SEMI-ANNUAL EFFLUENT RELEASE REPORT NORTH ANNA POWER STATION JANUARY 01, 1985, TO JUNE 30, 1985

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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

JANUARY 01, 1985, TO JUNE 30, 1985

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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 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, 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 radionclides in particlate 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 x 10 4 microcuries/ml.

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

Unplanned releases presented in Attachment 6 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

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

ATTACHMENT 1 EFFLUENT RELEASE DATA 1/85-6/85

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 EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1985) GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES NORTH ANNA POWER STATION

| | UNITS | 1st QUARTER | 2nd QUARTER | EST. TOTAL Z ERROR |
|--|---------|-------------|-------------|-----------------------|
| A. Fission and Activation Gases: | | | | |
| 1. Total Release | Ci | 7.28E+1 | 2.40E+2 | 1.50E+1 |
| 2. Average Release Rate for Period | μC1/sec | 9.36E+0 | 3.05E+1 | > < |
| B. Iodines: | | | | |
| 1. Total Iodine-131 Release | Ci | 9.36E-3 | 3.38E-2 | 1.50E+1 |
| 2. Average Release Rate for Period: | μC1/sec | 1.20E-3 | 4.30E-3 | >>< |
| C. PARTICULATES (T) > 8 days) | - | latin a | | |
| 1. Total Particulate (T1 > 8 days) Release | C1 | 2.83E-5 | 1.94E-3 | 1.50E+1 |
| 2. Average Release Rate for Period | μCi/sec | 3.64E-6 | 2.47E-4 | >< |
| 3. Gross Alpha Radioactivity Release | Ci | 1.71E-5 | 6.64E-5 | |
| D. Tritium: | Heady | 1 | | |
| 1. Total Release | Ci | 5.43E+0 | 2.25E+0 | 1.50E+1 |
| 2. Average Release Rate for Period | μCi/sec | 6.988-1 | 2.86E-1 | |
| E. Percentage of Technical Specification Limits: | 1000 | | | |
| 1. Total Body Dose Rate | z | 3.24E-2 | 1.34E-1 | |
| 2. Skin Dose Rate | z | 9.24E-3 | 3.82E-2 | |
| 3. Critical Organ Dose Rate | z | 1.35E-3 | 3.011E-3 | |

TABLE 1B EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1985) GASEOUS EFFLUENTS MIXED MODE RELEASES NORTH ANNA POWER STATION

Page 1 of 2

| | | CONTIN | UOUS MODE | | H MODE |
|-------------------------------|------|-------------|-------------|-------------|-------------|
| NUCLIDES RELEASED | UNIT | 1st QUARTER | 2nd QUARTER | 1st QUARTER | 2nd QUARTER |
| Fission and Activation Gases: | | | | | |
| Krypton - 85 | Ci | * | * | * | ** |
| Krypton - 85m | Ci | * | * | * | 1.13E-1 |
| Krypton - 87 | Ci | * . | * | * | 1.64E-2 |
| Vrypton - 88 | Ci | * | * | * | 1.14E-1 |
| Krypton - 88 Xenon - 131m | C1 | * | * | 9.71E-2 | * |
| Xenon - 133 | Ci | 2.49E+1 | 3.16E+1 | 8.46E+0 | 3.38E+1 |
| Xenon - 133m | Ci | * | * | 6.04E-2 | 6.59E-1 |
| Xenon - 135 | Ci | 3.02E+0 | 7.61E+0 | * | 4.03E+0 |
| Xenon - 133m | Ci | * | * | * | * |
| Xenon - 138 | Ci | * | * | * | * |
| Other (Specify) | Ci | | | | |
| Argon - 41 | Ci | * | * | * | 6.86E-2 |
| at goil - 4. | Ci | | | | |
| | Ci | | | | |
| Total for Period | Ci | 2.79E+1 | 3.92E+1 | 8.62E+0 | 3.88E+1 |
| lotal for refloa | Ci | 2777277 | | | |
| Iodines: | Ci | | | | |
| Iodine - 131 | C1 | 1.63E-5 | 4.15E-5 | 4.23E-6 | 4.21E-6 |
| | Ci | 1.032-3 | * | * | 2.48E-7 |
| Iodine - 132 | Cí | 6.18E-5 | 1.37E-4 | 3.57E-7 | 6.82E-6 |
| Iodine - 133 | Ci | * | * | * | * |
| Iodine - 134 | Ci | * | * | * | 2.42E-6 |
| Iodine - 135 | Ci | | | | 21722 0 |
| | Ci | 7.81E-5 | 1.79E-4 | 4.59E-6 | 1.37E-5 |
| Total for Period | Ci | 7.01E-3 | 1.775-4 | 4.376-0 | 1.2/6-2 |
| | C1 | | - | | |
| Particulates: | C1 | * | 5.04E-9 | | |
| Strontium - 89 | Ci | * | 3.046-9 | + | |
| Strontium - 90 | C1 | * | 1.33E-8 | * | * |
| Cesium - 134 | Cí | * | | * | * |
| Cesium - 137 | Ci | * | 3.03E-8 | * | * |
| Barium - 140 | Ci | * | * | * | * |
| Lanthanum - 140 | | * | * | | - |
| Other (Specify) | C1 | | 1 000 0 | * | / (/2 0 |
| Manganese - 54 | C1 | * | 1.09E-8 | * | 4.64E-9 |
| Iron - 55 | Ci | * | 5.97E-8 | * | * |
| Cobalt - 60 | C1 | 5.22E-8 | * | * | * |

^{*} Less than lower limits of detection

EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1985)
GASEOUS EFFLUENTS MIXED MODE RELEASES
NORTH ANNA POWER STATION

Page 2 of 2

| | | CONTI | CONTINUOUS MODE | DING | ۱ |
|--------------------|------|-------------|-----------------|-------------|--|
| NUCLIDES RELEASED | UNIT | 1st QUARTER | 2nd QUARTER | 1st QUARTER | 2nd QUARTER |
| O | | | | | |
| | C1 | * | * | * | 2.03E-3 |
| 5 | C1 | * | * | * | 1.58E-7 |
| | C1 | | | | |
| For | C1 | 5.22E-8 | 1.19E-7 | ĸ | 4.04E-9 |
| For Period (Th & 8 | C1 | * | * | ** | Z.03E-3 |
| Total For Period | C1 | 5.22E-8 | 1.19E-7 | * | 2.03E-3 |
| | Ct | | | | |
| GROSS ALPHA: | C1 | 3.11E-10 | * | * | * |
| | C1 | | | | |
| TRITIUM: | C1 | 5.20E-2 | 4.58E-3 | 7.68E-5 | 6.74E-4 |
| | C1 | | | | |
| | C1 | | | | |
| | Ci | | | | |
| | C1 | | | | |
| | Ci | | | | |
| | CI | | | | |
| | C1 | | | | |
| | Cf | | | | |
| | C1 | | | | |
| | Cf | | | | |
| | C1 | | | | |
| | CI | | | | |
| | C1 | | | | |
| | | | | | The second secon |

^{*} Less than lower limits of detection

TABLE 1C EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1985) GASEOUS EFFLUENTS-GROUND-LEVEL RELEASES NORTH ANNA POWER STATION

Page 1 of 2

| | | CONTIN | TUOUS MODE | BAT | CH MODE |
|--|------|-------------|--------------|-------------|-------------|
| NUCLIDES RELEASED | UNIT | 1st QUARTER | 2nd QUARTER | 1st QUARTER | 2nd QUARTER |
| Fission and Activation Gases: | | | | | |
| Krypton - 85 | Ci | * | * | * | * |
| Krypton - 85m | Ci | 3.76E-1 | 1.64E+0 | * | * |
| Krypton - 87 | Ci | 8.65E-1 | 3.86E+0 | * | . * |
| Krypton - 88 | Cí | 9.30E-1 | 4.11E+0 | * | * |
| Xenon - 131m | Ci | * | * | * | * |
| Xenon - 133 | Ci | 1.86E+0 | 2.66E+1 | 1.64E-5 | 1.91E-4 |
| Xenon - 133m | Ci | * | * | * | * |
| Xenon - 135 | Ci | 1.67E+1 | 6.06E+1 | 6.34E-2 | 1.23E-1 |
| Xenon - 153m | Ci | 9.42E+0 | 3.80E+1 | 2.32E-2 | 6.24E-2 |
| Xenon - 138 | Ci | 4.34E+0 | 2.11E+1 | * | * |
| Other (Specify) | Ci | | | | |
| Argon - 41 | Ci | 1.75E+0 | 6.38E+0 | 5.26E-6 | 2.12E-5 |
| | Ci | | | | |
| | Ci | | | | |
| Total for Period | Ci | 3.62E+1 | 1.62E+2 | 8.65E-2 | 1.86E-1 |
| | Ci | | | 1 | |
| Iodines: | Ci | | | | |
| Iodine - 131 | Cí | 6.62E-4 | 2.18E-3 | 2.61E-6 | 1.37E-5 |
| Todine - 132 | Ci | * | 3.43E-5 | 1.04E-5 | 9.23E-5 |
| Iodine - 133 | Ci | 8.56E-3 | 3.09E-2 | 1.87E-5 | 1.07E-4 |
| Iodine - 134 | Ci | * | * | 9.70E-6 | 1.55E-4 |
| Iodine - 135 | Ci | * | 2.96E-5 | 2.06E-5 | 1.39E-4 |
| | Ci | | | | |
| Total for Period | Cí | 9.22E-3 | 3.31E-2 | 6.20E-5 | 5.07E-4 |
| | Ci | 21000 | 31310 | 0.000 | 3.072 |
| Particulates: | Ci | | - | | |
| Strontium - 89 | Ci | * | 2.98E-6 | | |
| Strontium - 90 | Cí | * | * | | |
| Cesium - 134 | Ci | * | 1.66E-5 | 8.18E-7 | 3.09E-6 |
| Cesium - 137 | Cí | 1.74E-5 | 6.56E-5 | 1.40E-6 | 5.79E-6 |
| Barium - 140 | Ci | * | * | * | 3.756-0 |
| Other (Specify) | Cí | | | | - |
| Lanthanum - 140 | Cí | * | * | * | * |
| Niobium - 95 | Ci | * | | | |
| Iron - 55 | C1 | 3.69E-10 | * 4.27E-5 | 1.12E-7 | 9.31E-7 |
| Cobalt - 58 | | | | 5.50E-7 | 7 177 |
| | C1 | 3.20E-6 | 2.25E-6 | 3.3UE-/ | 3.92E-6 |
| Cobalt - 60 Less than lower limits of detection | Ci | 4.8IE-6 | 1.12E-5 | * | 3.16E-8 |

^{*} Less than lower limits of detection

TABLE 1C EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1985) GASEOUS EFFLUENTS-GOUND-LEVEL RELEASES NORTH ANNA POWER STATION

Page 2 of 2

| | | CONT | INUOUS MODE | BA | TCH MODE |
|---------------------------------|--|-------------|-------------|-------------|-------------|
| NUCLIDES RELEASED | UNIT | 1st QUARTER | 2nd QUARTER | 1st QUARTER | 2nd QUARTER |
| Particulates (cont): | | | | | |
| Yttrium - 91 | Ci | * | 1.79E-3 | * | * |
| Sodium - 24 | Ci | * | * | 6.38E-7 | 5.17E-6 |
| Rubidium - 88 (Th (8 days) | Ci | 5.64E-3 | 5.50E-2 | * | * |
| Rubidium - 89 (Th (8 days) | Ci | 4.75E-3 | 2.50E-2 | 3.73E-7 | * |
| Tellurium - 13lm (T'2 (8 days) | Ci | . * | 4.74E-5 | * | * |
| Tellurium - 132 (Th (8 days) | Ci | 8.65E-5 | 2.26E-4 | * | * |
| Cesium - 138 (T1 (8 days) | Ci | 1.76E-2 | 9.40E-2 | 8.52E-4 | 4.41E-4 |
| * | Ci | | | | |
| Total For Period (T) > 8 days) | Ci | 2.54E-5 | 1.93E-3 | 2.88E-6 | 1.38E-5 |
| Total For Period (Th (8 days) | Ci | 2.81E-2 | 1.74E-1 | 8.53E-4 | 4.46E-4 |
| Total For Period | Ci | 2.81E-2 | 1.76E-I | 8.56E-4 | 4.60E-4 |
| | Ci | | | | |
| GROSS ALPHA: | Ci | 1.71E-5 | 6.64E-5 | * | * |
| | Ci | | | | |
| TRITIUM: | Ci | 5.37E+0 | 2.21E+0 | 8.18E-3 | 3.04E-2 |
| | Ci | | | | |
| | Ci | | | | |
| | Ci | - | | | |
| | Ci | 1 | | | |
| | Ci | | | | |
| | Ci | | | | |
| | Ci | | | | |
| | Ci | + | | | |
| | Ci | + | | | |
| | Ci | 1 | | | |
| | Ci | + | | | |
| | Ci | | | | |
| | Či | | | | |
| | Ci | | | | |
| | Ci | | | | |
| | Cí | | | | |
| | Ci | | | | |
| | Cí | + | - | | |
| | Cí | + | | | |
| | Ci | - | | | |
| | The same of the sa | + | | | |
| | Ci | | | | |
| | C1 | | | | |
| Tacc than Invar Hedra of dates | Ci | | | | |

TABLE 2A EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1985) LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES NORTH ANNA POWER STATION

| The second secon | UNIT | 1st QUARTER | 2nd QUARTER | EST. TOTAL |
|--|--------|---|-------------------------------------|------------|
| A. Fission & Activation Products 1. Total release (not including tritium, gases, alpha) | Cí | 1.345-1 | 2.40E-1 | 1.50E+1 |
| Average diluted concentration during period | μC1/ml | 1.90E-10 | 3.38E-10 | >< |
| 3. Percent of applicable limit (T.S.) | z | 4.55E-3 | 5.92E-3 | |
| B. Tritium 1. Total release activity. | Ci | 4.37E+2 | 4.01E+2 | 1.50E+1 |
| Average diluted concentration during period. | μC1/ml | 6.21E-7 | 5.64E-7 | >< |
| 3. Percent of applicable limit (T.S.) | z | 2.07E-2 | 1.88E-2 | >>< |
| C. Dissolved and entrained gases 1. Total release activity. | Cí | 6.05E-1 | 2.27E-1 | 1.50E+1 |
| Average diluted concentration during period. | µCi/ml | 8.59E-10 | 3.20E-10 | |
| 3. Percent of applicable limit (T.S.) | z | 4.30E-4 | 1.60E-4 | >>< |
| 1. Total release activity. | Cí | <mda< td=""><td><mda< td=""><td>1.50E+1</td></mda<></td></mda<> | <mda< td=""><td>1.50E+1</td></mda<> | 1.50E+1 |
| E. Volume of waste released (prior to dilution) | Liters | 8.61E+7 | 7.69E+7 | $>\!\!<$ |
| F. Volume of dilution water used during period | Liters | 7.04E+11 | 7.11E+11 | >< |

TABLE 2B EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1985) LIQUID EFFLUENTS NORTH ANNA POWER STATION

Page 1 of 2

| | | CONTINUO | OUS MODE | BATCH | MODE |
|---------------------------------|------|-------------------------------|--------------------|---------|---------|
| NUCLIDES RELEASED | UNIT | QUARTER | QUARTER | QUARTER | QUARTE |
| Fission and Activation Products | | | | | |
| Strontium - 89 | Ci | * | * | | |
| Strontium - 90 | Ci | * | * | | |
| Cesium - 134 | Ci | 3.05E-2 | 5.50E-2 | 1.092-5 | * |
| Cesium - 137 | Ci | 6.14E-2 | 1.16E-1 3.32E-3 | 2.40E-5 | 5.69E-6 |
| Iodine - 131 | Ci | 6.32E-3 | 3.32E-3 | 3.36E-5 | * |
| Cobalt - 58 | Ci | 1.59E-2 | 3.66E-3 | 1.28E-5 | 2.81E-4 |
| Cobalt - 60 | Ci | 1.08E-2 | 2.32E-2 | 1.33E-6 | 1.49E-3 |
| Iron - 59 | Cí | * | * | * | * |
| Zinc - 65 | Ci | * | * | * | * |
| Chromium - 51 | Ci | * | * | * | * |
| Manganese - 54 | Ci | * | 5.67E-4 | 2.88E-8 | 8.79E-5 |
| Niobium - 95 | C1 | * | 1.12E-3 | 1.71E-8 | 1.77E-5 |
| Zirconium - 95 | Ci | * | * | * | * |
| Molybdenum - 99 | Ci | * | * | * | * |
| Technetium - 99 | Ci | * | * | 6.36E-6 | * |
| Barium - 140 | Ci | * | * | * | * |
| Lanthanum - 140 | Ci | * | * | * | * |
| Cerium - 141 | Cí | * | * | * | * |
| Other (Specify) | Ci | | | | |
| Sodium - 24 | Ci | 2.12E-3 | 1.40E-2 | 8.08E-6 | * |
| Cobalt - 57 | Ci | * | * | 1.26E-8 | 7.87E-6 |
| Silver - 110m | Ci | 2.15E-4 | 5.46E-3 | 7.15E-8 | 5.26E-5 |
| Antimony - 122 | Ci ' | 1.93E-3 | 6.28E-3 | 2.94E-8 | * |
| Iodine - 132 | Ci | * | * | 1.19E-4 | * |
| Iodine - 133 | Ci | 3,33E-3 | 6.88E-3 | 2.16E-4 | * |
| Iodine - 134 | Cí | * | * | 1.20E-4 | * |
| Iodine - 135 | Ci | * | 1.72E-3 | 2.71E-4 | * |
| Tellurfum - 131m | C1 | * | * | 3,87E-6 | * |
| Cesium - 138 | Ci | * | * | 7.40E-5 | * |
| Iron - 55 | Ci | * | * | | |
| | Ci | THE RESIDENCE OF THE PARTY OF | | | |
| | Ci | | 1 | | |
| Total for Period | Cí | 1.33E-1 | 2.38E-1 | 9.01E-4 | 1.94E-3 |

^{*} less than lower limits of detection

TABLE 2B
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1985)
LIQUID EFFLUENTS
NORTH ANNA POWER STATION

Page 2 of 2

| | | CONTIN | CONTINUOUS MODE | BAIC | H MODE |
|-------------------|------|-------------|-----------------|-----------------|-------------|
| NICTIDES RELEASED | UNIT | 1st QUARTER | 2nd QUARTER | 1st QUARTER 2nd | 2nd QUARTER |
| | | | | | |
| | C1 | 3.27E-1 | 1.58E-1 | * | * |
| Action 135 | C1 | 8.95E-2 | . 6.62E-2 | 1,01E-5 | 7.53E-6 |
| Other (Specify) | C1 | | | | |
| Venon - 133m | Cf | 4.34E-3 | * | * | * |
| Venon - 135m | C.2 | 1.84E-1 | 2.99E-3 | 1.52E-4 | 1.40E-5 |
| ACION COM | 13 | | | | |
| | Ct | | | | |
| | 64 | | | | |
| | Cf | | | | |
| | 13 | | | | |
| | Ct | | | | |
| | C1 | | | | |
| | 13 | | | | |
| | C1 | | | | |
| | Cd | | | | |
| | CI | | | | |
| | C1 | | | | |
| | CI | | | | |
| | Ct | | | | |
| | CI | | | | - |
| | CI | | | | |
| | CI | | | | |
| | C1 | | | | |
| | C1 | | | | |
| | C1 | | | | + |
| | C1 | | | | |
| | C1 | | | - | |
| | C1 | | | | |
| | C1 | | | | - 1 |
| Total for Period | C1 | 6.05E-1 | 2.27E-1 | 1.62E-4 | 2.15E-5 |
| | CI | | | - | , 400 |
| Tritium | CI | 4.37E+2 | 4.01E+2 | 8.98E-4 | Z-707-4 |
| | CI | | | | - |
| Alpha | C1 | * | * | * | * |
| | CI | | | | |

^{*} less than lower limits of detection

TABLE 3 (1/85 - 6/85) EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

| 1. T | ype of Waste | UNIT | 100 | ONTH | EST. ERROF | TOTAL |
|------|--|----------|-----|---------------|---------------|--------|
| a. | Spent resins, filter sludges, evaporator bottoms, etc. | m³ Ci | | 4E+2 00E+2 | 1.0 | |
| b. | Dry compressible waste, contaminated equipment, etc. | m³ Ci | | 0E+2 8E+1 | 1.0 | |
| c. | Irradiated components, control rods, etc. | m³ Ci | 0. | E E | | E E |
| d. | Other (describe) | m³ Ci | 0. | E | | E |

Estimate of major nuclide composition (by type of waste)

| a. | Н 3 | % 38.6 | 1.0 E+1 |
|----|--------|---------|----------|
| | Ni 63 | % 22.4 | 1.0 E+1 |
| | Fe 55 | % 12.95 | 1.0 E+1 |
| - | Co 60 | % 6.8 | 1.0 E+1 |
| | Cs 137 | % 5.94 | 1.0 E+1 |
| | C 14 | % 2.76 | 1.0 E+1 |
| - | Cs 134 | % 2.75 | 1.0 E+1 |
| | Cm 242 | % 2.11 | 1.0 E+1 |
| | Co 58 | % 1.72 | 1.0 E+1 |
| | Cm 244 | % 1.02 | 1.0 E+1 |
| | Pu 241 | % 1.01 | 1.0 E+1 |
| - | I 131 | 8.8 | 1.0 E+1 |
| | Mn 54 | % .71 | 1.0 E+1 |
| | Sb 122 | % .13 | 1.0 E+1 |
| | Pu 239 | % .08 | 1.0 E+1 |
| | Ce 144 | % .04 | 1.0 E+1 |
| | La 140 | % .03 | 1.0 E+1 |
| | Ba 140 | % .03 | 1.0 E+1 |
| | Sr 90 | % .01 | 1. 0 E+1 |
| | Xe 133 | % .01 | 1.0 E+1 |
| | Nb 95 | % .007 | 1. 0 E+1 |
| | Zr 95 | % .003 | 1. 0 E+1 |
| | Pu 238 | % .002 | 1. 0 E+1 |
| | Tc 99 | % .001 | 1. 0 E+1 |
| | I 129 | % .0006 | 1. 0 E+1 |
| | | % | . E |
| b, | | No. | . Е |
| | Fe 55 | % 51.05 | 1. 0 E+1 |
| | Н 3 | % 15.1 | 1. 0 E+1 |
| | Co 60 | % 10.4 | 1. 0 E+1 |

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

| (con't) | % | . E |
|---------|-----------|---------|
| Cs 137 | % 5.1 | 1.0 E + |
| Ce 144 | % 5.08 | 1.0 E + |
| Ni 63 | % 3.21 | 1.0 E + |
| Pu 241 | % 2.2 | 1.0 E + |
| C 14 | % 1.5 | 1.0 E + |
| Cs 134 | % 1.45 | 1.0 E + |
| Zr 95 | % 1.40 | 1.0 E + |
| Nb 95 | % 1.35 | 1.0 E + |
| Co 58 | % 1.1 | 1.0 E + |
| Sr 90 | % 1.0 | 1.0 E + |
| Om 242 | % .5 | 1.0 E + |
| Mn 54 | * .3 | 1.0 E + |
| Ru 103 | % .1 | 1.0 E + |
| Pu 238 | % .01 | 1.0 E + |
| Pu 239 | % .01 | 1.0 E + |
| Am 241 | % .005 | 1.0 E 4 |
| Cm 243 | % .003 | 1.0 E + |
| Cm 244 | % .003 | 1.0 E + |
| Sb 122 | % .002 | 1.0 E + |
| Tc 99 | % .001 | 1.0 E + |
| Pu 242 | % .0009 | 1.0 E + |
| I 129 | % .000006 | 1.0 E + |
| | * | . E |
| | % | . E |
| | % | . E |
| | % | . E |
| | % | . Е |
| | % | , E |
| | % | . E |
| | % | . Е |
| | % | . E |
| | % | , E |
| | ×, | , E |

3. Solid Waste Disposition

| NUMBER OF SHIPMENTS | MODE OF TRANSPORTATION | DESTINATION |
|---------------------------|------------------------|--------------|
| 32 | Private Vehicle | Barnwell, SC |
| IRRADIATED FUEL SHIPMENTS | (Disposition) | |
| NUMBER OF SHIPMENTS | MODE OF TRANSPORTATION | DESTINATION |

(01/85-06/85)

REVISIONS TO OFFSITE CALCULATION

MANUAL (ODCM)

No changes were made to the Offsite Dose Calculation

Manual (ODCM) for the time period covered by this report.

(01/85-06/85)

REVISIONS TO PROCESS CONTROL PROGRAM (PCP)

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

(01/85-06/85)

MAJOR CHANGES TO RADIOACTIVE SOLID

WASTE TREATMENT SYSTEMS

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

(01/85-06/85)

RADIOACTIVE LIQUID AND GASEOUS

EFFLUENT MONITORING INSTRUMENTATION INOPERABLE

None of the radioactive effluent monitors met the requirements of Technical Specification 3.3.3.10.b and 3.3.3.11.b, for providing an account due to inoperability.

(01/85-06/85)

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.

SEMI-ANNUAL EFFLUENT RELEASE REPORT NORTH ANNA POWER STATION JANUARY 01, 1985, TO JUNE 30, 1985

PREPARED BY: William C. Garner Assistant Supervisor

Health Physics

(Count Room & Environmental)

REVIEWED BY:

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(Technical Services)

REVIEWED BY:

A. H. Stafford Superintendent Health Physics

APPROVED BY:

E. Wayne Harrell

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.

PADIOACTIVE EFFLUENT RELEASE REPORT

FOR THE

NORTH ANNA POWER STATION

JANUARY 01, 1985, TO JUNE 30, 1985

INDEX

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| | Attachment 1 Effluent Release Data | 4 |
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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 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, 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 radionclides in particlate 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 x 10 4 microcuries/ml.

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

Unplanned releases presented in Attachment 6 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

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

ATTACHMENT 1 EFFLUENT RELEASE DATA 1/85-6/85

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 EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1985) GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES NORTH ANNA POWER STATION

| | UNITS | IstQUARTER | 2nd QUARTER | EST. TOTAL Z ERROR |
|---|---------|------------|-------------|-----------------------|
| A. Fission and Activation Gases: | | | | |
| 1. Total Release | C1 | 7.28E+1 | 2.40E+2 | 1.50E+1 |
| 2. Average Release Rate for Period | μC1/sec | 9.36E+0 | 3.05E+1 | $>\!<$ |
| B. <u>Iodines</u> : 1. Total Iodine-131 Release | Ci | 9.36E-3 | 3.38E-2 | 1.50E+1 |
| 2. Average Release Rate for Period: | μC1/sec | 1.20E-3 | 4.30E-3 | >< |
| C. PARTICULATES (T ¹ / ₂ > 8 days) 1. Total Particulate (T ¹ / ₂ > 8 days) Release | Ci | 2.83E-5 | 1.94E-3 | 1.50E+1 |
| 2. Average Release Rate for Period | μC1/sec | 3.64E-6 | 2.47E-4 | |
| 3. Gross Alpha Radioactivity Release | Ci | 1.71E-5 | 6.64E-5 | |
| D. Tritium: 1. Total Release | C1 | 5.43E+0 | 2.25E+0 | 1.50E+1 |
| 2. Average Release Rate for Period | μC1/sec | 6.98E-1 | 2.86E-1 | |
| E. Percentage of Technical Specification Limits: | | | | |
| 1. Total Body Dose Rate | z | 3.24E-2 | 1.34E-1 | |
| 2. Skin Dose Rate | z | 9.24E-3 | 3.82E-2 | >>< |
| 3. Critical Organ Dose Rate | z | 1.35E-3 | 3.011E-3 | |

TABLE 1B EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1985) GASEOUS EFFLUENTS MIXED MODE RELEASES NORTH ANNA POWER STATION

Page 1 of 2

| | | CONTIN | TUOUS MODE | BATC | H MODE |
|-------------------------------|------|-------------|-------------|--------------|------------|
| NUCLIDES RELEASED | UNIT | 1st QUARTER | 2nd QUARTER | 1 st QUARTER | 2nd QUARTE |
| Fission and Activation Cases: | | | | | |
| Krypton - 85 | Ci | * | * | * | + 宋 |
| Krypton - 85m | Ci | * | * | * | 1.13E-1 |
| Krypton - 87 | Ci | * . | * | * | 1.64E-2 |
| Krypton - 88 | Ci | . * | * | * | 1.14E-1 |
| Xenon - 131m | Ci | * | * | 9.71E-2 | Tt. |
| Xenon - 133 | C1 | 2.49E+1 | 3.16E+1 | 8.46E+0 | 3.38E+1 |
| Xenon - 133m | Ci | * | * | 6.04E-2 | 6.59E-1 |
| Xenon - 135 | Ci | 3.02E+0 | 7.61E+0 | * | 4.03E+0 |
| Xenon - 133m | Ci | * | * | * | * |
| Xenon - 138 | Ci | * | * | * | * |
| Other (Specify) | Ci | | | | |
| Argon - 41 | Ci | * | * | * | 6.86E-2 |
| 118011 - 11 | Ci | | | | 0.002-2 |
| | Cí | | | | |
| Total for Period | Ci | 2.79E+1 | 3.92E+1 | 8.62E+0 | 3.88E+1 |
| lotal for reriod | Ci | 2./9ET1 | 3.92671 | 0.02270 | 3.00671 |
| T-1/ | Ci | | | | |
| Iodines: | Ci | 1 (3n f | / 15p.5 | / 225 / | / 015 / |
| Todine - 131 | Ci | 1.63E-5 | 4.15E-5 | 4.23E-6 | 4.21E-6 |
| Iodine - 132 | | | | - " | 2.48E-7 |
| Iodine - 133 | Cí | 6.18E-5 | 1.37E-4 | 3.57E-7 | 6.82E-6 |
| Iodine - 134 | Ci | * | * | * | * |
| Iodine - 135 | C1 | * | * | * | 2.42E-6 |
| | Ci | | | | |
| Total for Period | C1 | 7.81E-5 | 1.79E-4 | 4.59E-6 | 1.37E-5 |
| | Ci | | | | |
| Particulates: | Ci | | | | |
| Strontium - 89 | C1 | * | 5.04E-9 | | |
| Strontium - 90 | Ci | * | * | | |
| Cesium - 134 | Ci | * | 1.33E-8 | * | * |
| Cesium - 137 | Ci | * | 3.03E-8 | * | * |
| Barium - 140 | Ci | * | * | * | * |
| Lanthanum - 140 | Ci | * | * | * | * |
| Other (Specify) | Ci | | | | |
| Manganese - 54 | Či | * | 1.09E-8 | * | 4.64E-9 |
| Iron - 55 | Ci | * | 5.97E-8 | | |
| Cobalt - 60 | Ci | 5.22E-8 | * | * | * |

* Less than lower limits of detection

TABLE 1B EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1985) GASEOUS EFFLUENTS MIXED MODE RELEASES NORTH ANNA POWER STATION

Page 2 of 2

| | | | INUOUS MODE | | CH MODE |
|---|------|-------------|-------------|-------------|------------|
| NUCLIDES RELEASED | UNIT | 1st QUARTER | 2nd QUARTER | 1st QUARTER | 2nd QUARTE |
| Particulates (cont): | | | | | |
| Rubidium - 88 (T'2 (8 days) | Ci | * | * | * | 2.03E-3 |
| Particulates (cont): Rubidium - 88 (T4 < 8 days) Cesium - 138 (T4 < 8 days) | C1 | * | * | * | 1.58E-7 |
| | Ci | | | | |
| Total For Period (T's > 8 days) Total For Period (T's < 8 days) | Ci | 5.22E-8 | 1.19E-7 | * | 4.64E-9 |
| Total For Period (Th < 8 days) | Ci | * | | | 2.03E-3 |
| Total For Period | Ci | 5.22E-8 | 1.19E-7 | * | 2.03E-3 |
| | C1 | | | | |
| GROSS ALPHA: | Ci | 3.11E-10 | * | * | * |
| | Ci | | | | |
| TRITIUM: | Ci | 5.20E-2 | 4.58E-3 | 7.68E-5 | 6.74E-4 |
| | Ci | | | | |
| | Ci | | | | |
| | Ci | | | | 1 |
| | Ci | | | | |
| | Ci | | - | | |
| | Cí | | | | |
| | Ci | 1 | | | |
| | Ci | | | | |
| | Ci | | | | |
| | Ci | 1 | | | |
| | Cí | | | | 1 |
| | Cí | 1 | | | |
| | Ci | | | | |
| | Cí | 1 | | | + |
| | Ci | 1 | | | + |
| | C1 | | | + | - |
| Less than lower limits of detec | | | | | |

^{*} Less than lower limits of detection

TABLE 1C EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1985) GASEOUS EFFLUENTS-GROUND-LEVEL RELEASES NORTH ANNA POWER STATION

Page 1 of 2

| | | CONTIN | TUOUS MODE | BAT | CH MODE |
|-------------------------------------|------|-------------|-------------|-------------|-------------|
| NUCLIDES RELEASED | UNIT | 1st QUARTER | 2nd QUARTER | 1st QUARTER | 2nd QUARTER |
| Fission and Activation Gases: | | | | | |
| Krypton - 85 | Ci | * | * | * | * |
| Krypton - 85m | Ci | 3.76E-1 | 1.64E+0 | * | * |
| Krypton - 87 | Ci | 8.65E-1 | 3.86E+0 | * | , * |
| Krypton - 88 | Ci | 9.30E-1 | 4.11E+0 | * | * |
| Xenon - 131m | Ci | * | * | * | * |
| Xenon - 133 | Cí | 1.86E+0 | 2.66E+1 | 1.64E-5 | 1.91E-4 |
| Xenon - 133m | Ci | * | * | * | * |
| Xenon - 135 | Ci | 1.67E+1 | 6.06E+1 | 6.34E-2 | 1.23E-1 |
| Xenon - 153m | Ci | 9.42E+0 | 3.80E+1 | 2.32E-2 | 6.24E-2 |
| Xenon - 138 | Ci | 4.34E+0 | 2.11E+1 | * | * |
| Other (Specify) | Ci | | | | |
| Argon - 41 | Ci | 1.75E+0 | 6.38E+0 | 5.26E-6 | 2.12E-5 |
| | Ci | | | | |
| | Ci | | | | |
| Total for Period | Ci | 3.62E+1 | 1.62E+2 | 8.65E-2 | 1.86E-I |
| | Cí | | | 1, 3,35,5 | 11000 1 |
| Iodines: | Cí | | | | |
| Iodine - 131 | Ci | 6.62E-4 | 2.18E-3 | 2.61E-6 | 1.37E-5 |
| Iodine - 132 | C1 | * | 3.43E-5 | 1.04E-5 | 9.23E-5 |
| Iodine - 133 | C1 | 8.56E-3 | 3.09E-2 | 1.87E-5 | 1.07E-4 |
| Iodine - 134 | Ci | * | * | 9.70E-6 | 1.55E-4 |
| Iodine - 135 | Ci | * | 2.96E-5 | 2.06E-5 | 1.39E-4 |
| | Ci | | 21,700-3 | 2.000-3 | 1.326-4 |
| Total for Period | C1 | 9.22E-3 | 3.31E-2 | 6.20E-5 | 5.07E-4 |
| | Ci | 1 | 3.31 | 0,202-3 | 3.076-4 |
| Particulates: | Ci | | | | |
| Strontium - 89 | Ci | * | 2.98E-6 | | |
| Strontium - 90 | Ci | * | * | | |
| Cesium - 134 | Cí | * | 1.66E-5 | 8,18E-7 | 3.09E-6 |
| Cesium - 137 | Ci | 1.74E-5 | 6.56E-5 | 1.40E-6 | 5.79E-6 |
| Barium - 140 | Ci | * | * | * | * |
| Other (Specify) | Ci | 1 | | | |
| Lanthanum - 140 | Ci | * | * | * | * |
| Niobium - 95 | Cí | * | * | 1.12E-7 | 9.31E-7 |
| Iron - 55 | Ci | 3.69E-10 | 4.27E-5 | 1.12E-/ | 9.31E-/ |
| Cobalt - 58 | C1 | 3.20E-6 | 2.25E-6 | 5.50E-7 | 3.92E-6 |
| Cobalt - 60 | Ci | 4.81E-6 | 1.12E-5 | 3.306-7 | 3.16E-8 |
| Less than lower limits of detection | | 4.012-0 | 1.126-3 | | J. 10E-8 |

TABLE 1C EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1985) GASEOUS EFFLUENTS-GOUND-LEVEL RELEASES NORTH ANNA POWER STATION

Page 2 of 2

| | | | INUOUS MODE | BA | TCH MODE |
|---------------------------------|------|--------------|-------------|-------------|-------------|
| NUCLIDES RELEASED | UNIT | 1st QUARTER | 2nd QUARTER | 1st QUARTER | 2nd QUARTER |
| Particulates (cont): | | | | | |
| Yttrium - 91 | Ci | * | 1.79E-3 | * | * |
| Sodium - 24 | Ci | * | * | 6.38E-7 | 5.17E-6 |
| Rubidium - 88 (T < 8 days) | Ci | 5.64E-3 | 5.50E-2 | * | *: |
| Rubidium - 89 (Ti < 8 days) | Ci | 4.75E-3 | 2.50E-2 | 3.73E-7 | * |
| Tellurium - 131m (Ty < 8 days) | Ci | * | 4.74E-5 | * | * |
| Tellurium - 132 (Ty (8 days) | Ci | 8.65E-5 | 2.26E-4 | * | * |
| Cesium - 138 (T' (8 days) | Ci | 1.76E-2 | 9.40E-2 | 8.52E-4 | 4.41E-4 |
| | Ci | | | | |
| Total For Period (T'2 > 8 days) | Ci | 2.54E-5 | 1.93E-3 | 2.88E-6 | 1.38E-5 |
| Total For Period (Th (8 days) | Ci | 2.81E-2 | 1.74E-I | 8.53E-4 | 4.46E-4 |
| Total For Period | Ci | 2.81E-2 | 1.76E-1 | 8.56E-4 | 4.60E-4 |
| | Ci | | | | |
| GROSS ALPHA: | Ci | 1.71E-5 | 6.64E-5 | * | * |
| | Ci | | | | |
| TRITIUM: | Cí | 5.37E+0 | 2.21E+0 | 8.18E-3 | 3.04E-2 |
| | Cí | | | | |
| | Ci | | | | |
| | Ci | | | | |
| | Ci | | | | |
| | Ci | | | | |
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| | CI | + | | | |
| | Ci | | | | |
| | Cí | 1 | | | |
| | Ci | | - | | |
| | CI | - | | | |
| Tace than lower limits of datas | | | | | |

TABLE 2A EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1985) LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES NORTH ANNA POWER STATION

| | UNIT | 1st QUARTER | 2nd QUARTER | EST. TOTAL |
|---|--------|---|-------------------------------------|------------|
| A. Fission & Activation Products 1. Total release (not including tritium, gases, alpha) | C1 | 1.34E-1 | 2.40E-1 | 1.50E+1 |
| Average diluted concentration during period | μCi/ml | 1.90E-10 | 3-38E-10 | >>< |
| 3. Percent of applicable limit (T.S.) | ž . | 4.55E~3 | 5.92E-3 | |
| B. Tritium 1. Total release activity. | Ci | 4.37E+2 | 4.01E+2 | 1.50E+1 |
| Average diluted concentration during period. | μC1/m1 | 6.21E-7 | 5.64E-7 | >< |
| 3. Percent of applicable limit (T.S.) | z | 2.07E-2 | 1.88E-2 | >>< |
| C. Dissolved and entrained gases 1. Total release activity. 2. Average diluted concentration during | C1 | 6.05E-1 | 2.27E-1 | 1.50E+1 |
| period. | μC1/ml | 8.59E-10 | 3.20E-10 | |
| 3. Percent of applicable limit (T.S.) | z | 4.30E-4 | 1.60E-4 | >< |
| D. Gross Alpha Radioactivity 1. Total release activity. | Cí | <mda< td=""><td><mda< td=""><td>1.50E+1</td></mda<></td></mda<> | <mda< td=""><td>1.50E+1</td></mda<> | 1.50E+1 |
| E. Volume of waste released (prior to dilution) | Liters | 8.61E+7 | 7.69E+7 | > |
| F. Volume of dilution water used during period | Liters | 7.04E+11 | 7.11E+11 | \searrow |

TABLE 2B EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1985) LIQUID EFFLUENTS NORTH ANNA POWER STATION

Page 1 of 2

| | | CONTINU | OUS MODE | BATCH | MODE |
|-------------------------------------|------|---------|--|--|---------|
| NUCLIDES RELEASED | UNIT | QUARTER | QUARTER | QUARTER | QUARTER |
| Fission and Activation Products | | | | | |
| Strontium - 89 | Ci | * | * | | |
| Strontium - 90 | Ci | * . | * | | |
| Cesium - 134 | Ci | 3.05E-2 | 5,50E-2 | 1.09E-5 | * |
| Cesium - 137 | Ci | 6,14E-2 | 1.16E-1 | 2,40E-5 | 5.69E-6 |
| Iodine - 131 | C1 | 6.32E-3 | 3.32E-3 | 3.36E-5 | * |
| Cobalt - 58 | Ci | 1.59E-2 | 3.66E-3 | 1.28E-5 | 2.81E-4 |
| Cobalt - 60 | Ci | 1.08E-2 | 2.32E-2 | 1.33E-6 | 1.49E-3 |
| Iron - 59 | Ci | * | * | * | * |
| Zinc - 65 | C1 | * | * | * | * |
| Chromium - 51 | Ci | * | * | * | * |
| Manganese - 54 | Ci | * | 5.67E-4 | 2.88E+8 | 8.79E-5 |
| Niobium - 95 | Ci | * | 1.12E-3 | 1.71E-8 | 1.77E-5 |
| Zirconium - 95 | Ci | * | * | 1./1E-0 | 1.//E-5 |
| Molybdenum - 99 | Ci | * | * | * | * |
| Technetium - 99 | Ci | * | * | 6.36E-6 | * |
| Barium - 140 | Ci | * | A | # | * |
| Lanthanum - 140 | Ci | * | * | * | * |
| Cerium - 141 | Ci | * | * | + | * |
| Other (Specify) | Ci | | | 1 | |
| Sodium - 24 | Ci | 2.12E-3 | 1.40E-2 | 8.08E-6 | * |
| Cobalt - 57 | Ci | * | * | 1.26E-8 | 7.87E-6 |
| Silver - 110m | Ci | 2.15E-4 | 5.46E-3 | 7.15E-8 | 5.26E-5 |
| Antimony - 122 | Ci ' | 1.93E-3 | 6.28E-3 | 2.94E-8 | 3.20E-3 |
| Iodine - 132 | Ci | * | * | 1.19E-4 | * |
| Iodine - 133 | Ci | 3,33E-3 | 6.88E-3 | 2.16E-4 | * |
| Iodine - 134 | Cí | * | * | 1.20E-4 | * |
| Todine - 135 | Ci | * | 1.72E-3 | 2.71E-4 | * |
| Tellurfum - 131m | Cí | * | * | 3.87E-6 | * |
| Cesium - 138 | Ci | * | * | 7.40E-5 | * |
| Iron - 55 | Ci | * | * | 7,406-3 | |
| | Ci | | | | |
| | Ci | | | | |
| | Ci | | | | |
| | Ci | | | | |
| | Ci | | | | - |
| Total for Period | C1 | 1.33E-I | 2.38E-1 | 9.01E-4 | 1.94E-3 |
| * less than lower limits of detecti | | 1.335-1 | 2.306-1 | 7.01E-4 | 1.946-3 |

TABLE 2B
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1985)
LIQUID EFFLUENTS
NORTH ANNA POWER STATION

Page 2 of 2

| | | CONTIN | CONTINUOUS MODE | BAIC | H MODE |
|-------------------|------|-------------|-----------------|-----------------|-------------|
| NUCLIDES RELEASED | UNIT | 1st QUARTER | 2nd QUARTER | 1st QUARTER 2nd | 2nd QUARTER |
| | | | | | - |
| - 133 | C1 | 3.27E-1 | 1.58E-1 | * | * |
| Xenon - 135 | C1 | 8.95E-2 | · 6.62E-2 | 1,01E-5 | 7.53E-6 |
| 100 | CI | | | | |
| | CI | 4.34E-3 | *. | * | * |
| Xenon - 135m | C1 | 1.84E-1 | 2.99E-3 | 1.522-4 | 1.40E-5 |
| | C1 | | | | |
| | C1 | | | | |
| | C4 | | | | |
| | CI | | | | |
| | CI | | | | |
| | C1 | | | | |
| | CI | | | | |
| | C1 | | | | |
| | CI | | | | - |
| | 130 | 1 000 | - 450 | 1 402 1 | 2 150 5 |
| Total for Period | 12 | 0.035-1 | 1-317.7 | 5-378-1 | 4 |
| Tritium | C1 | 4.37E+2 | 4.01E+2 | 8.98E-4 | 2.70E-4 |
| | CI | | | | - |
| Alpha | CI | * | * | * | * |
| | CH | | | | |

^{*} less than lower limits of detection

TABLE 3 (1/85 - 6/85) EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

| m³ Ci | 1.0 | 24E+2 00E+2 | 1.0 | |
|----------|----------|----------------|--------------------------------|------------------------|
| | | | 1.0 | C-1 |
| | 1 . 4 | +0E+2 | 1.0 | E+1 |
| Ci | | | 1.0 | |
| m³ | 0. | Ε | 1 | Ε |
| Ci | 0. | E | | E |
| m³ | 0. | Ε | | Ε |
| | m³ Ci | m³ 0. Ci 0. | m ³ 0. E Ci 0. E | m³ 0. E . Ci 0. E . |

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

| • н 3 | % 38.6 | 1.0 E+1 |
|---------|----------------|----------|
| Ni 63 . | % 22.4 | 1.0 E+1 |
| Fe 55 | % 12.95 | 1.0 E+1 |
| Co 60 | % 6.8 | 1.0 E+1 |
| Cs 137 | % 5.94 | 1.0 E+1 |
| C 14 | % 2.76 | 1.0 E+1 |
| Cs 134 | % 2.75 | 1.0 E+1 |
| Cm 242 | % 2.11 | 1.0 E+1 |
| Co 58 | % 1.72 | 1.0 E+1 |
| Cm 244 | % 1.02 | 1.0 E+1 |
| Pu 241 | % 1.01 | 1.0 E+1 |
| I 131 | % .8 | 1.0 E+1 |
| Mn 54 | % .71 | 1.0 E+1 |
| Sb 122 | % .13 | 1.0 E+1 |
| Pu 239 | . % .08 | 1.0 E+1 |
| Ce 144 | % .04 | 1.0 E+1 |
| La 140 | % .03 | 1.0 E+1 |
| Ba 140 | % .03 | 1. 0 E+1 |
| Sr 90 | % .01 | 1. 0 E+1 |
| Xe 133 | % .01 | 1. 0 E+1 |
| Nb 95 | % .007 | 1. 0 E+1 |
| Zr 95 | % .003 | 1. C E+1 |
| Pu 238 | % .002 | 1. 0 E+1 |
| Tc 99 | % .001 | 1. 0 E+1 |
| I 129 | % .0006 | 1. 0 E+1 |
| | d _k | . E |
| , | W K | . E |
| Fe 55 | % 51.05 | 1. 0 E+1 |
| Н 3 | % 15.1 | 1. 0 E+1 |
| Co 60 | % 10.4 | 1. 0 E+1 |

DESTINATION

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

| (con't) | * | . E |
|---------|-----------|---------|
| Cs 137 | 5.1 | 1.0 E + |
| Ce 144 | % 5.08 | 1.0 E + |
| N1 63 | % 3.21 | 1.0 E + |
| Pu 241 | % 2.2 | 1.0 E + |
| C 14 | % 1.5 | 1.0 E + |
| Cs 134 | % 1.45 | 1.0 E + |
| Zr 95 | % 1.40 | 1.0 E + |
| Nb 95 | % 1.35 | 1.0 E + |
| Co 58 | % 1.1 | 1.0 E + |
| Sr 90 | % 1.0 | 1.0 E + |
| Cm 242 | % .5 | 1.0 E + |
| Mn 54 | % .3 | 1.0 E + |
| Ru 103 | % .1 | 1.0 E + |
| Pu 238 | % .01 | 1.0 E + |
| Pu 239 | % .01 | 1.0 E + |
| Am 241 | % .005 | 1.0 E + |
| Cm 243 | % .003 | 1.0 E + |
| Cm 244 | % .003 | 1.0 E + |
| Sb 122 | % .002 | 1.0 E + |
| Tc 99 | % .001 | 1.0 E + |
| Pu 242 | % .0009 | 1.0 E + |
| I 129 | % .000006 | 1.0 E + |
| | % | . E |
| | % | . E |
| | % | . E |
| | % % | . E |
| | % | . E |
| | % | . E |
| | % % | . E |
| | % | . E |
| | % | . E |
| | * | . E |
| | 4 | . E |

3. Solid Waste Disposition

| NUMBER OF SHIPMENTS | MODE OF TRANSPORTATION | DESTINATION |
|---------------------------|------------------------|--------------|
| 32 | Private Vehicle | Barnwell, SC |
| IRRADIATED FUEL SHIPMENTS | (Disposition) | |

MODE OF TRANSPORTATION

NUMBER OF SHIPMENTS

(01/85-06/85)

REVISIONS TO OFFSITE CALCULATION

MANUAL (ODCM)

No changes were made to the Offsite Dose Calculation

Manual (ODCM) for the time period covered by this report.

(01/85-06/85)

REVISIONS TO PROCESS CONTROL PROGRAM (PCP)

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

(01/85-06/85)

MAJOR CHANGES TO RADIOACTIVE SOLID

WASTE TREATMENT SYSTEMS

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

(01/85-06/85)

RADIOACTIVE LIQUID AND GASEOUS

EFFLUENT MONITORING INSTRUMENTATION INOPERABLE

None of the radioactive effluent monitors met the requirements of Technical Specification 3.3.3.10.b and 3.3.3.11.b, for providing an account due to inoperability.

(01/85-06/85)

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.

VIRGINIA ELECTRIC AND POWER COMPANY RICHMOND, VIRGINIA 23261

W. L. STEWART VICE PRESIDENT NUCLEAR OPERATIONS

NPF-7

August 30, 1985

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

Serial No. 85-625 NOHP/FLT:pb Docket Nos. 50-338 L 50-339 License Nos. NPF-4

Dear Dr. Grace:

Enclosed is the Radioactive Effluent Release Report for North Anna Power Station for the period January 1, 1985 to June 30, 1985.

Very truly yours,

W. L. Stewart

Enclosure (2 copies)

cc: Mr. Edward J. Butcher, Acting Chief Operating Reactors Branch No. 3 Division of Licensing

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

> > DESIGNATED ORIGINAL Certified By Earline