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TITLE

Radioactive Contamination in Liquid Wastes Discharged to Ground at Separations Facilities Through December 1956

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RADIOACTIVE CONTAMINATION IN LIQUID WASTES
DISCHARGED TO GROUND AT SEPARATIONS FACILITIES
THROUGH DECEMBER, 1956

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INTRODUCTION

This document summarizes the amounts of radioactive contamination discharged to ground from separation facilities through December, 1956. Detailed data for individual disposal sites is presented on a month to month basis for the period of July through December, 1956. Previous publications (HW-28121⁽¹⁾, HW-33591⁽²⁾, HW-38562⁽³⁾, and HW-44784⁽⁴⁾) of this series may be referred to for specific information on measurements and radioactivity totals prior to July, 1956.

Tables I and II list the major disposal sites in separation facilities, total volume of waste discharged to each location, and the gross amounts of plutonium and beta particle emitters discharged to ground since startup. Tables III through XXXVI present this same data on a month to month basis and also include information on the source of the waste stream and the settling facility used. Isotopic data are included for all disposal sites from which the waste was analyzed for specific contaminants. Estimates of contamination and volumes discharged to the swamps are also included.

ABSTRACTSwamps

Open waste disposal sites at the separation areas have received approximately 9.15×10^{10} liters since startup. Approximately 1770 curies of fission products and 63 grams of plutonium were contained in this waste.

Other Disposal Sites

Exclusive of large volume open waste disposal sites, the estimated volume of waste discharged to ground since startup was 9.92×10^9 liters. Included in this is over 2,190,000 curies of fission products and 24.7 kilograms of plutonium.

The largest single contributor during the last six months of 1956 was the waste scavenging program from which 434,000 curies of fission products was discharged to ground. Another source contributing appreciably was the Redox D-1 and D-2 discharging an estimated 79,200 curies to the 216-S-7 cribs.

TABLE I

SUMMARY OF RADIOACTIVE WASTES DISCHARGED TO
MAJOR DISPOSAL SITES IN THE 200 EAST AREA THROUGH DECEMBER, 1956

Disposal Facility	Volume in Liters	Plutonium in grams	Beta Particle Emitters in curies
<u>"A" Facility</u>			
216-A-2 crib	1.65×10^4	53.0	0.004
216-A-3 crib	1.74×10^5	0.41	37.1
216-A-4 crib	2.07×10^6	82.5	15.5
216-A-5 crib	2.61×10^8	31.7	73.4
216-A-6 crib	3.43×10^8	11.2	10.0
216-A-7 crib	8.00×10^4	-	1.7
216-A-8 crib	5.85×10^8	47.0	136.0
216-A-9 crib	7.01×10^8	-	-
216-A-10 crib	2.34×10^8	-	-
<u>"B" Facility</u>			
5-6 crib*	3.60×10^7	174.0	7,800.0
216-BC cribs	3.06×10^7	44.7	430,000.0
216-BC trenches	3.47×10^7	19.0	375,000.0
216-BX trenches	1.48×10^7	5.66	15,800.0
216-BY cribs	3.38×10^7	60.9	409,000.0
216-ER cribs	3.70×10^8	366.0	2,510.0
241-B-1 and 2 cribs	4.46×10^7	4,260.0	5,350.0
241-B-3 crib	2.72×10^7	29.0	710.0
241-B-361 Reverse well	3.06×10^7	4,280.0	3,800.0
242-B-1 and 2 cribs	2.96×10^7	3.73	38.9
"B" Swamp (Includes Purex swamp)	2.39×10^{10}	3.13	13.2
<u>"C" Facility</u>			
216-C-1 crib	3.24×10^7	8.20	11,400.0
216-C-4 crib	3.46×10^4	1.39	112.0
216-C-5 crib	3.89×10^4	-	93.9
216-C-6 crib	6.18×10^3	0.051	4.44
200 East Area (excluding swamp)	2.81×10^9	9,480.0	1,260,000.0

*Alternate nomenclature - 241-B-361 crib

TABLE II

SUMMARY OF RADIOACTIVE WASTES DISCHARGED TO
MAJOR DISPOSAL SITES IN THE 200 WEST AREA THROUGH DECEMBER, 1956

Disposal Facility	Volume in Liters	Plutonium in grams	Beta Particle Emitters in curies
<u>"S" Facility</u>			
216-S-1 and 2 cribs	1.52×10^8	1,180.0	753,000.0
216-S-3 crib	4.21×10^6	0.370	267.0
216-S-5 crib	4.03×10^9	580.0	959.0
216-S-6 crib	1.98×10^9	409.0	530.0
216-S-7 crib	5.38×10^7	154.0	79,200.0
216-SI-1 and 2 cribs	6.68×10^7	90.9	437.0
216-SX-1 crib	8.44×10^6	35.8	56.1
276-S crib	3.32×10^6	2.30	9.94
222-S swamp	1.93×10^8	18.0	10.7
"S" swamp #1	6.35×10^9	3.27	1,050.0
<u>"T" Facility</u>			
216-TY-1 crib	1.11×10^7	58.6	28,800.0
241-T-1 and 2 cribs	2.90×10^7	3,720.0	1,500.0
241-T-3 crib	1.07×10^8	131.0	3,090.0
241-T trenches	6.50×10^6	178.0	3,430.0
241-T-17 crib*	9.68×10^5	1.43	840.0
241-T-361A Reverse well	1.13×10^7	3,350.0	2,800.0
241-TX trenches	8.02×10^6	7.10	33,500.0
241-TX-153 crib	4.56×10^7	14.2	2,040.0
361-T-1 and 2 cribs	4.50×10^7	392.0	17,800.0
"T" swamp	3.10×10^{10}	2.15	111.0
<u>"U" Facility</u>			
216-U-3 crib	7.88×10^5	0.04	0.42
216-WR-1, 2 and 3 cribs	3.34×10^8	365.0	2,470.0
222-U dry well	1.57×10^2	0.101	0.205
361-WR cribs	9.31×10^6	38.3	947.0
"U" swamp	3.01×10^{10}	36.3	581.0
<u>"Z" Facility</u>			
216-Z-10 crib	7.11×10^5	2,090.0	-
231 - 1 and 2 cribs	3.08×10^7	340.0	-
231-W trench	4.17×10^7	479.0	-
231-W-150 reverse well	1.00×10^6	50.0	-
234-5, 1 and 2 cribs & culvert	1.28×10^8	1,570.0	-
200 West Area (excluding swamps)	7.11×10^9	15,200.0	932,000.0

*Alternate nomenclature - 216-U-10 crib

TABLE III

Disposal Site : 216-A-3 crib

Waste Stream : Silica gel waste from 203-A from March, 1952 to date

Settling Facility: None

Period	Volume in Liters $N \times 10^6$	Uranium in kg	Plutonium in grams	Units in Curies			
				Beta Particle Emitters	Cs	Sr	Ru
July, 1956	0.009	-	-	-	-	-	-
August	0.0095	-	-	-	-	-	-
September	0.0095	0.19	-	0.3	0.00225	0.015	-
October	0.018	14.5	0.26	0.525	0.0038	0.004	0.0576
November	0.009	3.81	0.05	0.017	-	-	-
December	0.009	-	-	No analyses	-	-	-
6-Month Total	0.064	18.5	0.31	0.842	0.00605	0.019	0.0576
Previous Total	0.110	9.55	0.10	36.3	-	-	-
Total To Date	0.174	28.1	0.41	37.1	0.00605	0.019	0.0576

TABLE IV

Disposal Site: 216-A-4 crib

Waste Stream: Lab, cell, and drain waste from 202-A from December, 1955, to date.

Settling Facility: None

	Volume in Liters	Uranium	Plutonium	Beta Particle Emitters
Period	Units of 10^6	Units of kg.	Units of Grams	Units of Curies
July, 1956	0.168	1.1	1.0	0.005
August	0.0995	1.4	3.5	-
September	0.17	0.57	3.0	0.05
October	0.13	3.22	2.6	4.1
November	0.121	5.45	4.0	0.035
December	0.126	2.82	9.0	0.32
6-month total	0.815	14.6	23.1	4.52
Prev. Total	1.26	299.0	59.4	11.0
Total to Date	2.07	314.0	82.5	15.5

TABLE V

Disposal Site: 216-A-5 crib.

Waste Stream: Process Condensate from 202-A from November, 1955, to date.

Settling Facility: None

	Volume in Liters	Uranium	Plutonium	Beta Particle Emitters
Period	Units of 10^6	Units of kg	Units of Grams	Units of Curies
July, 1956	0.170	9.9	2.8	12.0
August	22.8	13.0	3.5	1.5
September	22.7	13.2	7.45	7.95
October	20.4	25.0	3.3	6.5
November	23.9	13.6	2.7	1.5
December	22.2	5.90	2.2	0.67
6-month total	112.0	80.6	22.0	30.1
Prev. Total	149.0	91.9	9.74	43.3
Total to Date	261.0	173.0	31.7	73.4

TABLE VI

Disposal Site: 216-A-6 crib.

Waste Stream: Coil and Jacket Steam Condensate from 202-A from November, 1955, to date.

Settling Facility: None.

	Volume in Liters	Uranium	Plutonium	Beta Particle Emitters
Period	Units of 10^6	Units of kg	Units of Grams	Units of Curies
July, 1956	24.2	-	-	-
August	28.2	-	-	-
September	56.7	-	-	-
October	46.3	55.4	0.34	8.8
November	26.3	0.0545	6.0	0.13
December	24.5	6.36	1.6	0.04
6-month total	206.0	61.8	7.9	8.97
Prev. Total	137.0	30.8	3.28	1.03
Total to Date	343.0	92.6	11.2	10.0

TABLE VII

Disposal Site: 216-A-7 crib.

Waste Stream: 152-A Diversion Box Drain from November, 1955, to date.

Settling Facility: None

Period	Volume in Liters	Uranium	Plutonium	Beta Particle Emitters
	Units of 10^6	Units of kg	Units of Grams	Units of Curies
July, 1956	0.004	-	-	-
August	0	-	-	-
September	0	-	-	-
October	0.0056	0.953	-	1.7
November	0	-	-	-
December	0.004	-	-	-
6-Month Total	0.0136	0.953	-	1.7
Prev. Total	0.0664	30.0	-	-
Total to Date	0.0800	31.0	-	1.7

TABLE VIII

Disposal Site: 216-A-8 crib.

Waste Stream: Tank Farm Condensate and Cooling Water from November, 1955, to date.

Settling Facility: None

	Volume in Liters	Uranium	Plutonium	Beta Particle Emitters
Period	Units of 10 ⁶	Units of kg	Units of Grams	Units of Curies
July, 1956	74.5	43.0	11.0	4.74
August	56.8	33.0	5.5	1.8
September	87.0	51.0	5.7	36.0
October	27.6	33.1	2.0	14.1
November	11.1	8.63	7.25	1.9
December	19.8	5.0	1.7	30.0
6-Month Total	277.0	174.0	33.2	88.5
Prev. Total	308.0	160.0	13.8	47.0
Total to Date	585.0	334.0	47.0	136.0

TABLE IX

Disposal Site: 216-A-9 crib.

Waste Stream: Acid Recovery Condensate and Cooling Water

Settling Facility: None.

	Volume in Liters	Uranium	Plutonium	Beta Particle Emitters
Period	Units of 10^6	Units of kg	Units of Grams	Units of Curies
July, 1956	84.5	-	-	-
August	132.0	-	-	-
September	76.0	-	-	-
6-Month Total	293.0	-	-	-
Prev. Total	408.0	-	-	-
Total to Date	701.0	-	-	-

TABLE X

Disposal Site : 216-BC cribs

Waste Stream : TBP Building scavenged wastes

Settling Facility: Tanks as indicated

Disposal Site	Date Emptied	Tank No.	Volume N x 10 ⁶ Liters	Pu grams	U kg	Units in Curies									pH
						Total Beta	Cs	Sr	Co	Ru	Sb	Ce	R.E.	ZrNb	
216-BC-3	Aug. '56	31-111-BY	1.94	0.52	219.	26,800.	544.	605.	-	1,910.	723.	1,790.	872.	328.	9.6
Previous Total			23.6	61.2	656.	264,000.	615.	713.	-	95,800.	8860.	17,300.	4360.	8410.	
Total to Date			25.5	61.7	875.	291,000.	1160.	1320.	-	97,700.	9380.	19,100.	5230.	8740.	

TABLE XI

Disposal Site: 216-BC Cribs.

Waste Stream: In-Farm scavenged wastes.

Settling Facility: Tanks as indicated.

Disp. Site	Date Emptied	Tank No.	Vol. $\times 10^6$ l	Pu grams	U kg	Total Beta	Guries								pH
							Cs	Sr	Co	Ru	Sb	Ce	R.E.	ZrNb	
216-BC-3	Aug., '56	6-112-105C	1.69	0.065	28.3	2320	32.6	36.6	-	1120.	473.	80.3	80.3	433.	9.3
Prev. Totals	-	-	3.36	5.75	131.0	2010	218.0	156.0	-	229.	1290.	56.1	438.0	142.	
Total to Date	-	-	5.05	5.82	159.0	4330	251.0	193.0	-	1350.	1760.	136.0	518.0	575.	

TABLE XII

216-BC CRIBS

(Summary of all Wastes)

Disposal Site	Date Last Used	Volume N x 10 ⁶ Liters	Pu grams	U kg	Units of Curies								
					Total Beta	Cs	Sr	Ru	Sb	Ce.	R.E.	ZrNb	Co
216-BC-1	Feb. '56	8.65	23.7	229.	134,000	241.	396.	59,000.	4980.	11,800.	2930.	6410.	-
216-BC-2	May '56	4.48	2.54	111.	55,000	62.3	77.5	17,500.	1160.	2,420.	494.	721.	-
216-BC-3	Aug. '56	5.60	7.08	323.	53,900	639.	699.	12,300.	1740.	3,100.	1260	1200.	-
216-BC-4	Jan. '56	3.36	5.75	131.	2,010	218.	156.	229.	1290.	56.1	438	142.	-
216-BC-5	Apr. '56	8.54	5.66	242.	50,900	249.	182.	18,900.	1970.	1,850.	626.	839.	-
Total to Date		30.6	44.7	1040.	430,000	1410.	1510.	108,000.	11,100.	19,300.	5750.	9310.	-

TABLE XIII

Disposal Site: 216-BC TRENCHES

Waste Stream: TBP Building Scavenged Wastes

Settling Facility: Tanks as Indicated

Disp. Site	Date Emptied	Tank No.	Vol. ⁶ Nx10 Liters	Pu Grams	U kg.	Curies								pH.	
						Total Beta	Cs	Sr	Co	Ru	Sb	Ce	R.E.		ZrNb
216-BC-7	Aug. '56	41-110-BY	1.83	0.35	76.7	12,100	586.	305.	1.21	4,840	319.	345.	566.	363.	9.9
216-BC-8	Sept.	42-106-BY	2.04	3.14	164.	19,800	162.	318.	1.08	8,030	555.	700.	663.	507.	9.3
216-BC-8	Sept.	43-107-BY	1.95	3.02	157.	19,000	155.	305.	1.03	7,700	533.	672.	636.	486.	9.3
216-BC-9	Oct.	44-108-BY	1.92	0.74	94.7	37,700	18.3	163.	1.82	1,940	351.	2,390.	112.	1,080.	9.7
216-BC-9	Oct.	45-110-BY	0.979	0.38	48.2	19,200	9.32	82.9	0.93	989	179.	1,210.	57.0	549.	9.7
216-BC-10	Oct.	45-110-BY	0.888	0.24	17.1	9,090	22.1	28.2	1.60	3,360	223.	296.	79.9	233.	10.0
216-BC-10	Oct.	46-106-BY	1.83	0.50	35.2	18,700	45.5	58.1	3.29	6,920	460.	610.	165.	479.	10.0
216-BC-11	Oct.	46-106-BY	0.312	0.08	5.99	3,190	7.76	9.90	0.56	1,180	78.4	104.	28.1	81.7	10.0
216-BC-11	Nov.	47-107-BY	2.23	2.58	64.2	33,300	58.9	82.4	1.18	14,100	754.	141.	224.	424.	9.1
216-BC-11	Nov.	48-108-BY	2.04	2.36	58.7	30,500	53.9	75.5	1.08	12,900	690.	129.	205.	388.	9.1
216-BC-11	Nov.	40-108-BY	0.291	0.34	8.4	4,350	7.70	10.8	0.15	1,840	98.6	18.5	29.3	55.4	9.1
216-BC-12	Nov.	40-108-BY	1.65	0.64	33.7	21,100	7.87	74.3	1.55	10,800	516.	232.	201.	118.	9.4
216-BC-12	Dec.	49-110-BY	1.92	0.74	39.3	24,600	9.16	86.5	1.80	12,600	601.	271.	234.	137.	9.4
216-BC-12	Dec.	39-107-BY	0.187	0.05	12.4	2,390	38.6	41.6	0.28	1,010	48.5	37.6	74.3	24.8	9.4
216-BC-13	Dec.	39-107-BY	1.33	0.51	27.2	17,000	6.34	59.8	1.25	8,730	415.	187.	162.	95.0	9.4
216-BC-13	Dec.	38-106-BY	1.85	0.50	122.	23,600	382.	412.	2.78	10,000	480.	372.	735.	245.	9.4
Total (July-Dec)			23.2	16.2	965.	296,000	1570.	2110.	21.6	107,000	6310.	7720.	4180.	5270.	

TABLE XIV

Disposal Site: 216-BC TRENCHES
 Waste Stream: In-Farm Scavenged Wastes
 Settling Facility: Tanks as Indicated

Disp. Site	Date Emptied	Tank No.	Vol. % N _x 10 Liters	Pu Grams	U Kg.	Curies								pH.	
						Total Beta	Cs	Sr	Co	Ru	Sb	Ce	R.E.		Zr Nb
216-B3-7	Aug. '56	5-1111-108-C	1.80	0.35	75.5	11,800	575.	299.	1.19	4,750	313.	337.	556.	356.	9.9
216-B3-7	Sept.	3-112-111-C	1.05	0.20	44.2	6,920	336.	175.	0.69	2,780	183.	197.	325.	209.	9.9
216-B3-8	Sept.	3-112-111-C	0.677	1.05	54.5	6,570	53.7	106.	0.36	2,670	184.	233.	220.	168.	9.9
216-B3-9	Oct.	4-109-110-C	1.84	0.71	90.6	36,100	17.5	156.	1.75	1,860	336.	2,280.	107.	1,030.	9.7
216-B3-10	Oct.	7-112-C	1.80	0.49	34.6	18,400	44.7	57.1	3.24	6,800	452.	600.	162.	471.	10.0
Total (July - Dec)			7.17	2.80	299.	79,800	1,030.	793.	7.23	18,900	1,470.	3,650.	1,370.	2,230.	

TABLE XV

216-BC TRENCHES

(Summary of all Wastes)

Trench Number	Date Last Used	Vol. 6 Nx10 Liters	Pu Grams	U kg.	Curies								
					Total Beta	Cs	Sr	Co	Ru	Sb	Ce	R.E.	Zr Nb
216-BC-7	Sept. '56	4.68	0.90	196.	30,800	1500.	779.	3.09	12,400	815.	879.	1450.	928.
216-BC-8	Sept.	4.67	7.21	376.	45,400	371.	729.	2.47	18,400	1270.	1600.	1520.	1160.
216-BC-9	Oct.	4.74	1.83	233.	93,000	45.1	403.	4.50	4,790	866.	5880.	276.	2660.
216-BC-10	Oct.	4.52	1.23	86.9	46,200	112.	143.	8.13	17,100	1140.	1510.	407.	1180.
216-BC-11	Nov.	4.56	5.36	137.	71,300	128.	179.	2.97	30,000	1620.	393.	486.	949.
216-BC-12	Dec.	3.76	1.43	85.4	48,100	55.7	202.	3.63	24,400	1170.	541.	509.	280.
216-BC-13	Dec.	3.18	1.01	149.	40,600	388.	472.	4.03	18,700	895.	559.	897.	340.
Total	To Date	34.7	19.0	1,260.	375,000	2,600.	2,910.	28.8	126,000	7,780.	11,400.	5,550.	7,500

TABLE XVI

Disposal Site: 216-C-1 crib.

Waste Stream: Condensate from 201-C from December, 1952, through April, 1954, and from February, 1955, to date. Coil and condenser cooling water from 201-C from June, 1953, to April, 1954, and from February, 1955, to date.

Settling Facility: None

	Volume in Liters	Uranium	Plutonium	Beta Particle Emitters
Period	Units of 10 ⁶	Units of kg	Units of Grams	Units of Curies
July	0.888	0.199	0.12	172.0
August	0.891	0.0227	0.04	4.24
September	0.790	0.00454	0.01	0.32
October	0.102	0.872	0.007	437.0
November	0.00153	0.000454	0.001	0.003
December	*None	-	-	-
6-Month Total	2.67	1.10	0.178	614.0
Prev. Total	29.7	292.0	8.02	10,800.0
Total to Date	32.4	293.0	8.20	11,400.0

*Use of this crib has essentially been discontinued.

TABLE XVII

Disposal Site: 216-C-4 crib.

Waste Stream: Organic Solvent from 276-C Bldg., since July, 1955.

Settling Facility: None

	Volume in Liters	Uranium	Plutonium	Beta Particle Emitters
Period	Units of 10^6	Units of Grams	Units of Grams	Units of Curies
July	0	-	-	-
August	0	-	-	-
September	0	-	-	-
October	0.00924	336.0	0.09	2.75
November	0.00417	1.82	0.015	4.00
December	0.00311	4.54	0.01	4.3
6-Month Total	0.0165	342.0	0.12	11.1
Prev. Total	0.0181	3150.0	1.27	101.0
Total to Date	0.0346	3490.0	1.39	112.0

TABLE XVIII

Disposal Site: 216-C-6 crib.

Waste Stream: Condensate from Waste Self-Concentrator since September, 1955.

Settling Facility: None

Period	Volume in Liters	Uranium	Plutonium	Beta Particle Emitters
	Units of 10^6	Units of Grams	Units of Grams	Units of Curies
December	0.000363	< .454	< .001	0.06
Prev. Total	0.00582	18.2	0.05	4.38
Total to Date	0.00618	18.7	0.051	4.44

TABLE XIX

Disposal Site: 216-ER-cribs #1, 2 and 3.

Waste Stream: 221-224-U Concentrator Condensates September, 1952 to date.

Settling Facility: None

	Volume in Liters	Uranium	Plutonium	Beta Particle Emitters	Ruthenium
Period	Units of 10 ⁶	Units of kg	Units of Grams	Units of Curies	Units of Curies
July, 1956	7.52	119.0	2.79	34.2	14.7
August	8.32	255.0	3.90	96.9	75.8
September	8.43	124.0	2.23	334.0	69.5
October	8.63	74.5	2.18	45.0	11.2
November	6.65	49.5	0.658	158.0	23.4
December	4.45	11.8	0.613	69.4	5.13
6-Month Total	44.0	634.0	12.4	738.0	200.0
Prev. Total	326.0	20,400.0	354.0	1,770.0	136.0
Total to Date	370.0	21,000.0	366.0	2,510.0	336.0

TABLE XI

Disposal Site: 216-S-3 crib.

Waste Stream: 241-S Tank Farm Condensate from August, 1953, through August, 1956.

Settling Facility: None

Period	Volume in Liters	Plutonium	Beta Particle Emitters
	Units of 10^6	Units of Grams	Units of Curies
July, 1956	0.005	0.000201	4.77
August	0.00779	0.00180	4.03
6-Month Total	0.0128	0.002	8.80
Prev. Total	4.2	0.368	258.0
Total to Date	4.21	0.370	267.0

TABLE XXI

Disposal Site: 216-S-5

Waste Stream: 202-S Process Vessel Cooling Water since March, 1954.

Settling Facility: None

Period	Volume in Liters	Plutonium	Beta Particle Emitters
	Units of 10^6	Units of Grams	Units of Curies
July, 1956	27.1	2.98	4.76
August	69.9	3.24	3.65
September	112.0	5.73	15.2
October	93.2	7.91	3.05
November	104.0	4.04	2.10
December	76.5	4.43	2.57
6-Month Total	483.0	28.3	31.3
Prev. Total	3550.0	552.0	928.0
Total to date	4030.0	580.0	959.0

TABLE XXII

Disposal Site: 216-S-6 crib.

Waste Stream: 202-S Process Vessel Cooling Water since October, 1954.

Settling Facility: None

	Volume in Liters	Plutonium	Beta Particle Emitters
Period	Units of 10^6	Units of Grams	Units of Curies
July, 1956	27.1	2.98	4.76
August	69.9	3.24	3.65
September	112.0	5.73	15.2
October	93.2	7.91	3.05
November	104.0	4.04	2.10
December	76.5	4.43	2.57
6-Month Total	483.0	28.3	31.3
Prev. Total	1500.0	381.0	499.0
Total to Date	1980.0	409.0	530.0

TABLE XXIII

Disposal Site: 216-S-7 crib.

Waste Stream: D-1 and D-2 Waste from January 12, 1956, to date.

Settling Facility: None

	Volume in Liters	Uranium	Plutonium	Beta Particle Emitters	Cs	Sr
Period	Units of 10^6	Units of kg	Units of Grams	Units of Curies	Units of Curies	Units of Curies
July, 1956	1.98	38.00	9.08	6,220.0	0.209	45.5
August	3.97	18.1	9.18	3,740.0	12.6	91.4
September	5.44	14.4	2.12	5,060.0	4.32	38.9
October	5.78	1,110.0	12.0	1,470.0	7.65	1.07
November	5.56	20.7	2.47	822.0	2.94	30.8
December	5.28	57.4	1.94	2,390.0	35.5	795.0
6-Month Total	28.0	1,260.0	36.8	19,700.0	63.2	1,000.0
Prev. Total						
D-1	0.154	36.3	4.13	24,500.0	*	*
D-2	25.6	816.0	113.0	35,000.0		
Total to Date	53.8	2,110.0	154.0	79,200.0	63.2	1,000.0

*Insignificant data reported prior to July, 1956.

TABLE XXIV

Disposal Site: 216-SL-#1 and 2 cribs.

Waste Stream: 300 Area Works Laboratory since July, 1953.

Settling Facility: 340 waste tanks.

	Volume in Liters	Plutonium	Beta Particle Emitters
Period	Units of 10^6	Units of Grams	Units of Curies
July, 1956	0.302	0.489	7.85
August	0.340	0.303	12.6
September	0.321	0.623	8.35
October	0.302	0.293	5.13
November	0.454	0.376	10.0
December	0.378	0.319	28.0
6-Month Total	2.10	2.40	71.9
Prev. Total	8.63	24.6	341.0
Total to Date	10.7	27.0	413.0

TABLE XXV

Disposal Site: 216-SL-#1 and 2 cribs.

Waste Stream: 222-S crib wastes from January, 1952, to date.

Settling Facility: 102-S Tank

	Volume in Liters	Plutonium	Beta Particle Emitters	Cs	Sr
Period	Units of 10^6	Units of Grams	Units of Curies	Units of Curies	Units of Curies
July, 1956	0.0212	0.225	0.0848	0.00555	0.00555
August	0.0226	0.165	0.154	0.0119	0.0358
September	0.0140	0.0909	0.103	0.00222	0.0296
October	0.0223	0.224	0.0636	0.00355	0.00591
November	0.0157	0.0965	0.0722	0.00249	0.0208
December	0.0130	0.145	0.0546	0.00155	0.0412
6-Month Total	0.109	0.947	0.532	0.0273	0.139
Prev. Total	1.77	53.8	16.9	0.0172	0.0872
Total to Date	1.88	54.7	17.4	0.0445	0.226

TABLE XXVI

216-SL-1 and 2 Cribs
(Summary of all Wastes)

Period	Volume in Liters	Plutonium	Beta Particle Emitters
	Units of 10^6	Units of Grams	Units of Curies
July, 1956	0.323	0.714	7.93
August	0.363	0.468	12.8
September	0.335	0.714	8.45
October	0.324	0.517	5.19
November	0.470	0.473	10.1
December	0.391	0.464	28.0
6-Month Total	2.21	3.35	72.5
Previous Total	64.6	87.7	364.
Total to Date	66.8	91.1	437.

TABLE XXVII

Disposal Site: 216-SX-1 crib.

Waste Stream: SX Tank Farm Condensate since November, 1954.

Settling Facility: 106 SX Tank (for some of the condensate).

Period	Volume in Liters	Uranium	Plutonium	Beta Particle Emitters	Cs	Sr	R.E.
	Units of 10 ⁶	Units of Grams	Units of Grams	Units of Curies	Curies	Curies	Curies
July, 1956	0.328	39.4	0.0127	0.162	0.0173	0.0173	0.00347
August	0.312	37.5	0.0241	0.139	0.0495	0.00165	0.0165
September	0.153	18.3	0.0059	0.0330	0.00404	0.000404	0.0202
October	0.221	2.65	0.0256	0.0217	0.000584	0.000233	0.00584
November	0.270	143.0	0.0105	0.118	0.00215	0.00143	0.00286
December	0.798	95.8	0.117	0.653	0.00422	0.0106	0.00633
6-Month Total	2.08	337.0	0.196	1.13	0.0778	0.0316	0.0552
Prev. Total	6.36	*	35.6	55.0	*	*	*
Total to Date	8.44	337.0	35.8	56.1	0.0778	0.0316	0.0552

*Insignificant data reported prior to July, 1956.

TABLE XXVIII

Disposal Site: 276-S crib.

Waste Stream: O-2 Aqueous from 276-S Bldg., since February, 1951.

Settling Facility: None

Period	Volume in Liters	Plutonium	Beta Particle Emitters
	Units of 10^6	Units of Grams	Units of Curies
July, 1956	0.00189	0.00193	0.00139
August	0.00454	0.00463	0.00340
September	0.00567	0.0105	0.0176
October	0.00189	0.00509	0.0102
November	0.00832	0.0222	0.784
December	0.00378	0.00292	0.00207
6-Month Total	0.0261	0.0473	0.819
Prev. Total	3.29	2.25	9.12
Total to Date	3.32	2.30	9.94

TABLE 22-2

Disposal Site: 216-TY-1 CRIB

Waste Stream: First Cycle Scavenged Waste

Settling Facility: Tanks as Indicated

Disposal Site	Date Emptied	Tank No.	Vol. 6 Nx10 ⁶ Liters	Pu Grams	U kg	Curies								pH
						Total Beta	Cs	Sr	Co	Ru	Sb	Ce	R.E. Zr Nb	
216-TY-1	Nov. '56	5-101-TY	2.11	8.15	13.2	5,310	5.02	7.81	0.13	206.	83.7	1,440.	72.5	9.1
216-TY-1	Nov.	6-103-TY	1.33	4.93	2.56	1,250	4.22	9.50	0.31	98.6	23.9	253.	42.2	9.5
Total (July Dec. 1956)			3.44	13.1	15.8	6,560	9.24	17.3	0.44	305.	108.0	1,690.	115.	
Prev. Total			7.64	45.5	134.0	22,200	155.0	651.0	-	2,210.0	811.0	4,430.	2,260.0	5,080.0
Total To Date			11.1	58.6	150.0	28,800	164.	668.0	0.44	2,510.0	919.0	6,120.	2,370.	5,200.0

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TABLE XXX

Disposal Site: 241-TX-153 crib and tile field

Waste Stream: (a) 242-T waste evaporator condensate from September, 1951, through July, 1955.
(b) T-Plant 2nd Cycle, 5-6 waste and 224-T from December, 1955, through August, 1956.

Settling Facility: (a) None. (b) 112-T tank cascade.

Period	Volume in Liters	Plutonium	Beta Particle Emitters
	Units of 10^6	Units of Grams	Units of Curies
July, 1956	0.298	0.01	10.1
August	0.264	0.18	10.2
6-Month Total	0.562	0.19	20.3
Prev. Total	45.0	14.0	2,020.0
Total to Date	45.6	14.2	2,040.0

TABLE XXXI

Disposal Site : 222-U Drywell
 Waste Stream : 222-U Laboratory Waste
 Settling Facility: None

Period	Volume	Uranium	Plutonium	Beta Particle Emitters
	Units of Liters	Units of Grams	Units of Micrograms	Units of Curies
July, 1956	2.41	0.003	3.17	0.0268
August	3.06	0.003	2.71	0.0216
September	6.50	-	-	< 0.0001
October	1.37	-	13.0	0.0161
November	None	-	-	-
December	1.71	-	0.0241	0.0153
6-Month Total	15.1	0.006	18.9	0.0798
Previous Total	142.0	8850.0	101,000.0	0.1250
Total To Date	157.0	8850.0	101,000.0	0.2050

Additional isotopic data are available from the Exposure Illustrator upon request.

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TABLE XXXII

Disposal Site: 216-WR-Crib #1, 2 and 3.

Waste Stream: 221-U, 224-U Concentrator Condensates July, 1952, to date.

Settling Facility: None

Period	Volume in Liters	Uranium	Plutonium	Beta Particle Emitters	Ru
	Units of 10^6	Units of kg	Units of Grams	Units of Curies	Units of Curies
July, 1956	7.52	119.0	2.79	34.2	14.7
August	8.32	255.0	3.90	96.9	75.8
September	8.43	124.0	2.23	334.0	69.5
October	8.63	74.5	2.18	45.0	11.2
November	6.65	49.5	0.658	158.0	23.4
December	6.67	18.2	0.920	104.0	11.6
6-Month Total	46.2	640.0	12.7	772.0	206.0
Prev. Total	288.0	23,200.0	352.0	1,700.0	136.0
Total to Date	334.0	23,800.0	365.0	2,470.0	342.0

TABLE XXXIII

Disposal Site: 361-WR or 216-U cribs.

Waste Stream: 224-U, 276-U, 221-U and 5-6 wastes intermittently from November, 1951, to date.

Settling Facility: 241-U-361 settling tank.

	Volume in Liters	Uranium	Plutonium	Beta Particle Emitters
Period	Units of 10^6	Units of kg	Units of Grams	Units of Curies
September, 1956	0.00465	59.0	-	-
6-Month Total	-	-	-	-
Prev. Total	9.30	3.57	38.3	947.0
Total to Date	9.31	62.6	38.3	947.0

TABLE XXXIV

Disposal Site: 216-Z-10 crib (Recuplex)

Waste Stream: Recuplex crucible slag slurry since July, 1955.

Settling Facility: None

Period	Volume in Liters	Plutonium
	Units of 10^6	Units of Grams
July, 1956	0.0300	87.9
August	0.0492	148.0
September	0.0230	119.0
October	0.0477	400.0
November	0.0333	206.0
December	0.0495	141.0
6-Month Total	0.233	1,100.0
Prev. Total	0.478	992.0
Total to Date	0.711	2,090.0

TABLE XXXV

Disposal Site: 231-W Trench.

Waste Stream: Standards Laboratory wastes and process waste from February, 1947, to date.

Settling Facility: Sump #2.

Period	Volume in Liters	Plutonium
	Units of 10 ⁶	Units of Grams
July, 1956	0.00694	0.08
August	0.00914	1.10
September	0.0151	0.22
October	0.00958	0.22
November	0.0185	0.65
December	0.0115	0.30
6-Month Total	0.0708	2.57
Prev. Total	41.6	476.0
Total to Date	41.7	479.0

TABLE XXXVI

Disposal Site: 234-5 crib #1 and 2 and culvert.

Waste Stream: Analytical Laboratory wastes, Development Laboratory wastes and process waste from June, 1949, to date.

Settling Facility: Sump SU #1 and SU #2.

Period	Volume in Liters	Plutonium
	Units of 10^6	Units of Grams
July, 1956	1.53	41.7
August	3.40	51.6
September	2.51	25.5
October	2.80	119.0
November	2.90	50.4
December	2.97	69.4
6-Month Total	16.1	358.0
Prev. Total	112.0	1,210.0
Total to Date	128.0	1,570.0

LARGE VOLUME WASTES TO OPEN DISPOSAL SITES

In addition to the radioactive wastes discharged to ground, large quantities of relatively uncontaminated water from the separations process were discharged to open storage areas in and near the separation facilities. Periodic process difficulties allowed trace quantities of radioactive material to enter these streams and thus cause these locations to become disposal sites for radioactive waste.

Prior to this publication, estimates of volume and radioactivity were reported in document HW-44784(4) for the period 1945 through June, 1956. Subsequent volume data were obtained from the process groups.

Weekly liquid samples were collected by Regional Monitoring and analyzed for the activity density of gross alpha and gross beta particle emitters. Estimates of the total activity discharged to these sites, with one exception, were calculated by the Radiological Chemical Analysis Operation. (*) Large fluctuation in volume and low sampling frequency necessitate re-emphasizing that the curie and gram values should be regarded as estimates only.

(*)The volume and activity measurements for the wastes discharged to the 222-S swamp were supplied by the Facilities Engineering Operation of the Chemical Processing Department.

SWAMPS CURRENTLY IN USE

Disposal Site	Volume (Liters)		Plutonium (Grams)		Beta Particle Emitters (Curies)	
	July-Dec 1956	Total to Date	July-Dec 1956	Total to Date	July-Dec 1956	Total to Date
"B" Swamp	4.20×10^9	2.39×10^{10}	0.292	3.13	1.20	13.2
"T" Swamp	3.40×10^7	3.10×10^{10}	0.006	2.15	0.78	111.0
"U" Swamp	3.20×10^9	3.01×10^{10}	11.3	36.3	116.0	581.0
222-S Swamp	1.02×10^7	1.93×10^8	0.057	18.0	0.046	10.7

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