

Duke Power Company

Oconee Nuclear Site

Attachment I

Radioactive Effluent Releases  
and Supplemental Information

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OCONEE NUCLEAR STATION

1996 RADIOACTIVE LIQUID EFFLUENT RELEASES

I. LIQUID RELEASES

	<u>UNITS</u>	<u>1ST QTR</u>	<u>2ND QTR</u>	<u>3RD QTR</u>	<u>4TH QTR</u>	<u>TOTAL</u>	
1. GROSS RADIOACTIVITY							
A. TOTAL RELEASE	CURIES	1.62E-02	1.61E-01	5.20E-02	1.13E-01	3.42E-01	
B. AVERAGE CONCENTRATION RELEASED	UCI/ML	4.77E-11	7.78E-10	2.34E-10	5.16E-10	3.46E-10	
C. MAXIMUM CONCENTRATION RELEASED	UCI/ML	4.59E-09	2.90E-08	7.18E-09	1.94E-08	2.90E-08	
2. TRITIUM							
A. TOTAL RELEASE	CURIES	1.59E+02	3.92E+02	2.09E+02	1.16E+02	8.77E+02	
B. AVERAGE CONCENTRATION RELEASED	UCI/ML	4.66E-07	1.90E-06	9.41E-07	5.31E-07	8.87E-07	
3. DISSOLVED NOBLE GASES							
A. TOTAL RELEASE	CURIES	8.25E-04	5.98E-03	1.30E-02	4.84E-03	2.46E-02	
B. AVERAGE CONCENTRATION RELEASED	UCI/ML	2.42E-12	2.90E-11	5.82E-11	2.21E-11	2.49E-11	
4. GROSS ALPHA ACTIVITY							
A. TOTAL RELEASE	CURIES	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
B. AVERAGE CONCENTRATION RELEASED	UCI/ML	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
5. VOLUME OF LIQUID WASTE TO DISCHARGE CANAL	LITERS	5.22E+08	4.46E+08	3.70E+08	4.08E+08	1.75E+09	
6. VOLUME OF DILUTION WATER	LITERS	3.40E+11	2.07E+11	2.23E+11	2.19E+11	9.88E+11	
7. RADIONUCLIDES RELEASED	CURIES						<u>10CFR20 EC RATIO</u>
H-3		1.59E+02	3.92E+02	2.09E+02	1.16E+02	8.77E+02	8.87E-04
CR-51		0.00E+00	1.91E-02	2.25E-04	4.29E-03	2.37E-02	4.79E-08
MN-54		0.00E+00	5.36E-04	6.05E-05	0.00E+00	5.96E-04	2.01E-08
FE-59		0.00E+00	1.46E-04	0.00E+00	3.59E-04	5.05E-04	5.11E-08
CO-57		0.00E+00	2.10E-04	0.00E+00	0.00E+00	2.10E-04	3.55E-09
CO-58		5.12E-04	4.54E-02	3.14E-03	2.96E-02	7.87E-02	3.98E-06
CO-60		1.85E-04	8.04E-03	2.07E-03	2.94E-03	1.32E-02	4.46E-06
NB-95		0.00E+00	4.26E-03	3.44E-04	1.36E-03	5.96E-03	2.01E-07
ZR-95		0.00E+00	3.20E-03	1.34E-04	1.02E-03	4.36E-03	2.20E-07
MO-99		0.00E+00	0.00E+00	0.00E+00	2.64E-04	2.64E-04	1.34E-08
TC-99M		0.00E+00	0.00E+00	0.00E+00	2.57E-04	2.57E-04	2.60E-10
RU-103		0.00E+00	1.64E-04	0.00E+00	4.17E-04	5.81E-04	1.96E-08
RU-106		0.00E+00	1.23E-03	1.02E-03	0.00E+00	2.25E-03	7.59E-07
AG-110M		3.10E-04	1.64E-02	9.72E-03	2.22E-02	4.86E-02	8.20E-06
I-131		4.54E-05	1.90E-04	1.17E-03	4.26E-03	5.66E-03	5.73E-06
I-132		0.00E+00	0.00E+00	0.00E+00	1.92E-04	1.92E-04	1.94E-09
I-133		2.82E-05	0.00E+00	1.39E-04	1.33E-05	1.81E-04	2.61E-08
SB-124		4.60E-04	2.09E-03	7.71E-05	7.59E-04	3.39E-03	4.90E-07
SB-125		1.42E-02	4.60E-02	2.59E-02	3.37E-02	1.20E-01	4.04E-06
SN-113		0.00E+00	1.01E-05	0.00E+00	1.83E-04	1.93E-04	6.51E-09
TE-125M		0.00E+00	0.00E+00	2.40E-03	0.00E+00	2.40E-03	1.21E-07
TE-132		0.00E+00	0.00E+00	0.00E+00	2.80E-04	2.80E-04	3.14E-08
CS-134		2.07E-04	1.20E-03	1.08E-03	1.72E-03	4.20E-03	4.73E-06
CS-137		2.76E-04	1.16E-02	3.57E-03	5.55E-03	2.09E-02	2.12E-05
LA-140		0.00E+00	1.37E-04	7.10E-05	3.56E-03	3.77E-03	4.23E-07
CE-141		0.00E+00	0.00E+00	0.00E+00	2.46E-05	2.46E-05	8.31E-10
CE-144		0.00E+00	8.90E-04	9.31E-04	0.00E+00	1.82E-03	6.14E-07
KR-85		0.00E+00	0.00E+00	0.00E+00	2.34E-03	2.34E-03	2.37E-08
XE-133		7.03E-04	5.84E-03	1.22E-02	2.47E-03	2.12E-02	2.15E-07
XE-135		1.22E-04	1.46E-04	7.34E-04	2.59E-05	1.03E-03	1.04E-08

TOTAL 10CFR20 EC RATIO = 9.43E-04

**Oconee Nuclear Station  
Radioactive Effluent Releases  
10CFR50, Appendix I Dose Calculation Results**

**Maximum Public Dose from 1996 2<sup>nd</sup> Quarter Liquid Effluent Releases**

<u>Organ</u>	<u>Maximum Dose</u> (mrem)	<u>Critical Age</u>	<u>Critical Pathway</u>	<u>Major Contributors</u>	
Skin	1.17E-03	Teen	Shore	Co-60	36.00%
				Cs-137	24.70%
				Sb-125	21.51%
				Ag-110m	11.69%
Bone	3.38E-01	Child	Fish	Cs-137	93.06%
				Cs-134	6.88%
Liver	3.80E-01	Teen	Fish	Cs-137	87.62%
				Cs-134	11.97%
Total Body	2.47E-01	Adult	Fish	Cs-137	84.67%
				Cs-134	14.83%
Thyroid	1.85E-03	Teen	Shore	H-3	39.03%
				Co-60	19.35%
				Cs-137	13.39%
				Sb-125	12.05%
				I-131	6.50%
				Ag-110m	6.34%
Kidney	1.29E-01	Teen	Fish	Cs-137	87.67%
				Cs-134	11.18%
Lung	5.12E-02	Teen	Fish	Cs-137	86.33%
				Cs-134	10.80%
GI-LLI	7.62E-02	Adult	Fish	Nb-95	87.31%
				Cs-137	8.18%

**Oconee Nuclear Station  
Radioactive Effluent Releases  
10CFR50, Appendix I Dose Calculation Results**

**Maximum Public Dose from 1996 Liquid Effluent Releases**

<u>Organ</u>	<u>Maximum Dose</u> (mrem)	<u>Critical Age</u>	<u>Critical Pathway</u>	<u>Major Contributors</u>	
Skin	2.06E-03	Teen	Shore	Co-60	28.45%
				Sb-125	27.01%
				Cs-137	21.42%
				Ag-110m	16.68%
Bone	5.49E-01	Child	Fish	Cs-137	87.37%
				Cs-134	12.55%
Liver	6.45E-01	Teen	Fish	Cs-137	78.67%
				Cs-134	20.88%
Total Body	4.30E-01	Adult	Fish	Cs-137	74.22%
				Cs-134	25.25%
Thyroid	6.20E-03	Teen	Fish	I-131	48.87%
				H-3	22.03%
				Co-60	8.02%
				Sb-125	7.93%
				Cs-137	6.09%
Kidney	2.18E-01	Teen	Fish	Cs-137	79.13%
				Cs-134	19.60%
Lung	8.65E-02	Teen	Fish	Cs-137	77.92%
				Cs-134	18.93%
GI-LLI	9.53E-02	Adult	Fish	Nb-95	82.55%
				Cs-137	9.96%

Oconee Nuclear Station  
Radioactive Effluent Releases  
40CFR190 Uranium Fuel Cycle Dose\* Calculation Results

Maximum Total Body Dose = 4.32E-01 mrem

Maximum Location: Site Boundary (1.0 mile), South-West Sector  
Critical Age = Adult

Liquid and Gas Effluent Contribution to Maximum Total Body Dose

Liquid Effluent Dose = 4.30E-01 mrem = 99.6% of total

Critical Path = Fish (99.7%)  
Major Contributors = Cs-137 (74.1%)  
Cs-134 (25.2%)

Gas Effluent Dose = 1.66E-03 mrem = 0.3% of total

Major Contributors = Xe-133 (52.9%)  
Xe-135 (44.4%)

Maximum Organ Dose = 6.68E-01 mrem

Maximum Location: Site Boundary (1.0 mile), South-South-East Sector  
Critical Age = Teen  
Critical Organ = Liver

Liquid and Gas Effluent Contribution to Maximum Organ Dose

Liquid Effluent Dose = 6.45E-01 mrem = 96.5% of total

Critical Path = Fish (99.6%)  
Major Contributors = Cs-137 (78.5%)  
Cs-134 (20.8%)

Gas Effluent Dose = 2.31E-02 mrem = 3.4% of total

Critical Path = Garden (66.7%)  
Major Contributor = H-3 (95.1%)

\* Annual dose limits from 40CFR190.10(a) of 25 mrem whole body, 75 mrem to the thyroid, and 25 mrem to any other organ.