

SEMI-ANNUAL REPORT NO. 78-2

PROVISIONAL OPERATING LICENSE NO. DPR-16

RADIOACTIVE EFFLUENT RELEASES

JULY 1, 1978 THROUGH DECEMBER 31, 1978

ADDENDUM No. I

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This addendum completes Semi-Annual Report 1978-2. Report 1978-2 was submitted incomplete due to delays encountered in the radiochemical analyses of strontium-89 and strontium-90. This addendum provides strontium data as well as processed results such as totals, averages and other reportable parameters.

Gaseous Effluents

During the reporting period, July 1, 1978 through December 31, 1978 a total of 3.46×10^5 curies of fission and activation gases, 3.68 curies of non-particulate halogens with half-lives greater than eight days, 3.68 curies of particulate activity with half lives greater than eight days, and 1.35×10^1 curies of tritium were released. The maximum hourly release rate of gross activity was 6.38×10^4 microcuries per second at approximately 0800 on August 8, 1978.

The airborne releases are summarized in Table II-1A.

Liquid Effluents

A total of 1.58×10^7 liters of water was processed through the radwaste system. Of this, 1.71×10^6 liters containing 1.97×10^1 curies of activity (including tritium) was released to the environment. The maximum concentration of gross radioactivity (Bq) released to the unrestricted area (averaged over the period of release) was 6.33×10^{-8} microcuries per milliliter on September 18, 1978.

The liquid release data are summarized in Table II-2A.

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TABLE II-1A
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT 1978-2
GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

	Unit	Third Quarter	Fourth Quarter	Est. Total Error %
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A. Fission & activation gases

1. Total release	Ci	2.76 E 5	6.96 E 4	3.0 E 1
2. Average release rate for period	μCi/sec	4.24 E 4	3.78 E 4	
3. Percent of Tech Spec limit	%	1.59 E 1	1.52 E 1	

B. Iodines

1. Total iodine-131	Ci	2.97	7.10 E-1	2.5 E 1
2. Average release rate for period	μCi/sec	3.73 E-1	8.92 E-2	
3. Percent of Tech Spec limit	%	9.33	2.23	

C. Particulates

1. Particulates with half-lives >8 days	Ci	3.57	1.06 E-1	2.5 E 1
2. Average release rate for period	μCi/sec	4.49 E-1	1.33 E-2	
3. Percent of Tech Spec limit	%	1.12 E 1	3.33 E-1	
4. Gross alpha radioactivity	Ci	5.14 E-5	9.49 E-5	

D. Tritium

1. Total release	Ci	1.15 E 1	1.99	4.0 E 1
2. Average release rate for period	μCi/sec	1.45	2.50 E-1	

Table II-1C
Effluent and Waste Disposal Semi-Annual Report 1978-2
Gaseous Effluents - Summation of All Releases

Isotopes Released	Unit	Third Quarter	Fourth Quarter		MDL
Particulates					
Strontium-89	Ci	7.58 E-1	2.62 E-2		3.31 E-9
Strontium-90	Ci	6.53 E-3	2.92 E-4		2.81 E-10
Cesium-134	Ci	1.00 E-3	1.17 E-4		9.52 E-11
Cesium-137	Ci	9.63 E-3	1.26 E-3		1.23 E-10
Barium-140	Ci	2.73	5.39 E-2		1.43 E-9
Neptunium-140	Ci	2.28	3.69 E-2		6.21 E-10
Others					
Radium-51	Ci	2.82 E-3	9.36 E-5		1.35 E-9
Manganese-54	Ci	4.53 E-4	1.46 E-2		1.30 E-10
Cobalt-58	Ci	<MDL	2.30 E-5		4.75 E-11
Iron-59	Ci	<MDL	4.12 E-4		1.96 E-10
Cobalt-60	Ci	1.33 E-5	4.16 E-3		4.09 E-10
Caesium-65	Ci	9.08 E-4	<MDL		1.77 E-9
Strontium-91	Ci	1.66 E-1	2.52 E-1		1.33 E-9
Rhenium-95	Ci	<MDL	4.30 E-5		1.09 E-10
Plutonium-95	Ci	<MDL	3.36 E-4		9.19 E-11
Hydrogen-99	Ci	3.35 E-2	1.02 E-2		3.57 E-10
Technetium-99m	Ci	3.35 E-2	1.02 E-2		3.57 E-10
Rhenium-103	Ci	<MDL	3.40 E-5		6.78 E-11
Rhenium-106	Ci	<MDL	8.33 E-4		1.05 E-9
Iodine-131	Ci	4.05 E-2	2.76 E-3		3.93 E-10
Iodine-133	Ci	4.03 E-1	2.79 E-2		3.58 E-10
Iodine-135	Ci	5.48 E-1	5.67 E-2		3.71 E-8
Barium-141	Ci	1.79 E-3	4.83 E-4		1.29 E-10
Barium-143	Ci	9.11 E-3	1.01 E-4		3.61 E-10
Barium-144	Ci	1.45 E-2	2.40 E-4		8.17 E-10
Actinium-233	Ci	1.39 E-3	4.11 E-4		4.55 E-10
Plutonium-239	Ci	1.03 E-2	3.44 E-3		7.57 E-10
Total for Period	Ci	7.05	5.04 E-1		

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TABLE II-2A
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT 1977
LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

	Unit	Third Quarter	Fourth Quarter	Est. Total Error %
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A. Fission and activation products

1. Total releases (not including tritium, gases, alpha)	Ci	9.62 E-3	8.74 E-2	3.0 E 1
2. Average diluted concentration during period	μCi/ml	8.68 E-11	1.32 E-9	
3. Percent of applicable limit	%	2.04 E-3	5.00 E-3	

B. Tritium

1. Total release	Ci	1.05	1.85 E 1	3.0 E 1
2. Average diluted concentration during period	μCi/ml	9.47 E-9	2.79 E-7	
3. Percent of applicable limit	%	3.16 E-4	9.31 E-3	

C. Dissolved and entrained gases

1. Total release	Ci	3.38 E-3	<MDL	3.0 E 1
2. Average diluted concentration during period	μCi/ml	3.05 E-11	-	
3. Percent of applicable limit	%	1.02 E-3	-	

D. Gross alpha radioactivity

1. Total release	Ci	<MDL	1.08 E-3	3.0 E 1
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E. Volume of waste released (prior to dilution)	liters	7.10 E 4	1.64 E 6	1.0 E 1
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F. Volume of dilution water used during period	liters	4.17 E 11	2.49 E 11	1.0 E 1
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Table II-2B
Waste Disposal Report 1978-2
Liquid Effluents

Batch Release

Nuclide	Unit	Third Quarter	Fourth Quarter		MDL
Strontium-89	Ci	4.52 E-4	1.00 E-3		7.04 E-10
Strontium-90	Ci	1.40 E-5	1.31 E-4		6.75 E-11
Iodine-131	Ci	4.90 E-4	<MDL		8.86 E-10
Cesium-134	Ci	<MDL	4.80 E-3		7.16 E-10
Cesium-137	Ci	<MDL	6.92 E-3		6.75 E-10
Chromium-51	Ci	1.14 E-3	<MDL		9.48 E-9
Manganese-54	Ci	5.48 E-4	1.40 E-2		7.34 E-10
Cobalt-58	Ci	<MDL	2.65 E-4		7.39 E-10
Iron-59	Ci	<MDL	8.33 E-4		1.30 E-9
Cobalt-60	Ci	1.41 E-3	4.21 E-2		1.18 E-9
Zinc-65	Ci	2.99 E-4	<MDL		1.44 E-9
Strontium-91	Ci	<MDL	6.68 E-4		2.24 E-9
Molybdenum-99	Ci	2.90 E-4	<MDL		1.77 E-9
Technetium-99m	Ci	2.90 E-4	<MDL		1.77 E-9
Barium-140	Ci	7.81 E-4	1.85 E-4		1.61 E-9
Lanthanum-140	Ci	3.00 E-3	5.01 E-4		8.69 E-10
Cobalt-57	Ci	<MDL	1.20 E-4		6.66 E-10
Zirconium-95	Ci	<MDL	1.34 E-3		1.09 E-9
Niobium-95	Ci	1.70 E-4	2.22 E-3		7.00 E-10
Niobium-95m	Ci	<MDL	1.82 E-4		5.88 E-9
Ruthenium-103	Ci	1.27 E-4	8.01 E-4		6.90 E-10
Antimony-124	Ci	<MDL	3.25 E-4		6.81 E-10
Iodine-133	Ci	2.13 E-4	<MDL		6.79 E-10
Cesium-136	Ci	<MDL	1.38 E-4		7.39 E-10
Cerium-141	Ci	3.91 E-4	6.63 E-3		1.99 E-9
Cerium-143	Ci	<MDL	1.71 E-4		1.42 E-9
Cerium-144	Ci	<MDL	4.10 E-3		4.69 E-9
Total (above)	Ci	9.62 E-3	8.74 E-2		
Xenon-133	Ci	2.88 E-3	<MDL		6.61 E-10
Xenon-135	Ci	5.03 E-4	<MDL		1.19 E-9
Tot (above)	Ci	3.38 E-3	<MDL		