

POOR ORIGINAL

CAROLINA POWER & LIGHT COMPANY
BRUNSWICK STEAM ELECTRIC PLANT
SEMIANNUAL ENVIRONMENTAL REPORT
January 1, 1979 - June 30, 1979

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ATTACHMENT 1

EFFLUENT, WASTE DISPOSAL, AND POTENTIAL DOSES SEMIANNUAL REPORT

January - June, 1979

Brunswick Steam Electric Plant

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Supplemental Information

Facility Brunswick Steam Electric Plant License Carolina Power & Light Co.

1. Regulatory Limits

a. Fission & activation gases

$$\Sigma \bar{E} \beta [1.5 Q_s + 575 Q_v] \leq 1 \text{ quarterly reporting average}$$

$$\Sigma \bar{E} \gamma [45 Q_s + 400 Q_v] \leq 1 \text{ quarterly reporting average}$$

$$\Sigma \bar{E} \beta [2.8 Q_s + 1160 Q_v] \leq 1 \text{ 12 consecutive month average}$$

$$\Sigma \bar{E} \gamma [90 Q_s + 800 Q_v] \leq 1 \text{ 12 consecutive month average}$$

b. I-131 and Particulates with half-lives >8 days

$$[3.26 \times 10^6] Q_s + [3.74 \times 10^7] Q_v \leq 1 \text{ quarterly reporting average}$$

$$[6.56 \times 10^6] Q_s + [7.46 \times 10^7] Q_v \leq 1 \text{ 12 consecutive month average}$$

c. Liquid effluents

20 Curies per calendar quarter

40 Curies per 12 consecutive months

2. Maximum Instantaneous Release Rates (10CFR20)

a. Fission & activation Gases

$$\Sigma Q_s [4.0 \bar{E} \gamma + 0.23 \bar{E} \beta] + Q_v [35 \bar{E} \gamma + 92 \bar{E} \beta] \leq 1$$

b. I-131 and Particulates with half-lives greater than eight days.

$$[3.7 \times 10^4] Q_s + [5.8 \times 10^6] Q_v \leq 1$$

c. Liquid Effluents

Values specified in 10CFR Part 20, Appendix B, Table II, Column 2 for unrestricted areas

3. Average Energy Stack

$$\bar{E} \gamma = 6.06\text{E-}01 \text{ MeV} \quad \bar{E} \beta = 4.35\text{E-}01 \text{ MeV}$$

Average Energy Ground

$$\bar{E} \gamma = 1.83\text{E-}01 \text{ MeV}; \quad \bar{E} \beta = 2.60\text{E-}01 \text{ MeV}$$

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4. Measurements and Approximations of Total Radioactivity

- a. Fission and activation gases
Analysis for specific radionuclides in representative grab samples by gamma spectroscopy.
- b. Iodines
Analysis for specific radionuclides collected on charcoal cartridges by gamma spectroscopy.
- c. Particulates
Analysis for specific radionuclides collected on filter papers by gamma spectroscopy.
- d. Liquid effluents
Analysis for specific radionuclides by individual releases by gamma spectroscopy.

Relative variance for each measurement used in calculating activity values were combined using the additive property of variance. The square root of the combined variance was extracted to obtain an estimate of the standard deviation of the multistep process. The standard deviation was used to evaluate the error in the calculated activities at the 95% confidence level.

5. Batch Releases

- a. Liquid
 - 1. Number of batch releases: 417
 - 2. Total time period for batch releases: $7.57E+04$ minutes
 - 3. Maximum time period for a batch release: 4335 minutes
 - 4. Average time period for batch release: 169 minutes
 - 5. Minimum time period for a batch release: 1 minute
 - 6. Average stream flow during periods of release of effluent into a flowing stream: not applicable.
- b. Gaseous
 - 1. Number of batch releases: none
 - 2. Total time period for a batch release: not applicable
 - 3. Maximum time period for a batch release: not applicable
 - 4. Average time period for a batch release: not applicable
 - 5. Minimum time period for a batch release: not applicable

6. Abnormal Release

a. Liquid

1. Number of releases: None
2. Total activity released: None

b. Gaseous

1. Number of releases: 1
2. Total activity released: 12 mCi (primarily activated corrosion products)

NOTE: This event resulted in a Technical Specification Violation. A 30 day report was submitted to the U. S. Nuclear Regulatory Commission Region II office (Reference: CP&L letter to James P. O'Reilly, Director, Region II Office, Serial GD-79-1330 dated May 22, 1979).

Meteorological Data During Abnormal Release

<u>Date</u>	<u>Time</u>	<u>Wind Direction</u>	<u>Wind Speed (mph)</u>	<u>Stability Class</u>
5/8/79	2045	ESE	7.9	D
5/8/79	2145	ESE	9.2	E
5/8/79	2245	ESE	5.0	E
5/8/79	2345	SE	4.6	E
5/9/79	0045	E	4.8	E
5/9/79	0145	ESE	5.4	E
5/9/79	0245	ESE	5.0	E

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TABLE 1A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT YEAR 1979

GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

	Unit I & II	Quarter I	Quarter II	Est. Total Error. %
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A. Fission & activation gases

1. Total release	Ci	1.66E+4	1.08E+4	2.25E+1
2. Average release rate for period	uCi/sec	2.10E+3	1.36E+3	
3. Percent of Technical Specification limit	%	8.08E+0	4.35E+0	

B. Iodines

1. Total iodine-131	Ci	4.71E-3	7.43E-3	1.24E+1
2. Average release rate for period	uCi/sec	5.97E-4	9.42E-4	
3. Percent of Technical Specification limit	%	8.05E-1	5.83E-1	

C. Particulates

1. Particulates with half-lives of >8 days	Ci	3.75E-2	3.24E-2	1.24E+1
2. Average release rate for period	uCi/sec	4.76E-3	4.11E-3	
3. Percent of Technical Specification limit	%	1.46E+1	1.14 E+1	
4. Gross alpha radioactivity	Ci	8.90E-7	9.91E-7	

D. Tritium

1. Total release	Ci	1.24E+0	1.79E+0	1.59E+1
2. Average release rate for period	uCi/sec	1.57E-1	2.27E-1	
*3. Percent of Technical Specification limit	%	3.79E-3	2.12E-2	

* Based on 10 CFR 20 App. B limit of 4E-05uCi/ml for H₃ submersion in an unrestricted area.

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TABLE 1B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT YEAR 1979

GASEOUS EFFLUENTS-ELEVATED RELEASE

Continuous Mode				Batch Mode	
Nuclides Released	Unit	Quarter I	Quarter II	Quarter	Quarter
1. Fission gases					
krypton-85	Ci	<MDA	<MDA		
krypton-85m	Ci	5.71E+2	1.58E+2		
krypton-87	Ci	1.11E+3	4.60E+2		
krypton-88	Ci	1.05E+3	3.10E+2		
xenon-133	Ci	3.42E+3	1.19E+3		
xenon-135	Ci	2.73E+3	2.76E+3		
xenon-135m	Ci	3.11E+2	7.36E+2		
xenon-138	Ci	4.80E+2	1.07E+3		
argon-41	Ci	4.36E+1	4.23E+2		
xenon-133m	Ci	1.33E+2	7.10E+1		
unidentified	Ci	1.24E+3	8.98E+2		
Total for Period	Ci	1.11E+4	8.08E+3		
2. Iodines					
iodine-131	Ci	3.30E-3	6.79E-3		
iodine-132	Ci	2.62E-3	1.55E-2		
iodine-133	Ci	6.17E-3	1.72E-1		
iodine-135	Ci	1.09E-3	4.78E-2		
Total for Period	Ci	1.32E-2	2.42E-1		
3. Particulates					
strontium-89	Ci	3.49E-4	1.66E-3		
strontium-90	Ci	4.17E-6	9.19E-7		
cesium-134	Ci	1.67E-5	1.02E-4		
cesium-137	Ci	7.71E-5	2.56E-4		
barium-lanthanum-140	Ci	1.12E-3	1.95E-3		
cobalt-58	Ci	3.03E-4	2.54E-4		
cobalt-60	Ci	1.08E-3	1.40E-3		
chromium-51	Ci	5.45E-4	3.74E-4		
zirconium-niobium-95	Ci	1.81E-7	<MDA		
zinc-65	Ci	1.21E-4	1.44E-4		
antimony-122	Ci	1.17E-6	<MDA		
iron-59	Ci	4.25E-4	2.71E-4		
manganese-54	Ci	1.60E-3	1.68E-3		
iodine-131	Ci	1.42E-5	5.43E-5		
cerium-139	Ci	4.17E-4	2.29E-5		
cerium-144	Ci	<MDA	<MDA		
yttrium-88	Ci	4.87E-6	<MDA		
antimony-122	Ci	<MDA	8.80E-6		
unidentified	Ci	7.54E-4	1.01E-3		
Total for Period	Ci	6.83E-3	9.19E-3		

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TABLE 1C

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

YEAR 1979

GASEOUS EFFLUENTS-GROUND LEVEL RELEASES

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		Quarter I	Quarter II	Quarter	Quarter
1. Fission gases:					
krypton-85	Ci	<MDA	<MDA		
krypton-85m	Ci	<MDA	<MDA		
krypton-87	Ci	<MDA	<MDA		
krypton-88	Ci	<MDA	<MDA		
xenon-133	Ci	5.75E+2	4.51E+2		
xenon-135	Ci	4.24E+3	1.86E+3		
xenon-135m	Ci	<MDA	6.25E+1		
xenon-138	Ci	<MDA	<MDA		
argon-41	Ci	<MDA	<MDA		
xenon-133m	Ci	3.44E+1	<MDA		
unidentified	Ci	6.06E+2	2.96E+2		
Total for Period	Ci	5.46E+3	2.67E+3		

2. Iodines

iodine-131	Ci	1.41E-3	6.38E-4		
iodine-132	Ci	4.77E-5	<MDA		
iodine-133	Ci	2.13E-4	4.05E-3		
iodine-135	Ci	<MDA	<MDA		
Total for Period	Ci	1.67E-3	4.69E-3		

3. Particulates

strontium-89	Ci	1.08E-5	1.04E-5		
strontium-90	Ci	2.84E-6	7.31E-6		
cesium-134	Ci	1.58E-5	3.73E-5		
cesium-137	Ci	4.49E-5	7.73E-5		
barium-lanthanum-140	Ci	<MDA	<MDA		
cobalt-58	Ci	1.68E-3	1.65E-3		
cobalt-60	Ci	5.10E-3	5.93E-3		
chromium-51	Ci	1.36E-2	6.43E-3		
zirconium-niobium-95	Ci	4.87E-6	1.89E-5		
zinc-65	Ci	6.14E-4	9.28E-4		
iron-59	Ci	1.68E-3	2.80E-3		
manganese-54	Ci	4.46E-3	2.58E-3		
iodine-131	Ci	6.20E-5	5.82E-5		
cerium-139	Ci	2.03E-7	<MDA		
cerium-144	Ci	<MDA	<MDA		
yttrium-88	Ci	5.29E-10	<MDA		
cesium-136	Ci	<MDA	<MDA		
tin-117m	Ci	<MDA	1.22E-5		
antimony-124	Ci	5.43E-6	2.32E-5		
cobalt-57	Ci	<MDA	1.23E-5		
unidentified	Ci	3.38 E-3	2.58E-3		
Total for Period	Ci	3.07E-2	2.32E-2		

TABLE 2A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT YEAR 1979

LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

Unit I & II	Quarter 1st	Quarter 2nd	Est. Total Error, %
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A. Fission activation products

*1. Total release (not including tritium, gases, alpha)	Ci	6.73E-1	1.73E+0	1.45E+1
2. Average diluted concentration during period	uCi/ml	1.05E-8	2.72E-8	
3. Percent of applicable limit	%	2.63E+1	6.96E+1	

B. Tritium

1. Total release	Ci	7.32E+0	5.18E+0	1.59E+1
2. Average diluted concentration during period	uCi/ml	1.58E-7	8.15E-8	
3. Percent of applicable limit	%	5.27E-3	2.72E-3	

C. Dissolved and entrained gases

1. Total release	Ci	2.45E-3	1.93E-2	1.45E+1
2. Average diluted concentration during period	uCi/ml	5.29E-11	3.04E-10	
3. Percent of applicable limit	%	1.76E-3	1.01E-2	

D. Gross alpha radioactivity

Total release	Ci	6.65E-5	1.72E-5	See attached note
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E. Volume of waste released (prior to dilution)	liters	9.98E+6	1.35E+7	5.66E+0
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F. Volume of dilution water used during period	liters	4.63E+10	6.36E+10	1.10E+1
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*Includes Estimated Total Error

NOTE ON ESTIMATED TOTAL ERROR IN
GROSS ALPHA RADIOACTIVITY (FROM TABLE 2A)

It is difficult to obtain a counting error for gross alpha due to the extremely small amount of alpha activity present in the liquid effluent samples. Only one monthly composite alpha analysis provides a sufficient number of counts to determine a reasonable counting error. This error combined with a sampling error resulted in an estimated total error of 70.2%. Assuming the worst possible case by taking the total curies released for both quarters, adding 70.2% of this to the total, and converting to $\mu\text{Ci/ml}$, a concentration of $6.07\text{E-}9 \mu\text{Ci/ml}$ is obtained. The value is well below the Environmental Technical Specifications monthly liquid composite minimum detectable concentration for gross alpha of $1.0\text{E-}7 \mu\text{Ci/ml}$.

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TABLE 2B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT YEAR 1979

LIQUID EFFLUENTS

Nuclides Released	Unit	Batch Mode		Continuous Mode	
		Quarter I	Quarter II	Quarter	Quarter
iodine-133	Ci	8.68E-4	7.86E-4		
iodine-132	Ci	<MDA	<MDA		
antimony-122	Ci	7.29E-3	1.98E-2		
antimony-124	Ci	1.00E-6	7.79E-5		
cobalt-57	Ci	<MDA	<MDA		

cesium-136	Ci	<MDA	1.86E-4		
cesium-138	Ci	<MDA	<MDA		
cerium-144	Ci	<MDA	<MDA		
yttrium-91m	Ci	<MDA	4.02E-4		
tellurium-129m	Ci	<MDA	<MDA		
strontium-85	Ci	<MDA	7.39E-5		

niobium-97m	Ci	<MDA	4.32E-4		
zirconium-97	Ci	<MDA	4.50E-4		
tin-113	Ci	<MDA	8.53E-6		
tin-117m	Ci	<MDA	<MDA		
indium-113m	Ci	<MDA	1.31E-5		

barium-139	Ci	<MDA	<MDA		
cerium-139	Ci	<MDA	<MDA		
strontium-91	Ci	<MDA	<MDA		
technitium-101	Ci	<MDA	<MDA		
tellurium-132	Ci	<MDA	<MDA		
tungsten-187	Ci	<MDA	<MDA		
continued on Table 2B-1					

Dissolved and Entrained Bases

krypton-85	Ci	<MDA	1.83E-2		
krypton-85m	Ci	<MDA	<MDA		
argon-41	Ci	5.08E-4	4.81E-4		
xenon-131m	Ci	<MDA	<MDA		
xenon-133	Ci	1.53E-3	3.88E-5		
xenon-135	Ci	4.13E-4	4.37E-4		
Total for Period	Ci	2.45E-3	1.93E-2		

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TABLE 2B-1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT YEAR 1979

LIQUID EFFLUENTS

Nuclides Released	Unit	Batch Mode		Continuous Mode	
		Quarter I	Quarter II	Quarter	Quarter
strontium-89	Ci	2.96E-4	7.26E-5		
strontium-90	Ci	2.02E-4	1.44E-5		
cesium-134	Ci	5.55E-2	1.58E-1		
cesium-137	Ci	1.19E-1	2.49E-1		
iodine-131	Ci	4.12E-3	2.55E-3		
cobalt-58	Ci	2.84E-2	3.85E-2		
cobalt-60	Ci	1.59E-1	1.79E-1		
iron-59	Ci	9.46E-3	1.59E-2		
zinc-65	Ci	7.47E-3	8.40E-3		
manganese-54	Ci	1.46E-1	2.02E-1		
chromium-51	Ci	4.25E-2	5.15E-2		
zirconium-niobium-95	Ci	2.49E-4	1.78E-3		
molybdenum-99	Ci	<MDA	<MDA		
technetium-99m	Ci	1.24E-4	5.21E-4		
barium-lanthanum-140	Ci	<MDA	<MDA		
cerium-141	Ci	<MDA	<MDA		
fluorine-18	Ci	7.52E-3	7.22E-2		
sodium-24	Ci	2.94E-2	3.60E-1		
manganese-56	Ci	<MDA	6.06E-4		
copper-64	Ci	2.50E-2	1.49E-1		
arsenic-76	Ci	5.76E-5	3.88E-4		
niobium-97	Ci	2.64E-4	6.60E-4		
strontium-85	Ci	<MDA	<MDA		
neptunium-239	Ci	<MDA	<MDA		
strontium-92	Ci	2.78E-4	7.27E-5		
silver-110m	Ci	1.43E-4	<MDA		
nickel-65	Ci	<MDA	<MDA		
mercury-203	Ci	4.76E-6	<MDA		
unidentified	Ci	8.53E-2	2.19E-1		
Total for period (above)	Ci	6.73E-1	1.73E+0		

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MINIMUM DETECTABLE ACTIVITIES ($\mu\text{Ci/ml}$)

1. For Liquid Releases

Ba-139	2.25E-8
Ba-140, La-140	3.69E-8
Ce-139	5.42E-9
Ce-141	8.30E-9
Ce-144	5.94E-8
Cs-136	4.72E-9
Cs-138	1.44E-8
Co-57	8.91E-9
In-113m	5.64E-9
I-132	5.94E-9
Kr-85	8.05E-7
Kr-85m	5.98E-9
Mn-56	6.95E-9
Hg-203	6.61E-9
Mo-99	3.18E-8
Np-239	3.55E-8
Ni-65	3.15E-8
Nb-97m	4.46E-9
Ag-110m	8.40E-9
Sr-85	5.62E-9
Sr-91	1.74E-8
Tc-101	4.58E-9
Te-129m	1.90E-7
Te-132	4.96E-9
Sn-113	3.66E-9
Sn-117m	6.29E-9
W-187	2.28E-8
Xe-131m	2.53E-7
Y-91m	1.03E-8
Zr-97	4.65E-9

2.. For Gaseous Releases

Ar-41	5.90E-9
Kr-85	3.68E-6
Kr-85m	1.20E-8
Kr-87	2.06E-8
Kr-88	2.65E-8
Xe-135m	1.19E-8
Xe-138	2.53E-8

3. For Particulates and Iodines

Sb-122	6.30E-15
Sb-124	1.84E-14
Ba-140, La-140	3.72E-14
Ce-139	6.64E-15
Ce-144	6.95E-14
Cs-136	4.86E-15
CO-57	7.33E-15
I-132	8.47E-15
I-135	2.92E-14
Sn-117m	6.97E-15
Y-88	9.61E-15
Zr-95, Nb-95	1.80E-14

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EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (YEAR)

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

A. Solid Waste Shipped Offsite for Burial or Disposal (Not irradiated fuel)

1. Type of Waste	Unit	6-month period	Est. Total Error, %
a. Spent resins, filter sludges, evaporated bottoms, etc.	m ³ Ci	6.80E02 1.52E03	1.50E01
b. Dry compressible waste, contaminated equip., etc.	m ³ Ci	1.31E03 3.87E01	2.00E01
c. Irradiated components, control rods, etc.	m ³ Ci	0.00E00 0.00E00	0.00E00
d. Other (describe)	m ³ Ci	0.00E00 0.00E00	0.00E00

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

A + B	Mn-54	%	3.07E01
	Co-60	%	2.61E01
	Cr-51	%	1.94E01
	Fe-59	%	6.34E00
	Co-58	%	5.95E00
	Cs-137	%	4.56E00
	Cs-134	%	3.71E00
	Zn-65	%	2.38E00
	Sb-122	%	5.30E-01
	Nb-95	%	2.14E-01
C	None	%	
		%	
		%	
		%	
		%	
		%	
		%	
		%	
		%	
		%	
D	None	%	

3. Solid Waste Disposition

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
207	Sole Use Vehicle	Chem-Nuclear Systems, Inc. Barnwell, South Carolina

B. Irradiated Fuel Shipments (Disposition)

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
0	N/A	N/A

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SHORELINE SEDIMENT DOSE AT CANAL, MREM/6 MOS.

	CHILD	TEEN	ADULT
WHOLE BODY	2.65E-06	1.27E-05	2.28E-06
SKIN	3.11E-06	1.49E-05	2.67E-06

LIQUID EFFLUENT DATA USED IN SHORELINE DOSE CALCULATIONS

DOSE DUE TO EATING FISH CAUGHT IN DISCHARGE CANAL, MREM/6 MOS

	CHILD	TEEN	ADULT
BONE	5.66E-05	4.62E-05	4.43E-05
LIVER	8.85E-05	1.05E-04	1.03E-04
WHOLE BODY	2.80E-05	4.16E-05	5.96E-05
THYROID	2.41E-06	2.33E-06	2.50E-06
KIDNEY	2.56E-05	3.14E-05	3.14E-05
LUNG	9.91E-06	1.27E-05	1.08E-05
GI-LLI	4.31E-05	1.22E-04	1.73E-04

LIQUID EFFLUENT DATA USED IN FISH DOSE CALCULATIONS

DOSE DUE TO EATING GREEN LEAFY VEGS. FROM WORST GARDEN, MREM/6 MOS

	CHILD	TEEN	ADULT
BONE	4.92E-04	3.12E-04	3.80E-04
LIVER	2.94E-04	2.46E-04	2.87E-04
WHOLE BODY	2.76E-04	2.00E-04	2.57E-04
THYROID	1.21E-02	8.01E-03	9.89E-03
KIDNEY	1.41E-04	1.19E-04	1.41E-04
LUNG	4.02E-05	3.50E-05	4.26E-05
GI-LLI	3.69E-04	7.12E-04	1.18E-03

DOSES CALCULATED FROM GASEOUS EFFLUENT DATA

DOSE DUE TO EATING PRODUCE FROM WORST GARDEN, MREM/6 MOS

	CHILD	TEEN	ADULT
BONE	4.97E-03	2.52E-03	1.74E-03
LIVER	3.14E-03	1.99E-03	1.28E-03
WHOLE BODY	3.40E-03	1.88E-03	1.34E-03
THYROID	1.26E-03	6.72E-04	4.77E-04
KIDNEY	1.05E-03	6.87E-04	4.70E-04
LUNG	4.65E-04	3.00E-04	2.09E-04
GI-LLI	4.45E-03	6.50E-03	5.90E-03

DOSES CALCULATED FROM GASEOUS EFFLUENT DATA

DOSES CALCULATED FOR MAXIMUM EXPOSED INDIVIDUAL

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I-131 DOSE DUE TO DRINKING MILK, MREM/6 MOS

	INFANT	CHILD	TEEN	ADULT
BONE	5.07E-04	2.43E-04	1.00E-04	5.52E-05
LIVER	5.97E-04	2.44E-04	1.40E-04	7.89E-05
WHOLE BODY	2.63E-04	1.39E-04	7.53E-05	4.52E-05
THYROID	1.96E-01	8.08E-02	4.09E-02	2.59E-02
KIDNEY	6.98E-04	4.01E-04	2.41E-04	1.35E-04
LUNG	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GI-LLI	2.13E-05	2.17E-05	2.77E-05	2.08E-05

TOTAL DOSE DUE TO DRINKING MILK, MREM/6 MOS

	INFANT	CHILD	TEEN	ADULT
BONE	3.97E-03	2.58E-03	1.19E-03	7.27E-04
LIVER	7.64E-03	4.19E-03	2.67E-03	1.59E-03
WHOLE BODY	3.21E-03	2.38E-03	1.37E-03	9.31E-04
THYROID	2.09E-01	8.60E-02	4.32E-02	2.72E-02
KIDNEY	3.69E-03	2.54E-03	1.66E-03	1.02E-03
LUNG	5.53E-04	3.36E-04	2.17E-04	1.40E-04
GI-LLI	4.44E-03	1.20E-03	1.67E-03	1.43E-03

DOSES EVALUATED FOR STEVENS' FARM (MK-35)

I-131 INHALATION DOSE AT WORST POINT ON SITE BOUNDARY, MREM/6 MOS

	INFANT	CHILD	TEEN	ADULT
BONE	6.69E-06	8.49E-06	6.25E-06	4.45E-06
LIVER	7.83E-06	9.49E-06	8.67E-06	6.31E-06
WHOLE BODY	3.46E-06	4.81E-06	4.66E-06	3.61E-06
THYROID	2.62E-03	2.87E-03	2.58E-03	2.10E-03
KIDNEY	9.14E-06	1.39E-05	1.48E-05	1.08E-05
LUNG	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GI-LLI	1.87E-07	5.01E-07	1.14E-06	1.11E-06

TOTAL INHALATION DOSE AT WORST POINT ON SITE BOUNDARY, MREM/6 MOS

	INFANT	CHILD	TEEN	ADULT
BONE	6.08E-05	1.23E-04	1.19E-04	1.04E-04
LIVER	1.92E-04	3.17E-04	3.58E-04	3.31E-04
WHOLE BODY	1.59E-04	2.82E-04	3.09E-04	2.98E-04
THYROID	4.25E-03	4.71E-03	4.07E-03	3.26E-03
KIDNEY	1.58E-04	2.73E-04	3.08E-04	2.93E-04
LUNG	5.31E-03	7.90E-03	1.01E-02	7.00E-03
GI-LLI	1.82E-04	3.65E-04	6.27E-04	6.61E-04

GASEOUS EFFLUENT DATA USED IN INHALATION DOSE CALCULATIONS

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DOSE FROM NOBLE GAS RELEASES-SKIN
MREM/6 MOS

	RADIAL DISTANCE, MILES				
	0.5	1.5	2.5	3.5	4.5
S	1.14E+00	4.31E-01	2.28E-01	1.53E-01	1.13E-01
SSW	1.07E+00	4.17E-01	2.27E-01	1.54E-01	1.15E-01
SW	6.71E-01	2.79E-01	1.55E-01	1.05E-01	7.80E-02
WSW	8.06E-01	3.41E-01	1.93E-01	1.34E-01	1.01E-01
W	7.75E-01	3.26E-01	1.86E-01	1.27E-01	9.45E-02
WNW	7.55E-01	3.04E-01	1.67E-01	1.13E-01	8.40E-02
NW	6.77E-01	2.86E-01	1.66E-01	1.15E-01	8.63E-02
NNW	5.62E-01	2.38E-01	1.38E-01	9.71E-02	7.35E-02
N	6.80E-01	2.80E-01	1.61E-01	1.12E-01	8.50E-02
NNE	8.82E-01	3.78E-01	2.21E-01	1.55E-01	1.17E-01
NE	1.09E+00	4.81E-01	2.79E-01	1.95E-01	1.46E-01
ENE	1.08E+00	4.33E-01	2.46E-01	1.71E-01	1.29E-01
E	1.51E+00	5.63E-01	3.01E-01	2.04E-01	1.52E-01
ESE	8.68E-01	3.39E-01	1.87E-01	1.27E-01	1.42E-01
SE	1.44E+00	5.34E-01	2.83E-01	1.91E-01	1.42E-01
SSE	1.82E+00	6.62E-01	3.45E-01	2.29E-01	1.69E-01

	RADIAL DISTANCE, MILES				
	7.5	15.0	25.0	35.0	45.0
S	6.16E-02	2.67E-02	1.43E-02	9.56E-03	7.07E-03
SSW	6.30E-02	2.72E-02	1.45E-02	9.61E-03	7.07E-03
SW	4.24E-02	1.82E-02	9.75E-03	6.49E-03	4.80E-03
WSW	5.56E-02	2.41E-02	1.28E-02	8.47E-03	6.21E-03
W	5.12E-02	2.16E-02	1.12E-02	7.33E-03	5.33E-03
WNW	4.58E-02	1.97E-02	1.06E-02	7.05E-03	5.21E-03
NW	4.72E-02	2.00E-02	1.05E-02	6.87E-03	5.00E-03
NNW	4.14E-02	1.83E-02	9.81E-03	6.51E-03	4.79E-03
N	4.76E-02	2.10E-02	1.13E-02	7.50E-03	5.52E-03
NNE	6.48E-02	2.80E-02	1.47E-02	9.65E-03	7.03E-03
NE	7.92E-02	3.33E-02	1.73E-02	1.12E-02	8.17E-03
ENE	7.19E-02	3.15E-02	1.69E-02	1.12E-02	8.23E-03
E	8.40E-02	3.69E-02	2.00E-02	1.34E-02	9.90E-03
ESE	5.22E-02	2.28E-02	1.23E-02	8.21E-03	9.09E-03
SE	7.76E-02	3.38E-02	1.83E-02	1.22E-02	9.09E-03
SSE	9.19E-02	3.98E-02	2.14E-02	1.43E-02	1.06E-02

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