



APR 29 2002

10 CFR 50.36a
TS 5.6.3

SERIAL: BSEP 02-0085

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-325 AND 50-324/LICENSE NOS. DPR-71 AND DPR-62
RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2001

Ladies and Gentlemen:

In accordance with 10 CFR 50.36a and Brunswick Steam Electric Plant (BSEP) Technical Specification 5.6.3, Carolina Power & Light Company submits the enclosed Radioactive Effluent Release Report for BSEP, Unit Nos. 1 and 2. This report covers the period from January 1, 2001, through December 31, 2001.

No regulatory commitments are contained in this submittal. Please refer any questions regarding this submittal to Mr. Edward T. O'Neil, Manager – Regulatory Affairs, at (910) 457-3512.

Sincerely,

William G. Noll
Plant General Manager
Brunswick Steam Electric Plant

CRE/cre

Enclosure: Radioactive Effluent Release Report for 2001

IE48

Document Control Desk
BSEP 02-0085 / Page 2

cc (with enclosure):

U. S. Nuclear Regulatory Commission, Region II
ATTN: Mr. Luis A. Reyes, Regional Administrator
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW, Suite 23T85
Atlanta, GA 30303-8931

U. S. Nuclear Regulatory Commission
ATTN: Mr. Theodore A. Easlick, NRC Senior Resident Inspector
8470 River Road
Southport, NC 28461-8869

U. S. Nuclear Regulatory Commission **(Electronic Copy Only)**
ATTN: Ms. Brenda L. Mozafari (Mail Stop OWFN 8G9)
11555 Rockville Pike
Rockville, MD 20852-2738

Ms. Jo A. Sanford
Chair - North Carolina Utilities Commission
P.O. Box 29510
Raleigh, NC 27626-0510

RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2001

Brunswick Steam Electric Plant
Radioactive Effluent Release Report
January 1, through December 31, 2001

<u>ATTACHMENTS</u>	<u>PAGES</u>
1. Effluent and Waste Disposal Report Supplemental Information	2 - 5
2. Effluent and Waste Disposal Data	6 - 22
3. Environmental Monitoring Program	23 - 25
4. Effluent Instrumentation	26 - 30
5. Major Modification to the Radioactive Waste Treatment Systems	31
6. Meteorological Data	32
7. Annual Dose Assessment	33 - 49
8. Off-Site Dose Calculation Manual (ODCM) and Process Control Program (PCP) Revisions	50

ATTACHMENT 1

EFFLUENT AND WASTE DISPOSAL REPORT SUPPLEMENTAL INFORMATION

Facility: Brunswick Steam Electric Plant
Licensee: Carolina Power and Light Company

1. Regulatory Limits

A. Fission and activation gases (Off-Site Dose Calculation Manual Specification (ODCMS) 7.3.8)

(1) Calendar Quarter*

- (a) ≤ 10 mrad gamma
- (b) ≤ 20 mrad beta

(2) Calendar Year

- (a) ≤ 20 mrad gamma
- (b) ≤ 40 mrad beta

B. Iodine-131, iodine-133, tritium, and particulates with half-lives greater than eight days (ODCMS 7.3.9)

(1) Calendar Quarter*

- (a) ≤ 15 mrem to any organ

(2) Calendar Year

- (a) ≤ 30 mrem to any organ

(3) Calendar Quarter for Burning Contaminated Oil*

- (a) < 0.1 % of limits for calendar quarter of (1)
- (b) 436 μCi (ODCM Appendix H)

(4) Calendar Year for Burning Contaminated Oil

- (a) < 0.1 % of limits for calendar year
- (b) 872 μCi (ODCM Appendix H)

C. Liquid effluents (ODCMS 7.3.4)

(1) Calendar Quarter**

- (a) ≤ 3 mrem to total body
- (b) ≤ 10 mrem to any organ

(2) Calendar Year

- (a) ≤ 6 mrem to total body
- (b) ≤ 20 mrem to any organ

NOTE: Dose calculations are determined in accordance with the ODCM

* Used for percent of ODCMS limit determination in Attachment 2, Table 1A

**Used for percent of ODCMS limit determination in Attachment 2, Table 2A

ATTACHMENT 1 (cont.)

EFFLUENT AND WASTE DISPOSAL REPORT SUPPLEMENTAL INFORMATION

2. Maximum permissible concentration and dose rates which determine maximum instantaneous release rates.

A. Fission and activation gases (ODCMS 7.3.7.a)

- (1) ≤ 500 mrem/year to total body
- (2) ≤ 3000 mrem/year to the skin

B. Iodine-131, iodine-133, tritium, and particulates with half-lives greater than eight days (ODCMS 7.3.7.b)

- (1) ≤ 1500 mrem/year to any organ

C. Liquid effluents (ODCMS 7.3.3)

The concentration of radioactive material released in liquid effluents to unrestricted areas after dilution in the discharge canal shall be limited to 10 times the concentrations specified in Appendix B, Table 2, Column 2 to 10 CFR 20.1001 - 20.2401 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to the value given in the ODCM specifications.

- (1) Tritium: limit = $1.00E-03$ $\mu\text{Ci/ml}^{**}$
- (2) Dissolved and entrained noble gases: limit = $2.00E-04$ $\mu\text{Ci/ml}^{**}$

3. Measurements and Approximations of Total Radioactivity

A. Fission and activation gases

- (1) Analyses for specific radionuclides in representative grab samples by gamma spectroscopy.

B. Iodines

- (1) Analysis for specific radionuclides collected on charcoal cartridges by gamma spectroscopy.

C. Particulates

- (1) Analysis for specific radionuclides collected on filter papers by gamma spectroscopy.

D. Particulates for Burning Oil

- (1) Analysis for specific radionuclides by grab samples of each batch of oil to be burned.

E. Liquid Effluents

- (1) Analysis for specific radionuclides of individual releases by gamma spectroscopy.

** Used as applicable limits for Attachment 2, Table 2A.

Nuclear counting statistics are reported utilizing 1-sigma error. Total error where reported represents a best effort to approximate the total of all individual and sampling errors.

ATTACHMENT 1 (cont.)

EFFLUENT AND WASTE DISPOSAL REPORT SUPPLEMENTAL INFORMATION

4. Batch Releases

A. Liquid

- | | |
|---|-----------------------------|
| (1) Number of batch releases: | 4.70E+01 |
| (2) Total time period for batch releases: | 5.32E+03 Minutes |
| (3) Maximum time period for a batch release: | 3.22E+02 Minutes |
| (4) Average time period for a batch release: | 1.13E+02 Minutes |
| (5) Minimum time period for a batch release: | 1.40E+01 Minutes |
| (6) Average stream flow during periods of
release of effluent into a flowing stream: | 8.13E+05 Gallons per Minute |

B. Gaseous

- | | |
|--|------------------|
| (1) Number of batch releases: | 0.00E+00 |
| (2) Total time period for batch releases: | 0.00E+00 Minutes |
| (3) Maximum time period for a batch release: | 0.00E+00 Minutes |
| (4) Average time period for a batch release: | 0.00E+00 Minutes |
| (5) Minimum time period for a batch release: | 0.00E+00 Minutes |

5. Abnormal releases*

A. Liquid

- | | |
|------------------------------|-----------------|
| (1) Number of releases: | 0.00E+00 |
| (2) Total activity released: | 0.00E+00 Curies |

B. Gaseous

- | | |
|------------------------------|-----------------|
| (1) Number of releases: | 0.00E+00 |
| (2) Total activity released: | 0.00E+00 Curies |

* There were no abnormal releases that exceeded 10 CFR 20 or 10 CFR 50 limits. See page 6 for a discussion of release events that occurred.

ATTACHMENT 1 (cont.)

EFFLUENT AND WASTE DISPOSAL REPORT SUPPLEMENTAL INFORMATION

1. Discussion of Tritium in the Storm Drain Collection Pond

Approximately $3.39\text{E}+07$ gallons containing $9.67\text{E}+01$ curies of tritium were released from the Storm Drain Collection Pond (SDCP) to the Intake Canal during this reporting period. This resulted in an estimated maximum dose to the individual of $1.83\text{E}-04$ mrem. The SDCP is a permitted release point.

2. Discussion of Releases from the Storm Drain Collector Basin

Due to heavy rains, the Storm Drain Collector Basin (SDCB) was released directly to the discharge canal on July 6th for approximately 1.4 hours. The SDCB is a permitted release point during periods of inclement weather to protect plant personnel and equipment. Approximately $6.42\text{E}+04$ gallons containing $1.00\text{E}-02$ curies of tritium and $1.14\text{E}-05$ curies of iodine were released during this instance. This resulted in an estimated maximum dose, to the limiting organ (thyroid), of $9.64\text{E}-07$ mrem. Total body dose related to this release is estimated at $1.44\text{E}-08$ mrem.

3. Summary

SDCP and SDCB curie totals are included in the quarterly summaries for FISSION AND ACTIVATION PRODUCTS and TRITIUM on Attachment 2, Table 2A when applicable.

The quantity of rainwater released from the SDCP and/or the SDCB is not included in the average diluted concentration determination or VOLUME OF WASTE RELEASED on Attachment 2, Table 2A.

ATTACHMENT 2

EFFLUENT AND WASTE DISPOSAL DATA

Table 1A:	Gaseous Effluents - Summation of all Releases
Table 1B:	Gaseous Effluents - Elevated Releases
Table 1C:	Gaseous Effluents - Ground Level Releases
Table 1D:	Gaseous Effluents - Ground Level Releases for Burning Contaminated Oil
Table 2A:	Liquid Effluents - Summation of all Releases
Table 2B:	Liquid Effluents - Batch Mode
	Lower Limits of Detection
Table 3A:	Solid Waste and Irradiated Fuel Shipments - Waste Class A
Table 3B:	Solid Waste and Irradiated Fuel Shipments - Waste Class B
Table 3C:	Solid Waste and Irradiated Fuel Shipments - Waste Class C
	Combustion of Waste Oil

ATTACHMENT 2 (cont.)

EFFLUENT AND WASTE DISPOSAL DATA
Table 1A: Gaseous Effluents - Summation of all Releases

A. FISSION AND ACTIVATION GASES

	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Estimated Total Percent Error
1. Total release	Ci	1.50E+02	1.49E+02	1.53E+02	1.55E+02	4.50E+01
2. Average release rate for period	μCi/sec	1.93E+01	1.90E+01	1.92E+01	1.95E+01	NA
3. Percent of ODCM limit	%	3.69E-02	3.57E-02	2.82E-02	3.04E-02	NA

B. IODINES

	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Estimated Total Percent Error
1. Total Iodine - 131 release	Ci	2.33E-03	2.71E-03	2.64E-03	3.01E-03	3.50E+01
2. Average release rate for period	μCi/sec	3.00E-04	3.45E-04	3.32E-04	3.79E-04	NA

C. PARTICULATES

	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Estimated Total Percent Error
1. Total release	Ci	1.06E-03	5.40E-04	5.89E-04	6.95E-04	3.50E+01
2. Average release rate for period	μCi/sec	1.36E-04	6.87E-05	7.41E-05	8.74E-05	NA
3. Gross Alpha	Ci	1.92E-07	4.00E-08	6.76E-08	1.01E-07	3.50E+01

D. TRITIUM

	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Estimated Total Percent Error
1. Total release	Ci	4.93E+01	3.36E+01	3.49E+01	2.81E+01	3.00E+01
2. Average release rate for period	μCi/sec	6.34E+00	4.27E+00	4.40E+00	3.54E+00	NA

E. IODINE-131, IODINE-133, TRITIUM AND PARTICULATES

	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4
1. Total release	Ci	4.93E+01	3.36E+01	3.50E+01	2.81E+01
2. Average release rate for period	μCi/sec	6.34E+00	4.27E+00	4.40E+00	3.54E+00
3. Percent of ODCM limit	%	9.00E-02	9.67E-02	9.33E-02	1.07E-01

ATTACHMENT 2 (cont.)

EFFLUENT AND WASTE DISPOSAL DATA
Table 1A: Gaseous Effluents - Summation of all Releases (cont.)

F. PARTICULATES VIA BURINING CONTAMINATED OIL

	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4
1. Total release	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2. Average release rate for period	μCi/sec	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3. Percent of ODCM limit	%	0.00E+00	0.00E+00	0.00E+00	0.00E+00

ATTACHMENT 2 (cont.)

EFFLUENT AND WASTE DISPOSAL DATA
Table 1B: Gaseous Effluents - Elevated Releases
Continuous Release

Nuclides Released

1. FISSION GASES

	<u>Unit</u>	<u>Quarter 1</u>	<u>Quarter 2</u>	<u>Quarter 3</u>	<u>Quarter 4</u>
krypton-85m	Ci	2.79E-01	4.89E+00	6.55E+00	1.23E+00
krypton-87	Ci	9.11E-01	1.38E+00	8.37E-01	1.54E+00
krypton-88	Ci	7.01E-02	3.70E+00	1.50E+00	≤LLD
xenon-133	Ci	1.10E+00	2.50E+01	1.69E+01	5.61E+00
xenon-135	Ci	7.41E+00	8.14E+00	6.31E+00	7.64E+00
xenon-135m	Ci	2.19E+01	2.43E+01	1.53E+01	1.96E+01
xenon-137	Ci	3.32E+01	1.17E+01	4.86E+01	5.50E+01
xenon-138	Ci	5.98E+01	5.67E+01	4.23E+01	4.35E+01
<u>total for period</u>		<u>1.25E+02</u>	<u>1.36E+02</u>	<u>1.38E+02</u>	<u>1.34E+02</u>

2. GASEOUS IODINES

	<u>Unit</u>	<u>Quarter 1</u>	<u>Quarter 2</u>	<u>Quarter 3</u>	<u>Quarter 4</u>
iodine-131	Ci	2.05E-03	2.53E-03	2.48E-03	2.82E-03
iodine-132	Ci	1.22E-02	1.87E-02	1.77E-02	1.98E-02
iodine-133	Ci	1.25E-02	1.68E-02	1.61E-02	1.91E-02
iodine-134	Ci	1.92E-02	4.52E-02	2.51E-02	2.09E-02
iodine-135	Ci	2.05E-02	2.86E-02	2.68E-02	3.10E-02
<u>total for period</u>		<u>6.64E-02</u>	<u>1.12E-01</u>	<u>8.82E-02</u>	<u>9.36E-02</u>

3. PARTICULATES

	<u>Unit</u>	<u>Quarter 1</u>	<u>Quarter 2</u>	<u>Quarter 3</u>	<u>Quarter 4</u>
chromium-51	Ci	1.37E-05	≤LLD	≤LLD	≤LLD
manganese-54	Ci	1.27E-06	≤LLD	≤LLD	≤LLD
cobalt-58	Ci	1.64E-05	≤LLD	≤LLD	≤LLD
cobalt-60	Ci	8.32E-05	≤LLD	2.08E-06	≤LLD
strontium-89	Ci	1.16E-04	9.96E-05	1.14E-04	5.08E-05
strontium-90	Ci	3.66E-07	3.64E-07	8.74E-07	1.51E-06
cesium-134	Ci	4.16E-06	≤LLD	≤LLD	≤LLD
cesium-137	Ci	3.60E-05	≤LLD	≤LLD	3.12E-06
barium-140	Ci	2.01E-04	1.57E-04	1.72E-04	2.32E-04
lanthanum-140	Ci	3.47E-04	2.68E-04	2.71E-04	3.79E-04
<u>total for period</u>		<u>8.19E-04</u>	<u>5.25E-04</u>	<u>5.60E-04</u>	<u>6.66E-04</u>

4. TRITIUM

	<u>Unit</u>	<u>Quarter 1</u>	<u>Quarter 2</u>	<u>Quarter 3</u>	<u>Quarter 4</u>
hydrogen-3	Ci	1.15E+01	1.47E+01	1.79E+01	1.08E+01

ATTACHMENT 2 (cont.)

EFFLUENT AND WASTE DISPOSAL DATA
Table 1C: Gaseous Effluents - Ground Level Releases
Continuous Release

Nuclides Released

1. FISSION GASES

	<u>Unit</u>	<u>Quarter 1</u>	<u>Quarter 2</u>	<u>Quarter 3</u>	<u>Quarter 4</u>
xenon-133	Ci	<LLD	8.41E-02	7.02E-01	<LLD
xenon-135	Ci	9.12E+00	6.13E+00	6.26E+00	5.74E+00
<u>xenon-135m</u>	Ci	1.61E+01	6.70E+00	7.44E+00	1.50E+01
total for period		2.52E+01	1.29E+01	1.44E+01	2.07E+01

2. GASEOUS IODINES

	<u>Unit</u>	<u>Quarter 1</u>	<u>Quarter 2</u>	<u>Quarter 3</u>	<u>Quarter 4</u>
iodine-131	Ci	2.83E-04	1.85E-04	1.56E-04	1.93E-04
iodine-132	Ci	1.46E-03	2.92E-03	2.63E-04	5.53E-04
iodine-133	Ci	2.30E-03	2.01E-03	1.38E-03	1.57E-03
iodine-134	Ci	2.59E-04	3.97E-03	<LLD	<LLD
<u>iodine-135</u>	Ci	2.10E-03	2.53E-03	7.39E-04	4.67E-04
total for period		6.40E-03	1.16E-02	2.54E-03	2.78E-03

3. PARTICULATES

	<u>Unit</u>	<u>Quarter 1</u>	<u>Quarter 2</u>	<u>Quarter 3</u>	<u>Quarter 4</u>
chromium-51	Ci	5.74E-05	<LLD	6.30E-06	1.68E-05
manganese-54	Ci	2.25E-06	<LLD	<LLD	<LLD
cobalt-58	Ci	1.44E-05	4.11E-07	<LLD	<LLD
cobalt-60	Ci	1.30E-04	1.28E-05	2.27E-05	6.88E-06
strontium-89	Ci	9.00E-06	2.14E-06	1.09E-06	4.50E-06
strontium-90	Ci	<LLD	<LLD	<LLD	1.27E-07
cesium-137	Ci	2.80E-06	<LLD	<LLD	<LLD
barium-140	Ci	7.87E-06	<LLD	<LLD	<LLD
<u>lanthanum-140</u>	Ci	1.49E-05	<LLD	<LLD	<LLD
total for period		2.39E-04	1.54E-05	3.01E-05	2.83E-05

4. TRITIUM

	<u>Unit</u>	<u>Quarter 1</u>	<u>Quarter 2</u>	<u>Quarter 3</u>	<u>Quarter 4</u>
hydrogen-3	Ci	3.78E+01	1.89E+01	1.70E+01	1.74E+01

ATTACHMENT 2 (cont.)

EFFLUENT AND WASTE DISPOSAL DATA

Table 1D: Gaseous Effluents - Ground Level Releases For Burning Contaminated Oil

Nuclides Released1. PARTICULATES

<u>Unit</u>	<u>Quarter 1</u>	<u>Quarter 2</u>	<u>Quarter 3</u>	<u>Quarter 4</u>
Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00

ATTACHMENT 2 (cont.)

EFFLUENT WASTE AND DISPOSAL DATA
Table 2A: Liquid Effluents - Summation of all Releases

A. FISSION AND ACTIVATION PRODUCTS (NOTE 1)

	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Estimated Total Percent Error
1. Total release (excluding tritium, gases, and alpha)	Ci	1.08E-03	4.37E-04	5.21E-04	3.35E-04	4.00E+01
2. Average diluted concentration (NOTE 2)	µCi/ml	2.19E-10	4.59E-10	6.89E-10	1.15E-10	NA
3. Percent of applicable limit	%	2.54E-03	6.29E-04	6.53E-04	5.79E-04	NA

B. TRITIUM (NOTE 1)

	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Estimated Total Percent Error
1. Total release	Ci	7.71E+01	2.06E+00	3.97E+01	3.03E+00	4.50E+01
2. Average diluted concentration (NOTE 2)	µCi/ml	1.56E-05	2.16E-06	5.25E-06	1.04E-06	NA
3. Percent of applicable limit	%	1.56E+00	2.16E-01	5.25E-01	1.04E-01	NA

C. DISSOLVED AND ENTRAINED GASES (NOTE 1)

	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Estimated Total Percent Error
1. Total release	Ci	8.03E-03	2.17E-03	4.77E-03	3.59E-03	4.00E+01
2. Average diluted concentration (NOTE 2)	µCi/ml	1.62E-09	2.28E-09	6.30E-10	1.23E-09	NA
3. Percent of applicable limit	%	8.11E-04	1.14E-03	3.15E-04	6.16E-04	NA

D. GROSS ALPHA RADIOACTIVITY

	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Estimated Total Percent Error
1. Total release	Ci	≤ LLD	≤ LLD	≤ LLD	≤ LLD	4.00E+01

NOTE 1: Includes radionuclides released via abnormal and/or non-routine releases

NOTE 2: Does not include rainwater (i.e. Storm Drain Collection Basin and/or Storm Drain Collection Pond)

ATTACHMENT 2 (cont.)

EFFLUENT AND WASTE DISPOSAL DATA
Table 2A: Liquid Effluents - Summation of all Releases (cont.)

E. VOLUME OF WASTE RELEASED (NOTE 2)

	<u>Unit</u>	<u>Quarter 1</u>	<u>Quarter 2</u>	<u>Quarter 3</u>	<u>Quarter 4</u>	<u>Estimated Total Percent Error</u>
1. Total volume	liters	9.09E+05	1.30E+05	8.47E+05	4.03E+05	1.50E+01

F. VOLUME OF DILUTION WATER

	<u>Unit</u>	<u>Quarter 1</u>	<u>Quarter 2</u>	<u>Quarter 3</u>	<u>Quarter 4</u>	<u>Estimated Total Percent Error</u>
1. Total volume (used during release for average diluted concentration)	liters	4.95E+09	9.53E+08	7.56E+09	2.91E+09	1.50E+01

G. VOLUME OF COOLING WATER DISCHARGED FROM PLANT

	<u>Unit</u>	<u>Quarter 1</u>	<u>Quarter 2</u>	<u>Quarter 3</u>	<u>Quarter 4</u>	<u>Estimated Total Percent Error</u>
1. Total volume	liters	3.54E+11	4.81E+11	5.23E+11	4.68E+11	1.50E+01

NOTE 1: Includes radionuclides released via abnormal and/or non-routine releases

NOTE 2: Does not include rainwater (i.e. Storm Drain Collection Basin and/or Storm Drain Collection Pond)

ATTACHMENT 2 (cont.)

EFFLUENT AND WASTE DISPOSAL DATA
Table 2B: Liquid Effluents - Batch Mode

Nuclides Released

1. FISSION AND ACTIVATION PRODUCTS

	<u>Unit</u>	<u>Quarter 1</u>	<u>Quarter 2</u>	<u>Quarter 3</u>	<u>Quarter 4</u>
manganese-54	Ci	1.06E-05	2.02E-06	≤LLD	≤LLD
iron-55	Ci	2.95E-04	1.01E-04	1.71E-04	4.43E-05
cobalt-58	Ci	2.09E-05	≤LLD	≤LLD	≤LLD
cobalt-60	Ci	6.34E-04	2.96E-04	2.87E-04	2.66E-04
strontium-89	Ci	≤LLD	≤LLD	≤LLD	≤LLD
strontium-90	Ci	≤LLD	≤LLD	≤LLD	≤LLD
iodine-131	Ci	4.77E-06	≤LLD	6.72E-06	4.98E-07
iodine-133	Ci	≤LLD	≤LLD	1.64E-05	9.46E-06
cesium-134	Ci	1.89E-05	4.33E-06	2.17E-06	≤LLD
cesium-137	Ci	9.91E-05	3.34E-05	3.78E-05	1.42E-05
<u>total for period</u>	Ci	<u>1.08E-03</u>	<u>4.37E-04</u>	<u>5.21E-04</u>	<u>3.35E-04</u>

2. DISSOLVED AND ENTRAINED GASES

	<u>Unit</u>	<u>Quarter 1</u>	<u>Quarter 2</u>	<u>Quarter 3</u>	<u>Quarter 4</u>
xenon-133	Ci	1.16E-03	2.25E-04	5.84E-04	6.48E-04
xenon-135	Ci	6.86E-03	1.95E-03	4.18E-03	2.94E-03
<u>total for period</u>	Ci	<u>8.03E-03</u>	<u>2.17E-03</u>	<u>4.77E-03</u>	<u>3.59E-03</u>

LOWER LIMITS OF DETECTION

Units: $\mu\text{Ci/ml}$

1. LIQUID RELEASES

Alpha	2.48E-08
Cr-51	1.44E-07
Mn-54	2.35E-08
Fe-55	2.57E-08
Co-58	1.46E-08
Fe-59	2.39E-08
Co-60	3.79E-08
Zn-65	2.70E-08
Sr-89	1.38E-08
Sr-90	1.34E-08
Mo-99	1.17E-07
I-131	1.39E-08
I-133	1.42E-08
Cs-134	2.88E-08
Cs-137	2.62E-08
Ce-141	1.97E-08
Ce-144	8.34E-08
Kr-87	3.24E-08
Kr-88	4.35E-08
Xe-133	4.71E-08
Xe-133m	1.30E-07
Xe-135	1.34E-08
Xe-135m	4.58E-08
Xe-138	1.33E-07

2. GASEOUS RELEASES

Kr-87	1.33E-08
Kr-88	1.37E-08
Xe-133	1.32E-08
Xe-133m	3.43E-08
Xe-135	4.16E-09
Xe-137	9.62E-07
Xe-138	1.58E-07

3. IODINES AND PARTICULATES

Alpha	1.59E-15
Cr-51	4.67E-13
Mn-54	4.44E-14
Co-58	3.19E-14
Fe-59	1.01E-13
Co-60	1.21E-13
Zn-65	2.28E-13
Sr-89	1.46E-15
Sr-90	1.12E-15
Mo-99	4.72E-13
I-131	5.43E-14
Cs-134	7.41E-14
Cs-137	5.04E-14
Ba-140	1.71E-13
La-140	1.37E-13
Ce-141	6.22E-14
Ce-144	2.48E-13

NOTES:

1. The above values represent typical "a priori" LLDs for isotopes where values of " $\leq\text{LLD}$ " are indicated in Tables 1A, 1B, 1C, 2A, and 2B. Also included are isotopes specified in ODCMS 7.3.3 and 7.3.7.
2. Where activity for any nuclide is reported as "Less than LLD," that nuclide is considered not present and the LLD activity listed is not considered in the summary data.

ATTACHMENT 2 (cont.)

EFFLUENT AND WASTE DISPOSAL DATA
Table 3A: Solid Waste and Irradiated Fuel Shipments – Waste Class A

Waste Class A

1. <u>Total volume shipped</u> (cubic meters)			1.72E+02
	Total curie quantity (estimated)		9.32E+01
2. <u>Type of Waste</u>			Estimated Total %Error
		<u>Unit</u>	<u>Period</u>
a. Spent resins, filter, sludges		meter ³	3.75E+01
		Curies	4.52E+01
			1.00E+01
b. Dry active waste, compacted/non-compactd		meter ³	1.34E+02
		Curies	4.80E+01
			1.00E+01
c. Irradiated components		meters ³	0.00E+00
		Curies	0.00E+00
			N/A
d. Others (describe)		meters ³	0.00E+00
		Curies	0.00E+00
			N/A
3. <u>Estimate of major radionuclides composition</u>			
a. C-14	4.46E+00 %		
Mn-54	1.40E+00 %		
Fe-55	2.36E+01 %		
Co-60	5.60E+01 %		
Ni-63	6.86E+00 %		
Cs-137	6.38E+00 %		
Zn-65	1.22E+00 %		
b. Fe-55	6.70E+01 %		
Co-60	2.77E+01 %		
Ni-63	1.43E+00 %		
Cs-134	1.52E+00 %		
Cs-137	1.29E+00 %		
c. N/A			
d. N/A			

NOTE:

Solid Radioactive Waste listed above was shipped for processing to various waste processing services or directly shipped to licensed disposal facility.

ATTACHMENT 2 (cont.)

EFFLUENT AND WASTE DISPOSAL DATA

Table 3A: Solid Waste and Irradiated Fuel Shipments – Waste Class A (cont.)

4. Cross reference table, waste stream, form, and container type

<u>Stream</u>	<u>Form</u>	<u>Container Type</u> Type A/Type B	<u>No. of shipments</u>
a. Resin	Dewatered & Solidified*	Type A or STP	2.70E+01
b. Dry active waste	Compacted/ Non-compacted	Type A or STP	1.20E+01
c. Irradiated components		N/A	N/A
d. Others (describe)		N/A	N/A

*Solidification agent or absorbent (e.g., cement, urea-formaldehyde)

5. Shipment Disposition

a. Solid Waste

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
2.70E+01	Highway	Barnwell, SC
1.20E+01	Highway	Envirocare of Utah

b. Irradiated Fuel

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
0	N/A	N/A

ATTACHMENT 2 (cont.)

EFFLUENT AND WASTE DISPOSAL DATA
Table 3B: Solid Waste and Irradiated Fuel Shipments – Waste Class B

Waste Class B

1. <u>Total volume shipped</u> (cubic meters)			3.20E+01
Total curie quantity (estimated)			1.15E+03
2. <u>Type of Waste</u>			Estimated Total %Error
	<u>Unit</u>	<u>Period</u>	
a. Spent resins, filter, sludges	meter ³	3.20E+01	
	Curies	1.15E+03	1.00E+01
b. Dry active waste, compacted/non-compacted	meter ³	0.00E+00	
	Curies	0.00E+00	N/A
c. Irradiated components	meters ³	0.00E+00	
	Curies	0.00E+00	N/A
d. Others (describe)	meters ³	0.00E+00	
	Curies	0.00E+00	N/A
3. <u>Estimate of major radionuclides composition</u>			
a. Cr-51	1.53E+00 %		
Mn-54	1.26E+00 %		
Fe-55	1.40E+01 %		
Co-58	2.38E+00 %		
Co-60	6.06E+01 %		
Ni-63	9.86E+00 %		
Zn-65	1.55E+00 %		
Cs-134	1.26E+00 %		
Cs-137	7.54E+00 %		
b.	N/A		
c.	N/A		
d.	N/A		

NOTE:

Solid Radioactive Waste was shipped either directly for disposal or to a waste processor for processing and then transported for disposal by the processor.

ATTACHMENT 2 (cont.)

EFFLUENT AND WASTE DISPOSAL DATA
Table 3B: Solid Waste and Irradiated Fuel Shipments – Waste Class B (cont.)

4. Cross reference table, waste stream, form, and container type

<u>Stream</u>	<u>Form</u>	<u>Container Type</u> Type A/Type B	<u>No. of shipments</u>
a. Resin and filters	Dewatered & Solidified*	Type B	1.60E+01
b. Dry active waste	Compacted/ Non-compacted	N/A	N/A
c. Irradiated components		N/A	N/A
d. Others (describe)		N/A	N/A

*Solidification agent or absorbent (e.g., cement, urea-formaldehyde)

5. Shipment Disposition

a. Solid Waste

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
1.60E+01	Highway	Barnwell, SC

b. Irradiated Fuel

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
0	N/A	N/A

ATTACHMENT 2 (cont.)

EFFLUENT AND WASTE DISPOSAL DATA
Table 3C: Solid Waste and Irradiated Fuel Shipments – Waste Class C

Waste Class C

1. <u>Total volume shipped</u> (cubic meters)			5.50E+00
Total curie quantity (estimated)			2.04E+01
2. <u>Type of Waste</u>			
			Estimated Total %Error
	<u>Unit</u>	<u>Period</u>	
a. Spent resins, filter, sludges	meter ³	5.50E+00	
	Curies	2.04E+01	1.00E+01
b. Dry active waste, compacted/non-compactd	meter ³	0.00E+00	
	Curies	0.00E+00	N/A
c. Irradiated components	meters ³	0.00E+00	
	Curies	0.00E+00	N/A
d. Others (describe)	meters ³	0.00E+00	
	Curies	0.00E+00	N/A
3. <u>Estimate of major radionuclides composition</u>			
a. Fe-55	6.42E+01		
Co-60	2.95E+01		
Ni-63	3.82E+00		
Cs-137	2.55E+00		
b. N/A			
c. N/A			
d. N/A			

NOTE:

Solid Radioactive Waste was shipped either directly for disposal or to a waste processor for processing and then transported for disposal by the processor.

ATTACHMENT 2 (cont.)

EFFLUENT AND WASTE DISPOSAL DATA
Table 3C: Solid Waste and Irradiated Fuel Shipments – Waste Class C (cont.)

4. Cross reference table, waste stream, form, and container type

<u>Stream</u>	<u>Form</u>	<u>Container Type</u> Type A/Type B	<u>No. of shipments</u>
a. Resin and filters	Dewatered & Solidified*	Type B	1.00E+00
b. Dry active waste	Compacted/ Non-compacted	N/A	N/A
c. Irradiated components		N/A	N/A
d. Others (describe)		N/A	N/A

*Solidification agent or absorbent (e.g., cement, urea-formaldehyde)

5. Shipment Disposition

a. Solid Waste

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
1.00E+00	Highway	Barnwell, S.C.

b. Irradiated Fuel

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
7.00E+00	Rail	New Hill, N.C.

ATTACHMENT 2 (cont.)
COMBUSTION OF WASTE OIL

No contaminated waste oil was incinerated during this report period.

ATTACHMENT 3

ENVIRONMENTAL MONITORING PROGRAM

Enclosure 1: Milk and Vegetable Sample Location

Enclosure 2: Land Use Census

ATTACHMENT 3 (cont.)

ENVIRONMENTAL MONITORING PROGRAM

Enclosure 1: Milk and Vegetation Sample Location

No milk animals are located in the area evaluated by the last Land Use Census, therefore, no milk sampling locations were available during this time period.

Vegetation sample locations remained unchanged.

ATTACHMENT 3 (cont.)

ENVIRONMENTAL MONITORING PROGRAM

Enclosure 2: Land Use Census

The 2001 Land Use Census did not identify any locations that are reportable in the Radioactive Effluent Release Report for 2001. The following is a summary of the nearest resident and garden locations identified within five miles of the plant. No milk animals were found within five miles of the plant. Three beef cattle with pasture were found 0.9 miles from the plant, in the SE and SSE sectors.

<u>Direction</u>	<u>Residence</u>	<u>Garden</u>
NNE	0.8 miles	1.2 miles
NE	None	None
ENE	None	None
E	None	None
ESE	1.5 miles	None
SE	0.9 miles	None
SSE	1.0 miles	None
S	1.1 miles	1.1 miles
SSW	1.2 miles	1.5 miles
SW	1.0 miles	2.9 miles
WSW	1.2 miles	1.2 miles
W	0.8 miles	1.1 miles
WNW	0.8 miles	1.0 miles
NW	0.9 miles	1.0 miles
NNW	0.8 miles	4.4 miles
N	0.7 miles	0.9 miles

ATTACHMENT 4

EFFLUENT INSTRUMENTATION

- Enclosure 1: Radioactive Liquid Effluent Monitoring Instrumentation
- Enclosure 2: Radioactive Gaseous Effluent Monitoring Instrumentation
- Enclosure 3: Liquid Hold-Up Tank

ATTACHMENT 4 (cont.)

EFFLUENT INSTRUMENTATION

Enclosure 1: Radioactive Liquid Effluent Monitoring Instrumentation

Although no Radioactive Liquid Effluent Monitoring Instruments were inoperable for a period of greater than 30 days, the Unit 2 Main Service Water System Effluent Radioactivity Monitor remained out-of-service under Technical Requirements Manual (TRM) conditions for over 39 days during the associated refueling outage.

Event Summary:

The Unit 2 Service Water Monitor event consisted of declaring the referenced monitor inoperable due to the monitor indication being below minimum required background counts. The condition occurred due to the securing of hydrogen water chemistry (HWC) injection to the shutdown unit and the associated reduction in background activity. An active TRM (A2-01-0336) was initiated on February 24, 2001, at 1020 hours. This required Off-site Dose Calculation Manual Surveillance (ODCMS) compensatory measure actions as stated below:

D. As required by Required Compensatory Measure A.1 and referenced in Table 7.3.1-1.	D.1 Collect and analyze a grab sample for gross radioactivity (beta or gamma) of the associated effluent. The LLD shall be $\leq 1.0 \text{ E-}7 \mu\text{Ci/gm}$.	Once per 12 hours
	<u>AND</u> D.2 Restore the channel to OPERABLE status.	30 days

At 21:37 on the same day, the Units 1 and 2 service water systems were cross-tied, eliminating the monitoring pathway. This action removed the applicability of the compensatory measure as referenced by the following:

ODCMS 7.3.0.2 If the ODCMS is met or is no longer applicable prior to expiration of the specified Completion Time(s), completion of the Required Compensatory measure(s) is not required, unless otherwise stated.

This crosstie restored the one required channel per function (ODCMS Table 7.3.1-1) for the associated service water pathway. The logical connector (AND) and the Senior Reactor Operator (SRO) notes for the TRM denoted that the subsequent action (D.2) should be reevaluated when the system is no longer cross-tied. The TRM remained in effect until unit restart and monitor evaluation, denoting that the background setpoint needed to be adjusted. Compensatory measures

ATTACHMENT 4 (cont.)

EFFLUENT INSTRUMENTATION

Enclosure 1: Radioactive Liquid Effluent Monitoring Instrumentation (cont.)

began when the service water system was split on March 23, 2001, at 1804 hours. The initial TRM was effective for over 39 days prompting a subsequent action as denoted below:

<p>I. Required Compensatory Measure B.3, C.2, D.2, E.2, F.2, or G.2 and associated Completion Time not met.</p>	<p>I.1 Prepare and submit, in the Radioactive Effluent Release Report, the reason the channel was not restored to OPERABLE status within 30 days.</p>	<p>Upon submittal of current calendar year Radioactive Effluent Release Report</p>
--	---	--

As noted previously, Unit 2 restart and HWC restoration did not eliminate the minimum background problem with the Main Service Water Radioactivity Monitor and required action by Chemistry and Instrumentation and Controls personnel to determine and install new values. The maintenance activity was not scheduled proactively due to the associated parties deciding to wait for the appropriate plant conditions to complete the monitor evaluation. Due to the environmental condition (i.e. the background radiation level surrounding the monitor) contributing to the operability status of the monitor, this approach was necessary to prevent rework and reinstallation of background setpoints. When conditions warranted and the resources were available, the work was completed and the TRM was canceled on April 4, 2001, at 1402 hours. In summary, the monitor operability concern was only evident during the time the required channels per function were applicable. This would apply to the period outside the crosstie event and result in a total inoperability of 12.3 days.

This item was determined not to be reportable but is being included in this report for informational purposes.

ATTACHMENT 4 (cont.)

EFFLUENT INSTRUMENTATION

Enclosure 2: Radioactive Gaseous Effluent Monitoring Instrumentation

No Radioactive Gaseous Effluent Monitoring Instruments were inoperable for a period of greater than 30 days.

ATTACHMENT 4 (cont.)

EFFLUENT INSTRUMENTATION

Enclosure 3: Liquid Hold-Up Tank

No Liquid Hold-Up Tank exceeded the 10-Curie limit of ODCMS 7.3.6 during this reporting period.

ATTACHMENT 5

MAJOR MODIFICATION TO THE RADIOACTIVE WASTE TREATMENT SYSTEMS

In accordance with ODCMS 7.5.1, major changes to the liquid, gaseous, and solid Radioactive Waste Treatment Systems shall be reported to the NRC as part of the Radioactive Effluent Release Report or as part of the Updated Final Safety Analysis Report (UFSAR) update. Any major modifications to the radioactive waste treatment systems will be submitted with the UFSAR in accordance with 10 CFR 50.71(e).

ATTACHMENT 6

METEOROLOGICAL DATA

Per Technical Specification 5.6.3 and ODCMS 7.4.2, the annual summary of meteorological data collected over the calendar year has been retained in a file and is available for NRC review upon request.

ATTACHMENT 7
ANNUAL DOSE ASSESSMENT

- Enclosure 1: 2001 Annual Liquid Dose Assessment
- Enclosure 2: 2001 Annual Gaseous Dose Assessment
- Enclosure 3: 2001 Dose Assessment Summary

ATTACHMENT 7 (cont.)

ANNUAL DOSE ASSESSMENT

Enclosure 1: 2001 Annual Liquid Dose Assessment

Included are:

Site Specific Data

Source Term

As Low As Reasonably Achievable Maximum Individual Dose

Summary - Total Integrated and Recreation Population Dose

ATTACHMENT 7 (cont.)

ANNUAL DOSE ASSESSMENT

Enclosure 1: 2001 Annual Liquid Dose Assessment (cont.)

Site Specific Data

BSEP UNITS 1 AND 2 LIQUID RELEASES 2001,

DISCHARGE = 2.04E+03 CFS

SOURCE TERM MULTIPLIER = 1.00E+00

SALTWATER SITE

NO RECONCENTRATION MODEL

50-MILE POPULATION = 3.18E+05

FRACTION ---

ADULT=0.71

TEENAGER=0.11

CHILD=0.18

DOSE FACTOR LIBRARY CONTAINS 698 ENTRIES

ATTACHMENT 7 (cont.)

ANNUAL DOSE ASSESSMENT

Enclosure 1: 2001 Annual Liquid Dose Assessment (cont.)

Source Term

* * * COST-BENEFIT ANALYSIS * * *						
0	NUCLIDE	RELEASE CI/YR	PERSON-REM DOSE		PERSON-REM PER CURIE	
			TOTAL BODY	THYROID	TOTAL BODY	THYROID
	1H 3	1.22E+02	2.41E-03	2.41E-03	1.98E-05	1.98E-05
	25MN 54	1.27E-05	1.40E-06	1.14E-08	1.11E-01	9.03E-04
	26FE 55	6.11E-04	2.09E-04	3.00E-13	3.42E-01	4.90E-10
	27CO 58	2.08E-05	8.14E-07	5.39E-09	3.91E-02	2.59E-04
	27CO 60	1.48E-03	1.97E-04	2.22E-05	1.33E-01	1.50E-02
	53I 131	1.20E-05	5.15E-08	2.93E-05	4.30E-03	2.44E+00
	53I 133	2.58E-05	3.95E-10	7.92E-08	1.53E-05	3.07E-03
	54XE 133	2.62E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	54XE 135	1.59E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	55CS 134	2.54E-05	2.30E-05	1.13E-07	9.04E-01	4.45E-03
	55CS 137	1.84E-04	9.96E-05	1.55E-06	5.40E-01	8.40E-03
0	TOTAL		2.94E-03	2.46E-03		

ATTACHMENT 7 (cont.)
ANNUAL DOSE ASSESSMENT
Enclosure 1: 2001 Annual Liquid Dose Assessment (cont.)

As Low As Reasonably Achievable Maximum Individual Dose (Page 1 of 2)

* * * AS LOW AS REASONABLY ACHIEVABLE * * *								
ADULT DOSES (MREM PER YEAR INTAKE)								
DOSE								
OPATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		2.18E-06	6.25E-06	5.25E-06	4.51E-06	4.54E-06	5.20E-06	7.52E-06
INVERT		3.10E-06	3.55E-06	2.26E-06	1.20E-06	1.11E-06	2.27E-06	7.77E-06
SHORELINE	2.59E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05
SWIMMING		1.31E-08	1.31E-08	1.31E-08	1.31E-08	1.31E-08	1.31E-08	1.31E-08
BOATING		6.54E-09	6.54E-09	6.54E-09	6.54E-09	6.54E-09	6.54E-09	6.54E-09
TOTAL	2.59E-05	2.73E-05	3.19E-05	2.96E-05	2.78E-05	2.77E-05	2.95E-05	3.73E-05
0	USAGE (KG/YR,HR/YR)		DILUTION	TIME (HR)	SHOREWIDTH FACTOR=0.5			
FISH	21.0		30.0	24.00				
INVERT	5.0		30.0	24.00				
SHORELINE	500.0		30.0	0.00				
SWIMMING	100.0		30.0	0.00				
BOATING	100.0		30.0	0.00				
TEEN DOSES (MREM PER YEAR INTAKE)								
DOSE								
OPATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		2.29E-06	5.34E-06	4.15E-06	3.49E-06	3.53E-06	4.35E-06	5.64E-06
INVERT		3.24E-06	3.45E-06	2.04E-06	9.43E-07	8.54E-07	2.28E-06	5.60E-06
SHORELINE	2.59E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05
SWIMMING		1.31E-08	1.31E-08	1.31E-08	1.31E-08	1.31E-08	1.31E-08	1.31E-08
BOATING		6.54E-09	6.54E-09	6.54E-09	6.54E-09	6.54E-09	6.54E-09	6.54E-09
TOTAL	2.59E-05	2.76E-05	3.09E-05	2.82E-05	2.65E-05	2.64E-05	2.87E-05	3.33E-05
0	USAGE (KG/YR,HR/YR)		DILUTION	TIME (HR)	SHOREWIDTH FACTOR=0.5			
FISH	16.0		30.0	24.00				
INVERT	3.8		30.0	24.00				
SHORELINE	500.0		30.0	0.00				
SWIMMING	100.0		30.0	0.00				
BOATING	100.0		30.0	0.00				

ATTACHMENT 7 (cont.)
ANNUAL DOSE ASSESSMENT
Enclosure 1: 2001 Annual Liquid Dose Assessment (cont.)

As Low As Reasonably Achievable Maximum Individual Dose (Page 2 of 2)

* * * AS LOW AS REASONABLY ACHIEVABLE * * *

0 0		C H I L D D O S E S			(MREM PER YEAR INTAKE)				
		D O S E							
OPATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI	
FISH		2.99E-06	4.66E-06	3.59E-06	2.90E-06	2.92E-06	3.64E-06	3.62E-06	
INVERT		4.41E-06	3.32E-06	2.16E-06	8.36E-07	7.32E-07	2.03E-06	2.50E-06	
SHORELINE	2.59E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	2.20E-05	
SWIMMING		1.31E-08	1.31E-08	1.31E-08	1.31E-08	1.31E-08	1.31E-08	1.31E-08	
BOATING		6.54E-09	6.54E-09	6.54E-09	6.54E-09	6.54E-09	6.54E-09	6.54E-09	
TOTAL	2.59E-05	2.95E-05	3.00E-05	2.78E-05	2.58E-05	2.57E-05	2.77E-05	2.82E-05	
0		USAGE (KG/YR,HR/YR)	DILUTION	TIME (HR)	SHOREWIDTH FACTOR=0.5				
FISH		6.9	30.0	24.00					
INVERT		1.7	30.0	24.00					
SHORELINE		500.0	30.0	0.00					
SWIMMING		100.0	30.0	0.00					
BOATING		100.0	30.0	0.00					

ATTACHMENT 7 (cont.)
ANNUAL DOSE ASSESSMENT
Enclosure 1: 2001 Annual Liquid Dose Assessment (cont.)

Summary - Total Integrated and Recreation Population Dose

1CP&L
LADTAP

ANNUAL RADIOLOGICAL EFFLUENT REPORTING
RADIATION DOSES FROM LIQUID EFFLUENTS

RUN DATE: 04/10/02
RUN TIME: 11:31:23

TOTAL INTEGRATED AND RECREATION POPULATION DOSES FROM LIQUID EFFLUENTS
(PERSON-REM)

PATHWAY	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI	SKIN
0 SPORT FISH	1.312E-03	3.306E-03	2.724E-03	2.293E-03	2.336E-03	2.722E-03	3.733E-03	0.000E+00
0 COM FISH	7.225E-05	1.823E-04	1.502E-04	1.262E-04	1.289E-04	1.502E-04	2.059E-04	0.000E+00
0 SPORT INVERT	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0 COM INVERT	6.303E-05	6.602E-05	4.188E-05	1.964E-05	1.915E-05	4.210E-05	1.248E-04	0.000E+00
0 DRINKING WATER	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0 SHORELINE	2.380E-05	2.380E-05	2.380E-05	2.380E-05	2.380E-05	2.380E-05	2.380E-05	2.798E-05
0 SWIMMING	3.729E-08	3.729E-08	3.729E-08	3.729E-08	3.729E-08	3.729E-08	3.729E-08	0.000E+00
0 BOATING	1.766E-08	1.766E-08	1.766E-08	1.766E-08	1.766E-08	1.766E-08	1.766E-08	0.000E+00
0 IRRIG VEG	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0 IRRIG LEAFY VEG	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0 IRRIG MILK	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0 IRRIG MEAT	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0 ALL PATHWAYS	1.471E-03	3.578E-03	2.940E-03	2.462E-03	2.508E-03	2.938E-03	4.087E-03	2.798E-05

ATTACHMENT 7 (cont.)

ANNUAL DOSE ASSESSMENT

Enclosure 2: 2001 Annual Gaseous Dose Assessment

Included are:

Source Term for the Three Release Modes and the Site Aggregate

Total 50 Mile Integrated Population Dose by Pathways and Organs

Hypothetical Maximum Individual Organ Dose Due to Iodines, Particulates, and Tritium for a Cow Milk Pathway at 4.75 Miles Northeast

Maximum Site Boundary Dose by Age Group and Organs for All Pathways

Estimated Individual Organ Dose Using the 2001 Land Use Census for the Worst Sector and Existing Pathway

Maximum Site Boundary Dose Due to Iodines, Particulates, and Tritium for Existing Pathways

ATTACHMENT 7 (cont.)

ANNUAL DOSE ASSESSMENT

Enclosure 2: 2001 Annual Gaseous Dose Assessment (cont.)

Source Term for the Three Release Modes and the Site Aggregate (Page 1 of 2)

GR01YREC
GR01YRGC
GR01YRMC
1CP&L

ANNUAL RADIOLOGICAL EFFLUENT REPORTING
GASRPT INPUT SOURCE TERMS

RUN DATE: 04/16/02
RUN TIME: 09:21:29

2001 SOURCE TERM (ELEVATED MODE) BSEP UNITS 1&2

1 H - 3	5.490E+01
24 CR- 51	1.370E-05
25 MN- 54	1.266E-06
27 CO- 58	1.639E-05
27 CO- 60	8.526E-05
36 KR- 85 M	1.294E+01
36 KR- 87	4.667E+00
36 KR- 88	5.270E+00
38 SR- 89	3.801E-04
38 SR- 90	3.112E-06
53 I -131	9.874E-03
53 I -132	6.842E-02
53 I -133	6.454E-02
53 I -134	1.103E-01
53 I -135	1.069E-01
54 XE-133	4.861E+01
54 XE-135	2.950E+01
54 XE-135 M	8.113E+01
54 XE-137	1.485E+02
54 XE-138	2.023E+02
55 CS-134	4.163E-06
55 CS-137	3.915E-05
56 BA-140	7.619E-04
57 LA-140	1.265E-03

SOURCE TERM (GROUND LEVEL) 2001 BSEP UNITS 1 AND 2

1 H - 3	7.665E+01
38 SR- 89	1.247E-05
38 SR- 90	1.270E-07
53 I -131	9.208E-05
53 I -132	4.367E-04
53 I -133	5.419E-04
53 I -135	2.588E-04
54 XE-133	8.499E-02
54 XE-135	5.556E+00
54 XE-135 M	5.848E-02
56 BA-140	7.870E-06
57 LA-140	1.489E-05

ATTACHMENT 7 (cont.)

ANNUAL DOSE ASSESSMENT

Enclosure 2: 2001 Annual Gaseous Dose Assessment (cont.)

Source Term for the Three Release Modes and the Site Aggregate (Page 2 of 2)

1CP&L
ANNUAL RADIOLOGICAL EFFLUENT REPORTING
GASRPT INPUT SOURCE TERMS

RUN DATE: 04/16/02
RUN TIME: 09:21:29

BRUNSWICK UNIT 1 AND 2, MIXED MODE CONTINUOUS GASEOUS RELEASES, 2001

1 H - 3	1.437E+01
24 CR- 51	8.046E-05
27 CO- 58	1.478E-05
27 CO- 60	1.724E-04
38 SR- 89	4.242E-06
53 I -131	7.251E-04
53 I -132	4.751E-03
53 I -133	6.726E-03
53 I -134	3.973E-03
53 I -135	4.957E-03
54 XE-133	7.016E-01
54 XE-135	2.170E+01
54 XE-135 M	4.516E+01
55 CS-137	2.796E-06

AGGREGATE SOURCE TERM

1 H - 3	1.4591E+02
24 CR- 51	9.4156E-05
25 MN- 54	1.2660E-06
27 CO- 58	3.1171E-05
27 CO- 60	2.5770E-04
36 KR- 85 M	1.2940E+01
36 KR- 87	4.6675E+00
36 KR- 88	5.2701E+00
38 SR- 89	3.9679E-04
38 SR- 90	3.2389E-06
53 I -131	1.0691E-02
53 I -132	7.3608E-02
53 I -133	7.1808E-02
53 I -134	1.1430E-01
53 I -135	1.1216E-01
54 XE-133	4.9394E+01
54 XE-135	5.6761E+01
54 XE-135 M	1.2635E+02
54 XE-137	1.4846E+02
54 XE-138	2.0232E+02
55 CS-134	4.1630E-06
55 CS-137	4.1943E-05
56 BA-140	7.6977E-04
57 LA-140	1.2795E-03

ATTACHMENT 7 (cont.)

ANNUAL DOSE ASSESSMENT

Enclosure 2: 2001 Annual Gaseous Dose Assessment (cont.)

Total 50 Mile Integrated Population Dose by Pathways and Organs

1CP&L

ANNUAL RADIOLOGICAL EFFLUENT REPORTING
ALARA ANNUAL INTEGRATED POPULATION DOSE SUMMARY (MANREM)

RUN DATE: 04/16/02
RUN TIME: 09:21:29

2001 SOURCE TERM (ELEVATED MODE) BSEP UNITS 1&2
SOURCE TERM (GROUND LEVEL) 2001 BSEP UNITS 1 AND 2
BRUNSWICK UNIT 1 AND 2, MIXED MODE CONTINUOUS GASEOUS RELEASES, 2001

	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
** TOTAL **	4.460E-02	4.463E-02	4.670E-03	4.463E-02	4.467E-02	5.748E-02	4.475E-02	5.123E-02
PLUME	3.746E-03 8.40%	3.746E-03 8.39%	3.746E-03 80.21%	3.746E-03 8.39%	3.746E-03 8.39%	3.746E-03 6.52%	3.829E-03 8.56%	1.028E-02 20.07%
GROUND PLANE	7.798E-04 1.75%	7.798E-04 1.75%	7.798E-04 16.70%	7.798E-04 1.75%	7.798E-04 1.75%	7.798E-04 1.36%	7.798E-04 1.74%	9.173E-04 1.79%
INHALATION	3.467E-02 77.74%	3.470E-02 77.75%	4.803E-05 1.03%	3.470E-02 77.76%	3.474E-02 77.77%	4.336E-02 75.44%	3.475E-02 77.67%	3.465E-02 67.63%
VEGETATION	3.477E-03 7.80%	3.479E-03 7.80%	9.062E-05 1.94%	3.477E-03 7.79%	3.482E-03 7.79%	6.995E-03 12.17%	3.463E-03 7.74%	3.462E-03 6.76%
COW MILK	9.549E-05 0.21%	9.513E-05 0.21%	1.183E-06 0.03%	9.594E-05 0.21%	9.640E-05 0.22%	3.653E-04 0.64%	9.494E-05 0.21%	9.492E-05 0.19%
MEAT & POULTRY	1.827E-03 4.10%	1.831E-03 4.10%	4.466E-06 0.10%	1.827E-03 4.09%	1.827E-03 4.09%	2.233E-03 3.88%	1.825E-03 4.08%	1.825E-03 3.56%

ATTACHMENT 7 (cont.)
ANNUAL DOSE ASSESSMENT
Enclosure 2: 2001 Annual Gaseous Dose Assessment (cont.)

Hypothetical Maximum Individual Organ Dose Due to Iodines, Particulates, and Tritium for a Cow Milk Pathway at 4.75 Miles NE

1CP&L ANNUAL RADIOLOGICAL EFFLUENT REPORTING RUN DATE: 04/16/02
GASRPT RADIATION DOSES AT SELECTED LOCATIONS RUN TIME: 09:21:29

2001 SOURCE TERM (ELEVATED MODE) BSEP UNITS 1&2
SOURCE TERM (GROUND LEVEL) 2001 BSEP UNITS 1 AND 2
BRUNSWICK UNIT 1 AND 2, MIXED MODE CONTINUOUS GASEOUS RELEASES, 2001

SPECIAL LOCATION METERS DIR PL GR IN V CM GM M
#42 COW MILK 7644.0 NE 0 1 1 1 1 0 0

ANNUAL BETA AIR DOSE = 4.228E-04 MILLRADS
ANNUAL GAMMA AIR DOSE = 5.502E-04 MILLRADS

	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT	3.148E-03	3.150E-03	1.605E-04	3.158E-03	3.174E-03	1.223E-02	3.123E-03	3.131E-03
GROUND PLANE	6.773E-05	6.773E-05	6.773E-05	6.773E-05	6.773E-05	6.773E-05	6.773E-05	7.967E-05
INHALATION	8.945E-04	8.955E-04	1.476E-06	8.957E-04	8.970E-04	1.166E-03	8.967E-04	8.937E-04
VEGETATION	1.627E-03	1.633E-03	6.820E-05	1.625E-03	1.627E-03	3.707E-03	1.614E-03	1.613E-03
COW MILK	5.592E-04	5.534E-04	2.312E-05	5.697E-04	5.830E-04	7.295E-03	5.449E-04	5.445E-04
TEENAGER	3.563E-03	3.558E-03	2.058E-04	3.584E-03	3.610E-03	1.633E-02	3.529E-03	3.535E-03
GROUND PLANE	6.773E-05	6.773E-05	6.773E-05	6.773E-05	6.773E-05	6.773E-05	6.773E-05	7.967E-05
INHALATION	9.004E-04	9.014E-04	1.974E-06	9.021E-04	9.039E-04	1.256E-03	9.039E-04	8.993E-04
VEGETATION	1.862E-03	1.867E-03	9.452E-05	1.860E-03	1.860E-03	3.589E-03	1.848E-03	1.847E-03
COW MILK	7.321E-04	7.213E-04	4.161E-05	7.540E-04	7.780E-04	1.142E-02	7.101E-04	7.093E-04
CHILD	4.910E-03	4.869E-03	3.722E-04	4.945E-03	4.981E-03	2.931E-02	4.850E-03	4.856E-03
GROUND PLANE	6.773E-05	6.773E-05	6.773E-05	6.773E-05	6.773E-05	6.773E-05	6.773E-05	7.967E-05
INHALATION	7.965E-04	7.965E-04	2.535E-06	7.979E-04	7.995E-04	1.235E-03	7.991E-04	7.953E-04
VEGETATION	2.885E-03	2.875E-03	2.019E-04	2.881E-03	2.878E-03	5.537E-03	2.862E-03	2.861E-03
COW MILK	1.161E-03	1.130E-03	1.000E-04	1.199E-03	1.235E-03	2.247E-02	1.122E-03	1.121E-03
INFANT	2.300E-03	2.236E-03	2.668E-04	2.413E-03	2.427E-03	5.450E-02	2.230E-03	2.237E-03
GROUND PLANE	6.773E-05	6.773E-05	6.773E-05	6.773E-05	6.773E-05	6.773E-05	6.773E-05	7.967E-05
INHALATION	4.581E-04	4.579E-04	1.857E-06	4.597E-04	4.600E-04	8.591E-04	4.604E-04	4.573E-04
COW MILK	1.774E-03	1.710E-03	1.972E-04	1.886E-03	1.899E-03	5.358E-02	1.702E-03	1.700E-03

ATTACHMENT 7 (cont.)

ANNUAL DOSE ASSESSMENT

Enclosure 2: 2001 Annual Gaseous Dose Assessment (cont.)

Maximum Site Boundary Dose by Age Group and Organs for All Pathways (Page 1 of 2)

1CP&L
GASRPT

ANNUAL RADIOLOGICAL EFFLUENT REPORTING
RADIATION DOSES AT SELECTED LOCATIONS

RUN DATE: 04/16/02
RUN TIME: 09:21:29

2001 SOURCE TERM (ELEVATED MODE) BSEP UNITS 1&2
SOURCE TERM (GROUND LEVEL) 2001 BSEP UNITS 1 AND 2
BRUNSWICK UNIT 1 AND 2, MIXED MODE CONTINUOUS GASEOUS RELEASES, 2001

SPECIAL LOCATION METERS DIR PL GR IN V CM GM M
3 SITE BOUNDARY 1127.0 NE 1 1 1 1 1 1 1

ANNUAL BETA AIR DOSE = 6.934E-03 MILLRADS
ANNUAL GAMMA AIR DOSE = 6.403E-03 MILLRADS

	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT	9.428E-02	9.417E-02	6.901E-03	9.456E-02	9.493E-02	3.156E-01	9.371E-02	1.004E-01
PLUME	4.253E-03	4.253E-03	4.253E-03	4.253E-03	4.253E-03	4.253E-03	4.322E-03	1.087E-02
GROUND PLANE	8.585E-04	8.585E-04	8.585E-04	8.585E-04	8.585E-04	8.585E-04	8.585E-04	1.010E-03
INHALATION	1.800E-02	1.801E-02	7.492E-06	1.801E-02	1.801E-02	1.905E-02	1.801E-02	1.800E-02
VEGETATION	3.268E-02	3.276E-02	9.651E-04	3.264E-02	3.266E-02	5.953E-02	3.250E-02	3.249E-02
COW MILK	1.116E-02	1.108E-02	3.049E-04	1.129E-02	1.146E-02	9.809E-02	1.097E-02	1.097E-02
GOAT MILK	2.265E-02	2.251E-02	4.886E-04	2.284E-02	2.299E-02	1.269E-01	2.239E-02	2.237E-02
MEAT & POULTRY	4.681E-03	4.707E-03	2.390E-05	4.682E-03	4.683E-03	6.933E-03	4.670E-03	4.670E-03
TEENAGER	1.076E-01	1.073E-01	7.902E-03	1.082E-01	1.088E-01	4.362E-01	1.068E-01	1.134E-01
PLUME	4.253E-03	4.253E-03	4.253E-03	4.253E-03	4.253E-03	4.253E-03	4.322E-03	1.087E-02
GROUND PLANE	8.585E-04	8.585E-04	8.585E-04	8.585E-04	8.585E-04	8.585E-04	8.585E-04	1.010E-03
INHALATION	1.812E-02	1.812E-02	9.689E-06	1.812E-02	1.813E-02	1.949E-02	1.813E-02	1.811E-02
VEGETATION	3.741E-02	3.747E-02	1.338E-03	3.737E-02	3.737E-02	5.969E-02	3.721E-02	3.720E-02
COW MILK	1.458E-02	1.444E-02	5.482E-04	1.486E-02	1.517E-02	1.525E-01	1.429E-02	1.429E-02
GOAT MILK	2.955E-02	2.933E-02	8.755E-04	2.996E-02	3.025E-02	1.950E-01	2.917E-02	2.914E-02
MEAT & POULTRY	2.794E-03	2.806E-03	1.924E-05	2.796E-03	2.796E-03	4.425E-03	2.786E-03	2.786E-03

ATTACHMENT 7 (cont.)

ANNUAL DOSE ASSESSMENT

Enclosure 2: 2001 Annual Gaseous Dose Assessment (cont.)

Maximum Site Boundary Dose by Age Group and Organs for All Pathways (Page 2 of 2)

1CP&L
GASRPT

ANNUAL RADIOLOGICAL EFFLUENT REPORTING
RADIATION DOSES AT SELECTED LOCATIONS

RUN DATE: 04/16/02
RUN TIME: 09:21:29

2001 SOURCE TERM (ELEVATED MODE) BSEP UNITS 1&2
SOURCE TERM (GROUND LEVEL) 2001 BSEP UNITS 1 AND 2
BRUNSWICK UNIT 1 AND 2, MIXED MODE CONTINUOUS GASEOUS RELEASES, 2001

SPECIAL LOCATION	METERS	DIR	PL	GR	IN	V	CM	GM	M
# 3 SITE BOUNDARY	1127.0	NE	1	1	1	1	1	1	1
	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN	
CHILD	1.523E-01	1.512E-01	1.142E-02	1.534E-01	1.543E-01	7.957E-01	1.509E-01	1.575E-01	
PLUME	4.253E-03	4.253E-03	4.253E-03	4.253E-03	4.253E-03	4.253E-03	4.322E-03	1.087E-02	
GROUND PLANE	8.585E-04	8.585E-04	8.585E-04	8.585E-04	8.585E-04	8.585E-04	8.585E-04	1.010E-03	
INHALATION	1.602E-02	1.602E-02	1.194E-05	1.603E-02	1.603E-02	1.771E-02	1.603E-02	1.602E-02	
VEGETATION	5.796E-02	5.780E-02	2.853E-03	5.787E-02	5.784E-02	9.219E-02	5.763E-02	5.762E-02	
COW MILK	2.309E-02	2.270E-02	1.316E-03	2.357E-02	2.404E-02	2.981E-01	2.258E-02	2.257E-02	
GOAT MILK	4.672E-02	4.620E-02	2.094E-03	4.747E-02	4.789E-02	3.767E-01	4.609E-02	4.604E-02	
MEAT & POULTRY	3.376E-03	3.376E-03	3.449E-05	3.379E-03	3.379E-03	5.840E-03	3.366E-03	3.365E-03	
INFANT	1.206E-01	1.187E-01	1.170E-02	1.241E-01	1.242E-01	1.593E+00	1.186E-01	1.252E-01	
PLUME	4.253E-03	4.253E-03	4.253E-03	4.253E-03	4.253E-03	4.253E-03	4.322E-03	1.087E-02	
GROUND PLANE	8.585E-04	8.585E-04	8.585E-04	8.585E-04	8.585E-04	8.585E-04	8.585E-04	1.010E-03	
INHALATION	9.214E-03	9.213E-03	8.196E-06	9.220E-03	9.221E-03	1.076E-02	9.224E-03	9.211E-03	
COW MILK	3.520E-02	3.437E-02	2.592E-03	3.663E-02	3.681E-02	7.039E-01	3.427E-02	3.424E-02	
GOAT MILK	7.106E-02	7.001E-02	3.987E-03	7.316E-02	7.305E-02	8.735E-01	6.994E-02	6.986E-02	

ATTACHMENT 7 (cont.)
ANNUAL DOSE ASSESSMENT
Enclosure 2: 2001 Annual Gaseous Dose Assessment (cont.)

Estimated Individual Organ Dose Using the 2001 Land Use Census for the Worst Sector and Existing Pathway

1CP&L
GASRPT

ANNUAL RADIOLOGICAL EFFLUENT REPORTING
RADIATION DOSES AT SELECTED LOCATIONS

RUN DATE: 04/16/02
RUN TIME: 09:21:29

2001 SOURCE TERM (ELEVATED MODE) BSEP UNITS 1&2
SOURCE TERM (GROUND LEVEL) 2001 BSEP UNITS 1 AND 2
BRUNSWICK UNIT 1 AND 2, MIXED MODE CONTINUOUS GASEOUS RELEASES, 2001

SPECIAL LOCATION METERS DIR PL GR IN V CM GM M
#22 RESIDENCE 1770.0 S 1 1 1 1 0 0 0

ANNUAL BETA AIR DOSE = 3.802E-03 MILLRADS
ANNUAL GAMMA AIR DOSE = 3.487E-03 MILLRADS

	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT	6.433E-02	6.435E-02	2.683E-03	6.432E-02	6.433E-02	7.062E-02	6.434E-02	6.772E-02
PLUME	2.310E-03	2.310E-03	2.310E-03	2.310E-03	2.310E-03	2.310E-03	2.349E-03	5.714E-03
GROUND PLANE	1.560E-04	1.560E-04	1.560E-04	1.560E-04	1.560E-04	1.560E-04	1.560E-04	1.835E-04
INHALATION	2.204E-02	2.205E-02	6.249E-06	2.205E-02	2.205E-02	2.278E-02	2.205E-02	2.204E-02
VEGETATION	3.982E-02	3.984E-02	2.103E-04	3.981E-02	3.982E-02	4.538E-02	3.978E-02	3.978E-02
TEENAGER	7.024E-02	7.026E-02	2.766E-03	7.024E-02	7.024E-02	7.581E-02	7.025E-02	7.363E-02
PLUME	2.310E-03	2.310E-03	2.310E-03	2.310E-03	2.310E-03	2.310E-03	2.349E-03	5.714E-03
GROUND PLANE	1.560E-04	1.560E-04	1.560E-04	1.560E-04	1.560E-04	1.560E-04	1.560E-04	1.835E-04
INHALATION	2.218E-02	2.219E-02	7.927E-06	2.219E-02	2.219E-02	2.314E-02	2.219E-02	2.218E-02
VEGETATION	4.559E-02	4.560E-02	2.916E-04	4.558E-02	4.559E-02	5.020E-02	4.555E-02	4.555E-02
CHILD	9.270E-02	9.267E-02	3.097E-03	9.269E-02	9.269E-02	1.010E-01	9.268E-02	9.606E-02
PLUME	2.310E-03	2.310E-03	2.310E-03	2.310E-03	2.310E-03	2.310E-03	2.349E-03	5.714E-03
GROUND PLANE	1.560E-04	1.560E-04	1.560E-04	1.560E-04	1.560E-04	1.560E-04	1.560E-04	1.835E-04
INHALATION	1.962E-02	1.962E-02	9.525E-06	1.962E-02	1.962E-02	2.080E-02	1.962E-02	1.961E-02
VEGETATION	7.062E-02	7.059E-02	6.212E-04	7.060E-02	7.060E-02	7.770E-02	7.055E-02	7.055E-02
INFANT	1.375E-02	1.375E-02	2.473E-03	1.375E-02	1.375E-02	1.483E-02	1.379E-02	1.718E-02
PLUME	2.310E-03	2.310E-03	2.310E-03	2.310E-03	2.310E-03	2.310E-03	2.349E-03	5.714E-03
GROUND PLANE	1.560E-04	1.560E-04	1.560E-04	1.560E-04	1.560E-04	1.560E-04	1.560E-04	1.835E-04
INHALATION	1.128E-02	1.128E-02	6.255E-06	1.128E-02	1.128E-02	1.236E-02	1.129E-02	1.128E-02

ATTACHMENT 7 (cont.)

ANNUAL DOSE ASSESSMENT

Enclosure 2: 2001 Annual Gaseous Dose Assessment (cont.)

Maximum Site Boundary Dose Due to Iodines, Particulates, and Tritium for Existing Pathways

1CP&L
GASRPT

ANNUAL RADIOLOGICAL EFFLUENT REPORTING
RADIATION DOSES AT SELECTED LOCATIONS

RUN DATE: 04/16/02
RUN TIME: 09:38:48

2001 SOURCE TERM (ELEVATED MODE) BSEP UNITS 1&2
SOURCE TERM (GROUND LEVEL) 2001 BSEP UNITS 1 AND 2
BRUNSWICK UNIT 1 AND 2, MIXED MODE CONTINUOUS GASEOUS RELEASES, 2001

SPECIAL LOCATION METERS DIR PL GR IN V CM GM M
8 SITE BOUNDARY 1127.0 SSE 0 1 1 0 0 0 0

ANNUAL BETA AIR DOSE = 1.669E-02 MILLRADS
ANNUAL GAMMA AIR DOSE = 1.338E-02 MILLRADS

	TOTAL BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT	1.228E-01	1.228E-01	2.792E-04	1.228E-01	1.228E-01	1.258E-01	1.228E-01	1.228E-01
GROUND PLANE INHALATION	2.500E-04 1.225E-01	2.500E-04 1.225E-01	2.500E-04 2.918E-05	2.500E-04 1.225E-01	2.500E-04 1.225E-01	2.500E-04 1.255E-01	2.500E-04 1.225E-01	2.941E-04 1.225E-01
TEENAGER	1.235E-01	1.236E-01	2.865E-04	1.236E-01	1.236E-01	1.274E-01	1.236E-01	1.236E-01
GROUND PLANE INHALATION	2.500E-04 1.233E-01	2.500E-04 1.233E-01	2.500E-04 3.652E-05	2.500E-04 1.233E-01	2.500E-04 1.233E-01	2.500E-04 1.272E-01	2.500E-04 1.233E-01	2.941E-04 1.233E-01
CHILD	1.093E-01	1.093E-01	2.931E-04	1.093E-01	1.093E-01	1.140E-01	1.093E-01	1.093E-01
GROUND PLANE INHALATION	2.500E-04 1.090E-01	2.500E-04 1.090E-01	2.500E-04 4.306E-05	2.500E-04 1.090E-01	2.500E-04 1.090E-01	2.500E-04 1.138E-01	2.500E-04 1.091E-01	2.941E-04 1.090E-01
INFANT	6.294E-02	6.294E-02	2.773E-04	6.296E-02	6.296E-02	6.731E-02	6.298E-02	6.298E-02
GROUND PLANE INHALATION	2.500E-04 6.269E-02	2.500E-04 6.269E-02	2.500E-04 2.733E-05	2.500E-04 6.271E-02	2.500E-04 6.271E-02	2.500E-04 6.706E-02	2.500E-04 6.273E-02	2.941E-04 6.268E-02

ATTACHMENT 7 (cont.)

ANNUAL DOSE ASSESSMENT

Enclosure 3: 2001 Dose Assessment Summary

I. Liquid Effluents:

<u>Maximum Dose to Individual: (mrem)</u>		<u>Limit: (mrem)</u>
Adult GI-LLI	3.73E-05	2.00E+01
Adult Total Body	2.96E-05	6.00E+00
<u>Total Integrated and Recreation Population Dose: (person-rem)</u>		
Total Body	2.94E-03	

II. Gaseous Effluents

<u>Noble Gas Air Dose at Site Boundary: (mrad)</u>		<u>Limit: (mrad)</u>
Gamma	1.34E-02	2.00E+01
Beta	1.67E-02	4.00E+01
<u>Iodine-131, Iodine-133, Tritium and Particulates: (mrem)</u>		<u>Limit: 3.00E+01</u>
Maximum hypothetical dose at site boundary for all pathways (infant thyroid):	1.59E+00	
Maximum hypothetical dose due to iodines, particulates, and tritium at 4.75 miles for the cow milk pathway per ODCM (infant thyroid):	5.80E-02	
Estimated organ dose due to iodines, particulates, and tritium for existing pathways to maximum exposed individual (child thyroid):	1.01E-01	
<u>Total 50 Mile Annual Integrated Population Dose: (person-rem)</u>		
Thyroid:	5.75E-02	
Total Body:	4.46E-02	

ATTACHMENT 8

OFF-SITE DOSE CALCULATION MANUAL (ODCM) AND
PROCESS CONTROL PROGRAM (PCP) REVISIONS

The ODCM was not revised during the report period.

The PCP was not revised during the report period.