SEMI-ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

NORTH ANNA POWER STATION

JANUARY 01, 1988 TO JUNE 30, 1988

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FORWARD

This report is submitted as required by Appendix A to Operating License Nos. NPF-4 and NPF-7, Technical Specifications for North Anna Power Station, Units 1 and 2, Virginia Electric and Power Company, Docket Nos. 50-338, 50-339, Section 6.9.1.9.

SEMI-ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
FOR THE

NORTH ANNA POWER STATION

JANUARY 01, 1988 TO JUNE 30, 1988

INDEX

1.0 PURPOSE AND SCOPE

The Semi-Annual Radioactive Effluent Release Report includes a summary of the quantities of radioactive liquid and gaseous effluents and solid waste as outlined in Regulatory Guide 1.21, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents of Light-Water-Cooled Nuclear Power Plants," Revision 1, June 1974, with data summarized on a quarterly basis following the format of Appendix B thereof. The report also includes a list of unplanned releases during the reporting period.

As required by Technical Specification 6.15.2 changes to the ODCM for the time period covered by this report are included. Information is provided to support the changes along with a package of those pages of the ODCM changed.

This report includes changes to the PCP with information and documentation necessary to support the rationale for the changes as required by Technical Specification 6.14.1.

This report includes a listing of new locations for dose calculations and/or environmental monitoring identified by the land use census pursuant to Technical Specification 3.12.2.

Major changes to radioactive liquid, gaseous and solid waste treatment systems are reported as required by Technical Specification 6.16.1. Information to support the reason(s) for the change(s) and a summary of the 10 CFR Part 50.59 evaluation are included. In lieu of reporting major changes in this report, major changes to the radioactive solid waste treatment system may be submitted as part of the annual FSAR update in accordance to Technical Specification 6.16.

1.0 PURPOSE AND SCOPE (cont.)

As required by Technical Specification 3.3.3.10.b and 3.3.3.11.b, a list and explanation for the inoperability of radioactive liquid and/or gaseous effluent monitors is provided in this report.

2.0 DISCUSSION

The basis for the calculation of the percent of technical specification for the critical organ in Table 1A is Technical Specification 3.11.2.1.b.

Technical Specification 3.11.2.1.b requires that the dose rate for iodine-131, for tritium, and for all radionuclides in particulate form with half-lives greater than 8 days shall be less than or equal to 1500 mrem/yr to the critical organ at and beyond the site boundary. The critical organ is the child's thyroid; inhalation pathway.

The basis for the calculation of percent of technical specification for the total body and skin in Table 1A is Technical Specification 3.11.2.1.a. Technical Specification 3.11.2.1.a requires that the dose rate for noble gases to areas at or beyond site boundary shall be less than or equal to 500 mrem/yr to the total body and less than or equal to 3000 mrem/yr to the skin.

The basis for the calculation of the percent of technical specification in Table 2A is Technical Specification 3.11.1.1. Technical Specification 3.11.1.1 states that the concentration of radioactive material released in liquid effluents to unrestricted areas shall be limited to the concentrations specified in 10 CFR Part 20, Appendix B, Table II, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2.0E-4 microcuries/ml.

Percent of technical specification calculations are based on the total gaseous or liquid effluents released for that respective quarter.

2.0 DISCUSSION (cont.)

Unplanned releases presented in Attachment 7 are defined according to the criteria presented in 10 CFR Part 50.73. Gaseous unplanned releases are those radioactive releases that exceed 2 times the applicable concentrations of the limits specified in Appendix B, Table II, of 10 CFR Part 20 in unrestricted areas, when averaged over a time period of one hour. Liquid unplanned releases are those effluent releases that exceed 2 times the limiting combined Maximum Permissible Concentration (MPC) specified in Appendix B, Table II, of 10 CFR Part 20 in unrestricted areas for all radionuclides except tritium and dissolved noble gases, when averaged over a time period of one hour.

The typical Lower Limit of Detection (L.L.D.) capabilities of the radioactive effluent analysis instrumentation are presented in Attachment 9. These Lower Limit of Detection values are based upon conservative conditions (i.e., minimum sample volume and maximum delay time prior to analysis). Actual Lower Limit of Detection values may be lower. If a radioisotope is not detected when analyzing effluent samples, then the activity of that radioisotope will be reported as Not Detectable (N/D) on Attachment 1 of this report. When the radioisotopes listed on Attachment 1 for a particular quarter and release mode are less than the Lower Limits of Detection, then the totals for this period will be designated as Not Applicable (N/A).

3.0 SUPPLEMENTAL INFORMATION

There are no inclusions for the time period covered by this report.

ATTACHMENT 1

EFFLUENT RELEASE DATA

(01/88 - 06/88)

This attachment includes a summary of the quantities of radioactive liquid and gaseous effluents and solid waste, as outlined in Regulatory Guide 1.21.

TABLE 1A
NORTH ANNA POWER STATION
SEMI-ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
SUMMATION OF ALL GASEOUS EFFLUENT RELEASES FOR 1988

	UNITS	1st QUARTER	2nd QUARTER	ESTIMATED TOTAL PERCENT ERROR (%)
A. Fission and Activation Gases:				
1. Total Release.	Curies	5.77E+1	2.50E+1	1.70E+1
2. Average Release Rate for Period.	µCi/sec	7.34E+0	3.18E+0	
B. Iodines:				
1. Total Iodine-131 Release.	Curies	4.26E-4	3.32E-4	1.70E+1
2. Average Release Rate for Period.	µCi/sec	5.41E-5	4.22E-5	
C. PARTICULATES ($T_{\frac{1}{2}}$ > 8 days):				
1. Total Particulate ($T_{\frac{1}{2}}$ > 8 days) Release.	Curies	5.63E-4	8.72E-6	1.70E+1
2. Average Release Rate for Period.	µCi/sec	7.16E-5	1.11E-6	
3. Gross Alpha Radioactivity Release.	Curies	7.07E-6	1.54E-5	1.70E+1
D. Tritium:				
1. Total Release.	Curies	1.04E+1	9.28E+0	1.70E+1
2. Average Release Rate for Period.	µCi/sec	1.33E+0	1.18E+0	
E. Percentage of Technical Specification Limits:				
1. Total Body Dose Rate.	%	3.82E-3	1.51E-3	
2. Skin Dose Rate.	%	1.50E-3	5.99E-4	
3. Critical Organ Dose Rate.	%	1.38E-3	9.91E-4	

N/D is Not Detectable & N/A is Not Applicable

TABLE 1B

NORTH ANNA POWER STATION

SEMI-ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

MIXED MODE GASEOUS EFFLUENT RELEASES FOR 1988

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	1st QUARTER	2nd QUARTER	1st QUARTER	2nd QUARTER
Fission and Activation Gases:					
Krypton - 85	Ci	N/D	N/D	N/D	N/D
Krypton - 85m	Ci	N/D	N/D	N/D	N/D
Krypton - 87	Ci	N/D	N/D	N/D	N/D
Krypton - 88	Ci	N/D	N/D	N/D	N/D
Xenon - 133	Ci	2.93E+0	3.25E+0	2.69E-1	3.69E-1
Xenon - 135	Ci	4.10E-2	7.15E-2	N/D	N/D
Xenon - 135m	Ci	N/D	N/D	N/D	N/D
Xenon - 138	Ci	N/D	N/D	N/D	N/D
Other (Specify)					
Total for Period	Ci	2.97E+0	3.33E+0	2.69E-1	3.69E-1
Iodines:					
Iodine - 131	Ci	1.02E-5	5.11E-6	4.09E-7	4.53E-7
Iodine - 133	Ci	4.37E-5	1.81E-5	N/D	1.64E-7
Iodine - 135	Ci	N/D	N/D	N/D	N/D
Other (Specify)					
Total For Period	Ci	5.39E-5	2.33E-5	4.09E-7	6.17E-7
Particulates:					
Strontium - 89	Ci	N/D	N/D	N/A	N/A
Strontium - 90	Ci	N/D	N/D	N/A	N/A
Cesium - 134	Ci	N/D	N/D	N/D	N/D
Cesium - 137	Ci	1.63E-8	4.25E-8	N/D	N/D
Barium - 140	Ci	N/D	N/D	N/D	N/D
Lanthanum - 140	Ci	N/D	N/D	N/D	N/D
Other (Specify)					
Iron - 55	Ci	1.75E-7	2.20E-7	N/A	N/A
Cobalt - 58	Ci	4.69E-7	1.04E-7	N/D	N/D
Cobalt - 60	Ci	1.31E-6	9.17E-7	N/D	N/D

N/D is Not Detectable & N/A is Not Applicable

TABLE 1B

NORTH ANNA POWER STATION

SEMI-ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

MIXED MODE GASEOUS EFFLUENT RELEASES FOR 1988

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	1st QUARTER	2nd QUARTER	1st QUARTER	2nd QUARTER
Particulates (cont):					
Total for Period ($T_{\frac{1}{2}}$ > 8 days)	Ci	1.97E-6	1.28E-6	N/D	N/D
Total for Period ($T_{\frac{1}{2}}$ < 8 days)	Ci	N/D	N/D	N/D	N/D
Total for Period	Ci	1.97E-6	1.28E-6	N/D	N/D
GROSS ALPHA:	Ci	N/D	N/D	N/D	N/D
TRITIUM:	Ci	1.01E+0	3.27E+0	1.02E-4	3.61E-4

N/D is Not Detectable & N/A is Not Applicable

TABLE 1C
NORTH ANNA POWER STATION
SEMI-ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
GROUND LEVEL GASEOUS EFFLUENT RELEASES FOR 1988

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	1st QUARTER	2nd QUARTER	1st QUARTER	2nd QUARTER
Fission and Activation Gases:					
Krypton - 85	Ci	N/D	N/D	N/D	N/D
Krypton - 85m	Ci	N/D	N/D	N/D	N/D
Krypton - 87	Ci	N/D	N/D	N/D	N/D
Krypton - 88	Ci	N/D	N/D	N/D	N/D
Xenon - 133	Ci	N/D	2.13E+1	5.45E+1	2.57E-3
Xenon - 135	Ci	N/D	N/D	N/D	N/D
Xenon - 135m	Ci	N/D	N/D	N/D	N/D
Xenon - 138	Ci	N/D	N/D	N/D	N/D
Other (Specify)					
Total for Period	Ci	N/D	2.13E+1	5.45E+1	2.57E-3
Iodines:					
Iodine - 131	Ci	2.17E-4	3.26E-4	1.98E-4	1.34E-8
Iodine - 133	Ci	2.44E-3	4.33E-3	4.76E-5	5.12E-9
Iodine - 135	Ci	N/D	N/D	1.20E-5	N/D
Other (Specify)					
Iodine - 132	Ci	N/D	N/D	6.65E-6	N/D
Total For Period	Ci	2.66E-3	4.66E-3	2.64E-4	1.85E-8
Particulates:					
Strontium - 89	Ci	N/D	N/D	N/A	N/A
Strontium - 90	Ci	N/D	N/D	N/A	N/A
Cesium - 134	Ci	N/D	N/D	1.44E-4	N/D
Cesium - 137	Ci	N/D	2.24E-6	3.85E-4	N/D
Barium - 140	Ci	N/D	N/D	N/D	N/D
Lanthanum - 140	Ci	N/D	N/D	N/D	N/D
Other (Specify)					
Manganese - 54	Ci	N/D	N/D	2.07E-6	N/D
Iron - 55	Ci	N/D	5.17E-6	N/A	N/A
Cobalt - 58	Ci	N/D	N/D	7.04E-6	N/D

N/D is Not Detectable & N/A is Not Applicable

TABLE 1C
NORTH ANNA POWER STATION
SEMI-ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
GROUND LEVEL GASEOUS EFFLUENT RELEASES FOR 1988

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	1st QUARTER	2nd QUARTER	1st QUARTER	2nd QUARTER
Particulates (cont):					
Cobalt - 60	Ci	N/D	N/D	2.22E-5	2.81E-8
Niobium - 95	Ci	N/D	N/D	5.75E-10	N/D
Antimony - 122 ($T_{\frac{1}{2}}$ < 8 days)	Ci	N/D	N/D	1.80E-5	N/D
Tellurium - 131m ($T_{\frac{1}{2}}$ < 8 days)	Ci	N/D	N/D	5.33E-9	N/D
Cesium - 138 ($T_{\frac{1}{2}}$ < 8 days)	Ci	N/D	N/D	N/D	9.19E-5
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
Total For Period ($T_{\frac{1}{2}}$ > 8 days)	Ci	N/D	7.41E-6	5.61E-4	2.81E-8
Total for Period ($T_{\frac{1}{2}}$ < 8 days)	Ci	N/D	N/D	1.80E-5	9.19E-5
Total for Period	Ci	N/D	7.41E-6	5.79E-4	9.19E-5
GROSS ALPHA:	Ci	7.07E-6	1.54E-5	N/D	N/D
TRITIUM:	Ci	7.32E+0	6.01E+0	2.10E+0	1.79E-5

N/D is Not Detectable & N/A is Not Applicable

TABLE 2A
NORTH ANNA POWER STATION
SEMI-ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
SUMMATION OF ALL LIQUID EFFLUENT RELEASES FOR 1988

	UNITS	1st QUARTER	2nd QUARTER	ESTIMATED TOTAL PERCENT ERROR (%)
A. Fission & Activation Products:				
1. Total liquid effluent release (not including tritium, noble gases and gross alpha).	Curies	1.63E-1	9.14E-2	1.70E+1
2. Average diluted concentration of liquid effluents during the period.	µCi/ml	2.67E-10	1.08E-10	
3. Percent of applicable Tech. Spec. limit.	%	1.19E-3	4.13E-4	
B. Tritium:				
1. Total liquid effluent release of tritium.	Curies	3.92E+2	4.75E+2	1.70E+1
2. Average diluted concentration of tritium during the period.	µCi/ml	6.43E-7	5.61E-7	
3. Percent of applicable Tech. Spec. limit.	%	2.14E-2	1.87E-2	
C. Dissolved and Entrained Noble Gases:				
1. Total liquid effluent release of noble gases.	Curies	3.36E-2	5.43E-2	1.70E+1
2. Average diluted concentration of noble gases during the period.	µCi/ml	5.50E-11	6.42E-11	
3. Percent of applicable Tech. Spec. limit.	%	2.75E-5	3.21E-5	
D. Gross Alpha Radioactivity:				
1. Total liquid effluent release of gross alpha.	Curies	N/D	N/D	1.70E+1
E. Total volume of liquid effluent released (prior to dilution) during the period.	Liters	7.14E+7	8.39E+7	2.00E+0
F. Total volume of dilution water used during the period.	Liters	6.10E+11	8.47E+11	2.00E+0

N/D is Not Detectable & N/A is Not Applicable

TABLE 2B

NORTH ANNA POWER STATION

SEMI-ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

LIQUID EFFLUENT RELEASES FOR 1988

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	1st QUARTER	2nd QUARTER	1st QUARTER	2nd QUARTER
Fission and Activation Products:					
Chromium - 51	Ci	N/D	N/D	N/D	N/D
Manganese - 54	Ci	9.68E-4	3.61E-4	N/D	N/D
Cobalt - 58	Ci	1.16E-2	1.78E-3	N/D	N/D
Iron - 59	Ci	N/D	N/D	N/D	N/D
Cobalt - 60	Ci	4.93E-2	3.98E-2	N/D	N/D
Zinc - 65	Ci	N/D	N/D	N/D	N/D
Strontium - 89	Ci	N/D	N/D	N/A	N/A
Strontium - 90	Ci	N/D	N/D	N/A	N/A
Niobium - 95	Ci	2.31E-3	1.03E-3	N/D	N/D
Zirconium - 95	Ci	4.27E-4	N/D	N/D	N/D
Molybdenum - 99 ($T_{\frac{1}{2}}$ < 8 days)	Ci	N/D	N/D	N/D	N/D
Technetium - 99m($T_{\frac{1}{2}}$ < 8 days)	Ci	N/D	N/D	N/D	N/D
Iodine - 131	Ci	N/D	N/D	N/D	N/D
Cesium - 134	Ci	1.62E-3	1.39E-3	N/D	3.46E-8
Cesium - 137	Ci	4.92E-3	3.90E-3	N/D	7.58E-8
Barium - 140	Ci	N/D	N/D	N/D	N/D
Lanthanum - 140	Ci	N/D	N/D	N/D	N/D
Cerium - 141	Ci	N/D	N/D	N/D	N/D
Other (specify)					
Sodium - 24 ($T_{\frac{1}{2}}$ < 8 days)	Ci	1.46E-3	5.99E-5	N/D	N/D
Iron - 55	Ci	N/D	N/D	N/A	N/A
Strontium - 85	Ci	5.99E-5	N/D	N/D	N/D
Zirconium - 97 ($T_{\frac{1}{2}}$ < 8 days)	Ci	2.30E-3	5.80E-4	N/D	N/D
Rhodium - Ruthenium - 106	Ci	1.30E-2	1.17E-3	N/D	N/D
Silver - 110m	Ci	7.46E-2	3.22E-2	N/D	N/D
Antimony - 124	Ci	3.08E-4	N/D	N/D	N/D
Antimony - 125	Ci	N/D	9.13E-3	N/D	N/D
Iodine - 133	Ci	1.94E-4	2.55E-5	N/D	N/D
	Ci				
Total for Period ($T_{\frac{1}{2}}$ > 8 days)	Ci	1.59E-1	9.08E-2	N/A	1.10E-7
Total for Period ($T_{\frac{1}{2}}$ < 8 days)	Ci	3.76E-3	6.40E-4	N/A	N/A
Total for Period	Ci	1.63E-1	9.14E-2	N/A	1.10E-7

N/D is Not Detectable & N/A is Not Applicable

TABLE 2B
NORTH ANNA POWER STATION
SEMI-ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
LIQUID EFFLUENT RELEASES FOR 1988

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNITS	1st QUARTER	2nd QUARTER	1st QUARTER	2nd QUARTER
Dissolved and Entrained Noble Gases:					
Xenon - 133	Ci	2.98E-2	5.01E-2	N/D	N/D
Xenon - 135	Ci	3.77E-3	4.14E-3	N/D	N/D
Other (specify)					
Xenon - 135m	Ci	N/D	1.05E-4	N/D	N/D
	Ci				
	Ci				
	Ci				
Total for Period:	Ci	3.36E-2	5.43E-2	N/D	N/D
Gross Alpha	Ci	N/D	N/D	N/D	N/D
Tritium	Ci	3.92E+2	4.75E+2	8.34E-4	N/D

N/D is Not Detectable & N/A is Not Applicable

TABLE 3
NORTH ANNA POWER STATION
SEMI-ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
SUMMATION OF SOLID RADIOACTIVE WASTE AND IRRADIATED FUEL SHIPMENTS
FOR 01-01-88 THROUGH 06-30-88

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (NOT IRRADIATED FUEL)

1. Type of Waste	UNIT	6-MONTH PERIOD	ESTIMATED TOTAL PERCENT ERROR (%)
a. Spent resins, filter sludges, evaporator bottoms, etc.	m^3	7.03E+1*	2.50E+1
	Ci	7.66E+2	2.50E+1
b. Dry compressible waste, contaminated equipment, etc.	m^3	9.37E+1**	2.50E+1
	Ci	2.08E+0	2.50E+1
c. Irradiated components, control rods, etc.	m^3	0.00E+0	0.00E+0
	Ci	0.00E+0	0.00E+0
d. Other (describe) Dry Sewage Sludge & Contaminated Oil	m^3	1.19E+1***	2.50E+1
	Ci	1.81E-2	2.50E+1

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

a. Cobalt - 60	%	4.57E+1	2.5 E+1
Iron - 55	%	1.80E+1	2.5 E+1
Cesium - 137	%	1.02E+1	2.5 E+1
Nickel - 63	%	1.78E+1	2.5 E+1
Cesium - 134	%	3.60E+0	2.5 E+1
Cobalt - 58	%	2.39E+0	2.5 E+1
Manganese - 54	%	1.77E+0	2.5 E+1
b. Cobalt - 60	%	2.72E+1	2.5 E+1
Iron - 55	%	2.12E+1	2.5 E+1
Cobalt - 58	%	1.56E+1	2.5 E+1
Cesium - 137	%	1.44E+1	2.5 E+1
Cesium - 134	%	5.63E+0	2.5 E+1
Niobium - 95	%	3.63E+0	2.5 E+1
Manganese - 54	%	3.10E+0	2.5 E+1
Nickel - 63	%	2.76E+0	2.5 E+1
Zirconium - 95	%	2.49E+0	2.5 E+1
Chromium - 51	%	2.33E+0	2.5 E+1
Tritium	%	1.44E+0	2.5 E+1
c. None	%		. E
	%		. E
	%		. E
	%		. E

TABLE 3
NORTH ANNA POWER STATION
SEMI-ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
SUMMATION OF SOLID RADIOACTIVE WASTE AND IRRADIATED FUEL SHIPMENTS
FOR 01-01-88 THROUGH 06-30-88

2. Estimate of major nuclide composition (by type of waste) (con.t)	UNIT	6-MONTH PERIOD	ESTIMATED TOTAL PERCENT ERROR(%)
d. (Sewage)			
Iron - 55	%	7.80E+1	2.5 E+1
Cobalt - 60	%	1.13E+1	2.5 E+1
Cerium - 144	%	4.02E+0	2.5 E+1
Cesium - 137	%	3.60E+0	2.5 E+1
Cesium - 134	%	3.10E+0	2.5 E+1
(Oil)			
Iron - 55	%	8.10E+0	2.5 E+1
Cobalt - 60	%	9.80E-1	2.5 E+1
Cerium - 144	%	7.90E+0	2.5 E+1
Cesium - 137	%	4.04E+1	2.5 E+1
Cesium - 134	%	8.26E+0	2.5 E+1
Tritium	%	3.22E+1	2.5 E+1

3. Solid Waste Disposition

NUMBER OF SHIPMENTS	MODE OF TRANSPORTATION	DESTINATION
9	Truck	Barnwell, SC
5	Truck	Oak Ridge, TN

B. IRRADIATED FUEL SHIPMENTS (Disposition)

NUMBER OF SHIPMENTS	MODE OF TRANSPORTATION	DESTINATION
0	N / A	N / A

* 1 shipment of powdex resin was shipped from North Anna to a licensed waste processor for volume reduction. Therefore the volume as listed for this waste type is not representative of the actual volume buried. Total volume buried for the reporting period was 52.79 m^3.

** 2 shipments of dry compressible waste were shipped from North Anna to a licensed waste processor for volume reduction. Therefore the volume as listed for this waste type is not representative of the actual volume buried. Total volume buried for the reporting period was 62.56 m^3.

*** 1 shipment of contaminated oil was shipped from North Anna to a licensed waste processor for incineration. Therefore the volume as listed for this waste type is not representative of the actual volume buried. Total volume buried for the reporting period was 2.97 m^3.

ATTACHMENT 2

ANNUAL AND QUARTERLY DOSES

(01/88 - 06/88)

An assessment of radiation doses to the maximum exposed member of the public due to radioactive liquid and gaseous effluents released from the site for each calendar quarter for the calendar year of this report along with an annual total of each effluent pathway will be made pursuant to Technical Specification 6.9.1.9 in the Semi Annual Radioactive Effluent Release Report submitted within sixty (60) days after January 01, 1989.

ATTACHMENT 3

(01/88 - 06/88)

REVISIONS TO OFFSITE DOSE CALCULATION

MANUAL (ODCM)

As required by Technical Specification 6.15, revisions to the ODCM for the time period covered by this report are synopsized below. Supporting documentation and affected pages of the ODCM are attached.

No revisions to the OFFSITE DOSE CALCULATION MANUAL (ODCM) were required for the time period covered by this report.

ATTACHMENT 4

(01/88 - 06/88)

REVISIONS TO PROCESS CONTROL PROGRAM (PCP)

As required by Technical Specification 6.14, revisions to to the PCP for the time period covered by this report are synopsized below. Supporting documentation and affected pages of the PCP are attached.

No revisions to the Process Control Program (PCP) were required for the time period covered by this report.

ATTACHMENT 5

(01/88 - 06/88)

MAJOR CHANGES TO RADIOACTIVE LIQUID, GASEOUS, AND SOLID WASTE TREATMENT SYSTEMS

As required by Technical Specification 6.16, major changes to radioactive liquid, gaseous and solid waste treatment systems for the time period covered by this report are reported below. Supporting information as to the reason(s) for the change(s) and a summary of the 10 CFR Part 50.59 evaluation are included.

No major changes to the radioactive liquid, gaseous, and solid waste treatment systems were made for the time period covered by this report.

ATTACHMENT 6

(01/88 - 06/88)

RADIOACTIVE LIQUID AND GASEOUS

EFFLUENT MONITORING INSTRUMENTATION INOPERABLE

As required by Technical Specification 3.3.3.10.b and 3.3.3.11.b, a list and explanation for the inoperability of radioactive liquid and/or gaseous effluent monitors is provided in this report.

On April 11, 1987, 1-RM-SW-108 (radiation monitor for service water discharged to Lake Anna) was declared inoperable. The service water line to 1-SW-P-10 (service water pump) was found clogged, which prevented flow through the radiation monitor. Attempts to maintain the service water line free from debris and return the monitor to service have been unsuccessful. The 1-RM-SW-108 (service water radiation monitor) was inoperable greater than thirty (30) days, because of difficulty in cleaning the service water supply line. Engineering Work Request #85-123 has been initiated to solve the radiation monitor check source and meter spiking problem and the flow line to the radiation monitor clogging problems.

ATTACHMENT 7

(01/88 - 06/88)

UNPLANNED RELEASES

As required by Technical Specification 6.9.1.9, a list of unplanned releases, defined according to the criteria presented in 10 CFR part 50.73, from the site to unrestricted areas of radioactive materials in gaseous and liquid effluents made during the reporting period is made below.

No unplanned releases, as defined according to the criteria presented in 10CFR Part 50.73, occurred during the time period covered by this report.

Attachment 8

(01/88 - 06/88)

Changes Required By The Land Use Census Evaluation

As required by Technical Specification 3.12.2 and 6.9.1.9, Evaluation of the Land Use Census is to be made for identifing the new location(s) for dose calculations and/or environmental monitoring pursuant to Technical Specification 3.12.2 requirements.

No Attachment required for this Semi-Annual Radioactive Effluent Release Report.

ATTACHMENT 9

Lower Limits of Detection For Effluent Sample Analysis
(01/88 - 06/88)

Gaseous Effluents

Radioisotope	Required L.L.D. (μCi/ml)	Typical L.L.D. (μCi/ml)
Krypton - 87	1.0E-4	8.56E-7 - 1.21E-6
Krypton - 88	1.0E-4	1.07E-6 - 1.29E-6
Xenon - 133	1.0E-4	7.38E-7 - 8.36E-7
Xenon - 133m	1.0E-4	3.63E-6 - 4.57E-6
Xenon - 135	1.0E-4	3.61E-7 - 4.99E-7
Xenon - 135m	1.0E-4	5.84E-7 - 8.97E-7
Xenon - 138	1.0E-4	1.43E-6 - 2.12E-6
Iodine - 131	1.0E-12	8.42E-14 - 1.00E-13
Manganese - 54	1.0E-11	5.79E-14 - 7.40E-14
Cobalt - 58	1.0E-11	6.21E-14 - 9.16E-14
Iron - 59	1.0E-11	7.33E-14 - 8.84E-14
Cobalt - 60	1.0E-11	1.20E-13 - 1.78E-13
Zinc - 65	1.0E-11	1.44E-13 - 2.83E-13
Strontium - 89	1.0E-11	4.00E-15 - 6.00E-15
Strontium - 90	1.0E-11	6.00E-16 - 1.00E-15
Molybdenum - 99	1.0E-11	4.18E-13 - 4.95E-13
Cesium - 134	1.0E-11	6.67E-14 - 8.46E-14
Cesium - 137	1.0E-11	6.91E-14 - 7.33E-14
Cerium - 141	1.0E-11	8.04E-14 - 1.04E-13
Cerium - 144	1.0E-11	3.01E-13 - 4.25E-13
Gross Alpha	1.0E-11	1.34E-14 - 2.17E-14
Tritium	1.0E-6	1.29E-7 - 1.44E-7

ATTACHMENT 9

Lower Limits of Detection For Effluent Sample Analysis
(01/88 - 06/88)
(cont.)

Liquid Effluents

Radioisotope	Required L.L.D. (μCi/ml)	Typical L.L.D. (μCi/ml)
Krypton - 87	1.0E-5	8.38E-8 - 1.11E-7
Krypton - 88	1.0E-5	1.51E-7 - 1.93E-7
Xenon - 133	1.0E-5	1.08E-7 - 1.38E-7
Xenon - 133m	1.0E-5	4.29E-7 - 5.37E-7
Xenon - 135	1.0E-5	4.56E-8 - 6.31E-8
Xenon - 135m	1.0E-5	7.92E-8 - 1.78E-7
Xenon - 138	1.0E-5	2.38E-7 - 4.34E-7
Iodine - 131	1.0E-6	5.12E-8 - 6.74E-8
Manganese - 54	5.0E-7	4.15E-8 - 7.30E-8
Iron - 55	1.0E-6	9.00E-7 - 1.00E-6
Cobalt - 58	5.0E-7	2.86E-8 - 7.61E-8
Iron - 59	5.0E-7	8.90E-8 - 1.30E-7
Cobalt - 60	5.0E-7	8.55E-8 - 8.88E-8
Zinc - 65	5.0E-7	1.06E-7 - 1.19E-7
Strontium - 89	5.0E-8	3.00E-8 - 4.00E-8
Strontium - 90	5.0E-8	8.00E-9 - 1.00E-8
Molybdenum - 99	5.0E-7	2.67E-7 - 3.29E-7
Cesium - 134	5.0E-7	5.10E-8 - 6.41E-8
Cesium - 137	5.0E-7	3.15E-8 - 7.07E-8
Cerium - 141	5.0E-7	6.72E-8 - 9.89E-8
Cerium - 144	5.0E-7	2.96E-7 - 4.22E-7
Gross Alpha	1.0E-7	7.73E-9 - 1.25E-8
Tritium	1.0E-5	3.57E-6 - 3.96E-6

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

August 26, 1988

D. S. CRUDEN
VICE PRESIDENT-NUCLEAR

United States Nuclear Regulatory Commission
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Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION UNITS 1 AND 2
SEMI-ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

Enclosed is the North Anna Power Station Semi-Annual Radioactive Effluent Release Report for January 1, 1988 through June 30, 1988. The report, submitted pursuant to North Anna Station Technical Specification 6.9.1.9, includes a summary of the quantities of radioactive liquid and gaseous effluents and solid waste released during the previous six months, as outlined in Regulatory Guide 1.21, Revision 1, June 1974.

Very truly yours,

N. E. Hardwick for
D. S. Cruden

Enclosure

cc: U. S. Nuclear Regulatory Commission
101 Marietta Street, N.W.
Suite 2900
Atlanta, GA 30323

Mr. J. L. Caldwell
NRC Senior Resident Inspector
North Anna Power Station

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