



April 11, 2011

Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Sir / Madam:

Subject: VIRGIL C. SUMMER NUCLEAR STATION UNIT 1
DOCKET NO. 50-395
OPERATING LICENSE NO. NPF-12
ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

Enclosed is the South Carolina Electric & Gas Company (SCE&G) Annual Radioactive Effluent Release Report as required by 10CFR50.36a, Section 6.9.1.8 of the Virgil C. Summer Nuclear Station Technical Specifications and Section 1.6.2 of the Offsite Dose Calculation Manual (ODCM). This submittal covers the period of January 1 through December 31, 2010.

Should there be any questions, please contact Ms. Susan B. Reese at (803) 345-4591.

Very truly yours,

George A. Lippard

SBR/GAL/gr
Enclosures

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VIRGIL C. SUMMER
JENKINSVILLE, SOUTH CAROLINA


**ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
VIRGIL C. SUMMER NUCLEAR STATION**

**FOR THE OPERATING PERIOD
JANUARY 1, 2010 - DECEMBER 31, 2010**

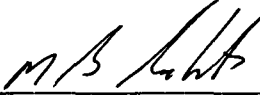
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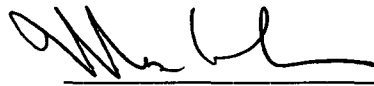
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ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

JANUARY – DECEMBER, 2010

VIRGIL C. SUMMER NUCLEAR STATION SOUTH CAROLINA ELECTRIC & GAS

This report is being submitted as a summary of quantities of radioactive liquid and gaseous effluents and solid waste released from the Virgil C. Summer Nuclear Station. This report satisfies the requirements in Technical Specifications Section 6.9.1.8, Offsite Dose Calculation Manual (ODCM) Section 1.6.2 and 10CFR50.36(a). Also included is an assessment of radiation doses from plant releases.

A brief discussion of the Supplemental Information and Tables 1 through 5 is presented in Sections A through D. An evaluation of the radiological impact on man due to operation of the Virgil C. Summer Nuclear Station is presented in Section E and Table 6. There were no abnormal releases for this period. A summary of the meteorological data for 2010 is presented in Section G. There were no changes made to the Offsite Dose Calculation Manual (ODCM) during the 12-month period. Section I gives a summary of oil incineration during the year. There were no ODCM Reportable Incidences. Section K identifies two major changes to the radwaste treatment systems approved by the Plant Safety Review Committee (PSRC) in 2010. Section L summarizes Carbon-14 gaseous effluents from the station.

A. Supplemental Information

Regulatory limits for doses, dose rate and effluent concentration limits presented in Supplemental Information are from the Virgil C. Summer Nuclear Station ODCM and 40 CFR 190. Average energy (\bar{E} bar) is not applicable to the method for determining release rate limits for fission and activation gaseous effluents; therefore, it has been omitted.

B. Gaseous Effluents

Gaseous effluents released from ground level are summarized in Tables 1 and 2. An elevated release pathway does not exist at Virgil C. Summer Nuclear Station. Cumulative doses are discussed in Section E.

The errors for gaseous effluent totals are given as the square root of the sum of squares of counting errors and flow or volume measurement errors. A systematic error of 15% has been added to estimate total error.

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C. Liquid Effluents

Liquid effluents are summarized in Tables 3 and 4. Estimated total errors are expressed as in Section B above.

D. Solid Waste Shipments

Solid waste shipments are summarized in Table 5. Curie content of radioactive waste packages is determined by dose rates and/or gamma spectroscopy analysis of samples. The total error for each type of Curie content determination is conservatively estimated to be the sum of a 15% systematic error and a 20% photon response error for the detector used.

E. Radiological Impact on Man

Potential doses to the maximum exposed individual in the unrestricted area were calculated using measured plant gaseous effluents and meteorological data in accordance with the Offsite Dose Calculation Manual. The source term involved no Waste Gas Decay Tank (WGDT) releases, 0.1 days of 6-inch Reactor Building purge releases, no 36-inch Reactor Building purge releases and a continuous 12-month Main Plant vent release. Oil incineration occurred for 236.7 hours in 2010. Doses are summarized in Table 6. The total activities released are presented in Tables 1 and 2. The highest quarterly air doses to the maximum exposed individual due to noble gases were $1.57\text{E-}06$ mrad for gamma during the first quarter and $5.54\text{E-}07$ mrad for beta during the first quarter. The maximum quarterly organ dose attributed to the releases was $2.00\text{E-}01$ mrem. Cumulative annual dose was $2.66\text{E-}06$ mrad, $9.38\text{E-}07$ mrad and $8.00\text{E-}01$ mrem for gamma, beta, and organ dose, respectively.

Measured plant liquid effluent data was used to calculate estimates of doses to individuals in accordance with the Offsite Dose Calculation Manual. The source term consisted of the isotopic contents of 146 Waste Monitor Tank batch releases, 5 Condensate Backwash Receiver Tank batch releases, 3 NaOH batch releases, 5.2 days of Steam Generator Blowdown release and a continuous Turbine Building Sump release.

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Doses are summarized in Table 6 and total radioactivity released is described in Tables 1 and 3. The highest quarterly total body dose to the maximum exposed individual due to the release of radioactive liquid was $1.26\text{E-}03$ mrem during the fourth quarter. The highest organ dose was $1.30\text{E-}03$ mrem to the LIVER for the fourth quarter. Cumulative annual doses for the hypothetical maximum exposed individual were $3.40\text{E-}03$ mrem for the total body and $4.21\text{E-}3$ mrem for the GI-LLI, the maximum annual organ. The GI-LLI was the maximum exposed organ for the first and second quarters, both GI-LLI and LIVER were the maximum exposed organs for the third quarter and the LIVER was the maximum exposed organ for the fourth quarter.

Dose rates and concentrations were below the limits specified in Supplemental Information, Section 2a, b, and c during all the effluent releases.

Radiation doses from radioactive effluents to members of the public due to their activities inside the site boundary were assessed using liquid and gaseous effluents along with meteorological data. Quarterly thermoluminescent dosimetry data from four (4) monitoring locations within the site boundary and eight (8) locations around the site boundary perimeter were analyzed and compared with respective pre-operational background and previous year history. Results showed that the 2010 quarterly dose rates did not differ significantly from the pre-operational or 2009 dose rates. It was concluded that doses to members of the public inside the site boundary were indistinguishable from normal background dose.

Radiation doses from radioactive effluents to workers at the Fairfield Hydro Station for the 12-month period were calculated to be $1.25\text{E-}07$ and $4.41\text{E-}08$ mrad for gamma and beta, respectively.

Radiation doses from radioactive effluents to workers at the New Nuclear Site for the 12-month period were calculated to be $7.82\text{E-}07$ and $2.76\text{E-}07$ mrad for gamma and beta, respectively.

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Radiation doses from nearby uranium fuel cycle sources were not assessed. The ODCM, Sections 1.3.1 and B/1.3 establish a five (5) mile limit beyond which doses from nearby plants are insignificant. There are no uranium fuel cycle plants within a five (5) mile radius of Virgil C. Summer Nuclear Station.

F. Abnormal Releases

During 2010, the plant had no abnormal releases.

G. Meteorology

The meteorological data for 2010 was collected and evaluated. An annual meteorological summary report providing joint frequency distributions of wind direction and speed by atmospheric stability class is maintained in plant records.

The wind direction and wind speed data used were acquired from the 10-meter level of the primary monitoring tower. Stability was determined by the primary differential temperature (61 to 10 meter).

The combined annual data recovery for wind direction, wind speed and stability was 100%. Primary variable recovery rates were as follows: wind direction (10 m) – 100%, wind speed (10 m) – 100%, and differential temperature (61 - 10 m) – 100%.

H. Offsite Dose Calculation Manual

The Virgil C. Summer Nuclear Station ODCM was not revised in 2010.

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I. Oil Incineration

The incinerator operated for a period of 236.7 hours, burning 1122 gallons of oil at the average rate of 4.74 gal/hr. The incinerated oil contained concentrations of 1.44E-05 uCi/ml for H3, 7.70E-09 uCi/ml for Mn-54, 5.61E-08 uCi/ml for Co-60, 2.64E-08 uCi/ml for Sb-125, 1.85E-08 uCi/ml for Cs-134 and 1.57E-07 uCi/ml for Cs-137. The dose to the maximum exposed individual from the incinerated oil was 1.21E-05 mrem.

J. Offsite Dose Calculation Manual Reportable Incidences

There were no ODCM Reportable Incidences in 2010.

K. Major Changes to Radioactive Waste Treatment Systems

Two Engineering Change Requests (ECR) were approved by the PSRC in 2010.

ECR 50380 eliminated the use of the Recycle and Waste Evaporators replacing them with a temporary DURATEK demineralizer system.

ECR 50493 relocated the temporary DURATEK demineralizer system and installs the necessary equipment to establish a permanent liquid processing system. Additionally the Recycle and Waste Evaporators were abandoned in place by this ECR.

The descriptions of these changes are included in Final Safety Analysis Report Revision Notices 03-038, 07-037, 08-003 and 10-005.

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The following design calculations were performed to verify compliance with 10 CFR 20 and 10 CFR 50 Appendix I.

- DC00030-024
- DC00030-051
- DC00030-053
- DC00030-056

The ECR packages and design calculations are maintained in plant records and are available for review.

L. Carbon-14 Gaseous Effluents

Carbon-14 production and release estimates were calculated using EPRI Report 1021106, "Estimation of Carbon-14 in Nuclear Plant Gaseous Effluents". This calculation uses active core coolant mass, average neutron flux by energy and reactor coolant nitrogen concentrations to determine carbon-14 generation based upon an effective full power year. The estimated generation for VC Summer Nuclear station for 2010 was 10.05 curies.

Public dose estimates were performed using NUREG-0133 and Regulatory Guide 1.109 methodology. Carbon dioxide is assumed to make up 20% of the Carbon-14 gaseous emissions from the station based upon available references and initial on-site testing conducted in 2010.

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VIRGIL C. SUMMER NUCLEAR STATION
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SUPPLEMENTAL INFORMATION

1. Regulatory Limits:

a. Fission and Activation Gases:

The air dose to an individual due to noble gases released in gaseous effluents shall be limited to less than or equal to 5 mrad for gamma radiation and 10 mrad for beta radiation during any calendar quarter and 10 mrad for gamma radiation and 20 mrad for beta radiation during any calendar year (ODCM, Section 1.2.3.1).

b. Iodines, Particulates (half-lives > 8 days) and Tritium:

The dose to an individual from radioidines, tritium and radioactive materials in particulate form with half-lives greater than 8 days in gaseous effluents shall be limited to less than or equal to 7.5 mrem to any organ during any calendar quarter and 15 mrem to any organ during any calendar year (ODCM, Section 1.2.4.1).

c. Liquid Effluents:

The dose or dose commitment to an individual from radioactive materials in liquid effluents released shall be limited to less than or equal to 1.5 mrem to the total body and 5 mrem to any organ during any calendar quarter and 3 mrem to the total body and 10 mrem to any organ during any calendar year (ODCM, Section 1.1.3.1).

d. All Sources:

The annual dose equivalent shall not exceed 25 mrem to the whole body, 75 mrem to the thyroid and 25 mrem to any other organ (40 CFR 190).

2. Dose Rate and Effluent Concentration Limits:

a. Fission and Activation Gases

The dose rate in unrestricted areas due to radioactive materials released in gaseous effluents shall be limited to less than or equal to 500 mrem/year to the total body and less than or equal to 3000 mrem/year to the skin (ODCM, Section 1.2.2.1).

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- b. Iodines, Particulates (half-lives > 8 days) and Tritium:

The dose rate in unrestricted areas due to radioactive materials in effluents shall be limited to less than or equal to 1500 mrem/year to any organ (ODCM, Section 1.2.2.1).

- c. Liquid Effluents:

The concentration of radioactive materials released from the site shall be limited to the concentrations specified in 10 CFR 20, Appendix B, Table 2, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2E-04 $\mu\text{Ci/ml}$ total activity (ODCM, Section 1.1.2.1).

3. Average Energy:

Not Applicable

4. Measurements and Approximations of Total Radioactivity:

- a. Fission and activation gases: Gamma spectrometry (HPGe)
- b. Iodines: Gamma spectrometry (HPGe)
- c. Particulates: Gamma spectrometry (HPGe), beta proportional counting, alpha proportional counting
- d. Tritium: Liquid scintillation
- e. Liquid effluents: Gamma spectrometry (HPGe), liquid scintillation (H-3), beta proportional counting, alpha proportional counting.

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5. Batch Releases:

a. Gaseous:

1. Number of batch releases: 0
2. Total time period for batch releases: 0 min
3. Maximum time period for a batch release: 0 min
4. Average time period for a batch release: 0 min
5. Minimum time period for a batch release: 0 min

b. Liquid:

1. Number of batch releases:

45	For first quarter, 2010
42	For second quarter, 2010
32	For third quarter, 2010
35	For fourth quarter, 2010
2. Total time period for batch releases:

3.38E+03	min. for first quarter, 2010
3.13E+03	min. for second quarter, 2010
2.49E+03	min. for third quarter, 2010
2.49E+03	min. for fourth quarter 2010
3. Maximum time period for a batch release:

9.30E+01	min. for first quarter, 2010
9.00E+01	min. for second quarter, 2010
8.30E+01	min. for third quarter, 2010
8.30E+01	min. for fourth quarter, 2010

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4. Average time period for batch releases:
- 7.51E+01 min. for first quarter, 2010
 - 7.45E+01 min. for second quarter, 2010
 - 7.77E+01 min. for third quarter, 2010
 - 7.12E+01 min. for fourth quarter, 2010
5. Minimum time period for a batch release:
- 6.80E+01 min. for first quarter, 2010
 - 5.00E+00 min. for second quarter, 2010*
 - 6.10E+01 min. for third quarter, 2010
 - 5.00E+00 min. for fourth quarter, 2010*
- * NaOH sump release
6. Average stream flow during periods of release of effluent into a flowing stream:
- 5.48E+06 gpm for first quarter, 2010
 - 8.05E+06 gpm for second quarter, 2010
 - 1.02E+07 gpm for third quarter, 2010
 - 4.88E+06 gpm for fourth quarter, 2010

6. Abnormal Releases:

a. Gaseous:

- 1. Number of releases: 0
- 2. Total activity released: 0

b. Liquid:

- 1. Number of releases: 0
- 2. Total activity released: 0

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
January - December 2010

Virgil C. Summer Nuclear Station
South Carolina Electric & Gas

Table 1
Gaseous Effluents Summation of All Releases

	UNITS	FIRST QUARTER	SECOND QUARTER	THIRD QUARTER	FOURTH QUARTER	2010 TOTAL	EST. ERROR %
A. Fission & Activation Gases							
1. Total release	Ci	8.46E-04	5.87E-04	0.00E+00	0.00E+00	1.43E-03	31.99
2. Average release rate	uCi / sec	1.09E-04	7.47E-05	0.00E+00	0.00E+00	4.54E-05	
3. Percent ODCM Qtr. gamma air dose limit	%	3.14E-05	2.18E-05	0.00E+00	0.00E+00	N/A	
4. Percent ODCM annual gamma air dose limit	%	1.57E-05	2.66E-05 *	2.66E-05 *	2.66E-05 *	2.66E-05	
5. Percent ODCM Qtr. beta air dose limit	%	5.54E-06	3.84E-06	0.00E+00	0.00E+00	N/A	
6. Percent ODCM annual beta air dose limit	%	2.77E-06	4.69E-06 *	4.69E-06 *	4.69E-06 *	4.69E-06	
B. Iodines							
1. Total iodine - 131	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	N/A
2. Average release rate	uCi / sec	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
C. Particulates							
1. Particulates with half - lifes > 8 days	Ci	0.00E+00	1.81E-05	3.81E-06	5.80E-06	2.77E-05	81.11
2. Average release rate	uCi / sec	0.00E+00	2.30E-06	4.79E-07	7.29E-07	8.78E-07	
3. Gross alpha radioactivity	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
D. Tritium							
1. Total release	Ci	1.72E-04	4.60E-04	0.00E+00	0.00E+00	6.31E-04	44.47
2. Average release rate	uCi / sec	2.21E-05	5.85E-05	0.00E+00	0.00E+00	2.00E-05	
E. Carbon 14							
1. Total release	Ci	2.51E+00	2.51E+00	2.51E+00	2.51E+00	1.01E+01	N/A
2. Average release rate	uCi / sec	3.23E-01	3.19E-01	3.16E-01	3.16E-01	3.18E-01	
F. Organ Dose (from B,C,and D)							
1. Percent ODCM Qtr. organ dose limit	%	1.21E-06	3.23E-06	0.00E+00	0.00E+00	N/A	
2. Percent ODCM annual organ dose limit	%	6.03E-07	2.22E-06 *	2.22E-06 *	2.22E-06 *	2.22E-06	

* Cumulative

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**TABLE 2
GASEOUS EFFLUENTS -- GROUND-LEVEL RELEASES**

Nuclides Released	Units	Continuous Mode					Batch Mode				
		First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Annual Total	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Annual Total
1 Fission gases											
Krypton-85	Ci	0	0	0	0	0	0	0	0	0	0
Krypton-85m	Ci	0	0	0	0	0	0	0	0	0	0
Krypton-87	Ci	0	0	0	0	0	0	0	0	0	0
Krypton-88	Ci	0	0	0	0	0	0	0	0	0	0
Xenon-131m	Ci	0	0	0	0	0	0	0	0	0	0
Xenon-133	Ci	0	0	0	0	0	0	0	0	0	0
Xenon-133m	Ci	0	0	0	0	0	0	0	0	0	0
Xenon-135	Ci	0	0	0	0	0	0	0	0	0	0
Xenon-135m	Ci	0	0	0	0	0	0	0	0	0	0
Xenon-138	Ci	0	0	0	0	0	0	0	0	0	0
Other: Ar-41	Ci	8.46E-04	5.87E-04	0	0	1.43E-03	0	0	0	0	0
Unidentified: None	Ci	0	0	0	0	0	0	0	0	0	0
Total for Period	Ci	8.46E-04	5.87E-04	0	0	1.43E-03	0	0	0	0	0
2 Iodines and other halogens											
Iodine-131	Ci	0	0	0	0	0	0	0	0	0	0
Iodine-132	Ci	0	0	0	0	0	0	0	0	0	0
Iodine-133	Ci	0	0	0	0	0	0	0	0	0	0
Br-82	Ci	0	0	0	0	0	0	0	0	0	0
Unidentified: None	Ci	0	0	0	0	0	0	0	0	0	0
Total for Period	Ci	0	0	0	0	0	0	0	0	0	0
3 Particulates											
Cromium-51	Ci	0	0	0	0	0	0	0	0	0	0
Manganese-54	Ci	0	0	0	0	0	0	0	0	0	0
Cobalt-58	Ci	0	0	0	0	0	0	0	0	0	0
Cobalt-60	Ci	0	0	0	0	0	0	0	0	0	0
Stronium-89	Ci	0	0	0	0	0	0	0	0	0	0
Stronium-90	Ci	0	0	0	0	0	0	0	0	0	0
Niobium-95	Ci	0	0	0	0	0	0	0	0	0	0
Cesium-134	Ci	0	0	0	0	0	0	0	0	0	0
Cesium-137	Ci	0	0	0	0	0	0	0	0	0	0
Other: Be-7	Ci	0	1.81E-05	3.81E-06	5.80E-06	2.77E-05	0	0	0	0	0
Unidentified: None	Ci	0	0	0	0	0	0	0	0	0	0
Total for Period	Ci	0	1.81E-05	3.81E-06	5.80E-06	2.77E-05	0	0	0	0	0

*Tritium and Carbon-14 not included. See Table 1.

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**Virgil C. Summer Nuclear Station
South Carolina Electric & Gas**

**TABLE 3
Liquid Effluents Summation of All Releases**

	UNITS	FIRST QUARTER	SECOND QUARTER	THIRD QUARTER	FOURTH QUARTER	2010 TOTAL	EST. ERROR %
A. Fission & Activation Products							
1. Total release	Ci	5.09E-03	3.01E-03	3.26E-03	2.88E-03	1.42E-02	19.65
2. Average diluted concentration	uCi/ml	1.54E-11	8.42E-12	9.17E-12	1.11E-11	1.09E-11	
B. Tritium							
1. Total release	Ci	2.12E+01	1.02E+02	2.05E+02	1.09E+02	4.36E+02	18.05
2. Average diluted concentration	uCi/ml	6.41E-08	2.85E-07	5.76E-07	4.19E-07	3.35E-07	
C. Dissolved and entrained gases							
1. Total release	Ci	9.87E-06	3.75E-05	7.55E-04	6.21E-04	1.42E-03	19.77
2. Average diluted concentration	uCi/ml	2.98E-14	1.05E-13	2.12E-12	2.39E-12	1.09E-12	
3. Percent ODCM limit (2.0E-4 uCi/ml)	%	1.49E-08	5.24E-08	1.06E-06	1.20E-06	5.46E-07	
D. Gross alpha radioactivity							
1. Total release	Ci	0	0	0	0	0	N/A
E. Volume of waste released (undiluted)							
	liters	1.71E+07	1.63E+07	1.28E+07	1.57E+07	6.19E+07	3.0
F. Volume of dilution water							
	liters	3.31E+11	3.57E+11	3.55E+11	2.60E+11	1.30E+12	4.3
G. ODCM limits (from A and B)							
1. Percent of ODCM Qtr total body limit	%	1.77E-02	5.53E-02	6.96E-02	8.41E-02	N/A	
2. Percent of ODCM annual total body limit	%	8.83E-03	3.65E-02 *	7.13E-02 *	1.13E-01 *	1.13E-01 *	
3. Percent of ODCM Qtr max. organ limit**	%	2.06E-02	1.84E-02	2.12E-02	2.59E-02	N/A	
4. Percent of ODCM annual max. organ limit**	%	1.03E-02	1.95E-02 *	3.01E-02 *	3.47E-02 *	4.21E-02 *	

* Cumulative

** See page 3 for max. organ for each quarter and cumulative.

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Virgil C. Summer Nuclear Station, South Carolina Electric & Gas

**TABLE 4
LIQUID EFFLUENTS**

Nuclides Released*	Units	Continuous Mode					Batch Mode				
		First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Annual Total	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Annual Total
Strontium-89	Ci	0	0	0	0	0	0	0	0	0	0
Strontium-90	Ci	0	0	0	0	0	0	0	0	1.45E-05	1.45E-05
Cesium-134	Ci	0	0	0	0	0	1.07E-05	1.65E-05	2.29E-05	3.30E-05	8.31E-05
Cesium-137	Ci	0	0	0	0	0	6.05E-05	7.34E-05	1.13E-04	1.29E-04	3.76E-04
Iodine-131	Ci	0	0	0	0	0	0	0	0	0	0
Cobalt-57	Ci	0	0	0	0	0	1.48E-06	0	0	0	1.48E-06
Cobalt-58	Ci	0	0	0	0	0	1.27E-03	2.66E-04	1.14E-04	3.86E-05	1.69E-03
Cobalt-60	Ci	0	0	0	0	0	1.10E-03	7.67E-04	1.04E-03	9.34E-04	3.84E-03
Iron-59	Ci	0	0	0	0	0	1.69E-05	5.21E-06	6.75E-06	0	2.89E-05
Zinc-65	Ci	0	0	0	0	0	1.00E-05	9.27E-06	3.80E-06	0	2.31E-05
Manganese-54	Ci	0	0	0	0	0	2.05E-04	1.10E-04	1.30E-04	8.05E-05	5.26E-04
Chromium-51	Ci	0	0	0	0	0	4.37E-04	0	0	0	4.37E-04
Zirconium-Niobium-95	Ci	0	0	0	0	0	6.38E-04	1.28E-04	8.55E-05	8.76E-06	8.60E-04
Molybdenum-99	Ci	0	0	0	0	0	0	0	0	0	0
Technetium-99m	Ci	0	0	0	0	0	0	0	0	0	0
Cerium-144	Ci	0	0	0	0	0	0	0	0	0	0
Other: Be-7	Ci	0	0	0	0	0	0	0	4.27E-05	9.00E-06	5.17E-05
Na-24	Ci	0	0	0	0	0	0	0	0	0	0
Fe-55	Ci	0	0	0	0	0	0	1.21E-03	1.56E-03	1.52E-03	4.29E-03
Nb-95m	Ci	0	0	0	0	0	0	1.10E-06	0	0	1.10E-06
Ag-110m	Ci	0	0	0	0	0	0	0	0	0	0
Sn-113	Ci	0	0	0	0	0	1.19E-06	0	0	5.52E-07	1.74E-06
Sb-122	Ci	0	0	0	0	0	0	0	1.01E-06	0	1.01E-06
Sb-124	Ci	0	0	0	0	0	8.03E-06	1.09E-05	0	0	1.89E-05
Sb-125	Ci	0	0	0	0	0	2.43E-04	4.09E-04	1.46E-04	1.09E-04	9.07E-04
Te-123m	Ci	0	0	0	0	0	1.86E-06	0	6.49E-07	0	2.51E-06
Te-125m	Ci	0	0	0	0	0	1.08E-03	0	0	0	1.08E-03
Te-129m	Ci	0	0	0	0	0	0	0	0	0	0
I-135	Ci	0	0	0	0	0	0	0	0	0	0
Total for Period (above)	Ci	0	0	0	0	0	5.08E-03	0	3.27E-03	0	1.42E-02
Ar-41	Ci	0	0	0	0	0	0	0	0	0	0
Kr-85m	Ci	0	0	0	0	0	0	0	0	0	0
Kr-88	Ci	0	0	0	0	0	0	0	0	0	0
Xenon-133	Ci	0	0	0	0	0	8.86E-06	3.75E-05	7.01E-04	6.17E-04	1.36E-03
Xenon-133m	Ci	0	0	0	0	0	0	0	1.74E-05	4.43E-06	2.18E-05
Xenon-135	Ci	0	0	0	0	0	1.01E-06	0	3.65E-05	0	3.75E-05
Total Entrained Gases	Ci	0	0	0	0	0	9.87E-06	3.75E-05	7.55E-04	6.21E-04	1.42E-03

*Tritium not included. See Table 3 for tritium numbers ----- No Unidentified nuclides found

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Virgil C. Summer Nuclear Station
South Carolina Electric & Gas

Table 5
SOLID WASTE SHIPMENTS

1. Solid Waste Shipped Offsite for Burial or Disposal (Not irradiated fuel).

Type of Waste	Unit	2010 Total	Est. Total Error, %
a. Spent resins, filters, sludge, evaporator bottoms, etc.	m ³	1.27E+01	+/-25
	Ci	8.80E+01	
b. Dry compressible waste contaminated equip., etc.	m ³	1.21E+02	+/-25
	Ci	1.73E-01	
c. Irradiated components, control rods, etc.	m ³	0	N/A
	Ci	0	
d. Other	m ³	0	N/A
	Ci	0	

2. Estimate of major nuclide composition for the year (by type of waste) for concentrations above 1.0%. Activities for nuclides are in Curies.

a.	Fe-55	55.9%	4.92E+01
	Ni-63	27.8%	2.45E+01
	Co-60	7.6%	6.69E+00
	Mn-54	4.4%	3.84E+00
	Sb-125	1.0%	8.51E-01
	Cs-137	1.0%	7.05E-01

b.	H-3	55.1%	9.55E-02
	Co-60	9.3%	1.62E-02
	Ni-95	8.6%	1.50E-02
	Co-58	6.4%	1.10E-02
	Zr-95	4.8%	8.26E-03
	Cr-51	4.4%	7.70E-03
	Fe-55	4.0%	6.84E-03
	Mn-54	1.9%	3.24E-03
	Ni-63	1.7%	2.90E-03
	Sb-125	1.0%	1.79E-03

c.	None	N/A	N/A

d.	None	N/A	N/A

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Table 5
SOLID WASTE SHIPMENTS

3. Solid Waste Disposition

Numbers of Shipments	Mode of Transportation	Destination
3	Hittman Trucking	Barnwell Disposal Facility
1	ECS/Hubbard Trucking	Impact Services
1	Specialty Transport Inc.	Impact Services

Notes:

Twelve (12) partial shipments of DAW were made from Studsvik (Memphis, TN) to Envirocare (Clive, UT) totaling 439.7ft³.

Four (4) shipments were sent for direct burial at Barnwell Disposal Facility (Barnwell, SC).

One (1) shipment was sent to the Barnwell Processing Facility and disposed of at the Barnwell Disposal Facility.

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**Table 6
GASEOUS AND LIQUID DOSES**

ODCM Section	GASEOUS LIMITS	FIRST QUARTER		SECOND QUARTER		THIRD QUARTER		FOURTH QUARTER		TOTAL ANNUAL DOSE
		DOSE	Percent of Limit	DOSE	Percent of Limit	DOSE	Percent of Limit	DOSE	Percent of Limit	
1.2.3.1.a,b	5 mrad gamma / qtr. 10 mrad gamma / yr.	1.57E-06 mrad	3.14E-05 1.57E-05	1.09E-06 mrad	2.18E-05 2.66E-05 *	0.00E+00 mrad	0.00E+00 2.66E-05 *	0.00E+00 mrad	0.00E+00 2.66E-05 *	2.66E-06
1.2.3.1.a,b	10 mrad beta / qtr. 20 mrad beta / yr.	5.54E-07 mrad	5.54E-06 2.77E-06	3.84E-07 mrad	3.84E-06 4.69E-06 *	0.00E+00 mrad	0.00E+00 4.69E-06 *	0.00E+00 mrad	0.00E+00 4.69E-06 *	9.38E-07
1.2.4.1.a,b	7.5 mrem organ/qtr 15 mrem organ/yr.	2.00E-01 mrem**	2.67E+00 1.33E+00	2.00E-01 mrem**	2.67E+00 2.67E+00 *	2.00E-01 mrem**	2.67E+00 4.00E+00 *	2.00E-01 mrem**	2.67E+00 5.34E+00 *	8.00E-01
	LIQUID LIMITS									
1.1.3.1a,b	1.5 mrem / qtr. 3 mrem / yr.	2.65E-04 mrem	1.77E-02 8.83E-03	8.30E-04 mrem	5.53E-02 3.65E-02 *	1.04E-03 mrem	6.96E-02 7.13E-02 *	1.26E-03 mrem	8.41E-02 1.13E-01 *	3.40E-03
1.1.3.1a,b	5 mrem organ/qtr*** 10 mrem organ/yr.	1.03E-03 mrem (GI-LLI)	2.06E-02 1.03E-02	9.21E-04 mrem (GI-LLI)	1.84E-02 1.95E-02 *	1.06E-03 mrem (Liver)/(GI-LLI)	2.12E-02 3.01E-02 *	1.30E-03 mrem (Liver)	2.59E-02 3.47E-02 *	4.21E-03 (GI-LLI)

* Includes contribution from previous quarters

** Includes dose from all nuclides

*** See page 3 for max organ for each quarter