

VIRGINIA ELECTRIC AND POWER COMPANY  
RICHMOND, VIRGINIA 23261

February 28, 1991

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, D. C. 20555

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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 July 1, 1990, through December 31, 1990. 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,

*RJ Saunders*

for W. L. Stewart  
Senior Vice President - Nuclear

Attachment

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**ATTACHMENT**

**SEMI-ANNUAL RADIOACTIVE  
EFFLUENT RELEASE REPORT**

**SURRY POWER STATION UNITS 1 AND 2  
LICENSE NOS. DPR-32 AND DPR-37**

**INDEPENDENT SPENT FUEL STORAGE INSTALLATION  
LICENSE NO. SNM-2501**

SEMI-ANNUAL  
RADIOACTIVE EFFLUENT RELEASE REPORT

SURRY POWER STATION

(July 1, 1990 Through December 31, 1990)

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## 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, 1990 Through December 31, 1990)**

Index

<u>Section No.</u>	<u>Subject</u>	<u>Page</u>
1	Purpose and Scope	1
2	Discussion	1 & 2
3	Supplemental Information	2
	Attachment 1 Effluent Release Data	
	Attachment 2 Annual and Quarterly Doses	
	Attachment 3 Revisions to Offsite Dose Calculation Manual (ODCM)	
	Attachment 4 Revisions to Process Control Program (PCP)	
	Attachment 5 Major Changes to Radioactive Liquid, Gaseous and Solid Waste Treatment Systems	
	Attachment 6 Inoperability of Radioactive Liquid and Gaseous Effluent Instrumentation	
	Attachment 7 Unplanned Releases	
	Attachment 8 Lower Level of Detection (LLD) for Effluent Analysis	

## 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.

This report includes changes to the PCP with information and documentation necessary to support the rationale for the changes as required by Technical Specification 6.8A.

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 Technical Specification 3.7E.2, 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 Technical Specification 3.11B.1.a (ii). Technical Specification 3.11B.1.a (ii) 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 Technical Specification 3.11B.1.a (i). This Technical Specification 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 Technical Specification 3.11A.1.a. Technical Specification 3.11A.1.a 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  $2 \times 10^{-4}$  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.

Unplanned releases presented in Attachment 7 are defined in Technical Specification 6.6.B.3 as those gaseous releases exceeding Technical Specification 3.11.B.1.a and those liquid releases exceeding Technical Specification 3.11.A.1.a.

The typical lower level of detection (LLD) capabilities of the radioactive effluent analysis instrumentation are presented in Attachment 8. 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

Technical Specification 3.11.D.1.d requires the identification of the cause for the unavailability of milk or leafy vegetation samples, required by Technical Specification, Table 4.9-3, and identification for obtaining replacement samples. All milk and leafy vegetation samples required by Table 4.9-3 were available for collection during the period of July 1, 1990 through December 31, 1990.

Technical Specification 3.11.D.2.b 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 being calculated in Technical Specification 4.9.C. No new sample location(s) that may yield a greater dose or dose commitment than are currently used in Technical Specification 4.9.C, 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, 1990 through December 31, 1990.

EFFLUENT RELEASE DATA

(July 1, 1990 Through December 31, 1990)



EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT  
 PERIOD: 7/1/90 TO 12/31/90  
 GASEOUS EFFLUENT-SUMMATION OF ALL RELEASES

SURRY POWER STATION UNITS 1&2	UNIT	THIRD QTR.	FOURTH QTR.	% EST. ERROR
<b>A. FISSION &amp; ACTIVATION GASES</b>				
1. TOTAL RELEASE	Ci	3.08E+02	8.84E+01	1.80E+01
2. AVE RELEASE RATE FOR PERIOD	μCi/sec	3.87E+01	1.11E+01	
<b>B. IODINE</b>				
1. TOTAL I-131	Ci	1.27E-04	8.54E-04	2.80E+01
2. AVE RELEASE RATE FOR PERIOD	μCi/sec	1.60E-05	1.07E-04	
<b>C. PARTICULATE</b>				
1. HALF-LIFE >8 DAYS	Ci	1.71E-04	2.61E-04	2.80E+01
2. AVE RELEASE RATE FOR PERIOD	μCi/sec	2.16E-05	3.29E-05	
3. GROSS ALPHA RADIOACTIVITY	Ci	6.33E-07	2.94E-07	
<b>D. TRITIUM</b>				
1. TOTAL RELEASE	Ci	4.67E+00	4.68E+00	3.10E+01
2. AVE RELEASE RATE FOR PERIOD	μCi/sec	5.88E-01	5.88E-01	
<b>PERCENTAGE OF T.S. LIMITS</b>				
CRITICAL ORGAN DOSE RATE	%	3.46E-03	9.48E-03	
TOTAL BODY DOSE RATE	%	6.67E-02	2.26E-02	
SKIN DOSE RATE	%	2.53E-02	8.92E-03	

TABLE 1B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT  
PERIOD: 7/1/90 TO 12/31/90  
GASEOUS EFFLUENTS-MIXED MODE RELEASES

SURREY POWER STATION UNITS 1&2	UNIT	CONTINUOUS MODE		BATCH MODE	
		THIRD QUARTER	FOURTH QUARTER	THIRD QUARTER	FOURTH QUARTER
<b>1. FISSION &amp; ACTIVATION GASES</b>					
KR-85	Ci	N/D	1.28E-01	2.60E+00	1.76E+00
KR-85M	Ci	N/D	N/D	1.94E-02	N/D
KR-87	Ci	N/D	N/D	N/D	N/D
KR-88	Ci	N/D	N/D	1.02E-02	N/D
XE-133	Ci	1.67E+01	5.06E+00	1.59E+02	3.06E+01
XE-135	Ci	1.81E-01	2.28E-01	8.66E-01	1.47E-04
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	4.66E-02	1.74E+00	6.02E-01
XE-133M	Ci	N/D	2.12E-02	1.13E+00	1.31E-01
AR-41	Ci	N/D	1.31E-01	1.10E-02	N/D
TOTAL FOR PERIOD	Ci	1.69E+01	5.61E+00	1.65E+02	3.31E+01
<b>2. IODINES</b>					
I-131	Ci	1.14E-06	7.91E-06	2.47E-07	7.55E-06
I-132	Ci	N/D	1.79E-07	N/D	N/D
I-133	Ci	4.46E-07	3.82E-07	1.33E-08	N/D
I-135	Ci	N/D	N/D	N/D	N/D
TOTAL FOR PERIOD	Ci	1.58E-06	8.47E-06	2.60E-07	7.55E-06
<b>3. PARTICULATES</b>					
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	1.50E-07	1.58E-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	2.63E-07	2.57E-07	N/D	N/D
CS-138	Ci	N/D	N/D	N/D	N/D
CO-58	Ci	N/D	1.52E-08	N/D	N/D
RB-88	Ci	N/D	N/D	N/D	N/D
SE-75	Ci	N/D	1.05E-08	N/D	N/D
SB-125	Ci	N/D	6.17E-09	N/D	N/D
CR-51	Ci	N/D	N/D	N/D	N/D
NB-95	Ci	N/D	N/D	N/D	N/D
AG-110M	Ci	N/D	N/D	N/D	N/D
MN-54	Ci	N/D	N/D	N/D	N/D

TABLE 1C

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT  
 PERIOD: 7/1/90 TO 12/31/90  
 GASEOUS EFFLUENTS-GROUND LEVEL RELEASES

SURREY POWER STATION UNITS 1&2	UNIT	CONTINUOUS MODE		BATCH MODE	
		THIRD QUARTER	FOURTH QUARTER	THIRD QUARTER	FOURTH QUARTER
<b>1. FISSION &amp; ACTIVATION GASES</b>					
KR-85	Ci	2.02E-02	N/D	N/D	N/D
KR-85M	Ci	5.76E-02	N/D	N/D	3.65E-04
KR-87	Ci	9.51E-02	N/D	N/D	2.16E-04
KR-88	Ci	1.24E-01	N/D	N/D	6.13E-04
XE-133	Ci	1.25E+02	3.62E+01	N/D	1.34E+01
XE-135	Ci	4.35E-01	5.40E-04	N/D	6.56E-02
XE-135M	Ci	1.05E-01	N/D	N/D	8.77E-05
XE-138	Ci	2.80E-01	N/D	N/D	N/D
XE-131M	Ci	N/D	N/D	N/D	1.87E-02
XE-133M	Ci	2.50E-01	N/D	N/D	3.48E-03
AR-41	Ci	7.09E-02	N/D	N/D	1.16E-02
TOTAL FOR PERIOD	Ci	1.26E+02	3.62E+01	N/A	1.35E+01
<b>2. IODINES</b>					
I-131	Ci	1.26E-04	6.61E-04	N/D	1.78E-04
I-132	Ci	1.73E-05	4.98E-03	N/D	5.47E-05
I-133	Ci	2.55E-04	7.60E-05	N/D	2.27E-05
I-135	Ci	2.96E-05	N/D	N/D	N/D
TOTAL FOR PERIOD	Ci	4.28E-04	5.72E-03	N/A	2.55E-04
<b>3. PARTICULATES</b>					
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	6.93E-06	1.25E-07	N/D	4.36E-06
CS-137	Ci	1.11E-04	4.85E-05	N/D	3.60E-05
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	4.03E-05	4.42E-05	N/D	1.77E-05
CS-138	Ci	9.18E-05	N/D	N/D	N/D
CO-58	Ci	1.26E-05	6.67E-05	N/D	4.96E-06
RB-88	Ci	1.11E-04	N/D	N/D	N/D
SE-75	Ci	N/D	N/D	N/D	N/D
SB-125	Ci	N/D	N/D	N/D	N/D
CR-51	Ci	N/D	2.89E-05	N/D	N/D
NB-95	Ci	N/D	5.03E-06	N/D	N/D
AG-110M	Ci	N/D	3.08E-06	N/D	N/D
MN-54	Ci	N/D	1.17E-06	N/D	N/D

TABLE 2A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT  
 PERIOD: 7/1/90 TO 12/31/90  
 LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

SURRY POWER STATION UNITS 1&2	UNIT	THIRD QTR.	FOURTH QTR.	% EST. ERROR
<b>A. FISSION AND ACTIVATION PRODUCTS</b>				
1. TOTAL RELEASE (NOT INCLUDING TRITIUM, GASES, ALPHA)	Ci	3.42E-01	1.95E+00	2.00E+01
2. AVE DIL. CONC. DURING PERIOD	μCi/ml	4.73E-10	4.41E-09	
3. PERCENT OF APPLICABLE LIMIT	%	2.05E-03	2.62E-02	
<b>B. TRITIUM</b>				
1. TOTAL RELEASE	Ci	2.81E+02	1.43E+02	2.00E+01
2. AVE DIL. CONC. DURING PERIOD	μCi/ml	3.89E-07	3.23E-07	
3. PERCENT OF APPLICABLE LIMIT	%	1.30E-02	1.08E-02	
<b>C. DISSOLVED AND ENTRAINED GASES</b>				
1. TOTAL RELEASE	Ci	2.75E+00	4.87E-01	2.00E+01
2. AVE DIL. CONC. DURING PERIOD	μCi/ml	3.80E-09	1.10E-09	
3. PERCENT OF APPLICABLE LIMIT	%	1.90E-03	5.50E-04	
<b>D. GROSS ALPHA RADIOACTIVITY</b>				
1. TOTAL RELEASE	Ci	0.00E+00	5.97E-05	2.00E+01
<b>E. VOLUME OF WASTE RELEASED (PRIOR TO DILUTION)</b>				
	LITERS	4.16E+07	4.11E+07	3.00E+00
<b>F. VOLUME OF DILUTION WATER USED DURING PERIOD</b>				
	LITERS	7.23E+11	4.42E+11	3.00E+00

TABLE 2B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT  
PERIOD: 7/1/90 TO 12/31/90  
LIQUID EFFLUENTS

SURREY POWER STATION UNITS 1&2	UNIT	CONTINUOUS MODE		BATCH MODE	
		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	4.40E-05	1.68E-05	2.88E-02	5.85E-02
CS-137	Ci	1.41E-02	1.45E-02	1.46E-01	2.59E-01
I-131	Ci	N/D	N/D	4.08E-04	2.42E-02
CO-58	Ci	N/D	1.31E-03	1.44E-02	3.21E-01
CO-60	Ci	5.12E-05	2.18E-04	5.13E-02	1.62E-01
FE-59	Ci	N/D	N/D	N/D	1.84E-02
ZN-65	Ci	N/D	N/D	1.38E-06	9.21E-05
MN-54	Ci	N/D	2.13E-05	8.13E-04	7.04E-03
CR-51	Ci	N/D	1.20E-04	1.72E-02	2.16E-01
ZR-95	Ci	N/D	N/D	7.79E-06	1.48E-02
NB-95	Ci	N/D	1.87E-05	1.02E-03	2.17E-02
MO-99	Ci	N/D	N/D	N/D	4.83E-06
TC-99M	Ci	N/D	N/D	4.98E-05	4.14E-05
BA-140	Ci	N/D	N/D	1.14E-05	N/D
LA-140	Ci	N/D	N/D	7.45E-06	2.12E-04
CE-141	Ci	N/D	N/D	N/D	4.16E-04
CO-57	Ci	N/D	N/D	7.84E-06	5.81E-04
SB-125	Ci	N/D	N/D	1.52E-02	2.69E-01
AG-110M	Ci	N/D	N/D	1.88E-03	1.40E-02
RU-103	Ci	N/D	N/D	1.63E-04	6.58E-03
SB-124	Ci	N/D	N/D	5.78E-06	1.96E-02
I-133	Ci	N/D	N/D	6.07E-05	1.17E-04
NA-24	Ci	N/D	N/D	2.11E-06	1.90E-04
FE-55	Ci	N/D	N/D	5.05E-02	5.18E-01
TE-132	Ci	N/D	N/D	2.68E-06	5.51E-04
RB-88	Ci	N/D	N/D	2.60E-04	N/D
I-132	Ci	N/D	N/D	1.72E-06	2.55E-04
CE-144	Ci	N/D	N/D	N/D	3.39E-04
NA-22	Ci	N/D	N/D	N/D	1.91E-06
ND-147	Ci	N/D	N/D	N/D	1.92E-05
TOTAL FOR PERIOD	Ci	1.41E-02	1.62E-02	3.28E-01	1.93E+00
XE-133	Ci	N/D	N/D	2.66E+00	4.62E-01
XE-135	Ci	N/D	N/D	4.07E-02	1.55E-02
XE-135M	Ci	N/D	N/D	1.42E-03	1.23E-03
XE-133M	Ci	N/D	N/D	2.59E-02	5.58E-03
XE-131M	Ci	N/D	N/D	1.85E-02	2.33E-03
AR-41	Ci	N/D	N/D	5.83E-04	2.11E-04
KR-88	Ci	N/D	N/D	3.85E-05	2.22E-05
KR-85M	Ci	N/D	N/D	3.37E-05	N/D
KR-87	Ci	N/D	N/D	1.02E-05	2.12E-05

**TABLE 3**  
**EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT**  
**SOLID WASTE AND IRRADIATED FUEL SHIPMENTS**  
**PERIOD 07/01/90-12/31/90**

**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 <sup>3</sup> Ci	2.28E+01 7.08E+02	1.00E+01 3.00E+01
b. Dry compressible waste, contaminated equip., etc.	m <sup>3</sup> Ci	4.53E+02* 4.93E+00	1.00E+01 3.00E+01
c. Irradiated components, control rods, etc.	m <sup>3</sup> Ci	0.00E+00 0.00E+00	0.00E+00 0.00E+00
d. Organic waste(i.e. oil and scintillation fluid)	m <sup>3</sup> Ci	0.00E+00 0.00E-00	0.00E+00 0.00E+00

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

a. Co-60	%	3.08E+01
Cs-137	%	2.76E+01
Ni-63	%	1.83E+01
Fe-55	%	1.21E+01
Cs-134	%	7.14E+00
Be-07	%	1.21E+00
b. Fe-55	%	3.05E+01
Co-60	%	3.02E+01
Ni-63	%	2.53E+01
Cs-137	%	1.19E+01
Cs-134	%	1.40E+00
c. _____	%	
d. _____	%	

TABLE 3  
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT  
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS  
PERIOD 07/01/90-12/31/90  
(continued)

3. Solid Waste Disposition

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
8	Truck	Barnwell, SC
8	Truck	Oak Ridge, TN

B. IRRADIATED FUEL SHIPMENT(Disposition)

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
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 6.91E+01 m<sup>3</sup>.

**ANNUAL AND QUARTERLY DOSES**

	LIQUID			GASEOUS		
	Total Body (mRem)	Thyroid (mRem)	GI-LLI (mRem)	Gamma (mRad)	Beta (mRad)	Thyroid (mRem)
1st Quarter	5.89E-03	1.00E-03	7.79E-03	4.29E-02	9.76E-02	3.06E-03
2nd Quarter	6.34E-03	1.08E-04	1.85E-02	1.06E-04	3.52E-04	4.15E-03
3rd Quarter	1.43E-03	7.44E-05	3.49E-03	9.91E-02	2.64E-01	2.64E-03
4th Quarter	1.01E-02	2.94E-03	7.41E-02	3.43E-02	1.01E-01	1.69E-02
Annual	2.38E-02	4.12E-03	1.04E-01	1.76E-01	4.63E-01	2.68E-01



REVISIONS TO OFFSITE DOSE CALCULATION MANUAL (ODCM)

There were no changes to the Offsite Dose Calculation Manual (ODCM) during the period of July 1, 1990 through December 31, 1990.

REVISIONS TO THE PROCESS CONTROL PROGRAM (PCP)

There were no changes to the Process Control Program during the period of July 1, 1990 through December 31, 1990.

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

There were no major changes to Surry's Radioactive Liquid, Gaseous or Solid Waste Treatment Systems during the period of July 1, 1990 through December 31, 1990.

**INOPERABILITY OF RADIOACTIVE LIQUID AND GASEOUS  
EFFLUENT MONITORING INSTRUMENTATION**

Technical Specification 3.7.E.2 requires the Semi-Annual Report to include an explanation why monitors required by Technical Specification Tables 3.7-5(a) and 3.7-5(b) which were determined inoperable, were not returned to operable status within 30 days.

Two monitors require explanation under this criteria for the period of July 1, 1990 through December 31, 1990. They are the Component Cooling Heat Exchanger Service Water Monitor and the Waste Gas Holdup System, Explosive Gas Oxygen Monitor.

1. The installation of the new Component Cooling Heat Exchanger (CCHX) Service Water Radiation Monitors 1-RM-SW-107A, B and D, under Design Change 89-21-3, is complete. The design of this passive Radiation Monitoring System should reduce the influence of biofouling experienced on the previous design and insure trouble free operability. The installation of 1-RM-SW-107C is scheduled for the spring 1991 Unit #2 Refueling Outage.

Grab sampling, as required by Table 3.7-5(a) when the monitor is out of service, has been performed since the monitor became inoperable and will continue until the new system is complete.

2. The installation of new and more reliable hydrogen and oxygen analyzers for the Waste Gas Holdup System was completed during the 1990 Unit #1 Fall Refueling Outage. The work completed under Engineering Work Request (EWR) 89-352 also included the redesign of the sample flow path.

Initial startup testing and calibrations indicate that the system will provide reliable, long term explosive gas monitoring. Local readout and alarm are currently available for both monitors with remote readout and alarm of the oxygen concentration available in the Control Room. Final close out of the EWR will be completed when remote indications for both monitors are available and minor startup problems are resolved. Projected completion date during the first quarter 1991.

Grab sampling as required by Technical Specification Table 3.7-5(b) when the monitor is out of service, has been performed since the monitor became inoperable. Even though installation is complete and local readout and alarms are operable, grab sampling will continue until final closeout of the EWR.

UNPLANNED RELEASES

There have been no Unplanned Liquid or Gaseous Releases that exceeded Technical Specification 3.11.A.1a and 3.11.B.1.a during the period July 1, 1990 through December 31, 1990.

LOWER LEVEL OF DETECTION FOR EFFLUENT SAMPLE ANALYSIS

<u>GASEOUS:</u>	<u>Isotope</u>	<u>Required LLD</u> (uCi/ml)	<u>Typical LLD</u> (uCi/ml)
	Kr-87	1.00 E-04	4.25 E-07 - 6.40 E-07
	Kr-88	1.00 E-04	3.76 E-07 - 5.65 E-07
	Xe-133	1.00 E-04	2.12 E-07 - 3.07 E-07
	Xe-133m	1.00 E-04	1.04 E-06 - 1.74 E-06
	Xe-135	1.00 E-04	1.19 E-07 - 2.05 E-07
	Xe-135m	1.00 E-04	2.63 E-06 - 3.73 E-06
	Xe-138	1.00 E-04	5.09 E-06 - 1.02 E-05
	I-131	1.00 E-12	2.16 E-13 - 3.48 E-13
	Sr-89	1.00 E-11	7.00 E-16 - 9.00 E-14
	Sr-90	1.00 E-11	2.00 E-16 - 2.00 E-14
	Cs-134	1.00 E-11	1.54 E-13 - 3.31 E-13
	Cs-137	1.00 E-11	2.26 E-13 - 1.02 E-12
	Mn-54	1.00 E-11	1.89 E-13 - 2.87 E-13
	Fe-59	1.00 E-11	2.96 E-13 - 5.44 E-13
	Co-58	1.00 E-11	1.65 E-13 - 3.94 E-13
	Co-60	1.00 E-11	2.34 E-13 - 5.34 E-13
	Zn-65	1.00 E-11	4.34 E-13 - 7.01 E-13
	Mo-99	1.00 E-11	8.69 E-13 - 2.40 E-12
	Ce-141	1.00 E-11	1.20 E-13 - 1.91 E-13
	Ce-144	1.00 E-11	4.12 E-13 - 7.40 E-13
	Alpha	1.00 E-11	9.58 E-15 - 1.18 E-14
	Tritium	1.00 E-06	6.56 E-08 - 7.46 E-08
<u>LIQUID:</u>	Sr-89	5.00 E-08	3.00 E-08 - 5.00 E-08
	Sr-90	5.00 E-08	5.00 E-09 - 2.00 E-08
	Cs-134	5.00 E-07	3.14 E-08 - 5.46 E-08
	Cs-137	5.00 E-07	3.60 E-08 - 1.83 E-07
	I-131	1.00 E-06	3.19 E-08 - 4.65 E-08
	Co-58	5.00 E-07	2.74 E-08 - 6.59 E-08
	Co-60	5.00 E-07	3.72 E-08 - 8.28 E-08
	Fe-59	5.00 E-07	4.41 E-08 - 9.26 E-08
	Zn-65	5.00 E-07	7.01 E-08 - 1.10 E-07
	Mn-54	5.00 E-07	3.15 E-08 - 4.78 E-08
	Mo-99	5.00 E-07	1.48 E-07 - 3.38 E-07
	Ce-141	5.00 E-07	2.62 E-08 - 4.72 E-08
	Ce-144	5.00 E-07	1.04 E-07 - 1.81 E-07
	Fe-55	1.00 E-06	5.00 E-07 - 1.00 E-06
	Alpha	1.00 E-07	5.52 E-09 - 6.80 E-09
	Tritium	1.00 E-05	1.83 E-06 - 2.06 E-06
	Xe-133	1.00 E-05	5.16 E-08 - 7.49 E-08
	Xe-135	1.00 E-05	2.47 E-08 - 3.71 E-08
	Xe-133m	1.00 E-05	2.70 E-07 - 3.18 E-07
	Xe-135m	1.00 E-05	3.91 E-07 - 6.51 E-07
	Xe-138	1.00 E-05	1.05 E-06 - 1.94 E-06
	Kr-87	1.00 E-05	8.62 E-08 - 1.31 E-07
	Kr-88	1.00 E-05	8.47 E-08 - 1.51 E-07