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April 14, 1961

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RADIOACTIVE CONTAMINATION IN LIQUID WASTES
DISCHARGED TO GROUND AT SEPARATIONS FACILITIES
THROUGH DECEMBER 1960

By Authority of J. L. Desrosier
Rec 9-15-71
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by

R. C. Henle
Radiation Monitoring Operation
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INTRODUCTION

This document summarizes the amounts of radioactive contamination discharged to ground from separations facilities through December 1960. Detailed data for individual disposal sites are presented on a month-to-month basis for the period of July through December 1960. Previous publications of this series are listed in the bibliography and may be referred to for specific information on measurements and radioactivity totals prior to December 1960.

Tables I and II list the major disposal sites in the 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 XXIII present this same data on a monthly basis for cribs still in use, and also include information on the source of the waste stream and the settling facility if used.

Isotopic data are included for disposal sites from which the waste was analyzed for specific contaminants. Estimates of contamination and volumes discharged to swamps are also included in Table XXIV.

ABSTRACT

SWAMPS

Open disposal sites at the separation areas have received approximately 1.65×10^{11} liters since startup. Approximately 2517 curies of fission products and 454 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 1.68×10^{10} liters. Included in this is over 2,522,500 curies of fission products and 49.94 kilograms of plutonium.

TABLE I

SUMMARY OF RADIOACTIVE WASTES DISCHARGEDTO MAJOR DISPOSAL SITES IN THE 200 EAST AREA THROUGH DECEMBER 1960

Disposal Facility	Volume in Liters	Plutonium in Grams	Beta Particle Emitters in Curies
<u>"A" Facility</u>			
216-A-2 Crib	2.30×10^5	127.0	587.0
216-A-3 Crib	1.52×10^6	2.41	428.0
216-A-4 Crib	6.23×10^6	140.0	267.0
216-A-5 Crib	1.55×10^9	56.0	2,826.0
216-A-6 Crib	2.78×10^9	21.2	3,910.0
216-A-7 Crib	8.0×10^4	-----	17.0
216-A-8 Crib (a)	1.03×10^9	49.0	10,300.0
216-A-9 Crib	1.31×10^9	-----	54.3
216-A-10 Crib	2.34×10^8	-----	-----
216-A-21 Crib	2.28×10^7	14.3	847.0
216-A-24 Crib	7.07×10^8	<1.3	4,105.0
216-A-28 Crib	3.00×10^4	0.0	31.0
<u>"B" Facility</u>			
5 and 6 Cribs (b)	3.60×10^7	174.0	7,800.0
216-BC Cribs	3.88×10^7	49.5	319,000.0
216-BC Trenches	7.98×10^7	62.7	601,000.0
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	3.72×10^8	367.0	2,570.0
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 Rev. Well	3.06×10^7	4,280.0	3,810.0
242-B-1 and 2 Cribs	2.96×10^7	3.73	38.9
"B" Swamp	4.99×10^{10}	4.23	36.7
(Incl. Purex)			
"G" Mtn. Swamp	2.40×10^{10}	0.40	27.9
<u>"C" Facility</u>			
216-C-1 Crib	3.24×10^7	8.21	11,400.0
216-C-4 Crib	4.77×10^4	1.40	119.0
216-C-5 Crib	3.89×10^4	-----	93.9
216-C-6 Crib	7.43×10^3	0.05	4.5
200 East Area (Excluding Swamps)	8.38×10^9	9,713.0	1,400,100.0

(a) 2.05×10^7 gallons of test water included in column for 216-A-8 Crib.

(b) Alternate nomenclature - 241-B-361 Crib.

TABLE II

SUMMARY OF RADIOACTIVE WASTES DISCHARGEDTO MAJOR DISPOSAL SITES IN THE 200 WEST AREA THROUGH DECEMBER 1960

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	0.37	267.0
216-S-5 Crib	4.06×10^9	582.0	960.0
216-S-6 Crib	2.79×10^9	448.0	1,118.0
216-S-7 Crib	2.10×10^8	396.0	266,100.0
216-SL-1 and 2 Cribs	9.30×10^7	156.0	3,025.0
216-SX-1 Crib	3.38×10^7	2.15	152.0
276-S Crib	3.44×10^6	6.07	14.2
222-S Swamp	1.88×10^8	18.1	11.2
202-S-1 Swamp (Abnd)	6.35×10^9	3.27	1,050.0
202-S-2 Swamp	8.30×10^9	283.5	673.5
<u>"T" Facility</u>			
216-TX-1 Crib	1.11×10^7	58.6	28,800.0
216-TX-3 Crib	8.95×10^5	3.90	43.9
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 Cribs(a)	9.68×10^5	1.43	840.0
T-361-A 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}	0.01	111.0
<u>"U" Facility</u>			
216-U-1 and 2 Cribs	1.79×10^6	4.17	235.0
216-U-3 Crib	7.88×10^5	0.04	0.42
216-U-8 Crib	3.75×10^8	367.0	2,686.0
216-U-12 Crib	8.88×10^6	-----	4.43
222-U Drywell	1.46×10^3	0.58	0.78
361-WR Cribs	9.31×10^6	38.3	947.0
"U" Swamp	4.50×10^{10}	144.6	606.6
<u>"Z" Facility</u>			
216-Z-3 Crib	2.06×10^8	5,698.0	-----
216-Z-8 Crib	8.79×10^3	44.8	-----
216-Z-9 Crib	3.09×10^6	18,800.0	-----

TABLE II (Continued)

Disposal Facility	Volume in Liters	Plutonium in Grams	Beta Particle Emitters in Curies
216-Z-12 Crib	8.39×10^7	3,780.0	-----
231-W Trench	4.17×10^7	479.0	-----
231-1 and 2 Cribs	3.08×10^7	340.0	-----
231-W-150 Reverse Well	1.00×10^6	50.1	-----
200 West Area (Excluding Swamps)	8.37×10^9	40,229.0	1,122,400.0 1126800

(a) Alternate nomenclature 261-U-10 Crib

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TABLE III

Disposal Site: 216-A-2 Crib

Waste Stream: Spent Organic Extraction from May 1956 to date

Period	Volume (n x 10 ⁶ L)	Uranium (kilograms)	Plutonium (grams)	Units in Curies
				Beta Particle Emitters
July, 1960	0.076	----	----	121
August	-----	----	----	---
September	-----	----	----	---
October	-----	----	----	---
November	-----	----	----	---
December	-----	----	----	---
6-Month Total	0.076	----	----	121
Previous Total	0.154	41.7	127.0	466
Total to Date	0.230	41.7	127.0	587

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TABLE IV

Disposal Site: 216-A-3 Crib

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

Period	Volume (n x 10 ⁶ L)	Uranium (kilograms)	Plutonium (grams)	Units in Curies			
				Beta Particle Emitters	Cs ¹³⁷	Sr ⁹⁰	Ru ¹⁰⁶
July, 1960	0.015	----	----	0.56			
August	0.363	21.77	0.0	1.04			
September	0.023	12.70	0.0	37.0			
October	0.011	14.06	0.0	0.08			
November	0.023	17.24	0.0	1.8			
December	0.023	34.93	0.0	6.25			
6-Month Total	0.458	100.70	0.0	46.73	---	---	---
Previous Total	1.057	881.0	2.41	381.7	0.006	0.019	0.058
Total to Date	1.515	981.7	2.41	428.4	0.006	0.019	0.058

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TABLE V

Disposal Site: 216-A-5 Crib

Waste Stream: Process condensate from 202-A from November 1955 to date

Period	Volume (n x 10 ⁶ L)	Uranium (kilograms)	Plutonium (grams)	Units in Curies
				Beta Particle Emitters
July, 1960	29.52	0.907	---	34.4
August	46.93	2.722	2.0	17.0
September	48.07	4.082	---	19.0
October	24.60	8.618	5.0	21.6
November	44.66	2.722	1.0	121.0
December	41.26	0.454	0.0	84.0
6-Month Total	235.0	19.50	8.0	327.0
Previous Total	1,319.8	205.87	48.01	2,499
Total to Date	1,554.8	225.37	56.01	2,826

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TABLE VI

Disposal Site: 216-A-6 Crib

Waste Stream: Coil and jacket steam condensate from 202-A from November
1955 to date

Period	Volume ($n \times 10^6$ L)	Uranium (kilograms)	Plutonium (grams)	Units in Curies
				Beta Particle Emitters
July	40.88	---	---	0.94
August	50.34	---	0.0	0.6
September	53.37	0.907	0.0	1.7
October	37.85	0.907	0.0	23.0
November	58.29	---	1.0	2.76
December	54.50	4.082	2.0	2750.0
6-Month Total	295.2	5.90	3.0	2779.0
Previous Total	2,483.5	152.4	18.22	1131.4
Total to Date	2,778.7	158.3	21.22	3910.4

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TABLE VII

Disposal Site: 216-A-21 Crib

Waste Stream: I^{131} caustic scrubbing waste from October 1957 to date

Period	Volume ($n \times 10^6$ L)	Uranium (kilograms)	Plutonium (grams)	Units in Curies
				Beta Particle Emitters
July, 1960	0.958	4.082	---	94.8
August	0.284	0.0	0.0	3.6
September	1.741	0.454	0.0	17.1
October	0.757	0.454	0.0	7.2
November	1.173	1.361	---	2.07
December	0.908	1.361	1.0	5.2
6-Month Total	5.82	7.71	1.0	130.0
Previous Total	17.01	7.95	13.3	716.9
Total to Date	22.83	15.66	14.3	846.9

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TABLE VIII

Disposal Site: 216-A-24 Crib

Waste Stream: Tank farm condensate and cooling water from May 19, 1958 to date

Period	Volume (n x 10 ⁶ L)	Uranium (kilograms)	Plutonium (grams)	Units in Curies
				Beta Particle Emitters
July, 1960	2.69	---	0.0	12.4
August	3.03	0.0	0.0	22.4
September	2.42	0.0	0.0	20.0
October	1.32	0.454	0.0	7.2
November	1.21	0.0	0.0	7.5
December	2.16	0.0	0.0	8.9
6-Month Total	12.8	0.5	0.0	78.4
Previous Total	694.1	48.9	< 1.32	4,026.4
Total to Date	706.9	49.4	< 1.32	4,104.8

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TABLE IX

Disposal Site: 216-A-28 Crib

Waste Stream: 203-A floorsump as of December 1959. (Receives 203 series tank and condensate from heating coils in 203-A)

Period	Volume (n x 10 ⁶ L)	Uranium (kilograms)	Plutonium (grams)	Units in Curies
				Beta Particle Emitters
July, 1960	---	---	---	---
August	---	---	---	---
September	---	---	---	---
October	---	---	---	---
November	---	---	---	---
December	---	---	---	---
6-Month Total	---	---	---	---
Previous Total	0.030	623.2	0.0	31.0
Total to Date	0.030	623.2	0.0	31.0

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TABLE X

Disposal Site: 216-S-6 Crib

Waste Stream: 202-S process vessel cooling water since October 1954

Period	Volume (n x 10 ⁶ L)	Uranium (kilograms)	Plutonium (grams)	Units in Curies			
				Beta Particle Emitters	Cs ¹³⁷	Sr ⁹⁰	Co ⁶⁰
July, 1960	11.355	0.087	0.006	0.579			
August	7.948	0.792	0.017	19.677			
September	12.869	1.700	0.068	11.798			
October	14.383	0.173	< 0.008	0.779			
November	16.276	0.371	0.086	2.438			
December	17.032	3.273	0.090	< 0.018			
6-Month Total	79.9	6.40	0.275	35.3	*	*	*
Previous Total	2,707.8	37.64	447.5	1,083.2	42.14	178.15	< 0.424
Total to Date	2,787.7	44.04	447.8	1,118.5			

* Analysis not complete. Data will be included in a later report.

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TABLE XI

Disposal Site: 216-S-7 Crib

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

Period	Volume (n x 10 ⁶ L)	Uranium (kilograms)	Plutonium (grams)	Units in Curies			
				Beta Particle Emitters	Cs ¹³⁷	Sr ⁹⁰	Co ⁶⁰
July, 1960	2.922	77.202	0.077	116.574			
August	2.400	12.392	8.242	61.501			
September	2.453	2.945	0.454	199.587			
October	3.362	5.653	0.888	62.355			
November	2.482	1.997	75.414	70.824			
December	2.767	2.691	8.772	279.975			
6-Month Total	16.4	102.9	93.8	790.8	*	*	*
Previous Total	194.1	2402.5	301.9	265,301.3	225.5	2773.0	1.91
Total to Date	210.5	2505.4	395.7	266,092.1			

* Analysis not complete. Data will be included in later report.

Period	Volume ($n \times 10^6$ L)	Uranium (kilograms)	Plutonium (grams)	Beta Particle Emitters	Units in Curies
July, 1960	0.636	---	0.487	11.928	
August	0.871	---	0.736	108.100	
September	0.946	---	0.300	125.000	
October	0.727	---	0.113	115.200	
November	0.765	---	0.081	20.200	
December	0.818	---	0.181	75.6	
6-Month Total	4.763	---	1.90	456.0	
Previous Total	31.4	---	85.7	2539.7	
Total to Date	36.2	---	87.6	2995.7	

Disposal Site: 216-SL-1 and 2 Crib
Waste Stream: 300 Area works Laboratory since July 1953 (340 waste tanks)

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TABLE XIII

Disposal Site: 216-SL-1 and 2 Cribs

Waste Stream: 222-S Crib wastes from January 1952 to date

Period	Volume (n x 10 ⁶ L)	Uranium (kilograms)	Plutonium (grams)	Units in Curies		
				Beta Particle Emitters	Cs ¹³⁷	Sr ⁹⁰
July, 1960	0.014	0.035	0.0	0.011		
August	0.0	---	---	---		
September	0.026	0.718	0.034	0.085		
October	0.0	---	---	---		
November	0.013	1.277	0.081	0.023		
December	0.013	0.080	0.235	0.043		
6-Month Total	0.066	2.110	0.350	0.162	*	*
Previous Total	2.589	3.639	58.72	22.6	0.308	1.37
Total to Date	2.655	5.749	59.07	22.8		

* Analysis not complete. Data will be included in later report.

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TABLE XIV

Disposal Site: 216-SL-1 and 2 Cribs

Waste Stream: Summary of 300 Area Works Lab., 222-S, and 207-SL Basin*

Period	Volume ($n \times 10^6$ L)	Plutonium (grams)	Units in Curies
			Beta Particle Emitters
July, 1960	0.650	0.487	11.939
August	0.871	0.736	108.100
September	0.972	0.334	125.085
October	0.727	0.113	115.200
November	0.778	0.162	20.223
December	0.831	0.416	75.643
6-Month Total	4.829	2.248	456.190
Previous Total	88.2	153.6	2,568.9
Total to Date	93.0	155.8	3,025.1

* 207-SL basin is inactive. In the past a total of 54.2×10^6 liters of waste, containing 9.15 grams of plutonium and 6.6 curies of beta particle emitters were discharged from 207-SL basin to 216-SL-1 and 2 cribs. Thus these totals are included in the grand totals to date from 216-SL-1 and 2.

TABLE XV

Disposal Site: 216-SX-1 Crib

Waste Stream: 241-SX tank farm Condensate since November 1954.

Period	Volume (n x 10 ⁶ L)	Uranium (kilograms)	Plutonium (grams)	Units in Curies				
				Beta Particle Emitters	Cs ¹³⁷	Sr ⁹⁰	RE+Y	Co ⁶⁰
July, 1960	0.473	< 0.001	0.0	0.259				
August	0.484	0.013	0.0	0.445				
September	0.358	0.006	0.0	0.209				
October	0.371	0.008	0.0	0.165				
November	0.426	0.013	0.0	0.462				
December	0.278	0.001	0.0	0.140				
6-Month Total	2.390	0.042	0.0	1.680	*	*	*	*
Previous Total	31.37	3.15	2.15	150.6	77.2	17.6	38.9	0.04
Total to Date	33.76	3.19	2.15	152.3				

* Analysis not complete. Data will be included in later report.

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TABLE XVI

Disposal Site: 276-S Crib

Waste Stream: 0-2 aqueous from 276-S building since February 1951.

Period	Volume (n x 10 ⁶ L)	Uranium (kilograms)	Plutonium (grams)	Units in Curies		
				Beta Particle Emitters	¹³⁷ Cs	⁹⁰ Sr
July, 1960	0.003	0.0	0.008	0.0		
August	0.002	0.0	0.005	0.0		
September	0.002	0.0	0.002	0.065		
October	0.002	0.0	0.002	0.015		
November	0.002	0.0	0.0	0.005		
December	0.002	0.0	0.001	0.009		
6-Month Total	0.013	0.0	0.018	0.094	*	*
Previous Total	3.43	0.021	6.05	14.1	0.008	0.04
Total to Date	3.44	0.021	6.07	14.2		

* Analysis not complete. Data will be included in later report.

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TABLE XVII

Disposal Site: 216-TY-3 Crib

Waste Stream: 221-T waste handling and decontamination operation since February 1960

Period	Volume (n x 10 ⁶ L)	Uranium (kilograms)	Plutonium (grams)	Units in Curies
				Beta Particle Emitters
July, 1960	0.0	0.0	0.0	0.0
August	0.058	3.122	<0.019	13.848
September	0.067	0.225	0.195	0.122
October	0.108	0.962	0.223	1.757
November	0.067	0.009	0.212	0.009
December	0.189	1.575	0.357	4.303
6-Month Total	0.489	5.893	1.006	21.039
Previous Total	0.406	9.669	2.894	22.819
Total to Date	0.895	15.562	3.900	43.858

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TABLE XVIII

Disposal Site: 216-U-12 Crib

Waste Stream: 224-U concentrator condensate - April 1960 to date

Period	Volume (n x 10 ⁶ L)	Uranium (kilograms)	Plutonium (grams)	Units in Curies	
				Beta Particle Emitters	Sr ⁹⁰
July, 1960	0.935	15.69	---	0.067	$< 3.74 \times 10^{-4}$
August	0.965	16.19	---	0.92	$< 3.86 \times 10^{-4}$
September	1.079	14.24	---	2.6	$< 4.32 \times 10^{-4}$
October	1.083	12.56	---	0.018	$< 4.33 \times 10^{-4}$
November	1.149	13.79	---	---	---
December	1.098	18.42	---	0.005	$< 1.10 \times 10^{-4}$
6-Month Total	6.309	90.89	---	3.610	$< 17.35 \times 10^{-4}$
Previous Total	2.571	84.6	---	0.824	$< 1.40 \times 10^{-4}$
Total to Date	8.880	175.5	---	4.434	$< 1.88 \times 10^{-3}$

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TABLE XIX

Disposal Site: 222-U Drywell
Waste Stream: 222-U laboratory waste

Period	Volume (liters)	Uranium (grams)	Plutonium (grams)	Units in Curies			
				Beta Particle Emitters	Cs ¹³⁷	Sr ⁹⁰	Ru ¹⁰⁶
July, 1960	0.0	0.0	0.0	0.0	0.0	0.0	0.0
August	29.0	---	---	0.002	0.0005	---	0.001
September	15.5	---	---	0.000036	0.000015	0.000023	---
October	0.0	0.0	0.0	0.0	0.0	0.0	0.0
November	0.0	0.0	0.0	0.0	0.0	0.0	0.0
December	2.0	---	---	0.001	0.001	---	0.00025
6-Month Total	46.5	0.0	0.0	0.0030	0.0015	0.000023	0.00125
Previous Total	1413.3	8860.0	0.581	0.778	0.171	0.00832	<0.281
Total to Date	1459.8	8860.0	0.581	0.781	0.173	0.00834	<0.282

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TABLE XX

Disposal Site: 216-U-1 and 2 Cribs

Period	Volume (n x 10 ⁶ L)	Uranium (kilograms)	Plutonium (grams)	Units in Curies
				Beta Particle Emitters
July, 1960	0.0	0.0	0.0	0.0
August	0.0	0.0	0.0	0.0
September	0.0	0.0	0.0	0.0
October	0.0	0.0	0.0	0.0
November	0.0	0.0	0.0	0.0
December	0.0	0.0	0.0	0.0
6-Month Total	0.0	0.0	0.0	0.0
Previous Total	1.79	200.6	4.17	234.8
Total to Date	1.79	200.6	4.17	234.8

TABLE XXI

Disposal Site: 216-Z-8 Crib

Waste Stream: Recouplex slug slurry since July 1955

Period	Volume (liters)	Plutonium (grams)
July, 1960	200	0.872
August	100	3.0
September	0.0	0.0
October	0.0	0.0
November	200	0.872
December	0.0	0.0
6-Month Total	500	4.744
Previous Total	8,290	40.01
Total to Date	8,790	44.75

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TABLE XXII

Disposal Site: 216-Z-9 Crib

Waste Stream: Recouplex silica supernatant overflow since October 1957

Period	Volume ($n \times 10^6$ L)	Plutonium (grams)
July, 1960	0.039	214.0
August	0.056	312.0
September	0.044	296.0
October	0.041	397.0
November	0.064	434.0
December	0.084	483.0
6-Month Total	0.328	2,136.0
Previous Total	2.76	16,660.0
Total to Date	3.09	18,796.0

Period	Volume ($n \times 10^6$ L)	Plutonium (grams)
July, 1960	3.174	387.29
August	4.645	59.6
September	4.206	110.9
October	3.113	41.6
November	4.086	95.7
December	4.484	88.7
6-Month Total	23.708	783.79
Previous Total	60.19	2,999.9
Total to Date	83.90	3,783.7

Disposal Site: 216-Z-12 Crib
Waste Stream: Analytical laboratory wastes, development laboratory wastes and process wastes from March 11, 1959 to date

TABLE XXIII

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LARGE VOLUME WASTES TO OPEN DISPOSAL SITES

In addition to the radioactive waste discharged to the ground, large quantities of relatively uncontaminated water from the separations process were discharged to the open storage areas in and near to the separations facilities. Periodic 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 documents HW-63646, HW-64375 and HW-69071. Subsequent volume data were obtained from the process and operating groups.

Monthly samples were collected by the Environmental Monitoring Operation and analyzed for the activity density of gross alpha and gross beta particle emitters. Estimates of the total activity discharged to these sites were calculated by the Radiological Chemical Analysis Operation when not supplied by the operating groups. Large fluctuation in volume and low sampling frequency necessitates re-emphasizing that the curie and gram values should be regarded as estimates only.

TABLE XXIV
SWAMPS CURRENTLY IN USE
July-December 1960

Disposal Site	Volume (Liters)		Plutonium (Grams)		Beta Particle Emitters (Curies)	
	July-December	Total to Date	July-December	Total to Date	July-December	Total to Date
"B" Swamp	2.02×10^9	$4.99^{155} \times 10^{10}$	0.02	4.23	0.29	36.7
"U" Swamp	9.93×10^8	4.50×10^{10}	3.3	144.6	0.31	606.6
202-S Swamp #2	1.57×10^9	8.30×10^9	<0.001	283.5	< 1.61	673.5
222-S Swamp	1.36×10^7	1.88×10^8	<0.010	18.12	< 0.039	11.24
Gable Mtn. Swamp	5.12×10^9	2.40×10^{10}	0.043	0.399	0.97	27.9

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BIBLIOGRAPHY

1. HWS-5000 - Official HAPO Building List Specification.
2. HW-28021 - Healy, J. W., Release of Radioactive Waste to Ground, May 20, 1953
3. HW-33591 - Ruppert, H. G. and Heid, K. R., Radioactive Contamination in Liquid Wastes Discharged to Ground at the Separations Facilities Through June 1954.
4. HW-38562 - Paas, H. J. and Heid, K. R., Radioactive Contamination in Liquid Wastes Discharged to Ground at Separations Facilities Through June 1955.
5. HW-43121 - Clukey, H. V., Tabulation of Radioactive Liquid Waste Disposal Facilities, May 1956, Declassified.
6. HW-48518 - Heid, K. R., Radioactive Contamination in Liquid Wastes Discharged to Ground at the Separations Facilities Through December 1956.
7. HW-55176 - Wood, V. W., Index of CPD Crib Building Numbers, Designs of CPD Radioactive Liquid Waste Disposal Sites, March 10, 1958.
8. HW-55593 - Bernard, R. M., Radioactive Contamination in Liquid Wastes Discharged to Ground at the Separations Facilities Through December 1957.
9. HW-59359 - Baldrige, K. R., Radioactive Contamination in Liquid Wastes Discharged to Ground at the Separations Facilities Through December 1958.
10. HW-63646 - McConiga, M. W., Radioactive Contamination in Liquid Wastes Discharged to Ground at the Separations Facilities Through June, 1959.
11. HW-64375 - McConiga, M. W., Radioactive Contamination in Liquid Wastes Discharged to Ground at the Separations Facilities Through December 1959.
12. HW-69071 - Henle, R. J., Radioactive Contamination in Liquid Wastes Discharged to Ground at the Separations Facilities Through June 1960.

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