

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
SUPPLEMENTAL INFORMATION
FIRST HALF 1985

1. Regulatory Limits

a. Fission and Activation Gases:

(1) Instantaneous -

$$\frac{Q_1}{0.13} + \frac{Q_2}{1.46} \leq 1$$

Q₁ = release rate from building exhaust vents in Ci/sec.

Q₂ = release rate from main stack in Ci/sec.

(2) Quarterly - ≤ 0.10 Ci/sec. as average

b. & c. Iodines and particulates, half-lives >8 days

(1) Instantaneous -

$$\frac{Q_3}{0.33} + \frac{Q_4}{44} \leq 1$$

Q₃ = release rate from building exhaust vents in uCi/sec.

Q₄ = release rate from main stack in uCi/sec.

(2) Quarterly - ≤ 0.80 uCi/sec. as average.

d. Liquid effluent: 1×10^{-7} uCi/ml (ref. 10 CFR 20, Appendix B, note 3C, Table II, column 2).

e. Tritium

(1) Liquid - $\leq 3.0E-3$ uCi/cc (ref. 10 CFR 20, Table II, column 2).

(2) Airborne - $\leq 2.0E-7$ uCi/ml (ref. 10 CFR 20, Table I, column 2).

2. Maximum Permissible Concentration

a. Fission and Activation Gases: Not Applicable

b. Iodines: Not Applicable

c. Particulates, half-lives >8 days: Not Applicable

d. Liquid effluents: sum of indiv. MPC ratios ≤ 1
(ref. 10 CFR 20, Appendix B, note 1)



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EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
SUPPLEMENTAL INFORMATION (CONTINUED)

FIRST HALF 1985

3. Average Energy - Not Applicable

4. Measurements and Approximations of Total Radioactivity

a., b. & c. Fission and Activation Gases, Iodines, and Particulates:

Airborne effluent gaseous activity is continuously monitored and recorded; additionally, grab samples are taken and analyzed monthly to determine specific radionuclide activity concentrations. Stack and building vent effluent flow rates are calculated once a shift based on the configuration of operating exhaust fans. The flow rate data is consolidated weekly to determine the volume of airborne effluents released from the plant.

Charcoal and particulate samples are taken and analyzed at least weekly to determine specific activity concentrations. The total activity released from the plant is then calculated by taking weekly activity concentration values and multiplying them by the weekly airborne effluent volume.

Allowance is made for a plus or minus one sigma counting error associated with gamma isotopic analyses.

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
 SUPPLEMENTAL INFORMATION (CONTINUED)
 FIRST HALF 1985

4. Measurements and Approximations of Total Radioactivity (Continued)

d. Liquid Effluents

Gross beta, gamma and total gamma isotopic activity concentrations are determined on each batch of liquid effluent prior to release. The total curie content of a released batch is determined by multiplying the highest of the above three activity concentrations by the total volume discharged. The total activity released during a month is then determined by summing the activity content of each batch discharged during the month.

Allowance is made for plus or minus one sigma counting error associated with the total gamma isotopic analyses.

5. <u>Batch</u>	<u>Value</u>		<u>Unit</u>
	<u>First</u>	<u>Second</u>	
a. <u>Liquid</u>	<u>Quarter</u>	<u>Quarter</u>	
(1) Number of batches released	144	151	Each
(2) Total time period for batch releases	46,501	46,393	Minute
(3) Maximum time period for a batch release	435	1,085	Minute
(4) Average time period for batch releases	322.92	918.56	Minute
(5) Minimum time period for batch releases	205	400	Minute
(6) Average stream flow during period of release of effluent into a flowing stream ¹	---	---	
b. <u>Gaseous</u>			
None			

¹To be supplied by others.

EFFLUENTS AND WASTE DISPOSAL SEMIANNUAL REPORT

FIRST HALF 1985

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

	<u>Unit</u>	<u>First Quarter</u>	<u>Second Quarter</u>	<u>% Error</u>
<u>A. Fission and Activation Products</u>				
1. Total Releases (1)	Curies	7.92E-01	2.23E-01	±1.50E+01
2. Average Diluted Conc. During Period	uCi/ml	4.00E-09	1.48E-09	
3. Percent of Applicable Limit	%	3.96E+00	1.12E+00	
<u>B. Tritium</u>				
1. Total Release	Curies	1.61E+01	1.08E+01	±5.00E+00
2. Average Diluted Conc. During Period	uCi/ml	8.13E-08	7.15E-08	±5.00E+00
3. Percent of Applicable Limit (3E-03 uCi/ml)	%	2.71E-03	2.38E-03	
<u>C. Dissolved and Entrained Gases</u>				
1. Total Release	Curies	3.91E-01	8.85E-03	±2.80E+00
2. Average Diluted Conc. During Period	uCi/ml	1.97E-09	5.86E-11	
3. Percent of Applicable Limit (6E-06 uCi/ml)	%	3.28E-02	9.77E-04	
<u>D. Gross Alpha Radioactivity¹</u>				
1. Total Release	Curies	3.20E-04	4.713E-04	±1.70E+01
<u>E. Volume of Waste Release</u>				
(Before Dilution)	Liters	1.61E+07	1.67E+07	±5.00E+00
F. <u>Volume of Dilution Water for Period</u>	Liters	1.98E+11	1.51E+11	± 1.00E+01

(1)Based on pre-release analyses which are not decay corrected.

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

LIQUID RELEASES FOR FIRST HALF 1985 BATCH MODE

<u>Isotope</u>	<u>First⁽¹⁾ Quarter</u>	<u>Second⁽¹⁾ Quarter</u>
1. Chromium-51	2.06E-02	1.32E-03
2. Manganese-54	4.49E-03	4.14E-03
3. Cobalt-58	4.36E-04	2.76E-04
4. Iron-59	2.78E-05	<2.67E-03
5. Cobalt-60	4.67E-02	2.22E-02
6. Zinc-65	7.67E-02	5.47E-02
7. Niobium-95	5.30E-05	5.69E-05
8. Zirconium-95	< MDA	<2.77E-03
9. Molybdenum-Techneium-99m	2.20E-03	9.60E-06
10. Iodine-131	9.64E-03	5.79E-05
11. Xenon-133	1.61E-01	1.36E-03
12. Cesium-134	7.20E-02	5.42E-02
13. Xenon-135	1.57E-01	1.61E-05
14. Cesium-137	8.43E-02	6.95E-02
15. Barium-140	5.35E-04	1.28E-04
16. Lanthanum-140	5.25E-03	<6.17E-04
* 17. Cerium-141	1.54E-02	<2.59E-03
18. Strontium-89	1.62E-03	3.65E-03
19. Strontium-90	8.04E-06	4.19E-06

(1) Quantities listed are in curies.

(2) Calculated by multiplying Cs-134 by a factor of 0.2133. (Established by ratio CE-141/CS-134 in March 1979). A new ratio of 0.1570 was established in December 1982. For conservatism, use of 0.2133 factor will continue.

(3) Predicted estimation of release.

NOTE: Reporting requirements for First and Second Quarter were changed from using <MDA to reporting a numerical < value.

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
LIQUID RELEASES FOR FIRST HALF 1985 BATCH MODE

<u>Isotope</u>	<u>First *</u> <u>Quarter</u>	<u>Second *</u> <u>Quarter</u>
<u>Others (Not Required for Reg. Guide 1.21)</u>		
* 1. Zinc-69m		1.03E-05
* 2. Arsenic-76		2.29E-04
* 3. Krypton-85m		2.21E-05
* 4. Technetium-104		1.36E-04
5. Silver-110m	8.65E-04	6.34E-04
6. Antimony-125	4.33E-04	4.35E-04
* 7. Barium-139		9.50E-05
* 8. Cesium-144	< MDA	1.40E-04
9. Bromine-84	1.64E-03	5.11E-04
10. Sodium-24	2.72E-02	
11. Fluorine-18	< MDA	
12. Iodine-133	2.62E-02	
13. Cesium-136	< MDA	
14. Manganese-56	< MDA	
15. Antimony-124	1.74E-04	
16. Copper-64	< MDA	
17. Iodine-135	9.71E-03	

Quantities listed are in curies.

NOTE: No values are recorded for isotopes which are not detected during a given quarter.

EFFLUENT AND WASTE DISPOSAL

FIRST HALF 1985

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

A. Solid Waste Shipped Off-Site for burial or disposal (not irradiated fuel)

1. Type of Waste	Unit	First Quarter	Second Quarter	Error %
a. Spent resin, filter sludges, evaporator bottoms, etc.	m3	1.39E+02	1.09E+02	1.50E+01
	Ci	9.86E+02	1.23E+03	
b. Dry compressible waste (Drums) contaminated equip., etc.	m3	9.95E+01	6.03E+01	1.50E+01
	Ci	3.27E+00	1.17E+00	
c. Irradiated Components, control rods, etc.	m3	NA	NA	
	Ci			
d. Non-compressible waste, (Boxes) Scrap metal, scrap wood, etc. (Drums)	m3	3.95E+02	4.10E+02	1.50E+01
	Ci	1.55E+01	1.73E+01	
	m3	1.08E+02	3.82E+01	
	Ci	1.67E+02	2.42E+01	

2. Estimate of major nuclide composition (by type of waste)

a. Spent Resins, Filter Sludges, Evaporator Bottoms, etc.

	First Quarter				Second Quarter			
	Unit		Unit		Unit		Unit	
1. Zinc-65	%	4.06E+01	Ci	4.01E+02	%	5.31E+01	Ci	6.55E+02
2. Cesium-137	%	1.94E+01	Ci	1.91E+02	%	1.39E+01	Ci	1.71E+02
3. Cesium-134	%	1.90E+00	Ci	1.88E+02	%	1.23E+01	Ci	1.52E+02
4. Chromium-7	%	6.22E+00	Ci	6.14E+01	%	4.92E+00	Ci	6.07E+01
5. Cobalt-60	%	5.58E+00	Ci	5.50E+01	%	1.15E+01	Ci	1.42E+02
6. Lanthanum-140	%	1.98E+00	Ci	1.96E+01	%	2.06E-01	Ci	2.55E+00
7. Barium-140	%	1.71E+00	Ci	1.69E+01	%	2.54E-01	Ci	3.13E+00
8. Iodine-131	%	1.66E+00	Ci	1.64E+01	%	5.96E-02	Ci	7.36E-01
9. Manganese-54	%	8.71E-01	Ci	8.59E+00	%	1.56E+00	Ci	1.92E+01
10. Silver-110m	%	4.22E-01	Ci	4.16E+00	%	7.37E-01	Ci	9.09E+00



EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

FIRST HALF 1985

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS (CONTINUED)

2. Estimate of Major Nuclide Composition (by type of waste) (Continued)
 a. Spent Resins, Filter Sludges, Evaporator Bottoms, etc (Continued)

	Unit	First Quarter		Second Quarter		Unit	Unit	
		Unit	Unit	Unit	Unit			
11. Cobalt-59	%	2.45E-01	Ci	2.41E+00	%	7.51E-01	Ci	9.26E+00
12. Strontium-90	%	3.78E-01	Ci	3.73E+00	%	2.07E-01	Ci	2.55E+00
13. Cerium-141	%	2.28E-01	Ci	2.25E+00	%	4.91E-02	Ci	6.06E-01
14. Other Nuclides	%	1.34E+00	Ci	1.32E+01	%	4.28E-01	Ci	5.28E+00
b. Dry Compressible Waste, Contaminated Equipment, etc.								
1. Zinc-65	%	2.75E+01	Ci	9.00E-01	%	5.11E+01	Ci	5.96E-01
2. Cesium-137	%	1.86E+01	Ci	6.08E-01	%	4.89E+00	Ci	5.70E-02
3. Cesium-134	%	1.93E+01	Ci	6.31E-01	%	4.02E+00	Ci	4.69E-02
4. Chromium-51	%	1.85E+01	Ci	6.05E-01	%	1.91E+01	Ci	2.23E-01
5. Cobalt-60	%	8.58E+00	Ci	2.81E-01	%	1.29E+01	Ci	1.51E-01
6. Lanthanum-140	%	1.43E+00	Ci	4.68E-02	%	8.66E-01	Ci	1.01E-02
7. Barium-140	%	1.32E+00	Ci	4.31E-02	%	9.77E-01	Ci	1.14E-02
8. Iodine-131	%	7.00E-01	Ci	2.29E-02	%	2.31E-01	Ci	2.70E-03
9. Manganese-54	%	8.40E-01	Ci	2.75E-02	%	8.92E-01	Ci	1.04E-02
10. Silver-110m	%	5.93E-01	Ci	1.94E-02	%	9.52E-01	Ci	1.11E-02
11. Cobalt-58	%	6.30E-01	Ci	2.06E-02	%	6.60E-01	Ci	7.70E-03
12. Strontium-90	%	3.64E-01	Ci	1.19E-02	%	2.57E-02	Ci	3.00E-04
13. Cerium-141	%	1.22E-01	Ci	4.00E-03	%	1.46E-01	Ci	1.70E-03
14. Other Nuclides	%	1.59E+00	Ci	4.21E-02	%	3.22E+00	Ci	3.75E-02

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
 FIRST HALF 1985
 SOLID WASTE AND IRRADIATED FUEL SHIPMENTS (CONTINUED)

2. Estimate of major nuclide composition (by type of waste) (continued)

c. Irradiated Components, Control Rods, etc.

<u>First Quarter</u>		<u>Second Quarter</u>	
<u>Unit</u>	<u>Unit</u>	<u>Unit</u>	<u>Unit</u>

NONE SHIPPED

d. Non-compressible Waste, Scrap Metal, Scrap Wood, etc.

		<u>First Quarter</u>		<u>Second Quarter</u>					
		<u>Unit</u>	<u>Unit</u>	<u>Unit</u>	<u>Unit</u>				
1.	Zinc-65	%	2.80E+01	Ci	5.12E+01	%	4.89E+01	Ci	2.02E+01
2.	Cesium-137	%	2.08E+01	Ci	3.80E+01	%	6.18E+00	Ci	2.55E+00
3.	Cesium-134	%	2.11E+01	Ci	3.84E+01	%	5.40E+00	Ci	2.23E+00
4.	Chromium-51	%	1.45E+01	Ci	2.64E+01	%	1.86E+01	Ci	7.70E+00
5.	Cobalt-60	%	8.80E+00	Ci	1.61E+01	%	1.27E+01	Ci	5.26E+01
6.	Lanthanum-140	%	1.12E+00	Ci	2.05E+00	%	8.77E-01	Ci	3.62E-01
7.	Barium-140	%	1.30E+00	Ci	2.38E+00	%	9.75E-01	Ci	4.03E-01
8.	Iodine-131	%	5.31E-01	Ci	9.71E-01	%	2.56E-01	Ci	1.06E-01
9.	Manganese-54	%	7.92E-01	Ci	1.45E+00	%	2.37E+00	Ci	9.78E-01
10.	Silver-110m	%	5.75E-01	Ci	1.05E+00	%	9.19E-01	Ci	3.79E-01
11.	Cobalt-58	%	5.46E-01	Ci	9.98E-01	%	1.70E+00	Ci	7.03E-01
12.	Strontium-90	%	4.07E-01	Ci	7.43E-01	%	8.84E-02	Ci	3.65E+02
13.	Cerium-141	%	9.86E-02	Ci	1.80E-01	%	1.38E-01	Ci	5.69E-02
14.	Other Nuclides	%	2.68E+00	Ci	1.47E+00	%	8.60E-01	Ci	3.55E-01

3. Solid Waste Disposition

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
78	Sole Use Truck	Barnwell, SC
38	Sole Use Truck	Richland, WA

4. Irradiated Fuel Disposition

NO SHIPMENT

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
 FIRST HALF 1985
 GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

<u>Summation of All Releases</u>	<u>Unit</u>	<u>First Quarter</u>	<u>Second Quarter</u>	<u>% Error</u>
A. Fission and Activation Gases				
1. Total Releases	Ci	2.57E+04	< MDA	±7.60E+00
2. Average release rate for period	uCi/sec.	3.27E+03	< MDA	
3. Percent of technical specification limit	%	6.54E+00	< MDA	
B. Iodines				
1. Total Iodine-131	Ci	2.01E-02	7.13E-05	±1.22E+01
2. Average release rate for period	uCi/sec.	2.56E-03	9.07E-06	
3. Percent of technical specification limit	%	6.40E-01	2.27E-03	
C. Particulates				
1. Particulate with half-lives >8 days	Ci	2.25E-03	4.69E-04	±1.05E+01
2. Average release rate for period	uCi/sec.	2.86E-04	5.97E-05	
3. Percent of technical specification limit	%	7.15E-02	1.49E-02	
4. Gross alpha radioactivity	Ci	1.05E-07	4.26E-07	
D. Tritium				
1. Total release	Ci	3.60E+00	1.42E+00	±3.00E+00
2. Average release rate for period	uCi/sec.	4.58E-01	1.81E-01	
3. Percent of technical specification limit	%	7.14E-01	2.47E-01	
4. Ground level releases	Ci	3.55E+00	1.42E+00	
5. Elevated release	Ci	5.48E-02	1.42E-03	

(1) Reporting period - 182 days

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

FIRST HALF 1985

GASEOUS EFFLUENTS - ELEVATED RELEASE

	<u>Unit</u>	<u>First Quarter</u>	<u>Second Quarter</u>
1. <u>Fission Gases</u>			
Krypton-85	Ci	< MDA	< MDA
Krypton-85m	Ci	5.29E+04	< MDA
Krypton-87	Ci	2.93E+03	< MDA
Krypton-88	Ci	9.96E+03	< MDA
Xenon-133	Ci	5.92E+03	< MDA
Xenon-135	Ci	3.39E+02	< MDA
Xenon-135m	Ci	3.60E+01	< MDA
Xenon-138	Ci	< MDA	< MDA
Others (specify)			
Argon-41	Ci	8.19E+02	< MDA
Unidentified	Ci	NA	NA
<u>Total for Period</u>	Ci	2.53E+04	< MDA
2. <u>Iodines</u>			
Iodine-131	Ci	1.96E-02	2.45E-05
Iodine-133	Ci	5.17E-02	< MDA
Iodine-135	Ci	3.39E-02	< MDA
<u>Total for Period</u>	Ci	1.05E-01	2.45E-05



EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

FIRST HALF 1985

GASEOUS EFFLUENTS - ELEVATED RELEASE (Continued)

	<u>Unit</u>	<u>First Quarter</u>	<u>Second Quarter</u>
3. <u>Particulates</u>			
Strontium-89(1)	Ci	1.99E-04	1.70E-04
Strontium-90(1)	Ci	1.20E-06	1.20E-06
Cesium-134	Ci	< MDA	< MDA
Cesium-137	Ci	4.92E-06	1.37E-06
Barium-140	Ci	1.30E-03	< MDA
Zirconium-95	Ci	< MDA	< MDA
Niobium-95	Ci	2.53E-06	< MDA
Cobalt-58	Ci	< MDA	< MDA
Manganese-54	Ci	< MDA	< MDA
Zinc-65	Ci	< MDA	< MDA
Iron-59	Ci	< MDA	< MDA
Cobalt-60	Ci	< MDA	< MDA
Others (specify)			
Lanthanum-140	Ci	4.79E-04	< MDA
<u>Total for Period</u>	Ci	1.99E-03	1.73E-04
4. <u>Tritium</u>	Ci	5.48E-02	1.42E-03

(1) Predicted estimation of releases

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
 FIRST HALF 1985
 GASEOUS EFFLUENTS - GROUND LEVEL RELEASES

	<u>Unit</u>	<u>First Quarter</u>	<u>Second Quarter</u>
1. <u>Fission Gases</u>			
Krypton-85	Ci	< MDA	< MDA
Krypton-85m	Ci	< MDA	< MDA
Krypton-87	Ci	< MDA	< MDA
Krypton-88	Ci	< MDA	< MDA
Xenon-133	Ci	2.84E+02	< MDA
Xenon-135	Ci	1.36E+02	< MDA
Xenon-135m	Ci	< MDA	< MDA
Xenon-138	Ci	< MDA	< MDA
Others (specify)			
Argon-41	Ci	< MDA	< MDA
Unidentified	Ci	NA	NA
<u>Total for Period</u>	Ci	4.20E+02	< MDA
2. <u>Iodines</u>			
Iodine-131	Ci	5.01E-04	4.68E-05
Iodine-133	Ci	3.06E-03	< MDA
Iodine-135	Ci	< MDA	< MDA
<u>Total for Period</u>	Ci	3.56E-03	4.68E-05

EFFLUENTS AND WASTE DISPOSAL SEMIANNUAL REPORT

FIRST HALF 1985

GASEOUS EFFLUENTS - GROUND LEVEL RELEASES (Continued)

	<u>Unit</u>	<u>First Quarter</u>	<u>Second Quarter</u>
3. <u>Particulates</u>			
Strontium-89(1)	Ci	1.86E-05	2.05E-05
Strontium-90(1)	Ci	2.55E-06	2.72E-06
Cesium-134	Ci	6.28E-05	2.25E-05
Cesium-137	Ci	6.43E-05	1.95E-05
Barium-140	Ci	< MDA	< MDA
Zirconium-95	Ci	< MDA	< MDA
Niobium-95	Ci	< MDA	< MDA
Cobalt-58	Ci	< MDA	< MDA
Manganese-54	Ci	< MDA	1.39E-05
Zinc-65	Ci	3.24E-05	8.28E-05
Iron-59	Ci	< MDA	< MDA
Cobalt-60	Ci	7.82E-05	1.34E-04
Others (specify)			
Lanthanum-140	Ci	< MDA	< MDA
<u>Total for Period</u>	Ci	2.59E-04	2.96E-04
4. <u>Tritium</u>	Ci	3.55E+00	1.42E+00

(1) Predicted estimation of releases