VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

February 28, 1992

United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Serial No. 92-122
NL/RPC
Docket Nos. 50-280
50-281
72-2
License Nos. DPR-32
DPR-37
SNM-2501

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
INDEPENDENT SPENT FUEL STORAGE INSTALLATION
SEMI-ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

Enclosed is the Surry Power Station Semi-Annual Radioactive Effluent Release Report for January 1, 1991 through June 30, 1991. The report, submitted pursuant to Surry Power Station Technical Specification 6.6.B.3 and ISFSI Technical Specification 1.4.1 of Appendix C, includes a summary of the quantities of radioactive liquid and gaseous effluents and solid waste released during the previous six months, as outlined in Regulatory Guide 1.21, Revision 1, June 1974.

Very truly yours,

W. L. Stewart
Senior Vice President - Nuclear

Attachment

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

Mr. M. W. Branch
NRC Senior Resident Inspector
Surry Power Station

Mr. Robert M. Bernero, Director
Office of Nuclear Material Safety and Safeguards
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

50-280 VEPCO SURRY 1

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
JULY 1, 1991 THRU DECEMBER 31, 1991

REC'D W/LTR DTD 02/28/92....9203050144

SEMI-ANNUAL
RADIOACTIVE EFFLUENT RELEASE REPORT

SURRY POWER STATION

(July 1, 1991 Through December 31, 1991)

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Superintendent
Radiological Protection

FORWARD

This report is submitted as required by Appendix A to Operating License No.'s DPR-32 and DPR-37, Technical Specifications for Surry Power Station, Units 1 and 2, Virginia Electric and Power Company, Docket No.'s 50-280, 50-281, Section 6.6.B.3. and as required by Appendix C to Materials License No. SNM-2501, Technical Specifications for Environmental Protection for Surry Independent Spent Fuel Storage, Docket No. 72-2, Section 1.4.1.

RADIOACTIVE EFFLUENT RELEASE REPORT

FOR THE

SURRY POWER STATION

(July 1, 1991 Through December 31, 1991)

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 Tables 1, 2 and 3 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 6.8B, 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.

Major changes to the radioactive liquid, gaseous and solid waste treatment systems are required to be reported in accordance with Technical Specification 6.9. If changes are made to these systems, the report shall include information to support the reason for the change and a summary of the 10CFR50.59 evaluation. In lieu of reporting major changes in this report, major changes to the radioactive waste treatment systems may be submitted as part of the annual FSAR update.

As required by the ODCM, a list and explanation for the inoperability of radioactive liquid and/or gaseous effluent monitors are 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 of Attachment 1, is the ODCM section 6.3.1 which 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 or 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 of Attachment 1, is the ODCM section 6.3.1 which requires that the dose rate for noble gases to areas at or beyond site boundary shall be less than or equal to 500 mRem/yr to the total body and less than or equal to 3000 mRem/yr to the skin.

The basis for the calculation of the percent of technical specification in Table 2A of Attachment 1, is the ODCM section 6.2.1 which states that the concentration of radioactive material released in liquid effluents to unrestricted areas shall be limited to the concentrations specified in 10CFR20, 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 the site boundary. The maximum exposed member of the public from the release of airborne iodine - 131, tritium and 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 gland. The maximum exposed member of the public from radioactive materials in liquid effluents in unrestricted areas is defined as an adult, exposed by either the invertebrate or fish pathway, with the critical organ being either the thyroid gland or gastrointestinal-lower large intestine. The total body dose was also determined for this individual.

Presented in Attachment 6 is a list of unplanned gaseous and liquid releases exceeding the ODCM limits of sections 6.3.1 and 6.2.1 respectively.

The typical lower level of detection (LLD) capabilities of the radioactive effluent analysis instrumentation are presented in Attachment 7. These LLD values are based upon conservative conditions (i.e., minimum sample volumes and maximum delay time prior to analysis). Actual LLD values may be lower. If an isotope is not detected when analyzing effluent samples, then the activity of that isotope will be reported as Not Detected (N/D) on Attachment 1 of this report. When all isotopes listed on Attachment 1 for a particular quarter and release mode are less than the lower level of detection, then the totals for this period will be designated as Not Applicable (N/A).

3.0 Supplemental Information

Section 6.5.1 of the ODCM requires the identification of the cause for the unavailability of milk or leafy vegetation samples, and identification for obtaining replacement samples. All milk and leafy vegetation samples were available for collection during the period of July 1, 1991 through December 31, 1991.

Section 6.5.2 of the ODCM requires the identification of new sample locations determined with the Land Use Census as yielding a calculated dose or dose commitment greater than the values currently being calculated. No new sample location(s) that may yield a greater dose or dose commitment than are currently used were identified in the Land Use Census.

Dry Cask Independent Spent Fuel Storage Installation Technical Specification Appendix C, 1.4.1 requires reporting the quantity of each of the principal radionuclides released from the installation to the environment in liquid and gaseous effluents during the previous 6 months of operations. There were no liquid or gaseous effluent releases from the Dry Cask Independent Spent Fuel Storage Installation during the period of July 1, 1991 through December 31, 1991.

EFFLUENT RELEASE DATA

(July 1, 1991 Through December 31, 1991)

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

TABLE 1A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
PERIOD: 7/ 1/91 TO 12/31/91
GASEOUS EFFLUENT-SUMMATION OF ALL RELEASES

SURRY POWER STATION UNITS 1&2	UNIT	THIRD QTR.	FOURTH QTR.	% EST. ERROR
A. FISSION & ACTIVATION GASES				
1. TOTAL RELEASE	CI	1.49E 01	1.25E 00	1.80E 01
2. AVG RELEASE RATE FOR PERIOD	UCI/SEC	1.87E 00	1.58E-01	
B. IODINE				
1. TOTAL I-131	CI	2.27E-04	6.72E-05	2.80E 01
2. AVG RELEASE RATE FOR PERIOD	UCI/SEC	2.85E-05	8.46E-06	
C. PARTICULATE				
1. HALF-LIVES >8 DAYS	CI	2.16E-04	1.02E-04	2.80E 01
2. AVG RELEASE RATE FOR PERIOD	UCI/SEC	2.72E-05	1.29E-05	
3. GROSS ALPHA RADIOACTIVITY	CI	6.91E-07	2.78E-07	
D. TRITIUM				
1. TOTAL RELEASE	CI	4.63E 00	9.04E 00	3.10E 01
2. AVG RELEASE RATE FOR PERIOD	UCI/SEC	5.82E-01	1.14E 00	
PERCENTAGE OF T.S. LIMITS				
CRITICAL ORGAN DOSE RATE	%	4.41E-03	5.63E-03	
TOTAL BODY DOSE RATE	%	9.24E-02	6.85E-04	
SKIN DOSE RATE	%	2.30E-02	2.01E-04	

TABLE 1B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
PERIOD: 7/ 1/91 TO 12/31/91
GASEOUS EFFLUENTS-MIXED-MODE RELEASES

		CONTINUOUS MODE		BATCH MODE	
SURRY POWER STATION UNITS 1&2	UNIT	THIRD QUARTER	FOURTH QUARTER	THIRD QUARTER	FOURTH QUARTER
1. FISSION & ACTIVATION GASES					
KR-85	CI	N/D	N/D	N/D	N/D
KR-85M	CI	N/D	N/D	1.22E-03	N/D
KR-87	CI	N/D	N/D	N/D	N/D
KR-88	CI	N/D	N/D	N/D	N/D
XE-133	CI	5.03E-01	6.89E-01	2.00E 00	N/D
XE-135	CI	9.96E-02	6.59E-02	9.65E-02	N/D
XE-135M	CI	N/D	N/D	N/D	N/D
XE-138	CI	N/D	N/D	N/D	N/D
XE-131M	CI	N/D	N/D	1.38E-02	N/D
XE-133M	CI	N/D	N/D	2.49E-02	N/D
AR-41	CI	7.04E-02	N/D	2.02E-03	N/D
TOTAL FOR PERIOD	CI	6.73E-01	7.55E-01	2.14E 00	N/A
2. IODINES					
I-131	CI	4.32E-07	1.15E-07	3.13E-07	N/D
I-133	CI	2.42E-07	N/D	1.11E-07	N/D
I-135	CI	N/D	N/D	N/D	N/D
I-132	CI	N/D	N/D	N/D	N/D
TOTAL FOR PERIOD	CI	6.74E-07	1.15E-07	4.24E-07	N/A
3. PARTICULATES					
SR-89	CI	N/D	N/D	N/D	N/D
SR-90	CI	N/D	N/D	N/D	N/D
CS-134	CI	N/D	N/D	N/D	N/D
CS-137	CI	3.97E-08	1.17E-07	N/D	N/D
BA-140	CI	N/D	N/D	N/D	N/D
LA-140	CI	N/D	N/D	N/D	N/D
CO-60	CI	1.24E-07	1.10E-07	N/D	N/D
CO-58	CI	N/D	5.82E-09	N/D	N/D
CS-138	CI	N/D	N/D	N/D	N/D
SE-75	CI	8.59E-09	N/D	N/D	N/D
RB-88	CI	N/D	N/D	2.09E-05	N/D

TABLE 1C

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
PERIOD: 7/ 1/91 TO 12/31/91
GASEOUS EFFLUENTS-GROUND LEVEL RELEASES

SURRY POWER STATION UNITS 1&2	UNIT	CONTINUOUS MODE THIRD QUARTER	CONTINUOUS MODE FOURTH QUARTER	BATCH MODE THIRD QUARTER	BATCH MODE FOURTH QUARTER
1. FISSION & ACTIVATION GASES					
KR-85	CI	N/D	N/D	N/D	N/D
KR-85M	CI	1.30E-04	1.11E-04	N/D	N/D
KR-87	CI	1.06E-04	2.92E-04	N/D	N/D
KR-88	CI	1.50E-04	6.00E-04	N/D	N/D
XE-133	CI	4.83E 00	3.97E-01	9.57E-02	6.59E-02
XE-135	CI	4.51E-01	7.11E-03	N/D	N/D
XE-135M	CI	7.56E-03	1.08E-02	N/D	N/D
XE-138	CI	4.64E-04	3.27E-04	N/D	N/D
XE-131M	CI	2.27E-03	N/D	N/D	N/D
XE-133M	CI	N/D	N/D	N/D	N/D
AR-41	CI	6.66E 00	2.85E-02	N/D	N/D
TOTAL FOR PERIOD	CI	1.20E 01	4.33E-01	9.57E-02	6.59E-02
2. IODINES					
I-131	CI	2.25E-04	6.38E-05	8.68E-07	3.28E-06
I-133	CI	2.98E-04	1.65E-04	4.18E-08	1.54E-07
I-135	CI	2.14E-05	N/D	N/D	N/D
I-132	CI	N/D	N/D	N/D	1.24E-08
TOTAL FOR PERIOD	CI	5.44E-04	2.29E-04	9.10E-07	3.45E-06
3. PARTICULATES					
SR-89	CI	N/D	N/D	N/D	N/D
SR-90	CI	N/D	N/D	N/D	N/D
CS-134	CI	5.96E-06	4.25E-07	N/D	N/D
CS-137	CI	1.01E-04	5.66E-05	2.46E-07	N/D
BA-140	CI	N/D	N/D	N/D	N/D
LA-140	CI	N/D	N/D	N/D	N/D
CO-60	CI	9.75E-05	4.51E-05	5.08E-08	N/D
CO-58	CI	1.11E-05	N/D	N/D	N/D
CS-138	CI	8.67E-05	4.06E-05	N/D	N/D
SE-75	CI	N/D	N/D	N/D	N/D
RB-88	CI	N/D	N/D	N/D	N/D

TABLE 2A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
PERIOD: 7/ 1/91 TO 12/31/91
LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

SURRY POWER STATION UNITS 1&2	UNIT	THIRD QTR.	FOURTH QTR.	% EST. ERROR
A. FISSION AND ACTIVATION PRODUCTS				
1. TOTAL RELEASE (NOT INCLUDING TRITIUM, GASES, ALPHA)	CI	3.42E-01	1.47E-02	2.00E 01
2. AVG DIL. CONC. DURING PERIOD	UCI/ML	5.89E-10	2.56E-11	
3. PERCENT OF APPLICABLE LIMIT	%	1.55E-03	1.23E-04	
B. TRITIUM				
1. TOTAL RELEASE	CI	2.03E 02	2.74E 02	2.00E 01
2. AVG DIL. CONC. DURING PERIOD	UCI/ML	3.49E-07	4.76E-07	
3. PERCENT OF APPLICABLE LIMIT	%	1.16E-02	1.59E-02	
C. DISSOLVED AND ENTRAINED GASES				
1. TOTAL RELEASE	CI	2.11E-02	2.59E-02	2.00E 01
2. AVG DIL. CONC. DURING PERIOD	UCI/ML	3.63E-11	4.50E-11	
3. PERCENT OF APPLICABLE LIMIT	%	1.81E-05	2.25E-05	
GROSS ALPHA RADIOACTIVITY				
TOTAL RELEASE	CI	0.00E-01	0.00E-01	2.00E 01
E. VOLUME OF WASTE RELEASED (PRIOR TO DILUTION)	LITERS	3.34E 07	2.85E 08	3.00E 00
F. VOLUME OF DILUTION WATER USED DURING PERIOD	LITERS	5.81E 11	5.76E 11	3.00E 00

TABLE 2B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
PERIOD: 7/ 1/91 TO 12/31/91
LIQUID EFFLUENTS

		CONTINUOUS MODE		BATCH MODE	
SURRY POWER STATION UNITS 1&2	UNIT	THIRD QUARTER	FOURTH QUARTER	THIRD QUARTER	FOURTH QUARTER
SR-89	CI	N/D	N/D	N/D	N/D
SR-90	CI	N/D	N/D	N/D	N/D
CS-134	CI	N/D	N/D	5.79E-03	2.43E-04
CS-137	CI	1.28E-02	1.09E-02	4.69E-02	2.09E-03
I-131	CI	N/D	N/D	4.19E-04	N/D
CO-58	CI	4.01E-08	N/D	2.20E-02	1.46E-04
CO-60	CI	2.10E-04	2.59E-04	6.94E-02	3.94E-04
FE-59	CI	N/D	N/D	4.92E-04	N/D
ZN-65	CI	N/D	N/D	N/D	N/D
MN-54	CI	N/D	N/D	1.56E-03	6.54E-06
CR-51	CI	N/D	N/D	1.11E-02	N/D
ZR-95	CI	N/D	N/D	6.09E-04	N/D
NB-95	CI	N/D	N/D	2.55E-03	N/D
MO-99	CI	N/D	N/D	N/D	N/D
TC-99M	CI	N/D	N/D	N/D	N/D
BA-140	CI	N/D	N/D	4.87E-05	N/D
LA-140	CI	N/D	N/D	7.03E-04	N/D
CE-141	CI	N/D	N/D	N/D	N/D
CO-57	CI	N/D	N/D	4.14E-05	N/D
SB-125	CI	N/D	N/D	8.31E-02	6.64E-04
AG-110M	CI	N/D	N/D	6.71E-03	2.18E-05
SB-124	CI	N/D	N/D	2.58E-03	N/D
I-133	CI	N/D	N/D	3.53E-05	N/D
RU-103	CI	N/D	N/D	4.96E-05	N/D
TE-132	CI	N/D	N/D	6.08E-06	N/D
NA-24	CI	N/D	N/D	9.91E-06	N/D
FE-55	CI	N/D	N/D	7.52E-02	N/D
SR-92	CI	N/D	N/D	N/D	7.79E-06
TOTAL FOR PERIOD	CI	1.30E-02	1.11E-02	3.29E-01	3.58E-03
XE-133	CI	N/D	2.05E-02	1.66E-02	5.46E-05
XE-135	CI	N/D	5.35E-03	4.42E-03	1.00E-05
AR-41	CI	N/D	N/D	1.53E-05	N/D
XE-135M	CI	N/D	N/D	3.65E-06	N/D

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS
PERIOD 07/01/91-12/31/91

SURRY POWER STATION

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL(Not irradiated fuel)

1. Type of waste	Unit	6-month Period	Est.Total Error,%
a. Spent resins, filter sludges, evaporator bottoms, etc.	m^3	9.17E+00	1.00E+01
	Ci	1.56E+02	3.00E+01
b. Dry compressible waste, contaminated equip., etc.	m^3	4.33E+02*	1.00E+01
	Ci	1.96E+00	3.00E+01
c. Irradiated components, control rods, etc.	m^3	0.00E+00	0.00E+00
	Ci	0.00E+00	0.00E+00
d. Organic waste(i.e. oil and scintillation fluid)	m^3	0.00E+00	0.00E+00
	Ci	0.00E-00	0.00E+00

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

a.	Co-60	%	6.20E+01
	Fe-55	%	1.75E+01
	Ni-63	%	7.64E+00
	Co-58	%	6.18E+00
	Cs-137	%	4.27E+00
	Cs-134	%	1.26E+00
b.	Co-60	%	3.04E+01
	Ni-63	%	2.90E+01
	Fe-55	%	2.86E+01
	Cs-137	%	1.05E+01
	Cs-134	%	1.39E+00
c.	_____	%	
d.	_____	%	

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS
PERIOD 07/01/91-12/31/91
(continued)

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
3	Truck	Barnwell, SC
10	Truck	Oak Ridge, TN

B. IRRADIATED FUEL SHIPMENT(Disposition)

Number of Shipments	Mode of Transportation	Destination
0		

*NOTE: Dry active waste was shipped to a licensed waste processor for volume reduction. Therefore, this volume is not representative of the actual volume buried. The total volume of dry active waste buried for the reporting period was 5.00E+01 m^3.

ANNUAL AND QUARTERLY DOSES

An assessment of radiation doses to the maximum exposed member of the public due to radioactive liquid and gaseous effluents released from the site for each calendar quarter for the calendar year of this report, along with an annual total of each effluent pathway is made pursuant to the ODCM, section 6.6.2 requirement.

	LIQUID			GASEOUS		
	Total Body (mRem)	Thyroid (mRem)	GI-LLI (mRem)	Gamma (mRad)	Beta (mRad)	Thyroid (mRem)
1st Quarter	5.35E-03	6.67E-05	1.71E-02	4.49E-05	1.09E-04	8.16E-04
2nd Quarter	8.54E-03	2.67E-04	5.32E-02	1.34E-02	2.57E-02	3.39E-03
3rd Quarter	1.20E-03	7.38E-05	9.30E-03	1.23E-01	5.37E-02	4.62E-03
4th Quarter	1.42E-04	5.95E-05	9.07E-05	9.50E-04	1.19E-03	1.59E-03
Annual	1.52E-02	4.67E-04	7.97E-02	1.37E-01	8.07E-02	1.04E-02

REVISIONS TO OFFSITE DOSE CALCULATION MANUAL (ODCM)

As required by Technical Specification 6.8.B, revisions to the ODCM, effective for the time period covered by this report, are synopsized in this attachment.

Revision 1 to the Virginia Power Offsite Dose Calibration Manual was effective July 01, 1991.

Revision 2 to the Virginia Power Offsite Dose Calculation Manual was effective September 01, 1991.

A copy of Revision 2 of the Offsite Dose Calculation Manual is attached. Changes made effective with Revision 1 and Revision 2 are indicated by marking the borders of the revised areas with the effective date of the change. All changes marked "Rev. 1" were effective July 01, 1991. All changes marked "Rev. 2" were effective September 01, 1991.

Additionally, changes were made in the presentation of text. Effective with Revision 1, formulas or equations within the ODCM were assigned a number. Future references to the equation are made via this equation number. Also effective with Revision 1, words or phrases that were capitalized in Revisions 0, if they were defined by Technical Specifications, were un-capitalized.

Punctuation, spelling and other grammatical errors were corrected in Revision 1 and Revision 2. These minor changes are not specifically identified, as they do not affect the text content. Page numbers were changed as required, to reflect the relocation of text by Revision 1 and Revision 2.