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1A. Page 1 of 1

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3. From: (Originating Organization)
Engineering

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M. E. Johnson

9. Equip./Component No.:
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10. System/Bldg./Facility:
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8. Originator Remarks:
This document descibes the origin of wastes contained in double-shell tank 241-AW-105
12/15

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		Design Auth.									
1	1	Resp. Engr.	M.E. Johnson	10/13/04	H6-19	1	1	David E. Place	David E. Place	10/15/04	R2-12
1	1	Resp. Mgr.	D.J. Washenfelder	10/19/04	R2-58	1	1	J Griffith	J Griffith	12/15/04	
		QA									
		Safety									
		Env.									
		Design Agent									

20. M.E. Johnson 10/13/04
Signature of EDT Originator Date

21. DOE APPROVAL (if required)
Ctrl. No.

22. S. Mackay 12/15/04
Design Auth./Resp. Engr./Resp. Mgr. Date

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ORIGIN OF WASTE IN TANK 241-AW-105

M. E. Johnson
CH2M HILL Hanford Group, Inc.
Richland, WA 99352
U.S. Department of Energy Contract DE-AC27-99RL14047

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Abstract: A review of waste transfer documentation was conducted to determine the origin of waste transferred into double-shell tank 241-AW-105. This review was conducted to support decisions concerning disposition of the waste present in this tank.

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EXECUTIVE SUMMARY

A review of waste transfer documentation was conducted to determine the origin of waste transferred into double-shell tank 241-AW-105. This review was conducted to support decisions concerning disposition of the waste present in this tank. Tank 241-AW-105 presently contains 264,000 gallons (~999,000 liters) of sludge and 157,000 gallons (~593,000 liters) of supernatant.

Tank 241-AW-105 entered service in 1980 and was first used to store concentrated complexant (CC) waste from operation of the 242-A Evaporator, double-shell slurry feed (DSSF), N reactor decontamination waste and miscellaneous low activity wastes from the PUREX Plant. With the exception of the sludge portion of the miscellaneous low activity PUREX Plant wastes, these wastes were removed in 1984 and the tank was then used from 1984 through 1988 to receive neutralized cladding removal waste (NCRW) from the PUREX Plant. Tank 241-AW-105 also received waste in 1988 from clean-out of tank CX-70 at the 201-C Hot Semi-Works facility and miscellaneous low activity wastes from the PUREX Plant from 1989 to 1990 and 1992 to 1996. The supernatant was periodically transferred from tank 241-AW-105 to other double-shell tanks for dispositioning.

The miscellaneous PUREX Plant wastes formed a sludge depositing in tank 241-AW-105. The NCRW also formed a sludge fraction that deposited atop the miscellaneous PUREX Plant waste in tank 241-AW-105. The NCRW sludge phase (926,000 liters) contains approximately 855 ηCi/gram TRU, as well as 39,200 Ci of ^{137}Cs and 8,630 Ci of ^{90}Sr. The miscellaneous PUREX Plant sludge phase (73,000 liters) contains approximately 2,075 ηCi/gram TRU, as well as 5,110 Ci of ^{137}Cs and 22,700 Ci of ^{90}Sr. The supernatant (593,000 liters) contains approximately 0.4 ηCi/gram TRU, as well as 5,920 Ci of ^{137}Cs and 13.1 Ci of ^{90}Sr. The volume and radionuclide content of these waste phases are based on the best basis inventory published in the Tank Waste Information Network System (http://twins.pnl.gov/twins.htm) as of October 13, 2004, with the radionuclides decay corrected to January 1, 2004.

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LIST OF TERMS

A1SltCk	242-A Evaporator saltcake
BBI	Best-Basis Inventory
CC	complexant concentrate
CWZr2	Zirconium cladding waste
DSSF	double-shell slurry feed
FY	fiscal year
HLW	high-level waste
PUREX	plutonium-uranium extraction
NCRW	neutralized cladding removal waste
RHO	Rockwell Hanford Operations
RMIS	Record Management Information System
SACS	Surveillance Analysis Computer System
TCSRC	Tank Characterization and Safety Resource Center
TRU	transuranic
TWINS	Tank Waste Information Network System

Units

Ci	curies
ft	feet
g	grams
kgal	kilo-gallons
kL	kiloliters
m	meters
mL	milliliters
ηCi	nanocuries
μCi	micro-curies

1.0 INTRODUCTION

The origin of the waste in tank 241-AW-105 has been reviewed to provide information for determining the disposition of this waste. Section 2.0 discusses the origin of waste transferred into and removed from tank 241-AW-105. Section 3.0 provides a description of the different types of wastes that were generated at the Hanford Site chemical processing plants and transferred to tank 241-AW-105. Section 4.0 summarizes the waste types that were transferred into tank 241-AW-105.

2.0 WASTE TRANSFERS ASSOCIATED WITH TANK 241-AW-105

This section provides a brief description of double-shell tank 241-AW-105 and summarizes waste transfers into and waste removal from this tank. In order to determine the origins of the waste presently stored in tank 241-AW-105, available reports for the Hanford Site and tank farm operating records were reviewed. Information reviewed included the Hanford Site contractors' monthly reports, tank farm waste status summary reports, waste transfer records, miscellaneous letters, and technical reports. The waste transfer records are available only as photocopies from the Tank Characterization and Safety Resource Center (TCSRC) located in 2750-E building.

2.1 DESCRIPTION OF TANK 241-AW-105

Tank 241-AW-105 is a double-shell tank that was constructed from 1976 to 1980. Double-shell tanks are constructed with a primary steel liner and an outer steel liner, both inside a reinforced concrete shell and covered by a concrete reinforced dome. The primary steel liner is separated from the outer steel liner by annulus, which is equipment with leak detection capability. Tank 241-AW-105 is one of the six tanks in the 241-AW Tank Farm, as shown in Figure 2. Tank 241-AW-105 has a maximum storage capacity of 4,390,000 liters (1,160,000 gallons), a diameter of 22.9 m (75.0 ft), and an operating depth of 10.7 m (35.2 ft). Figure 1 provides a plan view of tank 241-AW-105. Tank 241-AW-105 is equipment with fifteen 4-inch diameter risers, four 12-inch diameter risers, and three 24-inch diameter risers.

Figure 1. Tank 241-AW-105 Cross Section

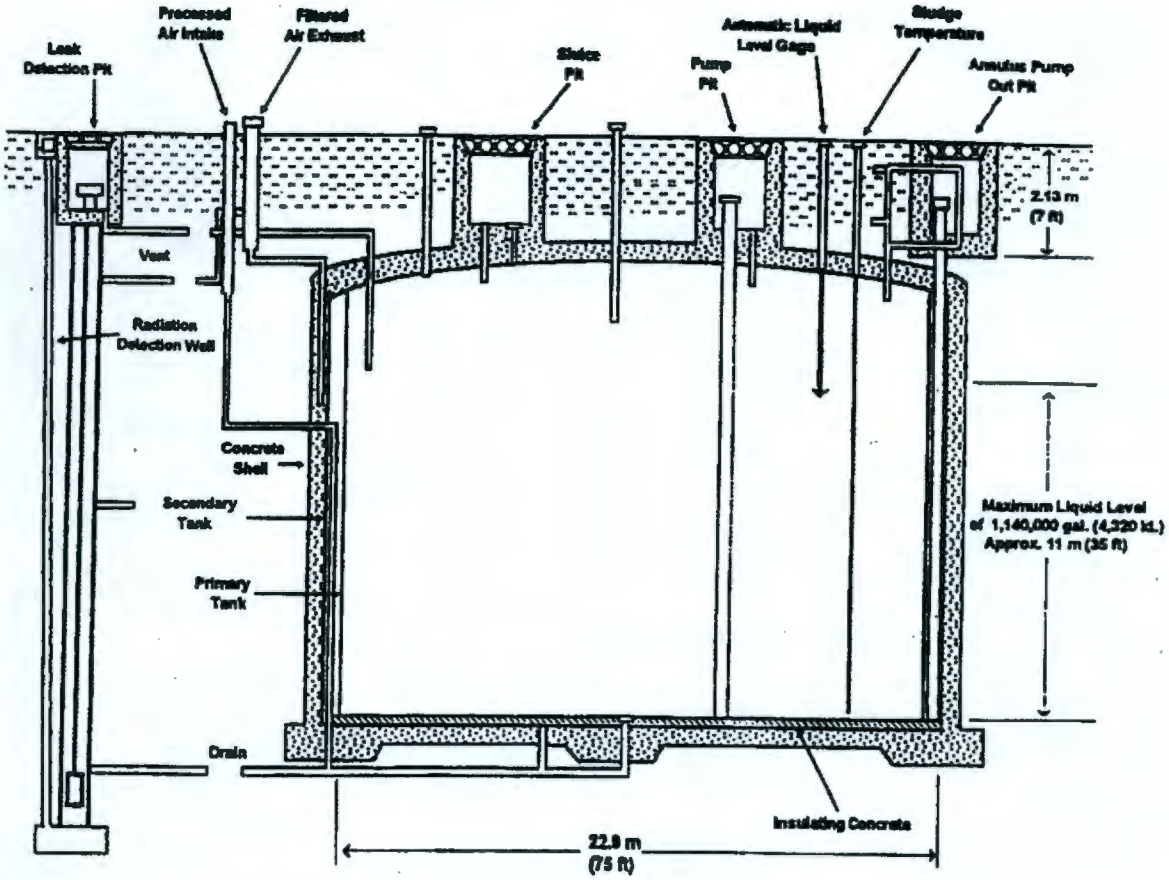
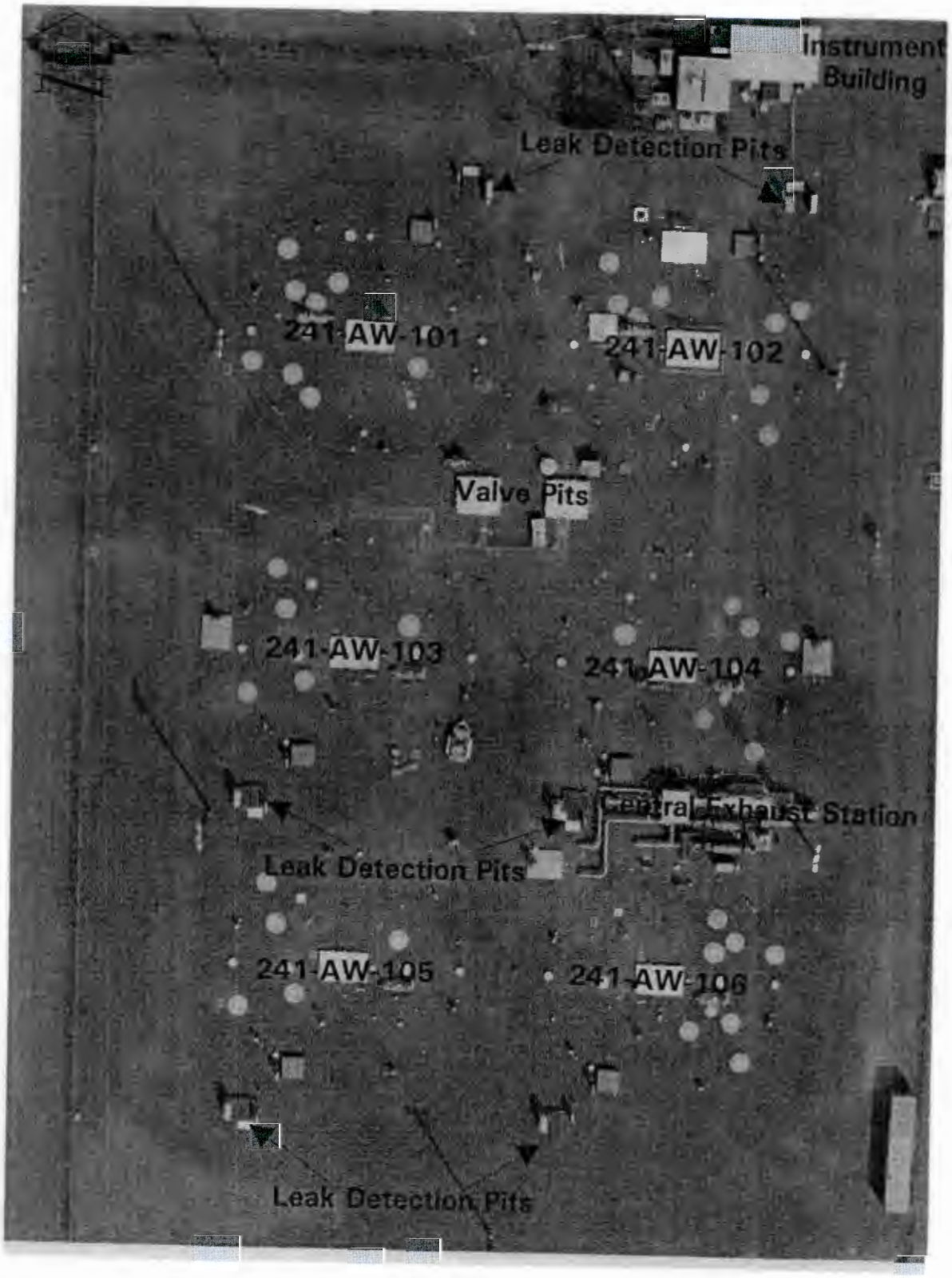


Figure 2. Aerial View of 241-AW Tank Farm



2.2 WASTE TRANSFERS FOR TANK 241-AW-105

This section describes the waste types that were transferred into and removed from tank 241-AW-105 from July 1980 to August 2004. Documentation of the waste transfer associated with tank 241-AW-105 are provided in Appendix A and B, along with the cited references. Appendix A provides a tabular listing of waste transfers associated with tank 241-AW-105. Appendix B provides a graphical representation of the waste level in tank 241-AW-105 for the period of July 1980 through August 2004. The waste level measurements for tank 241-AW-105 are from the Surveillance Analysis Computer System (SACS).

2.2.1 CC Waste Receipt (August 1980 – November 1980)

Tank 241-AW-105 went into service on July 1980. The tank contained approximately 3.75 inches (9,874 gallons) of water following operability testing.

A reported 919,180 gallons of concentrated complexant (CC) waste were slurried from the 242-A Evaporator (see section 3.2) during campaign 80-9 to tank 241-AW-105 from August 14, 1980 through August 27, 1980 (RHO-SD-WM-PE-005). The temperature of the CC waste averaged ~130°F when discharged from the evaporator. The tank was not filled to the maximum operating volume in order to allow for slurry growth of the CC waste. A measurement of the solids in tank 241-AW-105 was obtained in January 9, 1981 and determined to range from 0.8 inches (~1960 gallons) to 1.0 inch (~2470 gallons) (RHO-SD-WM-PE-005, page 12).

The complexed waste[1] that was concentrated during 242-A Evaporator campaign 80-9 was originally stored in tank 241-SY-103[2]. The CC waste was transferred to tank 241-S-107 where it was diluted at a ratio of 30 percent water to 70 percent waste and then pumped to tanks 241-A-101[3], 241-A-102[4], 241-BX-104[5] and 241-BX-105[6] for processing in the evaporator.

---

[1] Complexed waste is waste containing greater than 10 grams of carbon as total organic carbon per liter of waste.

[2] Tank 241-SY-103 went into service in 1977, receiving CC waste from the 242-S Evaporator. The CC waste originated from strontium solvent extraction processing conducted in the 221-B Plant.

[3] Tank 241-A-101 was placed in service in 1956 to receive high-level waste from the 202-A PUREX Plant. The tank continued to receive periodic transfers of PUREX high-level waste (HLW) and organic wash waste through early 1968. In the second quarter of 1968, through March 1969, the HLW supernatant and sludge in tank 241-A-101 was removed by sluicing (SD-WM-TI-302, page 159). The tank then was used to receive PUREX HLW and other miscellaneous wastes from other single-shell tanks. The supernatant was removed from the tank in fourth quarter of 1975 to allow for sluicing of the solids. Sluicing of the solids from tank 241-A-101 was conducted from the fourth quarter of 1975 through March 1976 (SD-WM-TI-302, page 159). A heel of less than 3-inches (~8,300 gallons) of PUREX HLW solids remained in tank 241-A-101 in April 1976 (ARH-LD-215B, page 26). Tank 241-A-101 was then used from 1976 through 1980 in conjunction with the 242-A Evaporator.

[4] Tank 241-A-102 was placed in service in 1956 to receive high-level waste from the 202-A PUREX Plant. The tank continued to receive periodic transfers of PUREX high-level waste (HLW) and organic wash waste through 1967. In 1968, through mid-1970, the tank was used receive HLW supernatant from other A Farm tanks and transfer this waste to tanks 241-C-105 for eventual transfer to B Plant for cesium ion

No additional waste was received into tank 241-AW-105 from September 1980 through August 1982. The Surveillance Analysis Computer System (SACS) liquid level measurements for tank 241-AW-105 (Appendix B, figure B-1) show a slight downward trend (reduction of 0.33-inches per month) in the liquid volume for tank 241-AW-105 which is indicative of waste cooling and water evaporation.

2.2.2 B Plant Waste Receipt (September 1982)

In September 1982, approximately 113,850 gallons of waste from waste was transferred from tank 241-AW-104 into tank 241-AW-105, filling this tank to 378.2 inches (RHO 1982). Tank 241-AW-104 was empty until receiving ~143,000 gallons of cesium ion exchange waste and low-level waste from 221-B Plant (see section 3.3) via tank 241-AY-101 in August 1981 (RHO 1982). No additional waste was added to tank 241-AW-104 before transferring the 221-B Plant cesium ion exchange waste and low-level waste to tank 241-AW-105.

A sample of the supernatant contained in tank 241-AW-105 was obtained and analyzed in September 1982, with the results reported in Table 1 (65453-82-345). No waste additions or removals from tank 241-AW-105 occurred from October 1982 through March 1983. Tank 241-AW-105 was reported to contain no solids as of March 31, 1983 (RHO-RE-SR-14 March 1983, page 12).

---

exchange (IX) processing. In late 1970, dilute waste was added to the sludge in tank 241-A-102 to remove soluble salts and cesium. The supernatant was then transferred to B Plant as before for cesium IX processing. The sludge in tank 241-A-102 was removed by sluicing (SD-WM-TI-302, page 160) from July 1972 through May 1973. The tank then was used to receive dilute wastes from the B Plant cesium IX process. The tank was again sluiced in early 1976 (SD-WM-TI-302, page 160). A heel of less than 2-inches (~5,520 gallons) of PUREX HLW solids remained in tank 241-A-102 in May 1976 (ARH-LD-217B, page 13). Tank 241-A-102 was then used from 1976 through 1980 in conjunction with the 242-A Evaporator.

[5] Tank 241-BX-104 was placed in service in 1949 and was used until early 1955 to store metal waste from the 221-B Bismuth Phosphate Plant. The metal waste was removed by sluicing the tank contents in 1954. In 1956, this tank was used to stored waste from the 221-U Tri-Butyl Phosphate Plant, which was discharged to the BC ditch in late 1956. The tank sat empty (waste heel of ~62 kgal) from 1957 through late 1962. Tank 241-BX-104 was then used to store coating removal waste (CW) from the PUREX Plant. The PUREX CW was removed in late 1967 and tank 241-BX-104 was then used through 1970 to store cesium ion exchange waste from 221-B Plant. The cesium ion exchange waste was removed in late 1970 and tank 241-BX-104 was used through late 1972 to receive and transfer to 221-B Plant, REDOX high-level waste supernatant for cesium ion exchange processing. Tank 241-BX-104 was again used through mid-1976 to store cesium ion exchange waste from 221-B Plant. From mid-1976 through 1978, tank 241-BX-104 was used to transfer waste from the 200 West Area to the 200 East Area and dilute customer wastes (i.e. reactor decontamination waste) for staging to the 242-A Evaporator.

[6] Tank 241-BX-105 was placed in service in 1949 and was used until early 1954 to store metal waste from the 221-B Bismuth Phosphate Plant. The metal waste was removed by sluicing the tank contents in 1954. In 1956, this tank was used to stored waste from the 221-U Tri-Butyl Phosphate Plant, which was discharged to the BC ditch in early 1957. The tank sat empty (waste heel of ~62 kgal) from 1957 through 1963. Tank 241-BX-105 was then used to store coating removal waste (CW) from the PUREX Plant. The PUREX CW was removed in 1968 and tank 241-BX-105 was then used through early 1974 to store cesium ion exchange waste from 221-B Plant. The cesium ion exchange waste was removed in early 1974 and tank 241-BX-105 was used through mid-1976 to store evaporator bottoms from the in-tank solidification unit. From mid-1976 through 1978, tank 241-BX-105 was used for staging waste to the 242-A Evaporator.

2.2.3 Waste Transfer to Tank 241-AW-101 (April 1983)

In April 1983 (refer to Appendix A, Table A-1), the waste contained in tank 241-AW-105 was transferred to tank 241-AW-101 (65950-83-1004) for staging as feed at a later date to the 242-A Evaporator (RHO-SD-WM-PE-017). A heel of approximately 18.8 inches (~51,000 gallons) of dilute B Plant wastes was left in tank 241-AW-105 following this transfer. No solids were reported in tank 241-AW-105 at the end of April 1983 (RHO-RE-SR-14 April 1983, page 12).

Table 1. Tank 241-AW-105 Supernatant Analysis (09/1982)

Analyte	Units	Concentration
Pu	ηCi/gram	7.9[1]
Am-241	ηCi/gram	121
Tc-99	ηCi/gram	78
HEDTA	M	0.1044
EDTA	M	0.0323
Sr-90	μCi/L	9.1E+03
Cs-137	μCi/L	2.37E+05
OH	M	0.647
TOC	gm/L	34.8
Na	M	8.52
Al	M	0.506
F	M	0.027
Sp. Gr.		1.356
Solids	Wt%	0

[1] The Pu was apparently present as a colloidal suspension and representative sub-sampling was difficult to obtain. Duplicate analysis yielded 107ηCi/gram.

2.2.4 Miscellaneous PUREX Waste Receipt (April 1983 – July 1984)

From April 1983 through July 4, 1984, waste from miscellaneous low activity waste from the PUREX Plant (see section 3.1) collected in tanks F-18, R-8 and G-8 were transferred into tank 241-AW-105. PUREX tanks G-8 and R-8 collected organic solvent wash solutions (RHO-SD-RE-PCP-006, page 24). PUREX tank F-18 collected miscellaneous sump wastes consisting of cooling water, steam condensate, chemicals, or other low activity leaks in process cells (RHO-SD-RE-PCP-006, page 24). The miscellaneous sump wastes were neutralized with sodium hydroxide solution and transferred to underground storage tanks. Solids precipitated from the PUREX Plant miscellaneous low activity wastes in tank 241-AW-105. In particular, organic solvent wash wastes contained sodium oxalate, sodium carbonate, uranium, iron and manganese which likely contributed to most of the precipitated material.

Tank 241-AW-105 received a total of ~2.74 million gallons of miscellaneous low activity wastes from the PUREX Plant during this period, as indicated in Appendix A, Table A-1. The miscellaneous low activity wastes collected in tank 241-AW-105 were periodically transferred to other double-shell tanks for dispositioning. Tank 241-AW-105 contained ~101,400 gallons of miscellaneous low activity waste from the PUREX Plant on July 4, 1984. The solids volume reported in tank 241-AW-105 at the end of June 1984 was 14,000 gallons (RHO-RE-SR-14 June 1984, page 12).

2.2.5 Tank 241-AW-103 Transfer to Tank 241-AW-105 (September 1983)

The 202-A PUREX Plant had been idle from September 1972 through March 1983. During this period, new double-shell tanks had been constructed in 241-AW Tank Farm. Waste transfer lines from the PUREX Plant were constructed to some of these double-shell tanks. Operability testing of the waste transfer lines from the PUREX Plant to the 241-AW Tank Farm was conducted from April 14 to June 10, 1983 (RHO-SD-RE-OTR-009).

Approximately 1,925 gallons of waste were transferred from PUREX tank E-5 to tank 241-AW-103 on April 25, 1983 during operability testing of the waste transfer lines. An additional ~127,000 gallons of waste was transferred from the PUREX Plant to tank 241-AW-103 as part of pre-operational testing activities. Tank 241-AW-103 contained a total of ~342,700 gallons of waste following the completion of the pre-operational testing activities at the PUREX Plant. The waste in tank 241-AW-103 was a mixture of the PUREX Plant pre-operational testing waste, 100-N Reactor decontamination (see section 3.5) and double-shell slurry feed (DSSF) waste from 242-A Evaporator campaigns 80-8, 80-10, and 81-1 (RHO-SD-WM-PE-004, RHO-SD-WM-PE-006, and RHO-SD-WM-PE-007).

After completing the operability testing activities at the PUREX Plant, approximately 264,000 gallons of supernatant was transferred from tank 241-AW-103 to tank 241-AW-105 in September 1983 (65950-83-998PM) and mixed with the miscellaneous PUREX Plant low activity wastes stored in tank 241-AW-105 (see section 2.2.4).

2.2.6 NCRW Transfers (July 1984 – December 1988)

At the Hanford Site, the first step in reprocessing irradiated nuclear fuel elements involved the chemical dissolution of the cladding that surrounded the uranium fuel elements. The cladding was chemically dissolved in a chemical solution that minimized the dissolution of the irradiated uranium fuel element and the fission products trapped in the fuel element. The entrained solid material was separated using centrifuges. The cladding solution was neutralized with a caustic solution and then transferred to underground storage tanks. The neutralized cladding removal waste from dissolution of Zircaloy®[7] clad fuel elements was designated as NCRW. Zircaloy® clad fuel elements were primarily processed in the 202-A PUREX Plant at the Hanford Site. NCRW was collected in PUREX tank E-5 and then transferred to underground storage tanks. Section 3.1 provides further discussion of the PUREX Plant.

Tanks 241-AW-103 and 241-AW-105 were used to receive NCRW from October 1983 through December 1988. Approximately 2.55 million gallons of NCRW was transferred to tank 241-AW-105 from July 1984 through December 1988, as detailed in Appendix A-1, Table A-1 and Appendix A-2, Table A-2. The dates that tanks 241-AW-103 and 241-AW-105 were used to receive NCRW are listed in Table 3 (letters 65611-86-118 and 65611-87-090).

Tank 241-AW-105 also received salt well liquor[8] and water flushes from the 244-BX double-container receiver tank (DCRT) during April through July 1985. DCRT 244-BX received salt well liquor from single-shell in the 241-B, 241-BX and 241-BY tank farms. The records differ on the quantity of salt well liquor received into tank 241-AW-105, varying from ~77,300 gallons (based on the Tank Farm Daily Operating Reports) to 130,000 gallons (based on Appendix A-2). The difference is due to water dilution added to transfer the salt well liquor and flush the transfer line.

When tank 241-AW-105 was not receiving NCRW, the NCRW solids were allowed to settle to the bottom of the tank and a clarified supernatant layer formed. The supernatant was then periodically transferred from tank 241-AW-105 to tank 241-AW-102, as listed in Table 2[9].

The PUREX Plant ceased operations in December 1988, followed by a stabilization campaign (see section 2.2.8). In December 1988, the total volume of waste in tank 241-

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[7] Zircaloy® is a trademark of Teledyne Wah Chang, Albany, Oregon.

[8] Wastes in some single-shell tanks were concentrated to the point of saturation where salts would precipitate. The saturated solution remaining atop the precipitated salts was removed along with as much as practical of the interstitial liquid contained in the precipitated salts. The saturated salt solution and interstitial liquid was known as salt well liquor.

[9] The dates and volumes of supernatant transferred from tank 241-AW-105 differ slightly than the values presented in Appendices A-1 and A-2. These differences are due to the source data used to prepare Table 2 and Appendices A-1 and A-2.

AW-105 was approximately 830,000 gallons of which 297,000 gallons were identified as sludge (WHC-EP-0182-9, page F-3).

Table 2. Supernatant Transfers from Tank 241-AW-105 to 241-AW-102

Dates	Volume Transferred (kgal)	Reference
December 9, 1985 to December 28, 1985	484	RHO-SD-WM-PE-026, *242-A Evaporator / Crystallizer FY 1986 Campaign Run 86-1 Post Run Document*
May 15, 1986 to May 20, 1986	390	RHO-SD-WM-PE-031, *242-A Evaporator / Crystallizer FY 1986 Campaign Run 86-4 Post Run Document* (transfer volume listed as 374 kgal from 5-30-86 to 6-2-86)
August 15, 1987 September 1, 1987 to September 5, 1987	633 (returned 613)	WHC-SD-WM-PE-033, *242-A Evaporator / Crystallizer FY 1987 Campaign Run 87-3 Post Run Document*: ~632 kgal of NCRW supernatant transferred from tank 241-AW-105 on August 27, 1987. ~668.6 kgal of NCRW supernatant + flush returned from tank 241-AW-102 to tank 241-AW-105 (9-8-87 to 9-13-87) due to high ammonium hydroxide concentration in evaporator process condensate.
February 15, 1988	72	*Daily Operating Report Tank Farm Processing Operations January – December 1988*, (TCSRC) and Letter 13331-87-975
March 15, 1988	228	*Daily Operating Report Tank Farm Processing Operations January – December 1988*, (TCSRC): daily operating reports indicate transfer occurred from March 1 to March 7, 1988 and volume was ~201,180 gallons.
April 15, 1988	275	*Daily Operating Report Tank Farm Processing Operations January – December 1988*, (TCSRC): daily operating reports indicate transfer occurred from April 6 to April 7, 1988 and volume was ~276,150 gallons.

Table 3. NCRW Fill Cycle for Tanks 241-AW-103 and 241-AW-105

Date	NCRW Receiver Tank
May 1983 – September 1983 (Pre-PUREX Start-up)	241-AW-103
October 1983 – July 4, 1984	241-AW-103
July 4, 1984 – January 9, 1985	241-AW-105
January 9, 1985 – June 15, 1985	241-AW-103
June 15, 1985 – December 10, 1985	241-AW-105
December 10, 1985 – March 19, 1986	241-AW-103
March 19, 1986 – May 29, 1986	241-AW-105
May 29, 1986 – August 21, 1986	241-AW-103
July 1986 – July 1987	241-AW-105
August 2, 1987 – March 1988	241-AW-103
May 1988 – December 1988	241-AW-105
June 1988 – December 1988	241-AW-103

2.2.7 Tank CX-70 Waste Transfers (March – July 1988)

Tank CX-70 is located in the 241-CX tank farm adjacent to the former 201-C Hot Semiworks facility in the 200 East Area of the Hanford Site. Tank CX-70 was installed in 1951 to receive waste from testing the REDOX process flowsheet conducted at the Hot Semiworks facility from November 1952 to October 1953. Section 3.4 provides further discussion on the processes conducted at the 201-C Hot Semiworks. Two other waste storage tanks are also located in the 241-CX tank farm and are identified as CX-71 and CX-72, but were installed at a later date and used in conjunction with testing of the PUREX process conducted at the Hot Semiworks from May 1955 through March 1956.

Tank CX-70, as shown in Figure 3 is a vertical cylindrical, concrete tank with a stainless-steel liner covering the entire interior surfaces of the concrete. The tank inside diameter is 20 ft with an inside height of 15 ft. The tank operating volume is 31,000 gallons measured from a point 1 ft. from the top of the tank. The tank is equipped with a 10 inch, stainless steel vent line that enters the top of the tank and makes an S-bend about halfway from the tank top to the surface grade level. The vent line bend and line below the bend are encased in concrete. A fiberglass filter was originally attached to the vent line for tank CX-70 (HW-22955, pages 1-405.5-1 thru 1-405.5-3).

This tank was designed to receive and store wastes generated from testing of the REDOX[10] process chemical flowsheet that was conducted at the 201-C Semiworks from November 1952 to October 1953. REDOX process wastes included the coating removal waste from dissolution of the aluminum coating on uranium fuel elements and fission products separated from the dissolved fuel elements. Tank CX-70 was reported to have received a total of 94,951 liters (25,086 gallons) of wastes containing 942.98 pounds of uranium and 226.64 grams of plutonium (HW-52860, page 56). Large volumes of decontamination solutions containing oxalic acid, caustic-permanganate, caustic tartaric and other chemicals were also reported to have been routed to tank CX-70 (Disposition and Isolation of Tanks 270-E-1, 270-W, 241-CX-70, 241-CX-71, and 241-CX-72, letter dated July 2, 1974 from J. A. Teal to D. G. Harlow, Atlantic Richfield Hanford Company). After filling with the REDOX process test wastes and decontamination solutions, tank CX-70 was left undisturbed until 1979.

The estimated supernatant and sludge volumes in tank CX-70 were 21,300 and 10,700 gallons on May 1, 1974. The supernatant was sampled in 1974 with the analyses reported in Table 4. In 1979, the supernatant was removed from tank CX-70 to tank 011-CR in the 244-CR Vault and then to tank 241-C-104, leaving ~10,300 gallons of sludge in this tank.

[10] The REDOX (Reduction Oxidation) process was the second generation process used to separate plutonium and uranium from dissolved, irradiated uranium fuel elements. The REDOX process was the first solvent extraction process. Hexone and methyl isobutyl ketone were used to extract plutonium and uranium. The REDOX process was conducted at the 202-S REDOX Plant from January 1952 through December 1967 (RHO-CD-505 RD).

The sludge contained in tank CX-70 was sampled and analyzed in 1976, with the results reported in Table 5 (MEM-041576). The sludge in tank CX-70 was sampled again in 1985 with the analyses reported in Table 6 (Letter no. 65453-85-235 and 65453-85-246). Based on the 1985 sludge sample analyses, the transuranic concentration (i.e. plutonium) of the sludge in tank CX-70 was ~205 ηCi/gram of sludge and the sludge contained a total of ~495 Ci ^{137}Cs and 2,920 Ci ^{90}Sr.

From March through July 1988, approximately 10,050 gallons of sludge contained in tank CX-70 were sluiced using 140,000 gallons of water to tank 241-AW-105 (WHC-SD-DD-TI-057, page 25, WHC-SD-DD-TI-034 and *Daily Operating Report Tank Farm Processing Operations January – December 1988*, (TCSRC)). The 250 gallons of sludge and 500 gallons of water remaining in tank CX-70 were drummed and transferred to the Hanford Site Central Waste Complex in 1992 (WHC-SD-EN-ES-040, page 2-24).

Table 4. Tank CX-70 Supernatant Analysis (1974)

Analyte	Units	Concentration
Pu	gram/gallon	9.24E-05
Sr-90	µCi/gallon	3.23E+02
Cs-137	µCi/gallon	5.79E+04
U	Gm/gallon	5.67
pH		9.65

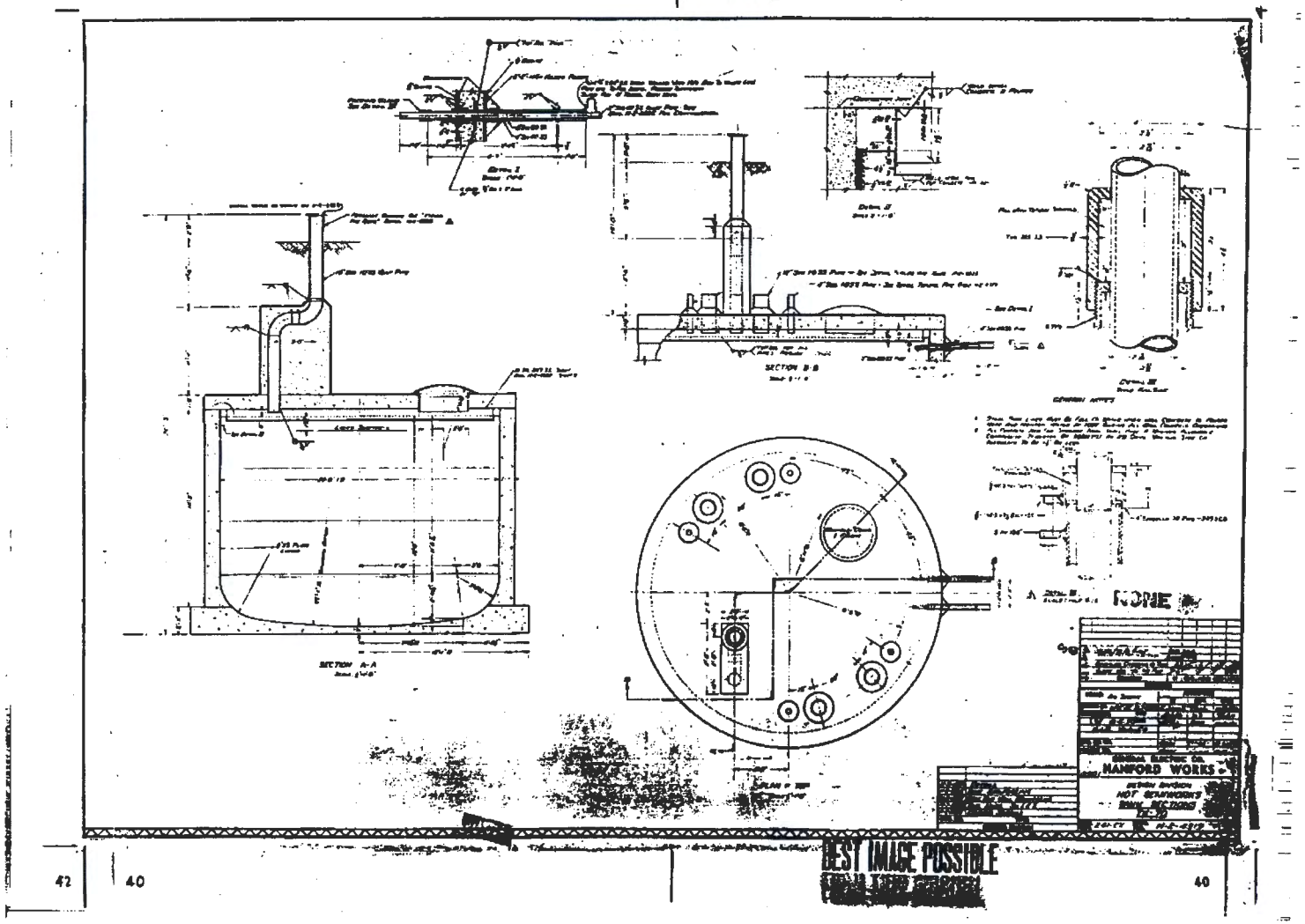
Table 5. Tank CX-70 Sludge Analysis (03/1976)

Analyte	Units	Concentration
Pu	gram/liter	1.35E-03
Sr-90	µCi/L	1.05E+05
Cs-137	µCi/L	2.15E+04
% H2O	Wt%	58.3
Al	M	6.4
Fe	M	0.4
Na	M	3.2
Ni	M	0.8
NO3	M	1.4
Mg	M	0.02
Mn	M	0.3
PO4	M	0.1
Si	M	0.4
Sp. Gr.		1.35
Particle density	gm/ml	2.74

Table 6. Tank CX-70 Sludge Slurry Analysis (1985)

Analyte	Units	Concentration
Na	M	3.42
Mn	M	0.17
Fe	M	0.14
Al	M	0.79
Ca	M	0.04
Cr	M	0.03
P	M	0.06
K	M	0.05
Si	M	0.03
Ni	M	0.01
Mg	M	0.015
PO4	M	0.071
SO4	M	0.059
TOC	gm/L	0.598
Total alpha	µCi/L	335
Cs-137	µCi/L	1.27E+04
Sr-90	µCi/L	7.49E+04
Pu-239/240	µCi/L	253
Volume Settle Solids	Volume %	90
Sp. Gr.		1.236

Figure 3 Tank CX-70 (Drawing H-2-4319)



2.2.8 PUREX Stabilization Campaign (November 1989 – March 1990)

Following shutdown of the PUREX Plant in December 1988, there remained an inventory of approximately 90.7 metric tons of irradiated uranium material left in the facility. The PUREX facility conducted a stabilization campaign from November 1989 through March 1990 to reduce the inventory of nuclear materials and to place various internal systems into a stable configuration (HNF-SP-1147, page 1).

The stabilization campaign generated NCRW waste batches that were transferred to tank 241-AW-105 during this period. No other PUREX waste types were transferred to tank 241-AW-105 during the PUREX facility stabilization campaign.

Following the completion of the stabilization campaign, the PUREX facility contained approximately 9-kgs of plutonium in oxide form, 9-kgs of plutonium and 5.3 MT of uranium in the recycled uranium nitrate solution, 1,100 gallons of neptunium bearing solution[11], plutonium bearing sludges and solids on various cell floors, 2.9 tons of aluminum clad fuel, 50 zirconium clad fuel elements[12], 180,000 to 200,000 gallons of contaminated nitric acid[13], and 21,000 gallons of organic solvent[14]. The solvent extraction columns were drained and did not contain solvent (HNF-SP-1147, pages 1-5).

The PUREX Plant then entered a standby period from March 1990 through December 1992. Planning for decontamination of the PUREX Plant ensued during the later part of this period.

2.2.9 PUREX Plant Decontamination (October 1993 – June 1996)

Deactivation of the PUREX Plant occurred from October 1993 through June 1996. Deactivation activities involved flushing canyon vessels, equipment and cells to remove the majority of the remaining special nuclear materials (i.e. uranium, plutonium and neptunium) and fission products. Details on the PUREX and UO_3 Plant deactivation can be found in HNF-SP-1147.

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[11] The neptunium bearing solution was transferred to tank 241-AZ-102 on January 13, 1993 (E-mail 1996, "Np Transfer to AZ-102").

[12] The aluminum clad and zirconium clad fuel elements were transferred to the 105-K West Basins for storage along with an existing inventory of spent fuel elements in the fall of 1995 (HNF-SP-1147, pages 88-92).

[13] The contaminated nitric acid solution was transferred to the BNFL facilities in Sellafield U.K. from May 1995 through November 1995 (HNF-SP-1147, pages 92-93). BNFL used the nitric acid in their processing facilities and later returned to the Hanford site uranium that been contained in the contaminated nitric acid.

[14] The organic solvent was shipped to a co-generation facility in Tennessee operated by Diversified Scientific Services Incorporated. The solvent was burned to produce electricity in the co-generation facility (HNF-SP-1147, pages 93-97).

Liquid wastes generated from PUREX Plant deactivation included (WHC-SP-1011, pages 7.3-5 and 7.3-6):

- Flush and decontamination solutions from canyon process cells, vessels and sample gallery floor drains
- Vessel ventilation system condensate
- Sample header and condensate ventilation header drainage
- Rain water intrusion into the 241-A-151 diversion box collected in catch tank 241-S-302-A
- Pipe and operating gallery and sample gallery floor drains
- Steam condensate and rain water collection in PUREX tank P1
- PUREX analytical laboratory waste
- Laboratory vacuum pump seal water
- Rain water intrusion into the PUREX U cell sumps
- PUREX canyon exhaust stack condensate and flush water
- Acid fractionator building sumps
- PUREX storage tunnel sumps

The PUREX Plant deactivation wastes were collected in tank 241-AW-105. Tank 241-AW-105 also received in April 1995 transfers of canyon flush solutions mixed with plutonium and uranium solutions that were leftover from the stabilization campaign (HNF-SP-1147, page 87).

The waste supernatant collected in tank 241-AW-105 during the PUREX facility decontamination was periodically transferred to other double-shell tanks for processing through the 242-A Evaporator. In November 1994, ~765,000 gallons of supernatant were transferred from tank 241-AW-105 to tank 241-AP-108 7CF10-055-094). This supernatant was then transferred to tank 241-AP-101 in December 1994, then to tank 241-AP-107 in January 1995 and finally tank 241-AW-102 in late January 1995. The supernatant was processed for volume reduction along with other dilute, double-shell tank supernatants through the 242-A Evaporator as campaign 95-1 (WHC-SD-WM-PE-055). An additional batch of 330,000 gallons of supernatant were transferred from tank 241-AW-105 to tank 241-AP-104 in November 1995 and processed for volume reduction with other dilute, double-shell tank supernatants through the 242-A Evaporator as campaign 96-1 (WHC-SD-WM-PE-056).

2.2.10 Composition of Waste Stored in Tank 241-AW-105

The Hanford Site prepares a Best Basis Inventory (BBI) estimate of the composition of the wastes stored in all 177 Hanford Site underground storage tanks. The BBI effort involves developing and maintaining waste tank inventories comprising 25 chemical and 46 radionuclide components in the 177 Hanford Site underground storage tanks. Waste sample analyses, process knowledge, and waste templates are used to create the BBIs. These BBIs provide waste composition data necessary as part of the River Protection Project (RPP) process flowsheet modeling work, safety analyses, risk assessments, and

system design for retrieval, treatment, and disposal operations. Development and maintenance of the BBI is an on-going effort, with the current BBIs available electronically through TWINS, http://twins.pnl.gov/data/datamenu.htm .

Table 7 provides the BBIs for the major fission products and transuranic elements contained in each of the waste phases in tank 241-AW-105 as of October 13, 2004, with the radionuclides decay corrected to January 1, 2004. The volume and density of each waste phase present in tank 241-AW-105 are provided in Table 8. The following information was used in preparing the BBI for tank 241-AW-105:

- Statistical means for 2004 supernatant grab samples from tank 241-AW-105.
- Statistical means for the sludge core segments from tank 241-AW-105 2001 core samples.
- Statistical means for the supernatant core segments and the sludge core segments from tank 241-AW-105 1997 core samples 195 and 196.
- Statistical means from the 1996 grab samples.
- BBI waste type templates for zirconium cladding coating waste (CWZr2) and Dilute, non-complexed PUREX waste from miscellaneous streams, 1983-88 (PL2) for the sludge solids and sludge liquids, and Hanford Defined Waste (HDW) model vector 241-AW-105 for the supernatant (RPP-8847).
- Zirconium process knowledge from PUREX process records (HNF-SD-WM-TI-740).
- Process knowledge of uranium and plutonium contained in waste received from PUREX during post-shutdown plant cleanout activities in 1995 (Place 1995).

Where possible, the 2001 core data were used to derive the best-basis inventory for the CWZr2 and PL2 sludge solids and sludge liquids. Second in data hierarchy was the 1997 core data for the CWZr2 and PL2 sludge solids. Although the 2001 core is from a single riser only, the 2001 core is preferred over the 1997 core; this hierarchy fills a BBI requirement for separate solids and interstitial liquid estimates. When no analytical data were available, the CWZr2 solid and liquid templates, and the PL2 solid and liquid templates values were used to represent the sludge solids and sludge liquids. Templates are based on sampling data from tanks that contain the same waste type as tank 241-AW-105, supplemented with revision 5 HDW model data (RPP-19822).

Zirconium assays from tanks 241-AW-105 and 241-AW-103 are highly variable, which may be caused by non-homogeneous waste or laboratory bias. Zirconium in the CWZr2 sludge solids is represented with a process knowledge vector rather than sample data because in this particular case the process history is considered the best source of

information. Zirconium is a limiting component in HLW glass formulation and therefore is a key analyte. The zirconium process knowledge vector for tank 241-AW-105 is based on fuel fabrication and fuel processing records reported in RPP-8847.

The sample-based U and Pu inventories for the CWZr2 sludge solids are not consistent with the transfer history. The U and Pu inventories are best represented by process knowledge vector which combines sampling data and waste transfer data. During the final cleanout of the PUREX facility in 1995, accountability records indicate that tank 241-AW-105 received a series of transfers containing 8.216 metric tons of uranium and 6.969 kilograms of plutonium (Place 1995). This cleanout waste had been processed through solvent extraction and contained essentially no fission products. Cadmium nitrate was added at the PUREX facility for criticality control. The U, Cd, and Pu are expected to have precipitated, forming a thin deposit on top of the CWZR2 sludge. The difference between the process history and sample-based inventories suggests that the thin layer of solids from these clean-out transfers may not have been fully represented by the solids sample vectors. Therefore, a process knowledge vector was developed to account for the U and Pu content of the NCRW sludge solids.

The sum of the concentrations of TRU with half-life greater than 20-years contained in the NCRW sludge and liquid phases is ~855 ηCi per gram. The sum of the TRU concentrations contained in the PL2 sludge and liquid phases (i.e. miscellaneous PUREX Plant wastes) is ~2,075 ηCi per gram. The supernatant waste phase contains ~0.4 ηCi per gram of the TRU.

Table 7. Best Basis Inventory for Tank 241-AW-105 as of October 13, 2004

Analyte	Waste Phase	Waste Type	Inventory Ci	Basis	Concentration µCi/gm
137Cs	Sludge (Liquids)	CWZr2 (Liquid)	1.69E+04	TE	6.18E+01
137Cs	Sludge (Liquids)	PL2 (Liquid)	5.39E+00	TE	4.32E-01
137Cs	Sludge (Solids)	CWZr2 (Solid)	2.23E+04	S	2.54E+01
137Cs	Sludge (Solids)	PL2 (Solid)	5.10E+03	S	6.19E+01
137Cs	Supernatant	NA	5.92E+03	S	9.33E+00
137Cs	Total		5.03E+04	S/TE	
237Np	Sludge (Liquids)	CWZr2 (Liquid)	4.14E-03	TE	1.51E-05
237Np	Sludge (Liquids)	PL2 (Liquid)	1.75E-05	TE	1.40E-06
237Np	Sludge (Solids)	CWZr2 (Solid)	5.12E-03	TE	5.92E-06
237Np	Sludge (Solids)	PL2 (Solid)	2.88E-05	TE	3.69E-07
237Np	Supernatant	NA	5.71E-03	TE	9.36E-06
237Np	Total		1.50E-02	TE	
238Pu	Sludge (Liquids)	CWZr2 (Liquid)	3.46E-01	TE	1.26E-03
238Pu	Sludge (Liquids)	PL2 (Liquid)	3.47E-02	TE	2.78E-03
238Pu	Sludge (Solids)	CWZr2 (Solid)	5.98E+01	C	6.16E-02
238Pu	Sludge (Solids)	PL2 (Solid)	4.55E+00	C	5.52E-02
238Pu	Supernatant	NA	1.35E-02	C	2.12E-05
238Pu	Total		6.47E+01	C/TE	
239Pu	Sludge (Liquids)	CWZr2 (Liquid)	3.50E+00	TE	1.28E-02
239Pu	Sludge (Liquids)	PL2 (Liquid)	3.44E-01	TE	2.75E-02
239Pu	Sludge (Solids)	PL2 (Solid)	4.49E+01	C	5.46E-01
239Pu	Sludge (Solids)	CWZr2 (Solid)	6.03E+02	E	6.21E-01
239Pu	Supernatant	NA	1.36E-01	C	2.14E-04
239Pu	Total		6.52E+02	E/C/TE	
240Pu	Sludge (Liquids)	CWZr2 (Liquid)	9.84E-01	TE	3.59E-03
240Pu	Sludge (Liquids)	PL2 (Liquid)	9.68E-02	TE	7.75E-03
240Pu	Sludge (Solids)	CWZr2 (Solid)	1.70E+02	E	1.75E-01
240Pu	Sludge (Solids)	PL2 (Solid)	1.27E+01	C	1.54E-01
240Pu	Supernatant	NA	3.83E-02	C	6.04E-05
240Pu	Total		1.84E+02	E/C/TE	
241Am	Sludge (Liquids)	CWZr2 (Liquid)	4.84E+00	TE	1.77E-02
241Am	Sludge (Liquids)	PL2 (Liquid)	3.59E-02	TE	2.87E-03
241Am	Sludge (Solids)	CWZr2 (Solid)	2.37E+02	S	2.70E-01
241Am	Sludge (Solids)	PL2 (Solid)	1.45E+02	S	1.76E+00
241Am	Supernatant	NA	3.79E-02	S	5.97E-05
241Am	Total		3.86E+02	S/TE	
90Sr	Sludge (Liquids)	CWZr2 (Liquid)	1.11E+03	TE	4.06E+00
90Sr	Sludge (Liquids)	PL2 (Liquid)	4.72E+00	TE	3.78E-01
90Sr	Sludge (Solids)	CWZr2 (Solid)	7.52E+03	S	8.56E+00
90Sr	Sludge (Solids)	PL2 (Solid)	2.27E+04	S	2.75E+02
90Sr	Supernatant	NA	1.31E+01	S	2.07E-02
90Sr	Total		3.13E+04	S/TE	
99Tc	Sludge (Liquids)	CWZr2 (Liquid)	3.88E+00	TE	1.42E-02

Table 7. Best Basis Inventory for Tank 241-AW-105 as of October 13, 2004

Analyte	Waste Phase	Waste Type	Inventory Ci	Basis	Concentration µCi/gm
99Tc	Sludge (Liquids)	PL2 (Liquid)	1.24E-03	TE	9.92E-05
99Tc	Sludge (Solids)	CWZr2 (Solid)	4.81E+00	TE	5.57E-03
99Tc	Sludge (Solids)	PL2 (Solid)	2.04E-03	TE	2.62E-05
99Tc	Supernatant	NA	5.36E+00	TE	8.78E-03
99Tc	Total		1.41E+01	TE	

Notes: S - Sample-based
C - Calculated
E - Engineering assessment-based
TE - Based on an HDW model/engineering-based waste template
TS - Based on a sample-based waste template

Table 8. Volume and Density of 241-AW-105 Waste Phases

Waste Phase	Origin	Volume (kL)	Density (g/ml)
Supernatant		593	1.06
PL2 Sludge	Miscellaneous PUREX wastes. See Section 2.2.4	61	1.41
PL2 Sludge - Interstitial Liquid	Miscellaneous PUREX wastes. See Section 2.2.4	12	1.17
CWZr2 Sludge	NCRW sludge. See Section 2.2.6.	660	1.47
CWZr2 Sludge - Interstitial Liquid	NCRW sludge. See Section 2.2.6.	266	1.10

3.0 WASTE GENERATED AT CHEMICAL PROCESSING PLANTS

There were numerous irradiated nuclear fuel reprocessing, research and development, plutonium processing, and waste management activities conducted at the Hanford Site starting in 1944. These irradiated nuclear fuel reprocessing, research and development, plutonium processing, and waste management activities conducted in the processing plants are discussed further in DOE/RL-97-02, *National Register of Historic Places Multiple Property Document Form - Historic, Archaeological and Traditional Cultural Properties of the Hanford Site, Washington February 1997* and DOE/RL-97-1047, *Hanford Site Historic District History of the Plutonium Production Facilities 1943 – 1990.*

It has been established in Section 2.0 that neutralized DSSF from the 242-A Evaporator, 100-N Reactor decontamination waste, cladding removal waste (NCRW), and miscellaneous wastes from the 202-A PUREX Plant were transferred into tank 241-AW-103. The following sections provide a discussion of the processed that generated these waste types.

3.1 PUREX PLANT

The PUREX Plant processed irradiated nuclear fuels using a continuous solvent extraction process to separate uranium and plutonium from waste products. The 202-A PUREX Plant was constructed from April 1953 through April 1955. Following non-radioactive commissioning tests in 1955, the PUREX plant was operated from January 1956 through September 1972 and then from October 1983 to December 1988 to reprocess irradiated nuclear fuels (PPD-493-9-DEL and WHC-MR-0437). A brief, stabilization run was conducted in 1990 and then the facility was shutdown (letter 9305270), followed by facility decontamination from 1993 through 1996.

3.1.1 Coating Dissolution

The first step in the processing of irradiated nuclear fuels is to dissolve the coating or cladding that encases the fuel. The PUREX Plant processed both aluminum coated and zirconium clad irradiated nuclear fuels. For the aluminum coated fuel, the fuel coating was dissolved in sodium hydroxide – sodium nitrate solution. The coating removal waste (designated as CW) was inherently alkaline and did not require neutralization before transfer to underground storage tanks. Tank 241-AW-103 did not receive any coating removal waste from dissolution of aluminum clad fuel.

The zirconium clad fuel, Zircaloy® (98.5% zirconium and 1.5% tin), was dissolved in a solution of ammonium fluoride and ammonium nitrate. The ammonium fluoride / ammonium nitrate solution also attacked the uranium fuel, and a small amount of the uranium, transuranic elements, and other fission products were also dissolved in the

process. Most of the uranium and transuranic elements that were dissolved during the coating dissolution were present as fluoride solids.

The cladding dissolution solution and entrained solids were removed from the dissolver by jetting to PUREX tank E-3. The uranium fuel in the dissolver was rinsed with water and the rinse water combined with the cladding waste. The cladding waste was then processed through the E Cell centrifuge, where the solution is separated from the uranium and transuranic fluoride solids and transferred to PUREX tank E-5. The uranium and transuranic fluoride solids remained in the centrifuge bowl and were metathesized to hydroxide precipitates by addition potassium hydroxide. The metathesis solution was separated from the uranium and plutonium hydroxide precipitates by centrifugation and washing. The metathesis and wash solutions were also collected in PUREX tank E-5. The cladding and metathesis wastes, plus wash solutions that were collected in PUREX Plant tank E-5 were neutralized with sodium hydroxide, and the slurry was transferred to the tank farms to allow solids in the waste to precipitate as sludge. The zirconium cladding waste was designated as NCRW (PFD-T-200-00002).

3.1.2 Solvent Extraction

After dissolving the coating / cladding on the irradiated nuclear fuel, the uranium fuel elements were then dissolved. The dissolved fuel elements are then processed through a solvent extraction system that used tri-butyl phosphate solvent in a normal paraffin hydrocarbon diluent. The fission products and impurities were separated in a nitric acid solution from the uranium and plutonium in the PUREX solvent extraction process. The nitric acid solution containing the fission products and impurities was evaporated to volatilize nitric acid for recovery and re-use in the PUREX Plant (RHO-MA-116, page 4-162).

The concentrated, acidic fission product solution was partially denitrated by sugar addition and neutralized by the addition of sodium hydroxide solution in PUREX tank F-16. The neutralized waste was transferred from PUREX tank F-16 to underground storage tanks in the 200 East Area tank farms. The waste formed supernatant and sludge layers within the tanks. Most of the supernatant, known as PUREX supernatant neutralized (PSN) was eventually processed in the 221-B Plant to remove cesium. Most of the PUREX waste sludges were sluiced from single-shell tanks, acidified (waste known as PUREX Acidified Sludge [PAS]), and transferred to 221-B Plant to remove strontium.

The plutonium solutions generated at the PUREX Plant were transferred to the 234-5Z building (Z-Plant) for further processing. Uranium solutions were transferred to the 224-U building (UO_3 Plant) for conversion to an oxide and transfer to offsite facilities for re-use in the fabrication of nuclear fuel.

3.1.3 Miscellaneous Plant Waste Solutions

During the solvent extraction process conducted at the PUREX Plant, the organic solvents were washed to remove organic degradation products that would interfere with the process. The waste from washing the organic solvents, known as organic wash waste (OWW), was collected in PUREX Plant tanks G-8 and R-8 before transfer to the underground storage tanks.

Miscellaneous low, radioactivity wastes from the 291-A exhaust ventilation were also collected in PUREX Plant tank U-3 (RHO-MA-116, page 4-167). Tanks U-3 and U-4 also collected miscellaneous laboratory sump wastes and sump waste from the 206-A acid fractionator building (RHO-MA-116, page 4-167). Miscellaneous low, radioactivity wastes from the cell sumps were collected in PUREX Plant tank F-18. Sodium nitrite and sodium hydroxide were added to the miscellaneous low, radioactivity waste streams collected in tanks U-3, U-4, and F-18 to meet corrosion inhibitor requirements and then transferred to the underground storage tanks.

3.2 242-A EVAPORATOR

The 242-A Evaporator was constructed in the 200 East Area of the Hanford Site from 1974 through 1977. Figure 4 depicts the 242-A Evaporator building. The 242-A Evaporator is the second vacuum evaporation unit constructed at the Hanford Site and is similar in design to the 242-S Evaporator. The 242-A Evaporator began operation in 1977 and processed intermittent batches of wastes through 1989. The evaporator was shutdown from late 1989 through early 1994 for upgrades.

The 242-A Evaporator process employs a conventional forced-circulation, vacuum evaporation system to concentrate radioactive waste solutions. The main process components of the evaporator-crystallizer system are the re-boiler, vapor-liquid separator, recirculation pump, condensers, vacuum system, condensate collection tank, and ion exchange column (no longer in service).

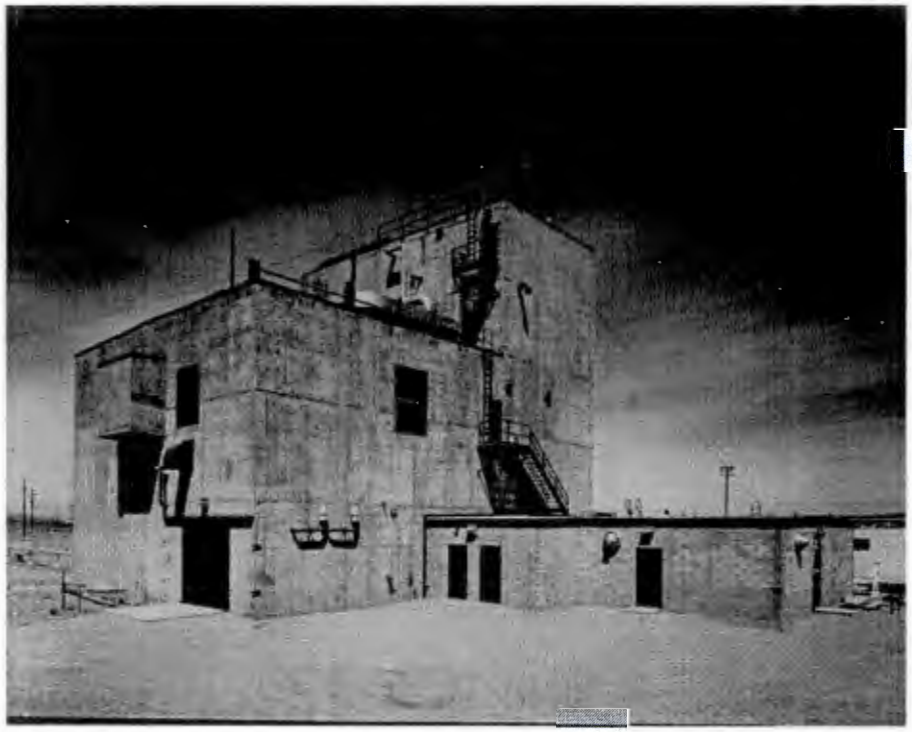
Waste from tank 241-AW-102[15] is pumped into the evaporator recirculation line on the upstream side of the re-boiler at a rate to maintain a constant specific gravity in the concentrated waste. As the feed enters the recirculation line, it blends with the main process slurry stream which flows to the re-boiler. In the re-boiler, the mixture is heated slightly to a temperature normally between 130°F and 170°F by steam that is flowing through the re-boiler shell. The steam and waste do not come into direct contact. The heated slurry is discharged from the re-boiler to the vapor-liquid separator. A fraction of the water in the waste flashes to steam in the vapor-liquid separator and is drawn through the wire mesh de-entrainer pads into the vapor line leading to the condensers. The steam derived from the waste is condensed to water and discharged to the 200 East Area Effluent Treatment Facility. As evaporation takes place in the vapor-liquid separator vessel, the waste is concentrated. Waste flows from the vapor-liquid separator vessel to

[15] Tank 241-A-102 was used as the evaporator feed tank from 1977 through 1980.

the recirculation pump suction via a drop-out leg. The recirculation pump discharges the slurry back to the re-boiler.

The process continues until the waste reaches the desired concentration point. At which point, a small fraction of the concentrated waste is withdrawn from the upper recirculation line and is pumped by the slurry pump to an underground storage tank. Prior operation of the 242-A Evaporator (1977 – 1985) was conducted to achieve super-saturation of the waste in the vapor-liquid separator vessel, which creates new salt crystal nuclei and promotes growth of existing crystals in the slurry liquor. Typically, waste was concentrated to the saturation limit for sodium aluminate and the resulting slurry discharged from the evaporator was designated as DSSF. Waste concentrated beyond the saturation limit for sodium aluminate is designated as double-shell slurry (DSS) with only one tank full of this waste type having been made to date, which is presently stored in tank 241-AN-103. Production of DSSF and DSS were conducted to minimize the volume of wastes stored in the double-shell tanks. However, this practice was not continued when the evaporator re-started operations in 1994 because of concerns with retention of gases in the DSSF and DSS wastes.

Figure 4 242-A Evaporator



3.3 221-B PLANT FISSION PRODUCTS PROCESSING

The 221-B Plant was originally constructed from 1943-1945 as part of the Manhattan Project during WWII. The plant operated from April 1945 through September 1952 processing irradiated uranium fuel elements to separate plutonium. The process equipment in B Plant was flushed to remove residual plutonium and fission products and placed in standby status until 1961. From 1961 through July 1963, equipment was replaced in some of the process cells within B Plant to prepare the facility for recovery of fission products from high-level waste solutions. Figure 5 provides an aerial view of the B Plant.

From August 1963 through June 1966, B-Plant was used in conjunction with the PUREX facility, 244-CR Vault, and the 201-C Hot Semiworks (renamed Strontium Semiworks in 1963) to separate strontium-90 and rare earths (i.e., cerium-144 and promethium-147) from high-level waste solutions. Then, from July 1966 through December 1967, equipment was replaced within B-Plant to expand the processing capability to include cesium removal from fission high-level waste solutions using ion exchange equipment. The strontium and rare earths processing equipment was also replaced to include only strontium removal using a solvent extraction equipment, followed by precipitation and centrifugation equipment for purifying the strontium. The cesium ion exchange process was operated from December 1967 through September 1983 and again briefing in October 1985 through February 1986. The strontium solvent extraction process operated from January 1968 through mid-1977. Each of the fission products processing events in the B-Plant is discussed in more detail in the following sections.

Figure 5 221-B Plant and WESF circa 1978

3.3.1 STRONTIUM AND RARE EARTHS PROCESSING

On September 18, 1961 (HW-71187-DEL, page F-2), renovation of cells 5 through 12 within B-Plant canyon was initiated to use these cells for separating strontium and rare earths from a mixed fission product solution (HW-69011). Construction activities were completed, and the facility was accepted by operations on January 31, 1963 (HW-76848-DEL, page B-2). Processing of radioactive waste in cells 5 through 12 at the B-Plant commenced on August 2, 1963 (HW-78817-DEL, page B-2 and G-2).

B-Plant was used in conjunction with the PUREX facility, 244-CR Vault and the 201-C Hot Semiworks to separate strontium-90, cerium-144 and promethium-147 from high-level waste solutions. The PUREX facility generated a first cycle raffinate solution from the solvent extraction reprocessing of irradiated reactor fuel (i.e., high-level waste). The first cycle raffinate solution was highly acidic and contained most of the fission products (e.g., strontium-89/90, cerium-144, promethium-147, and cesium-137) that were separated from the uranium and plutonium during the reprocessing of irradiated reactor fuel. The acidity of the first cycle raffinate solution was reduced by addition of sugar and digestion at elevated temperature to decompose the nitric acid solution.

In a section of the PUREX facility known as the head-end, first cycle raffinate solution was reacted with sodium sulfate and lead nitrate to precipitate strontium and rare earth (i.e., cerium and promethium) fission products (HW-63051 and HW-69534). Lead co-precipitated with strontium and increased the amount of strontium precipitated from the first cycle raffinate solution. The resulting strontium and rare earth precipitate was centrifuged and washed to separate the supernatant, which contained soluble fission products such as cesium-137, zirconium-niobium-95, and ruthenium-rhodium-106. The supernatant containing the soluble fission products (e.g., cesium-137, zirconium-niobium-95, and ruthenium-rhodium-106) was neutralized and transferred to underground storage tanks. The strontium and rare earth precipitate was metathesized to soluble carbonates by addition of sodium carbonate. The strontium and rare earth carbonate precipitates were then dissolved in nitric acid and transferred to B-Plant via 244-CR Vault for further processing.

In B-Plant, the strontium nitrate / rare earth nitrate solution were processed to form separate solutions containing strontium and rare earths (HW-77016). The strontium nitrate / rare earth nitrate solution was reacted with oxalic acid to precipitate the rare earths along with lead, leaving strontium in solution. The precipitate was centrifuged to separate the strontium solution from the rare earth precipitate. The strontium solution was stored in B-Plant and transferred periodically to the 201-C Hot Semiworks for purification. The rare earth precipitate was dissolved in nitric acid and stored in B-Plant for further processing.

Lead was removed from the rare earth solution by adding sodium hydroxide solution to form soluble plumbite and insoluble rare earth hydroxide precipitates (HW-81373, RL-

SEP-197, page G-2, and HAN-90907, page 21). The plumbite was separated from the rare earth hydroxide precipitate by centrifugation and discarded to the single-shell tanks. The rare earth hydroxide precipitate was washed with sodium hydroxide solution to remove soluble lead and the wash solution was also discarded to the single-shell tanks. The rare earth hydroxide precipitate was dissolved in nitric acid, stored in B-Plant, and eventually transferred to the 201-C Hot Semiworks for purification.

Processing of strontium and rare earth solutions within B-Plant continued until June 1966 (HAN-95105-DEL, page 15). Separations of strontium and rare earths from the first cycle raffinate solution continued to be conducted in the head-end section of the PUREX facility through February 8, 1967 (HAN-96805-DEL, page AIII-4). The strontium and rare earth solution was transferred from PUREX to the 244-CR Vault for storage from July 1966 through February 1967, while equipment modifications were conducted at B-Plant.

3.3.2 CESIUM AND STRONTIUM PROCESSING

From July 1966 (HAN-95284-DEL, page 13) through October 1967 (HAN-98918-DEL, page AIII-2), equipment within the 221-B Plant was flushed and replaced with new equipment for separating cesium and strontium from high-level waste. In January 1967 (HAN-96590-DEL, page AIII-4) and in March 1967 (HAN-97066-DEL, page AIII-4), testing was conducted of a new centrifuge and a precipitation-decantation-centrifugation technique for separating iron and aluminum from PUREX sludge waste. Construction activities continued to be conducted in the 221-B Plant throughout 1967.

On December 27, 1967 (HAN-99396-DEL, page AIII-3), alkaline supernatants stored in the single-shell tanks were transferred to B-Plant, and cesium was separated using an ion exchange process. Cesium ion exchange processing continued at B-Plant until October 1983 using at first inorganic and later organic ion exchange materials (RHO-RE-SA-169). The recovered cesium was purified through a second ion exchange process that used an inorganic ion exchange media (SD-RE-TM-002). The second ion exchange process was conducted from August 1974 through September 1983. The waste from the second ion exchange process was blended with the feed solutions to the first ion exchange process. The purified cesium solution was transferred to the 225-B Waste Encapsulation and Storage Facility (WESF) for conversion to cesium chloride salt and double contained sealing in stainless steel capsules (SD-RE-TM-002). A brief cesium ion exchange campaign was conducted from October 1985 through February 1986 to process cesium chloride solution recovered from cesium capsules. Cesium was also precipitated from acidic, PUREX high-level waste (known as CAW) using phosphotungstic acid (PTA), with the cesium precipitate dissolved in sodium hydroxide solution and processed through the ion exchange equipment for cesium recovery (ARH-CD-917). The PTA process operated from 1968 through 1972.

On January 31, 1968, the solvent extraction equipment installed in B-Plant was operated to purify the inventory of rare earth solutions stored at B-Plant (HAN-99604-DEL, page AIII-3). The semi-purified promethium - cerium solution was stored in B-Plant process tank 6-2 (HAN-100127-DEL, page AIII-3). Separation of strontium from the strontium and rare earths solutions stored in the 244-CR Vault was then conducted in March 1968 using the solvent extraction equipment (HAN-100127-DEL, page AIII-3).

The B-Plant solvent extraction equipment began processing the PUREX first cycle raffinate solution to separate strontium on April 20, 1968 (HAN-100357-DEL, page AIII-3). The processing of PUREX first cycle raffinate solution was completed on August 30, 1968 (PRD-SEP-68-DEL, page AIII-3). The B-Plant solvent extraction equipment was then used to separate strontium from PUREX high-level waste sludges that had been acidified (known as PAS) in 244-AR Vault and transferred to B-Plant for centrifugation to separate solids and strontium removal (PRD-SEP-68-DEL, page AIII-4). In addition, the B-Plant solvent extraction equipment was operated periodically to separate strontium from CAW solutions following the PTA processing to separate cesium. Strontium separation from high-level waste solutions using the solvent extraction equipment continued at B-Plant until mid-1977.

3.4 HOT SEMIWORKS

The Hot Semiworks, 201-C building, was constructed in 1951 to 1952 as a research and test facility for the REDOX and TBP Plant chemical separations processes (HW-22955). An aerial view of the Hot Semiworks facility circa 1983 is provided in Figure 6. The Hot Semiworks was originally operated from November 1952 to October 1953 as a pilot facility to research and demonstrate the REDOX chemical separations process (HW-31767). The facility was modified in 1953 and operated from May 1955 (HW-38768-RD) through March 1956 (HW-49673-RD) as a research and demonstration facility for the PUREX chemical separations process. REDOX and PUREX process flowsheet testing conducted at the Hot Semiworks included the dissolution of aluminum clad irradiated fuel for processing through the pilot plant solvent extraction system to separate uranium and plutonium from fission products.

Following completion of the PUREX chemical separation process research and development activities, a maintenance program was initiated at the Hot Semiworks facility for plant improvements. This maintenance program was completed in July 1957 and the Hot Semiworks was placed in standby mode in July 1957 (HW-52860). The Hot Semiworks was re-activated in 1961 and used until 1967 to separate fission products from various high-level waste solutions. The above ground structures at the Hot Semiworks were demolished in 1983-84 (WHC-SD-EN-ES-019).

The radioactive waste from the REDOX process research test runs were concentrated and transferred to an underground storage tank, TK-70 (also designated as 241-CX-70) located at the Hot Semiworks 241-CX tank farm facilities. The organic solvent waste from the REDOX process test runs was transferred to an underground crib. The

radioactive wastes from the PUREX process research test runs were concentrated and transferred to tanks 241-C-201 through 241-C-204 (RPP-15408). Process condensates and cooling water from equipment in the Hot Semiworks were transferred to crib 216-C-1 (HW-48518, page 21). Process condensates from the evaporation of radioactive waste were transferred to crib 216-C-6 (HW-48518, page 21). Organic solvent waste from the PUREX process research runs was transferred from Hot Semiworks building 276-C to crib 216-C-4 starting in October 1955 (HW-48518, page 22).

In 1961, the Hot Semiworks was modified to incorporate solvent extraction and ion exchange columns for demonstrating strontium purification processing (HW-68786). The Hot Semiworks was operated from May 1961 to October 1961 to demonstrate strontium separation from PUREX waste and transfer the separated strontium to Oak Ridge National Laboratory (HW-72666-RD Part 1, page 6). The Hot Semiworks facility was renamed the Strontium Semiworks facility in 1961 and was operated until 1967 to separate strontium from various waste solutions.

The Strontium Semiworks along with a renovated portion of B-Plant, PUREX Plant head-end, and the 244-CR vault were used from 1961 through 1967 to separate strontium-90, cesium-137, cerium-144, and promethium-147 from various waste solutions (HW-71179). The head-end of PUREX was used to separate strontium-90 from high-level waste with the strontium-90 solution transferred to the 244-CR vault for storage and decay of strontium-89 and eventual transfer to the Strontium Semiworks. The 244-CR vault was also used to transfer solutions containing strontium and rare earths from the PUREX Plant to B-Plant for separating the strontium-90 and rare earths (mixture of cerium-144 and promethium-147) into separate solutions (HW-77016).

The strontium-90 solution and rare earths solution were transferred separately to the Strontium Semiworks for further purification and load-out onto casks (HW-78987-REV, page 12 and HW-81481, page 38). Solvent extraction equipment was operated under various flowsheet conditions to purify separate batches of strontium-90, cerium-144, and promethium-147. Organic solvent waste from the Strontium Semiworks was transferred to an underground crib. When the Strontium Semiworks was eventually shutdown in 1967, the organic solvent was transferred to the REDOX Plant for incorporation in the REDOX process.

PUREX high-level waste solutions that were stored in C Farm were also passed through a shielded cask that contained Decalso®[16] ion exchange material to separate cesium-137. Building 801-C in C-Farm was used to contain the shielded cask while cesium was loaded onto the ion exchange material (HW-71333). A cask station at the PUREX facility was also used to load cesium onto ion exchange material.

The Strontium Semiworks was also used in conjunction with the 801-C cask station to demonstrate the separation of technetium-99 from alkaline high-level waste solutions. Approximately 1-kg of technetium-99 was separated from high-level waste that was stored in C-Farm SSTs in October 1963 (HW-79377-C, page C-7 and HW-79480, page

[16] Decalso® is a synthetic, sodium aluminosilicate gel manufactured by the Permutit Company, New York.

G-2). The high-level waste solution was passed through a shielded cask in the 801-C building that contained Decalso® ion exchange material to separate cesium. The effluent solution from the cesium cask was then passed through a separate shielded cask in the 801-C building that contained IRA-401®[17] ion exchange material, which adsorbed technetium from the waste solution. The Strontium Semiworks received the cask that was loaded with technetium in November 1963, eluted and concentrated the technetium, which was then loaded into a smaller cask for transfer to the Hanford Laboratories located in the 300 Area (HW-79768, page G-2). A second campaign to recover an additional 1-kg of technetium-99 from high-level waste stored in C-Farm was conducted in August through September 1964 in the same manner as the first campaign (HW-83876, page B-2 and HW-84354, page B-1).

In addition to the technetium-99 campaigns, the Strontium Semiworks used the installed solvent extraction equipment to purify a solution containing a mixture of americium, cerium, and rare earths (HAN-98529-DEL, page AIII-3). The solution containing a mixture of americium, cerium, and rare earths had been separated at the REDOX facility while reprocessing the irradiated fuel from the Shippingport reactor (ARH-1354). The americium, cerium, and rare earths were shipped the Hanford Laboratories in the 300 Area.

Tanks 241-C-107, 241-C-108, 241-C-109, 241-C-111, and 241-C-112 all received highly radioactive waste solutions from the Strontium Semiworks from 1961 through 1967 (RPP-15408, page 15). Tank 241-CX-70 did not receive any waste from the Strontium Semiworks operations.

After being used successfully to separate various fission products from waste solutions, the Strontium Semiworks was deactivated beginning from October 1967 (HAN-98918-DEL, page AIII-3) through November 1967 (HAN-99196-DEL, page AIII-3).

[17] IRA-401® is a styrene, di-butyl benzene ion exchange bead manufactured by the Rohm and Haas Company, Philadelphia, Pennsylvania.

Figure 6 Hot Semiworks circa 1983

3.5 100-N REACTOR DECONTAMINATION WASTE

This section provides only a general description of the 100-N Reactor. For further details in the 100-N Reactor, see DOE/RL-97-1047.

The 100-N Reactor is one of the nine graphite core reactor that were constructed at the Hanford Site from 1943 through 1963. The 100-N Reactor was completed in 1963 and operated until 1986. Purified water was re-circulated through the reactor core in a closed-loop cooling system. The 100-N Reactor also generated steam which was transferred to a commercial facility for the production of electricity.

Periodic maintenance was conducted on the radioactively contaminated components of the reactor. The radioactively contaminated components of the reactor were first decontaminated prior to maintenance activities. The 100-N Reactor decontamination wastes have been described as a 4 percent tri-sodium phosphate (Na_3PO_4) and 2 percent sodium sulfate (Na_2SO_4) solution (letter 65413-79-174). However, other decontamination chemicals are likely to have been used. Analyses of the 100-N Reactor decontamination solutions were not located.

The spent decontamination solutions were transported from the 100-N Reactor area via railcar to the 200 Area tank farms for storage in the underground tanks. Prior to 1980, the 100-N Reactor decontamination wastes were unloaded to tanks at the 204-S facility (see Figure 7) located in the 200 West Area and then transferred to single-shell tanks. Beginning in 1980, the 100-N Reactor decontamination wastes were received in the 204-AR Railcar Unloading facility (see Figure 8) located in the 200-E Area of the Hanford Site and then transferred to various double-shell tanks.

Figure 7. 204-S Tanker Car Unloading Facility

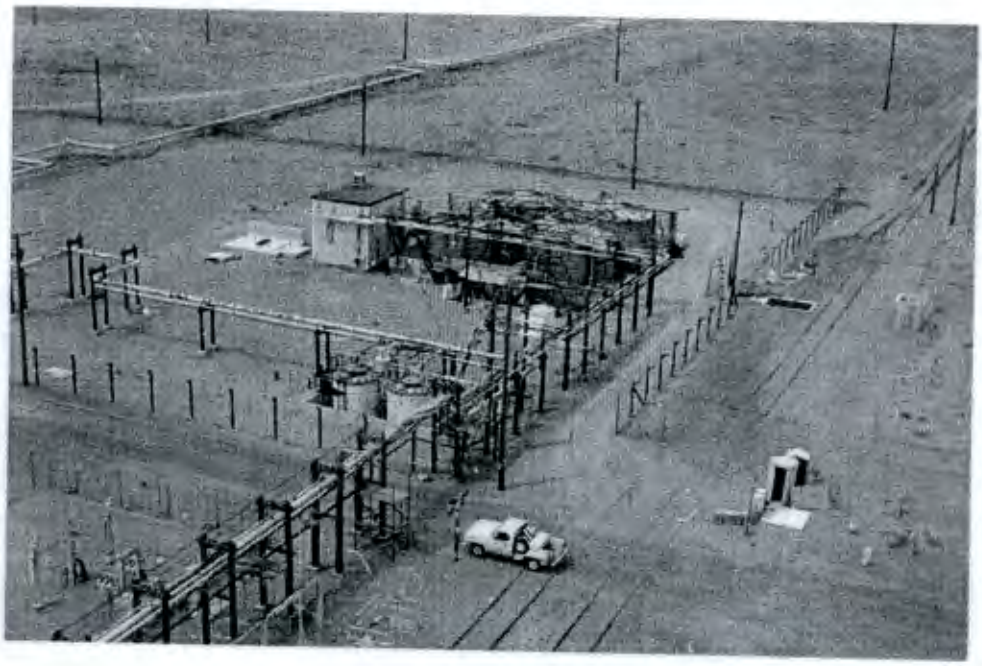


Figure 8. 204-AR Railcar Unloading Facility

4.0 SUMMARY

Tank 241-AW-105 received CC waste in 1980 and miscellaneous B Plant low activity wastes in 1982. These wastes were transferred in April 1983 to tank 241-AW-101, leaving a heel of ~51,000 gallons in tank 241-AW-105. Tank 241-AW-105 was next used to store DSSF and N reactor decontamination wastes from tank 241-AW-103 and miscellaneous low activity wastes from the PUREX Plant from April 1983 – July 1984. While the majority of these wastes were removed in 1984, the miscellaneous PUREX Plant waste had precipitated leaving a heel of approximately 73,000 liters (~19,300 gallons or ~7 inches of waste) of sludge categorized as PL2 type waste in tank 241-AW-105. The PL2 sludge waste phase contains ~2,075 ηCi/gram TRU, as well ~5,110 Ci of ^{137}Cs and 22,700 Ci ^{90}Sr.

Tank 241-AW-105 was then used from 1984 through 1988 to receive neutralized cladding removal waste (NCRW) from the PUREX Plant and high TRU content sludge retrieved from tank CX-70. The tank CX-70 waste was generated during REDOX process research and testing studies conducted at the 201-C Hot Semiworks. Tank 241-AW105 also received miscellaneous low activity wastes from stabilization and decommissioning the PUREX Plant conducted from 1992 through 1996. The NCRW formed a sludge fraction that deposited atop the PL2 sludge in tank 241-AW-105. The supernatant was periodically transferred from tank 241-AW-105 to other double-shell tanks for dispositioning. Tank 241-AW-105 presently contains ~593,000 liters (157,000 gallons) of supernatant. The supernatant contains 0.4 ηCi/gram TRU, as well as 5,920 Ci of ^{137}Cs and 13.1 Ci of ^{90}Sr. Approximately 926,000 liters (~272,900 gallons) of NCRW sludge are present in tank 241-AW-105. The NCRW sludge phase contains approximately 855 ηCi per gram TRU, as well as 39,200 Ci of ^{137}Cs and 8,630 Ci of ^{90}Sr.

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APPENDIX A

TANK 241-AW-105 WASTE TRANSFER RECORDS

A.1 WASTE TRANSFER RECORDS FOR JULY 1980 – SEPTEMBER 1985

Tank 241-AW-105 waste transfer records for July 1980 through September 1985 are listed in the daily operating reports for the Tank Farms as well as individual waste transfer datasheets. Appendix A-1 provides a summary of the tank 241-AW-105 waste transfers listed in Tank Farm daily operating reports and waste transfer datasheets.

A.2 WASTE TRANSFER RECORDS FOR JANUARY 1985 – AUGUST 2004

Tank 241-AW-105 waste transfers that occurred after January 1, 1985 are listed in the TWINS database at the following web addresses:

- January 1, 1985 to December 2000:

  http://twins.pnl.gov/data/hcde3s.exe?table=tcd.dbo.transfers_denorm&type=table&where1=waste_site_id+%3D+%27241-AW-105%27

- January 1, 2001 through the August 2004:

  http://twins.pnl.gov/data/hcde3s.exe?table=tcd.dbo.v_TXFR_transfers&type=table&where1=waste_site_id+%3D+%27241-AW-105%27

All waste transfers associated with tank 241-AW-105 from January 1985 through August 2004 were downloaded from the TWINS database on August 19, 2004 and listed in Appendix A-2.

Appendix A-1

Tank 241-AW-105 Waste Transfer Records

July 1980 through September 1985

Table A-1. Tank 241-AW-105 Waste Transfers July 1980 through September 1985

Year	Month	Source	Volume (gallons)	Comments	References
1980	January		0		
	February		0		
	March		0		
	April		0		
	May		0		
	June		0		
	July		9,874	Approximately 9,875-gallons (3.75-inches) of water in tank from operability testing.	
	August	242-A Evaporator	919,180	Complexant Concentrate (CC) waste from evaporator campaign 80-9.	RHO-SD-WM-PE-005, 1982
	September		0		
	October		0		
	November		0		
	December		0		
1981	January		0		RMIS Document Accession # D196193700
	February		0		RMIS Document Accession # D196193700
	March		0		RMIS Document Accession # D196193700
	April		0		RMIS Document Accession # D196193700
	May		0		RMIS Document Accession # D196193700
	June		0		RMIS Document Accession # D196193700
	July		0		RMIS Document Accession # D196193700
	August		0		RMIS Document Accession # D196193700

Table A-1. Tank 241-AW-105 Waste Transfers July 1980 through September 1985

Year	Month	Source	Volume (gallons)	Comments	References
	September		0		RMIS Document Accession # D196193700
	October		0		RMIS Document Accession # D196193700
	November		0		RMIS Document Accession # D196193700
	December		0		RMIS Document Accession # D196193700
1982	January		0		RMIS Document Accession # D196193700
	February		0		RMIS Document Accession # D196193700
	March		0		RMIS Document Accession # D196193700
	April		0		RMIS Document Accession # D196193700
	May		0		RMIS Document Accession # D196193700
					RMIS Document Accession # D196193700
	June		0		RMIS Document Accession # D196193700
	July		0		RMIS Document Accession # D196193700
	August		0		RMIS Document Accession # D196193700
	September	241-AW-104	113,850	Transferred waste from tank 241-AW-104 into tank 241-AW-105 from 9/17/82 through 9/19/82	RMIS Document Accession # D196193700 and Monthly Waste Generations Actuals - FY 1983 (Tank Farm Information Center)

Table A-1. Tank 241-AW-105 Waste Transfers July 1980 through September 1985

Year	Month	Source	Volume (gallons)	Comments	References
	October	none	0		RMIS Document Accession # D196193700 and Monthly Waste Generations Actuals - FY 1983 (Tank Farm Information Center)
	November	none	0		RMIS Document Accession # D196193700 and Monthly Waste Generations Actuals - FY 1983 (Tank Farm Information Center)
	December	none	0		Monthly Waste Generations Actuals - FY 1983 (Tank Farm Information Center)
1983	January	none	0		Monthly Waste Generations Actuals - FY 1983 (Tank Farm Information Center)
	February	none	0		Monthly Waste Generations Actuals - FY 1983 (Tank Farm Information Center)
	March	none	0		Monthly Waste Generations Actuals - FY 1983 (Tank Farm Information Center)
	April		- 1,018,000	Transferred 1,018,000 gallons of waste from tank 241-AW-105 to tank 241-AW-101, leaving ~51,000 gallons of waste in tank 241-AW-105	Waste was processed in 242-A Evaporator as part of campaign 84-4 (RHO-SD-WM-PE-017)
	April	PUREX F-18, R-8, and G-8	10,175	RHO-SD-RE-OTR-009, (1983) Operability Test Results (OTR) for Project B-281 Equipment, PUREX to 241-AW Tank Farm Process Lines and Jumpers, identifies that ~10,450-gallons of waste was transferred into tank 241-AW-105 from PUREX tanks F-18, G-8, and R-8 (4/28 to 5/1/1983) as part of the testing of transfer routes.	Monthly Waste Generations Actuals - FY 1983 (Tank Farm Information Center)
	May	PUREX G-8, F-18, R-8, U-3	173,524	Tank 241-AW-105 reported to have received only 116,000-gallons of the 173,524-gallons of PUREX waste.	Monthly Waste Generations Actuals - FY 1983 (Tank Farm Information Center)

Table A-1. Tank 241-AW-105 Waste Transfers July 1980 through September 1985

Year	Month	Source	Volume (gallons)	Comments	References
	June	PUREX G-8, F-18, R-8, U-3, U-4	205,708	RHO-MA-116 (1982), PUREX Technical Manual, page 4-152, Figure 4-16 identifies that tank TK-F18 received miscellaneous sump waste (e.g., cooling water and chemicals leaked into process cells) and sodium hydroxide solution (for neutralizing waste). Page 4-136, section 4.7.2.2 identifies that tanks TK-R-8 and G-8 received spent solvent wash solution.	Monthly Waste Generations Actuals - FY 1983 (Tank Farm Information Center)
	July	PUREX G-8, F-18, R-8, U-3	62,975		Daily Operating Report Tank Farm Processing Operations Monthly Waste Generations Actuals - FY 1983 (Tank Farm Information Center)
	August	PUREX G-8, F-18, U-3	106,150		Daily Operating Report Tank Farm Processing Operations and Monthly Waste Generations Actuals - FY 1983 (Tank Farm Information Center)
	September	PUREX G-8, F-18, R-8, U-3, U-4	195,159		Daily Operating Report Tank Farm Processing Operations and Monthly Waste Generations Actuals - FY 1983 (Tank Farm Information Center)
	September	241-AW-103	264,000	Transferred 100-inches (~264,000 gallons) of waste from tank 241-AW-103 to 241-AW-105.	65950-83-998PM
	October	PUREX G-8, F-18, R-8, U-3, U-4, 302-A catch tank	140,129		Daily Operating Report Tank Farm Processing Operations and Monthly Waste Generations Actuals - FY 1984 (Tank Farm Information Center)
	November	PUREX G-8, F-18, R-8, U-3, U-4	163,202		Daily Operating Report Tank Farm Processing Operations and Monthly Waste Generations Actuals - FY 1984 (Tank Farm Information Center)

Table A-1. Tank 241-AW-105 Waste Transfers July 1980 through September 1985

Year	Month	Source	Volume (gallons)	Comments	References
	November		-314,929	Transferred 114.5-inches (399.6-inches to 285.1-inches) of waste (314,929-gallons) from tank 241-AW-105 to tank 241-AW-102 from 11/20/1983 to 11/26/1983.	Daily Operating Report Tank Farm Processing Operations and Monthly Waste Generations Actuals - FY 1984 (Tank Farm Information Center) Waste was processed in 242-A Evaporator as part of campaign 84-3 (RHO-SD-WM-PE-018)
	December	PUREX G-8, F-18, R-8, U-3, U-4	168,686		Daily Operating Report Tank Farm Processing Operations and Monthly Waste Generations Actuals - FY 1984 (Tank Farm Information Center)
	December		-282,000	Transferred ~282,000 gallons from tank 241-AW-105 to tank 241-AZ-102 in December 1983.	
1984	January	PUREX G-8, F-18, R-8, U-3, U-4	187,549		Monthly Waste Generations Actuals - FY 1984 (Tank Farm Information Center)
	February	PUREX G-8, F-18, R-8, U-3	150,150		Monthly Waste Generations Actuals - FY 1984 (Tank Farm Information Center)
	March	PUREX G-8, F-18, R-8, U-3, U-4 241-AW-104	686,718	Received 215,368-gallons of PUREX wastes into tank 241-AW-105. Transferred 471,350-gallons of waste from tank 241-AW-104 into tank 241-AW-105.	Monthly Waste Generations Actuals - FY 1984 (Tank Farm Information Center)
	March		-192,775	Transferred 192,775-gallons of waste from tank 241-AW-105 into tank 241-AZ-102.	Monthly Waste Generations Actuals - FY 1984 (Tank Farm Information Center)
	April	PUREX G-8, F-18, R-8, U-3, U-4	166,643		RPT-040184 and Monthly Waste Generations Actuals - FY 1984 (Tank Farm Information Center)

Table A-1. Tank 241-AW-105 Waste Transfers July 1980 through September 1985

Year	Month	Source	Volume (gallons)	Comments	References
	April		-143,825	Transferred approximately 46-inches of waste (143,825-gallons) from tank 241-AW-105 to tank 241-AN-101 from 4-12-1984 to 4-14-1984.	RPT-040184 and Monthly Waste Generations Actuals - FY 1984 (Tank Farm Information Center)
	May	PUREX G-8, F-18, R-8, U-3, U-4	157,094		RPT-050184 and Monthly Waste Generations Actuals - FY 1984 (Tank Farm Information Center)
	May		-512,394	Transferred approximately 37.4-inches of waste (110,550-gallons) from tank 241-AW-105 to tank 241-AN-101 from 5-3-1984 to 5-5-1984. Transferred approximately 146.1-inches of waste (401,844-gallons) from tank 241-AW-105 to tank 241-AW-102 from 5-12-1984 to 5-15-1984.	RPT-050184 and Monthly Waste Generations Actuals - FY 1984 (Tank Farm Information Center)
	June	PUREX G-8, F-18, R-8, U-3, U-4	166,383		RPT-060184 and Monthly Waste Generations Actuals - FY 1984 (Tank Farm Information Center)
	June		-768,480	Transferred approximately 136.6-inches of waste (375,714-gallons) from tank 241-AW-105 to tank 241-AW-102 from 6-5-1984 to 6-7-1984. Transferred approximately 107.1-inches of waste (294,575-gallons) from tank 241-AW-105 to tank 241-AW-102 from 6-10-1984 to 6-13-1984. Transferred approximately 35.7-inches of waste (98,191-gallons) from tank 241-AW-105 to tank 241-AW-102 from 6-18-1984 to 6-20-1984.	RPT-060184 and Monthly Waste Generations Actuals - FY 1984 (Tank Farm Information Center)
	July		-167,229	Transferred approximately 60.8-inches of waste (167,229-gallons) from tank 241-AW-105 to tank 241-AW-102 from 7-1-1984 to 7-4-1984. **Tank waste level at 37.1-inches (101,436-gallons) on 7-4-1984.**	RPT-070184 and Monthly Waste Generations Actuals - FY 1984 (Tank Farm Information Center)

Table A-1. Tank 241-AW-105 Waste Transfers July 1980 through September 1985

Year	Month	Source	Volume (gallons)	Comments	References
	July	PUREX E-5	198,550	Began routing E-5 waste (175,725-gallons) to tank 241-AW-105 on July 5, 1984. Routed U-3/U-4, R-8/G-8, and F-18 wastes to tank 241-AW-101.	RPT-070184 and Monthly Waste Generations Actuals - FY 1984 (Tank Farm Information Center)
	August	PUREX E-5	196,350		RPT-080184 and Monthly Waste Generations Actuals - FY 1984 (Tank Farm Information Center)
	September	PUREX E-5	118,222		RPT-090184 and Monthly Waste Generations Actuals - FY 1984 (Tank Farm Information Center)
	October	PUREX E-5	8,800		RPT-100184 and Monthly Waste Generations Actuals - FY 1985 (Tank Farm Information Center)
	November	PUREX E-5	55,825		RPT-110184 and Monthly Waste Generations Actuals - FY 1985 (Tank Farm Information Center)
	December	PUREX E-5	133,650		RPT-120184 and Monthly Waste Generations Actuals - FY 1985 (Tank Farm Information Center)
1985	January	PUREX E-5	49,675		Monthly Waste Generations Actuals - FY 1985 (Tank Farm Information Center)
	February	none	0		Monthly Waste Generations Actuals - FY 1985 (Tank Farm Information Center)
	March	none	0		Monthly Waste Generations Actuals - FY 1985 (Tank Farm Information Center)
	April	none	0		Monthly Waste Generations Actuals - FY 1985 (Tank Farm Information Center). Appendix A-2 indicates tank AW-105 received 57 kgal of saltwell liquor in April 1985.
	May	244-BX	77,275	Transferred saltwell liquid and water flush from tank 244-BX to tank 241-AW-105.	Monthly Waste Generations Actuals - FY 1985 (Tank Farm Information Center). Appendix A-2 indicates tank AW-105 received 52 kgal of saltwell liquor in May 1985.

Table A-1. Tank 241-AW-105 Waste Transfers July 1980 through September 1985

Year	Month	Source	Volume (gallons)	Comments	References
	May		-403,150	Transferred 403,150-gallons of supernatant waste from tank 241-AW-105 to tank 241-AW-102	Monthly Waste Generations Actuals - FY 1985 (Tank Farm Information Center).
	June	none	0		Monthly Waste Generations Actuals - FY 1985 (Tank Farm Information Center)
	July	PUREX E-5	102,300		Monthly Waste Generations Actuals - FY 1985 (Tank Farm Information Center). Appendix A-2 indicates tank AW-105 received 21 kgal of saltwell liquor in July 1985.
	August	PUREX E-5	187,603		Monthly Waste Generations Actuals - FY 1985 (Tank Farm Information Center)
	September	PUREX E-5	95,700		Monthly Waste Generations Actuals - FY 1985 (Tank Farm Information Center)

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Appendix A-2

Tank 241-AW-105 Waste Transfer Records

January 1985 through August 2004

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
gain	PD	PUREX NCRW Sludge (TRU)	PDNSG	Non-TRU Decladding Sludge From PUREX	241-AW-105	Tank	1/1/1985 0:00	1/31/1985 0:00	83	94	11	819
gain	DN	Dilute Non-Complexed	PDSUP	Dilute, Non-Complexed Waste PUREX Decladding Waste	241-AW-105	Tank	1/1/1985 0:00	1/31/1985 0:00	662	696	34	804
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	1/1/1985 0:00	1/31/1985 0:00	696	700	4	808
gain	DN	Dilute Non-Complexed	SWLIQ	Dilute, Non-Complexed Waste from All Single-Shell Tanks	241-AW-105	Tank	4/1/1985 0:00	4/30/1985 0:00	700	757	57	876
transfer	DN	Dilute Non-Complexed	241-AW-105	Tank	241-AW-102	Tank	5/1/1985 0:00	5/1/1985 0:00	757	152	-605	271
gain	DN	Dilute Non-Complexed	SWLIQ	Dilute, Non-Complexed Waste from All Single-Shell Tanks	241-AW-105	Tank	5/2/1985 0:00	5/30/1985 0:00	152	204	52	323
gain	PD	PUREX NCRW Sludge (TRU)	PDSLG	PUREX Decladding Sludge	241-AW-105	Tank	7/1/1985 0:00	7/31/1985 0:00	94	104	10	333
gain	DN	Dilute Non-Complexed	PDSUP	Dilute, Non-Complexed Waste PUREX Decladding Waste	241-AW-105	Tank	7/1/1985 0:00	7/31/1985 0:00	230	311	81	440

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
gain	DN	Dilute Non-Complexed	SWLIQ	Dilute, Non-Complexed Waste from All Single-Shell Tanks	241-AW-105	Tank	7/1/1985 0:00	7/31/1985 0:00	209	230	21	359
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	7/1/1985 0:00	7/31/1985 0:00	204	209	5	338
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	7/1/1985 0:00	7/31/1985 0:00	311	323	12	452
gain	PD	PUREX NCRW Sludge (TRU)	PDSLG	PUREX Decladding Sludge	241-AW-105	Tank	8/1/1985 0:00	8/31/1985 0:00	104	122	18	470
gain	DN	Dilute Non-Complexed	PDSUP	Dilute, Non-Complexed Waste PUREX Decladding Waste	241-AW-105	Tank	8/1/1985 0:00	8/31/1985 0:00	323	503	180	650
gain	PD	PUREX NCRW Sludge (TRU)	PDSLG	PUREX Decladding Sludge	241-AW-105	Tank	9/1/1985 0:00	9/30/1985 0:00	122	138	16	666
gain	DN	Dilute Non-Complexed	PDSUP	Dilute, Non-Complexed Waste PUREX Decladding Waste	241-AW-105	Tank	9/1/1985 0:00	9/30/1985 0:00	503	573	70	736
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	9/1/1985 0:00	9/30/1985 0:00	573	588	15	751
gain	PD	PUREX NCRW Sludge (TRU)	PDSLG	PUREX Decladding Sludge	241-AW-105	Tank	10/1/1985 0:00	10/30/1985 0:00	138	157	19	770

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
gain	DN	Dilute Non-Complexed	PDSUP	Dilute, Non-Complexed Waste PUREX Decladding Waste	241-AW-105	Tank	10/1/1985 0:00	10/30/1985 0:00	607	685	78	867
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	10/1/1985 0:00	10/30/1985 0:00	588	607	19	789
gain	PD	PUREX NCRW Sludge (TRU)	PDSLG	PUREX Decladding Sludge	241-AW-105	Tank	11/1/1985 0:00	11/30/1985 0:00	157	183	26	1037
gain	DN	Dilute Non-Complexed	PDSUP	Dilute, Non-Complexed Waste PUREX Decladding Waste	241-AW-105	Tank	11/1/1985 0:00	11/30/1985 0:00	685	829	144	1011
gain	DN	Dilute Non-Complexed	PDCSS	Dilute Non-Complexed PUREX Decladding Waste, FY 1986 Only	241-AW-105	Tank	12/1/1985 0:00	12/1/1985 0:00	835	876	41	1095
gain	PD	PUREX NCRW Sludge (TRU)	PDSLG	PUREX Decladding Sludge	241-AW-105	Tank	12/1/1985 0:00	12/1/1985 0:00	183	194	11	1054
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	12/1/1985 0:00	12/1/1985 0:00	829	835	6	1043
transfer	DN	Dilute Non-Complexed	241-AW-105	Tank	241-AW-102	Tank	12/15/1985 0:00	12/15/1985 0:00	876	392	-484	611
gain	PD	PUREX NCRW Sludge (TRU)	PDCSS	Dilute Non-Complexed PUREX	241-AW-105	Tank	3/15/1986 0:00	3/30/1986 0:00	194	208	14	625

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
				Decladding Waste, FY 1986 Only								
gain	DN	Dilute Non-Complexed	PDSUP	Dilute, Non-Complexed Waste PUREX Decladding Waste	241-AW-105	Tank	3/15/1986 0:00	3/30/1986 0:00	392	478	86	711
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	3/15/1986 0:00	3/30/1986 0:00	478	499	21	732
gain	PD	PUREX NCRW Sludge (TRU)	PDCSS	Dilute Non-Complexed PUREX Decladding Waste, FY 1986 Only	241-AW-105	Tank	4/15/1986 0:00	4/30/1986 0:00	208	227	19	770
gain	DN	Dilute Non-Complexed	PDSUP	Dilute, Non-Complexed Waste PUREX Decladding Waste	241-AW-105	Tank	4/15/1986 0:00	4/30/1986 0:00	518	651	133	903
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	4/15/1986 0:00	4/30/1986 0:00	499	518	19	751
gain	PD	PUREX NCRW Sludge (TRU)	PDCSS	Dilute Non-Complexed PUREX Decladding Waste, FY 1986 Only	241-AW-105	Tank	5/15/1986 0:00	5/30/1986 0:00	227	240	13	545

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
gain	DN	Dilute Non-Complexed	PDSUP	Dilute, Non-Complexed Waste PUREX Decladding Waste	241-AW-105	Tank	5/15/1986 0:00	5/30/1986 0:00	280	358	78	623
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	5/15/1986 0:00	5/30/1986 0:00	261	280	19	532
transfer	DN	Dilute Non-Complexed	241-AW-105	Tank	241-AW-102	Tank	5/15/1986 0:00	5/20/1986 0:00	651	261	-390	513
evaporation	PD	PUREX NCRW Sludge (TRU)	DN100	Evaporation	241-AW-105	Tank	6/1/1986 0:00	6/30/1986 0:00	240	208	-32	591
evaporation	DN	Dilute Non-Complexed	DN100	Evaporation	241-AW-105	Tank	6/1/1986 0:00	6/30/1986 0:00	358	390	32	623
gain	PD	PUREX NCRW Sludge (TRU)	PDCSS	Dilute Non-Complexed PUREX Decladding Waste, FY 1986 Only	241-AW-105	Tank	7/1/1986 0:00	7/1/1986 0:00	208	209	1	624
gain	PD	PUREX NCRW Sludge (TRU)	PDCSS	Dilute Non-Complexed PUREX Decladding Waste, FY 1986 Only	241-AW-105	Tank	8/1/1986 0:00	8/30/1986 0:00	209	216	7	685
gain	DN	Dilute Non-Complexed	PDSUP	Dilute, Non-Complexed Waste PUREX Decladding Waste	241-AW-105	Tank	8/1/1986 0:00	8/30/1986 0:00	400	444	44	678
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous	241-AW-105	Tank	8/1/1986 0:00	8/30/1986 0:00	390	400	10	634

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
				Sources								
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	9/1/1986 0:00	9/30/1986 0:00	444	441	-3	682
gain	DN	Dilute Non-Complexed	PDL87	PUREX Decladding Supernate, 1987	241-AW-105	Tank	1/1/1987 0:00	1/31/1987 0:00	441	466	25	707
gain	PD	PUREX NCRW Sludge (TRU)	PDS87	PUREX Decladding Sludge	241-AW-105	Tank	1/1/1987 0:00	1/31/1987 0:00	216	224	8	721
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	1/1/1987 0:00	1/31/1987 0:00	466	472	6	713
gain	DN	Dilute Non-Complexed	PDL87	PUREX Decladding Supernate, 1987	241-AW-105	Tank	2/1/1987 0:00	2/28/1987 0:00	473	478	5	727
gain	PD	PUREX NCRW Sludge (TRU)	PDS87	PUREX Decladding Sludge	241-AW-105	Tank	2/1/1987 0:00	2/28/1987 0:00	224	226	2	729
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	2/1/1987 0:00	2/28/1987 0:00	472	473	1	722
gain	DN	Dilute Non-Complexed	PDL87	PUREX Decladding Supernate, 1987	241-AW-105	Tank	3/1/1987 0:00	3/31/1987 0:00	478	504	26	755
gain	PD	PUREX NCRW Sludge (TRU)	PDS87	PUREX Decladding Sludge	241-AW-105	Tank	3/1/1987 0:00	3/31/1987 0:00	226	234	8	763

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	3/1/1987 0:00	3/31/1987 0:00	504	511	7	770
gain	DN	Dilute Non-Complexed	PDL87	PUREX Decladding Supernate, 1987	241-AW-105	Tank	4/1/1987 0:00	4/30/1987 0:00	515	529	14	788
gain	PD	PUREX NCRW Sludge (TRU)	PDS87	PUREX Decladding Sludge	241-AW-105	Tank	4/1/1987 0:00	4/30/1987 0:00	234	238	4	792
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	4/1/1987 0:00	4/30/1987 0:00	511	515	4	774
gain	DN	Dilute Non-Complexed	PDL87	PUREX Decladding Supernate, 1987	241-AW-105	Tank	5/1/1987 0:00	5/30/1987 0:00	543	563	20	831
gain	PD	PUREX NCRW Sludge (TRU)	PDS87	PUREX Decladding Sludge	241-AW-105	Tank	5/1/1987 0:00	5/30/1987 0:00	238	243	5	797
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	5/1/1987 0:00	5/30/1987 0:00	529	543	14	811
gain	DN	Dilute Non-Complexed	PDL87	PUREX Decladding Supernate, 1987	241-AW-105	Tank	6/1/1987 0:00	6/30/1987 0:00	566	580	14	853
gain	PD	PUREX NCRW Sludge (TRU)	PDS87	PUREX Decladding Sludge	241-AW-105	Tank	6/1/1987 0:00	6/30/1987 0:00	243	248	5	836
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	6/1/1987 0:00	6/30/1987 0:00	563	566	3	839
gain	DN	Dilute Non-Complexed	PDL87	PUREX Decladding Supernate, 1987	241-AW-105	Tank	7/1/1987 0:00	7/30/1987 0:00	592	639	47	912

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
gain	PD	PUREX NCRW Sludge (TRU)	PDS87	PUREX Decladding Sludge	241-AW-105	Tank	7/1/1987 0:00	7/30/1987 0:00	248	263	15	927
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	7/1/1987 0:00	7/30/1987 0:00	580	592	12	865
evaporation	PD	PUREX NCRW Sludge (TRU)	DN100	Evaporation	241-AW-105	Tank	8/2/1987 0:00	8/2/1987 0:00	263	241	-22	905
evaporation	DN	Dilute Non-Complexed	DN100	Evaporation	241-AW-105	Tank	8/2/1987 0:00	8/2/1987 0:00	639	661	22	927
transfer	DN	Dilute Non-Complexed	241-AW-105	Tank	241-AW-102	Tank	8/15/1987 0:00	8/15/1987 0:00	661	28	-633	294
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	9/1/1987 0:00	9/30/1987 0:00	28	89	61	355
transfer	DN	Dilute Non-Complexed	241-AW-102	Tank	241-AW-105	Tank	9/1/1987 0:00	9/5/1987 0:00	89	702	613	968
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	10/1/1987 0:00	10/30/1987 0:00	702	724	22	990
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	2/1/1988 0:00	2/15/1988 0:00	724	722	-2	988
transfer	DN	Dilute Non-Complexed	241-AW-105	Tank	241-AW-102	Tank	2/15/1988 0:00	2/15/1988 0:00	722	650	-72	916
gain	PD	PUREX NCRW Sludge (TRU)	CX70	Dilute, Complexed (mixture) Hot-Semiworks TRU	241-AW-105	Tank	3/1/1988 0:00	3/30/1988 0:00	241	267	26	946

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
				Solids								
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	3/1/1988 0:00	3/30/1988 0:00	650	654	4	920
transfer	DN	Dilute Non-Complexed	241-AW-105	Tank	241-AW-102	Tank	3/15/1988 0:00	3/30/1988 0:00	654	426	-228	718
gain	PD	PUREX NCRW Sludge (TRU)	CX70	Dilute, Complexed (mixture) Hot-Semiworks TRU Solids	241-AW-105	Tank	4/1/1988 0:00	4/30/1988 0:00	267	315	48	781
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	4/1/1988 0:00	4/1/1988 0:00	426	441	15	733
transfer	DN	Dilute Non-Complexed	241-AW-105	Tank	241-AW-102	Tank	4/15/1988 0:00	4/15/1988 0:00	441	166	-275	506
gain	PD	PUREX NCRW Sludge (TRU)	CX70	Dilute, Complexed (mixture) Hot-Semiworks TRU Solids	241-AW-105	Tank	5/1/1988 0:00	5/30/1988 0:00	315	322	7	513
gain	DN	Dilute Non-Complexed	PDL87	PUREX Decladding Supernate, 1987	241-AW-105	Tank	5/1/1988 0:00	5/30/1988 0:00	166	178	12	528
gain	PD	PUREX NCRW Sludge (TRU)	PDS87	PUREX Decladding Sludge	241-AW-105	Tank	5/1/1988 0:00	5/30/1988 0:00	322	325	3	516
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	5/1/1988 0:00	5/1/1988 0:00	178	192	14	542

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
gain	PD	PUREX NCRW Sludge (TRU)	CX70	Dilute, Complexed (mixture) Hot-Semiworks TRU Solids	241-AW-105	Tank	6/1/1988 0:00	6/30/1988 0:00	327	329	2	546
gain	DN	Dilute Non-Complexed	PDL87	PUREX Decladding Supernate, 1987	241-AW-105	Tank	6/1/1988 0:00	6/30/1988 0:00	199	213	14	567
gain	PD	PUREX NCRW Sludge (TRU)	PDS87	PUREX Decladding Sludge	241-AW-105	Tank	6/1/1988 0:00	6/30/1988 0:00	325	327	2	544
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	6/1/1988 0:00	6/30/1988 0:00	192	199	7	553
gain	PD	PUREX NCRW Sludge (TRU)	CX70	Dilute, Complexed (mixture) Hot-Semiworks TRU Solids	241-AW-105	Tank	7/1/1988 0:00	7/30/1988 0:00	329	331	2	569
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	7/1/1988 0:00	7/30/1988 0:00	213	233	20	589
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	8/1/1988 0:00	8/30/1988 0:00	233	238	5	594
gain	DN	Dilute Non-Complexed	PML89	PUREX Spent Metathesis Liquid After FY89	241-AW-105	Tank	9/1/1988 0:00	9/30/1988 0:00	254	313	59	669
gain	PD	PUREX NCRW Sludge (TRU)	PMS89	PUREX Spent Metathesis Solids After FY89	241-AW-105	Tank	9/1/1988 0:00	9/30/1988 0:00	331	341	10	679
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous	241-AW-105	Tank	9/1/1988 0:00	9/30/1988 0:00	238	254	16	610

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
				Sources								
gain	DN	Dilute Non-Complexed	PML89	PUREX Spent Metathesis Liquid After FY89	241-AW-105	Tank	10/1/1988 0:00	10/30/1988 0:00	313	354	41	720
gain	PD	PUREX NCRW Sludge (TRU)	PMS89	PUREX Spent Metathesis Solids After FY89	241-AW-105	Tank	10/1/1988 0:00	10/30/1988 0:00	341	348	7	740
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	10/1/1988 0:00	10/30/1988 0:00	354	367	13	733
gain	DN	Dilute Non-Complexed	PML89	PUREX Spent Metathesis Liquid After FY89	241-AW-105	Tank	11/1/1988 0:00	11/30/1988 0:00	367	415	48	788
gain	PD	PUREX NCRW Sludge (TRU)	PMS89	PUREX Spent Metathesis Solids After FY89	241-AW-105	Tank	11/1/1988 0:00	11/30/1988 0:00	348	356	8	796
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	11/1/1988 0:00	11/30/1988 0:00	415	425	10	806
gain	DN	Dilute Non-Complexed	PML89	PUREX Spent Metathesis Liquid After FY89	241-AW-105	Tank	12/1/1988 0:00	12/30/1988 0:00	429	447	18	828
gain	PD	PUREX NCRW Sludge (TRU)	PMS89	PUREX Spent Metathesis Solids After FY89	241-AW-105	Tank	12/1/1988 0:00	12/30/1988 0:00	356	359	3	831
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	12/1/1988 0:00	12/30/1988 0:00	425	429	4	810
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface	4/1/1989 0:00	4/30/1989 0:00	447	444	-3	828

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
						Change, Instrument, etc.)						
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	5/1/1989 0:00	5/30/1989 0:00	444	441	-3	825
gain	DN	Dilute Non-Complexed	UNKN	Gain Due To Gas, Surface Change, Instrument, Etc.	241-AW-105	Tank	6/1/1989 0:00	6/30/1989 0:00	441	444	3	828
gain	DN	Dilute Non-Complexed	PML89	PUREX Spent Metathesis Liquid After FY89	241-AW-105	Tank	7/1/1989 0:00	7/30/1989 0:00	444	445	1	833
gain	PD	PUREX NCRW Sludge (TRU)	PMS89	PUREX Spent Metathesis Solids After FY89	241-AW-105	Tank	7/1/1989 0:00	7/30/1989 0:00	359	363	4	832
gain	DN	Dilute Non-Complexed	UNKN	Gain Due To Gas, Surface Change, Instrument, Etc.	241-AW-105	Tank	11/1/1989 0:00	11/30/1989 0:00	445	448	3	836
gain	DN	Dilute Non-Complexed	PML89	PUREX Spent Metathesis Liquid After FY89	241-AW-105	Tank	12/1/1989 0:00	12/30/1989 0:00	448	490	42	878
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	12/1/1989 0:00	12/30/1989 0:00	490	495	5	883
gain	DN	Dilute Non-Complexed	PML89	PUREX Spent Metathesis Liquid After FY89	241-AW-105	Tank	1/1/1990 0:00	1/30/1990 0:00	495	500	5	888

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
gain	DN	Dilute Non-Complexed	PML89	PUREX Spent Metatheais Liquid After FY89	241-AW-105	Tank	2/2/1990 0:00	2/28/1990 0:00	500	509	9	897
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	2/2/1990 0:00	2/28/1990 0:00	509	517	8	905
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	4/1/1990 0:00	4/30/1990 0:00	517	514	-3	902
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	6/1/1990 0:00	6/30/1990 0:00	514	511	-3	899
gain	DN	Dilute Non-Complexed	UNKN	Gain Due To Gas, Surface Change, Instrument, Etc.	241-AW-105	Tank	7/1/1990 0:00	7/30/1990 0:00	511	517	6	905
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	9/1/1990 0:00	9/30/1990 0:00	517	514	-3	902
gain	DN	Dilute Non-Complexed	UNKN	Gain Due To Gas, Surface Change, Instrument, Etc.	241-AW-105	Tank	10/1/1990 0:00	10/31/1990 0:00	514	517	3	905

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	12/1/1990 0:00	12/31/1990 0:00	517	514	-3	902
gain	DN	Dilute Non-Complexed	UNKN	Gain Due To Gas, Surface Change, Instrument, Etc.	241-AW-105	Tank	8/1/1991 0:00	8/31/1991 0:00	514	517	3	905
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	9/1/1991 0:00	9/30/1991 0:00	517	514	-3	902
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	1/1/1992 0:00	1/31/1992 0:00	514	513	-1	901
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	3/1/1992 0:00	3/31/1992 0:00	513	511	-2	899
gain	DN	Dilute Non-Complexed	UNKN	Gain Due To Gas, Surface Change,	241-AW-105	Tank	4/1/1992 0:00	4/30/1992 0:00	511	512	1	900

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
				Instrument, Etc.								
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	7/29/1992 0:00	7/29/1992 0:00	512	518	6	906
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	8/26/1992 0:00	8/26/1992 0:00	518	523	5	911
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	9/10/1992 0:00	9/30/1992 0:00	523	547	24	935
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	10/29/1992 0:00	10/30/1992 0:00	547	552	5	940
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	11/14/1992 0:00	11/14/1992 0:00	552	557	5	945

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	12/11/1992 0:00	12/30/1992 0:00	557	570	13	958
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	1/16/1993 0:00	1/16/1993 0:00	570	575	5	963
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	2/1/1993 0:00	2/27/1993 0:00	575	589	14	977
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	3/6/1993 0:00	3/18/1993 0:00	589	598	9	986
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	4/1/1993 0:00	4/30/1993 0:00	598	595	-3	983

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	5/1/1993 0:00	5/31/1993 0:00	595	593	-2	981
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	5/10/1993 0:00	5/21/1993 0:00	593	606	13	994
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	6/1/1993 0:00	6/30/1993 0:00	606	605	-1	993
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	6/28/1993 0:00	6/28/1993 0:00	605	610	5	998
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	7/31/1993 0:00	7/31/1993 0:00	610	614	4	1002

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
gain	DN	Dilute Non-Complexed	UNKN	Gain Due To Gas, Surface Change, Instrument, Etc.	241-AW-105	Tank	10/1/1993 0:00	10/31/1993 0:00	614	615	1	1003
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	10/20/1993 0:00	10/20/1993 0:00	615	622	7	1010
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	10/28/1993 0:00	10/28/1993 0:00	622	627	5	1015
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	11/2/1993 0:00	11/18/1993 0:00	627	649	22	1037
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	12/8/1993 0:00	12/8/1993 0:00	649	656	7	1044
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	INST	Loss due to Change of Instruments	3/31/1994 0:00	3/31/1994 0:00	656	652	-4	1040
gain	DN	Dilute Non-Complexed	INST	Change In Tank Level Due To Change In	241-AW-105	Tank	4/30/1994 0:00	4/30/1994 0:00	652	655	3	1043

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
				Instrumentation								
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	6/17/1994 0:00	6/17/1994 0:00	655	660	5	1048
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	8/21/1994 0:00	8/25/1994 0:00	660	669	9	1057
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	9/1/1994 0:00	9/20/1994 0:00	669	687	18	1075
evaporation	PD	PUREX NCRW Sludge (TRU)	DN100	Evaporation	241-AW-105	Tank	11/1/1994 0:00	11/1/1994 0:00	363	261	-102	973
evaporation	DN	Dilute Non-Complexed	DN100	Evaporation	241-AW-105	Tank	11/1/1994 0:00	11/1/1994 0:00	687	789	102	1075
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	11/11/1994 0:00	11/19/1994 0:00	791	807	16	1093
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous	241-AW-105	Tank	11/11/1994 0:00	11/19/1994 0:00	789	791	2	1077

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
				Sources								
transfer	DN	Dilute Non-Complexed	241-AW-105	Tank	241-AP-108	Tank	11/25/1994 0:00	11/30/1994 0:00	807	327	-480	613
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	12/1/1994 0:00	12/31/1994 0:00	327	325	-2	611
transfer	DN	Dilute Non-Complexed	241-AW-105	Tank	241-AP-108	Tank	12/1/1994 0:00	12/3/1994 0:00	325	41	-284	327
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	12/5/1994 0:00	12/23/1994 0:00	41	56	15	342
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	1/6/1995 0:00	1/31/1995 0:00	58	75	17	361
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	1/6/1995 0:00	1/31/1995 0:00	56	58	2	344
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr	241-AW-105	Tank	2/3/1995 0:00	2/28/1995 0:00	75	97	22	383

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
				Fuel)								
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	2/3/1995 0:00	2/28/1995 0:00	97	100	3	386
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	3/3/1995 0:00	3/25/1995 0:00	100	124	24	410
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	3/3/1995 0:00	3/25/1995 0:00	124	127	3	413
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	4/5/1995 0:00	4/25/1995 0:00	127	136	9	422
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	4/5/1995 0:00	4/25/1995 0:00	136	138	2	424
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	5/1/1995 0:00	5/31/1995 0:00	138	184	46	470
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	5/1/1995 0:00	5/31/1995 0:00	184	187	3	473

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	6/1/1995 0:00	6/30/1995 0:00	187	186	-1	472
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	6/7/1995 0:00	6/28/1995 0:00	186	286	100	572
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	6/7/1995 0:00	6/28/1995 0:00	286	288	2	574
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	7/1/1995 0:00	7/31/1995 0:00	288	287	-1	573
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	7/12/1995 0:00	7/29/1995 0:00	289	308	19	594
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	7/12/1995 0:00	7/29/1995 0:00	287	289	2	575

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	8/1/1995 0:00	8/31/1995 0:00	308	307	-1	593
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	8/16/1995 0:00	8/16/1995 0:00	307	311	4	597
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	9/13/1995 0:00	9/21/1995 0:00	312	325	13	611
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	9/13/1995 0:00	9/21/1995 0:00	311	312	1	598
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	10/1/1995 0:00	10/31/1995 0:00	325	324	-1	610
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc.	241-AW-105	Tank	10/16/1995 0:00	10/26/1995 0:00	325	336	11	622

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
				Streams (npr Fuel)								
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	10/16/1995 0:00	10/26/1995 0:00	324	325	1	611
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	11/1/1995 0:00	11/30/1995 0:00	336	333	-3	619
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	11/7/1995 0:00	11/22/1995 0:00	333	387	54	673
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	11/7/1995 0:00	11/22/1995 0:00	387	389	2	675
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	11/11/1995 0:00	11/11/1995 0:00	389	390	1	676
transfer	DN	Dilute Non-Complexed	241-AW-105	Tank	241-AP-104	Tank	11/13/1995 0:00	11/15/1995 0:00	390	60	-330	346
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument,	12/1/1995 0:00	12/31/1995 0:00	60	59	-1	345

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
						etc.)						
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	12/8/1995 0:00	12/28/1995 0:00	59	87	28	373
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	1/5/1996 0:00	1/30/1996 0:00	87	106	19	392
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	2/6/1996 0:00	2/27/1996 0:00	106	125	19	411
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	3/6/1996 0:00	3/27/1996 0:00	126	138	12	424
gain	DN	Dilute Non-Complexed	WATER	Flush Water From Miscellaneous Sources	241-AW-105	Tank	3/6/1996 0:00	3/27/1996 0:00	125	126	1	412

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	5/16/1996 0:00	5/16/1996 0:00	138	140	2	426
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	5/22/1996 0:00	5/22/1996 0:00	140	145	5	431
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	6/1/1996 0:00	6/30/1996 0:00	145	144	-1	430
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	6/19/1996 0:00	6/19/1996 0:00	144	149	5	435
gain	DN	Dilute Non-Complexed	PXMSC	Dilute, Non-Complexed Waste From PUREX Misc. Streams (npr Fuel)	241-AW-105	Tank	6/30/1996 0:00	6/30/1996 0:00	149	154	5	440

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	11/1/1996 0:00	11/30/1996 0:00	154	153	-1	439
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	2/1/1997 0:00	2/28/1997 0:00	153	152	-1	438
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	9/1/1997 0:00	9/30/1997 0:00	152	151	-1	437
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	11/1/1997 0:00	11/30/1997 0:00	151	150	-1	436
evaporation	DN	Dilute Non-Complexed	DN100	Evaporation	241-AW-105	Tank	3/1/1998 0:00	3/1/1998 0:00	150	156	6	436
evaporation	PD	PUREX NCRW Sludge (TRU)	DN100	Evaporation	241-AW-105	Tank	3/1/1998 0:00	3/1/1998 0:00	261	255	-6	430

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	INST	Loss due to Change of Instruments	4/15/1998 0:00	4/15/1998 0:00	156	154	-2	434
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	10/1/1998 0:00	10/31/1998 0:00	154	153	-1	433
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	12/1/1998 0:00	12/31/1998 0:00	153	152	-1	432
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	1/1/1999 0:00	1/31/1999 0:00	152	151	-1	431
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	3/1/1999 0:00	3/31/1999 0:00	151	150	-1	430

Table A-2. Tank 241-AW-105 Transfers January 1985 through December 2000

Transaction Type	Waste Type	Waste Type Description	Source	Source Description	Destination	Destination Description	Transfer Begin Date	Transfer End Date	Waste Type Start Volume kgal	Waste Type End Volume kgal	Transfer Volume kgal	Tank Volume kgal
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	9/1/1999 0:00	9/30/1999 0:00	150	149	-1	429
evaporation	SL	DSS/SST solids Sludge	DN100	Evaporation	241-AW-105	Tank	10/1/1999 0:00	10/1/1999 0:00	25	0	-25	404
evaporation	DN	Dilute Non-Complexed	DN100	Evaporation	241-AW-105	Tank	10/1/1999 0:00	10/1/1999 0:00	149	174	25	429
evaporation	SL	DSS/SST solids Sludge	SL100	Evaporation	241-AW-105	Tank	10/1/1999 0:00	10/1/1999 0:00	0	255	255	429
evaporation	PD	PUREX NCRW Sludge (TRU)	SL100	Evaporation	241-AW-105	Tank	10/1/1999 0:00	10/1/1999 0:00	255	0	-255	174
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	12/1/1999 0:00	12/31/1999 0:00	174	173	-1	428
loss	DN	Dilute Non-Complexed	241-AW-105	Tank	UNKN	Loss due to (Burp, Lance Evaporation, Surface Change, Instrument, etc.)	2/1/2000 0:00	2/29/2000 0:00	173	172	-1	427

Table A-3. Tank 241-AW-105 Transfers January 2001 through August 2004

Event Type	Waste Phase	Waste Designation	Waste Designation Description	Source	Destination	Reason	Start Date	End Date	Previous Waste Type Volume kgal	New Waste Type Volume kgal	Transfer Volume kgal	Tank Total Volume kgal	Comment
ADJ	Supernatant	DN	Super (DN) (Dilute Non-Complexed)	ADJ	241-AW-105	General Variance (+/-)	2/1/2001 0:00	2/28/2001 0:00	172	171	-1	426	
ADJ	Sludge	SL	Sludge Solid	ADJ	241-AW-105	General Variance (+/-)	2/1/2001 0:00	2/28/2001 0:00	255	255	0	426	
ADJ	Supernatant	DN	Super (DN) (Dilute Non-Complexed)	ADJ	241-AW-105	Rebaseline	1/1/2001 0:00	1/1/2001 0:00	0	172	172	427	
ADJ	Sludge	SL	Sludge Solid	ADJ	241-AW-105	Rebaseline	1/1/2001 0:00	1/1/2001 0:00	0	255	255	427	
ADJ	Supernatant	DN	Super (DN) (Dilute Non-Complexed)	ADJ	241-AW-105	General Variance (+/-)	1/1/2002 0:00	1/31/2002 0:00	171	170	-1	425	
ADJ	Sludge	SL	Sludge Solid	ADJ	241-AW-105	General Variance (+/-)	1/1/2002 0:00	1/31/2002 0:00	255	255	0	425	
ADJ	Supernatant	DN	Super (DN) (Dilute Non-Complexed)	ADJ	241-AW-105	Analysis (+/-)	3/1/2002 0:00	3/1/2002 0:00	170	162	-8	425	Sludge volume 255 Kgal to 263 Kgal per BBI review.
ADJ	Sludge	SL	Sludge Solid	ADJ	241-AW-105	Analysis (+/-)	3/1/2002 0:00	3/1/2002 0:00	255	263	8	425	Sludge volume 255 Kgal to 263 Kgal per BBI review.
ADJ	Supernatant	DN	Super (DN) (Dilute Non-Complexed)	ADJ	241-AW-105	General Variance (+/-)	5/1/2002 0:00	5/30/2002 0:00	162	161	-1	424	
ADJ	Sludge	SL	Sludge Solid	ADJ	241-AW-105	General Variance (+/-)	5/1/2002 0:00	5/30/2002 0:00	263	263	0	424	
ADJ	Supernatant	DN	Super (DN) (Dilute Non-Complexed)	ADJ	241-AW-105	General Variance (+/-)	1/31/2003 0:00	1/31/2003 0:00	161	160	-1	423	
ADJ	Sludge	SL	Sludge Solid	ADJ	241-AW-105	General Variance (+/-)	1/31/2003 0:00	1/31/2003 0:00	263	263	0	423	
ADJ	Supernatant	DN	Super (DN) (Dilute Non-Complexed)	ADJ	241-AW-105	General Variance (+/-)	2/1/2003 0:00	2/28/2003 0:00	160	159	-1	422	
ADJ	Sludge	SL	Sludge Solid	ADJ	241-AW-105	General Variance (+/-)	2/1/2003 0:00	2/28/2003 0:00	263	263	0	422	
ADJ	Sludge	SL	Sludge Solid	ADJ	241-AW-105	General Variance (+/-)	12/1/2003 0:00	12/31/2003 0:00	263	263	0	421	

Table A-3. Tank 241-AW-105 Transfers January 2001 through August 2004

Event Type	Waste Phase	Waste Designation	Waste Designation Description	Source	Destination	Reason	Start Date	End Date	Previous Waste Type Volume kgal	New Waste Type Volume kgal	Transfer Volume kgal	Tank Total Volume kgal	Comment
ADJ	Supernatant	DN	Super (DN) (Dilute Non-Complexed)	ADJ	241-AW-105	General Variance (+/-)	12/1/2003 0:00	12/31/2003 0:00	159	158	-1	421	
ADJ	Supernatant	DN	Super (DN) (Dilute Non-Complexed)	ADJ	241-AW-105	Analysis (+/-)	4/1/2004 0:00	4/1/2004 0:00	158	158	0	421	BBI FY04 Q3 Update, DN not changed to 157 because of rounding
ADJ	Sludge	SL	Sludge Solid	ADJ	241-AW-105	Analysis (+/-)	4/1/2004 0:00	4/1/2004 0:00	263	190	-73	421	BBI FY04 Q3 Update, DN not changed to 157 because of rounding
ADJ	Sludge	IS	Sludge Interstitial (IS)	ADJ	241-AW-105	Analysis (+/-)	4/1/2004 0:00	4/1/2004 0:00	0	73	73	421	BBI FY04 Q3 Update, DN not changed to 157 because of rounding

APPENDIX B

SURVEILLANCE ANALYSIS COMPUTER SYSTEM (SACS)

SURFACE LEVEL MEASUREMENTS FOR TANK 241-AW-105

B.1 SURFACE LEVEL MEASUREMENTS

From July 1980 to the present, the surface level of the waste stored in tank 241-AW-105 was either manually measured or measured with an automated instrument. The waste surface level measurements were recorded in the Surveillance Analysis Computer System (SACS). The SACS measurements of the waste surface level can be accessed through the Tank Waste Information Network System (TWINS) database at the following web addresses:

http://twins.pnl.gov/data/getLookupFields3.exe?table=twins_catalog.dbo.lp_Retrieve_SACS_SL&whatsnew=Measurements

The surface level measurements for the waste stored in tank 241-AW-105 were downloaded from the TWINS database on August 19, 2004. The surface level measurements for the waste stored in tank 241-AW-105 are plotted in Appendix B for July 1980 through August 18, 2004. The waste transfer records in Appendices A are consistent with waste surface level measurements in Appendix B.

Figure B-1.

Tank 241-AW-105 Waste Surface Level July 1980 - June 1984

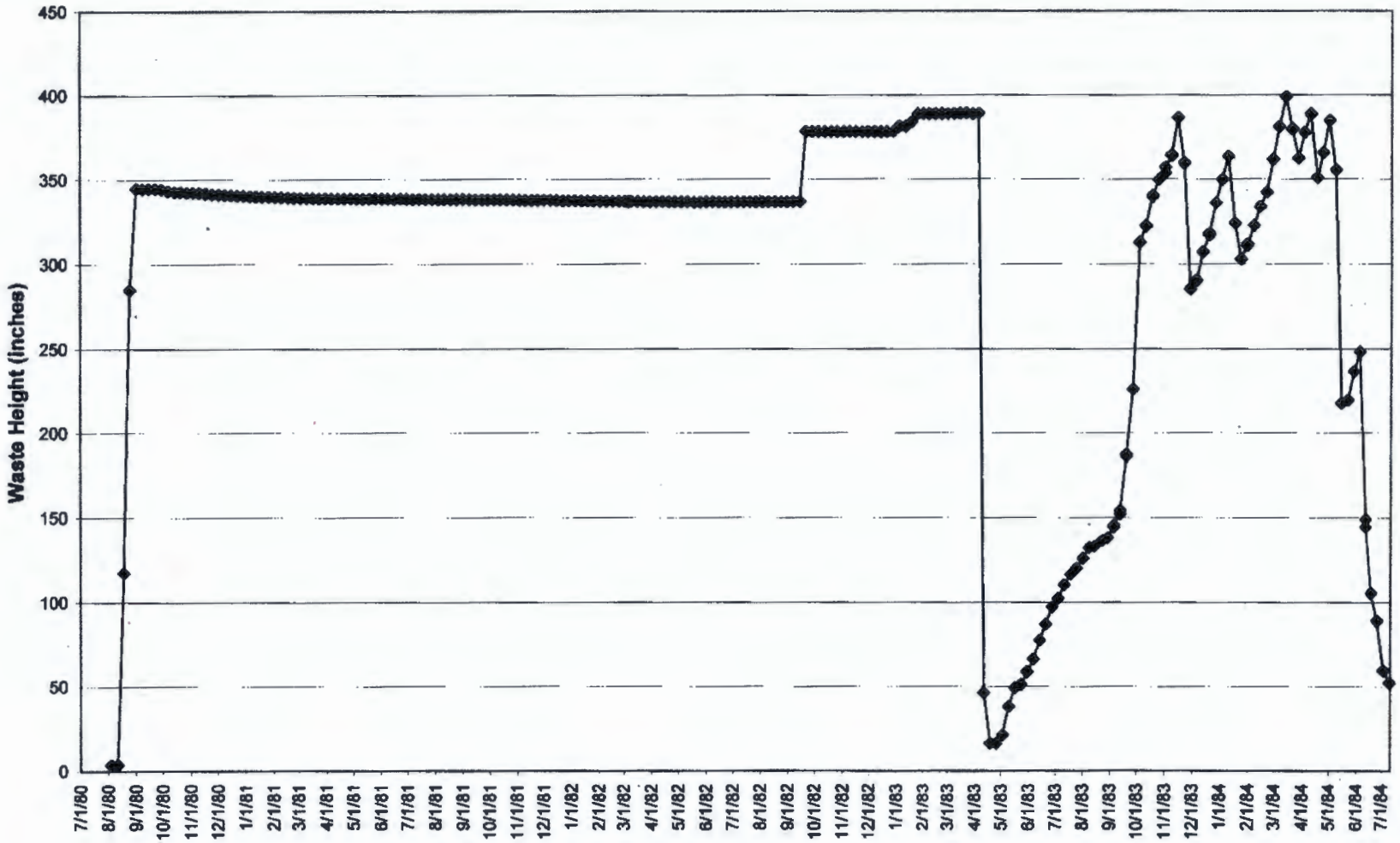


Figure B-2.

Tank 241-AW-105 Waste Surface Level July 1984 - December 1989

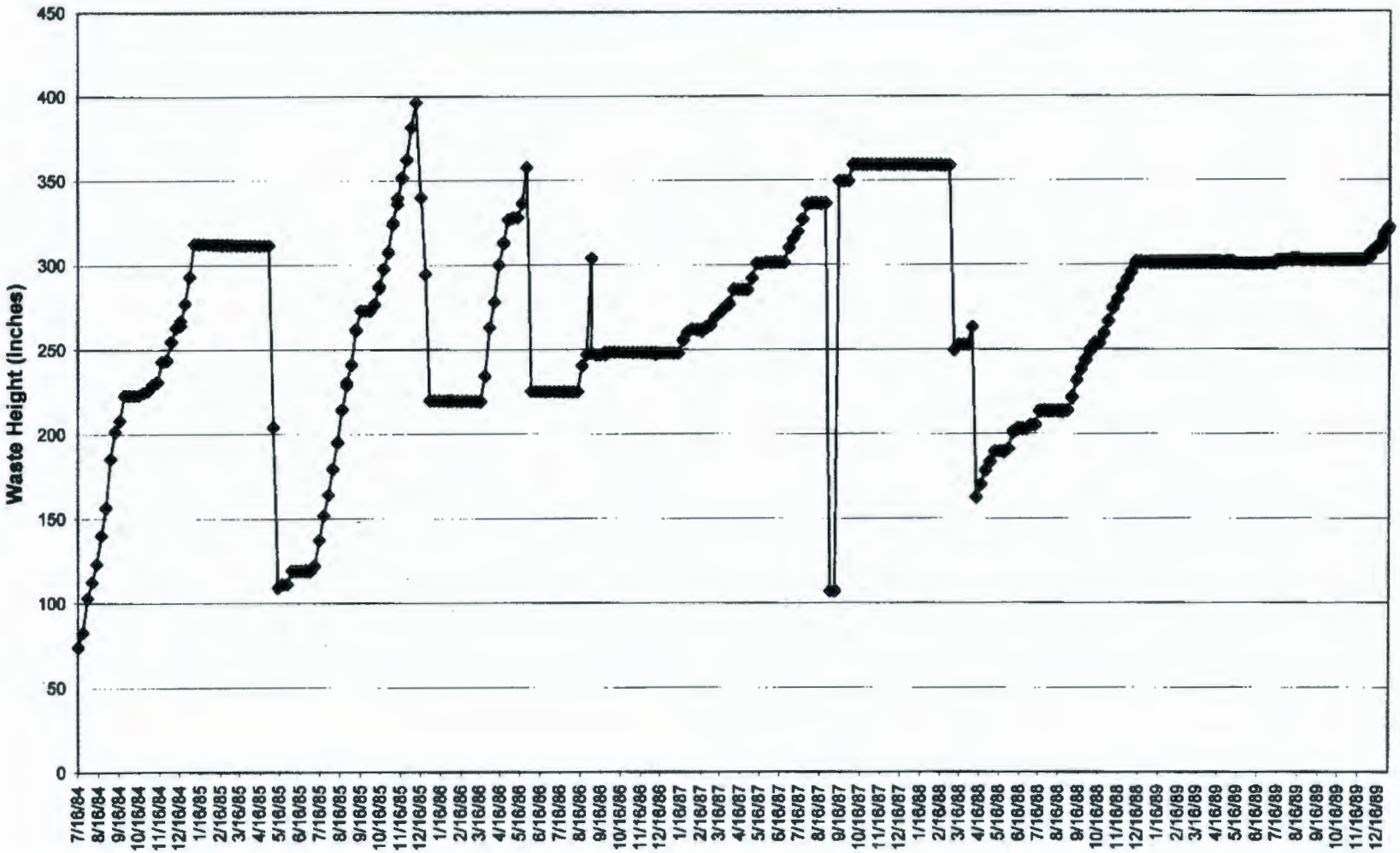


Figure B-3.

Tank 241-AW-105 Waste Surface Level January 1990 - December 1994

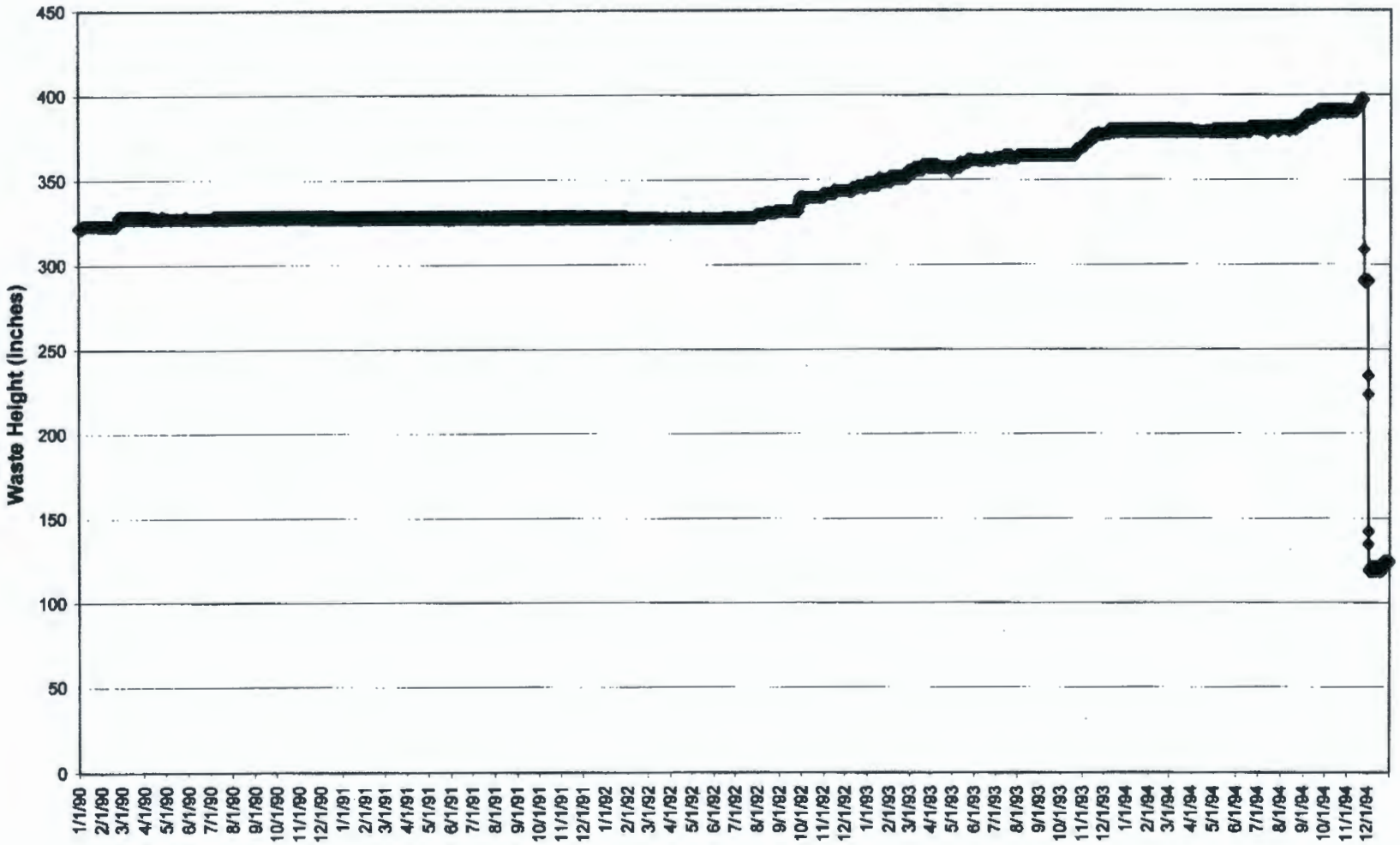
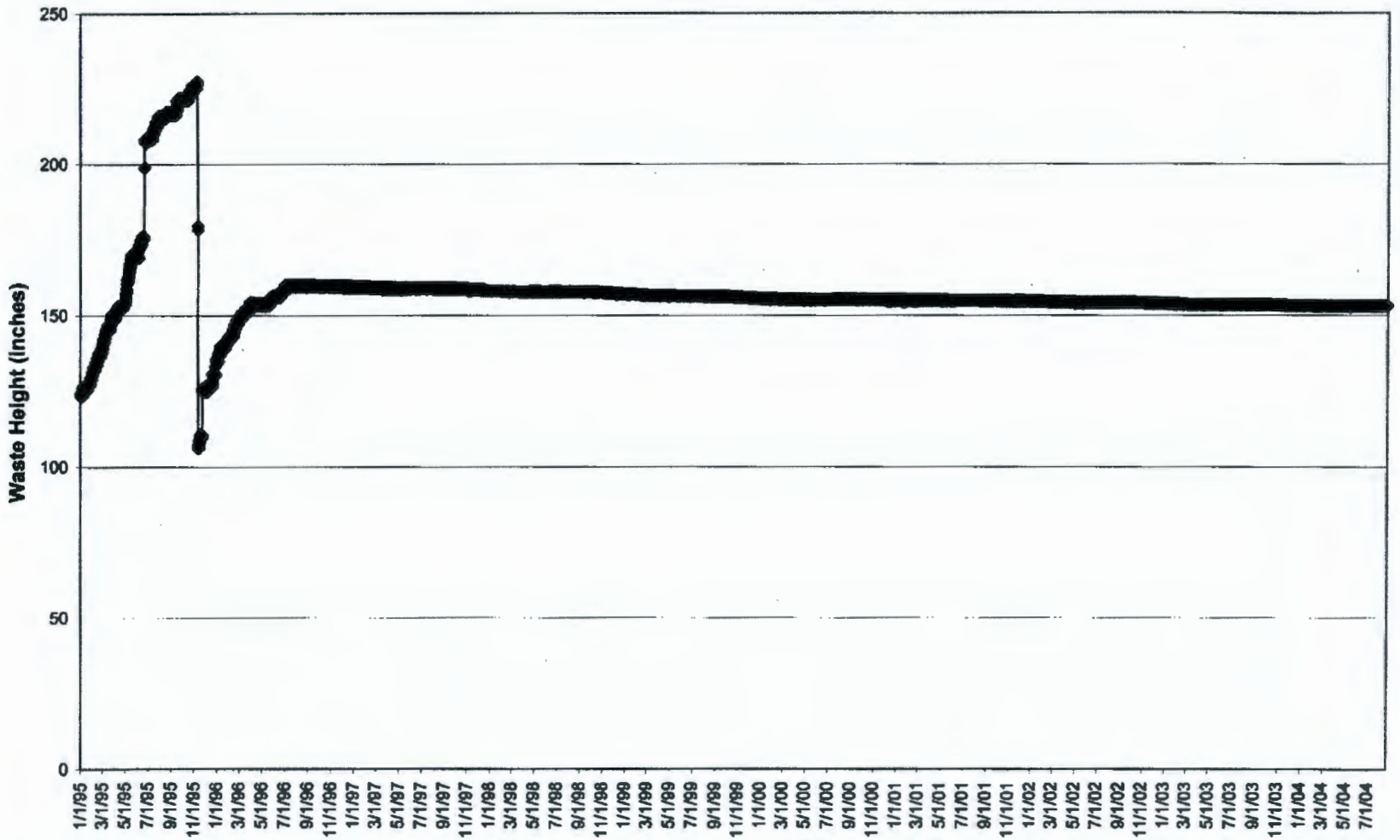


Figure B-4.

Tank 241-AW-105 Waste Surface Level January 1995 - August 2004