SEMI-ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

NORTH ANNA POWER STATION

JULY 1, 1984, TO DECEMBER 31, 1984

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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 6.9.1.12.

RADIOACTIVE EFFLUENT RELEASE REPORT

FOR THE

NORTH ANNA POWER STATION

JULY 1, 1984 TO DECEMBER 31, 1984

INDEX

1.0 PURPOSE AND SCOPE

The 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 from 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 submitted within 60 days after January 1 of each year includes an assessment of radiation doses to the maximum exposed member of the public due to radioactive liquid and gaseous effluents released from the site during the previous calendar year. The report also includes a list of unplanned releases during the reporting period.

As required by Technical Specification 6.15, 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.

Major changes to radioactive solid waste treatment systems are reported as required by Technical Specification 6.16. Information to support the reason for the change 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 systems may be submitted as part of the annual FSAR update.

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 mrems/yr to the total body and less than or equal to 3000 mrems/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 2×10^{-4} microcuries/ml.

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

The annual and quarterly doses, as reported in Attachment 2, were calculated according to the methodology presented in the ODCM. The beta and gamma air doses due to noble gases released from the site were calculated at site boundary. The maximum exposed member of the public from iodine-131, from tritium, and from all radionuclides in particulate form with half-lives greater than 8 days is defined as an infant, exposed through the grass-cow-milk pathway, with the critical organ being the thyroid. The maximum exposed member of the public from radioactive materials in liquid effluents in unrestricted areas is defined as an adult, exposed by the fish pathway, with the critical organ being the liver. The total body dose from liquid effluents is also determined for this individual.

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.

3.0 SUPPLEMENTAL INFORMATION

Not included in this report are the Fourth Quarter, 1984, results of the following analysis:

Particulate Filters

Ventilation Vent - A: SR-89/90, Fe-55

Ventilation Vent - B: SR-89/90, Fe-55

Process Vent: SR-89/90, Fe-55

Liquid Composites

Turbine Building Sump: SR-89/90, Fe-55

Clarifier Effluent: SR-89/90, Fe-55

When furnished these results by the vendor, an addendum to this report will be properly submitted.

ATTACHMENT 1

EFFLUENT RELEASE DATA

(1/84 - 12/84)

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

TABLE 1A

EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1984)

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

NORTH ANNA POWER STATION

	Units	3rd Quarter	4th Quarter	Est. Total % Error
A. Fission and Activation Gases:				
1. Total Release	Ci	9.767 E + 3	2.065 E + 1	1.50 E + 1
2. Average Release Rate for Period:	μCi/sec	1.23 E + 3	2.60 E + 0	
B. Iodines:				
1. Total Iodine-131 Release	Ci	1.87 E - 3	1.87 E - 4	1.50 E + 1
2. Average Release Rate for Period:	μCi/sec	2.35 E - 4	2.35 E - 5	
C. Particulates ($T\frac{1}{2}$ > 8 days):				
1. Total Particulate ($T\frac{1}{2}$ > 8 days) Release	Ci	8.169 E - 4	3.491 E - 4	1.50 E + 1
2. Average Release Rate for Period	μCi/sec	1.04 E - 4	4.39 E - 5	
3. Gross Alpha Radioactivity Release	Ci	4.72 E - 6	2.37 E - 5	
D. Tritium:				
1. Total Release	Ci	6.097 E - 1	3.285 E + 0	1.50 E + 1
2. Average Release Rate for Period	μCi/sec	7.67 E - 2	4.13 E - 1	
E. Percentage of Technical Specification Limits:				
1. Total Body Dose Rate	%	1.77 E - 1	3.93 E - 3	
2. Skin Dose Rate	%	2.96 E - 2	9.02 E - 4	
3. Critical Organ Dose Rate	%	2.32 E - 3	4.97 E - 4	

TABLE 1B
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT(1984)
GASEOUS EFFLUENTS MIXED MODE RELEASES
NORTH ANNA POWER STATION

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNIT	3rd QUARTER	4th QUARTER	3rd QUARTER	4th QUARTER
Fission and Activation Gases:					
Krypton - 85	Ci	*	*	1.43 E + 1	*
Krypton - 85m	Ci	*	*	*	8.67 E - 3
Krypton - 87	Ci	*	*	*	*
Krypton - 88	Ci	*	*	*	6.47 E - 3
Xenon - 131m	Ci	*	*	2.65 E + 2	*
Xenon - 133	Ci	6.35 E + 1	7.58 E + 0	9.08 E + 3	7.16 E + 0
Xenon - 133m	Ci	*	*	4.34 E + 1	6.22 E - 2
Xenon - 135	Ci	7.81 E - 1	1.31 E + 0	1.89 E - 3	4.52 E - 1
Xenon - 135m	Ci	*	*	*	*
Xenon - 138	Ci	*	*	*	*
Other (Specify)	Ci				
Argon - 41	Ci	*	*	*	3.08 E - 3
	Ci				
Total for Period	Ci	6.43 E + 1	8.89 E + 0	9.40 E + 3	7.69 E + 0
	Ci				
Iodines:	Ci				
Iodine - 131	Ci	5.69 E - 6	9.30 E - 6	8.29 E - 5	5.12 E - 6
Iodine - 132	Ci	*	*	3.44 E - 4	1.80 E - 8
Iodine - 133	Ci	3.09 E - 6	3.23 E - 5	1.60 E - 8	5.73 E - 6
Iodine - 134	Ci	*	*	*	*
Iodine - 135	Ci	*	7.01 E - 8	*	1.30 E - 6
	Ci				
Total for Period	Ci	8.78 E - 6	4.17 E - 5	4.27 E - 4	1.22 E - 5
	Ci				
Particulates:	Ci				
Strontium - 89	Ci	*			
Strontium - 90	Ci	*			
Cesium - 134	Ci	*	*	- *	*
Cesium - 137	Ci	3.33 E - 8	3.15 E - 8	*	*
Barium - 140	Ci	*	*	*	*
Lanthanum - 140	Ci	*	*	*	*
Other (Specify)	Ci				
Cobalt - 58	Ci	2.07 E - 8	*	2.22 E - 6	1.58 E - 8
Cobalt - 60	Ci	*	8.20 E - 8	5.85 E - 7	3.86 E - 9
Strontium - 85	Ci	*	*	1.15 E - 9	*
Tellurium - 131m ($T_{1/2}$ < 8 days)	Ci	*	*	2.68 E - 9	*
	Ci				

* Less than lower limits of detection

TABLE 1B
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1984)
GASEOUS EFFLUENTS MIXED MODE RELEASES
NORTH ANNA POWER STATION

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNIT	3rd QUARTER	4th QUARTER	3rd QUARTER	4th QUARTER
Particulates (con't)					
Sodium - 24 ($T_{1/2}$ < 8 days)	Ci	*	*	*	2.60 E - 9
Rubidium - 88 ($T_{1/2}$ < 8 days)	Ci	*	*	*	6.23 E - 5
Iron - 55	Ci	*			
Total for Period	Ci	5.40 E - 8	1.14 E - 7	2.81 E - 6	6.23 E - 5
Gross Alpha	Ci	*	5.89 E - 10	*	*
	Ci				
Tritium	Ci	3.69 E - 3	1.76 E - 1	7.99 E - 3	1.91 E - 4
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
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	Ci				
	Ci				
	Ci				

* Less than lower limits of detection

TABLE 1C
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1984)
GASEOUS EFFLUENTS - GROUND - LEVEL RELEASES
NORTH ANNA POWER STATION

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNIT	3rd QUARTER	4th QUARTER	3rd QUARTER	4th QUARTER
Fission and Activation Gases:					
Krypton - 85	Ci	*	*	*	*
Krypton - 85m	Ci	*	5.43 E - 2	4.98 E + 0	7.81 E - 5
Krypton - 87	Ci	*	1.08 E - 1	5.27 E + 0	1.69 E - 4
Krypton - 88	Ci	*	9.01 E - 2	7.07 E + 0	1.97 E - 4
Xenon - 131m	Ci	*	*	*	*
Xenon - 133		1.58 E + 2	3.30 E - 1	5.36 E + 1	4.65 E - 1
Xenon - 133m	Ci	*	*	*	*
Xenon - 135	Ci	1.98 E + 1	8.82 E - 1	3.12 E + 1	6.24 E - 4
Xenon - 135m	Ci	*	1.20 E + 0	1.73 E + 1	1.96 E - 3
Xenon - 138	Ci	*	5.01 E - 1	*	*
Other (Specify)	Ci				
Argon - 41	Ci	*	4.32 E - 1	6.04 E + 0	6.25 E - 4
	Ci				
Total for Period	Ci	1.78 E + 2	3.60 E + 0	1.25 E + 2	4.69 E - 1
	Ci				
Iodines:	Ci				
Iodine - 131	Ci	1.78 E - 3	1.69 E - 4	1.81 E - 6	3.27 E - 6
Iodine - 132	Ci	*	*	1.54 E - 8	1.25 E - 5
Iodine - 133	Ci	9.97 E - 4	1.52 E - 3	1.93 E - 6	2.25 E - 5
Iodine - 134	Ci	*	*	1.06 E - 6	1.42 E - 5
Iodine - 135	Ci	*	*	1.50 E - 6	2.34 E - 5
	Ci				
Total for Period	Ci	2.78 E - 3	1.69 E - 3	6.32 E - 6	7.59 E - 5
	Ci				
Particulates:	Ci				
Strontium - 89	Ci	*			
Strontium - 90	Ci	*			
Cesium - 134	Ci	4.30 E - 5	2.15 E - 5	1.46 E - 4	1.87 E - 5
Cesium - 137	Ci	1.66 E - 4	1.11 E - 4	2.92 E - 4	3.85 E - 5
Barium - 140	Ci	*	*	*	*
Lanthanum - 140	Ci	*	*	*	*
Other (Specify)	Ci				
Manganese - 54	Ci	*	*	3.37 E - 7	1.05 E - 8
Cobalt - 58	Ci	7.81 E - 5	4.37 E - 5	3.45 E - 8	4.60 E - 5
Cobalt -60	Ci	7.89 E - 5	5.81 E - 5	1.87 E - 6	7.81 E - 7
Strontium - 85	Ci	7.82 E - 6	*	*	*
	Ci				

* Less than lower limits of detection

TABLE 1C
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1984)
GASEOUS EFFLUENTS - GROUND - LEVEL RELEASES
NORTH ANNA POWER STATION

		CONTINUOUS MODE		BATCH MODE	
NUCLIDES RELEASED	UNIT	3rd QUARTER	4th QUARTER	3rd QUARTER	4th QUARTER
Particulates (con't)					
Iron - 55	Ci	*			
Rubidium - 86	Ci	*	*	*	4.72 E - 6
Niobium - 95	Ci	*	5.72 E - 6	*	*
Sodium - 24 ($T_{1/2}$ < 8 days)		*	*	3.35 E - 9	4.93 E - 7
Rubidium - 88 ($T_{1/2}$ < 8 days)	Ci	*	1.59 E - 3	6.34 E - 2	*
Rubidium - 89 ($T_{1/2}$ < 8 days)	Ci	*	7.32 E - 4	*	*
Antimony - 122 ($T_{1/2}$ < 8 days)	Ci	*	*	1.71 E - 5	1.27 E - 6
Tellurium - 131m ($T_{1/2}$ < 8 days)	Ci	6.61 E - 5	*	*	*
Tellurium 132 ($T_{1/2}$ < 8 days)	Ci	*	1.15 E - 5	1.38 E - 3	*
Cesium - 138 ($T_{1/2}$ < 8 days)	Ci	8.11 E - 6	2.31 E - 3	1.29 E - 1	2.83 E - 5
	Ci				
Total for Period	Ci	4.48 E - 4	4.88 E - 3	1.94 E - 1	1.39 E - 4
	Ci				
Gross Alpha	Ci	4.72 E - 6	2.37 E - 5	*	*
	Ci				
Tritium	Ci	3.86 E - 1	3.09 E + 0	2.12 E - 1	1.85 E - 2
	Ci				
	Ci				
	Ci				
	Ci				
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	Ci				
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	Ci				
	Ci				

* Less than lower limits of detection

TABLE 2A
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1984)
LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES
NORTH ANNA POWER STATION

	UNIT	3rd QUARTER	4th QUARTER	EST. TOTAL ERROR %
A. Fission & Activation products				
1. Total release (not including tritium, gases, alpha)	Ci	6.63 E - 1	5.25 E - 1	1.50 E + 1
2. Average diluted concentration during period	μCi/ml	1.61 E - 9	8.13 E - 10	
3. Percent of applicable limit (T.S)	%	9.84 E - 3	5.41 E - 3	
B. Tritium				
1. Total release activity.	Ci	2.01 E + 1	1.72 E + 2	1.50 E + 1
2. Average diluted concentration during period	μCi/ml	4.89 E - 8	2.66 E - 7	
3. Percent of applicable limit (T.S.)	%	1.63 E - 3	8.87 E - 3	
C. Dissolved and entrained gases				
1. Total release activity.	Ci	1.59 E + 0	1.63 E - 1	1.50 E + 1
2. Average diluted concentration during period	μCi/ml	3.87 E - 9	2.52 E - 10	
3. Percent of applicable limit (T.S.)	%	1.94 E - 3	1.26 E - 4	
D. Gross Alpha radioactivity				
1. Total release activity.	Ci	< LLD	1.16 E - 4	1.50 E + 1
E. Volume of waste released (prior to dilution)	Liters	4.36 E + 7	8.08 E + 7	
F. Volume of dilution water used during period	Liters	4.11 E + 11	6.46 E + 11	

TABLE 2B
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1984)
LIQUID EFFLUENTS
NORTH ANNA POWER STATION

NUCLIDES RELEASED	UNIT	CONTINUOUS MODE 3rd QUARTER	CONTINUOUS MODE 4th QUARTER	BATCH MODE 3rd QUARTER	BATCH MODE 4th QUARTER
Fission and Activation Products:					
Strontium - 89	Ci	*			
Strontium - 90	Ci	*			
Cesium - 134	Ci	1.52 E - 1	1.59 E - 1	4.55 E - 6	3.26 E - 4
Cesium - 137	Ci	2.78 E - 1	3.17 E - 1	9.88 E - 6	6.97 E - 4
Iodine - 131	Ci	1.07 E - 3	*	*	2.60 E - 6
Cobalt - 58	Ci	3.84 E - 2	1.59 E - 2	9.70 E - 7	1.15 E - 4
Cobalt - 60	Ci	3.24 E - 2	1.29 E - 2	5.28 E - 7	1.58 E - 4
Iron - 59	Ci	2.21 E - 3	*	*	*
Zinc - 65	Ci	*	*	*	*
Chromium - 51	Ci	6.28 E - 3	*	*	5.65 E - 6
Manganese - 54	Ci	1.46 E - 3	*	*	5.75 E - 6
Niobium - 95	Ci	6.71 E - 3	*	5.16 E -8	2.91 E - 6
Zirconium - 95	Ci	4.56 E - 3	3.32 E - 4	*	*
Molybdenum - 99	Ci	*	*	*	*
Technetium - 99	Ci	*	*	*	*
Barium - 140	Ci	*	*	*	*
Lanthanum - 140	Ci	*	*	*	*
Cerium - 141	Ci	4.06 E - 5	*	*	*
Other (Specify)	Ci				
Antimony - 122	Ci	5.25 E - 2	1.74 E - 2	2.55 E - 7	3.03 E - 5
Sodium - 24	Ci	1.63 E - 4	1.13 E - 5	*	1.02 E - 6
Antimony - 124	Ci	5.89 E - 3	7.45 E - 4	*	*
Silver - 110m	Ci	5.05 E - 3	5.15 E - 4	*	4.74 E - 6
Ruthenium - 103	Ci	2.12 E - 3	*	*	*
Tellurium - 129m	Ci	3.93 E - 3	*	*	*
Iron - 55	Ci	7.03 E - 2	*		
Iodine - 132	Ci	*	*	*	1.69 E - 5
Iodine - 133	Ci	*	*	*	3.17 E - 5
Iodine - 134	Ci	*	*	*	4.16 E - 6
Iodine - 135	Ci	*	*	*	2.28 E - 5
Tellurium - 131m	Ci	*	*	*	3.38 E - 6
Cesium - 138	Ci	*	*	*	1.63 E - 6
Cobalt - 57	Ci	*	*	*	1.34 E - 6
	Ci				
	Ci				
Total for Period	Ci	6.63 E - 1	5.23 E - 1	1.62 E - 5	1.43 E - 3
	Ci				

TABLE 2B
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1984)
LIQUID EFFLUENTS
NORTH ANNA POWER STATION

NUCLIDES RELEASED	UNIT	CONTINUOUS MODE 3rd QUARTER	CONTINUOUS MODE 4th QUARTER	BATCH MODE 3rd QUARTER	BATCH MODE 4th QUARTER
Dissolved and Entrained Gases:					
Xenon - 133	Ci	1.53 E + 0	1.47 E - 1	*	*
Xenon - 135	Ci	2.54 E - 2	1.54 E - 2	*	*
Other (Specify)	Ci				
Xenon - 131m	Ci	9.50 E - 3	*	*	*
Xenon - 133m	Ci	2.20 E - 2	2.23 E - 4	*	*
Xenon - 135m	Ci	*	*	*	1.54 E - 6
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
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	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
Total for Period	Ci	1.59 E + 0	1.63 E - 1	*	1.54 E - 6
	Ci				
Tritium	Ci	2.01 E + 1	1.72 E + 2	2.06 E -5	3.73 E - 3
	Ci				
Alpha	Ci	*	1.16 E - 4	*	*
	Ci				
	Ci				
	Ci				

TABLE 3
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (7/84-12/84)
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

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

1. Type of Waste

Type of Waste	UNIT	6-MONTH PERIOD	EST. TOTAL ERROR, %
a. Spent resins, filter sludges, evaporator bottoms, etc.	m^3	1.07 E + 2	1.0 E + 1
	Ci	7.85 E + 2	1.0 E + 1
b. Dry compressible waste, contaminated equipment, etc.	m^3	5.14 E + 2	1.0 E + 1
	Ci	6.63 E + 1	1.0 E + 1
c. Irradiated components, control rods, etc.	m^3	. E	. E
	Ci	. E	. E
d. Other (describe) SOLIDIFIED OIL	m^3	3.37 E + 1	1.0 E + 1
	Ci	2.22 E -1	1.0 E + 1

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

a. Cr 51	%	5.8 E - 1
Mn 54	%	1.17 E 0
Co 58	%	9.9 E 0
CO 60	%	1.82 E + 1
Sb 122	%	9.8 E - 1
Nb 95	%	3.5 E - 1
Cs 134	%	7.64 E 0
Cs 137	%	1.47 E + 1
Ba 140	%	5.0 E - 2
La 140	%	5.0 E - 2
Ce 144	%	2.1 E - 1
Zr 95	%	1.7 E - 1
Ru 103	%	3.0 E - 2
Tc 99	%	1.0 E - 3
Sr 90	%	2.6 E - 2
I 129	%	3.0 E - 6
C 14	%	7.0 E - 2
Fe 55	%	1.77 E + 1
H 3	%	2.34 E + 1
Ni 63	%	3.78 E 0
Pu 241	%	1.9 E - 1
Cm 242	%	1.0 E - 3
Pu 238	%	7.0 E - 4
Pu 239	%	9.0 E - 4
Pu 242	%	4.0 E - 5
Am 241	%	5.0 E - 4
Cm 244	%	1.0 E - 4
	%	. E
b. Cr 51	%	6.2 E - 1
Mn 54	%	2.65 E 0
Co 58	%	4.72 E 0
Co 60	%	2.25 E + 1
Sb 122	%	1.4 E - 1
Nb 95	%	1.14 E 0
Cs 134	%	5.54 E 0
Cs 137	%	1.92 E + 1
Ce 144	%	1.8 E 0
Zr 95	%	5.1 E - 1
Ru 103	%	1.9 E - 1

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

Tc 99	%	1.0 E - 3
Sr 90	%	1.6 E - 2
I 129	%	8.0 E - 6
C 14	%	2.2 E - 1
Fe 55	%	2.73 E + 1
H 3	%	8.53 E 0
Ni 63	%	3.81 E 0
Pu 241	%	1.09 E 0
Cm 242	%	8.0 E - 2
Pu 238	%	6.0 E - 4
Pu 239	%	6.0 E - 4
Pu 242	%	2.0 E - 4
Am 241	%	7.0 E - 5
Cm 244	%	3.0 E - 4
	%	. E
c.	%	. E
	%	. E
d. Cr 51	%	3.31 E + 1
Co 60	%	2.66 E + 1
Cs 134	%	3.87 E 0
Cs 137	%	2.33 E + 1
Tc 99	%	5.8 E - 3
Sr 90	%	8.3 E - 2
I 129	%	1.3 E - 5
C 14	%	1.7 E - 1
Fe 55	%	1.20 E + 1
Ni 63	%	5.36 E - 1
Pu 241	%	1.7 E - 1
Cm 242	%	1.7 E - 3
Pu 238	%	9.7 E - 4
Pu 239	%	6.9 E - 4
Pu 242	%	1.7 E - 4
Am 241	%	4.8 E - 4
Cm 244	%	4.7 E - 4
	%	. E
	%	. E
	%	. E
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3. Solid Waste Disposition

NUMBER OF SHIPMENTS	MODE OF TRANSPORTATION	DESTINATION
3	Private Vehicle	Richland, WA
51	Private Vehicle	Barnwell, SC

B. IRRADIATED FUEL SHIPMENTS (Disposition)

NUMBER OF SHIPMENTS	MODE OF TRANSPORTATION	DESTINATION
NONE		

ATTACHMENT 2

ANNUAL AND QUARTERLY DOSES

(1/84 - 12/84)

This attachment includes an assessment of radiation doses to the maximum exposed member of the public due to radioactive liquid and gaseous effluents released from the site.

TABLE 4
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT
1984 ANNUAL DOSE ASSESSMENT
NORTH ANNA POWER STATION

LIQUID EFFLUENTS:

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual Total
Total Body Dose	mrem	0.93	0.86	1.11	1.15	4.04
Critical Organ Dose	mrem	1.27	1.17	1.54	1.59	5.57

GASEOUS EFFLUENTS:

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual Total
Noble Gas Gamma Dose	mrad	0.50	0.51	0.27	0.005	1.28
Noble Gas Beta Dose	mrad	0.83	0.62	0.57	0.003	2.02
Critical Organ Dose for I-131, H-3, particulates with $T_{½} > 8$ days	mrem	0.69	2.95	0.10	0.008	3.75

ATTACHMENT 3

(7/84-12/84)

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.

10-11-84: Revisions were made to the ODCM to more clearly identify sampling stations and their relative positions to effluent release points.

Exposure Pathway and/or Sample	Sample (Station) Number	Location
Airborne: (cont'd):		
Particulate & Radioiodine (cont'd)	21	air sampler is mounted on the power pole at the end of Rt.685 at the barricade, approx. 1.5 miles from the junction of Rt. 652 & 685
	22	air sampler is mounted on the power pole approx. 0.8 miles from North Anna's Visitor's Center, West on Rt. 700, at the exclusion area boundary on the West side of Rt. 700
	23	air sampler is mounted on the power pole approx. 25 feet from the shoreline, inside the exclusion area boundary, located on lot #34 on Carr Circle in the Aspen Hill subdivision
	24 (control)	air sampler is mounted on top of the Orange Va Regional Vepco Office Building approx. 1 mile South of the junction of Rt. 20 & 15 on the right
Soil	1,3,4,5,6,7 21,22,23,24	Previously Identified
Direct:		
TLDs	N-1/33	are located at Bearing Cooling Tower on stairwell structure approximately 150 feet from Vepco security building on Vepco North Anna Power Station site
	N-2/34	are located on power pole approximately 200 feet from entrance of Sturgeon's Creek Marina off Rt. 208

Exposure Pathway and/or Sample	Sample (Station) Number	Location
Direct (cont'd):		
TLDs (cont'd):		
	NNE-3/35	are located on Vepco North Anna Power Station site at rain gauge in construction parking lot "C" near weather tower
	NNE-4/36	are located on power pole at Good Hope Church at the intersection of Rt. 208 and Rt. 601.
	NE-5/37	are located on weather tower across from security building and behind Vepco's parking lot "B"
	NE-6/38	are located off Rt. 601 on Rt. 713 at Lake Anna Marina entrance on power pole
	ENE-7/39	are located on island across from training facility on weather tower fence
	ENE-8/40	are located on power pole at entrance of Rt. 689 off Rt. 601 on left
	E-9/41	are located on the island across from the training facility on the second power pole on the right headed toward the recreation area
	E-10/42	are located on 500 Kv Vepco power line off Rt. 601 at "Morning Glory Hill": near home of J. R. Humphries
	ESE-11/43	are located on island after crossing dike from Vepco "A" parking lot on first power pole approximately 0.1 mile from island entrance
	ESE-12/44	are located on a power pole on Rt. 622 off Rt. 601 across the road from R. L. Garlic's home, approximately 25 feet from the road

Exposure Pathway and/or Sample	Sample (Station) Number	Location
Direct (cont'd):		
TLDs (cont'd):		
	SE-13/45	are located on island across from Vepco training facility at Vepco Biology Lab entrance gate
	SE-14/46	are located at entrance to Dam off Rt. 601 at intersection with Rt. 701
	SSE-15/47	are located on power pole approximately 25 feet fron the shoreline on Lot #34 on Carr Circle in the Aspen Hill subdivision
	SSE-16/48	are located on power pole at intersection of Rt. 614 and Rt. 652 at Elk Creek
	S-17/49	are located on entrance to warehouse compound on gate 0.35 miles from Vepco main security building
	S-18/50	are located on power pole at Rt. 614 intersection with Rt. 652 approximately 1/2 mile from Elk Creek Church
	SSW-19/51	are located on light pole along Vepco site access road approximately 0.7 mile from Vepco main security building
	SSW-20/52	are located on a power pole approximately 200 yards from the fork of Rt. 618 and Rt. 614 on Rt. 618 North side approximately 100 feet from the road
	SW-21/53	are located on light pole on Vepco North Anna Power Station site access road approximately 0.85 miles from Vepco main Security Building

Exposure Pathway and/or Sample	Sample (Station) Number	Location
Direct (cont'd):		
TLDs (cont'd):		
	SW-22/54	are located on power pole approximately 2.5 miles from intersection of Rt. 652 and Rt. 700 exiting North Anna Power Station at abandoned house and dumpster site
	WSW-23/55	are located on first power line (500 Kv) upon entering Vepco North Anna Power Station site to right off Rt. 700
	WSW-24/56	are located on a power pole approximately 0.8 miles from North Anna Power Station Visitor's Center, West on Rt. 700
	W-25/57	are located at North Anna Power Station radio tower approximately 0.15 East on Rt. 700 from Visitor's Center entrance
	W-26/58	are located on power pole on Rt. 685 off Rt. 652 approximately 1.0 miles from intersection at abandoned trailer
	WNW-27/59	are located at power pole at the end of Rt. 685 at barricade, approximately 1.5 miles from the junction of Rt. 652 and Rt. 685
	WNW-28/60	are located on a power pole at the end of H. Purcells' private road off Rt. 685
	NW-29/61	are located past Unit 1 and 2 intake at end of road on transformer fence on North Anna Power Station site
	NW-30/62	are located on a power pole at Lake Anna Campground on Rt. 208

Exposure Pathway and/or Sample	Sample (Station) Number	Location
Direct (cont'd):		
TLDs (cont'd):		
	NNW-31/63	are located on fence near Unit 1 and 2 intake structure on North Anna Power Station site
	NNW-32/64	are located approximately 3.3 miles from intersection of Rt. 652 and 208 going East on light point at Sam Hairfield and Bro. Store on Rt. 208
	C-1/2	are located on a power pole approximately 175 feet behind the Bumpass Post Office at the fork of Rt.601 and 618
	C-3/4	are located on the top of the Orange Va Regional Vepco Office Building approximately 1 mile South of the junction of Rt. 20 and Rt. 15 on the right
	C-5/6	are located in Mineral on a power pole approximately 200 feet off Rt. 618 on Albermale Street behind the house on the corner
	C-7/8	are located on power pole at Glen Marye Shopping Center in Louisa
Water Borne:	1,2,3,4,5,5A,6,7, 21,22,23,24	Previously Identified
a. Surface	8	sampled from 2nd lagoon on discharge
	9	sampled from Lake near Rt. 208 bridge
	11	sampled from North Anna river just below the lake dam
b. Ground	1A	sampled from well at North Anna Power Station's Biology Lab on island across from discharge canal

2.0 SAMPLING STATION IDENTIFICATION AND RELATIVE POSITION TO EFFLUENT RELEASE POINT

STATION NUMBER	LOCATION	DISTANCE MILES	DEGREES AND COMPASS DIRECTION		REMARKS
1	On Site	0.2	42	NE	
3	Mineral	7.1	243	WSW	
4	Wares Crossroads	5.1	287	WNW	
5	Good Hope Church	4.2	20	NNE	
6	Levy	4.7	115	ESE	
7	Bumpass	7.3	167	SSE	
8	Discharge Lagoons	1.1	148	SSE	
9	Lake Anna, upstream	2.2	320	NW	Control
11	North Anna River, downstream	5.8	128	SSE	
12	Holladay Dairy	8.3	310	NW	
13	Fredericks Hall	5.6	205	SSW	
14	Route 713	1.2	43	NNE	
15	Route 614	1.7	133	ESE	
16	Route 629/522	12.6	314	NW	Control
21	Route 685	1.0	301	WNW	
22	Route 700	1.0	242	WSW	
23	Aspen Hills	0.9	158	SSE	

2.0 SAMPLING STATION IDENTIFICATION AND RELATIVE POSITION TO EFFLUENT RELEASE POINT (cont.)

STATION NUMBER	LOCATION	DISTANCE MILES	DEGREES AND COMPASS DIRECTION	REMARKS
24	Orange	22.0	325 NW	Control
5A	Sturgeon's Creek	3.2	11 NNE	
2	Fredericks Hall	5.3	225 SSW	
N-1/33	On Site (Bearing Cooling Tower)	0.06	10 N	
N-2/34	Sturgeon's Creek	3.20	11 N	
NNE-3/35	On Site (Parking Lot "C")	0.25	32 NNE	
NNE-4/36	Rt. 208 (Good Hope Church)	4.96	25 NNE	
NE-5/37	On Site (Parking Lot "B")	0.20	42 NE	
NE-6/38	Rt. 713 (Lake Anna Marina)	1.49	34 NE	
ENE-7/39	On Site (Weather Tower Fence)	0.36	74 ENE	
ENE-8/40	Rt. 689	2.43	65 ENE	
E-9/41	On Site (Near Training Facility)	0.30	91 E	
E-10/42	"Morning Glory Hill"	2.85	93 E	
ESE-11/43	On Site (Island Dike)	0.12	103 ESE	
ESE-12/44	Rt. 622	4.75	115 ESE	
SE-13/45	On Site (Vepco Biology Lab)	0.75	138 SE	
SE-14/46	Rt. 701 (Dam Entrance)	5.88	137 SE	

2.0 SAMPLING STATION IDENTIFICATION AND RELATIVE POSITION TO EFFLUENT RELEASE POINT (cont.)

STATION NUMBER	LOCATION	DISTANCE MILES	DEGREES AND COMPASS DIRECTION		REMARKS
SSE-15/47	Aspen Hill	0.93	158	SSE	
SSE-16/48	Elk Creek	2.33	165	SSE	
S-17/49	On Site (Warehouse Compound Gate)	0.22	173	S	
S-18/50	Rt. 690 (Elk Creek Church)	1.55	178	S	
SSW-19/51	On Site (Access Rd.)	0.36	197	SSW	
SSW-20/52	Rt. 618	5.30	205	SSW	
SW-21/53	On Site (Access Rd.)	0.30	218	SW	
SW-22/54	Rt. 700	4.36	232	SW	
WSW-23/55	On Site (500KV Tower)	0.40	237	WSW	
WSW-24/56	On Site (Rt. 700)	1.00	242	WSW	
W-25/57	On Site (Radio Tower)	0.31	279	W	
W-26/58	Rt. 685	1.55	274	W	
WNW-27/59	End of Rt. 685	1.00	301	WNW	
WNW-28/60	H. Purcell's Private Road	1.52	303	WNW	
NW-29/61	On Site (End of #1 & #2 Intake)	0.15	321	NW	
NW-30/62	Lake Anna Campground	2.54	319	NW	

2.0 SAMPLING STATION IDENTIFICATION AND RELATIVE POSITION TO EFFLUENT RELEASE POINT (cont.)

STATION NUMBER	LOCATION	DISTANCE MILES	DEGREES AND COMPASS DIRECTION		REMARKS
NNW-31/63	On Site (#1 & #2 Intake)	0.07	349	NNW	
NNW-32/64	Rt. 208	3.43	344	NNW	
C-1/2	Bumpass Post Office	7.30	167	SSE	CONTROL
C-3/4	Orange	22.00	325	NW	CONTROL
C-5/6	Mineral	7.10	243	WSW	CONTROL
C-7/8	Louisa	11.54	257	WSW	CONTROL

FIGURE 13.0

RADIOLOGICAL ENVIRONMENTAL SAMPLING STATIONS

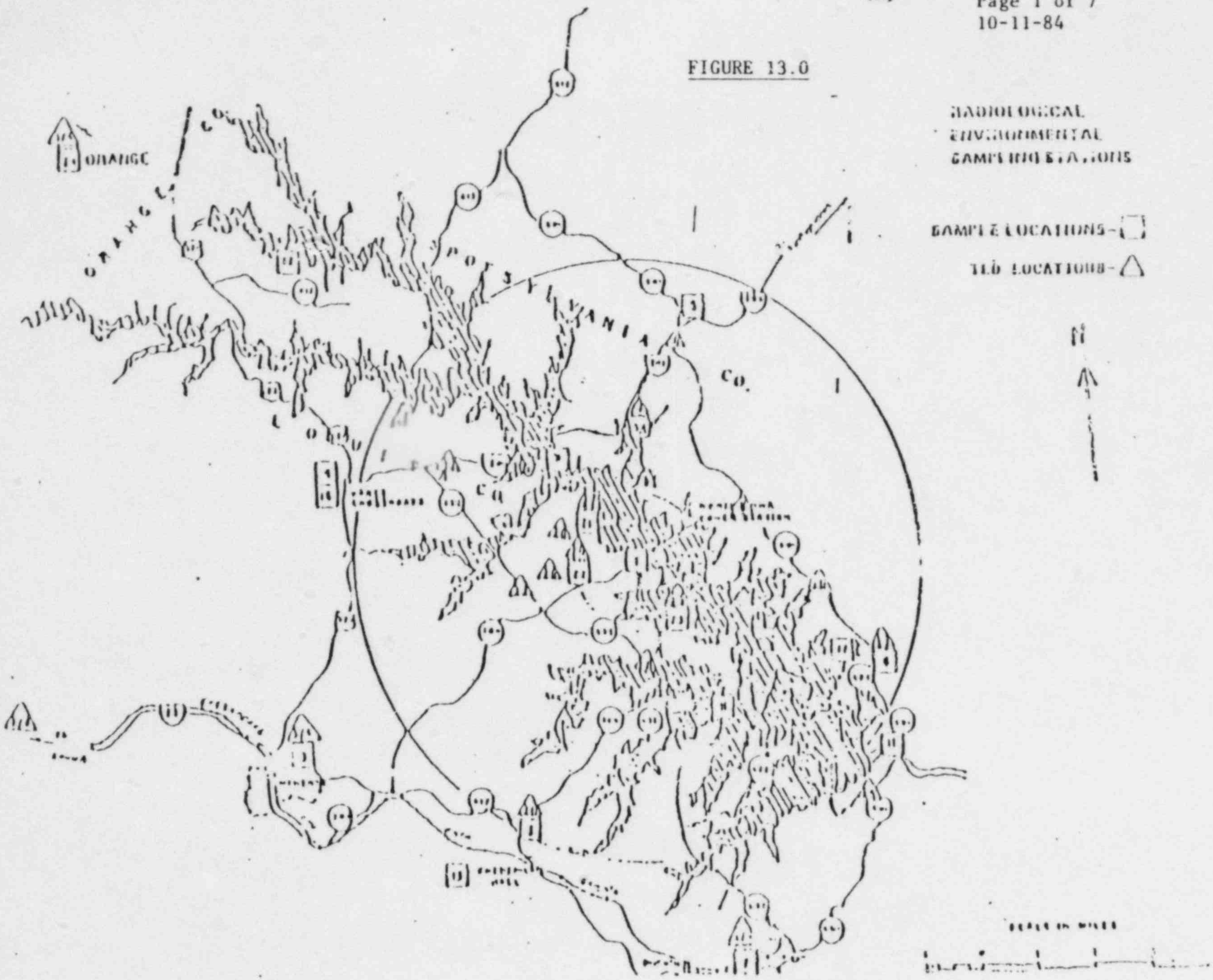
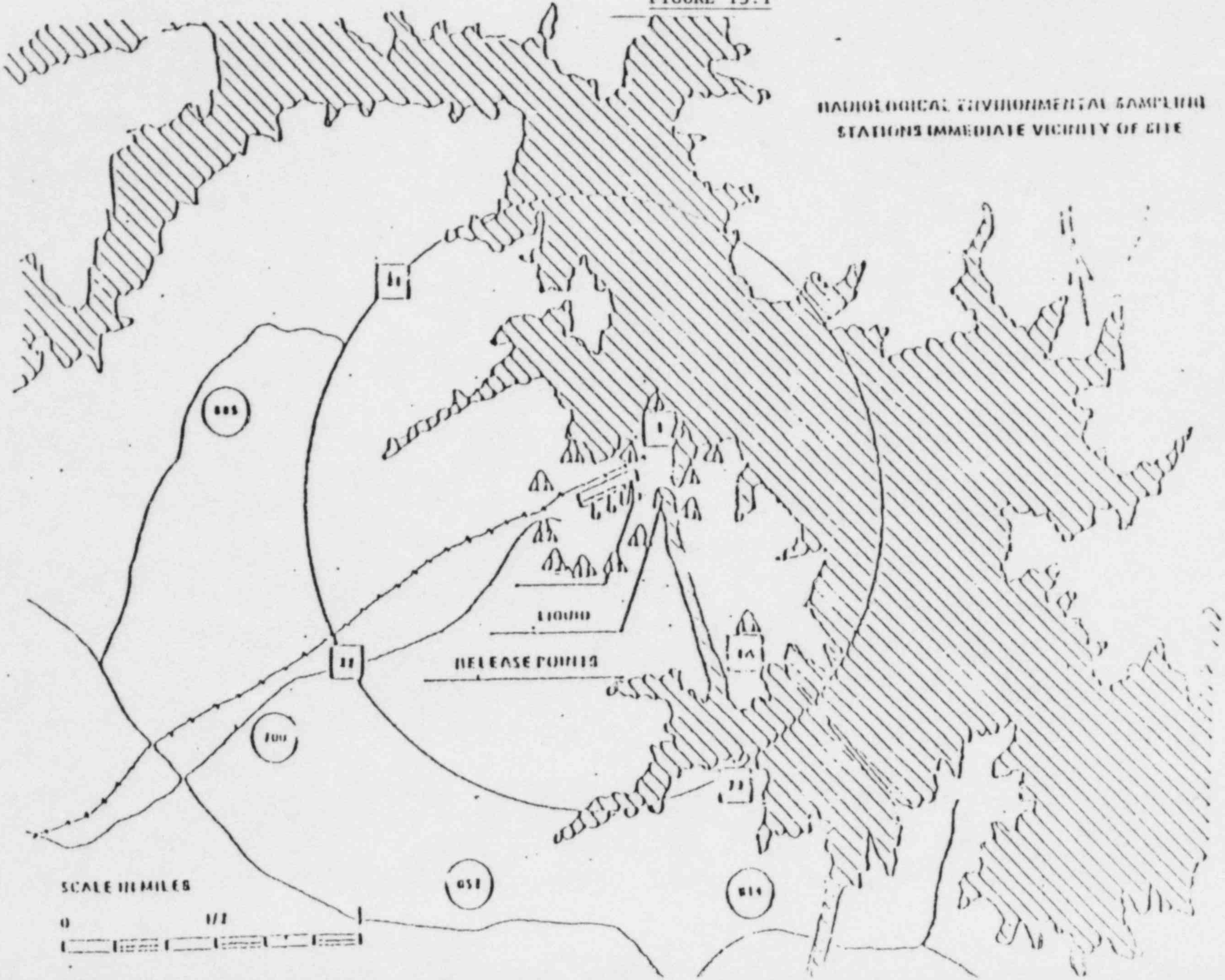


FIGURE 13.1

RADIOLOGICAL ENVIRONMENTAL SAMPLING
STATIONS IMMEDIATE VICINITY OF SITE



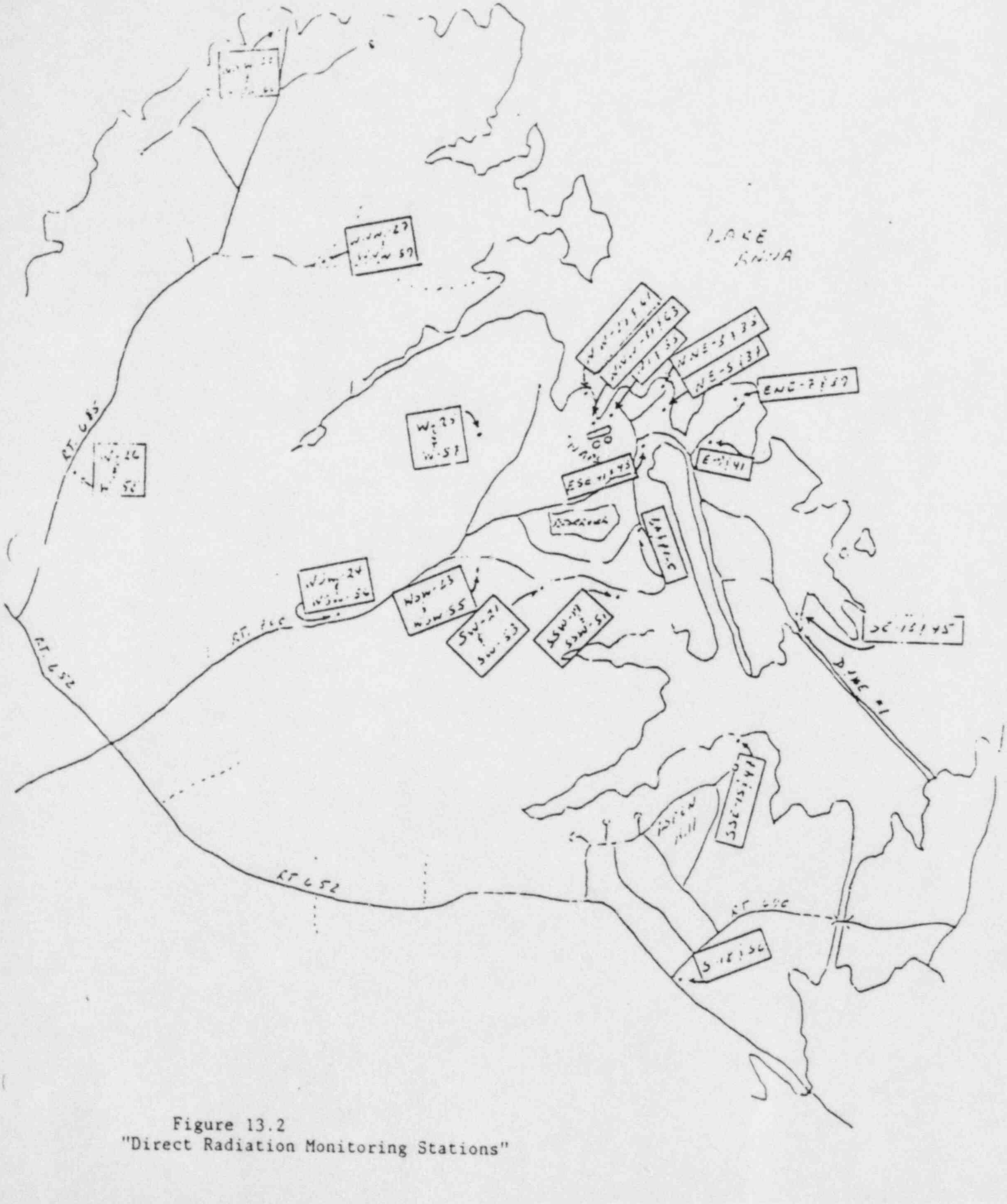


Figure 13.2
"Direct Radiation Monitoring Stations"

"Direct Radiation Monitoring Stations"

Figure 13.3

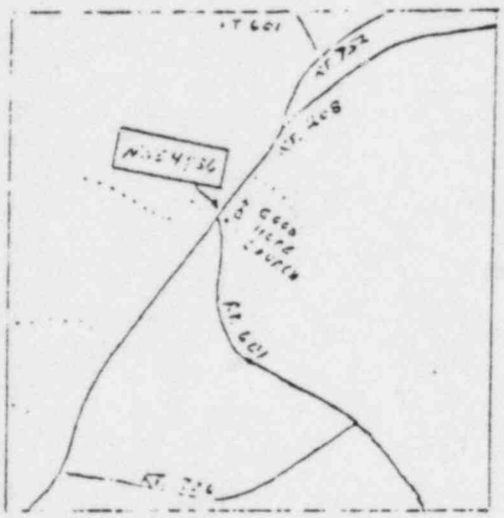


Figure 13.4

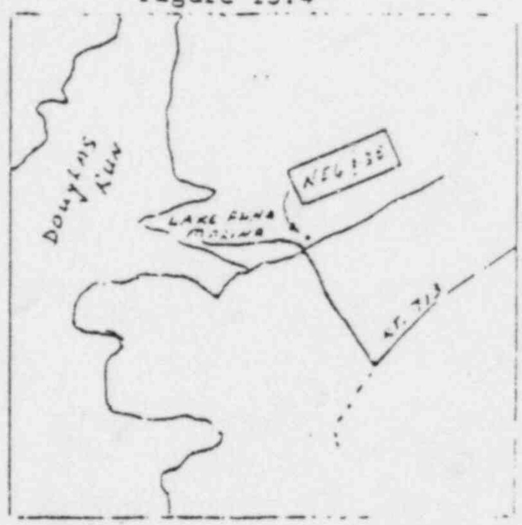


Figure 13.5

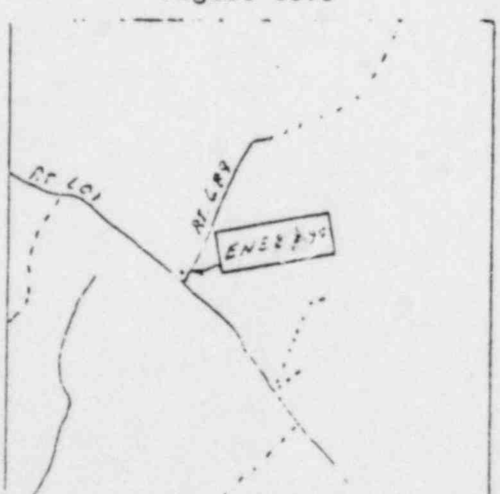
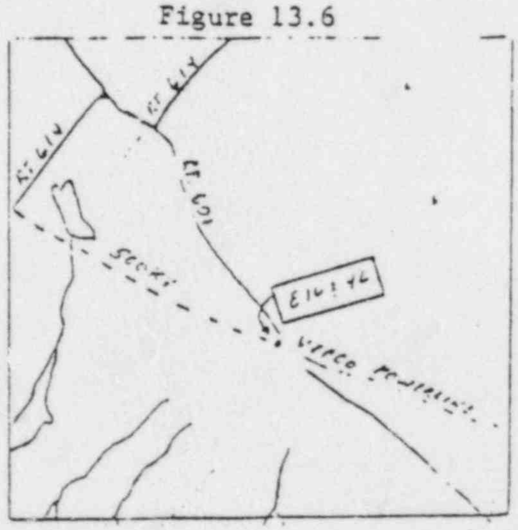


Figure 13.6



"Direct Radiation Monitoring Stations"

Figure 13.7

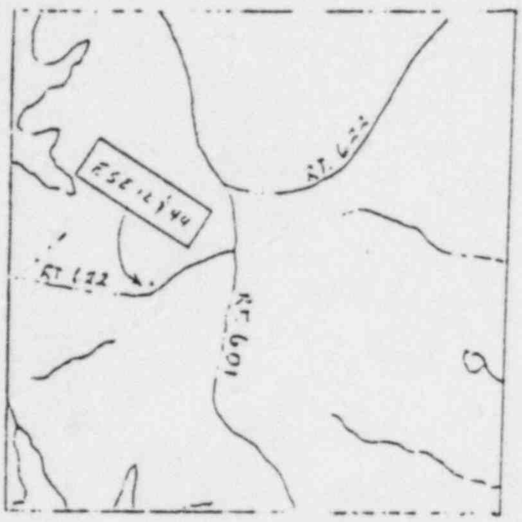


Figure 13.8

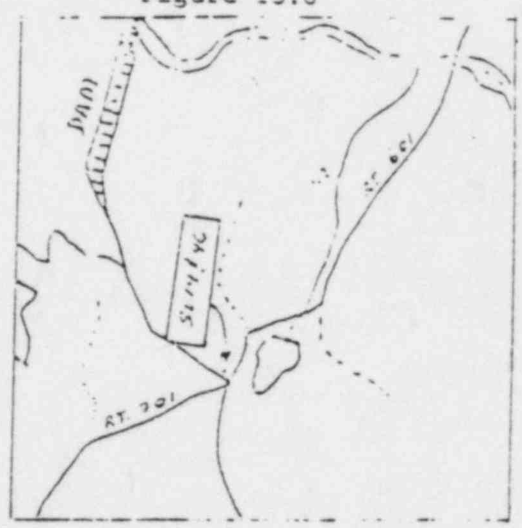


Figure 13.9

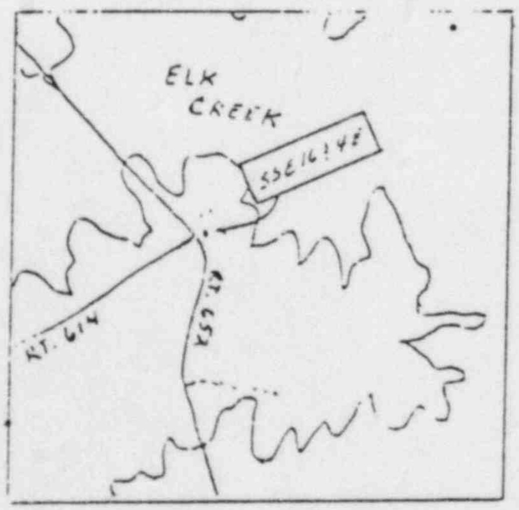
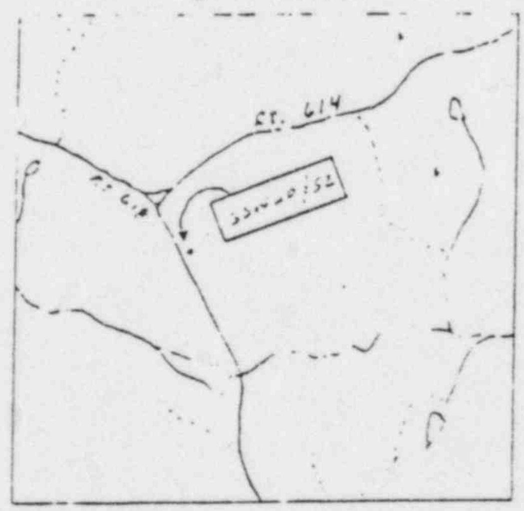


Figure 13.10



"Direct Radiation Monitoring Stations"

Figure 13.11

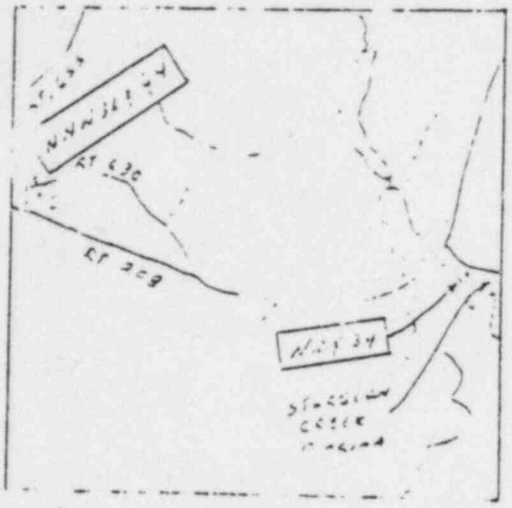


Figure 13.12

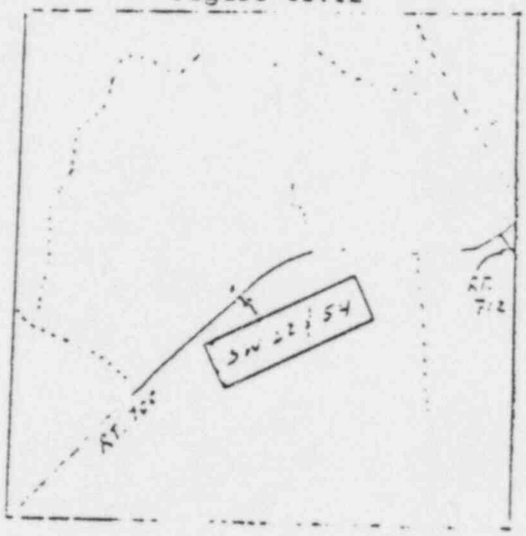


Figure 13.13

"Direct Radiation Monitoring Stations"

Figure 13.14

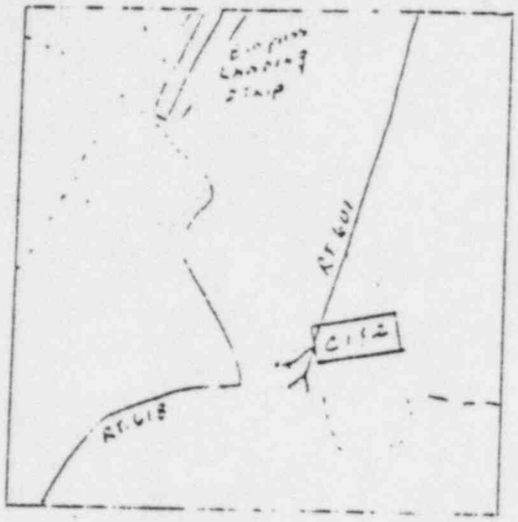


Figure 13.15

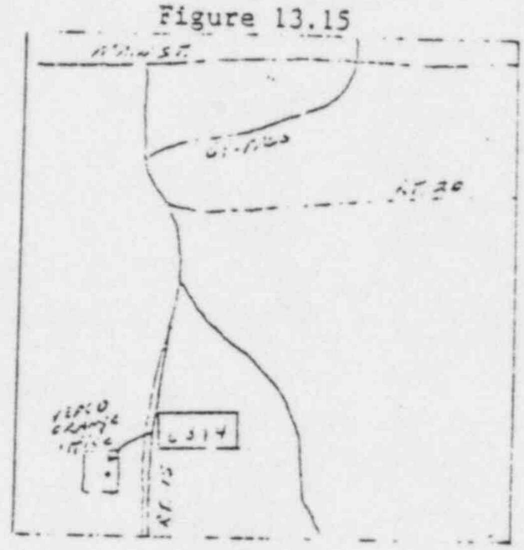


Figure 13.16

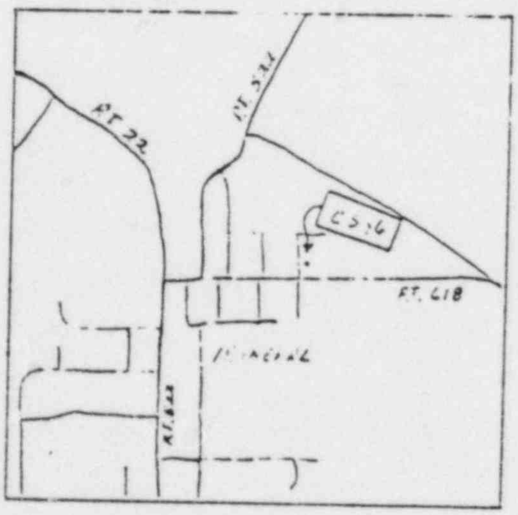
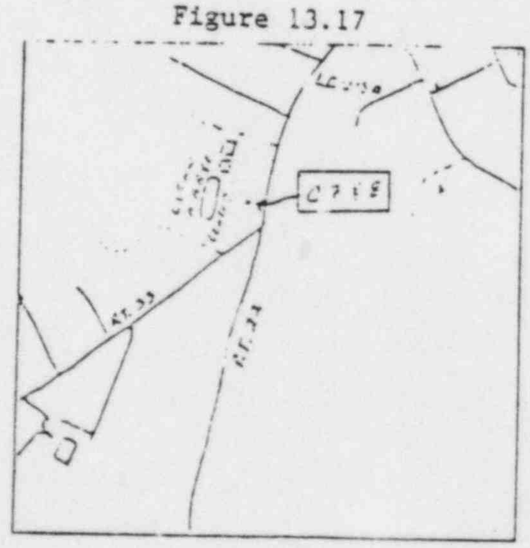


Figure 13.17



ATTACHMENT 4

(7/84-12/84)

REVISIONS TO PROCESS CONTROL PROGRAM (PCP)

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

12-27-84: The PCP was revised to incorporate radwaste solidification system operating procedures, by reference, and to reflect the guidance of NRC Generic Letter 84-12, Compliance with 10 CFR Part 61 and Implementation of the Radiological Effluent Technical Specifications (RETS) and Attendant Process Control Program (PCP).

SERIAL # 290

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

April 30, 1984

NOTED MAY 10 1984 J.O.E.

TO ALL OPERATING REACTORS AND APPLICANTS FOR OPERATING LICENSES

Gentlemen:

SUBJECT: COMPLIANCE WITH 10 CFR PART 61 AND IMPLEMENTATION OF THE RADIOLOGICAL EFFLUENT TECHNICAL SPECIFICATIONS (RETS) AND ATTENDANT PROCESS CONTROL PROGRAM (PCP) (GENERIC LETTER 84-12)

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

April 30, 1984

NOTED MAY 10 1984 J.O.E.

TO ALL OPERATING REACTORS AND APPLICANTS FOR OPERATING LICENSES

Gentlemen:

SUBJECT: COMPLIANCE WITH 10 CFR PART 61 AND IMPLEMENTATION OF THE RADIOLOGICAL EFFLUENT TECHNICAL SPECIFICATIONS (RETS) AND ATTENDANT PROCESS CONTROL PROGRAM (PCP) (GENERIC LETTER 84-12)

This letter is to inform you that the waste manifest provisions of 10 CFR 20.311 became effective on December 27, 1983. The manifest system is closely related to certain requirements of 10 CFR Part 61 that place new requirements on classification and acceptable forms for low-level radioactive wastes being shipped from commercial nuclear power plants to commercial disposal facilities. The NRC staff has been made aware of the fact that neither the states nor the disposal facility operators currently have sufficient resources to assure that all incoming low-level radioactive waste is in compliance with these new regulations. Consequently, the NRC has been asked to provide reasonable assurance that its licensees are complying with all applicable provisions of Part 61.

During the development of Part 61, the NRC staff determined that compliance with the radioactive waste form requirements of Part 61 and the certification requirements of 10 CFR 20.311 could be achieved by the development and use of a Process Control Program (PCP) as an attendant part of the licensee's Radiological Effluent Technical Specifications (RETS). This approach was determined to be acceptable by the responsible state regulatory agencies that license the disposal sites. It is now apparent, however, that many licensees do not yet have approved PCPs and that no licensee has a PCP which specifically addresses the new requirements of Part 61.

As an interim measure, the responsible state regulatory agencies and the disposal site operators have agreed to continue to accept nuclear power plant low-level radioactive wastes based upon the NRC staff's assurance that reasonable progress is being made toward demonstration of full compliance with new requirements of Part 61 and Part 20. The NRC staff has been readily able to offer such assurances for those plants for which there are NRC approved and implemented RETS and the attendant PCPs. The NRC staff will assume a good-faith effort on the part of these licensees to modify in a timely fashion the PCPs to accommodate all new and applicable Part 61 and Part 20 requirements. We are prepared to assist, when requested, those licensees which presently have approved PCPs to assure that they are upgraded to meet the new requirements of Part 61; however, the NRC staff cannot offer the same type of assurances for those operating plants which do not possess currently approved RETS and PCPs. Prompt action may be necessary if radioactive waste shipments from these plants are to continue without interruption.

The NRC staff will make every effort to avoid any interruption of low-level radioactive waste shipments by its licensees. We are prepared to expedite the implementation of NRC approved RETS and PCPs for all licensees who request assistance.

If you have any questions concerning this subject, please contact either W. Gammill or F. Congel via your Project Manager.

Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation

1.0 SCOPE

1.1 Purpose

The purpose of the North Anna Nuclear Power Station Process Control Program is to ensure that:

a. Solidified liquid wastes, dewatered resins, and aqueous filter media are packaged in the proper container based on their activity level;

b. Dewatered resins and aqueous filter media are packaged with no detectable free standing liquid prior to transportation;

c. Liquid wastes are solidified and contain no detectable free standing liquid; and

d. Resultant solidified wastes are in compliance with the provisions of 10 CFR Part 61.

1.2 Applicability

This Process Control Program (PCP) shall be implemented by all personnel who operate dewatering equipment, operate solidification equipment, package spent filter cartridges, collect and process samples used to verify conditions required by this Program, and prepare documentation for shipping of radioactive waste.

2.0 SYSTEM DESCRIPTION

2.1 Dewatering System

Two sources of spent resins for dewatering and disposal exist at the North Anna Station. The first is the Spent Resin Holdup Tank which collects for decay and disposal spent resins from the primary coolant purification system. These resins are dewatered in disposable high integrity containers. The second is the High Level Liquid Waste Treatment System. This system utilizes resins which are received on-site in disposable containers. When the resins in these containers are chemically exhausted or the activity level of the resins approaches the limit for the container, the resins are dewatered. The following sections provide a description for each dewatering system.

2.1.1.e Shipping Cask

The shipping cask can be any licensed shipping cask, designed for use with the high integrity container utilized, which provides adequate radiation shielding and package integrity for transportation of dewatered spent resins.

2.1.1.f Dewatering Pump

The dewatering pump is an air driven, 1-1/2" "Sandpiper" pump or equivalent.

2.1.1.g TV Monitor

The TV monitor is a remote display television utilized, when required, to monitor the container filling operation. This monitor provides information to the operator on container resin and water level and resin slurry consistency.

2.1.1.h Interconnecting Hose and Piping

The resin transfer line used to sluice resin from the primary coolant purification demineralizers to the Spent Resin Holdup Tank, as well as connections from the tank to the Spent Resin Transfer Pump, Spent Resin Recirculation Pump, and plant ventilation system are permanently installed stainless steel piping. The connection from the Spent Resin Transfer Pump to the dewatering container, the connection from the dewatering container to the dewatering pump, and the connection from the dewatering pump back to the Spent Resin Holdup Tank are all flexible rubber hose.

2.1.1.i Valves

Valves are installed in the system, as required, to select flow paths and isolate portions of the dewatering system as may be necessary.

2.1.1.j Instrumentation and Controls

Controls are provided to remotely start and stop pumps, remotely open and close valves, remotely monitor the container fill-head level and influent flow, and remotely indicate the container fill and discharge flow.

2.1.1.k Sample Taps

As an example, a sample tap is provided on the discharge side of the Spent Resin Recirculation Pump.

2.1.2 Dewatering System for Resins Received In Disposable Containers

The High Level Liquid Waste (HLLW) System contains from two to seven disposable filter/demineralizer vessels. The dewatering system for the HLLW disposable filter/demineralizer vessels consists of the disposable vessel and the dewatering pump.

2.1.2.a Disposable Vessel

The disposable filter/demineralizer vessel can be any container designed for use as a disposable filter/demineralizer vessel, with provisions for dewatering.

2.1.2.b Dewatering Pump

The dewatering pump is an air driven, 1-1/2" "Sandpiper" pump or equivalent.

2.1.3 Dewatering System For Filter Cartridges

The High Level Liquid Waste Filter utilizes disposable cartridge filters. The cartridges are air dried prior to disposal, therefore no dewatering system or equipment is needed nor exists for dewatering spent filter cartridges.

2.2. Solidification System

There is no permanently installed, operating solidification system on site. In the event contractor services are utilized for solidification, the contractor will be required to provide to VEPCO a complete description of the solidification system to be used. The system description provided will be subject to VEPCO review and acceptance and once accepted, will be incorporated by reference into this Process Control Program. The solidification system will not be operable until the system description is accepted by VEPCO.

3.0 CHARACTERISTICS OF WASTE FEEDS

3.1 Dewatered Resins

Resins to be dewatered are either sluiced to the disposable dewatering high integrity container or are contained in a disposable container. Low activity resin may be shipped in a carbon steel liner.

3.2 Filter Elements

Spent filter elements are removed from the filter vessel housing and are processed as individual units.

3.3 Liquids For Solidification

Presently liquid wastes are not fed to a solidification system. In the event contractor services are utilized for solidification, the waste stream characterization will be provided by either:

a. VEPCO personnel collecting and analyzing samples in accordance with station approved procedures; or

b. the contractor collecting and analyzing samples in accordance with station approved procedures.

The procedures will consider the solidification process utilized and will analyze for parameters or constituents which may affect the solidification process. Sample collection and analysis procedures will be subject to VEPCO review and acceptance and once accepted, will be incorporated by reference into this Process Control Program. The solidification system will not be operable until the sample collection and analysis procedures are accepted by VEPCO.

4.0 SYSTEM OPERATION

4.1 Dewatering

4.1.1 Dewatering Resins from the Spent Resin Holdup Tank

Spent resins from the primary loop cleanup system are sluiced to the Spent Resin Holdup Tank for decay and storage. The spent resin storage time in the tank is maximized to the extent possible to allow for maximum radioactivity decay. During the period of resin storage, the tank contents are periodically mixed using the Spent Resin Recirculation Pump to prevent excessive settling and resin packing. Prior to resin transfer to the dewatering container, the tank contents will be mixed. A sample for isotopic analysis may be taken from the sample tap on the recirculation line. Sample requirements are defined in Section 5.0. If a sample is taken from the recirculation line, a portion of the recirculating slurry is drawn into a sample container, the sample container contents decanted, and an isotopic analysis performed in accordance with approved procedures in the station Health Physics Procedures Manual, Section 3.

Following mixing and sampling (if performed), the radwaste metering pump is used to transfer resin slurry to the disposable dewatering container. The Spent Resin Recirculation Pump will be operating during resin transfer. The operator fills the container with slurry until the container has been filled. This is verified by the remote TV monitor. When the container is filled, the transfer of slurry to the container is stopped. The excess water is then removed by the dewatering pump. This water is transferred back to the Spent Resin Holdup Tank. After the excess water is removed, slurry is again transferred to the container until the container is filled with the resin and water mixture. The container is again drained using the dewatering pump. This process continues until the container is filled with resin (i.e., sluicing water removed). The resin-filled container is dewatered in accordance with one of the following approved station dewatering procedures:

- VEPCO Procedure 1-OP-20.2 for dewatering disposable containers.

- Chem-Nuclear Systems Inc. procedure FO-OP-003, "Dewatering Procedure for CNSI Conical-bottom High Integrity Containers Containing Bead-Type Ion Exchange Resin, 1% Free-Standing Water."

Each procedure specifies a series of minimum periods for dewatering pump operation and shutdown and provides a minimum time period for sample collection. These procedures are not included as they are considered proprietary. The procedures have been tested for compliance in dewatering to less than the specified percentage as required by Chem-Nuclear Systems, Inc., State of South Carolina Radwaste Material License No. 97.

The approved procedures must be strictly followed and the documentation required by the above procedures must be completed.

4.1.2 Dewatering Resins In Disposable Filter/Demineralizer Vessels

Spent resins from the High Level Liquid Waste System are contained in disposable filter/demineralizer vessels. The vessels may be removed from service when either calculations indicate the resins contain close to 1 μCi/gm radioactivity or the resins have insufficient ion exchange capacity remaining for adequate liquid processing. Once removed from service, the vessels are drained and dewatered in accordance with one of the following procedures. The procedure selected will be determined by the container to be dewatered.

- VEPCO Procedure 1-OP-20.2 for dewatering disposable containers.

- Chem-Nuclear Systems Inc. procedure 06601-27-01, "Dewatering Procedure for the Annular L14-195 and L21-300 Demineralizer Liners, 1% FSW."

- Chem-Nuclear Systems Inc. procedure FO-OP-005, "Dewatering Procedure for the 10 Cu. Ft. Filtration Unit Containing Ion Exchange Resins, 1% FSW."

- Chem-Nuclear Systems Inc. procedure FO-OP-001, "Dewatering Procedure for the 24-inch Diameter Pressure Demineralizer Vessel Containing Activated Carbon, 0.5% Free-Standing Water."

- Chem-Nuclear Systems Inc. procedure FO-OP-004, "Dewatering Procedure for the 24-inch Diameter Pressure Demineralizer Vessel Containing Ion Exchange Resins, 0.5% FSW."

- Chem-Nuclear Systems Inc. procedure FO-OP-007, "Dewatering Procedure for the L14-195 and 14-170 Conical-Bottom Demineralizer Vessels, 0.5% Free-Standing Water."

Each procedure specifies a series of minimum periods for dewatering pump operation and shutdown and provides a minimum time period for sample collection. These procedures are not included as they are considered proprietary. The procedures have been tested for compliance in dewatering to less than the specified percentage as required by Chem-Nuclear Systems, Inc., State of South Carolina Radwaste Material License No. 97.

The above procedure(s) must be strictly followed and the documentation required by the above procedures must be completed.

4.2 Spent Filter Cartridge Disposal

When used, High Level Liquid Waste cartridge filters are to be removed from service, the vessels drained, and the elements removed. [Note: The wound-type elements used do not contain void spaces which can trap liquid in pockets.] In accordance with Health Physics Department Procedures, a sample of the element will be removed for radioassay following removal of the element from the filter vessel. The element will be allowed to air dry. The element will be considered to contain less than 0.5% free-standing water when it can be placed on a clean, dry plastic sheet for a minimum of four hours and, when removed, the plastic contains no free liquid. If free liquid remains on the plastic, the filter element will continue to be placed on a dry piece of plastic for four hour increments until, when the element is removed from the plastic, no free liquid remains on the plastic. Drying of the elements may be assisted by placing the elements in a flow of warm, dry air or any other means which meets station HP procedures for control of airborne particulates. However, the four-hour dryness verification shall occur with no drying air flow present. Contractors may use mechanical filters for this service that would be controlled by contractor procedures.

4.3 Solidification

There is no permanently installed, operating solidification system on site. In the event contractor services are utilized for solidification, the contractor will be required to provide to VEPCO system operating procedures. The system operating procedures must define the process control parameters which assure the proper proportioning and mixing of waste and solidification agents. The operating procedures shall also specify minimum data logging requirements to document system operation within the specified ranges. The system operating procedures will be subject to VEPCO review and acceptance and once accepted, will be incorporated by reference into this Process Control Program. The solidification system will not be operable until the system operating procedures are accepted by VEPCO.

Presently accepted procedures for use are:

- Chem-Nuclear Systems, Inc. procedure SD-OP-027, "Operating Procedure for CNSI Portable Cement/Oil Solidification Unit No. 1 (PSU/Oil-C-1)";

- Chem-Nuclear Systems, Inc. procedure SD-OP-026, "Process Control Program for Cement/Oil Solidification"; and

- Chem-Nuclear Systems, Inc. procedure SD-OP-003, "Process Control Program for CNSI Cement Solidification Units."

5.0 COLLECTION AND ANALYSIS OF SAMPLES

5.1 General Requirements

5.1.1 Definitions

5.1.1.a Batch - The amount of waste which fills one disposable liner or drum.

5.1.1.b Transfer - The delivery of liquid or sluiced radioactive waste to a solidification or disposable container. There may be several transfers made from several sources that compose a batch. If the transfers are made from the same source and the contents of the source are known not to change during the time of the transfers, the volume of each transfer need not be known. If the transfers are made from several different sources, the volume of each transfer must be known. If several transfers are made from one source which has inputs to that source during the duration of the transfers, the volume of each transfer must be known.

5.1.1.c Sample - A portion of a transfer or batch that represents the contents of that transfer or batch.

5.1.1.d Composite - A mixture of samples proportional by volume to the individual transfers making up a batch, thus resulting in the test specimen being representative of the batch.

5.1.1.e Direct In-Container Sample - A sample removed from the disposable container after the container has been filled; the contents of which are a composite of samples taken from various positions within the container.

5.1.2 Frequency of Samples

5.1.2.a Dewatered Resins - A sample for radioassay purposes shall be taken from each batch. The sample may be a representative sample taken at the source (when the source remains unchanged during the transfer of a batch), a composite sample composed of samples collected at the source, or a direct in-container sample.

5.1.2.b Spent Filter Cartridges

A sample of each spent filter cartridge shall be obtained for radioassay purposes.

5.1.2.c Solidification

A sample of at least every tenth batch of each type of liquid or sluiced radioactive waste (e.g., boric acid solutions, spent resins, evaporator bottoms) shall be used to demonstrate solidification.

If any test specimen fails to solidify, the batch under test shall be suspended until such time as additional test specimens can be obtained, alternative solidification parameters can be determined in accordance with the procedures incorporated by reference into this Process Control Program, and a subsequent test verifies solidification. Solidification of a batch may then be resumed using the alternate solidification parameters determined.

If the initial test specimen from a batch of waste fails to verify solidification, then representative test specimens shall be collected from each successive batch of the same type of waste until three (3) consecutive initial test specimens demonstrate solidification. The operating procedure incorporated by reference into this Process Control Program shall be modified, as required, to assure solidification of subsequent batches of waste.

5.3.3 Acceptance Criteria

The results of the radioassay are considered acceptable when it has been verified and documented that the spent filter cartridge is packaged in a container which is acceptable for transportation and burial, considering the radioactivity concentrations which exist in the waste. Standard liners and drums are acceptable for waste containing less than 1 μCi/gm activity and High Integrity Containers are required for waste containing more than 1 μCi/gm activity.

5.4 Liquids for Solidification

There is no permanently installed, operating solidification system on-site. In the event contractor services are utilized for solidification, the contractor or VEPCO shall provide procedures for sample collection and sample analysis. The sample collection and sample analysis procedures shall be for both radioactivity determinations and solidification verification. These procedures will be subject to VEPCO review and acceptance and once accepted, will be incorporated into this Process Control Program by reference (See Section 4.3). The solidification system will not be operable until the sample collection and analysis procedures are accepted by VEPCO.

All chemicals used to condition or solidify waste or simulated waste in solidification tests shall be representative of the actual chemicals to be used in full scale solidification. If chemicals of a different type or from a different manufacturer are used, the new material shall be tested to verify it produces a solid product prior to full scale solidification.

7.1.3 Physical Interfaces

7.1.3.a Process Fluids

1. High Level Liquid Waste Tank Discharge: 5-25 gpm at 30-150 psig; maximum temperature-125F; 1-1/2", 150 psi hose with Kam-Lock fitting.

2. Filter Atmospheric Vent Hose: 1/2" tygon hose connected to a 1/2" needle valve (150 psi rating) connected to a Kam-Lock fitting.

3. Demineralized Water Discharge: 5-25 gpm at 150 psig; 1-1/2", 150 psi hose with Kam-Lock fitting.

4. Resin Transfer: 1-1/2", 150 psi hose; 25 gpm max at 150 psi max; quick disconnect fitting at disposable liner fill head.

5. Dewatering Line: 1-1/2" hose connection at disposable liner fillhead; quick disconnect fitting.

6. Crane Services for loading and unloading vessels.

7. Protective clothing and dosimetry devices for Chem-Nuclear Systems, Inc. operators.

8. Shielding.

7.2 Filter Cartridges

The utility is responsible for removing the cartridges from the filter housing. All actions following cartridge removal are utility actions, therefore, there are no additional interfaces.

7.3 Solidification

There is no permanently installed, operating solidification system on site. In the event contractor services are utilized for solidification, the contractor will be required to provide a list of physical interfaces, services required, and breakdown of utility/contractor responsibilities. These documents will be subject to VEPCO review and acceptance and once accepted, will be incorporated into this Process Control Program by reference (See Section 4.3). The solidification system will not be operable until the definition of physical interfaces, services required, and utility/contractor responsibilities are accepted by VEPCO.

ATTACHMENT 5

(7/84-12/84)

MAJOR CHANGES TO RADIOACTIVE SOLID

WASTE TREATMENT SYSTEMS

No major changes to the radioactive solid waste treatment systems were made for this reporting period.

ATTACHMENT 6

(7/84-12/84)

RADIOACTIVE LIQUID AND GASEOUS

EFFLUENT MONITORING INSTRUMENTATION INOPERABLE

As required by Technical Specification 3.3.3.10.b and 3.3.3.11.b, an account of inoperable radioactive effluent monitors for the time period covered by this report is provided below.

On July 2, 1984, RMSW-108 (radiation monitor for Service Water discharged to Lake Anna) was declared inoperable. Repair parts were ordered from the manufacturer, the monitor repaired, and returned to service on August 7, 1984. The monitor was inoperable greater than 30 days because of the need to order repair parts from the manufacturer.

ATTACHMENT 7

(7/84-12/84)

UNPLANNED RELEASES

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

William L. Stewart
Vice President
Nuclear Operations

Nuclear Operations Department
Post Office Box 26666
One James River Plaza
Richmond, Virginia 23261

DMB

85 MAR 4 A10:09

VIRGINIA POWER

March 1, 1985

Dr. J. Nelson Grace
Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 2900
Atlanta, Georgia 30323

Serial No. 85-141
NO/JHL:acm
Docket Nos. 50-338
50-339
License Nos. NPF-4
NPF-7

Dear Dr. Grace:

Enclosed is the Radioactive Effluent Release Report for North Anna Power Station for the period July 1, 1984 to December 31, 1984.

Very truly yours,

W. L. Stewart

Enclosure (2 copies)

cc: Mr. James R. Miller, Chief
Operating Reactors Branch No. 3
Division of Licensing

Mr. M. W. Branch
NRC Resident Inspector
North Anna Power Station

1/1 IE25