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RADIOACTIVE CONTAMINATION IN LIQUID
WASTE DISCHARGED TO GROUND
AT THE SEPARATIONS FACILITIES THROUGH DECEMBER, 1965

BY

B. J. McMurray

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CONTENTS

	<u>Page</u>
INTRODUCTION	3
ABSTRACT	4
SUMMARY OF CONTAMINATION DISCHARGED TO GROUND AT 200 EAST AREA	5
SUMMARY OF CONTAMINATION DISCHARGED TO GROUND AT 200 WEST AREA	6
DATA FOR INDIVIDUAL ACTIVE DISPOSAL SITES	
<u>200 EAST AREA</u>	
216 - A - 3 Crib (Silica gel waste from 203-A)	7
216 - A - 10 Crib (Condensate from F cell fractionator)	8
216 - A - 21 Crib (Caustic scrubber waste)	9
216 - A - 24 Crib (Tank farm condensate and cooling water)	10
216 - A - 27 Crib (Caustic scrubber waste)	11
216 - A - 30 Crib (Purex coil and jacket steam condensate)	12
216 - A - 36 Crib (Dissolver scrubber waste)	13
216 - B - 50 Crib (In-tank-solidification condensate)	14
216 - C - 10 Crib (Strontium semi-works)	15
<u>200 WEST AREA</u>	
216 - S - 6 Crib (Redox jacket and coil condensate and cooling water)	16
216 - S - 7 Crib (D-2 wastes)	17
216 - S - 9 Crib (D-2 wastes)	18
216 - S - 13 Crib (Aqueous waste from 276-S)	19
216 - S - 20 Crib (Redox laboratory wastes)	20
216 - S - 21 Crib (SX tank farm condensate)	21
216 - T - 27 Crib (300 Area waste)	22
216 - T - 28 Crib (T Plant wastes)	23

CONTENTS (Continued)

DATA FOR INDIVIDUAL ACTIVE DISPOSAL SITES (Continued)	<u>Page</u>
216 - T - 28 Crib (300 Area waste)	24
216 - T - 28 Crib (Summary of all wastes)	25
216 - U - 12 Crib (UO ₃ Plant concentrator condensate)	26
216 - Z - 1A Crib (Plutonium reclamation wastes)	27
216 - Z - 7 Crib (300 Area waste)	28
216 - Z - 12 Crib (234-5 laboratory and process waste)	29
LARGE VOLUME WASTES TO OPEN DISPOSAL SITES	30
SWAMPS CURRENTLY IN USE	31
SWAMPS NO LONGER IN USE	32
BIBLIOGRAPHY	33 & 34

INTRODUCTION

This document summarizes the amounts of radioactive contamination discharged to ground from chemical separations and laboratory facilities through December, 1965. Detailed data for individual disposal sites are presented on a month-to-month basis for the period of January through December, 1965. 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 January, 1965. Several changes in crib nomenclature were made during 1965. These changes are noted on the individual tables so reference may be made to them in previous reports.

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 start-up. Tables III through XXIV 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 Tables XXV and XXVI.

ABSTRACTSWAMPS

Open disposal sites at the separation areas have received 2.22×10^{11} liters since start-up. Approximately 20,000 curies of fission products and 1,050 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 start-up was 2.23×10^{10} liters. Included in this is over 2.9×10^6 curies of fission products and 80 kilograms of plutonium.

TABLE I

SUMMARY OF RADIOACTIVE WASTES DISCHARGED
TO MAJOR DISPOSAL SITES IN 200 EAST AREA THROUGH 1965

<u>Disposal Facility</u>	<u>Volume x 10⁶ liters</u>	<u>Plutonium in grams</u>	<u>Beta Particle Emitters in curies</u>
"A" Facility			
216-A-2 Crib (Abandoned)	<1	130	590
216-A-3 Crib	2.8	0.2	490
216-A-4 Crib	6.2	140	270
216-A-5 Crib	1,800	63	3,400
216-A-6 Crib	2,800	21	4,000
216-A-7 Crib	-	-	17
216-A-8 Crib	1,000	49	10,000
216-A-9 Crib	1,300	-	54
216-A-10 Crib	1,713	146	114,800
216-A-21 Crib	88	150	2,750
216-A-24 Crib	789	41	4,535
216-A-27 Crib	6.6	51	150
216-A-28 Crib	-	-	31
216-A-30 Crib	2,142	46	3,203
216-A-31 Crib	41	-	95,000
216-A-36 Crib	41	12.6	84,500
"B" Facility			
216-B-5 (241-361 Reverse well)	30	4,300	3,800
216-B-7 (241-B-1 & 2 Crib)	49*	4,300	10,000*
216-B-8 (241-B-3 Crib)	27	29	710
216-B-9 (5-6 Crib)	40	170	7,800
216-B-11 (242-B-1 & 2 Crib)	30	4	39
216-B-12 (216-ER Crib)	370	370	2,600
216-B-14-19 (216-BC Crib)	40	50	320,000
216-B-20-34 (216-BC Trenches)	80	63	600,000
216-B-35-42 (216-BX Trenches)	15	6	16,000
216-B-43-49 (216-BY Crib)	34	61	410,000
"C" Facility			
216-C-1 Crib	32	8	11,000
216-C-4 Crib	41	1	120
216-C-5 Crib	41	-	94
216-C-6 Crib	41	-	2,000
216-C-10 Crib	1	-	30
200 East Area Excluding Swamps	12,400	10,175	1,708,000

* Corrected for Construction Wastes to this Site from Phase I and II Wastes in 1962 and 1965.

TABLE II

SUMMARY OF RADIOACTIVE WASTES DISCHARGED
TO MAJOR DISPOSAL SITES IN THE 200 WEST AREA THROUGH 1964

<u>Disposal Facility</u>	<u>Volume (n x 10⁶ L)</u>	<u>Plutonium (grams)</u>	<u>Units in Curies Beta Particle Emitters</u>
"S" Facility			
216-S-1 and Z Cribs	150	1,180	750,000
216-S-3 Crib	4	.4	270
216-S-5 Crib	4,100	580	960
216-S-6 Crib	3,830	463	2,200
216-S-7 Crib	376	436	281,600
216-S-9 Crib	10	2	1,500
216-S-13 Crib	5	8	560
216-S-20 Crib	125	170	6,600
216-S-21 Crib	65	2	400
"T" Facility			
216-T-3 (216-T-361-A Reverse well)	11	3,400	2,800
216-T-6 (361-T-1 & 2 Cribs)	45	390	18,000
216-T-7 (241-T-3 Cribs)	110	130	3,100
216-T-14-17 (216-T Trenches)	7	180	3,400
216-T-18 (241-T-17 Crib)	1	1	840
216-T-19 (241-TX-153 Crib)	46	14	2,000
216-T-21-25 (216-TX-Trenches)	8	7	34,000
216-T-26 (216-TC-1 Crib)	11	59	29,000
216-T-27 (216-TR-2 Crib)	42	13	2,000
216-T-28 (216-TY-3 Crib)	42	70	58,500
216-T-32 (241-T-1 & 2 Crib)	29	3,200	1,500
"U" Facility			
216-U-1 (361-WR Crib)	9	38	950
216-U-2 (216-U-1 & 2 Crib)	2	4	240
216-U-3 Crib	1	.04	41
216-U-8 Crib	380	370	2,700
216-U-12 Crib	85	1	850
222-U Dry Wells	-	.6	1
"Z" Facility			
216-Z-1A Crib	1	3,775	---
216-Z-3 Crib	210	5,700	---
216-Z-5 A & B (231 - 1 & 2 Crib)	31	340	---
216-Z-7 (231-W Trench)	44	480	210
216-Z-8 Crib	.01	48	---
216-Z-9 Crib	4	28,000	---
216-Z-10 Crib (231-W-150 Reverse Well)	1	50	---
216-Z-12 Crib	210	19,000	---
200 East Area			
Excluding Swamps	9,995	68,112	1,204,182

TABLE III

Disposal Site: 216-A-3 Crib

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

<u>Period</u>	<u>Volume</u> <u>(n x 10⁶ l)</u>	<u>Uranium</u> <u>(kilograms)</u>	<u>Plutonium</u> <u>(grams)</u>	<u>Units in Curies</u> <u>Beta Particle</u> <u>Emitters</u>	<u>Co⁶⁰</u>	<u>Sr⁹⁰</u>	<u>Cs¹³⁷</u>
January	.014	23.2					
February	.025	78.6					
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
12-Month Total	.039	101.8			<1	<1	<1
Previous Total	2.76	1,533	0.17	487	<1	<1	<1
Total to Date	2.80	1,635	0.17	487	<1	<1	<1

TABLE IV

Disposal Site: 216-A-10 Crib

Waste Stream : Condensate from F Cell Fractionator

<u>Period</u>	<u>Volume</u> (<u>n x 10⁶ l</u>)	<u>Uranium</u> (<u>kilograms</u>)	<u>Plutonium</u> (<u>grams</u>)	<u>Units in Curies</u> <u>Beta Particle</u> <u>Emitters</u>	<u>Co⁶⁰</u>	<u>Sr⁹⁰</u>	<u>Cs¹³⁷</u>
January	85	15	36	6,000			
February	23.52	-	1	1,915			
March	49.36	2.73	-	368			
April	85.84	4.09	3	1,577			
May	53.88	-	1	6,042			
June	36.34	15.91	2	4,152	-	1.4	<3.5
July	15.87	.45	36	26.6			
August	27.78	7.7	1	67			
September	32.82	1.4	-	22.9			
October	23.55	.45	1	76.0			
November	13.02	.45	-	8.3			
December	25.74	.45	-	32.3	0.5	0.1	<0.8
12-Month Total	387.72	33.63	45	14,287.1	0.5	1.5	<3.8
Previous Total	1,325	107	101.2	100,500	168	55	18.35
Total to Date	1,713	141	146	114,800	169	57	22.2

TABLE V

Disposal Site: 216-A-21 Crib

Waste Stream : Iodine caustic scrubbing waste from October, 1957 to June 1965.

<u>Period</u>	<u>Volume</u> ($n \times 10^6$ l)	<u>Uranium</u> (kilograms)	<u>Plutonium</u> (grams)	<u>Units in Curies</u> <u>Beta Particle</u> <u>Emitters</u>	<u>Co⁶⁰</u>	<u>Sr⁹⁰</u>	<u>Cs¹³⁷</u>
January	.761	1.0	1	2.75			
February	1.169	2.28	17	31.45			
March	1.928	10.	20	88.			
April	2.112	5	14	58.9			
May	2.074	5	5	18.5			
June	.553	.99	11	12.9		0.08	2.4
July							
August							
September							
October							
November							
December							
12-Month Total	8.597	24.27	68	212.50		0.08	2.4
Previous Total	79	171	82.1	2,540	8.20	5.92	80.2
Total to Date	88	195	150	2,753	8.20	6.00	82.6

TABLE VI

Disposal Site: 216-A-24 Cribs

Waste Stream : Tank Farm condensate and cooling water from May 1958 to date.

<u>Period</u>	<u>Volume</u> ($n \times 10^6$ l)	<u>Uranium</u> (kilograms)	<u>Plutonium</u> (grams)	<u>Units in Curies</u> <u>Beta Particle</u> <u>Emitters</u>	<u>Co⁶⁰</u>	<u>Sr⁹⁰</u>	<u>Cs¹³⁷</u>
January	1.245			6.04			
February	.246						
March	.704			1.75			
April	.787			2.0			
May	1.086			1.4			
June	.878			1.52		0.02	18.6
July	.988			.86			
August	1.302			3.2			
September	1.707			1.72			
October	1.404			5.0			
November	1.863			5.3			
December	1.983			5.84	0.03	0.24	0.15
12-Month Total	14.193			34.63	0.03	0.26	18.8
Previous Total	775	49	<1	4,500	0.11	6.36	499.8
Total to Date	789	49	<1	4,535	0.14	6.62	518.6

TABLE VII

Disposal Site: 216-A-27 Crib

Waste Stream : Iodine caustic scrubbing waste from June 1965 to date.

<u>Period</u>	<u>Volume (n x 10⁶ l)</u>	<u>Uranium (kilograms)</u>	<u>Plutonium (grams)</u>	<u>Units in Curies</u>			
				<u>Beta Particle Emitters</u>	<u>Co⁶⁰</u>	<u>Sr⁹⁰</u>	<u>Cs¹³⁷</u>
January							
February							
March							
April							
May							
June	1.071	1.11	23	26.1			
July	1.060	1.36	8	13.5			
August	1.279	4.54	5	6.9			
September	1.180	3.18	7	38.3			
October	.908	1.36	3	19.7			
November	.447	.45	1	18.8			
December	.655	5.00	4	27.4	0.03	1.04	0.61
12-Month Total	6.600	17.00	51	150.4	0.03	1.04	0.61
Previous Total							
Total to Date	6.600	17.00	51	150.4	0.03	1.04	0.61

TABLE VIII

Disposal Site: 216-A-30 Crib

Waste Stream : Coil and jacket steam condensate from January 1961 to date.

Period	Volume ($n \times 10^6$ l)	Uranium (kilograms)	Plutonium (grams)	Units in Curies		
				Beta Particle Emitters	Co ⁶⁰	Sr ⁹⁰ Cs ¹³⁷
January	21.50			3.93		
February	34.93			5.10		
March	49.05	1.8	1	4.6		
April	50.76		1	3.9		
May	50.26			188		
June	74.07			8.86		0.2 <2.2
July	22.37			2.82		
August	35.35			3.8		
September	33.54	1.0		1.5		
October	39.02			3.5		
November	26.55			1.2		
December	39.78	4.5		5.32	<0.2	0.2 <0.4
12-Month Total	482.18	7.3	2	232.53	<0.2	0.4 <2.6
Previous Total	1,660	17	44	2,970	10.96	27.35 99.2
Total to Date	2,142	24	46	3,203	11.16	27.7 101.8

TABLE IX

Disposal Site: 216-A-36 Crib

Waste Stream: Multipurpose dissolver scrubber waste from October 1965 to date.

Period	Volume ($n \times 10^6$ l)	Uranium (kilograms)	Plutonium (grams)	Units in Curies		
				Beta Particle Emitters	Co ⁶⁰	Sr ⁹⁰ Cs ¹³⁷
January						
February						
March						
April						
May						
June						
July						
August						
September						
October	.246	4.5	3	80,000	400	360
November	.110	.45		900	5	4
December	.132	18.8	9.3	3,629	20	16
12-Month Total	.488	23.75	12.6	84,529	425	380
Previous Total						
Total to Date	.488	23.75	12.6	84,529	425	380

TABLE X

Disposal Site: 216-B-50 Crib

Waste Stream : In-Tank Solidification condensate from January 1965 to date.

<u>Period</u>	<u>Volume</u> ($n \times 10^6$ l)	<u>Uranium</u> (kilograms)	<u>Plutonium</u> (grams)	<u>Units in Curies</u> <u>Beta Particle</u> <u>Emitters</u>	<u>Co⁶⁰</u>	<u>Sr⁹⁰</u>	<u>Cs¹³⁷</u>
January	.042			.015			
February							
March	.151			.006			.04
April	.594			<.003			<.2
May	.954			<.1			<.5
June	.908			.09			.15
July	.549			.43			.212
August	.700			.16			.04
September	.659			.03			.05
October	.583			.10			.04
November	.144			.49			.22
December	.273			2.8			2.1
12-Month Total	5.557			4.224			3.552
Previous Total							
Total to Date	5.5			4.2			3.6

TABLE XI

Disposal Site: 216-C-10 Crib

Waste Stream : Hot Semiworks Waste from November 1964 to date.

<u>Period</u>	<u>Volume</u> ($n \times 10^6$ l)	<u>Uranium</u> (kilograms)	<u>Plutonium</u> (grams)	<u>Units in Curies</u> <u>Beta Particle</u> <u>Emitters</u>	<u>Co⁶⁰</u>	<u>Sr⁹⁰</u>	<u>Cs¹³⁷</u>
January	.007			1.0		1.0	
February	.019			1.0		1.0	
March	.013			1.7		1.7	
April	.007			1.0		1.0	
May	.031			4.0		4.0	
June	.030			4.5		4.5	
July	.024			6.5		6.5	
August	.023			2.5		2.5	
September	.014			0.01		0.01	
October	.057			0.6		0.6	
November	.034			2.2		2.2	
December	.012			0.1		0.1	
12-Month Total	.271			25.11		25.11	
Previous Total	.024			11.1			
Total to Date	.295			36		25	

TABLE XII

Disposal Site: 216-S-6 Crib

Waste Stream : Redox process vessel cooling water from October 1954 to date.

Period	Volume (n x 10 ⁶ l)	Uranium (kilograms)	Plutonium (grams)	Units in Curies Beta Particle Emitters	Co ⁶⁰	Sr ⁹⁰	Cs ¹³⁷
January	18.925	.208	.018	1.135			
February	13.626	.109	.077	2.448			
March	13.248	.681	.006	1.470			
April	7.949	7.064	.079	3.654			
May	12.491	.420	.059	1.122			
June	19.304	.626	.009	.714		.289	.003
July	28.766	.950	.034	1.140			
August	5.564	.028	.008	16.317			
September	28.766	1.969	.054	76.836			
October	25.738	.210	.158	12.580			
November	24.224	1.105	.040	13.248			
December	20.601	1.349	.227	1.866		18.7	91.8
12-Month Total	219.202	14.719	.769	132.530		19.0	91.8
Previous Total	3,608.	155.	462.	2,068.	<.05	323.	90.
Total to Date	3,827	170.	463.	2,201	<.05	342.0	181.8

Disposal Site: 216-S-7 Crib

Waste Stream : D-1 and D-2 Wastes from January 1959 to July 1965.

Period	Volume ($n \times 10^6$ l)	Uranium (kilograms)	Plutonium (grams)	Units in Curies		
				Beta Particle Emitters	Co ⁶⁰	Sr ⁹⁰ Cs ¹³⁷
January	4.524	1.336	.056	1,191.629		
February	3.648	10.596	.225	774.823		
March	1.498	.414	.110	795.357		
April	1.666	.360	.020	148.314		
May	3.267	2.354	.161	897.780		
June	1.346	1.164	1.316	297.679		101.979 101.557
July	.884	.506	.043	182.753		
August						
September						
October						
November						
December						
12-Month Total	16.833	16.730	1.931	4,288.335		101.979 101.557
Previous Total	359.	2,664.	434.1	227,300.	2.3 2,945.	364.
Total to Date	376.	2,681.	436.0	281,600 .	2.3 3,047.	466.

TABLE XIII

Disposal Site: 216-S-9 Crib

Waste Stream : D-1 and D-2 Wastes from July 1965 to date.

<u>Period</u>	<u>Volume (n x 10⁶ l)</u>	<u>Uranium (kilograms)</u>	<u>Plutonium (grams)</u>	<u>Units in Curies Beta Particle Emitters</u>	<u>Co⁶⁰</u>	<u>Sr⁹⁰</u>	<u>Cs¹³⁷</u>
January							
February							
March							
April							
May							
June							
July	.885	.507	.044	182.754			
August	2.643	1.143	.032	427.329			
September	1.169	.253	.510	99.450			
October	1.167	.449	.072	185.965			
November	2.417	.302	.548	378.822			
December	1.720	.590	.741	233.563		46.0	85.3
12-Month Total	10.001	3.244	1.947	1,507.883		46.0	85.3
Previous Total							
Total to Date	10.0	3.24	1.95	1,508.		46.0	85.3

TABLE XV

Disposal Site: 216-S-13 Crib

Waste Stream : Aqueous waste from 276-S Building from February 1951 to date.

<u>Period</u>	<u>Volume (n x 10⁶ l)</u>	<u>Uranium (kilograms)</u>	<u>Plutonium (grams)</u>	<u>Units in Curies Beta Particle Emitters</u>	<u>Co⁶⁰</u>	<u>Sr⁹⁰</u>	<u>Cs¹³⁷</u>
January	.017	.586	.005	7.470			
February	.021	10.	.03	15.			
March	.041	4.418	.007	10.163			
April	.075	12.600	.003	.513			
May	.096	.889	.008	6.782			
June	.045	.055	.001	1.153			
July	.032	1.674	.005	3.230		.004	1.326
August	.032	.302	.002	3.185			
September	.012	2.659	.003	2.555			
October	.041	.884	.030	192.240			
November	.014	.589	.008	2.243			
December	.014	.103	.007	13.392		.02	1.028
12-Month Total	.440	34.759	.109	257.926		.024	2.354
Previous Total	4.46	50.	8.15	300.		.01	2.1
Total to Date	4.90	85.	8.26	558.		.03	4.5

TABLE XVI

Disposal Site: 216-S-20 Crib

Waste Stream : Redox Laboratory and 207-SL Basin Wastes from January 1952 to date.

<u>Period</u>	<u>Volume</u> ($n \times 10^6$ l)	<u>Uranium</u> (kilograms)	<u>Plutonium</u> (grams)	Units in Curies		
				<u>Beta Particle</u> <u>Emitters</u>	<u>Co⁶⁰</u>	<u>Sr⁹⁰</u> <u>Cs¹³⁷</u>
January	.047	.004	.043	.018		
February	.004	.006	.049	.302		
March	.024	.002	.003	.008		
April	.010	.002	.003	.011		
May	.025	.019	.031	.037		
June	.053	.010	.045	.046		.003 <.001
July	.034	.017	.003	.002		
August	.009	<.001	.001	<.001		
September	.017	.001	.007	.011		
October	.021	<.001	.004	<.001		
November	.012	.007	.001	.005		
December	.032	.002	.013	.012		.002 .011
12-Month Total	.288	.072	.203	.454		.005 .01
Previous Total	124.	35.	169.	6,620.	1.4	44.7 110.5
Total to Date	124.3	35.1	169.2	6,620	1.4	44.7 110.5

TABLE XVII

Disposal Site: 216-S-21 Crib

Waste Stream : SX Tank Farm condensate from November 1954 to date.

<u>Period</u>	<u>Volume ($n \times 10^6$ l)</u>	<u>Uranium (kilograms)</u>	<u>Plutonium (grams)</u>	<u>Units in Curies Beta Particle Emitters</u>	<u>Co⁶⁰</u>	<u>Sr⁹⁰</u>	<u>Cs¹³⁷</u>
January	.846	<.001	.001	6.731			
February	.903	.001	.009	90.996			
March	1.032	.008	.002	6.922			
April	.448	.001	<.001	.173			
May	1.298	.005	<.001	5.148			
June	1.305	.003	.001	5.553		.216	11.311
July	1.211	.003	.001	7.841			
August	.876	<.001	.001	4.283			
September	.974	.005	.006	14.946			
October	.977	.002	<.001	8.542			
November	1.055	.291	<.001	9.642			
December	1.062	.010	.015	13.529		1.403	18.179
12-Month Total	11.987	.331	.040	174.306		1.619	29.490
Previous Total	53.9	3.7	2.25	223.	.04	19.	101.
Total to Date	65.9	4.0	2.29	397.	.04	20.6	130.5

TABLE XVIII

Disposal Site: 216-T-27 Crib

Waste Stream : 300 Area Laboratories effluent (340 Facility) from October 2, 1965 to November 17, 1965.

<u>Period</u>	<u>Volume (n x 10⁶ l)</u>	<u>Uranium (kilograms)</u>	<u>Plutonium (grams)</u>	<u>Units in Curies</u>		
				<u>Beta Particle Emitters</u>	<u>Co⁶⁰</u>	<u>Sr⁹⁰ Cs¹³⁷</u>
January						
February						
March						
April						
May						
June						
July						
August						
September	1.4	.2	3.4	620		
October	39.6	.2	9.1	1,254		
November	.8		0.1	112		
December						
12-Month Total	41.8		12.6	1,986		
Previous Total						
Total to Date	42		12.6	2,000		

TABLE XVIII

Disposal Site: 216-T-28 Crib

Waste Stream : T-Plant Waste Handling and Decontamination Operation from
February, 1960 to date.

<u>Period</u>	<u>Volume ($n \times 10^6$ l)</u>	<u>Uranium (kilograms)</u>	<u>Plutonium (grams)</u>	<u>Units in Curies</u>		
				<u>Beta Particle Emitters</u>	<u>Co⁶⁰</u>	<u>Sr⁹⁰</u> <u>Cs¹³⁷</u>
January	.243	2.418	.117	717.842		
February						
March	.281	3.375	.696	626.670		
April	.388	1.630	.520	1,895.103		
May						
June	.255	2.710	.262	1,360.975		
July	.136	0.163	.089	92.808		
August	.351	3.206	.557	13,736.176		
September						
October						
November						
December	.228	2.578	1.104	123.705		
12-Month Total	1.882	15.080	3.345	18,533.279		
Previous Total	9.6	117.	24.6	24,138.		
Total to Date	11.5	132.	27.9	42,671.		

TABLE XX

Disposal Site: 216-T-28 Crib

Waste Stream : 300 Area Laboratories effluent (340 Facility) from October 1963 to October 1965.

Period	Volume ($n \times 10^6$ l)	Uranium (kilograms)	Plutonium (grams)	Units in Curies		
				Beta Particle Emitters	Co ⁶⁰	Sr ⁹⁰ Cs ¹³⁷
January	1.1	*	0.9	216		
February	1.0	*	7.4	200		
March	1.9	3.5	4.0	7,800		
April	1.7	0.9	5.3	440		
May	1.1	1.0	3.7	970		
June	2.0	*	.02	128		
July	1.0	8.3	1.3	864		
August	1.4	*	4.0	1,204		
September						
October						
November						
December						
12-Month Total	11.2	*	26.6	11,822		
Previous Total	19	236	15.7	3,901		
Total to Date	30.	*	42.3	15,723		

* Complete data not yet available from Battelle-Northwest.

TABLE XXI

Disposal Site: 216-T-28 Crib

Waste Stream : Total of 300 Area and WH & DO wastes.

Period	Volume (n x 10 ⁶ l)	Uranium * (kilograms)	Plutonium (grams)	Units in Curies		
				Beta Particle Emitters	Co ⁶⁰	Sr ⁹⁰ Cs ¹³⁷
January	1.3		1.0	934		
February	1.0		7.4	200		
March	2.3		4.7	8,427		
April	2.1		5.8	2,335		
May	1.1		3.7	970		
June	2.3		0.3	1,489		
July	1.1		1.4	957		
August	1.8		4.6	14,940		
September						
October						
November						
December	0.2		1.1	124		
12-Month Total	13.2		30.0	30,376		
Previous Total	28.5		40.4	28,040		
Total to Date	41.7		70.4	58,416		

* Complete data not yet available from Battelle-Northwest.

TABLE XXI

Disposal Site: 216-U-12 Cribs

*Waste Stream : UO_3 Plant concentrator condensate from April, 1960 to date.

<u>Period</u>	<u>Volume</u> ($n \times 10^6$ l)	<u>Uranium</u> (kilograms)	<u>Plutonium</u> (grams)	<u>Units in Curies</u> <u>Beta Particle</u> <u>Emitters</u>	<u>Co⁶⁰</u>	<u>Sr⁹⁰</u>	<u>Cs¹³⁷</u>
January	.655	1.36		.008			
February	.730	2.73		.015			
March	.731	2.27					
April	1.61	17.7		.003			
May	1.68	77.3		.005			
June	1.17	33.6		.020			
July	.63	5.5		.02			
August	1.55	16.4		.9			
September	1.3	15.0		.02			
*October	2.15	14.54		772.01		104.3	
November	.82	7.73		.016			
December	.78	15.00		.015			
12-Month Total	13.806	209.13		773.032		104.3	
Previous Total	69.	1,308.		79.8		104.3	
Total to Date	83.	1,517.		852.8		104.3	

Disposal of contaminated water from 244-WR Vault was accomplished in October, 1965 and included 3.14 kg. Thorium.

TABLE XXII

Disposal Site: 216-Z-1A Crib

Waste Stream : Plutonium Reclamation wastes from June 1964 to date.

<u>Period</u>	<u>Volume (n x 10⁶ l)</u>	<u>Uranium (kilograms)</u>	<u>Plutonium (grams)</u>	<u>Units in Curies Beta Particle Emitters</u>	<u>Co⁶⁰</u>	<u>Sr⁹⁰</u>	<u>Cs¹³⁷</u>
January	.080		198				
February	.082		127				
March	.074		128				
April	.071		222				
May	.071		168				
June	.087		12				
July	.066		268				
August	.083		189				
September	.077		149				
October	.081		65				
November	.090		86				
December	.057		28				
12-Month Total	.919		1,640				
Previous Total	.44		2,132				
Total to Date	1.36		3,772				

TABLE XXIV

Disposal Site: 216-Z-7 Crib

Waste Stream : 300 Area Laboratories effluent (340 Facility) from November 17, 1965 to date.

<u>Period</u>	<u>Volume (n x 10⁶ l)</u>	<u>Uranium (kilograms)</u>	<u>Plutonium (grams)</u>	<u>Units in Curies</u>		
				<u>Beta Particle Emitters</u>	<u>Co⁶⁰</u>	<u>Sr⁹⁰</u> <u>Cs¹³⁷</u>
January						
February						
March						
April						
May						
June						
July						
August						
September						
October						
November	0.7		0.1	111		
December	1.2		0.1	98		
12-Month Total	1.9		0.2	209		
Previous Total	42		480.	-		
Total to Date	44		480	209		

TABLE XXIV

Disposal Site: 216-Z-12 Crib

Waste Streams: Analytical laboratory wastes
 Development laboratory wastes
 Plutonium processing wastes

<u>Period</u>	<u>Volume (n x 10⁶ l)</u>	<u>Uranium (kilograms)</u>	<u>Plutonium (grams)</u>	<u>Units in Curies</u>		
				<u>Beta Particle Emitters</u>	<u>Co⁶⁰</u>	<u>Sr⁹⁰</u> <u>Cs¹³⁷</u>
January	1.727		279			
February	1.252		430			
March	2.228		232			
April	1.773		222			
May	1.651		111			
June	1.625		103			
July	1.289		118			
August	1.113		120			
September	1.663		28			
October	.871		38			
November	1.000		86			
December	.631		97			
12-Month Total	16.823		1,864			
Previous Total	190.		17,280			
Total to Date	207.		19,144			

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 XXV

SWAMPS CURRENTLY IN USE

<u>Disposal Site</u>	<u>Volume (Liters)</u>		<u>Uranium (Kilograms)</u>	<u>Plutonium (Grams)</u>		<u>Units in Curies Beta Particle Emitters</u>	
	<u>1965</u>	<u>Total to Date</u>	<u>1965</u>	<u>1965</u>	<u>Total to Date</u>	<u>1965</u>	<u>Total to Date</u>
"B" Swamp & Chem. Sewer	885×10^6	6.17×10^{10}	8.3	27	195	55.9	4,135
"U" Swamp	$1,360 \times 10^6$	5.18×10^{10}	37.8	-	145	11.4	667
202-S Swamp Number 2	$2,917 \times 10^6$	2.56×10^{10}	12.5	1.8	357	24.6	825
222-S Swamp	35×10^6	3.51×10^8	2.9	0.4	20	3.6	16
Gable Mt. Swamp	$11,927 \times 10^6$	8.29×10^{10}	51.9	62	331	525.	13,688
Totals to Date		22.23×10^{10}			1,048		19,331

TABLE XXVISWAMPS NO LONGER IN USE

<u>Disposal Site</u>	<u>Volume ($n \times 10^6$ L)</u>	<u>Plutonium (Grams)</u>	<u>Units in Curies Beta Particle Emitters</u>
202-S-1	6.3×10^3	3	1100
"T" Swamp	3.1×10^4	0.01	110
Totals	3.7×10^4	3.0	1200

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SCALE - 1" = 500'

pg 37

200 WEST AREA

CONELL

LEGEND

- ROADS
- RAILROADS
- HANFORD WORKS ROAD NUMBER
- U.S. HIGHWAY NUMBER
- STATE HIGHWAY NUMBER
- GRAVEL ROADS

SCALE IN MILES

**DATE
FILMED**

6/30/94

END