- ABLE LIQUID REMAIN (Kgal)	PUMP- ABLE LIQUID REMAIN (Kgal)	DSS (Kgallons)	SLDG CAKE VOL MTHD	LIQ VOL MTHD	SOL VOL MTHD	SOLIDS VOLUME UPDATE	LAST PHOTO DATE	CHANGE SINCE LAST MONTHLY REPORT
				LENT WASTE INCHES															
				***** AN FARM STATUS *****															
AN-101 DN	SOUND	DRCVR		232.4	639	501	639	0	0.0	0.0	639	639	0	0	0	FM	S	08/22/89	0/ 0/ 0
AN-102 CC	SOUND	CWHT		399.3	1098	42	1009	3	0.0	0.0	1012	1009	0	89	0	FM	S	08/22/89	0/ 0/ 0
AN-103 DSS	SOUND	CWHT		346.5	953	187	16	0	0.0	0.0	16	16	937	0	0	FM	S	08/22/89	10/29/87
AN-104 DSSF	SOUND	CWHT		385.5	1060	80	796	25	0.0	0.0	821	799	0	264	0	FM	S	08/22/89	08/19/88
AN-105 DSSF	SOUND	CWHT		410.2	1128	12	1128	0	0.0	0.0	1128	1128	0	0	0	FM	S	10/22/84	01/26/88
AN-106 CP	SOUND	CWHT		8.0	22	1118	5	0	0.0	0.0	5	5	0	17	0	FM	S	08/22/89	0/ 0/ 0
AN-107 CC	SOUND	CWHT		388.0	1067	73	933	9	0.0	0.0	942	933	0	134	0	FM	S	08/22/89	09/01/88
7 DOUBLE-SHELL TANKS				TOTALS:	5967	2013	4526	37	0.0	0.0	4563	4529	937	504	0				
				***** AP FARM STATUS *****															
AP-101 DN	SOUND	DRCVR		385.8	1061	79	1061	0	0.0	0.0	1061	1061	0	0	0	FM	S	05/01/89	0/ 0/ 0
AP-102 DN	SOUND	GRTFD		402.2	1106	34	1106	0	0.0	0.0	1106	1106	0	0	0	FM	S	07/11/89	0/ 0/ 0
AP-103 DN	SOUND	DRCVR		412.0	1133	7	1133	0	0.0	0.0	1133	1133	0	0	0	FM	S	10/13/88	0/ 0/ 0
AP-104 DN	SOUND	GRTFD		6.9	19	1121	19	0	0.0	0.0	19	19	0	0	0	FM	S	10/13/88	0/ 0/ 0
AP-105 DSSF	SOUND	CWHT		298.9	822	318	822	0	0.0	0.0	822	822	0	0	0	FM	S	02/02/89	0/ 0/ 0
AP-106 DN	SOUND	DRCVR		410.5	1129	11	1129	0	0.0	0.0	1129	1129	0	0	0	FM	S	10/13/88	0/ 0/ 0
AP-107 DN	SOUND	DRCVR		405.1	1114	26	1114	0	0.0	0.0	1114	1114	0	0	0	FM	S	10/13/88	0/ 0/ 0
AP-108 DN	SOUND	DRCVR		328.0	902	238	902	0	0.0	0.0	902	902	0	0	0	FM	S	10/13/88	0/ 0/ 0
8 DOUBLE-SHELL TANKS				TOTALS:	7286	1834	7286	0	0.0	0.0	7286	7286	0	0	0				

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TABLE E-4. INVENTORY AND STATUS BY TANK
DOUBLE-SHELL TANKS
September 1993

TANK STATUS				LIQUID VOLUME										SOLIDS VOLUME			VOLUME DETERMINATION				
TANK	WASTE MATL	TANK INTEGRITY	TANK USE	EQUIVA-	TOTAL WASTE (Kgal)	AVAIL SPACE (Kgal)	SUPER-NATANT LIQUID (Kgal)	DRAIN-	PUMPED THIS MONTH	TOTAL PUMPED	DRAIN-	PUMP-	DSS (Kgallons)	SLDG	CAKE	LIQ VOL MTHD	SOL VOL MTHD	SOLIDS VOLUME UPDATE	LAST PHOTO DATE	CHANGE	
				LENT WASTE INCHES				ABLE INTER-STIT. (Kgal)			ABLE LIQUID REMAIN (Kgal)	ABLE LIQUID REMAIN (Kgal)								SINCE LAST MONTHLY REPORT	
+++++ AW FARM STATUS +++++																					
AW-101	DSSF	SOUND	CWHT	418.9	1152	0	1068	2	0.0	0.0	1070	1068	0	84	0	FM	S	10/22/84	03/17/88	(1)	
AW-102	DN	SOUND	EVFD	341.1	938	202	937	0	0.0	0.0	937	937	0	1	0	FM	S	02/29/84	02/02/83		
AW-103	DN/PD	SOUND	DRCVR	235.6	648	492	285	37	0.0	0.0	322	300	0	363	0	FM	S	02/01/89	0/ 0/ 0		
AW-104	DN	SOUND	DRCVR	408.7	1124	16	834	49	0.0	0.0	883	861	0	179	111	FM	S	03/05/87	02/02/83		
AW-105	DN/PD	SOUND	DRCVR	364.4	1002	138	705	29	0.0	0.0	734	712	0	297	0	FM	S	03/05/87	0/ 0/ 0		
AW-106	DN	SOUND	SRCVR	394.2	1084	56	788	42	0.0	0.0	830	808	0	211	85	FM	S	01/31/92	02/02/83		
6 DOUBLE-SHELL TANKS				TOTALS:	5948	904	4617	159	0.0	0.0	4776	4686	0	1135	196						
+++++ AY FARM STATUS +++++																					
AY-101	DC	SOUND	DRCVR	327.6	901	79	818	2	0.0	0.0	820	818	0	83	0	FM	S	02/02/87	12/28/82		
AY-101	DN	SOUND	DRCVR	327.6	901	79	869	0	0.0	0.0	869	869	0	32	0	FM	S	02/10/88	04/28/81		
2 DOUBLE-SHELL TANKS				TOTALS:	1802	158	1687	2	0.0	0.0	1689	1687	0	115	0						
+++++ AZ FARM STATUS +++++																					
AZ-101	AGING	SOUND	CWHT	346.5	953	27	918	0	0.0	0.0	918	918	0	35	0	FM	S	09/30/90	08/18/83		
AZ-102	AGING	SOUND	DRCVR	346.2	952	28	857	4	0.0	0.0	861	857	0	95	0	FM	S	06/04/92	12/24/84		
2 DOUBLE-SHELL TANKS				TOTALS:	1905	55	1775	4	0.0	0.0	1779	1775	0	130	0						

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Tank Farms	Available Space Calculations Used In This Document (Most Conservative)	Document SD-WM-TI-357*		Document OSD-T-151-00007** Specification Limit
		Operating Limit	Tank Capacity	
AN, AP, AW, SY	1,140,000 gal (414.5 in.)	1,144,000 gal (416 in.)	1,164,000 gal (421.8 in.)	1,160,500 gal (422 in.)
AY, AZ (Aging Waste)	980,000 gal (356.4 in.)	990,000 gal (360 in.)	1,000,000 gal (363.6 in.)	1,001,000 gal (364 in.)

****WHC-OSD-T-151-00007, "Operating Specifications for 241-AN, AP, AW, AY, AZ, & SY Tank Farms."**

(1) Tank AW-101: Although the total waste exceeds the 1140 Kgal specified for waste volume projections of available space, it does not exceed the operating limit criteria.

TABLE E-5. INVENTORY AND STATUS BY TANK
SINGLE-SHELL TANKS
September 1993

TANK STATUS				LIQUID VOLUME							SOLIDS VOLUME		VOLUME DETERMINATION						
TANK	WASTE MATERIAL	TANK INTEGRITY	STABIL/ ISOLATION STATUS	TOTAL WASTE (Kgal)	SUPER- NATANT LIQUID (Kgal)	DRAIN- ABLE INTER- STIT. (Kgal)	PUMPED THIS MONTH (Kgal)	TOTAL PUMPED (Kgal)	DRAIN- ABLE LIQUID REMAIN (Kgal)	PUMP- ABLE LIQUID REMAIN (Kgal)	SLUDGE (Kgal)	SALTCAKE (Kgal)	LIQUIDS VOLUME METHOD	SOLIDS VOLUME METHOD	SOLIDS VOLUME UPDATE	SOLIDS UPDATE	CHG SINCE		
																SOURCE SEE FOOTNOTE	LAST PHOTO DATE	LAST MONTHLY REPORT	
+++++ A FARM STATUS +++++																			
A-101	DSSF	SOUND	/PI	953	0	413	0.0	0.0	413	390	3	950	P	F	11/21/80		08/21/85		
A-102	DSSF	SOUND	IS/PI	41	4	2	0.0	39.5	6	0	15	22	P	FP	07/27/89	(1)	07/20/89		
A-103	DSSF	ASMD LKR	IS/IP	370	4	13	0.0	111.0	12	0	366	0	-	FP	06/03/88	(1)	12/28/88		
A-104	NCPLX	ASMD LKR	IS/IP	28	0	0	0.0	0.0	0	0	28	0	M	PS	01/27/78		06/25/86		
A-105	NCPLX	ASMD LKR	IS/IP	19	0	4	0.0	0.0	4	0	19	0	P	MP	08/23/79	(1)	08/20/86		
A-106	CP	SOUND	IS/IP	125	0	7	0.0	0.0	7	0	125	0	P	M	09/07/82		08/17/86		
6 SINGLE-SHELL TANKS TOTALS				1536	8	439	0.0	150.5	442	390	556	972							
+++++ AX FARM STATUS +++++																			
AX-101	DSSF	SOUND	/PI	748	0	320	0.0	0.0	320	298	3	745	P	F	05/06/82		08/18/87		
AX-102	CC	ASMD LKR	IS/IP	39	3	14	0.0	13.0	17	3	7	29	F	S	09/06/88		06/05/89		
AX-103	CC	SOUND	IS/IP	112	0	36	0.0	0.0	36	3	2	110	F	S	08/19/87		08/13/87		
AX-104	NCPLX	ASMD LKR	IS/IP	7	0	0	0.0	0.0	0	0	7	0	P	M	04/28/82		08/18/87		
4 SINGLE-SHELL TANKS TOTALS:				906	3	370	0.0	13.0	373	304	19	884							

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TABLE E-5. INVENTORY AND STATUS BY TANK
SINGLE-SHELL TANKS
September 1993

TANK STATUS				LIQUID VOLUME							SOLIDS VOLUME		VOLUME DETERMINATION						
TANK	WASTE MATERIAL	TANK INTEGRITY	STABIL/ ISOLATION STATUS	TOTAL WASTE (Kgal)	SUPER- NATANT LIQUID (Kgal)	DRAIN- ABLE INTER- STIT. (Kgal)	PUMPED THIS MONTH (Kgal)	TOTAL PUMPED (Kgal)	DRAIN- ABLE LIQUID REMAIN (Kgal)	PUMP- ABLE LIQUID REMAIN (Kgal)	SLUDGE (Kgal)	SALTCAKE (Kgal)	LIQUIDS VOLUME METHOD	SOLIDS VOLUME METHOD	SOLIDS VOLUME UPDATE	SOLIDS UPDATE	CHG SINCE		
																SOURCE SEE FOOTNOTE	LAST PHOTO DATE	LAST MONTHLY REPORT	
+++++ B FARM STATUS +++++																			
B-101	NCPLX	ASMD LKR	IS/IP	113	0	6	0.0	0.0	6	0	113	0	P	F	04/28/82		05/19/83		
B-102	NCPLX	SOUND	IS/IP	32	4	0	0.0	0.0	4	0	18	10	P	F	08/22/85	(1)	08/22/85		
B-103	NCPLX	ASMD LKR	IS/IP	59	0	0	0.0	0.0	0	0	59	0	F	F	02/28/85	(1)	10/13/88		
B-104	NCPLX	SOUND	IS/IP	371	1	46	0.0	0.0	47	40	301	69	M	M	06/30/85	(1)	10/13/88		
B-105	NCPLX	ASMD LKR	IS/IP	306	0	23	0.0	0.0	23	0	40	266	P	MP	12/27/84	(1)	05/19/88		
B-106	NCPLX	SOUND	IS/IP	117	1	6	0.0	0.0	7	0	116	0	F	F	03/31/85	(1)	02/28/85		
B-107	NCPLX	ASMD LKR	IS/IP	165	1	12	0.0	0.0	13	7	164	0	M	M	03/31/85	(1)	02/28/85		
B-108	NCPLX	SOUND	IS/IP	94	0	4	0.0	0.0	4	0	94	0	F	F	05/31/85	(1)	05/10/85		
B-109	NCPLX	SOUND	IS/IP	127	0	8	0.0	0.0	8	0	127	0	M	M	04/08/85	(1)	04/02/85		
B-110	NCPLX	ASMD LKR	IS/IP	246	1	22	0.0	0.0	23	17	245	0	MP	MP	02/28/85	(1)	03/17/88		
B-111	NCPLX	ASMD LKR	IS/IP	237	1	21	0.0	0.0	22	16	236	0	F	F	06/28/85	(1)	06/26/85		
B-112	NCPLX	ASMD LKR	IS/IP	33	3	0	0.0	0.0	3	0	30	0	F	F	05/31/85	(1)	05/29/85		
B-201	NCPLX	ASMD LKR	IS/IP	29	1	3	0.0	0.0	4	0	28	0	M	M	04/28/82		11/12/86		
B-202	NCPLX	SOUND	IS/IP	27	0	3	0.0	0.0	3	0	27	0	P	M	05/31/85	(1)	05/29/85		
B-203	NCPLX	ASMD LKR	IS/IP	51	1	5	0.0	0.0	6	0	50	0	PM	PM	05/31/84	(1)	11/13/86		
B-204	NCPLX	ASMD LKR	IS/IP	50	1	5	0.0	0.0	6	0	49	0	P	M	05/31/84	(1)	10/21/87		
16 SINGLE-SHELL TANKS			TOTALS	2057	15	164	0.0	0.0	179	80	1697	345							

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TABLE E-5. INVENTORY AND STATUS BY TANK
SINGLE-SHELL TANKS
September 1993

TANK STATUS				LIQUID VOLUME							SOLIDS VOLUME		VOLUME DETERMINATION					
TANK	WASTE MATERIAL	TANK INTEGRITY	STABIL/ ISOLATION STATUS	TOTAL WASTE (Kgal)	NATANT LIQUID (Kgal)	DRAIN- ABLE		TOTAL PUMPED (Kgal)	DRAIN- ABLE LIQUID REMAIN (Kgal)	PUMP- ABLE LIQUID REMAIN (Kgal)	SLUDGE (Kgal)	SALTCAKE (Kgal)	LIQUIDS VOLUME METHOD	SOLIDS VOLUME METHOD	SOLIDS VOLUME UPDATE	SOLIDS SOURCE SEE FOOTNOTE	LAST PHOTO DATE	CHG SINCE LAST MONTHLY REPORT
						INTER- STIT. (Kgal)	PUMPED THIS MONTH (Kgal)											
***** BX FARM STATUS *****																		
BX-101 NCPLX	ASMD LKR	IS/IP		43	1	0	0.0	0.0	1	0	42	0	P	M	04/28/82		11/24/88	
BX-102 NCPLX	ASMD LKR	IS/IP		96	0	4	0.0	0.0	4	0	96	0	P	M	04/28/82		09/18/85	
BX-103 NCPLX	SOUND	IS/IP		66	4	0	0.0	0.0	4	0	62	0	P	F	11/29/83		10/31/86	
BX-104 NCPLX	SOUND	IS/IP		99	3	30	0.0	17.4	33	27	96	0	F	F	09/22/89	(1)	09/21/89	
BX-105 NCPLX	SOUND	IS/IP		51	5	6	0.0	15.0	11	4	43	3	F	S	09/03/86	(1)	10/23/86	
3X-106 NCPLX	SOUND	/PI		46	15	0	0.0	0.0	15	15	31	0	MP	PS	04/28/82		05/19/88	
BX-107 NCPLX	SOUND	IS/PI		345	1	29	0.0	23.1	30	23	344	0	MP	P	09/18/90	(2)	09/11/90	
BX-108 NCPLX	ASMD LKR	IS/IP		26	0	1	0.0	0.0	1	0	26	0	M	PS	07/31/79	(1)	10/23/86	
BX-109 NCPLX	SOUND	IS/PI		193	0	13	0.0	8.2	13	8	193	0	FP	P	09/17/90	(2)	09/11/90	
BX-110 NCPLX	SOUND	IS/PI		199	1	15	0.0	0.0	16	10	189	9	MP	M	08/22/85	(1)	07/31/85	
BX-111 NCPLX	ASMD LKR	IS/PI		230	19	50	0.0	0.0	69	46	68	143	M	M	07/26/77		07/16/93	
BX-112 NCPLX	ASMD LKR	/PI		165	1	7	0.0	4.1	8	2	164	0	FP	P	09/17/90	(2)	09/11/90	
BX-112 NCPLX	SOUND	IS/PI		165	1	7	0.0	4.1	8	2	164	0	FP	P	09/17/90	(2)	09/11/90	
12 SINGLE-SHELL TANKS			TOTALS:	1559	50	155	0.0	67.8	205	135	1354	155						
***** BY FARM STATUS *****																		
BY-101 NCPLX	SOUND	IS/IP		387	0	5	0.0	35.8	5	0	109	278	P	M	05/30/84		09/19/89	
BY-102 NCPLX	SOUND	/PI		341	0	41	0.0	123.3	41	22	0	341	MP	M	08/30/91	(2)	09/11/87	
BY-103 NCPLX	ASMD LKR	/PI		400	0	160	0.0	78.5	160	137	5	395	MP	M	04/03/90	(2)	09/07/89	
BY-104 NCPLX	SOUND	IS/IP		406	0	18	0.0	329.5	18	0	40	366	P	M	04/28/82		04/27/83	
BY-105 NCPLX	SOUND	IS/IP		406	0	18	0.0	329.5	18	0	40	366	P	M	04/28/82		07/11/86	
BY-105 NCPLX	ASMD LKR	/PI		503	0	192	0.0	0.0	192	169	44	459	P	MP	04/28/82		11/04/82	
BY-106 NCPLX	ASMD LKR	/PI		642	0	235	0.0	0.0	235	213	95	547	P	MP	04/28/82		10/15/86	
BY-107 NCPLX	ASMD LKR	IS/IP		266	0	25	0.0	56.4	25	0	60	206	P	MP	04/28/82			

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TABLE E-5. INVENTORY AND STATUS BY TANK
SINGLE-SHELL TANKS
September 1993

TANK STATUS				LIQUID VOLUME							SOLIDS VOLUME		VOLUME DETERMINATION						
TANK	WASTE MATERIAL	TANK INTEGRITY	STABIL/ ISOLATION STATUS	TOTAL WASTE (Kgal)	NATANT LIQUID (Kgal)	DRAIN- ABLE INTER- STIT. (Kgal)	PUMPED THIS MONTH (Kgal)	TOTAL PUMPED (Kgal)	DRAIN- ABLE LIQUID REMAIN (Kgal)	PUMP- ABLE LIQUID REMAIN (Kgal)	SLUDGE (Kgal)	SALTCAKE (Kgal)	LIQUIDS VOLUME METHOD	SOLIDS VOLUME METHOD	SOLIDS VOLUME UPDATE	SOLIDS	CHG		
																SOURCE SEE FOOTNOTE	LAST PHOTO DATE	LAST Mnthly REPORT	
				+++++ C FARM STATUS +++++															
BY-108	NCPLX	ASMD LKR	IS/IP	228	0	9	0.0	27.5	9	0	154	74	MP	M	04/28/82		10/15/86		
BY-109	NCPLX	SOUND	/PI	423	0	78	0.0	93.5	78	57	83	340	F	PS	08/30/91	(2)	10/15/86		
BY-110	NCPLX	SOUND	IS/IP	398	0	9	0.0	213.3	9	0	103	295	M	S	09/10/79		07/26/84		
BY-111	NCPLX	SOUND	IS/IP	459	0	0	0.0	313.2	0	0	21	438	P	M	04/28/82		10/31/86		
BY-112	NCPLX	SOUND	IS/IP	291	0	8	0.0	116.4	8	0	5	286	P	M	04/28/82		04/14/88		
12 SINGLE-SHELL TANKS				TOTALS:	4744	0	780	0.0	1387.4	780	598	719	4025						
				+++++ C FARM STATUS +++++															
C-101	NCPLX	ASMD LKR	IS/IP	88	0	3	0.0	0.0	3	0	88	0	M	M	11/29/83		11/17/87		
C-102	DC	SOUND	/PI	423	0	37	0.0	11.6	37	19	423	0	F	FP	04/28/82		05/18/76		
C-103	NCPLX	SOUND	/PI	195	133	0	0.0	0.0	133	133	62	0	F	S	10/22/90	(2)	07/28/87		
C-104	CC	SOUND	IS/IP	295	0	11	0.0	0.0	11	5	295	0	FP	P	09/22/89	(1)	07/25/90		
C-105	NCPLX	SOUND	/PI	150	0	11	0.0	0.0	11	4	150	0	F	S	05/31/85		04/01/88		
C-106	NCPLX	SOUND	/PI	229	32	16	0.0	0.0	48	42	197	0	F	PS	04/28/82		04/05/79		
C-107	DC	SOUND	/PI	275	0	26	0.0	16.3	26	20	275	0	F	S	01/30/92	(2)	00/00/00		
C-108	NCPLX	SOUND	IS/IP	66	0	0	0.0	0.0	0	0	66	0	M	S	02/24/84	(1)	12/05/74		
C-109	NCPLX	SOUND	IS/IP	66	4	0	0.0	0.0	4	0	62	0	M	PS	11/29/83		01/30/76		
C-110	DC	ASMD LKR	/PI	187	0	7	0.0	8.9	7	5	187	0	F	FMP	03/01/92	(2)	08/12/86		
C-111	NCPLX	ASMD LKR	IS/IP	57	0	0	0.0	0.0	0	0	57	0	M	S	04/28/82		02/25/70		
C-112	NCPLX	SOUND	IS/PI	104	0	32	0.0	0.0	32	26	104	0	M	PS	09/18/90	(2)	09/18/90		

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TABLE E-5. INVENTORY AND STATUS BY TANK
SINGLE-SHELL TANKS
September 1993

TANK STATUS				LIQUID VOLUME							SOLIDS VOLUME		VOLUME DETERMINATION					
TANK	WASTE MATERIAL	TANK INTEGRITY	STABIL/ ISOLATION STATUS	TOTAL WASTE (Kgal)	SUPER- NATANT LIQUID (Kgal)	DRAIN- ABLE INTER- STIT. (Kgal)	PUMPED THIS MONTH (Kgal)	TOTAL PUMPED (Kgal)	DRAIN- ABLE LIQUID REMAIN (Kgal)	PUMP- ABLE LIQUID REMAIN (Kgal)	SLUDGE (Kgal)	SALTCAKE (Kgal)	LIQUIDS VOLUME METHOD	SOLIDS VOLUME METHOD	SOLIDS VOLUME UPDATE	SOLIDS UPDATE	CHG	
																SOURCE SEE FOOTNOTE	LAST PHOTO DATE	SINCE LAST MNTHL REPORT
C-201	NCPLX	ASMD LKR	IS/IP	2	0	0	0.0	0.0	0	0	2	0	P	MP	03/31/82		12/02/86	
C-202	EMPTY	ASMD LKR	IS/IP	1	0	0	0.0	0.0	0	0	1	0	P	M	01/19/79		12/09/86	
C-203	NCPLX	ASMD LKR	IS/IP	5	0	0	0.0	0.0	0	0	5	0	P	MP	04/28/82		12/09/86	
C-204	NCPLX	ASMD LKR	IS/IP	3	0	0	0.0	0.0	0	0	3	0	P	MP	04/28/82		12/09/86	
16 SINGLE-SHELL TANKS				TOTALS:	2146	169	143	0.0	36.8	312	254	1977	0					
+++++ S FARM STATUS +++++																		
S-101	NCPLX	SOUND	/PI	427	12	84	0.0	0.0	96	90	244	171	F	PS	09/16/80		03/18/88	
S-102	DSSF	SOUND	/PI	549	0	230	0.0	0.0	230	208	4	545	P	FP	04/28/82		03/18/88	
S-103	DSSF	SOUND	/PI	248	17	85	0.0	0.0	102	79	10	221	M	S	11/20/80		06/01/89	
S-104	NCPLX	ASMD LKR	IS/IP	294	1	28	0.0	0.0	29	23	293	0	M	M	12/20/84	(1)	12/12/84	
S-105	NCPLX	SOUND	IS/IP	456	0	35	0.0	114.3	35	13	2	454	MP	S	09/26/88		04/12/89	
S-106	NCPLX	SOUND	/PI	543	0	185	0.0	99.8	185	162	32	511	P	FP	06/28/82		03/17/89	
S-107	NCPLX	SOUND	/PI	368	6	45	0.0	0.0	51	44	293	69	F	PS	09/25/80		03/12/87	
S-108	NCPLX	SOUND	/PI	604	0	127	0.0	151.6	127	105	4	600	P	MP	04/28/82		03/12/87	
S-109	NCPLX	SOUND	/PI	568	0	141	0.0	111.0	141	119	13	555	F	PS	09/30/75		08/24/84	
S-110	NCPLX	SOUND	/PI	390	0	110	0.0	185.9	110	103	131	259	F	PS	05/14/92		03/12/87	
S-111	NCPLX	SOUND	/PI	596	10	195	0.0	3.3	205	134	139	447	P	FP	04/28/82		08/10/89	
S-112	NCPLX	SOUND	/PI	637	0	134	0.0	125.1	134	112	6	631	P	FP	06/28/82		03/24/87	
12 SINGLE-SHELL TANKS				TOTALS:	5680	46	1399	0.0	791.0	1445	1192	1171	4463					

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TABLE E-5. INVENTORY AND STATUS BY TANK
SINGLE-SHELL TANKS
September 1993

TANK STATUS				LIQUID VOLUME							SOLIDS VOLUME		VOLUME DETERMINATION					
TANK	WASTE MATERIAL	TANK INTEGRITY	STABIL/ ISOLATION STATUS	TOTAL WASTE (Kgal)	SUPER-NATANT LIQUID (Kgal)	DRAIN-ABLE INTER-STIT. (Kgal)	PUMPED THIS MONTH (Kgal)	TOTAL PUMPED (Kgal)	DRAIN-ABLE LIQUID REMAIN (Kgal)	PUMP-ABLE LIQUID REMAIN (Kgal)	SLUDGE (Kgal)	SALTCAKE (Kgal)	LIQUIDS VOLUME METHOD	SOLIDS VOLUME METHOD	SOLIDS VOLUME UPDATE	SOLIDS UPDATE	CHG SINCE	
																SOURCE SEE FOOTNOTE	LAST PHOTO DATE	LAST MNTHLY REPORT
+++++ SX FARM STATUS +++++																		
SX-101 DC	SOUND		/PI	456	1	145	0.0	0.0	146	124	112	343	P	FP	04/28/82		03/10/89	
SX-102 DSSF	SOUND		/PI	543	0	183	0.0	0.0	183	177	117	426	P	M	04/28/82		01/07/88	
E-14 SX-103 NCPLX	SOUND		/PI	652	1	232	0.0	0.0	233	211	115	536	F	S	07/15/91		12/17/87	
SX-104 DSSF	ASMD LKR		/PI	614	0	201	0.0	113.2	201	195	136	478	F	S	07/07/89		09/08/88	
SX-105 DSSF	SOUND		/PI	683	0	261	0.0	0.0	261	238	73	610	P	F	04/28/82		06/15/88	
SX-106 NCPLX	SOUND		/PI	538	61	194	0.0	0.0	255	233	12	465	F	PS	10/28/80		06/01/89	
SX-107 NCPLX	ASMD LKR		IS/IP	104	0	5	0.0	0.0	5	0	104	0	P	M	04/28/82		03/06/87	
SX-108 NCPLX	ASMD LKR		IS/IP	115	0	6	0.0	0.0	6	0	115	0	P	M	04/28/82		03/06/87	
SX-109 NCPLX	ASMD LKR		IS/IP	250	0	10	0.0	0.0	10	0	0	250	P	M	10/05/93		05/21/86 *	
SX-110 NCPLX	ASMD LKR		IS/IP	62	0	0	0.0	0.0	0	0	62	0	M	PS	10/06/76		02/20/87	
SX-111 NCPLX	ASMD LKR		IS/IP	125	0	7	0.0	0.0	7	0	125	0	M	PS	05/31/74		03/10/87	
SX-112 NCPLX	ASMD LKR		IS/IP	92	0	3	0.0	0.0	3	0	92	0	P	M	04/28/82		03/10/87	
SX-113 NCPLX	ASMD LKR		IS/IP	26	0	0	0.0	0.0	0	0	26	0	P	M	04/28/82		03/18/88	
SX-114 NCPLX	ASMD LKR		IS/IP	181	0	14	0.0	0.0	14	0	181	0	P	M	04/28/82		02/26/87	
SX-115 NCPLX	ASMD LKR		IS/IP	12	0	0	0.0	0.0	0	0	12	0	P	M	04/28/82		03/31/88	
15 SINGLE-SHELL TANKS			TOTALS:	4453	63	1261	0.0	113.2	1324	1178	1532	2858						

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TABLE E-5. INVENTORY AND STATUS BY TANK
SINGLE-SHELL TANKS
September 1993

TANK STATUS				LIQUID VOLUME							SOLIDS VOLUME		VOLUME DETERMINATION						
TANK	WASTE MATERIAL	TANK INTEGRITY	STABIL/ ISOLATION STATUS	TOTAL WASTE (Kgal)	SUPER- NATANT LIQUID (Kgal)	DRAIN- ABLE INTER- STIT. (Kgal)	PUMPED THIS MONTH (Kgal)	TOTAL PUMPED (Kgal)	DRAIN- ABLE LIQUID REMAIN (Kgal)	PUMP- ABLE LIQUID REMAIN (Kgal)	SLUDGE (Kgal)	SALTCAKE (Kgal)	LIQUIDS VOLUME METHOD	SOLIDS VOLUME METHOD	SOLIDS VOLUME UPDATE	SOLIDS UPDATE	CHG		
																SOURCE SEE FOOTNOTE	LAST PHOTO DATE	LAST MONTHLY REPORT	
+++++ T FARM STATUS +++++																			
T-101	NCPLX	ASMD LKR	IS/PI	102	1	16	0.0	25.3	17	0	101	0	F	S	04/14/93		04/07/93		
T-102	NCPLX	SOUND	IS/IP	32	13	0	0.0	0.0	13	13	19	0	P	FP	08/31/84		06/28/89		
T-103	NCPLX	ASMD LKR	IS/IP	27	4	0	0.0	0.0	4	0	23	0	F	FP	11/29/83	(1)	07/02/84		
T-104	NCPLX	SOUND	/PI	445	3	47	0.0	0.0	50	44	442	0	P	MP	04/28/82		06/29/89		
T-105	NCPLX	SOUND	IS/IP	98	0	23	0.0	0.0	23	17	98	0	P	F	05/29/87		05/14/87		
T-106	NCPLX	ASMD LKR	IS/IP	21	2	0	0.0	0.0	2	0	19	0	P	FP	04/28/82		06/29/89		
T-107	NCPLX	ASMD LKR	/PI	180	9	13	0.0	0.0	22	16	171	0	P	FP	08/31/84		07/12/84		
T-108	NCPLX	ASMD LKR	IS/IP	44	0	0	0.0	0.0	0	0	44	0	P	M	04/28/82		07/17/84		
T-109	NCPLX	ASMD LKR	IS/IP	58	0	0	0.0	0.0	0	0	58	0	M	M	12/30/84	(1)	02/25/93		
T-110	NCPLX	SOUND	/PI	379	3	39	0.0	0.0	42	36	376	0	P	FP	04/28/82		07/12/84		
T-111	NCPLX	ASMD LKR	/PI	458	2	49	0.0	0.0	51	45	456	0	P	FP	04/28/82		08/02/84		
T-112	NCPLX	SOUND	IS/IP	67	7	0	0.0	0.0	7	7	60	0	P	FP	04/28/82		08/01/84		
T-201	NCPLX	SOUND	IS/IP	29	1	3	0.0	0.0	4	0	28	0	M	PS	05/31/78		04/15/86		
T-202	NCPLX	SOUND	IS/IP	21	0	2	0.0	0.0	2	0	21	0	FP	P	07/12/81		07/06/89		
T-203	NCPLX	SOUND	IS/IP	35	0	4	0.0	0.0	4	0	35	0	M	PS	01/31/78		08/03/89		
T-204	NCPLX	SOUND	IS/IP	38	0	4	0.0	0.0	4	0	38	0	FP	P	07/22/81		08/03/89		
16 SINGLE-SHELL TANKS			TOTALS:	2034	45	200	0.0	25.3	245	178	1989	0							

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TABLE E-5. INVENTORY AND STATUS BY TANK
SINGLE-SHELL TANKS
September 1993

TANK STATUS				LIQUID VOLUME							SOLIDS VOLUME		VOLUME DETERMINATION						
TANK	WASTE MATERIAL	TANK INTEGRITY	STABIL/ ISOLATION STATUS	TOTAL WASTE (Kgal)	SUPER- NATANT LIQUID (Kgal)	DRAIN- ABLE INTER- STIT. (Kgal)	PUMPED THIS MONTH (Kgal)	TOTAL PUMPED (Kgal)	DRAIN- ABLE LIQUID REMAIN (Kgal)	PUMP- ABLE LIQUID REMAIN (Kgal)	SLUDGE (Kgal)	SALTCAKE (Kgal)	LIQUIDS VOLUME METHOD	SOLIDS VOLUME METHOD	SOLIDS VOLUME UPDATE	SOLIDS SOURCE SEE FOOTNOTE	LAST PHOTO DATE	CHG SINCE LAST Mnthly REPORT	
+++++ TX FARM STATUS +++++																			
E-16	TX-101	NCPLX	SOUND	IS/IP	87	3	2	0.0	0.0	5	0	84	0	F	P	02/02/84	(1)	10/24/85	
	TX-102	NCPLX	SOUND	IS/IP	113	0	22	0.0	94.4	22	0	0	113	M	S	08/31/84		10/31/85	
	TX-103	NCPLX	SOUND	IS/IP	157	0	15	0.0	68.3	15	0	157	0	F	S	08/14/80		10/31/85	
	TX-104	NCPLX	SOUND	IS/IP	65	1	14	0.0	3.6	15	0	0	64	F	FP	04/06/84		10/16/84	
	TX-105	NCPLX	ASMD LKR	IS/IP	609	0	20	0.0	121.5	20	0	0	609	M	PS	08/22/77		10/24/89	
	TX-106	NCPLX	SOUND	IS/IP	453	0	10	0.0	134.6	10	0	0	453	M	S	08/29/77		10/31/85	
	TX-107	NCPLX	ASMD LKR	IS/IP	36	1	1	0.0	0.0	2	0	0	35	FP	FP	01/20/84	(1)	10/31/85	
	TX-108	NCPLX	SOUND	IS/IP	134	0	0	0.0	13.7	0	0	0	134	P	FP	05/30/83		09/12/89	
	TX-109	NCPLX	SOUND	IS/IP	384	0	10	0.0	72.3	10	0	0	384	F	PS	05/30/83		10/24/89	
	TX-110	NCPLX	ASMD LKR	IS/IP	462	0	15	0.0	115.1	15	0	0	462	M	PS	05/30/83		10/24/89	
	TX-111	NCPLX	SOUND	IS/IP	370	0	9	0.0	98.4	9	0	0	370	M	PS	07/26/77		09/12/89	
	TX-112	NCPLX	SOUND	IS/IP	649	0	24	0.0	94.0	24	0	0	649	P	PS	05/30/83		11/19/87	
	TX-113	NCPLX	ASMD LKR	IS/IP	607	0	16	0.0	19.2	16	0	0	607	M	PS	05/30/83		04/11/83	
	TX-114	NCPLX	ASMD LKR	IS/IP	535	0	15	0.0	104.3	15	0	0	535	M	PS	05/30/83		04/11/83	
	TX-115	NCPLX	ASMD LKR	IS/IP	640	0	19	0.0	99.i	19	0	0	640	M	S	03/25/83		06/15/88	
	TX-116	NCPLX	ASMD LKR	IS/IP	631	0	23	0.0	23.8	23	0	0	631	M	PS	03/31/72		10/17/89	
	TX-117	NCPLX	ASMD LKR	IS/IP	626	0	8	0.0	54.3	8	0	0	626	M	PS	12/31/71		04/11/83	
	TX-118	NCPLX	SOUND	IS/IP	347	0	27	0.0	89.1	27	0	0	347	F	S	11/17/80		12/19/79	
18 SINGLE-SHELL TANKS				TOTALS:	6905	5	250	0.0	1205.7	255	0	241	6659						

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TABLE E-5. INVENTORY AND STATUS BY TANK
SINGLE-SHELL TANKS
September 1993

TANK STATUS				LIQUID VOLUME							SOLIDS VOLUME		VOLUME DETERMINATION						
TANK	WASTE MATERIAL	TANK INTEGRITY	STABIL/ ISOLATION STATUS	TOTAL WASTE (Kgal)	SUPER- NATANT LIQUID (Kgal)	DRAIN- ABLE INTER- STIT. (Kgal)	PUMPED THIS MONTH (Kgal)	TOTAL PUMPED (Kgal)	DRAIN- ABLE LIQUID REMAIN (Kgal)	PUMP- ABLE LIQUID REMAIN (Kgal)	SLUDGE (Kgal)	SALTCAKE (Kgal)	LIQUIDS VOLUME METHOD	SOLIDS VOLUME METHOD	SOLIDS VOLUME UPDATE	SOLIDS UPDATE	LAST PHOTO DATE	CHG SINCE LAST MONTHLY REPORT	
																SEE FOOTNOTE			
+++++ TY FARM STATUS +++++																			
TY-101	NCPLX	ASMD LKR	IS/IP	118	0	0	0.0	8.2	0	0	118	0	P	F	04/28/82		08/22/89		
TY-102	NCPLX	SOUND	IS/IP	64	0	14	0.0	6.6	14	0	0	64	P	FP	06/28/82		07/07/87		
TY-103	NCPLX	ASMD LKR	IS/IP	162	0	5	0.0	11.5	5	0	162	0	P	FP	07/09/82		08/22/89		
TY-104	NCPLX	ASMD LKR	IS/IP	46	3	12	0.0	0.0	15	0	43	0	P	FP	06/27/90	(1)	11/03/87		
TY-105	NCPLX	ASMD LKR	IS/IP	231	0	0	0.0	3.6	0	0	231	0	P	M	04/28/82		09/07/89		
TY-106	NCPLX	ASMD LKR	IS/IP	17	0	0	0.0	0.0	0	0	17	0	P	M	04/28/82		08/22/89		
6 SINGLE-SHELL TANKS				TOTALS:	638	3	31	0.0	29.9	34	0	571	64						
+++++ U FARM STATUS +++++																			
U-101	NCPLX	ASMD LKR	IS/IP	25	3	0	0.0	0.0	3	0	22	0	P	MP	04/28/82		06/19/79		
U-102	NCPLX	SOUND	/PI	374	18	126	0.0	0.0	144	122	43	313	P	MP	04/28/82		06/08/89		
U-103	NCPLX	SOUND	/PI	468	13	176	0.0	0.0	189	166	32	423	P	FP	04/28/82		09/13/88		
U-104	NCPLX	ASMD LKR	IS/IP	122	0	7	0.0	0.0	7	0	122	0	P	MP	04/28/82		08/10/89		
U-105	NCPLX	SOUND	/PI	418	37	142	0.0	0.0	179	157	32	349	FM	PS	09/30/78		07/07/88		
U-106	NCPLX	SOUND	/PI	226	15	68	0.0	0.0	83	61	26	185	F	PS	12/30/83		07/07/88		
U-107	DSSF	SOUND	/PI	406	31	147	0.0	0.0	178	156	15	360	F	S	12/30/83		10/27/88		
U-108	NCPLX	SOUND	/PI	468	24	172	0.0	0.0	196	174	29	415	F	S	12/30/83		09/12/84		
U-109	NCPLX	SOUND	/PI	463	19	163	0.0	0.0	182	160	48	396	F	F	11/13/77		07/07/88		
U-110	NCPLX	ASMD LKR	IS/PI	186	0	15	0.0	0.0	15	9	186	0	M	M	12/30/84	(1)	12/11/84		
U-111	DSSF	SOUND	/PI	329	0	122	0.0	0.0	122	99	26	303	PS	FPS	04/28/82		06/23/88		
U-112	NCPLX	ASMD LKR	IS/IP	49	4	0	0.0	0.0	4	0	45	0	P	MP	02/10/84	(1)	08/03/89		

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TABLE E-5. INVENTORY AND STATUS BY TANK
SINGLE-SHELL TANKS
September 1993

TANK STATUS				LIQUID VOLUME							SOLIDS VOLUME		VOLUME DETERMINATION					
TANK	WASTE MATERIAL	TANK INTEGRITY	STABIL/ ISOLATION STATUS	TOTAL WASTE (Kgal)	SUPER- NATANT LIQUID (Kgal)	DRAIN- ABLE INTER- STIT. (Kgal)	PUMPED THIS MONTH (Kgal)	TOTAL PUMPED (Kgal)	DRAIN- ABLE LIQUID REMAIN (Kgal)	PUMP- ABLE LIQUID REMAIN (Kgal)	SLUDGE (Kgal)	SALTCAKE (Kgal)	LIQUIDS VOLUME METHOD	SOLIDS VOLUME METHOD	SOLIDS VOLUME UPDATE	SOLIDS UPDATE	CHG	
																SOURCE SEE FOOTNOTE	LAST PHOTO DATE	LAST Mnth REPO
U-201	NCPLX	SOUND	IS/IP	5	1	0	0.0	0.0	1	0	4	0	M	S	08/15/79		08/03/89	
U-202	NCPLX	SOUND	IS/IP	5	1	0	0.0	0.0	1	0	4	0	M	S	08/15/79		08/08/89	
U-203	NCPLX	SOUND	IS/IP	3	1	0	0.0	0.0	1	0	2	0	M	S	08/15/79		06/13/89	
U-204	NCPLX	SOUND	IS/IP	3	1	0	0.0	0.0	1	0	2	0	M	S	08/15/79		06/13/89	
16 SINGLE-SHELL TANKS			TOTALS:	3550	168	1138	0.0	0.0	1306	1104	638	2744						
GRAND TOTAL				36208	575	6330	0	3821	6900	5413	12214	23419						

NOTE: +/- 1K gal differences are the result of rounding

Total Waste is calculated as the sum of Sludge and Saltcake plus Supernate.

(1) WHC-SD-RE-TI-178 SST STABILIZATION RECORD

(2) TANK FARMS SST ENGINEER MONTHLY INPUT (Retained 10 yr in Monthly Summary Report author's office)

Note: The category "Interim Isolated" (II) was changed to "Intrusion Prevention" (IP) in June 1993. See section C. "Tank and Equipment Code and Status Definitions"

* SX-109 - Tank Waste was reclassified from Sludge to Saltcake, per Single-Shell Tank Engineering

References:

- (1) Data Transmittal Package for 241-SX-109 Waste Tank Characterization, SD-RE-TI-10, reports a very dry saltcake for Segment 1 (Core 1), and a very hard material for Segments 2, 3, and 3B (Core 1).
- (2) The photographs developed on May 21, 1986, indicate a very dry surface is present.
- (3) "A History of the 200 Area Tank Farm," WHC-MR-0132, documents transfers made to SX-109 were concentrated saltcake and self-concentrating wastes.

APPENDIX F
PERFORMANCE SUMMARY

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TABLE F-1. PERFORMANCE SUMMARY (Sheet 1 of 3)

WASTE VOLUMES (Kgallons)

September 1993

INCREASES/DECREASES IN WASTE VOLUMES STORED IN DOUBLE-SHELL TANKS

SOURCE	THIS MONTH	FY1993 TO DATE
B PLANT	0	135
PUREX TOTAL (1)	0	77
PFP (1)	0	5
T PLANT (1)	11	68
S PLANT (1)	0	10
300/400 AREAS (1)	0	35
SULFATE WASTE - 100 N (2)	0	0
MINI-RUN (14)	0	359
TANK FARMS & SALTWELL LIQUID (6)	0	74
OTHER GAINS	35	361
Slurry increase (3)	1	
Condensate	33	
Instrument change (7)	0	
Unknown (5)	1	
OTHER LOSSES	-23	-323
Slurry decrease (3)	-2	
Evaporation (4)	-15	
Instrument change (7)	0	
Unknown (5)	-6	
EVAPORATED	0	0
GROUTED	0	0
Total	23	801

Note: +/- 1 Kgal differences are the result of rounding

* 105-C was removed from the High Heat Load list effective 7/1/93.
(See June 1993 report)

8112 gallons of water were added to 106-C during September 1993

INCREASES/DECREASES IN WASTE VOLUMES STORED IN SINGLE-SHELL TANKS

SOURCE	THIS MONTH	FY1993 TO DATE
106-C (8)	11	62
Gains		
Losses	-8	-62
Total	3	0

CUMULATIVE EVAPORATION - 1950 TO PRESENT WASTE VOLUME REDUCTION

FACILITY	
242-B EVAPORATOR (9)	7172
242-T EVAPORATOR (1950's) (9)	9181
IN-TANK SOLIDIFICATION UNIT 1 (10)	11876
IN-TANK SOLIDIFICATION UNIT 2 (10)	15295
IN-TANK SOLID. UNIT 1 & 2 (10)	7965
(after conversion of Unit 1 to a cooler for Unit 2)	
242-T (Modified) (9)	24471
242-S EVAPORATOR (11)	41983
242-A EVAPORATOR (12)	65227
B PLANT (Cell 23) (13)	1185
REDOX (12)	12393
Total	196748

TOTAL THROUGHPUT

FACILITY	
242-A EVAPORATOR (12)	182437
242-S EVAPORATOR (11)	134587
Total	317024

Footnotes: See Next Page

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TABLE F-1. Performance Summary (Sheet 2 of 3)

Footnotes:

INCREASES/DECREASES IN WASTE VOLUMES

- (1) Including Flush
- (2) Sulfate waste is generated from ion exchange backflushing and sand filter clean out, resulting in sulfate waste (Na_2SO_4).
- (3) Slurry increase/growth is caused by gas generation within the waste. The gas which is trapped in the waste expands in the tank causing the surface level and volume to increase. Slurry decrease results from the periodic release of gas in the waste.
- (4) Aging waste tanks
- (5) Unknown waste gains or losses may be the result of rounding calculations, clean water slowly leaking through a valve, changes in levels (expansion/contraction) because of ambient temperature changes, different measuring devices being used by Tank Farm operators, transfers taking place during the end of the month, Tank Farm activities such as miscellaneous water additions not associated with facility waste generation, or the addition of water which is added to aging waste tanks and then evaporated off.
- (6) Includes Tank Farms miscellaneous flushes (flushes are used to "clean out" pipelines and reduce personnel exposure, reduce potential for waste incompatibility, prevent line plugging, and reduce waste content of potential spills or leaks), and saltwell liquid, which results from pumping of single-shell tanks to double-shell tanks.
- (7) Liquid level measurement instrument changes from the automatic FIC to manual tape (and vice versa) result in unusual gains or losses because the manual tape may rest on an uneven crust surface giving a different reading from that of the automatic FIC. These instrument changes are made when the automatic FIC is out of service and the reading from the manual tape is used for reporting purposes. The reported reading reverts back to the automatic FIC when it is repaired.
- (8) Water is periodically added to 105-C and 106-C to provide evaporative cooling. Losses due to evaporation are calculated assuming all losses are evaporative losses. Drywell monitoring for leak detection is done monthly on tank 105-C. Some drywells are monitored weekly and some are monitored every two weeks on tank 106-C. If there are any indications of a leak from these tanks, the assumption that all losses are due to evaporation will be reevaluated.

TABLE F-1. Performance Summary (Sheet 3 of 3)

WASTE VOLUME REDUCTION

- (9) Currently inoperative. These evaporator systems (242-B and 242-T) were installed in 1952 in each of the two operating areas to remove water from the waste, and ran for approximately 4 yr after which both units were shut down. The 242-T Evaporator was reactivated in December 1965, and shut down again in April 1976.
- (10) Currently inoperative. These two in-tank solidification (ITS) units provided in-tank heating to promote in-tank boiling or evaporation. The ITS Unit 1 started up March 1965, and ITS Unit 2 started up February 1968. In August 1971, ITS Unit 1 was converted from an evaporator to a cooler for ITS Unit 2. Both units were shut down June 1974.
- (11) Currently inoperative. The 242-S Evaporator-Crystallizer was started up November 1973, and shut down March 1980, when its processing campaign was completed. It is in standby mode with no future mission. This evaporator operates under a vacuum, employing evaporative concentration with subsequent crystallization and precipitation of salt crystals.
- (12) Currently inoperative. The 242-A Evaporator-Crystallizer was started up March 1977, and shut down April 1989 because of regulatory issues, and has remained shut down for subsequent upgrading. The projected start-up date is January 15-17, 1994. This evaporator operates under a vacuum, employing evaporative concentration with subsequent crystallization and precipitation of salt crystals (forming saltcake).
- (13) Currently inoperative. Additional concentration of wastes was completed by using the concentrators at REDOX and B Plant. The REDOX concentrator was used from July 1967 to June 1972, while the B Plant concentrator was used from July 1967 to February 1968.
- (14) Waste generated for training and testing purposes prior to Evaporator restart

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APPENDIX G

**PUMPING RECORD
LIQUID STATUS AND PUMPABLE LIQUID
REMAINING IN TANKS**

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TABLE G-1. PUMPING RECORD

(Kgallons)

September 1993

TANK FARMS	PUMPED THIS MONTH	PUMPED FY TO DATE	CUMULATIVE TOTAL PUMPED 1979 TO DATE
EAST			
A	0.0	0.0	150.5
AN	N/A	N/A	N/A
AP	N/A	N/A	N/A
AW	N/A	N/A	N/A
AX	0.0	0.0	13.0
AY	N/A	N/A	N/A
AZ	N/A	N/A	N/A
B	0.0	0.0	0.0
BX	0.0	0.0	68.9
BY	0.0	0.0	1387.4 *
C	0.0	0.0	36.8 **
Total	0.0	0.0	1856.6
WEST			
S	0.0	0.0	791.0
SX	0.0	0.0	113.2
SY	N/A	N/A	N/A
T	0.0	25.3	25.3
TX	0.0	0.0	1205.7
TY	0.0	0.0	29.9
U	0.0	0.0	0.0
Total	0.0	25.3	2165.1
TOTAL	0.0	25.3	3821.7

NA = Not Applicable

- * The total volume pumped was adjusted by the Single-Shell Tanks Engineer to account for the 14% miscalibration of the constant velocity transmitter and the amount of flush water used. DIL, DLR and PLR volumes were recalculated, based on the observed porosity in 102 and 109-BY.
- ** The total volume pumped was recalculated by the Single-Shell Tanks Engineer based on the surface level readings taken after shutdown of the saltwell pumps on January 28, 1992, in 102-C, 107-C and 110-C, and revised again based on recalculation of flush water additions on January 26, 1993. (The total for the tank farm remains the same, the amount pumped varied among the three tanks).

**TABLE G-2. LIQUID STATUS AND PUMPABLE LIQUID
REMAINING IN TANKS**

WASTE VOLUMES (Kgallons)

September 1993

TANK FARMS	SUPERNATANT LIQUID	DRAINABLE INTERSTITIAL LIQUID	DRAINABLE LIQUID REMAINING	PUMPABLE LIQUID REMAINING
EAST				
A	8	439	442	390
AN	4526	37	4563	N/A
AP	7286	0	7286	N/A
AW	4617	159	4776	N/A
AX	3	370	373	304
AY	1687	2	1689	N/A
AZ	1775	4	1779	N/A
B	15	164	179	80
BX	50	155	205	135
BY	0	780	780	598
C	169	143	312	254
Total	20136	2253	22384	1761
WEST				
S	46	1399	1445	1192
SX	63	1261	1324	1178
SY	861	237	1098	N/A
T	45	200	245	178
TX	5	250	255	0
TY	3	31	34	0
U	168	1138	1306	1104
Total	1191	4516	5707	3652
TOTAL	21327	6769	28091	5413 (1)

(1) Volume based on 12.5% (sludge waste) and 45% (saltcake waste) liquid in solid (porosity) value. This is a conservative (high) estimate.

Note: +/- 1 Kgal differences are the result of computer rounding

N/A = Not applicable

APPENDIX H
CATCH TANKS AND SPECIAL
SURVEILLANCE FACILITIES

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TABLE H-1. EAST AND WEST AREA CATCH TANKS AND SPECIAL SURVEILLANCE FACILITIES

ACTIVE - still running transfers through the associated diversion boxes or pipeline encasements

September 30, 1993

VOLUME
OF
CONTENTS MONITORED

FACILITY	LOCATION	PURPOSE (receives waste from:)	(Gallons)	BY	REMARKS
EAST AREA					
241-A-302-A	A FARM	151-A DB	1335	CASS/FIC	PUMPED 08/11/92
241-311-ER	B PLANT	151-ER, 152-ER DB	5320	CASS/FIC	PUMPED 05/29/91
241-152-AX	AX FARM	152-AX DB	3135	MANUALLY	DIAL O/S, USING ZIP CORD, PUMPED 08/29/92
241-151-AZ	AZ FARM	152-AZ DB, AZ LOOP SEAL	2350	CASS/FIC	VOLUME CHANGES DAILY
241-154-AZ	AZ FARM	102-AZ HTG COIL STEAM CONDENSATE	0	CASS/MT	AUTOMATIC PUMP
244-BX-TK/SMP	BX COMPLEX	DCRT - RECEIVES FROM SEVERAL FARMS	9917	MANUALLY	USING MANUAL TAPE FOR TANK
244-A-TK/SMP	A COMPLEX	DCRT - RECEIVES FROM SEVERAL FARMS	6445	MCS	DIRECT GAL READING, 8/2/93*
204-AR	AY FARM	RR CARS DURING TRANSFER TO REC. TKS	500	DIP TUBE	ALARMS ON CASS
417-A	A FARM	702-A PROCESS CONDENSATE	41300	DIP TUBE	
Vent Station Catch Tank		CROSS COUNTRY TRANSFER LINE	673	MT	
WEST AREA					
241-TX-302-C	TX FARM	154-TX DB	3898	CASS/FIC	FIC REPAIRED
241-U-301-B	U FARM	151-U, 152-U, 153-U, 252-U DB	O/S	CASS/FIC	
241-UX-302-A	U PLANT	154-UX DB	11018	CASS/MFIC	
241-S-304	S FARM	151-S DB	2265	FIC	OPERATIONAL 10/91, REPLACED S-302-A
244-S-TK/SMP	S FARM	DCRT - RECEIVES FROM SEVERAL FARMS	10123	MANUALLY	CWF
244-TX-TK/SMP	TX FARM	DCRT - RECEIVES FROM SEVERAL FARMS	18116	MANUALLY	MT

Total active facilities 16

* MCS problem 8/3 to 8/31/93

LEGEND: DB - Diversion Box
 DCRT - Double-Contained Receiver Tank
 TK - Tank
 SMP - Sump
 R - Usually denotes replacement
 FIC - Food Instrument Corporation
 MFIC - Manual FIC
 MT - Manual Tape
 CWF - Weight Factor/SpG = Corrected Weight Factor
 CASS - Computer Automated Surveillance System
 MCS - Monitor and Control System
 O/S - Out of Service

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TABLE H-2. EAST AREA CATCH TANKS AND SPECIAL SURVEILLANCE FACILITIES

INACTIVE – no longer receiving waste transfers

September 30, 1993

VOLUME
OF
CONTENTS MONITORED
(Gallons) BY

FACILITY LOCATION RECEIVED WASTE FROM: REMARKS

241-A-302-B	A FARM	152-A DB	3600	CASS/MT	ISOLATED 1985, PROJECT B-138 INTERIM STABILIZED 1990
241-B-301-B	B FARM	151-B, 152-B, 153-B, 252-B DB	UNKNOWN	NM	ISOLATED 1985(1)
241-B-302-B	B FARM	154-B DB	UNKNOWN	NM	ISOLATED 1985(1)
241-BX-302-A	BX FARM	152-BR, 153-BX, 152-BXR, 152-BYR DB	UNKNOWN	NM	ISOLATED 1985(1)
241-BX-302-B	BX FARM	154-DB	UNKNOWN	NM	ISOLATED 1985(1)
241-BX-302-C	BX FARM	155-B DB	UNKNOWN	NM	ISOLATED 1985(1)
241-C-301-C	C FARM	151-C, 152-C, 153-C, 252-C DB	UNKNOWN	NM	ISOLATED 1985(1)
241-CX-70	HOT SEMI-	TRANSFER LINES	UNKNOWN	NM	ISOLATED, DECOMMISSION PROJ.
241-CX-72	WORKS	TRANSFER LINES	UNKNOWN	NM	SEE DWG H-2-95-501, 2/5/87
244-AR	A COMPLEX	DCRT - RECEIVES FROM SEVERAL FARMS	UNKNOWN	NM	BEING UPGRADED
244-BXR-TK/SMP-001	BX FARM	TRANSFER LINES	UNKNOWN	NM	INTERIM STABILIZED 1985(1)
244-BXR-TK/SMP-002	BX FARM	TRANSFER LINES	UNKNOWN	NM	INTERIM STABILIZED 1985(1)
244-BXR-TK/SMP-003	BX FARM	TRANSFER LINES	UNKNOWN	NM	INTERIM STABILIZED 1985(1)
244-BXR-TK/SMP-011	BX FARM	TRANSFER LINES	UNKNOWN	NM	INTERIM STABILIZED 1985(1)
361-B-TANK	B PLANT	DRAINAGE FROM B-PLANT	UNKNOWN	NM	INTERIM STABILIZED 1985(1)

Total East Area inactive facilities 15

LEGEND: DB - Diversion Box
DCRT - Double-Contained Receiver Tank
MT - Manual Tape
CASS - Computer Automated Surveillance System
TK - Tank
SMP - Sump
R - Usually denotes replacement
NM - Not Monitored

(1) SOURCE: WASTE STORAGE TANK STATUS & LEAK DETECTION CRITERIA document

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TABLE H-3. WEST AREA CATCH TANKS AND SPECIAL SURVEILLANCE FACILITIES

INACTIVE – no longer receiving waste transfers

September 30, 1993

VOLUME
OF
CONTENTS

FACILITY	LOCATION	RECEIVED WASTE FROM:	(Gallons)	BY	REMARKS
241-S-302	S FARM	240-S-151 DB	2276	CASS/FIC *	ASSUMED LEAKER EPDA 85-04
241-S-302-A	S FARM	241-S-151 DB		CASS/FIC *	ASSUMED LEAKER TF-EFS-90-042
				* FIC in Intrusion mode	Partially filled with grout 2/91, determined still assumed leaker after leak test
241-S-302-B	S FARM	S ENCASEMENTS	UNKNOWN	NM	ISOLATED 1985(1)
241-SX-304(302)	SX FARM	152-SX TRANSFER BOX, 151-SX DB	UNKNOWN	NM	ISOLATED 1985(1)
241-TX-302	TX FARM	153-TX DB	UNKNOWN	NM	ISOLATED 1985(1)
241-TX-302-X-B	TX FARM	TX ENCASEMENTS	UNKNOWN	NM	ISOLATED 1985(1)
241-TX-302-B	TX FARM	155-TX DB	1320	CASS/MT	NEW MT INSTALLED 7/16/93
241-TY-302-A	TY FARM	153-TX DB	UNKNOWN	NM	ISOLATED 1985(1)
241-TY-302-B	TY FARM	TY ENCASEMENTS	UNKNOWN	NM	ISOLATED 1985(1)
244-U-TK/SMP	U FARM	DCRT - RECEIVES FROM SEVERAL FARMS	UNKNOWN	NM	NOT YET IN USE
244-UR VAULT	U FARM	TRANSFER LINES	UNKNOWN	NM	INTERIM STABILIZED, MT REMOVED 1985(1)
244-UR-TK/SMP-001	U FARM	TRANSFER LINES	UNKNOWN	NM	INTERIM STABILIZED, MT REMOVED 1985(1)
244-UR-TK/SMP-002	U FARM	TRANSFER LINES	UNKNOWN	NM	INTERIM STABILIZED, MT REMOVED 1985(1)
244-UR-TK/SMP-003	U FARM	TRANSFER LINES	UNKNOWN	NM	INTERIM STABILIZED, MT REMOVED 1985(1)
244-TXR VAULT	TX FARM	TRANSFER LINES	UNKNOWN	NM	INTERIM STABILIZED, MT REMOVED 1984(1)
244-TXR-TK/SMP-001	TX FARM	TRANSFER LINES	UNKNOWN	NM	INTERIM STABILIZED, MT REMOVED 1984(1)
244-TXR-TK/SMP-002	TX FARM	TRANSFER LINES	UNKNOWN	NM	INTERIM STABILIZED, MT REMOVED 1984(1)
244-TXR-TK/SMP-003	TX FARM	TRANSFER LINES	UNKNOWN	NM	INTERIM STABILIZED, MT REMOVED 1984(1)
361-T-TANK	T PLANT	DRAINAGE FROM T-PLANT	UNKNOWN	NM	ISOLATED 1985(1)
361-U-TANK	U PLANT	DRAINAGE FROM U-PLANT	UNKNOWN	NM	INTERIM STABILIZED, MT REMOVED 1985(1)

Total West Area inactive facilities 20

LEGEND: DB – Diversion Box
DCRT – Double-Contained Receiver Tank
TK – Tank
SMP – Sump
R – Usually denotes replacement
FIC – Food Instrument Corporation
MT – Manual Tape
O/S – Out of Service
CASS – Computer Automated Surveillance System
NM – Not Monitored

(1) SOURCE: WASTE STORAGE TANK STATUS & LEAK DETECTION CRITERIA document

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APPENDIX I
LEAK VOLUME ESTIMATES

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TABLE I-1. SINGLE-SHELL TANK LEAK VOLUME ESTIMATES (4) (Sheet 1 of 6)

Tank No.	Date Declared Confirmed or Assumed Leaker (3)	Volume (2)(4) (Gallons)	Associated KiloCuries 137 cs (10)	Interim Stabilized Date	Leak Estimate Updated Reference
241-A-103	1987	5500 (9)		8/88	1987 (l)
241-A-104	1975	500 to 2500	0.8 to 1.8 (q)	9/78	1983 (a)(q)
241-A-105 (1)	1963	10000 to 277000	85 to 760 (b)	7/79	1991 (b),(c)
241-AX-102	1988	3000 (9)		9/88	1989 (h)
241-AX-104	1977	-- (7)		8/81	1989 (g)
241-B-101	1974	-- (7)		3/81	1989 (g)
241-B-103	1978	-- (7)		2/85	1989 (g)
241-B-105	1978	-- (7)		12/84	1989 (g)
241-B-107	1980	8000 (9)		3/85	1986 (d),(f)
241-B-110	1981	10000 (9)		12/84	1986 (d)
241-B-111	1978	-- (7)		6/85	1989 (g)
241-B-112	1978	2000		5/85	1989 (g)
241-B-201	1980	1200 (9)		8/81	1984 (e),(f)
241-B-203	1983	300 (9)		6/84	1986 (d)
241-B-204	1984	400 (9)		6/84	1989 (g)
241-BX-101	1972	-- (7)		9/78	1989 (g)
241-BX-102	1971	70000	50 (l)	11/78	1986 (d)
241-BX-108	1974	2500	0.5 (l)	7/79	1986 (d)
241-BX-110	1976	-- (7)		8/85	1989 (g)
241-BX-111	1984	-- (7)		N/A	1993 (g),(r)
241-BY-103	1973	<5000		N/A	1983 (a)
241-BY-105	1984	-- (7)		N/A	1989 (g)
241-BY-106	1984	-- (7)		N/A	1989 (g)
241-BY-107	1984	15100 (9)		7/79	1989 (g)
241-BY-108	1972	<5000		2/85	1983 (a)
241-C-101	1980	20000 (9,11)		11/83	1986 (d)
241-C-110	1984	2000		N/A	1989 (g)
241-C-111	1968	5500 (9)		3/84	1989 (g)
241-C-201 (5)	1988	550		3/82	1987 (l)
241-C-202 (5)	1988	450		8/81	1987 (l)
241-C-203	1984	400 (9)		3/82	1986 (d)
241-C-204 (5)	1988	350		9/82	1987 (l)
241-S-104	1968	24000 (9)		12/84	1989 (g)
241-SX-104	1988	6000 (9)		N/A	1988 (k)
241-SX-107	1964	<5000		10/79	1983 (a)
241-SX-108 (6)	1962	2400 to 35000	17 to 140 (m) (q)	8/79	1991 (m) (q)
241-SX-109 (6)	1965	<10000	<40 (n)	5/81	1992 (n)
241-SX-110	1976	5500 (9)		8/79	1989 (g)
241-SX-111	1974	500 to 2000	0.6 to 2.4 (l) (q)	7/79	1986 (d) (q)
241-SX-112	1969	30000	40 (l)	7/79	1986 (d)
241-SX-113	1962	15000	8 (l)	11/78	1986 (d)
241-SX-114	1972	-- (7)		7/79	1989 (g)
241-SX-115	1965	50000	21 (o)	9/78	1992 (o)
241-T-101	1992	7500 (9)		4/93	1992 (p)
241-T-103	1974	<1000 (9)		11/83	1989 (g)
241-T-106	1973	115000 (9)	40 (l)	8/81	1986 (d)
241-T-107	1984	-- (7)		N/A	1989 (g)
241-T-108	1974	<1000 (9)		11/78	1980 (f)
241-T-109	1974	<1000 (9)		12/84	1989 (g)
241-T-111 (5)	1984	<1000 (9)		N/A	1980 (l)
241-TX-105	1977	-- (7)		9/83	1989 (g)
241-TX-107	1984	2500		10/79	1986 (d)
241-TX-110	1977	-- (7)		4/83	1989 (g)
241-TX-113	1974	-- (7)		4/83	1989 (g)
241-TX-114	1974	-- (7)		4/83	1989 (g)
241-TX-115	1977	-- (7)		9/83	1989 (g)
241-TX-116	1977	-- (7)		4/83	1989 (g)
241-TX-117	1977	-- (7)		3/83	1989 (g)
241-TY-101	1973	<1000 (9)		8/83	1980 (l)
241-TY-103	1973	3000	0.7 (l)	2/83	1986 (d)
241-TY-104	1981	1400 (9)		11/83	1986 (d)
241-TY-105	1960	35000	4 (l)	2/83	1986 (d)
241-TY-106	1959	20000	2 (l)	11/78	1986 (d)
241-U-101	1959	30000	20 (l)	9/79	1986 (d)
241-U-104	1961	55000	0.09 (l)	10/78	1986 (d)
241-U-110	1975	5000 to 8100 (9)	0.05 (q)	12/84	1986 (d) (q)
241-U-112	1980	8500 (9)		9/78	1986 (d)
67 Tanks		<500,000 - 900,000 (B)			

N/A = not applicable (not yet interim stabilized)

FOOTNOTES: SEE NEXT PAGE

TABLE I-1. Single-Shell Tank Leak Volume Estimates
(Sheet 2 of 6)

Footnotes:

- (1) Current estimates (see reference b) are that 610 Kgal of cooling water was added to Tank 241-A-105 from November 1970 to December 1978 to aid in evaporative cooling. In accordance with *Dangerous Waste Regulations* (Washington Administrative Code 173-303-070 (2)(a)(ii), as amended, Washington State Department of Ecology, 1990, Olympia, Washington), any of this cooling water that has been added and subsequently leaked from the tank must be classified as a waste and should be included in the total leak volume. In August 1991, the leak volume estimate for this tank was updated and moved into compliance with the WAC regulations. Previous estimates excluded the cooling water leaks from the total leak volume estimates because the waste content (concentration) in the cooling water which leaked should be much less than the original liquid waste in the tank (the sludge is relatively insoluble). The total leak volume estimate in this report (10 Kgal to 277 Kgal) is based on the following (see References).
1. Reference (b) contains an estimate of 5 Kgal to 15 Kgal for the initial leak prior to August 1968.
 2. Reference (b) contains an estimate of 5 Kgal to 30 Kgal for the leak while the tank was being sluiced from August 1968 to November 1970.
 3. Reference (b) contains an estimate of 610 Kgal of cooling water added to the tank from November 1970 to December 1978 but it was estimated that the leakage was small during this period. This reference contains the statement "Sufficient heat was generated in the tank to evaporate most, and perhaps nearly all, of this water." This results in a low estimate of zero gallons leakage from November 1970 to December 1978.
 4. Reference (c) contains an estimate that 378 to 410 Kgal evaporated out of the tank from November 1970 to December 1978. Subtracting the minimum evaporation estimate from the cooling water added estimate provides a range from 0 to 232 Kgal of cooling water leakage from November 1970 to December 1978.

	<u>Low Estimate</u>	<u>High Estimate</u>
Prior to August 1968	5,000	15,000
August 1968 to November 1970	5,000	30,000
November 1970 to December 1978	<u>0</u>	<u>232,000</u>
Totals	10,000	277,000

- (2) These leak volume estimates do not include (with some exceptions), such things as: (a) cooling/raw water leaks, (b) intrusions (rain infiltration) and subsequent leaks, (c) leaks inside the tank farm but not through the tank liner (surface leaks, pipeline leaks, leaks at the joint for the overflow or fill lines, etc.), and (d) leaks from catch tanks, diversion boxes, encasements, etc.

TABLE I-1. Single-Shell Tank Leak Volume Estimates
(Sheet 3 of 6)

- (3) In many cases, a leak was suspected long before it was identified or confirmed. For example, reference (d) shows that Tank 241-U-104 was suspected of leaking in 1956. The leak was "confirmed" in 1961. This report lists the "assumed leaker" date as 1961. Using present standards, Tank 241-U-104 would have been declared as assumed leaker in 1956. In 1984, the criteria designations of "suspected leaker," "questionable integrity," "confirmed leaker," "declared leaker," "borderline," and "dormant," were merged into one category now reported as "assumed leaker." See reference (f) for explanation of when, how long, and how fast some of the tanks leaked. It is highly likely that there have been undetected leaks from single-shell tanks because of the nature of their design and instrumentation.
- (4) There has been an effort in the past two years to reevaluate these leak volume estimates. During the FY 1993 funding reviews, this reevaluation of leak volumes was given a priority which resulted in this activity no longer being funded. The priority versus funding will be reevaluated as part of the prior to FY 1994 budget planning.
- (5) The leak volume estimate date for these tanks is before the "declared leaker" date because the tank was in a "suspected leaker" or "questionable integrity" status; however, a leak volume had been estimated prior to the tank being reclassified.
- (6) The increasing radiation levels in drywells and laterals associated with these three tanks could be indicative of a continuing leak or movement of existing radionuclides in the soil. There is no conclusive way to confirm these observations.
- (7) Methods were used to estimate the leak volumes from these 19 tanks based on the assumption that their cumulative leakage is approximately the same as for 18 of the 24 tanks identified in footnote (10). For more details see reference (g). The total leak volume estimate for these tanks is 150 Kgal (rounded to the nearest 10 Kgal), for an average of approximately 8 Kgal for each of the 19 tanks.
- (8) The total has been rounded to the nearest 50 Kgal. Upperbound values were used in many cases in developing these estimates. It is likely that some of these tanks have not actually leaked.
- (9) Leak volume estimate is based solely on observed liquid level decreases in these tanks. This is considered to be the most accurate method for estimating leak volumes.
- (10) The curie content listed is as listed in the reference document and is not decayed to a consistent date; therefore, a cumulative total is inappropriate.

TABLE I-1. Single-Shell Tank Leak Volume Estimates
(Sheet 4 of 6)

- (11) Tank 241-C-101 experienced a liquid level decrease in the late 1960s and was taken out of service and pumped to a "minimum heel" in December 1969. In 1970, the tank was classified as a "questionable integrity" tank. Liquid level data show decreases in level throughout the 1970s and the tank was saltwell pumped during the 1970s, ending in April 1979. The tank was reclassified as a "confirmed leaker" in January 1980. See reference (q) and (s): refer to reference (s) for information on the potential for there to have been leaks from other C-farm tanks (specifically, C-102, C-103, and C-109).

TABLE I-1. Single-Shell Tank Leak Volume Estimates.
(Sheet 5 of 6)

References:

- (a) Murthy, K.S., et al, June 1983, *Assessment of Single-Shell Tank Residual Liquid Issues at Hanford Site, Washington*, PNL-4688, Pacific Northwest Laboratory, Richland, Washington.
- (b) WHC, 1991a, *Tank 241-A-105 Leak Assessment*, WHC-MR-0264, Westinghouse Hanford Company, Richland, Washington.
- (c) WHC, 1991b, *Tank 241-A-105 Evaporation Estimate 1970 Through 1978*, WHC-EP-0410, Westinghouse Hanford Company, Richland, Washington.
- (d) Smith, D. A., January 1986, *Single-Shell Tank Isolation Safety Analysis Report*, SD-WM-SAR-006, Rev. 1, Westinghouse Hanford Company, Richland, Washington.
- (e) McCann, D. C., and T. S. Vail, September 1984, *Waste Status Summary*, RHO-RE-SR-14, Rockwell Hanford Operations, Richland, Washington.
- (f) Catlin, R. J., March 1980, *Assessment of the Surveillance Program of the High-Level Waste Storage Tanks at Hanford*, Hanford Engineering Development Laboratory, Richland, Washington.
- (g) Baumhardt, R. J., May 15, 1989, Letter to R. E. Gerton, U.S. Department of Energy-Richland Operations Office, *Single-Shell Tank Leak Volumes*, Westinghouse Hanford Company, Richland, Washington.
- (h) WHC, 1990a, *Occurrence Report "Surface Level Measurement Decrease in Single-Shell Tank 241-AX-102,"* WHC-UO-89-023-TF-05, Westinghouse Hanford Company, Richland, Washington.
- (i) Groth, D. R., July 1, 1987, Internal Memorandum to R. J. Baumhardt, *Liquid Level Losses in Tanks 241-C-201, -202 and -204*, 65950-87-517, Westinghouse Hanford Company, Richland, Washington.
- (j) Groth, D. R. and G. C. Owens, May 15, 1987, Internal Memorandum to J. H. Roecker, *Tank 103-A Integrity Evaluation*, Westinghouse Hanford Company, Richland, Washington.
- (k) Campbell, G. D., July 8, 1988, Internal Memorandum to R. K. Welty, *Engineering Investigation: Interstitial Liquid Level Decrease in Tank 241-SX-104*, 13331-88-416, Westinghouse Hanford Company, Richland, Washington.
- (l) ERDA, 1975, *Final Environmental Statement Waste Management Operations, Hanford Reservation, Richland, Washington*, ERDA-1538, 2 vols., U.S. Energy Research and Development Administration, Washington, D.C.
- (m) WHC, 1992a, *Tank 241-SX-108 Leak Assessment*, WHC-MR-0300, Westinghouse Hanford Company, Richland, Washington.
- (n) WHC, 1992b, *Tank 241-SX-109 Leak Assessment*, WHC-MR-0301, Westinghouse Hanford Company, Richland, Washington.

TABLE I-1. Single-Shell Tank Leak Volume Estimates.
(Sheet 6 of 6)

- (o) WHC, 1992c, *Tank 241-SX-115 Leak Assessment*, WHC-MR-0302, Westinghouse Hanford Company, Richland, Washington.
- (p) WHC, 1992d, *Occurrence Report*, "Apparent Decrease in Liquid Level in Single Shell Underground Storage Tank 241-T-101, Leak Suspected; Investigation Continuing," RL-WHC-TANKFARM-1992-0073, Westinghouse Hanford Company, Richland, Washington.
- (q) WHC-1990b, *A History of the 200 Area Tank Farms*, WHC-MR-0132, Westinghouse Hanford Company, Richland, Washington.
- (r) WHC, 1993, *Occurrence Report*, "Single-Shell Underground Waste Storage Tank 241-BX-111 Surface Level Decrease and Change From Steady State Condition," RL-WHC-TANKFARM-1993-0035, Westinghouse Hanford Company, Richland, Washington.
- (s) WHC, 1993a, *Assessment of Unsaturated Zone Radionuclide Contamination Around Single-Shell Tanks 241-C-105 and 241-C-106*, WHC-SD-EN-TI-185, REV OA, Westinghouse Hanford Company, Richland, Washington.

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