GEORGIA POWER COMPANY

PLANT E. I. HATCH

UNITS NO. 1 & 2

SEMI-ANNUAL REPORT

PLANT RADIOACTIVE EFFLUENT RELEASES

January 1, 1988 - June 30, 1988

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PLANT E. I. HATCH

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RADIOACTIVE EFFLUENT RELEASE REPORT

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1 LIQUID EFFLUENTS

1.1. REGULATORY LIMITS

1. The Technical Specifications presented in this section are for Unit 1. Requirements for Unit 2 are the same as Unit 1; however, the Technical Specification numbers are not the same.

TECHNICAL SPECIFICATIONS

3.14.1 The radioactive liquid effluent monitoring instrumentation channels shown in table 3.14.1-1 shall be OPERABLE with their alarm/trip setpoints set to ensure that the limits of Specification 3.15.1 are not exceeded. The alarm/trip setpoints of these channels shall be determined in accordance with the OFFSITE DOSE CALCULATION MANUAL (ODCM). (Technical Specification Table 3.14.1-1 is included in this section as Table 1-1).

3.15.1.1 The concentration of radioactive material released at any time from the site to UNRESTRICTED AREAS (figure 3.15-1) shall be limited to the concentrations specified in 10 CFR Part 20, Appendix B, Table II (column 2) for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2.0E-04 uCi/ml total activity.

3.15.1.2 The dose or dose commitment to a MEMBER OF THE PUBLIC from radioactive materials in liquid effluents released, from each reactor unit, from the site (figure 3.15-1) shall be limited to:

a. During any calendar quarter to less than or equal to 1.5 mrem to the total body and to less than or equal to 5 mrem to any organ.

b. During any calendar year to less than or equal to 3 mrem to the total body and to less than or equal to 10 mrem to any organ.

3.15.1.3 The liquid radwaste treatment system, as described in the ODCM, shall be used to reduce the radioactive materials in liquid wastes prior to their discharge when the projected doses due to the liquid effluent per Unit from the site (figure 3.15-1) when projected over the calendar quarter would exceed 0.18 mrem to the total body or 0.62 mrem to any organ.

3.15.1.4(a) The contents within any outside temporary tank shall be limited to less than or equal to 10 curies, excluding tritium and dissolved or entrained noble gases.

(a) An outside temporary tank is not surrounded by liners, dikes, or walls that are capable of holding the tank contents and not having tank overflows and drains connected to the liquid radwaste treatment system.

6.9.1.9 states in part: "The Radioactive Effluent Release Report shall include (on a quarterly basis) unplanned releases from the site to unrestricted areas of radioactive materials in gaseous and liquid effluents that were in excess of 1 Ci, excluding dissolved and entrained gases and tritium for liquid effluents, or those in excess of 150 Ci of noble gases or 0.02 Ci of radioiodines for gaseous releases".

TABLE 1-1
TECHNICAL SPECIFICATION
TABLE 3.14.1-1 (SHEET 1 of 2)

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

Instrument	Minimum Channels OPERABLE	Applicability	ACTION
1. Gross Radioactivity Monitors Providing Automatic Termination of Release			
Liquid Radwaste Effluent Line	1	(a)	100
2. Gross Radioactivity Monitors not Providing Automatic Termination of Release			
Service Water System Effluent Line	1	(b)	101
3. Flowrate Measurement Devices**			
Liquid Radwaste Effluent Line	1	(a)	102
Discharge Canal	1	(b) (a)	102
4. Service Water System to Closed Cooling Water System Differential Pressure	1	At all times	103

**Pump curves may be utilized to estimate flow; in such cases, ACTION statement 102 is not required.

(a) Whenever the radwaste discharge valves are not locked closed.

(b) Whenever the service water system pressure is below the closed cooling water system pressure or differential pressure indication is not available.

TABLE 1-1 (CONTINUED)
TECHNICAL SPECIFICATION
TABLE 3.14.1-1 (SHEET 1 of 2)

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

TABLE NOTATIONS

ACTION 100 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases may be continued, provided that prior to initiating a release:

a. At least two independent samples are analyzed in accordance with Specification 4.15.1.1.1.

b. At least two technically qualified individuals independently verify the release rate calculations and discharge valving.

Otherwise, suspend release of radioactive effluents via this pathway. If the channel remains inoperable for over 30 days, an explanation of the circumstances shall be included in the next semi-annual effluent release report.

ACTION 101 - With the numbers of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue, provided that once per shift grab samples are collected and analyzed for gross radioactivity (beta or gamma) at a Lower Limit of Detection of at least 10^{-7} uCi/ml. If the channel remains inoperable for over 30 days, an explanation of the circumstances shall be included in the next semi-annual effluent release report.

ACTION 102 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue, provided the flowrate is estimated at least once per 4 hours during actual releases. If the channel remains inoperable for over 30 days, an explanation of the circumstances shall be included in the next semi-annual effluent release report.

ACTION 103 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, assure that the service water system effluent system monitor is OPERABLE.

1.2 MAXIMUM PERMISSIBLE CONCENTRATIONS

The MPC values used in determining allowable liquid radwaste release rates and concentrations for principal gamma emitters, I-131, tritium, Sr-89, Sr-90 and Fe-55 are taken from 10CFR Part 20, Appendix B, Table II, Column 2.

For dissolved or entrained noble gases in liquid radwaste, the MPC is taken from Technical Specification 3.15.1.1 (Unit 1) and 3.11.1.1 (Unit 2) as 2.0E-04 uCi/ml.

For gross alpha in liquid radwaste, the MPC is taken from 10CFR Part 20, Appendix B, Note 2.b as 3.0E-08 uCi/ml.

Further, for all the above radionuclides or categories of radioactivity, the overall MPC fraction is determined in accordance with 10 CFR Part 20, Appendix B, Note 1.

The method whereby the MPC fraction is used to determine release rates and liquid radwaste effluent radiation monitor setpoints is described in Section 1.3 of this report.

1.3 MEASUREMENTS AND APPROXIMATIONS OF TOTAL RADIOACTIVITY

Prior to release of any tank containing liquid radwaste, and following the required recirculation, samples are collected and analyzed in accordance with Technical Specification Tables 4.15.1-1 (Unit 1) and 4.11.1-1 (Unit 2). A sample from each tank planned for release is analyzed for principal gamma emitters, I-131, and dissolved and entrained noble gases by gamma spectrometry. Monthly and quarterly composites are prepared for analysis by extracting aliquots from each sample taken from tanks which are released. Liquid radwaste sample analyses are performed as follows:

	Measurement	Frequency	Method
1.	Gamma Isotopic	Each Batch	Gamma spectroscopy with computerized data reduction
2.	Dissolved or Entrained Noble Gases	Each Batch	Gamma spectroscopy with computerized data reduction

Measurement	Frequency	Method
3. Tritium	Monthly Composite	Distillation and liquid scintillation counting
4. Gross Alpha	Monthly Composite	Gas Flow Proportional counting
5. Sr-89 and Sr-90	Quarterly Composite	Chemical separation and gas flow proportional counting
6. Fe-55	Quarterly Composite	Chemical separation and low energy photon detector.

Gamma isotopic measurements are performed in-house in the radiochemistry lab using germanium spectrometry. Three germanium detectors are available: a 25% efficient and two 15% efficient intrinsic germanium detectors, with 2.0 FWHM resolution and housed in 4 inch-thick lead shields. A one-liter liquid radwaste sample is poured into a Marinelli beaker in preparation for a 2000-3000 second count. A peak search of the resulting gamma ray spectrum is performed by the computer system. Energy and net count data for all significant peaks are determined, and quantitative reduction or LLD calculations are performed for the nuclides specified in Table Notation e of Technical Specification Tables 4.15.1-1 (Unit 1) and 4.11.1-1 (Unit 2): Mn-54, F-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, Ce-141 and Ce-144. The quantitative calculations include corrections for counting time, decay time, sample volume, sample geometry, detector efficiency, baseline counts, and branching ratio. LLD calculations, including the above corrections, are made based on the counts in two standard deviations of the baseline count at the location on the spectrum where a peak for that radionuclide would be located if present.

The radionuclide concentrations determined by gamma spectroscopic analysis of a sample taken from a tank planned for release and the most current sample analysis results available for tritium, gross alpha, Sr-89, Sr-90, and Fe-55 are used along with the corresponding MPC values to determine an MPC fraction for the tank planned for release. This MPC fraction is then used, with appropriate safety factors, along with the expected dilution stream flow to calculate a maximum permissible release rate and a liquid effluent monitor setpoint. The monitor setpoint is calculated to assure that the limits of Technical Specifications 3.15.1.1 (Unit 1) or 3.11.1.1 (Unit 2) are not exceeded.

A monitor reading in excess of the calculated setpoint therefore results in an automatic termination of the liquid radwaste discharge. Liquid effluent discharge is also automatically terminated if the dilution stream flow rate falls below the dilution flow rate used in the setpoint calculations and established as a setpoint on the dilution stream flow monitor.

Radionuclide concentrations, safety factors, dilution stream flow rate, and liquid effluent radiation monitor calibration factor are entered into the computer and a prerelease printout is generated. If the release is not permissible appropriate warnings will be included on the prerelease printout. If the release is permissible it is approved by the Chemistry Foreman on duty. The pertinent information is transferred manually from the prerelease printout to a one-page release permit which is forwarded to Radwaste Operations. When the release is completed the release permit is returned from Radwaste Operations with actual release data included. These data are input to the computer and a postrelease printout is generated. The postrelease printout contains actual release rates, actual release concentrations and quantities, actual dilution flow, and calculated doses to an individual.

1.4 LIQUID EFFLUENT RELEASE DATA

Regulatory Guide 1.21 Tables 2A and 2B are found in this report as Table 1-2a for Unit 1, Table 1-2b for Unit 2 and Table 1-2c for the site; and Table 1-3a for Unit 1, 1-3b for Unit 2, and Table 1-3c for the site.

The values for the four categories of Tables 1-2a and 1-2b, and 1-2c are calculated and the Tables completed as follows:

1. Fission and activation products - The total release values(not including tritium, gases, and alpha) are comprised of the sum of the measured individual radionuclide activities. This sum is for each batch released to the river for the respective

quarter. Percent of applicable limit is determined from a mixed nuclide MPC fraction calculation. The average concentration for each nuclide over all released batches is divided by the corresponding individual MPC value. The sum over all nuclides of the Ci/MPCi ratios times 100 is the percent of applicable limit for effluent releases during the quarter.

2. Tritium - The measured tritium concentrations in the monthly composite samples are used to calculate the total release and average diluted concentration during each period. Average diluted concentration divided by the MPC limit, 3.0E-03 uCi/ml, is converted to percent to give the percent of applicable limit.

3. Dissolved and entrained gases - Concentrations of dissolved and entrained gases in liquid effluents are measured by germanium spectroscopy on a one liter sample from each liquid radwaste batch. The average concentration of dissolved or entrained noble gases for all released batches is divided by the MPC value stated in Technical Specifications 3.15.1.1 and 3.11.1.1 (2.0E-04 uCi/ml) to determine the MPC fraction. The result x100 is the percent of applicable limit for noble gases in liquid effluent releases during the quarter. Radioisotopes of iodine in any form are also determined during the isotopic analysis for each batch; therefore, a separate analysis for possible gaseous forms is not performed because it would not provide additional information.

4. Gross alpha radioactivity - The measured gross alpha concentrations in the monthly composite samples are used to calculate the total release of alpha radioactivity.

Other data pertinent to batch releases of radioactive liquid effluent from both units are as follows:

Number of batch releases:	841
Total time period for batch releases:	121,325 minutes
Maximum time period for a batch release:	270.0 minutes
Average time period for batch releases:	144.3 minutes
Minimum time period for a batch release:	2.0 minutes
Average stream flow during periods of release of liquid effluent into a flowing stream:	8,580 CFS

1.5 RADIOLOGICAL IMPACT ON MAN DUE TO LIQUID RELEASES

Doses to an individual, due to radioactivity in liquid effluent, were calculated in accordance with Technical Specifications 3/4.15.1.2 (Unit 1) and 3/4.11.1.2 (Unit 2) using the methodology presented in the Plant Edwin I. Hatch Offsite Dose Calculation Manual. As required by the above Technical Specifications, doses were calculated separately for Unit 1 and Unit 2. Results are presented in Table 1-4a for Unit 1 and Table 1-4b for Unit 2.

TABLE 1-2a
E. I. HATCH NUCLEAR PLANT - UNIT 1
SEMIANNUAL EFFLUENT RELEASE REPORT 1988
LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

	Unit	Quarter 1	Quarter 2	Est. Total Error %
A. Fission & Activation Products				
1. Total release (not including H-3, gases, alpha)	Ci	3.22E-01	1.33E-01	4.6E+01
2. Average diluted concentration during period	uCi/ml	1.25E-07	6.53E-08	
3. % of applicable limit	%	1.46E+00	5.34E-01	
B. Tritium				
1. Total release	Ci	8.65E+00	5.81E+00	3.7E+01
2. Average diluted concentration during period	uCi/ml	3.36E-06	2.86E-06	
3. % of applicable limit	%	1.12E-01	9.53E-02	
C. Dissolved and Entrained Gases				
1. Total release	Ci	3.73E-03	5.12E-03	1.0E+02
2. Average diluted concentration during period	uCi/ml	1.45E-09	2.52E-09	
3. % of applicable limit	%	7.25E-04	1.26E-03	
D. Gross alpha radioactivity				
1. Total release	Ci	2.35E-06	1.30E-06	1.2E+02
E. Volume of waste (prior to dilution)	liters	1.04E+07	7.64E+06	1.0E+01
F. Volume of dilution water used	liters	2.57E+09	2.03E+09	1.6E+02

TABLE 1-2b
E. I. HATCH NUCLEAR PLANT - UNIT 2
SEMIANNUAL EFFLUENT RELEASE REPORT 1988
LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

	Unit	Quarter 1	Quarter 2	Est. Total Error %
A. Fission & Activation Products				
1. Total release (not including H-3, gases, alpha)	Ci	1.65E-01	4.58E-02	4.7E+01
2. Average diluted concentration during period	uCi/ml	1.36E-07	3.15E-08	
3. % of applicable limit	%	4.08E+00	3.20E-01	
B. Tritium				
1. Total release	Ci	2.71E+00	3.16E+00	3.7E+01
2. Average diluted concentration during period	uCi/ml	2.24E-06	2.19E-06	
3. % of applicable limit	%	7.46E-02	7.29E-02	
C. Dissolved and Entrained Gases				
1. Total release	Ci	2.24E-02	4.52E-03	1.0E+02
2. Average diluted concentration during period	uCi/ml	1.85E-08	3.13E-09	
3. % of applicable limit	%	9.26E-03	1.56E-03	
D. Gross alpha radioactivity				
1. Total release	Ci	8.17E-07	2.15E-07	1.2E+02
E. Volume of waste (prior to dilution)	liters	4.67E+06	4.75E+06	1.0E+01
F. Volume of dilution water used	liters	1.21E+09	1.45E+09	1.6E+02

TABLE 1-2c

E. I. HATCH NUCLEAR PLANT - SITE

SEMIANNUAL EFFLUENT RELEASE REPORT 1988

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

	Unit	Quarter 1	Quarter 2	Est. Total Error %
A. Fission & Activation Products				
1. Total release (not including H-3, gases, alpha)	Ci	4.87E-01	1.79E-01	4.7E+01
2. Average diluted concentration during period	uCi/ml	1.29E-07	5.14E-08	
3. % of applicable limit	%	2.34E+00	4.79E-01	
B. Tritium				
1. Total release	Ci	1.14E+01	8.97E+00	3.7E+01
2. Average diluted concentration during period	uCi/ml	3.00E-06	2.58E-06	
3. % of applicable limit	%	1.00E-01	8.60E-02	
C. Dissolved and Entrained Gases				
1. Total release	Ci	2.62E-02	9.65E-03	1.0E+02
2. Average diluted concentration during period	uCi/ml	6.92E-09	2.77E-09	
3. % of applicable limit	%	3.46E-03	1.39E-03	
D. Gross alpha radioactivity				
1. Total release	Ci	3.17E-06	1.52E-06	1.2E+02
E. Volume of waste (prior to dilution)	liters	1.50E+07	1.24E+07	1.0E+01
F. Volume of dilution water used	liters	3.78E+09	3.48E+09	1.6E+02

TABLE 1-3a
E. I. HATCH NUCLEAR PLANT - UNIT 1
SEMIANNUAL LIQUID EFFLUENTS RELEASE REPORT 1988*

Nuclides Released	Unit	Continuous Mode**		Batch Mode	
		Quarter 1	Quarter 2	Quarter 1	Quarter 2
H-3	Ci			8.65E+00	5.81E+00
Na-24	Ci			7.31E-03	4.30E-04
Cr-51	Ci			1.77E-03	2.17E-03
Mn-54	Ci			4.28E-03	2.05E-03
Mn-56	Ci			8.78E-06	1.25E-05
Fe-55	Ci			0.00E+00	0.00E+00
Fe-59	Ci			4.48E-04	8.05E-05
Co-58	Ci			8.34E-04	6.35E-04
Co-60	Ci			1.23E-02	6.02E-03
Cu-64	Ci			8.21E-03	1.75E-03
Ni-65	Ci			0.00E+00	0.00E+00
Zn-65	Ci			3.26E-02	2.29E-02
As-76	Ci			5.18E-05	3.72E-05
Rb-88	Ci			0.00E+00	3.82E-04
Sr-89	Ci			0.00E+00	7.49E-04
Sr-90	Ci			0.00E+00	0.00E+00
Sr-91	Ci			0.00E+00	0.00E+00
Sr-92	Ci			4.48E-05	1.68E-04
Y-91m	Ci			6.89E-05	3.50E-05
Zr-95	Ci			5.97E-06	0.00E+00
Nb-95	Ci			1.35E-04	3.32E-05
Nb-97	Ci			8.58E-04	1.38E-03
Mo-99	Ci			0.00E+00	0.00E+00
Tc-99m	Ci			7.73E-04	2.02E-05
Sb-125	Ci			2.66E-04	1.15E-03
I-131	Ci			5.27E-03	9.48E-04
I-132	Ci			0.00E+00	0.00E+00
I-133	Ci			4.06E-04	1.15E-04
I-134	Ci			2.95E-03	2.60E-03
I-135	Ci			0.00E+00	0.00E+00
Cs-134	Ci			1.01E-01	3.67E-02
Cs-136	Ci			1.65E-03	1.29E-05
Cs-137	Ci			1.40E-01	5.23E-02
Cs-138	Ci			0.00E+00	0.00E+00
Ba-139	Ci			0.00E+00	0.00E+00
Ba-140	Ci			0.00E+00	0.00E+00
La-140	Ci			0.00E+00	0.00E+00
Ce-141	Ci			3.58E-06	0.00E+00
Ce-144	Ci			4.96E-05	0.00E+00
Np-239	Ci			0.00E+00	0.00E+00
Totals	Ci			3.21E-01	1.32E-01

TABLE 1-3a
E. I. HATCH NUCLEAR PLANT - UNIT 1
SEMIANNUAL LIQUID EFFLUENTS RELEASE REPORT 1988*

Nuclides Released	Unit	Continuous Mode** Quarter 1	Continuous Mode** Quarter 2	Batch Mode Quarter 1	Batch Mode Quarter 2
Kr-85m	Ci			0.00E+00	0.00E+00
Kr-85	Ci			0.00E+00	0.00E+00
Xe-131m	Ci			2.80E-04	1.58E-04
Xe-133	Ci			1.59E-03	2.28E-03
Xe-133m	Ci			0.00E+00	1.24E-05
Xe-135m	Ci			1.71E-05	1.29E-04
Xe-135	Ci			1.84E-03	2.54E-03
Ar-41	Ci			2.72E-06	0.00E+00
Totals	Ci			3.73E-03	5.12E-03
Gross Alpha	Ci			2.35E-06	1.30E-06

*Zeros in this table indicate that no radioactivity was present above detectable levels. See Table 1-5 for typical lower limits of detection for liquid sample analyses.

**There are no continuous mode radioactive liquid release pathways at Plant Hatch.

TABLE 1-3b
E. I. HATCH NUCLEAR PLANT - UNIT 2
SEMIANNUAL LIQUID EFFLUENTS RELEASE REPORT 1988*

Nuclides Released	Unit	Continuous Mode** Quarter 1	Continuous Mode** Quarter 2	Batch Mode Quarter 1	Batch Mode Quarter 2
H-3	Ci			2.71E+00	3.16E+00
Na-24	Ci			2.91E-05	7.33E-06
Cr-51	Ci			1.86E-04	8.60E-05
Mn-54	Ci			1.87E-03	8.21E-04
Mn-56	Ci			0.00E+00	0.00E+00
Fe-55	Ci			0.00E+00	0.00E+00
Fe-59	Ci			9.54E-05	0.00E+00
Co-58	Ci			3.42E-04	2.80E-04
Co-60	Ci			4.88E-03	2.45E-03
Cu-64	Ci			0.00E+00	0.00E+00
Ni-65	Ci			1.39E-06	0.00E+00
Zn-65	Ci			1.37E-02	6.20E-03
As-76	Ci			0.00E+00	0.00E+00
Sr-89	Ci			0.00E+00	0.00E+00
Sr-90	Ci			0.00E+00	0.00E+00
Sr-91	Ci			2.29E-04	5.07E-04
Sr-92	Ci			0.00E+00	0.00E+00
Y-91m	Ci			0.00E+00	0.00E+00
Zr-95	Ci			0.00E+00	0.00E+00
Nb-95	Ci			0.00E+00	0.00E+00
Nb-97	Ci			1.11E-05	2.36E-05
Mo-99	Ci			0.00E+00	0.00E+00
Tc-99m	Ci			1.36E-04	1.03E-05
Sb-125	Ci			1.11E-04	4.96E-06
I-131	Ci			1.17E-02	1.02E-03
I-132	Ci			0.00E+00	4.82E-06
I-133	Ci			8.16E-04	1.72E-03
I-134	Ci			1.66E-05	8.11E-06
I-135	Ci			0.00E+00	0.00E+00
Cs-134	Ci			5.95E-02	1.40E-02
Cs-136	Ci			1.46E-03	7.62E-06
Cs-137	Ci			6.99E-02	1.82E-02
Cs-138	Ci			0.00E+00	0.00E+00
Ba-139	Ci			2.06E-04	0.00E+00
Ba-140	Ci			1.17E-04	2.30E-04
La-140	Ci			1.44E-05	0.00E+00
Ce-141	Ci			6.12E-06	0.00E+00
Ce-144	Ci			0.00E+00	0.00E+00
Np-239	Ci			0.00E+00	1.52E-04
Totals	Ci			1.65E-01	4.58E-02

TABLE 1-3b
E. I. HATCH NUCLEAR PLANT - UNIT 2
SEMIANNUAL LIQUID EFFLUENTS RELEASE REPORT 1988*
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Nuclides Released	Unit	Continuous Mode** Quarter 1	Continuous Mode** Quarter 2	Batch Mode Quarter 1	Batch Mode Quarter 2
Kr-85	Ci			0.00E+00	0.00E+00
Kr-85m	Ci			0.00E+00	0.00E+00
Kr-87	Ci			0.00E+00	0.00E+00
Xe-131m	Ci			5.27E-03	0.00E+00
Xe-133m	Ci			4.96E-04	0.00E+00
Xe-133	Ci			1.58E-02	8.29E-04
Xe-135m	Ci			0.00E+00	1.78E-04
Xe-135	Ci			8.53E-04	3.52E-03
Ar-41	Ci			0.00E+00	0.00E+00
Totals	Ci			2.24E-02	4.53E-03
Gross Alpha	Ci			8.17E-07	2.15E-07

*Zeros in this table indicate that no radioactivity was present above detectable levels. See Table 1-5 for typical lower limits of detection for liquid sample analyses.

**There are no continuous mode radioactive liquid release pathways at Plant Hatch.

TABLE 1-3c
E. I. HATCH NUCLEAR PLANT - SITE
SEMIANNUAL LIQUID EFFLUENTS RELEASE REPORT 1988*
Page 1 of 2

Nuclides Released	Unit	Continuous Mode**		Batch Mode	
		Quarter 1	Quarter 2	Quarter 1	Quarter 2
H-3	Ci			1.14E+01	8.97E+00
Na-24	Ci			7.34E-03	4.37E-04
Cr-51	Ci			1.96E-03	2.26E-03
Mn-54	Ci			6.15E-03	2.87E-03
Mn-56	Ci			8.78E-06	1.25E-05
Fe-55	Ci			0.00E+00	0.00E+00
Fe-59	Ci			5.43E-04	8.05E-05
Co-58	Ci			1.18E-03	9.16E-04
Co-60	Ci			1.72E-02	8.47E-03
Cu-64	Ci			8.21E-03	1.75E-03
Ni-6[illegible]	Ci			1.39E-06	0.[illegible]E+00
Zn-65	Ci			4.63E-02	2.9[illegible]-02
As-76	Ci			5.18E-05	5.72E-05
Rb-88	Ci			0.00E+00	3.82E-04
Sr-89	Ci			0.00E+00	7.49E-04
Sr-90	Ci			0.00E+00	0.00E+00
Sr-91	Ci			2.29E-04	5.07E-04
Sr-92	Ci			4.48E-05	1.68E-04
Y-91m	Ci			6.89E-05	3.50E-05
Zr-95	Ci			5.97E-06	0.00E+00
Nb-95	Ci			1.99E-04	3.32E-05
Nb-97	Ci			8.69E-04	1.40E-03
Mo-99	Ci			0.00E+00	0.00E+00
Tc-99m	Ci			9.10E-04	3.06E-05
Sb-125	Ci			3.77E-04	1.16E-03
I-131	Ci			1.70E-02	1.97E-03
I-132	Ci			0.00E+00	4.82E-06
I-133	Ci			1.22E-03	1.84E-03
I-134	Ci			2.97E-03	2.61E-03
I-135	Ci			0.00E+00	0.00E+00
Cs-134	Ci			1.61E-01	5.07E-02
Cs-136	Ci			3.11E-03	2.05E-05
Cs-137	Ci			2.10E-01	7.04E-02
Cs-138	Ci			0.00E+00	0.00E+00
Ba-139	Ci			2.06E-04	0.00E+00
Ba-140	Ci			1.17E-04	2.30E-04
La-140	Ci			1.44E-05	0.00E+00
Ce-141	Ci			9.70E-06	0.00E+00
Ce-144	Ci			4.96E-05	0.00E+00
Np-239	Ci			0.00E+00	1.52E-04
Totals	Ci			4.87E-01	1.79E-01

TABLE 1-3c
E. I. HATCH NUCLEAR PLANT - SITE
SEMIANNUAL LIQUID EFFLUENTS RELEASE REPORT 1988*
Page 2 of 2

Nuclides Released	Unit	Continuous Mode**		Batch Mode	
		Quarter 1	Quarter 2	Quarter 1	Quarter 2
Kr-85m	Ci			0.00E+00	0.00E+00
Kr-85	Ci			0.00E+00	0.00E+00
Kr-87	Ci			0.00E+00	0.00E+00
Xe-131m	Ci			5.55E-03	1.58E-04
Xe-133m	Ci			4.96E-04	1.24E-05
Xe-133	Ci			1.74E-02	3.11E-03
Xe-135m	Ci			1.71E-05	3.08E-04
Xe-135	Ci			2.70E-03	6.06E-03
Ar-41	Ci			2.72E-06	0.00E+00
Totals	Ci			2.62E-02	9.65E-03
Gross Alpha	Ci			3.17E-06	1.52E-06

*Zeros in this table indicate that no radioactivity was present above detectable levels. See Table 1-5 for typical lower limits of detection for liquid sample analyses.

**There are no continuous mode radioactive liquid release pathways at Plant Hatch.

TABLE 1-4a
E. I. HATCH NUCLEAR PLANT UNIT 1
SEMIANNUAL EFFLUENT RELEASE REPORT 1988
INDIVIDUAL DOSES DUE TO LIQUID RELEASES

Cumulative Dose Per Quarter

Organ	Tech Spec Limit	Units	Quarter 1	% of Tech Spec Limit	Quarter 2	% of Tech Spec Limit
Bone	5.0	mrem	6.43E-01	1.29E+01	2.36E-01	4.72E+00
Liver	5.0	mrem	1.12E+00	2.24E+01	4.11E-01	8.22E+00
T.Body	1.5	mrem	8.21E-01	5.47E+01	3.00E-01	2.00E+01
Thyroid	5.0	mrem	2.76E-02	5.52E-01	4.40E-03	8.80E-02
Kidney	5.0	mrem	3.75E-01	7.50E+00	1.39E-01	2.78E+00
Lung	5.0	mrem	1.22E-01	2.44E+00	4.45E-02	8.90E-01
GI-LLI	5.0	mrem	3.22E-02	6.44E-01	1.47E-02	2.94E-01

Cumulative Dose Per Year

Organ	Tech Spec Limit	Unit	Quarters 1 & 2	% of Tech Spec Limit
Bone	10.0	mrem	8.79E-01	8.79E+00
Liver	10.0	mrem	1.53E+00	1.53E+01
Total Body	3.0	mrem	1.12E+00	3.74E+01
Thyroid	10.0	mrem	3.20E-02	3.20E-01
Kidney	10.0	mrem	5.14E-01	5.14E+00
Lung	10.0	mrem	1.67E-01	1.67E+00
GI-LLI	10.0	mrem	4.69E-02	4.69E-01

TABLE 1-4b
E. I. HATCH NUCLEAR PLANT UNIT 2
SEMIANNUAL EFFLUENT RELEASE REPORT 1988
INDIVIDUAL DOSES DUE TO LIQUID RELEASES

Cumulative Dose Per Quarter

Organ	Tech Spec Limit	Units	Quarter 1	% of Tech Spec Limit	Quarter 2	% of Tech Spec Limit
Bone	5.0	mrem	4.21E-01	8.42E+00	8.88E-02	1.78E+00
Liver	5.0	mrem	7.70E-01	1.54E+01	1.59E-01	3.18E+00
T.Body	1.5	mrem	5.67E-01	3.78E+01	1.17E-01	7.80E+00
Thyroid	5.0	mrem	7.96E-02	1.59E+00	4.74E-03	9.48E-02
Kidney	5.0	mrem	2.57E-01	5.14E+00	5.34E-02	1.07E+00
Lung	5.0	mrem	8.40E-02	1.68E+00	1.73E-02	3.46E-01
GI-LLI	5.0	mrem	1.99E-02	3.98E-01	5.25E-03	1.05E-01

Cumulative Dose Per Year

Organ	Tech Spec Limit	Unit	Quarters 1 & 2	% of Tech Spec Limit
Bone	10.0	mrem	5.10E-01	5.10E+00
Liver	10.0	mrem	9.29E-01	9.29E+00
Total Body	3.0	mrem	6.84E-01	2.28E+01
Thyroid	10.0	mrem	8.43E-02	8.43E-01
Kidney	10.0	mrem	3.10E-01	3.10E+00
Lung	10.0	mrem	1.01E-01	1.01E+00
GI-LLI	10.0	mrem	2.52E-02	2.51E-01

TABLE 1-5
LOWER LIMITS OF DETECTION - LIQUID SAMPLE ANALYSES

The values in this table represent apriori lower limits of detection (LLD) which are typically achieved in laboratory analyses of liquid radwaste samples.

RADIONUCLIDE	LLD	UNITS
Mn-54	5.38E-08	uCi/ml
Fe-59	7.78E-08	
Co-58	4.67E-08	
Co-60	4.78E-08	
Zn-65	1.31E-07	
Mo-99	5.10E-07*	
Cs-134	7.18E-08	
Cs-137	6.05E-08	
Ce-141	1.41E-07	
Ce-144	6.30E-07*	
I-131	6.51E-08	
Xe-135	8.45E-08	
Fe-55	8.00E-07	
Sr-89	2.30E-08	
Sr-90	7.67E-09	
H-3	5.00E-07	

*In accordance with Technical Specification Tables 4.15.2-1 (Unit 1) and 4.11.1 (Unit 2), Table Notation b, the permissible Lower Limit of Detection may be increased inversely proportional to the magnitude of the gamma yield. However, the LLD determined in this manner must not exceed 10 percent of the Maximum Permissible Concentration (MPC) value specified in 10CFR20, Appendix B, Table II (Column 2).

2 GASEOUS EFFLUENTS

2.1 REGULATORY LIMITS

The Technical Specifications presented in this section are for Unit 1. Requirements for Unit 2 are the same as for Unit 1; however, the Technical Specification numbers are not the same.

TECHNICAL SPECIFICATIONS

3.14.2 The radioactive gaseous effluent monitoring instrumentation channels shown in table 3.14.2-1 shall be OPERABLE with their alarm/trip setpoints set to ensure that the limits of Specification 3.15.2.1(a) are not exceeded. The alarm/trip setpoints of these channels shall be determined in accordance with the ODCM. Technical Specification Table 3.14.2-1 is included in this section as Table 2-1.)

3.15.2.1 The dose rate at any time in the UNRESTRICTED AREAS (figure 3.15-1) due to radioactive materials released in gaseous effluents from the site shall be limited to the following values:

a. The dose rate limit for noble gases shall be less than or equal to 500 mrem/year to the total body and less than or equal to 3000 mrem/year to the skin.

b. The dose rate limit for I-131, I-133, tritium, and for all radioactive materials in particulate form and radionuclides other than noble gases with half-lives greater than 8 days shall be less than or equal to 1500 mrem/year to any organ.

3.15.2.2 The air dose in UNRESTRICTED AREAS (figure 3.15-1) due to noble gases released in gaseous effluents from each reactor unit shall be limited to the following:

a. During any calendar quarter, to less than or equal to 5 mrad for gamma radiation and less than or equal to 10 mrad for beta radiation.

b. During any calendar year, to less than or equal to 10 mrad for gamma radiation and less than or equal to 20 mrad for beta radiation.

3.15.2.3 The dose to any organ of a MEMBER OF THE PUBLIC from I-131, I-133, tritium , and all radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents released to UNRESTRICTED AREAS (figure 3.15-1) from each reactor unit shall be limited to the following:

a. During any calendar quarter to less than or equal to 7.5 mrem to any organ.

b. During any calendar year to less than or equal to 15 mrem to any organ.

3.15.2.4 The GASEOUS RADWASTE TREATMENT SYSTEM as described in the ODCM shall be in operation. (This Technical Specification applies whenever the main condenser air ejector system is in operation.)

4.15.2.4 GASEOUS RADWASTE TREATMENT SYSTEM operability shall be demonstrated by administrative controls which assure that the offgas treatment system is not bypassed.

3.15.2.5 The annual (calendar year) dose or dose commitment to any MEMBER OF THE PUBLIC due to releases of radioactivity and to radiation from uranium fuel cycle sources shall be limited to less than or equal to 25 mrem to the total body or any organ, except the thyroid, which shall be limited to less than or equal to 75 mrem.

(With the calculated doses from the release of radioactive materials in liquid or gaseous effluents exceeding twice the limits of Specifications 3.15.1.2(a), 3.15.1.2(b), 3.15.2.2.(a), 3.15.2.2(b), 3.15.2.3(a), or 3.15.2.3(b), calculations shall be made including direct radiation contributions from the reactor units and from outside storage tanks to determine whether the above limits of Specification 3.15.2.5 have been exceeded.

3.15.2.6 The concentration of hydrogen downstream of the recombiners in the main condenser offgas treatment system shall be limited to less than or equal to 4 percent by volume.

3.15.2.7 The gross gamma radioactivity rate of the noble gases Xe-133, Xe-135, Xe-138, Kr-85m, Kr-87, and Kr-88 measured at the main condenser evacuation system pretreatment monitor station shall be limited to less than or equal to 240,000 uCi/second.

6.9.1.9 states in part:

"The Radioactive Effluent Release Report shall include (on a quarterly basis) unplanned releases from the site to unrestricted areas of radioactive materials in gaseous and liquid effluents that were in excess of 1 Ci, excluding dissolved and entrained gases and tritium for liquid effluents, or those in excess of 150 Ci of noble gases or 0.02 Ci of radioiodines for gaseous releases."

TABLE 3.14.2-1 (SHEET 1 OF 4)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

Instrument	Minimum Channels OPERABLE	Applicability	Parameter	ACTION
1. Main Condenser Offgas Treatment System Explosive Gas Monitoring System				
Hydrogen Monitor	(1)	**	% Hydrogen	106
2. Reactor Building Vent Stack Monitoring System				
a. Noble Gas Activity Monitor	(1)	*	Radioactivity Rate Measurement +	105
b. Iodine Sampler Cartridge	(1)	*	Verify Presence of Cartridge	107
c. Particulate Sampler Filter	(1)	*	Verify Presence of Filter	107
d. Effluent System Flowrate Measurement Device	(1)	*	System Flowrate Measurement	104
e. Sampler Flowrate Measurement Device	(1)	*	Sampler Flowrate Measurement	104
3. Recombiner Building Ventilation Monitoring System				
a. Noble Gas Activity Monitor	(1)	*	Radioactivity Rate Measurement +	105
b. Iodine Sampler Cartridge	(1)	*	Verify Presence of Cartridge	107
c. Particulate Sampler Filter	(1)	*	Verify Presence of Filter	107
d. Sampler Flowrate Measurement Device	(1)	*	Sampler Flowrate Measurement	104

TABLE 2-1

TABLE 3.14.2-1 (SHEET 2 OF 4)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

Instrument	Minimum Channels OPERABLE	Applicability	Parameter	ACTION
4. Main Stack Monitoring System				
a. Noble Gas Activity Monitor	(1)	*	Radioactivity Rate Measurement +	105
b. Iodine Sampler Cartridge	(1)	*	Verify Presence of Cartridge	107
c. Particulate Sampler Filter	(1)	*	Verify Presence of Filter	107
d. Effluent System Flowrate Measuring Devices	(1)	*	System Flowrate Measurement	104
e. Sampler Flowrate Measuring Device	(1)	*	Sampler Flowrate Measurement	104
5. Condenser Offgas Pretreatment Monitor				
Noble Gas Activity Monitor	(1)	***	Radioactivity Rate Measurement	108

TABLE 2-1 (Cont'd)

TABLE 3.14.2-1 (SHEET 3 OF 4)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

Table Notations

+Monitor must be capable of responding to a Lower Limit of Detection of 1×10^{-4} μCi/ml.

*During releases via this pathway.

**During main condenser offgas treatment system operation.

***During operation of the main condenser air ejector.

ACTION 104 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue, provided the flowrate is estimated at least once per 4 hours.

If the number of channels OPERABLE remains less than required by the Minimum Channels OPERABLE requirement for over 30 days, an explanation of the circumstances shall be included in the next semi-annual effluent release report.

ACTION 105 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue, provided grab samples are taken daily and analyzed daily for gross activity within 24 hours. With the number of main stack monitoring system channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, without delay suspend drywell purge.

If the number of channels OPERABLE remains less than required by the Minimum Channels OPERABLE requirement for over 30 days, an explanation of the circumstances shall be included in the next semi-annual effluent release report.

ACTION 106 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, operation of the main condenser offgas treatment system may continue provided:

(a) Gas samples are collected once per 4 hours and analyzed within the ensuing 4 hours, or

(b) Using a temporary hydrogen analyzer installed in the offgas system line downstream of the recombiner, hydrogen concentration readings are taken and logged every 4 hours.

TABLE 3.14.2-1 (SHEET 4 OF 4)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

Table Notations (Continued)

If the number of channels OPERABLE remains less than required by the Minimum Channels OPERABLE requirement for over 30 days, an explanation of the circumstances shall be included in the next semi-annual effluent release report.

ACTION 107 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue, provided samples are continuously collected with auxiliary sampling equipment for periods on the order of 7 days and analyzed within 48 hours after the end of the sampling period.

If the number of channels OPERABLE remains less than required by the Minimum Channels OPERABLE requirement for over 30 days, an explanation of the circumstances shall be included in the next semi-annual effluent release report.

ACTION 108 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, release to the environment may continue for up to 72 hours provided:

a. The offgas system is not bypassed, and

b. The offgas post-treatment monitor (D11-K615) or the main stack monitor (D11-K600) is OPERABLE.

Otherwise, be in at least HOT STANDBY within 12 hours.

If the number of channels OPERABLE remains less than required by the Minimum Channels OPERABLE requirement for over 30 days, an explanation of the circumstances shall be included in the next semi-annual effluent release report.

2.2 MEASUREMENT AND APPROXIMATIONS OF TOTAL RADIOACTIVITY

Waste gas release at Plant Hatch is confined to four paths: main stack (also called the offgas vent), Unit 1 reactor building vent; Unit 2 reactor building vent, and the recombiner building vent. Each of these four paths is continuously monitored for gaseous radioactivity. Each is equipped with an integrating-type sample collection device for collecting particulates and iodines. Sample collection is in accordance with Technical Specification Tables 4.15.2-1 (Unit 1) and 4.11.2-1 (Unit 2). Unless required more frequently under certain circumstances specified in Table Notations to the above mentioned tables, samples are collected as follows:

1. Noble gas samples are collected by grab sampling monthly.

2. Tritium samples are collected by grab sampling monthly.

3. Radioiodine samples are collected by pulling the sample stream through a charcoal cartridge over a 7-day period.

4. Particulates are collected by pulling the sample stream through a particulate filter over a 7-day period.

5. The 7-day particulate filters above are analyzed for gross alpha activity.

6. Quarterly composite samples are prepared from the particulate filters collected over the previous quarter and the quarterly composite sample is analyzed for Sr-89 and Sr-90.

Sample analyses results and release flow rates from the four release points form the basis for calculating released quantities of radionuclide-specific radioactivity, dose rates associated with gaseous releases, and cumulative doses for the current quarter and year. This task is normally performed with computer assistance.

The noble gas grab sample analysis results are used along with maximum expected release flow rates from each of the four vents to calculate monitor setpoints for the gaseous effluent monitors serving the four release points, to assure that the limits of Technical Specifications 3.15.2.1.a (Unit 1) or 3.11.2.1.a (Unit 2) are not exceeded. Calculation of monitor setpoints is described in the Plant Hatch ODCM.

With each release period released radioactivity, dose rates, and cumulative doses are calculated. Cumulative dose results are tabulated along with percent of Technical Specification limits (3.15.2.2 and 3.15.2.3 (Unit 1); 3.11.2.2 and 3.11.2.3 (Unit 2) for each release, for the current quarter and year.

After each calendar quarter (13 weeks) a summary of waste gas releases from the four vents is compiled for preparation of the Semiannual Effluent Release Report required by Technical Specifications 6.9.1.8 and 6.9.1.9 and described in NRC Regulatory Guide 1.21.

The methods for determining released quantities of radioactivity, dose rates and cumulative doses are as follows:

1. FISSION AND ACTIVATION GAS

The radionuclide-specific released radioactivity is determined from sample analyses results collected as described above and average release flow rates over the period represented by the collected sample.

Instantaneous dose rates due to noble gases and due to radioiodines, tritium, and particulates are calculated (with computer assistance). Calculated dose rates are compared to the dose rate limits specified in 3.15.2.1.a (Unit 1) and 3.11.2.1.a (Unit 2) for noble gases; and 3.15.2.1.b (Unit 1) and 3.11.2.1.b (Unit 2) for radioiodine, tritium, and particulates. Dose rate calculation methodology is presented in the Plant Hatch ODCM.

Beta and gamma air doses due to noble gases are calculated for the location in the unrestricted area with the potential for the highest exposure due to gaseous releases. Air doses are calculated for each release period and cumulative totals are kept for each unit for the current calendar quarter and year. Cumulative air doses are compared to the dose limits specified in Technical Specifications 3.15.2.2 (Unit 1) and 3.11.2.2 (Unit 2). Current percent of technical specification limits are shown on the printout for each release period. Air dose calculation methodology is presented in the Plant Batch ODCM.

2. RADIOIODINE, TRITIUM, AND PARTICULATE RELEASES

Released quantities of radioiodines are determined from the weekly samples and release flow rates for the four release points. Radioiodine concentrations are determined by gamma spectroscopy.

Released quantities of particulates are determined from the weekly (filter) samples and release flow rates for the four release points. Gamma spectroscopy is used to quantify concentrations of principal gamma emitters.

After each calendar quarter the particulate filters from each vent are combined, fused, and strontium separation is performed. Since sample flows and vent flows are almost constant over each quarterly period the filters from each vent can be dissolved together. Decay corrections are made back to the middle of the quarterly collection period. Where significant Sr-89 or Sr-90 is not detected, LLD's are calculated. Strontium concentrations are input to the composite file of the computer to be used in release, dose rate and individual dose calculations.

Tritium samples are obtained monthly from each vent by passing the sample stream through a cold trap. The grams of water vapor/cubic foot gas is measured upstream of the cold trap in order to alleviate the difficulties in determining water vapor collection efficiencies. The tritium samples are analyzed by an independent laboratory and results are furnished in uCi/ml of water. The tritium concentration in water is converted to tritium concentration in air and this value is input into the composite file of the computer to be used in release, dose rate, and individual dose calculations.

Dose rates due to radioiodine, tritium, and particulates are calculated for a hypothetical child, exposed to the inhalation pathway, at the location in the unrestricted area where the potential dose rate is expected to be the highest. Dose rates are calculated for each release point, for each release period, and the total dose rate from all four release points are compared to the dose rate limits specified in Technical Specifications 3.15.2.1.b (Unit 1) or 3.11.2.1.b (Unit 2).

Individual doses due to radioiodine, tritium, and particulates are calculated for the critical receptor, which for Plant Hatch is a child exposed to the garden vegetation, inhalation, and ground-plane pathways. Individual doses are calculated for each release period and cumulative totals are kept for each unit for the current calendar quarter and year. Cumulative individual doses are compared to the dose limits specified in Technical Specifications 3.15.2.3 (Unit 1) and 3.11.2.3 (Unit 2). Current percent of technical specification limits are shown on the printout for each release period.

3. GROSS ALPHA RELEASE

The gross alpha release is computed each month by counting the particulate filters each week for gross alpha activity in a proportional counter. The four or five weeks' numbers are then recorded on a data sheet and the activity is summed at the end of the month. This concentration is input to the composite file of the computer and is used for release calculations.

4. ERROR ESTIMATES

Regulatory Guide 1.21 requires that estimated total error in analysis techniques be reported. These estimates are required for the total fission and activation gas release, total I-131 release, total particulates with half-lives greater than 8-day release, and total tritium release.

"The total or maximum error associated with the effluent measurement will include the cumulative errors resulting from the total operation of sampling and measurement. Because it may be very difficult to assign error terms for each parameter affecting the final measurement, detailed statistical evaluation of error are not suggested. The objective should be to obtain an overall estimate of the error associated with measurements of radioactive materials released in liquid and gaseous effluents and solid waste."

Estimated errors are based on errors in counting equipment calibration, counting statistics, vent flow rates, vent sample flow rates, non-steady release rates, chemical yield factors, and sample losses for such items as charcoal cartridges.

(1) Fission and Activation Total Release was calculated from sample analysis results and release point flow rates.

Statistical Error	60%
Counting Equipment Calibration	10%
Vent Flow Rates	10%
Non-Steady Release Rates	20%
	100%

(2) I-131 Release was calculated from each weekly sample:

Statistical Error	60%
Counting Equipment Calibration	10%
Vent Flow Rates	10%
Vent Sample Flow Rates	10%
Non-Steady Release Rates	10%
Losses From Charcoal Cartridge	10%
	110%

(3) Particulates with half-lives greater than 8 days release was calculated from sample analysis results and release point flow rates.

Statistical Error at LLD concentration	60%
Counting Equipment Calibration	10%
Vent Flow Rates	10%
Vent Sample Flow Rates	10%
Non-Steady Release Rates	10%
	100%

(4) Total Tritium Release was dominated by the reactor building vent tritium release; hence, the larger statistical errors of the off-gas vent and recombiner building vent tritium releases do not affect the error in the total tritium release:

Water Vapor in Sample Stream Determination	20%
Vent Flow Rates	10%
Counting Calibration and Statistics	10%
Non-Steady Release	50%
	90%

2.3 GASEOUS EFFLUENT RELEASE DATA

Regulatory Guide 1.21 Tables 1A, 1B, and 1C are found in this report as Tables 2-2a-c, 2-3a-c, and 2-4a-c. Data are presented on a quarterly basis as required by Regulatory Guide 1.21.

To complete Tables 2-2a-c, total release for each of the four categories (fission and activation gases; iodines; particulates; and tritium) was divided by the number of seconds in the quarter to obtain a release rate in uCi/second for each category.

However, the applicable Technical Specification limits are not in terms of release rate in uCi/second but in terms of dose rate in mrem/year, as presented in Technical Specifications 3.15.2.1 (Unit 1) and 3.11.2.1 (Unit 2). Noble gases are limited as specified in 3.15.2.1.a and 3.11.2.1.a. The other three categories (tritium, radioiodines, and particulates) are limited as a group as specified in 3.15.2.1.b and 3.11.2.1.b. Further the limits specified in Technical Specifications 3.15.2.1 and 3.11.2.1 are site limits, not unit limits. Dose rates due to noble gas releases and due to radioiodine, tritium, and particulates are presented in Table 2-5 along with percent of technical specification limits.

Gross alpha radioactivity is reported in Tables 2-2a, 2-2b, and 2-2c as curies released in each quarter.

Limits for cumulative beta and gamma air doses, due to noble gases, are specified in Technical Specifications 3.15.2.2 (Unit 1) and 3.11.2.2 (Unit 2). These limits are unit limits. Cumulative air doses are presented in Tables 2-6a and 2-6b, along with percent of technical specification limits.

Limits for cumulative individual doses, due to radioiodine, tritium, and particulates, are specified in Technical Specifications 3.15.2.3 (Unit 1) and 3.11.2.3 (Unit 2). These limits are also unit limits. Cumulative individual doses are presented in Tables 2-7a and 2-7b, with percent of technical specification limits.

2.4 RADIOLOGICAL IMPACT DUE TO GASEOUS RELEASES

Dose rates due to noble gas releases were calculated for the site in accordance with Technical Specifications 3/4.15.2.1.a (Unit 1) and 3/4.11.2.1.a (Unit 2). Results are presented in Table 2-5. Dose rates due to radioiodine, tritium, and particulates in gaseous releases were calculated in accordance with Technical Specifications 3/4.15.2.1.b (Unit 1) and 3/4.11.2.1.b (Unit 2). These results are also in Table 2-5.

Cumulative air doses due to noble gas releases were calculated for each unit in accordance with Technical Specification 3/4.15.2.2 (Unit 1) and 3/4.11.2.2 (Unit 2). These results are presented in Tables 2-6a and 2-6b.

Cumulative doses to an individual due to radioiodine, tritium , and particulates were calculated for each unit in accordance with Technical Specifications 3/4.15.2.3 (Unit 1) and 3/4.11.2.3 (Unit 2). These results are presented in Tables 2-7a and 2-7b.

Dose rates and doses were calculated using the methodology presented in the Plant Hatch Offsite Dose Calculation Manual.

TABLE 2-2a
E. I. HATCH NUCLEAR PLANT - UNIT 1
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1988
GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

E. I. Hatch Nuclear Plant	Unit	Quarter 1	Quarter 2	Est. Total Error %
A. Fission & Activation Gases				
1. Total Release	Ci	4.62E+02	6.59E+02	1.00E+02
2. Average Release Rate For Period	uCi/sec	5.87E+01	8.38E+01	
*3. % of Tech Spec Limit	%			
B. Iodines				
1. Total Iodine-131	Ci	1.17E-02	1.25E-03	1.10E+02
2. Average Release Rate For Period	uCi/sec	1.49E-03	1.58E-04	
*3. % of Tech Spec Limit	%			
C. Particulates				
1. Particulates with half-lives 8 days	Ci	2.89E-03	4.68E-04	1.00E+02
2. Average Release Rate For Period	uCi/sec	3.68E-04	5.96E-05	
* 3. % of Tech Spec Limit	%			
4. Gross Alpha Radioactivity	Ci	1.22E-06	1.90E-06	
D. Tritium				
1. Total Release	Ci	6.52E+00	5.26E+00	9.00E+01
2. Average Release Rate For Period	uCi/sec	8.29E-01	6.69E-01	
*3. % of Tech Spec Limit	%			

*Technical Specification limits are in terms of dose rate (mrem/yr) and dose (mrem). See Tables 2-5, 2-6a, 2-6b, 2-7a, and 2-7b.

TABLE 2-2b
E. I. HATCH NUCLEAR PLANT - UNIT 2
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1988
GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

E. I. Hatch Nuclear Plant	Unit	Quarter 1	Quarter 2	Est. Total Error %
A. Fission & Activation Gases				
1. Total Release	Ci	5.24E+02	1.46E+02	1.00E+02
2. Average Release Rate For Period	uCi/sec	6.67E+01	1.85E+01	
*3. % of Tech Spec Limit	%			
B. Iodines				
1. Total Iodine-131	Ci	7.21E-03	1.39E-03	1.10E+02
2. Average Release Rate For Period	uCi/sec	9.17E-04	1.77E-04	
*3. % of Tech Spec Limit	%			
C. Particulates				
1. Particulates with half-lives 8 days	Ci	7.12E-03	7.44E-04	1.00E+02
2. Average Release Rate For Period	uCi/sec	9.06E-04	9.46E-05	
*3. % of Tech Spec Limit	%			
4. Gross Alpha Radioactivity	Ci	8.57E-07	1.21E-06	
D. Tritium				
1. Total Release	Ci	5.94E+00	4.95E+00	9.00E+01
2. Average Release Rate For Period	uCi/sec	7.55E-01	6.30E-01	
*3. % of Tech Spec Limit	%			

*Technical Specification limits are in terms of dose rate (mrem/yr) and dose (mrem). See Tables 2-5, 2-6a, 2-6b, 2-7a, and 2-7b.

TABLE 2-2c
E. I. HATCH NUCLEAR PLANT - SITE
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1988
GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

E. I. Hatch Nuclear Plant	Unit	Quarter 1	Quarter 2	Est. Total Error %
A. Fission & Activation Gases				
1. Total Release	Ci	9.86E+02	8.04E+02	1.00E+02
2. Average Release Rate For Period	uCi/sec	1.25E+02	1.02E+02	
*3. % of Tech Spec Limit	%			
B. Iodines				
1. Total Iodine-131	Ci	1.89E-02	2.64E-03	1.10E+02
2. Average Release Rate For Period	uCi/sec	2.41E-03	3.36E-04	
*3. % of Tech Spec Limit	%			
C. Particulates				
1. Particulates with half-lives 8 days	Ci	1.00E-02	1.21E-03	1.00E+02
2. Average Release Rate For Period	uCi/sec	1.27E-03	1.54E-04	
*3. % of Tech Spec Limit	%			
4. Gross Alpha Radioactivity	Ci	2.07E-06	3.10E-06	
D. Tritium				
1. Total Release	Ci	1.25E+01	1.02E+01	9.00E+01
2. Average Release Rate For Period	uCi/sec	1.58E+00	1.30E+00	
*3. % of Tech Spec Limit	%			

*Technical Specification limits are in terms of dose rate (mrem/yr) and dose (mrem). See Tables 2-5, 2-6a, 2-6b, 2-7a, and 2-7b.

TABLE 2-3a
E. I. HATCH NUCLEAR PLANT - UNIT 1
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1988
GASEOUS EFFLUENTS - ELEVATED RELEASE*

Nuclides Released	Unit	Continuous Mode Quarter 1	Continuous Mode Quarter 2	Batch Mode** Quarter 1	Batch Mode** Quarter 2
1. Fission Gases					
Kr-85	Ci	0.00E+00	0.00E+00		
Kr-85m	Ci	3.86E+01	1.41E+01		
Kr-87	Ci	6.52E+00	2.22E+00		
Kr-88	Ci	5.36E+01	1.43E+01		
Xe-133	Ci	8.69E+01	5.50E+01		
Xe-135	Ci	2.01E+00	2.69E+00		
Xe-135m	Ci	2.40E+00	4.94E+00		
Xe-138	Ci	0.00E+00	9.64E+00		
Xe-131m	Ci	1.35E+00	2.05E+00		
Xe-133m	Ci	2.04E-01	1.05E+00		
Xe-137	Ci	0.00E+00	0.00E+00		
Ar-41	Ci	0.00E+00	2.79E+00		
TOTAL FOR PERIOD	Ci	1.92E+02	1.09E+02		
2. Iodines					
I-131	Ci	4.78E-04	1.05E-03		
I-133	Ci	1.61E-04	1.33E-03		
I-135	Ci	1.77E-04	5.30E-04		
TOTAL FOR PERIOD	Ci	8.17E-04	2.91E-03		
3. Particulates					
Cr-51	Ci	0.00E+00	0.00E+00		
Mn-54	Ci	0.00E+00	0.00E+00		
Co-58	Ci	0.00E+00	0.00E+00		
Co-60	Ci	3.62E-07	0.00E+00		
Zn-65	Ci	9.15E-07	2.13E-06		
Sr-89	Ci	5.57E-05	4.64E-05		
Sr-90	Ci	6.46E-07	8.85E-07		
Nb-95	Ci	0.00E+00	0.00E+00		
Cs-134	Ci	1.99E-06	0.00E+00		
Cs-137	Ci	3.72E-05	1.58E-06		
Ba-140	Ci	2.72E-05	7.58E-05		
La-140	Ci	4.19E-05	1.57E-04		
TOTAL FOR PERIOD	Ci	1.66E-04	2.84E-04		

*Zeroes in this table indicate that no radioactivity was present above detectable levels. See Table 2-8 for typical lower limits of detection for gaseous sample analyses.

**There are no batch mode radioactive gaseous release pathways at Plant Hatch.

TABLE 2-3b
E. I. HATCH NUCLEAR PLANT - UNIT 2
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1988
GASEOUS EFFLUENTS - ELEVATED RELEASE*

Nuclides Released	Unit	Continuous Mode Quarter 1	Continuous Mode Quarter 2	Batch Mode** Quarter 1	Batch Mode** Quarter 2
1. Fission Gases					
Kr-85	Ci	0.00E+00	0.00E+00		
Kr-85m	Ci	3.86E+01	1.41E+01		
Kr-87	Ci	6.52E+00	2.22E+00		
Kr-88	Ci	5.36E+01	1.43E+01		
Xe-133	Ci	8.54E+01	5.73E+01		
Xe-135	Ci	1.68E+00	3.18E+00		
Xe-135m	Ci	2.40E+00	4.94E+00		
Xe-138	Ci	0.00E+00	9.64E+00		
Xe-131m	Ci	1.35E+00	2.05E+00		
Xe-133m	Ci	2.04E-01	1.05E+00		
Xe-137	Ci	0.00E+00	0.00E+00		
Ar-41	Ci	0.00E+00	2.79E+00		
TOTAL FOR PERIOD	Ci	1.90E+02	1.12E+02		
2. Iodines					
I-131	Ci	5.36E-05	1.07E-03		
I-133	Ci	1.50E-04	1.34E-03		
I-135	Ci	1.77E-04	5.30E-04		
TOTAL FOR PERIOD	Ci	3.81E-04	2.94E-03		
3. Particulates					
Cr-51	Ci	0.00E+00	0.00E+00		
Mn-54	Ci	0.00E+00	0.00E+00		
Co-58	Ci	0.00E+00	0.00E+00		
Co-60	Ci	3.62E-07	0.00E+00		
Zn-65	Ci	9.15E-07	2.13E-06		
Sr-89	Ci	3.40E-05	5.45E-05		
Sr-90	Ci	3.95E-07	1.04E-06		
Nb-95	Ci	0.00E+00	0.00E+00		
Cs-134	Ci	1.99E-06	0.00E+00		
Cs-137	Ci	3.59E-05	1.85E-06		
Ba-140	Ci	2.72E-05	7.91E-05		
La-140	Ci	4.19E-05	1.60E-04		
TOTAL FOR PERIOD	Ci	1.43E-04	2.98E-04		

*Zeroes in this table indicate that no radioactivity was present above detectable levels. See Table 2-8 for typical lower limits of detection for gaseous sample analyses.

**There are no batch mode radioactive gaseous release pathways at Plant Hatch.

TABLE 2-3c
E. I. HATCH NUCLEAR PLANT - SITE
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1988
GASEOUS EFFLUENTS - ELEVATED RELEASE*

Nuclides Released	Unit	Continuous Mode Quarter 1	Continuous Mode Quarter 2	Batch Mode** Quarter 1	Batch Mode** Quarter 2
1. Fission Gases					
Kr-85	Ci	0.00E+00	0.00E+00		
Kr-85m	Ci	7.72E+01	2.83E+01		
Kr-87	Ci	1.30E+01	4.44E+00		
Kr-88	Ci	1.07E+02	2.85E+01		
Xe-133	Ci	1.72E+02	1.12E+02		
Xe-135	Ci	3.69E+00	5.86E+00		
Xe-135m	Ci	4.80E+00	9.88E+00		
Xe-138	Ci	0.00E+00	1.93E+01		
Xe-131m	Ci	2.70E+00	4.10E+00		
Xe-133m	Ci	4.08E-01	2.09E+00		
Xe-137	Ci	0.00E+00	0.00E+00		
Ar-41	Ci	0.00E+00	5.57E+00		
TOTAL FOR PERIOD	Ci	3.81E+02	2.20E+02		
2. Iodines					
I-131	Ci	5.32E-04	2.12E-03		
I-133	Ci	3.11E-04	2.67E-03		
I-135	Ci	3.55E-04	1.06E-03		
TOTAL FOR PERIOD	Ci	1.20E-03	5.85E-03		
3. Particulates					
Cr-51	Ci	0.00E+00	0.00E+00		
Mn-54	Ci	0.00E+00	0.00E+00		
Co-58	Ci	0.00E+00	0.00E+00		
Co-60	Ci	7.24E-07	0.00E+00		
Zn-65	Ci	1.83E-06	4.26E-06		
Sr-89	Ci	8.98E-05	1.01E-04		
Sr-90	Ci	1.04E-06	1.93E-06		
Nb-95	Ci	0.00E+00	0.00E+00		
Cs-134	Ci	3.97E-06	0.00E+00		
Cs-137	Ci	7.31E-05	3.43E-06		
Ba-140	Ci	5.44E-05	1.55E-04		
La-140	Ci	8.38E-05	3.17E-04		
TOTAL FOR PERIOD	Ci	3.09E-04	5.82E-04		

*Zeroes in this table indicate that no radioactivity was present above detectable levels. See Table 2-8 for typical lower limits of detection for gaseous sample analyses.

**There are no batch mode radioactive gaseous release pathways at Plant Hatch.

TABLE 2-4a
E. I. HATCH NUCLEAR PLANT - UNIT 1
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1988
GASEOUS EFFLUENTS - GROUND-LEVEL RELEASES*

Nuclides Released	Unit	Continuous Mode Quarter 1	Continuous Mode Quarter 2	Batch Mode** Quarter 1	Batch Mode** Quarter 2
1. Fission Gases					
Kr-85	Ci	0.00E+00	0.00E+00		
Kr-85m	Ci	1.99E+01	3.02E-03		
Kr-87	Ci	3.24E+01	0.00E+00		
Kr-88	Ci	0.00E+00	0.00E+00		
Xe-133	Ci	7.42E+01	5.36E+02		
Xe-135	Ci	9.15E+01	1.37E+01		
Xe-135m	Ci	5.16E+01	0.00E+00		
Xe-138	Ci	4.97E-01	0.00E+00		
Xe-131m	Ci	0.00E+00	0.00E+00		
Xe-133m	Ci	0.00E+00	0.00E+00		
Xe-137	Ci	3.32E-02	0.00E+00		
Ar-41	Ci	0.00E+00	0.00E+00		
TOTAL FOR PERIOD	Ci	2.70E+02	5.50E+02		
2. Iodines					
I-131	Ci	1.12E-02	1.94E-04		
I-133	Ci	2.33E-03	2.69E-04		
I-135	Ci	2.12E-04	0.00E+00		
TOTAL FOR PERIOD	Ci	1.38E-02	4.63E-04		
3. Particulates					
Cr-51	Ci	2.87E-05	4.66E-05		
Mn-54	Ci	7.08E-06	2.06E-06		
Co-58	Ci	1.74E-05	6.28E-06		
Co-60	Ci	5.56E-05	1.35E-05		
Zn-65	Ci	2.47E-04	1.06E-04		
Sr-89	Ci	4.69E-05	1.70E-06		
Sr-90	Ci	2.54E-07	0.00E+00		
Nb-95	Ci	1.10E-09	0.00E+00		
Cs-134	Ci	7.68E-04	0.00E+00		
Cs-137	Ci	8.47E-04	8.20E-06		
Ba-140	Ci	2.77E-04	0.00E+00		
La-140	Ci	4.33E-04	0.00E+00		
TOTAL FOR PERIOD	Ci	2.73E-03	1.85E-04		

*Zeroes in this table indicate that no radioactivity was present above detectable levels. See Table 2-8 for typical lower limits of detection for gaseous sample analyses.

**There are no batch mode radioactive gaseous release pathways at Plant Hatch.

TABLE 2-4b
E. I. HATCH NUCLEAR PLANT - UNIT 2
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1988
GASEOUS EFFLUENTS - GROUND-LEVEL RELEASES*

Nuclides Released	Unit	Continuous Mode Quarter 1	Continuous Mode Quarter 2	Batch Mode** Quarter 1	Batch Mode** Quarter 2
1. Fission Gases					
Kr-85	Ci	8.81E+01	0.00E+00		
Kr-85m	Ci	7.56E+00	0.00E+00		
Kr-87	Ci	2.92E+01	0.00E+00		
Kr-88	Ci	1.69E+01	0.00E+00		
Xe-133	Ci	8.24E+01	2.06E+01		
Xe-135	Ci	8.58E+01	1.32E+01		
Xe-135m	Ci	2.45E+01	0.00E+00		
Xe-138	Ci	0.00E+00	0.00E+00		
Xe-131m	Ci	0.00E+00	0.00E+00		
Xe-133m	Ci	0.00E+00	0.00E+00		
Xe-137	Ci	0.00E+00	0.00E+00		
Ar-41	Ci	0.00E+00	0.00E+00		
TOTAL FOR PERIOD	Ci	3.35E+02	3.38E+01		
2. Iodines					
I-131	Ci	7.16E-03	3.25E-04		
I-133	Ci	4.55E-03	1.35E-03		
I-135	Ci	2.96E-03	1.45E-03		
TOTAL FOR PERIOD	Ci	1.47E-02	3.12E-03		
3. Particulates					
Cr-51	Ci	4.99E-05	0.00E+00		
Mn-54	Ci	2.79E-05	0.00E+00		
Co-58	Ci	1.96E-04	0.00E+00		
Co-60	Ci	2.44E-04	0.00E+00		
Zn-65	Ci	2.81E-03	1.24E-06		
Sr-89	Ci	6.77E-04	1.35E-04		
Sr-90	Ci	1.47E-06	3.58E-07		
Nb-95	Ci	3.65E-05	0.00E+00		
Cs-134	Ci	2.70E-04	0.00E+00		
Cs-137	Ci	3.01E-04	3.57E-06		
Ba-140	Ci	9.62E-04	1.85E-04		
La-140	Ci	1.41E-03	1.20E-04		
TOTAL FOR PERIOD	Ci	6.98E-03	4.46E-04		

*Zeroes in this table indicate that no radioactivity was present above detectable levels. See Table 2-8 for typical lower limits of detection for gaseous sample analyses.

**There are no batch mode radioactive gaseous release pathways at Plant Hatch.

TABLE 2-4c
E. I. HATCH NUCLEAR PLANT - SITE
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1988
GASEOUS EFFLUENTS - GROUND-LEVEL RELEASES*

Nuclides Released	Unit	Continuous Mode Quarter 1	Continuous Mode Quarter 2	Batch Mode** Quarter 1	Batch Mode** Quarter 2
1. Fission Gases					
Kr-85	Ci	8.81E+01	0.00E+00		
Kr-85m	Ci	2.75E+01	3.02E-03		
Kr-87	Ci	6.17E+01	0.00E+00		
Kr-88	Ci	1.69E+01	0.00E+00		
Xe-133	Ci	1.57E+02	5.36E+02		
Xe-135	Ci	1.77E+02	4.75E+01		
Xe-135m	Ci	7.61E+01	0.00E+00		
Xe-138	Ci	4.97E-01	0.00E+00		
Xe-131m	Ci	0.00E+00	0.00E+00		
Xe-133m	Ci	0.00E+00	0.00E+00		
Xe-137	Ci	3.32E-02	0.00E+00		
Ar-41	Ci	0.00E+00	0.00E+00		
TOTAL FOR PERIOD	Ci	6.05E+02	5.84E+02		
2. Iodines					
I-131	Ci	1.84E-02	5.19E-04		
I-133	Ci	6.88E-03	1.62E-03		
I-135	Ci	3.17E-03	1.45E-03		
TOTAL FOR PERIOD	Ci	2.84E-02	3.58E-03		
3. Particulates					
Cr-51	Ci	7.86E-05	4.66E-05		
Mn-54	Ci	3.50E-05	2.06E-06		
Co-58	Ci	2.13E-04	6.28E-06		
Co-60	Ci	2.99E-04	1.35E-05		
Zn-65	Ci	3.06E-03	1.07E-04		
Sr-89	Ci	7.24E-04	1.37E-04		
Sr-90	Ci	1.73E-06	3.58E-07		
Nb-95	Ci	3.65E-05	0.00E+00		
Cs-134	Ci	1.04E-03	0.00E+00		
Cs-137	Ci	1.15E-03	1.18E-05		
Ba-140	Ci	1.24E-03	1.85E-04		
La-140	Ci	1.84E-03	1.20E-04		
TOTAL FOR PERIOD	Ci	9.71E-03	6.30E-04		

*Zeroes in this table indicate that no radioactivity was present above detectable levels. See Table 2-8 for typical lower limits of detection for gaseous sample analyses.

**There are no batch mode radioactive gaseous release pathways at Plant Hatch.

TABLE 2-5
E. I. HATCH NUCLEAR PLANT - SITE
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1988
GASEOUS EFFLUENTS - DOSE RATES

Dose Rates Due to Noble Gases

Organ	Tech Spec Limit	Unit	Quarter 1	% of Tech Spec Limit	Quarter 2	% of Tech Spec Limit
TBody	500	mrem/yr	1.35E+00	2.71E-01	2.33E-01	4.67E-02
Skin	3000	mrem/yr	2.89E+00	9.63E-02	5.35E-01	1.78E-02

Dose Rates Due to Radioiodine, Tritium, and Particulates

Organ	Tech Spec Limit	Unit	Quarter 1	% of Tech Spec Limit	Quarter 2	% of Tech Spec Limit
Bone	1500	mrem/yr	3.78E-03	2.52E-04	2.14E-04	1.43E-05
Liver	1500	mrem/yr	1.84E-02	1.23E-03	1.22E-02	8.13E-04
TBody	1500	mrem/yr	1.61E-02	1.07E-03	1.21E-02	8.07E-04
Thyroid	1500	mrem/yr	3.61E-01	2.41E-02	2.79E-02	1.86E-03
Kidney	1500	mrem/yr	1.76E-02	1.17E-03	1.22E-02	8.13E-04
Lung	1500	mrem/yr	2.53E-02	1.69E-03	1.30E-02	8.67E-04
GI-LLI	1500	mrem/yr	1.58E-02	1.05E-03	1.22E-02	8.13E-04

TABLE 2-6a
E. I. HATCH NUCLEAR PLANT - UNIT 1
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1988
AIR DOSES DUE TO NOBLE GAS RELEASES

Cumulative Doses Per Quarter

Type of Radiation	Tech Spec Limit	Unit	Quarter 1	% of Tech Spec Limit	Quarter 2	% of Tech Spec Limit
Gamma	5.0	mrad	1.63E-01	3.26E+00	5.81E-02	1.16E+00
Beta	10.0	mrad	1.91E-01	1.91E+00	1.59E-01	1.59E+00

Cumulative Doses Per Year

Type of Radiation	Tech Spec Limit	Unit	Quarters 1 & 2	% of Tech Spec Limit
Gamma	10.0	mrad	2.21E-01	2.21E+00
Beta	20.0	mrad	3.50E-01	1.75E+00

TABLE 2-6b
E. I. HATCH NUCLEAR PLANT - UNIT 2
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1988
AIR DOSES DUE TO NOBLE GAS RELEASES

Cumulative Doses Per Quarter

Type of Radiation	Tech Spec Limit	Unit	Quarter 1	% of Tech Spec Limit	Quarter 2	% of Tech Spec Limit
Gamma	5.0	mrad	1.94E-01	3.88E+00	9.58E-03	1.92E-01
Beta	10.0	mrad	2.27E-01	2.27E+00	1.46E-02	1.46E-01

Cumulative Doses Per Year

Type of Radiation	Tech Spec Limit	Unit	Quarters 1 & 2	% of Tech Spec Limit
Gamma	10.0	mrad	2.01E-01	2.04E+00
Beta	20.0	mrad	2.42E-01	1.21E+00

TABLE 2-7a
E. I. HATCH NUCLEAR PLANT - UNIT 1
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1988
INDIVIDUAL DOSES DUE TO RADIOIODINE, TRITIUM,
AND PARTICULATES IN GASEOUS RELEASES

Cumulative Dose Per Quarter

Organ	Tech Spec Limit	Unit	Quarter 1	% of Tech Spec Limit	Quarter 2	% of Tech Spec Limit
Bone	7.5	mrem	1.02E-02	1.36E-01	3.03E-04	4.04E-03
Liver	7.5	mrem	1.25E-02	1.67E-01	1.54E-03	2.05E-02
Tot.Body	7.5	mrem	1.19E-02	1.59E-01	1.53E-03	2.04E-02
Thyroid	7.5	mrem	7.22E-02	9.63E-01	3.45E-03	4.60E-02
Kidney	7.5	mrem	1.14E-02	1.52E-01	1.53E-03	2.04E-02
Lung	7.5	mrem	1.09E-02	1.45E-01	1.54E-03	2.05E-02
GI-LLI	7.5	mrem	1.07E-02	1.43E-01	1.53E-03	2.04E-02

Cumulative Dose Per Year

Organ	Tech Spec Limit	Unit	Quarters 1 & 2	% of Tech Spec Limit
Bone	15.0	mrem	1.05E-02	7.00E-02
Liver	15.0	mrem	1.40E-02	9.36E-02
Total Body	15.0	mrem	1.34E-02	8.95E-02
Thyroid	15.0	mrem	7.57E-02	5.04E-01
Kidney	15.0	mrem	1.29E-02	8.62E-02
Lung	15.0	mrem	1.24E-02	8.29E-02
GI-LLI	15.0	mrem	1.22E-02	8.15E-02

TABLE 2-7b
E. I. HATCH NUCLEAR PLANT - UNIT 2
SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT 1988
INDIVIDUAL DOSES DUE TO RADIOIODINE, TRITIUM,
AND PARTICULATES IN GASEOUS RELEASES

Cumulative Dose Per Quarter

Organ	Tech Spec Limit	Unit	Quarter 1	% of Tech Spec Limit	Quarter 2	% of Tech Spec Limit
Bone	7.5	mrem	8.59E-03	1.15E-01	2.34E-04	3.12E-03
Liver	7.5	mrem	9.72E-03	1.30E-01	1.22E-03	1.63E-02
Tot.Body	7.5	mrem	9.38E-03	1.25E-01	1.22E-03	1.63E-02
Thyroid	7.5	mrem	4.90E-02	6.53E-01	4.25E-03	5.67E-02
Kidney	7.5	mrem	9.29E-03	1.24E-01	1.22E-03	1.63E-02
Lung	7.5	mrem	9.66E-03	1.29E-01	1.27E-03	1.69E-02
GI-LLI	7.5	mrem	9.30E-03	1.24E-01	1.26E-03	1.68E-02

Cumulative Dose Per Year

Organ	Tech Spec Limit	Unit	Quarters 1 & 2	% of Tech Spec Limit
Bone	15.0	mrem	8.82E-03	5.88E-02
Liver	15.0	mrem	1.09E-02	7.29E-02
Total Body	15.0	mrem	1.06E-02	7.07E-02
Thyroid	15.0	mrem	5.33E-02	3.55E-01
Kidney	15.0	mrem	1.05E-02	7.01E-02
Lung	15.0	mrem	1.09E-02	7.29E-02
GI-LLI	15.0	mrem	1.06E-02	7.04E-02

TABLE 2-8
LOWER LIMITS OF DETECTION - GASEOUS SAMPLE ANALYSES

The values in this table represent apriori lower limits of detection (LLD) which are typically achieved in laboratory analyses of gaseous radwaste samples.

RADIONUCLIDE	LLD	UNITS
Kr-87	1.31E-07	uCi/ml
Kr-88	2.10E-07	
Xe-133	1.62E-07	
Xe-133m	6.07E-08	
Xe-135	5.77E-08	
Xe-138	2.85E-06	
I-131	4.37E-14	
I-133	6.16E-13	
Mn-54	2.78E-14	
Fe-59	4.62E-14	
Co-58	2.46E-14	
Co-60	2.88E-14	
Zn-65	7.51E-14	
Mo-99	6.02E-13	
Cs-134	3.64E-14	
Cs-137	2.88E-14	
Ce-141	4.94E-14	
Ce-144	2.02E-13	
Sr-89	1.17E-14	
Sr-90	3.82E-15	
H-3	5.82E-12	

3. SOLID WASTE

3.1 REGULATORY REQUIREMENTS

The Technical Specifications presented in this section are for Unit 1. Requirements for Unit 2 are the same as for Unit 1; however, the Technical Specification numbers are not the same.

TECHNICAL SPECIFICATIONS

3.15.3.1 The solid radwaste system shall be used in accordance with the PROCESS CONTROL PROGRAM to provide for the SOLIDIFICATION of wet solid wastes and for the SOLIDIFICATION and packaging of other radioactive wastes, as required, to ensure the meeting of the requirements of 10 CFR Part 20 and of 10 CFR Part 71 prior to shipment of radioactive wastes from the site.

6.9.1.9 states in part:

The Radioactive Effluent Release Report shall include the following information for each type of solid waste shipped offsite during the report period:

a. Container volume

b. Total curie quantity (specify whether determined by measurement or estimate)

c. Principal radionuclides (specify whether determined by measurement or estimate)

d. Type of waste, e.g., spent resin, compacted dry waste, evaporator bottoms

e. Type of container, e.g., LSA, type A, type B, large quantity

f. Solidification agent, e.g., cement.

3.2 SOLID WASTE DATA

Regulatory guide 1.21 Table 3 is found in this report as Table 3-1a. and 3-1b.

TABLE 3-1a
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (YEAR)
JANUARY - JUNE, 1988
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS
FOR UNIT I AND II

1. Type of waste	UNIT	6 month period	Est. Total ERROR%
a. Spent resins, filter studges, evaporator bottoms, etc.	m^3	2.02E2	
	Ci	1.36E3	1.00 E1
b. Dry compressible waste, contaminated equip. etc.	m^3	2.90E2	
	Ci	3.50E0	2.00 E1
c. Irradiated components, control rods, etc.	m^3	. E	
	Ci	. E	. E
d. Other (describe) equip. etc. CRD Filters	m^3	1.10E0	
	Ci	4.20E0	2.00 E1

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

ISOTOPE	PERCENT	CURIES
a. Zn-65	29.10	395.76
Cs-137	21.20	288.32
Cs-134	18.30	248.88
Other	31.40	427.04
b. Zn-65	40.30	1.41
Co-60	34.10	1.19
Cs-137	9.10	0.32
Other	16.50	0.58
c.		
N/A		
d. Co-60	44.7	1.88
Fe-55	21.7	0.91
Zn-65	14.8	0.62
Nb-95	4.8	0.20
Other	14.0	0.59

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
38	Cask	Barnwell
12	Van (Box)	Barnwell

B. IRRADIATED FUEL SHIPMENTS (Disposition)

Number of Shipments	Mode of Transportation	Destination
NA	NA	NA

January 1 - June 30

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT(YEAR) 1988

SOLID WASTE AND IRRADIATED FUEL SHIPMENT

FOR UNIT I & II

TABLE 3-1B

TYPE OF WASTE	CURIE QUANTITY/ DETERMINED	PRINCIPLE NUCLIDES/ DETERMINATION	BURIAL CONTAINER DESCRIPTION	NUMBER OF CONTAINERS SHIPPED	VOLUME OF EACH CONTAINER Ft 3	TYPE SHIPPING CONTAINER	SOLIDIFICATION AGENT
DEWATERED RESIN	45.89 MEASURED	Zn-65,Cs-134,Cs-13. Co-60 MEASURED	14-210 CSL	9	199.4	LSA,TYPE A	None
DEWATERED RESIN	948.34 MEASURED	Zn-65,Cs-134,Cs-137, Co-60 MEASURED	10-142 HIC	6	132.4	LSA,TYPE B	None
DEWATERED RESIN	368.42 MEASURED	Zn-65,Cs-134,Cs-137, Co-60 MEASURED	14-210 HIC	22	202.1	LSA,TYPE A	None
COMPACTED DAW	3.50 ESTIMATED	Zn-65,Cs-137, Fe-55 MEASURED	Steel B-25 STC	109	95.2	LSA,STC	None
CRD FILTERS	4.20 ESTIMATED	Co-60,Fe-55, Zn-65 MEASURED	Medium - 2 HIC Overpack	1	38.3	LSA,TYPE A	None

Notes: STC - Strong tight cointainer
HIC - High integrity container
LSA - Low specific activity
CSL - Carbon steel liner

4. CHANGES IN THE RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

In the Semi-annual radioactive effluent release report for the second half of 1987, it was reported pursuant to Technicial Specification 3.16.1.c. that milk had become unavailable during the third quarter of 1987 at Clark's Farm which is in the NNW sector at 4.8 miles and that efforts made to find a replacement sample were fruitless. It was also reported that it was expected that milk would again be available at this location in six months or so. As a consequence of regular follow-up inquiries to the Clarks, it was learned that milk again had become available; collections resumed during the second quarter of 1988.

5. CHANGES TO THE PLANT HATCH ODCM

Technical Specifications 6.9.1.8 and 6.9.1.9 require in part that changes to the Plant Hatch Offsite Dose Calculation Manual (ODCM) be reported to the Commission in the next Semi-annual Effluent Release Report.

On January 28, 1988, the PRB recommended approval of changes to the Plant Hatch ODCM pertaining to changing the location of the critical receptor for gaseous releases. These changes became effective for the first quarter of 1988.

A change in the location of the critical receptor was the result of changes in land use in the vicinity of Plant Hatch, that was noted during the land use survey as required by HNP Technical Specification 3.16.2. Since new vegetable gardens were observed, potential dose assessments were performed to evaluate other potential locations based on the land use survey. The critical receptor identified in this revision to the ODCM was identified as a result of these potential dose assessments. Documentation of PRB review and approval of these changes is presented in Appendix A of this report.

Appendix B of this report contains the modified pages of the Plant Hatch ODCM discussed in Appendix A. These modifications to the Plant Hatch ODCM are identified as Revision 4.

Georgia Power Company
Plant E. I.Hatch
Semi-annual Report
Plant Radioactive Effluent Releases
January 1 through June 30, 1988

Appendix A

GEORGIA POWER COMPANY
PLANT E. I. HATCH

FORM TITLE:
DOCUMENT CHANGE REQUEST

CHANGE AFFECTS: ( ) UNIT ONE ( ) UNIT TWO (✓) UNITS ONE AND TWO

REQUEST DATE : 1-21-88 REQUEST NO.: 88-03 REVISION NO. 0

NON-ROUTINE

REQUEST INITIATED: ( ) ON-SITE, (✓) OFF SITE BY: S.C. Ewald

DOCUMENT(S) AFFECTED: Offsite Dose Calculation Manual

SECTION/TITLE : Table 2.2-12, CONTROLLING RECEPTOR; Table 2.2-13, SITE SPECIFIC (OR DEFAULT) VALUES TO BE USED IN PATHWAY FACTOR CALCS; REFERENCES

DESCRIPTION OF PROPOSED CHANGE [ATTACH MARKED UP COPY OF AFFECTED DOCUMENT(S)]:
The description of the proposed changes is contained in Attachment 2. The changes are contained in Attachment 3.

REASON FOR CHANGE : The reasons for these proposed changes are contained in letter RS-417, S.C. Ewald to S.B. Tipps, dated 1-4-88 (SIC). This letter is the first page of Attachment 1.

ENVIRONMENTAL IMPACT STATEMENT REQUIRED: ( ) YES (X) NO
DESCRIBED IN FSAR: (X) YES ( ) NO
UNREVIEWED SAFETY QUESTION: ( ) YES (X) NO 10 CFR 50.59 evaluation on Page 15 of Att 1.
PRIORITY: ( ) EMERGENCY RELIEF ( ) RELOAD LICENSING (X) INDIVIDUAL SUBMITTAL

NO. ATTACHMENTS: 3

NSC MEMBER	DATE	NSC SUPERVISOR	DATE	MANAGER NSC	DATE
C.J. Fehr	11-21-88	J L Elton	11-21-88	Stan Ivan	11/21/88

FORWARD TO PRB SECRETARY FOR INITIAL PRB REVIEW JZE 01-22-88

PRB RECOMMENDS CHANGE: (✓) YES ( ) NO 88-4 1-24-88
PRB MEETING NO. DATE

IF NO, GIVE REASON:

REQUEST: (✓) APPROVED ( ) DISAPPROVED

IF DISAPPROVED, GIVE REASON:

PLANT MANAGER DATE

ATTACHMENT 2

DISCUSSION OF PROPOSED ODCM CHANGES

I. Table 2.2-12 was modified to incorporate changes in the location, age group and dispersion and deposition factors for the new critical receptor. Also, the Annual Land Use Census was changed to the Annual Land Use Survey to be consistent with the Technical Specifications.

II. Sheet 2 of Table 2.2-13 was modified to provide site specific values for fractions of annual intakes of locally grown leafy vegetation and stored vegetation. As a follow-up to the land use survey, it was learned from the owners of the garden that the garden is maintained for only two months during the year.

DCCR No. 88 - 03
ATTACHMENT No. 2
SHEET 1 OF 1

TABLE 2.2-12
CONTROLLING RECEPTOR
(To support subsection 2.2.2.b)

The location and exposure pathways associated with the controlling receptor are determined based on information obtained during the Annual Land Use ~~census.~~* Dispersion and deposition values were calculated for the location of the controlling receptor based on the HNP site meteorological data collected for the period 1984-1986.**

Location: SW at ~~2.2~~ 1.1 miles
Age Group: ~~Child~~ adult
Exposure Pathways: Inhalation, ground-plane, and garden vegetation
Dispersion and Deposition Values for this location:

Ground-level

$$(\overline{X/Q'})_{vp} = \text{~~7.39E-7~~ } 4.58E\text{-}6 \ \frac{sec}{m^3}$$

$$(\overline{D/Q'})_{vp} = \text{~~2.73E-9~~ } 1.80E\text{-}8 \ \frac{1}{m^2}$$

Elevated

$$(\overline{X/Q'})_{sp} = \text{~~7.21E-8~~ } 1.41E\text{-}7 \ \frac{sec}{m^3}$$

$$(\overline{D/Q'})_{sp} = \text{~~7.32E-10~~ } 3.29E\text{-}9 \ \frac{1}{m^2}$$

* References ~~14 and 18.~~ 20
** Reference ~~17.~~ 21

88 03
3
1 3

TABLE 2.2-13 (SHEET 2 OF 3)

SITE-SPECIFIC (OR DEFAULT) VALUES TO BE USED IN PATHWAY FACTOR CALCULATIONS*

Parameter	Description	Value
Grass-Cow-Meat (continued)		
$(DFL)_{ija}$	Ingestion dose factor for age group	Tables 2.2-6 thru 2.2-8
Y_p	Pasture grass areal density	0.7 kg/m²
Y_s	Stored feed areal density	2.0 kg/m²
f_p	Fraction of year that cow grazes on pasture	1.0
f_s	Fraction of total feed that is pasture grass while cow is on pasture	1.0
H	Absolute humidity of the atmosphere	8.0 gm/m³
Garden Vegetation		
Y_v	Garden vegetation areal density	2.0 kg/m²
U_{al}	Leafy vegetation consumption rate for age group	Table 2.2-10
U_{as}	Stored vegetation consumption rate for age group	Table 2.2-10
$(DFL)_{ija}$	Ingestion dose factor for age groups	Tables 2.2-6 thru 2.2-8
f_l	Fraction of annual intake of leafy vegetation grown locally (Site Specific)	~~1.0~~ 0.17
f_g	Fraction of annual intake of stored vegetation grown locally (Site Specific)	~~0.76~~ 0.13
H	Absolute humidity of the atmosphere	8.0 gm/m³
Grass-Goat-Milk		
Q_F	Feed consumption rate for goat	6.0 kg/day
U_{ap}	Milk consumption rate for age group	Table 2.2-10

DCR 88-03 Att. 3 Pg. 2 of 3

*Supports Section 2.2.2.b.

REFERENCES (Continued)

14. Hatch Nuclear Plant Land Use Survey - 1987, Georgia Power Company, February 1987.

15. Letter to Georgia Power Company from Pickard, Lowe, and Garrick, Inc., Washington, D.C., May 11, 1987.

16. Letter to Georgia Power Company from Pickard, Lowe, and Garrick, Inc., Washington, D.C., June 3, 1987.

17. Letter to Georgia Power Company from Pickard, Lowe, and Garrick, Inc., Washington, D.C., June 11, 1987.

18. Internal Memorandum, W.H. Ollinger to D.M. Hopper, Georgia Power Company, June 9, 1987.

19. Letter to Georgia Power Company from Quantum Technology, Inc., Marietta, Georgia, June 17, 1987.

20 Hatch Nuclear Plant Land Use Survey by Georgia Power Company, November 1987

21 Letter to Georgia Power Company from Pickard Lowe and Garrick, Inc., Washington, D.C., Nov. 30, 1987

DOCR No.	88 - 03
ATTACHMENT No.	3
	3 3

Georgia Power Company
Plant E. I.Hatch
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Plant Radioactive Effluent Releases
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Appendix B

TABLE 2.2-12
CONTROLLING RECEPTOR
(To support subsection 2.2.2.b)

The location and exposure pathways associated with the controlling receptor are determined based on information obtained during the Annual Land Use Survey.* Dispersion and deposition values were calculated for the location of the controlling receptor based on the HNP site meteorological data collected for the period 1984-1986.**

Location: SW at 1.1 miles
Age Group: Adult
Exposure Pathways: Inhalation, ground-plane, and garden vegetation
Dispersion and Deposition Values for this location:

Ground-level

$$(\overline{X/Q'})_{vp} = 4.58E\text{-}6 \ \frac{sec}{m^3}$$

$$(\overline{D/Q'})_{vp} = 1.90E\text{-}8 \ \frac{1}{m^2}$$

Elevated

$$(\overline{X/Q'})_{sp} = 1.46E\text{-}7 \ \frac{sec}{m^3}$$

$$(\overline{D/Q'})_{sp} = 3.29E\text{-}9 \ \frac{1}{m^2}$$

* Reference 20.
** Reference 21.

TABLE 2.2-13 (SHEET 2 OF 3)

SITE-SPECIFIC (OR DEFAULT) VALUES TO BE USED IN PATHWAY FACTOR CALCULATIONS*

Parameter	Description	Value
Grass-Cow-Meat (continued)		
$(DFL)_{ija}$	Ingestion dose factor for age group	Tables 2.2-6 thru 2.2-8
Y_p	Pasture grass areal density	0.7 kg/m²
Y_s	Stored feed areal density	2.0 kg/m²
f_p	Fraction of year that cow grazes on pasture	1.0
f_s	Fraction of total feed that is pasture grass while cow is on pasture	1.0
H	Absolute humidity of the atmosphere	8.0 gm/m³
Garden Vegetation		
Y_v	Garden vegetation areal density	2.0 kg/m²
$U_{a\ell}$	Leafy vegetation consumption rate for age group	Table 2.2-10
U_{as}	Stored vegetation consumption rate for age group	Table 2.2-10
$(DFL)_{ija}$	Ingestion dose factor for age groups	Tables 2.2-6 thru 2.2-8
f_ℓ	Fraction of annual intake of leafy vegetation grown locally (Site specific)	0.17
f_g	Fraction of annual intake of stored vegetation grown locally (Site specific)	0.13
H	Absolute humidity of the atmosphere	8.0 gm/m³
Grass-Goat-Milk		
Q_F	Feed consumption rate for goat	6.0 kg/day
U_{ap}	Milk consumption rate for age group	Table 2.2-10

*Supports Section 2.2.2.b.

REFERENCES (Continued)

14. Hatch Nuclear Plant Land Use Survey - 1987, Georgia Power Company, February 1987.

15. Letter to Georgia Power Company from Pickard, Lowe, and Garrick, Inc., Washington, D.C., May 11, 1987.

16. Letter to Georgia Power Company from Pickard, Lowe, and Garrick, Inc., Washington, D.C., June 3, 1987.

17. Letter to Georgia Power Company from Pickard, Lowe, and Garrick, Inc., Washington, D.C., June 11, 1987.

18. Internal Memorandum, W.H. Ollinger to D.M. Hopper, Georgia Power Company, June 9, 1987.

19. Letter to Georgia Power Company from Quantum Technology, Inc., Marietta, Georgia, June 17, 1987.

20. Hatch Nuclear Plant Land Use Survey, Georgia Power Company, November 1987.

21. Letter to Georgia Power Company from Pickard, Lowe, and Garrick, Inc., Washington, D.C., November 30, 1987.

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Senior Vice President
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the southern electric system

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X7GJ17-H530

August 26, 1988

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

PLANT HATCH - UNITS 1, 2
NRC DOCKETS 50-321, 50-366
OPERATING LICENSES DPR-57, NPF-5
SEMI-ANNUAL RADIOACTIVE EFFLUENT
RELEASE REPORT

Gentlemen:

In accordance with the provisions of the Plant Hatch Technical Specifications Sections 6.9.1.8 and 6.9.1.9, Georgia Power Company (GPC) is providing six copies of the Plant Hatch Units 1 and 2 Semi-Annual Radioactive Effluent Release Report. This report covers the period of January 1, 1988 through June 30, 1988.

Should you have any questions in this regard, please contact this office at any time.

Sincerely,

W. G. Hairston, III

LGB/lg

Enclosures:

Plant Hatch Semi-Annual Radioactive Effluent Release Report

c: (see next page)

IE48
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c: Georgia Power Company
Mr. H. C. Nix, General Manager - Plant Hatch
Mr. L. T. Gucwa, Manager Licensing and Engineering
Mr. S. C. Ewaid, Manager Radiological Safety
GO-NORMS

U. S. Nuclear Regulatory Commission, Washington, D. C.
Mr. L. P. Crocker, Licensing Project Manager - Hatch

U. S. Nuclear Regulatory Commission, Region II
Dr. J. N. Grace, Regional Administrator (2 copies)
Mr. J. E. Menning, Senior Resident Inspector - Hatch

American Nuclear Insurers
Mr. L. Cross

State of Georgia
Mr. J. Setser, Department of Natural Resources

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