Public Service
Electric and Gas
Company

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Vice President Nuclear Operations

FEB 2 6 1992

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United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Gentlemen:

RADIOACTIVE EFFLUENT RELEASE REPORT - 12
HOPE CREEK GENERATING STATION
DOCKET NOS. 50-272 AND 50-311

In accordance with Section 6.9.1.11 of Appendix A to the Operating License for Hope Creek Generating Station (HCGS), Public Service Electric and Gas Company (PSE&G) hereby transmits one copy of the semi-annual Radioactive Effluent Release Report, RERR-12. This report summarizes liquid and gaseous releases and solid waste shipments from the Hope Creek Generating Station for the period July 1 through December 31, 1991.

Should you have any questions regarding this transmittal, please feel free to contact us.

Sincerely,

Attachment

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1/1

REPORT only

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Licensing Project Manager

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HOPE CREEK GENERATING STATION
SEMIANNUAL RADIOACTIVE
EFFLUENT RELEASE REPORT
HCGS RERR-12

DOCKET NO. 50-354
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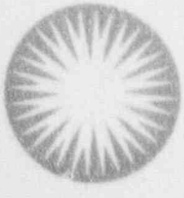
FEBRUARY, 1992



PSE&G

The Energy People

HOPE CREEK GENERATING STATION
RADIOACTIVE EFFLUENT RELEASE REPORT
JULY - DECEMBER 1991

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HOPE CREEK GENERATING STATION
RADIOACTIVE EFFLUENT RELEASE REPORT
JULY - DECEMBER 1991

INTRODUCTION

This report, HCGS-RERR-12, summarizes information pertaining to the releases of radioactive materials in liquid, gaseous and solid form from the Hope Creek Generating Station (HCGS) for the period July 1 , 1991 to December 31, 1991.

The Hope Creek Generating Station (HCGS) employs a General Electric (GE) Boiling Water Reactor designed to operate at a rated core thermal power of 3293 MWt with a gross electrical output of approximately 1118 MWe and a net output of approximately 1067 MWe. The HCGS achieved initial criticality on June 28, 1986 and went into commercial operation on December 20, 1986.

This report is prepared in the format of Regulatory Guide 1.21, Appendix B, as required by Specification 6.9.1.7 of the Hope Creek Technical Specifications.. Preceding the tables summarizing the gaseous and liquid discharges and solid waste shipments are our responses to parts A-F of the "Supplemental Information" section of Regulatory Guide 1.21, Appendix B.

As required by Regulatory Guide 1.21, our Technical Specification limits are described in detail within this report along with a summary description of how total activity measurements and their approximations were developed.

To facilitate determination of compliance with 40CFR190 requirements, the following information on electrical output is provided.

> Hope Creek generated **4,516,979** megawatt-hours of electrical energy (net) during the reporting period.

Results of liquid and gaseous composites analyzed for Sr-89, Sr-90 and Fe-55 for the fourth quarter of 1991 were not available for inclusion in this report. The results of these composites will be provided in the next Radioactive Effluent Release Report.

The Sr-89, Sr-90 and Fe-55 analyses for the first half of 1991 (refer to RERR-11) have been completed; amended pages to RERR-11 are included in this report.

PART A. PRELIMINARY SUPPLEMENTAL INFORMATION

1.0 REGULATORY LIMITS

1.1 Fission and Activation Gas Release Limits

The dose rate due to radioactive materials released in gaseous effluents from the site to areas at and beyond the site boundary, shall be limited to the following:

For noble gases: Less than or equal to 500 mrems/yr to the total body and less than or equal to 3000 mrems/yr to the skin.

In addition, the air dose due to noble gases released in gaseous effluents from the site to areas at and beyond the site boundary, shall be limited to the following:

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

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

1.2 Iodine, Particulates, and Tritium

The dose rate due to radioactive materials released in gaseous effluents from the site to areas at and beyond the site boundary, shall be limited to the following:

For Iodine-131,I-133, for tritium, and for all radionuclides in particulate form with half-lives greater than 8 days: Less than or equal to 1500 mrems/yr to any organ.

In addition, the dose to a member of the public from iodine-131,133, from tritium, and from all radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents released, from each reactor unit, from the site to areas at and beyond the site boundary, shall be limited to the following:

During any calendar quarter: Less than or equal to 7.5 mrems to any organ and,

During any calendar year: Less than or equal to 15 mrems to any organ.

1.3 Liquid Effluents Release Limits

The concentration of radioactive material released in liquid effluents to unrestricted areas shall be limited to the concentrations specified in 10CFR20, Appendix B, Table II, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2E-4 microcuries per milliliter.

In addition, the dose or dose commitment to a member of the public from radioactive materials in liquid effluents released to unrestricted areas shall be limited to:

During any calendar quarter: Less than or equal to 1.5 mrems to the total body, and less than or equal to 5 mrems to any organ, and

During any calendar year: Less than or equal to 3 mrems to the total body, and less than or equal to 10 mrems to any organ.

1.4 Total Dose Limit

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

2.0 MAXIMUM PERMISSIBLE CONCENTRATIONS (MPC)

Regulatory Guide 1.21 requires that the licensee provide the MPCs used in determining allowable release rates or concentrations for radioactive releases.

a. MPC values were not used to determine the maximum release rates for fission gases, iodines, or particulates.

b. MPC values as stated in 10CFR20, Appendix B, Table II, Column 2 are used for liquid effluents.

c. The MPC value used for dissolved or entrained noble gases is 2E-4 microcuries per milliliter.

3.0 AVERAGE ENERGY

Regulatory Guide 1.21 requires that the licensee provide the average energy of the radionuclide mixture in releases of fission and activation gases, if applicable.

Release limits for HCGS are not based upon average energy. Therefore this section is not applicable to HCGS.

4.0 MEASUREMENTS AND APPROXIMATION OF TOTAL RADIOACTIVITY

4.1 Liquid Effluents

Liquid effluents are monitored in accordance with Table 4.11.1.1.1-1 of the Technical Specifications. During the period of record, all liquid wastes were routed to the sampling tanks for monitoring prior to release. Technical Specifications require these tanks to be uniformly mixed for sampling and analysis before being released. Batch releases are defined as releases from the equipment drain sample tanks, floor drain sample tanks, detergent drain tanks, and the condensate storage tank dike. Normally, there are no continuous liquid releases. Specific activities from analyses were multiplied by the volume of effluent discharged to the environment in order to determine the total liquid activity discharged.

The detection requirements of Table 4.1.1.1-1 of the Technical Specifications are achieved or exceeded. Radionuclides measured at concentrations below the Technical Specification detection limit (LLDs) are treated as being present. Radionuclides with a one sigma gamma counting error > 30% are considered as not being present.

4.2 Gaseous Effluents

Gaseous effluent streams are monitored and sampled in accordance with Table 4.11.2.1.2-1 of the Technical Specifications. The north plant vent (NPV) and south plant vent (SPV) are the final release points for most planned gaseous effluent releases. A small quantity of gaseous effluent will be released via the filtration, recirculation, and ventilation system (FRVS) vent during testing periods. The NPV and SPV are continuously monitored for iodine, particulates and noble gases; the FRVS is continuously monitored for noble gases. The NPV and SPV monitors have moving particulate and fixed charcoal filters; the FRVS monitor has fixed particulate and charcoal filters.

The filters and charcoal are changed weekly, and are analyzed on a multichannel analyzer. The NPV and SPV are sampled monthly for noble gases and tritium.

The detection requirements of Tables 4.11.2.1.2-1 of the Technical Specifications are achieved or exceeded. Radionuclides measured at concentrations below the Technical Specification detection limit (LLDs) are treated as being present. Radionuclides with a one sigma gamma counting error > 30% are considered as not being present.

Continuous Mode gaseous releases are quantified by routine (monthly) sampling and isotopic analyses of the plant vents. If noble gases are detected during the routine sampling,the measured concentrations are adjusted using the radiation monitoring readings to obtain an average concentration for the period. This average concentration is then multiplied by the total vent flow value for the entire sampling period in order to estimate the normal continuous release of radioactivity through the plant vent.

When monthly vent grab samples yield no detectable activity, continuous mode releases are quantified by integrating Radiation Monitor System readings. Noble gas isotopic abundances for these integrations are based on the ANSI N237-1976/ANS-18.1 mix for BWRs. Doses calculated from this data employ the methods from Section 2.0 and Appendix C of the Hope Creek ODCM.

Batch Mode gaseous releases (primary containment purge) are quantified by pre-release sampling and isotopic analysis. Specific activities for each isotope are multiplied by the total purge flow volume in order to estimate the batch release of radioactivity through the plant vent.

Elevated plant vent radiation monitoring system readings while the channel is in an alarm state are treated as batch mode releases. If specific activity data from grab samples taken is not available, then the abnormal release is quantified by the use of the plant vent radiation monitors. The monitor's response is converted to a "specific activity" using historical efficiency factors. The "specific activity" is multiplied by the volume of effluent discharged while the channel was in an alarm state in order to estimate the total activity discharged.

4.3 Estimated Total Error

The estimated total error of reported liquid releases is within 25%.

The estimated total error of the reported continuous gaseous releases is within 50% when concentrations exceed detectable levels. This error is due primarily to variability of waste stream flow rates and changes in isotopic distributions of waste streams between sampling periods. The estimated total error of the reported batch gaseous releases is within 10%.

Error estimates for releases where sample activity is below the detectable concentration levels are not included since error estimates at the LLD are not defined.

The estimated total error of reported solid releases is within 25%.

5.0 BATCH RELEASES

Summaries of batch releases of gaseous and liquid effluents are provided in Tables 4A and 4B.

6.0 UNPLANNED RELEASES

During this reporting period there were no unplanned releases.

7.0 ELEVATED RADIATION MONITOR RESPONSES

During this reporting period, the plant vent radiation monitors indicated slightly elevated readings on several occasions. As indicated above, monitor readings were quantified and treated as continuous releases. The elevated readings are included in Tables 1A and 1B.

8.0 MODIFICATION TO PREVIOUS RADIOACTIVE EFFLUENT RELEASE REPORTS

Our last report (RERR-11) did not include the quarterly Sr-89, Sr-90 and Fe-55 composite data for the first half of 1991. Amended pages to RERR-11 are included at the end of this report.

Additionally, calculational errors were found after RERR-10 was submitted. Corrected values are included at the end of this report.

PART B. GASEOUS EFFLUENTS

See Summary Tables 1A through 1C.

PART C. LIQUID EFFLUENTS

See Summary Tables 2A through 2C.

PART D. SOLID WASTE

See Summary in Table 3.

PART E. RADIOLOGICAL IMPACT ON MAN

The calculated individual doses in this section are based on actual locations of nearby residents and farms. The population dose impact is based on historical site specific data i.e., food production, milk production, feed for milk animals and seafood production.

The doses were calculated using methods described in Regulatory Guide 1.109 and represent calculations for the six month reporting interval. Individual doses from batch and continuous releases were calculated using the annual average historic meteorological dispersion coefficients as described in the Offsite Dose Calculation Manual. Population doses were calculated using the meteorological dispersion coefficients for the six month reporting interval.

Liquid Pathways

Doses to individuals in the population from liquid releases are primarily from the seafood ingestion pathway. Calculated doses to individuals are as shown below.

Total body dose to an individual: 4.34E-02 mrem

Highest organ dose: 1.00E-01 mrem to the Liver

Dose to the 6 million individuals living within the 50 mile radius of the plant site:

Total population dose: 5.08E-01 person-rem

Average population dose: 8.51E-05 mrem/person

Air Pathways

The calculated doses to individuals via the air pathway are shown below:

Total body dose: 3.87E-01 mrem

Skin dose: 8.42E-01 mrem

Highest organ dose due to radioiodines and particulates with half lives greater than 8 days:

5.37E-05 mrem to the Liver.

Dose to the 6 million individuals living within the 50 mile radius of the plant site:

Total population dose: 5.42E+00 person-rem

Average population dose: 9.08E-04 mrem/person

Direct Radiation

Direct radiation may be estimated by Thermoluminescent dosimetric (TLD) measurements. One method for comparing TLD measurements is by comparison with pre-operational data. It should be noted that the TLDs measure direct radiation from both the Salem and Hope Creek Generating Stations at Artificial Island, and natural background radiation.

TLD data for the six month reporting period is given below:

TLD	Location	Measurement
2S-2	0.3 mile	5.0 mrad/month
5S-1	0.9 mile	4.7 mrad/month

These values are interpreted to represent natural background, since the values are within the statistical variation associated with the pre-operational program results, which are 3.7 mrad/month for location 2S-2, and 4.2 mrad/month for location 5S-1.

Total Dose

40CFR190 limits the total dose to members of the public due to radioactivity and radiation from uranium fuel cycle sources to:

<25 mrem total body or any organ
<75 mrem thyroid

for a calendar year. For Artificial Island, the major sources of dose are from liquid and gaseous effluents from the Hope Creek and Salem plants.

The following doses to a member of the public have been calculated for the six month reporting period. They are the sum of gaseous and liquid pathway doses for the Salem 1 and 2 and Hope Creek plants:

0.752 mrem total body
1.74 mrem organ (GI-LLI)
0.336 mrem thyroid

Dose to members of the public due to activities inside the site boundary.

In accordance with the requirements of Technical Specification 6.9.1.7, the dose to members of the public inside the site boundary has been calculated based on the following assumptions:

* Such persons are participating or spectators in local softball league
* 10 hours per week on site
* dose due to airborne pathway(inhalation) and noble gases
* persons are located about 3/4 mile west of plant discharge points (baseball fields)
* occupancy coincides with batch gaseous discharges

For the six month reporting period, the calculated doses are:

5.4E-03 mrem total body
5.5E-03 mrem organ (Lung)

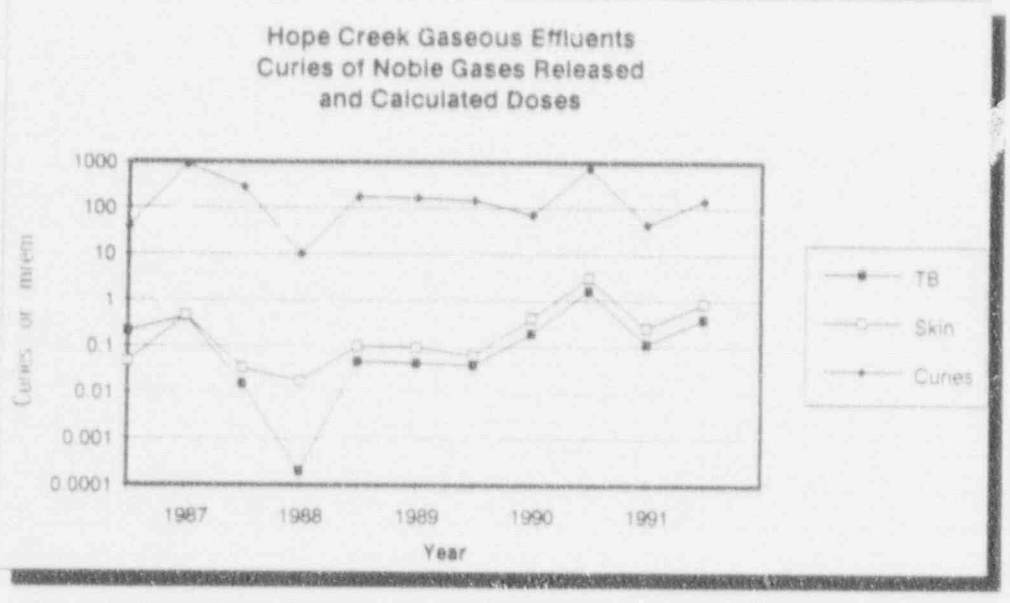
Assessment

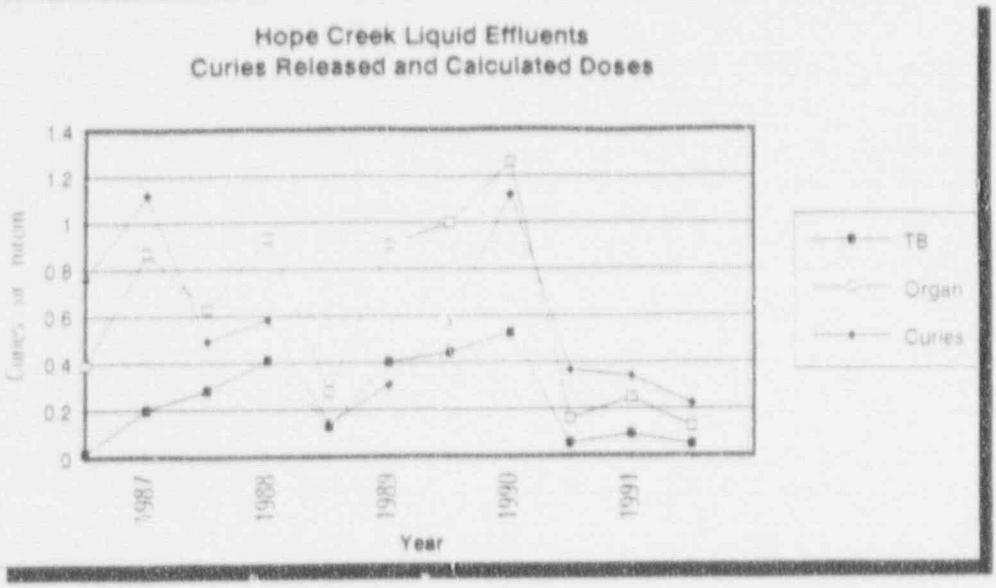
Hope Creek gaseous effluents continue to be one of the lowest of United States BWRs, with an average release rate of 9.3 microcuries per second, characteristic of a plant with no cladding defects.

Individual noble gas radionuclide concentrations are too low to measure directly. Calculated doses from noble gases are based on a default isotopic mixture, which assumes little decay, and has principally short lived species with large dose factors. Because of this assumed isotopic mix, calculated doses are probably conservative by a factor of 25, assuming that the actual discharge consisted of mostly xenon-137.

Hope Creek liquid effluents are about the same as the previous reporting period, and lower than the average discharges of the previous three years. Calculated doses are due principally to isotopes of iron and zinc.

The following two trend graphs show the gaseous and liquid effluents and calculated doses from Hope Creek since plant initial operation in 1986.





PART F. METEOROLOGICAL DATA

Cumulative joint wind frequency distributions by atmospheric stability class at the 300 foot elevation are provided for the third and fourth quarters of 1991 in Tables 5 and 6.

PART G. OFFSITE DOSE CALCULATION MANUAL (ODCM) CHANGES

During this period, there were no changes to the HCGS Off-site Dose Calculation Manual.

PART H. INOPERABLE MONITORS

During this period, there were no effluent monitors inoperable for greater than 30 days.

PART I. ENVIRONMENTAL MONITORING LOCATION CHANGES

During the reporting period, there was no changes to the environmental monitoring sampling locations.

HOPE CREEK GENERATING STATION

TABLE 1A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JULY - DECEMBER 1991

GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

	Units	3rd Quarter	4th Quarter	Est. Total Error %
A. Fission and Activation Gases				
1. Total release	Ci	6.24E+01	8.55E+01	25
2. Average release rate for period	µCi/sec	7.85E+00	1.08E+01	
3. Percent of technical specification limit (T.S. 3.11.2.2(a),	%	8.51E-01	1.17E+00	
B. Iodines				
1. Total iodine-131,133	Ci	0.00E+00	0.00E+00	25
2. Average release rate for period	µCi/sec	0.00E+00	0.00E+00	
3. Percent of technical specification limit (2) (T.S. 3.11.2.3(a))	%	3.01E-06	7.28E-04	
C. Particulates				
1. Particulates with half-lives >8 days	Ci	2.44E-07	3.91E-04	25
2. Average release rate for period	µCi/sec	3.07E-08	4.92E-05	
3. Percent of technical specification limit (2) (T.S. 3.11.2.3(a))	%	3.01E-06	7.28E-04	
4. Gross alpha	Ci	0.00E+00	0.00E+00	
D. Tritium				
1. Total Release	Ci	5.28E+00	5.11E+00	25
2. Average release rate for period	µCi/sec	6.64E-01	6.43E-01	
3. Percent of technical specification limit (2) (T.S. 3.11.2.3(a))	%	3.01E-06	7.28E-04	

(1) For batch releases the estimated overall error is within 10%
(2) Iodine, tritium and particulates are treated as a group

HOPE CREEK GENERATING STATION

TABLE 1B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JULY - DECEMBER 1991
GASEOUS EFFLUENTS-GROUND LEVEL RELEASES

		CONTINUOUS MODE		BATCH MODE	
Nuclides Released	Unit	3rd Quarter	4th Quarter	3rd Quarter	4th Quarter
1. Fission Gases					
Krypton-83m	Ci	6.24E-01	8.55E-01	0.00E+00	0.00E+00
Krypton-85m	Ci	6.24E-01	8.55E-01	0.00E+00	0.00E+00
Krypton-87	Ci	2.49E+00	3.42E+00	0.00E+00	0.00E+00
Krypton-88	Ci	2.49E+00	3.42E+00	0.00E+00	0.00E+00
Krypton-89	Ci	1.68E+01	2.31E+01	0.00E+00	0.00E+00
Xenon-133	Ci	1.25E+00	1.71E+00	0.00E+00	0.00E+00
Xenon-135	Ci	3.12E+00	4.28E+00	0.00E+00	0.00E+00
Xenon-135m	Ci	3.74E+00	5.13E+00	0.00E+00	0.00E+00
Xenon-137	Ci	1.93E+01	2.65E+01	0.00E+00	0.00E+00
Xenon-138	Ci	1.19E+01	1.63E+01	0.00E+00	0.00E+00
TOTALS	Ci	6.24E+01	8.55E+01	0.00E+00	0.00E+00
2. Iodines					
Iodine-131	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTALS	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3. Particulates (half-live >8 days					
Manganese-54	Ci	1.09E-07	9.42E-05	0.00E+00	0.00E+00
Zinc-65	Ci	1.35E-07	2.97E-04	0.00E+00	0.00E+00
TOTALS	Ci	2.44E-07	3.91E-04	0.00E+00	0.00E+00

HOPE CREEK GENERATING STATION

TABLE 1C

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

JULY - DECEMBER 1991

GASEOUS EFFLUENTS-ELEVATED RELEASES

There were no elevated gaseous releases during this reporting period.

HOPE CREEK GENERATING STATION

TABLE 2A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JULY - DECEMBER 1991

LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

	Units	3rd Quarter	4th Quarter	Est. Total Error %
A. Fission and activation products				
1. Total release (not including tritium, gases, alpha)	Ci	6.25E-02	5.17E-02	25
2. Average diluted concentration during period	µCi/mL	3.06E-08	2.81E-08	
3. Percent of technical specification limit (T.S. 3.11.1.2.(a))	%	1.42E+00	1.48E+00	
B. Tritium				
1. Total release	Ci	3.82E+00	6.62E+00	25
2. Average diluted concentration during period	µCi/mL	1.87E-06	3.60E-06	
3. Percent of technical specification limit (T.S. 3.11.1.1)	%	6.23E-02	1.20E-01	
C. Dissolved and entrained noble gases				
1. Total release	Ci	3.48E-03	3.45E-03	25
2. Average diluted concentration during period	µCi/mL	1.70E-09	1.88E-09	
3. Percent of technical specification limit (T.S. 3.11.1.1)	%	8.50E-04	9.40E-04	
D. Gross alpha activity				
1. Total release	Ci	0.00E+00	0.00E+00	
E. Volume of waste release (prior to dilution - Batch Release)	liters	3.21E+06	3.94E+06	
F. Volume of dilution water used during entire period	liters	2.04E+09	1.84E+09	

HOPE CREEK GENERATING STATION

TABLE 2B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JULY - DECEMBER 1991

LIQUID EFFLUENTS

		CONTINUOUS MODE		BATCH MODE	
Nuclides Released	Unit	3rd Quarter	4th Quarter	3rd Quarter	4th Quarter
Niobium-95	Ci	0.00E+00	0.00E+00	5.23E-06	1.49E-05
Chromium-51	Ci	0.00E+00	0.00E+00	1.00E-02	2.59E-02
Manganese-54	Ci	0.00E+00	0.00E+00	5.02E-03	9.80E-03
Iron-55	Ci	0.00E+00	0.00E+00	3.21E-02	0.00E+00
Iron-59	Ci	0.00E+00	0.00E+00	8.98E-04	1.04E-03
Cobalt-58	Ci	0.00E+00	0.00E+00	1.43E-04	2.06E-04
Cobalt-60	Ci	0.00E+00	0.00E+00	1.21E-03	2.30E-03
Zinc-65	Ci	0.00E+00	0.00E+00	1.28E-02	1.17E-02
Silver-110m	Ci	0.00E+00	0.00E+00	2.73E-04	5.92E-04
Strontium-91	Ci	0.00E+00	0.00E+00	4.67E-06	0.00E+00
Strontium-92	Ci	0.00E+00	0.00E+00	2.61E-05	1.36E-04
Mercury-203	Ci	0.00E+00	0.00E+00	2.72E-06	0.00E+00
Cesium-137	Ci	0.00E+00	0.00E+00	0.00E+00	1.08E-05
TOTALS	Ci	0.00E+00	0.00E+00	6.25E-02	5.17E-02
Tritium	Ci	0.00E+00	0.00E+00	3.82E+00	6.62E+00
Xenon-133	Ci	0.00E+00	0.00E+00	7.36E-04	5.02E-04
Xenon-135	Ci	0.00E+00	0.00E+00	2.74E-03	2.95E-03
TOTALS	Ci	0.00E+00	0.00E+00	3.82E+00	6.62E+00

Note: Composite sample results for Iron-55 in the 4th quarter were not available in sufficient time to be included in this report. Results will be transmitted in an amendment with the next report.

HOPE CREEK GENERATING STATION

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JULY - DECEMBER 1991
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

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

1. Type of waste		Units(1)	6-month period	Est. Total Error, %
a.	Spent resins, filters, sludges, evaporator bottoms	m3 Ci	6.58E+01 2.32E+03	25
b.	Dry compressible waste, contaminated equipment.	m3 Ci	2.31E+01 2.82E+00	25
c.	Irradiated components, control rods	m3 Ci	3.25E+00 3.84E+04	25
d.	Others (described) Oil	m3 Ci	1.51E+01 2.95E-06	25

2. Estimate of major nuclide composition (for Type A and B waste)

	RESINS		DAW		OIL	
	(%)	(Ci)	(%)	(Ci)	(%)	(Ci)
Chromium-51	0.0	0.00E+00	1.4	3.90E-02	0.0	0.00E+00
Iron-55	73.3	1.73E+03	17.9	5.04E-01	79.7	2.35E-06
Tritium (H-3)	0.0	0.00E+00	0.0	0.00E+00	3.7	1.09E-07
Manganese-54	3.6	8.36E+01	2.0	5.63E-02	1.4	3.98E-08
Carbon-14	0.0	0.00E+00	0.0	0.00E+00	3.7	1.09E-07
Cobalt-60	2.5	5.81E+01	1.3	3.70E-02	2.1	6.20E-08
Nickel-63	0.0	0.00E+00	0.0	0.00E+00	0.0	0.00E+00
Zinc-65	20.4	4.74E+02	76.8	2.16E+00	8.3	2.45E-07

2. Estimate of major nuclide composition (for Type C waste)

	Irradiated Hardware	
	(%)	(Ci)
Iron-55	58.3	2.24E+04
Cobalt-60	36.8	1.41E+04
Manganese-54	3.3	1.27E+03
Nickel-63	1.7	6.52E+02

(1) Volumes are measured, activities are estimated

HOPE CREEK GENERATING STATION

TABLE 3
(CONT'D)

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JULY - DECEMBER 1991
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination	Type of Containers
29	Truck	Barnwell, SC	HIC and 17E drums
4	Truck	Oak Ridge, TN	Strong, tight containers
2	Truck	Oak Ridge, TN	17E drums

IRRADIATED FUEL SHIPMENTS (Disposition)

Number of Shipments	Mode of Transportation	Destination
None	N/A	N/A

HOPE CREEK GENERATING STATION
TABLE 4A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JULY - DECEMBER 1991
SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED
IN A BATCH MODE

BATCH RELEASES ONLY

1. Dates: July 1 - September 30, 1991

2. Type of release: Gas

3. Number of releases during the 3rd Quarter: 0

4. Total time duration for all releases of type listed above:
0.00E+00 min

5. Maximum duration for release of type listed above:
0.00E+00 min

6. Average duration for release of type listed above:
0.00E+00 min

7. Minimum duration for release of type listed above:
0.00E+00 min

8. Average stream flow (dilution flow) during the period of release: N/A

HOPE CREEK GENERATING STATION
TABLE 4A
(CONT'D)

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JULY - DECEMBER 1991
SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED
IN A BATCH MODE

BATCH RELEASES ONLY

1. Dates: October 1 - December 31, 1991

2. Type of release: Gas

3. Number of releases during the 4th Quarter: 0

4. Total time duration for all releases of type listed above:
0.00E+00 min

5. Maximum duration for release of type listed above:
0.00E+00 min

6. Average duration for release of type listed above:
0.00E+00 min

7. Minimum duration for release of type listed above:
0.00E+00 min

8. Average stream flow (dilution flow) during the period of release: N/A

HOPE CREEK GENERATING STATION
TABLE 4B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JULY - DECEMBER 1991
SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED
IN A BATCH MODE

BATCH RELEASES ONLY

1. Dates: July 1 - September 30, 1991

2. Type of release: Liquid

3 Number of releases during the 3rd Quarter: 79

4. Total time duration for all releases of type listed above: 1.56E+04 min

5. Maximum duration for release of type listed above: 7.59E+02 min

6. Average duration for release of type listed above: 1.98E+02 min

7. Minimum duration for release of type listed above: 3.6E+01 min

8. Average stream flow (dilution flow) during the period of release: 34378 gpm

HOPE CREEK GENERATING STATION
TABLE 4B
(CONT'D)

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JULY - DECEMBER 1991
SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED
IN A BATCH MODE

BATCH RELEASES ONLY

1. Dates: October 1 - December 31, 1991

2. Type of release: Liquid

3. Number of releases during the 4th Quarter: 98

4. Total time duration for all releases of type listed above: 1.74E+04 min

5. Maximum duration for release of type listed above: 4.59E+02 min

6. Average duration for release of type listed above: 1.78E+02 min

7. Minimum duration for release of type listed above: 2.9E+01 min

8. Average stream flow (dilution flow) during the period of release: 27966 gpm

ARTIFICIAL ISLAND 7/91- 9/91

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 300 ft
DELTA T: (300-33ft)

ALL STABILITY CLASSES

WIND SPEED GROUPS (MPH)

DIRECTION	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6-24.5		GE 24.6		SUM	PERCENT
	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	3	0.1	33	1.6	42	2.1	36	1.8	4	0.2	4	0.2	122	6.0
NNE	0	0.0	2	0.1	28	1.4	45	2.2	39	1.9	7	0.3	0	0.0	121	6.0
NE	0	0.0	5	0.2	23	1.1	52	2.6	36	1.8	3	0.1	0	0.0	119	5.9
ENE	0	0.0	-	0.2	20	1.0	42	2.1	7	0.3	0	0.0	0	0.0	73	3.6
E	0	0.0	3	0.1	25	1.2	39	1.9	8	0.4	0	0.0	0	0.0	75	3.7
ESE	0	0.0	4	0.2	12	0.6	15	0.7	14	0.7	6	0.3	0	0.0	51	2.5
SE	0	0.0	8	0.4	23	1.1	24	1.2	34	1.7	10	0.5	0	0.0	99	4.9
SSE	0	0.0	7	0.3	38	1.9	61	3.0	71	3.5	18	0.9	5	0.2	200	9.9
S	0	0.0	6	0.3	27	1.3	29	1.4	54	2.7	17	0.8	5	0.2	138	6.8
SSW	0	0.0	5	0.2	25	1.2	37	1.8	91	4.5	29	1.4	1	0.0	188	9.3
SW	0	0.0	8	0.4	36	1.8	82	4.1	116	5.7	20	1.0	0	0.0	262	13.0
WSW	0	0.0	6	0.3	26	1.3	84	4.2	49	2.4	4	0.2	0	0.0	169	8.4
W	0	0.0	11	0.5	25	1.2	40	2.0	24	1.2	1	0.0	0	0.0	101	5.0
WNW	0	0.0	4	0.2	34	1.7	24	1.2	16	0.8	0	0.0	0	0.0	78	3.9
NW	0	0.0	2	0.1	33	1.6	45	2.2	27	1.3	3	0.1	0	0.0	110	5.4
NNW	0	0.0	6	0.3	33	1.6	37	1.8	30	1.5	10	0.5	1	0.0	117	5.8
	0	0.0	84	4.2	441	21.8	698	34.5	652	32.2	132	6.5	16	0.8	2623	100.0

MISSING HOURS: 185

MEAN WIND SPEED: 11.3

TABLE 5

ARTIFICIAL ISLAND 7/91- 9/91

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 300 FT
DELTA T: (300-33FT)

DIRECTION VS SPEED ONLY

WIND SPEED GROUPS (MPH)

	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6-24.5				SUM	PERCENT
DIRECTION	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	3	0.1	34	1.7	42	2.1	36	1.8	4	0.2	4	0.2	123	6.1
NNE	0	0.0	2	0.1	28	1.4	45	2.2	39	1.9	7	0.3	0	0.0	121	6.0
NE	0	0.0	5	0.2	23	1.1	52	2.6	36	1.8	3	0.1	0	0.0	119	5.9
ENE	0	0.0	4	0.2	20	1.0	42	2.1	7	0.3	0	0.0	0	0.0	73	3.6
E	0	0.0	3	0.1	25	1.2	39	1.9	8	0.4	0	0.0	0	0.0	75	3.7
ESE	0	0.0	4	0.2	12	0.6	15	0.7	14	0.7	6	0.3	0	0.0	51	2.5
SE	0	0.0	8	0.4	23	1.1	24	1.2	34	1.7	10	0.5	0	0.0	99	4.9
SSE	0	0.0	7	0.3	38	1.9	61	3.0	71	3.5	18	0.9	5	0.2	200	9.9
S	0	0.0	6	0.3	28	1.4	29	1.4	54	2.7	17	0.8	5	0.2	139	6.9
SSW	0	0.0	5	0.2	26	1.3	37	1.8	91	4.5	29	1.4	1	0.0	189	9.3
SW	0	0.0	8	0.4	36	1.8	82	4.0	116	5.7	20	1.0	0	0.0	262	12.9
WSW	0	0.0	6	0.3	26	1.3	84	4.1	49	2.4	4	0.2	0	0.0	169	8.3
W	0	0.0	11	0.5	25	1.2	40	2.0	24	1.2	1	0.0	0	0.0	101	5.0
WNW	0	0.0	4	0.2	34	1.7	24	1.2	16	0.8	0	0.0	0	0.0	78	3.8
NW	0	0.0	2	0.1	33	1.6	45	2.2	27	1.3	3	0.1	0	0.0	110	5.4
NNW	0	0.0	6	0.3	33	1.6	37	1.8	30	1.5	10	0.5	1	0.0	117	5.8
	0	0.0	84	4.1	444	21.9	698	34.5	652	32.2	132	6.5	16	0.8	2026	100.0

MISSING HOURS: 182

MEAN WIND SPEED: 11.2

TABLE 5

ARTIFICIAL ISLAND 7/91- 9/91

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 300 FT
DELTA T: (300-33FT)

LAPSE RATE: LE 1.9 DEG C/100M
CLASS A

WIND SPEED GROUPS (MPH)

	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6-24.5		GE 24.6		SUM PERCENT	
DIRECTION	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
NNE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
NE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
ENE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
E	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
ESE	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	1	0.0
SE	0	0.0	0	0.0	0	0.0	3	0.1	2	0.1	0	0.0	0	0.0	5	0.2
SSE	0	0.0	0	0.0	4	0.2	8	0.4	4	0.2	0	0.0	0	0.0	16	0.8
S	0	0.0	0	0.0	3	0.1	1	0.0	0	0.0	0	0.0	0	0.0	4	0.2
SSW	0	0.0	0	0.0	1	0.0	1	0.0	1	0.0	0	0.0	0	0.0	3	0.1
SW	0	0.0	0	0.0	2	0.1	2	0.1	10	0.5	0	0.0	0	0.0	14	0.7
WSW	0	0.0	0	0.0	3	0.1	4	0.2	1	0.0	0	0.0	0	0.0	8	0.4
W	0	0.0	0	0.0	1	0.0	1	0.0	1	0.0	0	0.0	0	0.0	3	0.1
WNW	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
NW	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
NNW	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1	0	0.0	2	0.1
	0	0.0	0	0.0	14	0.7	21	1.0	19	0.9	2	0.1	0	0.0	56	2.8

MEAN WIND SPEED: 11.0
MISSING: 9

TABLE 5

ARTIFICIAL ISLAND 7/91- 9/91

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 300 FT
DELTA T: (300-33FT)

LAPSE RATE: -1.8 TO -1.7 DEG C/100M
CLASS 8

WIND SPEED GROUPS (MPH)

	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6-24.5		GE 24.6		SUM PERCENT	
DIRECTION	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	0	0.0	3	0.1	3	0.1	0	0.0	0	0.0	0	0.0	6	0.3
NNE	0	0.0	0	0.0	1	0.0	0	0.0	1	0.0	0	0.0	0	0.0	2	0.1
NE	0	0.0	0	0.0	0	0.0	3	0.1	3	0.1	0	0.0	0	0.0	6	0.3
ENE	0	0.0	1	0.0	2	0.1	3	0.1	0	0.0	0	0.0	0	0.0	6	0.3
E	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	0	0.0	2	0.1
ESE	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	1	0.0
SE	0	0.0	0	0.0	3	0.1	3	0.1	0	0.0	1	0.0	0	0.0	7	0.3
SSE	0	0.0	0	0.0	10	0.5	10	0.5	3	0.1	0	0.0	0	0.0	23	1.1
S	0	0.0	0	0.0	3	0.1	2	0.1	0	0.0	0	0.0	0	0.0	5	0.2
SSW	0	0.0	0	0.0	4	0.2	2	0.1	4	0.2	0	0.0	0	0.0	10	0.5
SW	0	0.0	0	0.0	6	0.3	5	0.2	6	0.3	0	0.0	0	0.0	17	0.8
WSW	0	0.0	0	0.0	8	0.4	15	0.7	1	0.0	0	0.0	0	0.0	24	1.2
W	0	0.0	0	0.0	4	0.2	3	0.1	4	0.2	0	0.0	0	0.0	11	0.5
WNW	0	0.0	0	0.0	3	0.1	2	0.1	4	0.2	0	0.0	0	0.0	9	0.4
NW	0	0.0	0	0.0	1	0.0	3	0.1	1	0.0	0	0.0	0	0.0	5	0.2
NNW	0	0.0	0	0.0	2	0.1	2	0.1	1	0.0	2	0.1	0	0.0	7	0.3
	0	0.0	1	0.0	51	2.5	58	2.9	28	1.4	3	0.1	0	0.0	141	7.0

MEAN WIND SPEED: 9.5
MISSING: 5

TABLE 5

ARTIFICIAL ISLAND 7/91- 9/91

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 300 ft
DELTA T: (300-33ft)

LAPSE RATE: -1.6 TO -1.5 DEG C/100M
CLASS C

WIND SPEED GROUPS (MPH)

	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6-24.5		GE 24.6		SUM PERCENT	
DIRECTION	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	0	0.0	9	0.4	9	0.4	1	0.0	0	0.0	0	0.0	19	0.9
NNE	0	0.0	0	0.0	3	0.1	6	0.3	0	0.0	0	0.0	0	0.0	9	0.4
NE	0	0.0	0	0.0	4	0.2	3	0.1	0	0.0	1	0.0	0	0.0	8	0.4
ENE	0	0.0	0	0.0	0	0.0	3	0.1	0	0.0	0	0.0	0	0.0	3	0.1
E	0	0.0	0	0.0	2	0.1	4	0.2	0	0.0	0	0.0	0	0.0	6	0.3
ESE	0	0.0	0	0.0	2	0.1	0	0.0	1	0.0	0	0.0	0	0.0	3	0.1
SE	0	0.0	0	0.0	1	0.0	3	0.1	5	0.2	0	0.0	0	0.0	9	0.4
SSE	0	0.0	2	0.1	5	0.2	12	0.6	6	0.3	1	0.0	0	0.0	26	1.3
S	0	0.0	0	0.0	2	0.1	1	0.0	1	0.0	0	0.0	0	0.0	4	0.2
SSW	0	0.0	1	0.0	5	0.2	0	0.0	3	0.1	0	0.0	0	0.0	9	0.4
SW	0	0.0	0	0.0	9	0.4	4	0.2	8	0.4	1	0.0	0	0.0	22	1.1
WSW	0	0.0	0	0.0	1	0.0	9	0.4	1	0.0	0	0.0	0	0.0	11	0.5
W	0	0.0	1	0.0	2	0.1	10	0.5	1	0.0	0	0.0	0	0.0	14	0.7
WNW	0	0.0	0	0.0	3	0.1	0	0.0	2	0.1	0	0.0	0	0.0	5	0.2
NW	0	0.0	0	0.0	5	0.2	2	0.1	2	0.1	0	0.0	0	0.0	9	0.4
NNW	0	0.0	1	0.0	8	0.4	10	0.5	4	0.2	1	0.0	1	0.0	25	1.2
	0	0.0	5	0.2	61	3.0	76	3.8	35	1.7	4	0.2	1	0.0	192	9.0

MEAN WIND SPEED: 9.4
MISSING: 23

TABLE 5

ARTIFICIAL ISLAND 7/91- 9/91

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 300 FT
DELTA T: (300-33FT)

LAPSE RATE: -1.4 TO -0.5 DEG C/100M
CLASS 0

WIND SPEED GROUPS (MPH)

	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6-24.5		GE 24.6		SUM PERCENT	
DIRECTION	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	0	0.0	13	0.6	14	0.7	10	0.5	3	0.1	2	0.1	42	2.1
NNE	0	0.0	1	0.0	13	0.6	26	1.3	11	0.5	0	0.0	0	0.0	51	2.5
NE	0	0.0	3	0.1	12	0.6	20	1.0	5	0.2	0	0.0	0	0.0	40	2.0
ENE	0	0.0	3	0.1	7	0.3	24	1.2	2	0.1	0	0.0	0	0.0	36	1.8
E	0	0.0	2	0.1	10	0.5	14	0.7	1	0.0	0	0.0	0	0.0	27	1.3
ESE	0	0.0	0	0.0	6	0.3	3	0.1	4	0.2	0	0.0	0	0.0	13	0.6
SE	0	0.0	5	0.2	6	0.3	8	0.4	10	0.5	6	0.3	0	0.0	35	1.7
SSE	0	0.0	3	0.1	7	0.3	21	1.0	47	2.3	14	0.7	5	0.2	97	4.8
S	0	0.0	2	0.1	6	0.3	14	0.7	36	1.8	15	0.7	5	0.2	78	3.9
SSW	0	0.0	2	0.1	9	0.4	26	1.3	39	1.9	13	0.6	0	0.0	89	4.4
SW	0	0.0	4	0.2	14	0.7	31	1.5	35	1.7	6	0.3	0	0.0	90	4.4
WSW	0	0.0	1	0.0	3	0.1	30	1.5	11	0.5	1	0.0	0	0.0	46	2.3
W	0	0.0	2	0.1	5	0.2	8	0.4	1	0.0	1	0.0	0	0.0	17	0.8
WNW	0	0.0	1	0.0	5	0.2	13	0.6	0	0.0	0	0.0	0	0.0	19	0.9
NW	0	0.0	1	0.0	10	0.5	15	0.7	12	0.6	0	0.0	0	0.0	38	1.9
NNW	0	0.0	3	0.1	12	0.6	8	0.4	10	0.5	3	0.1	0	0.0	36	1.8
	0	0.0	33	1.6	138	6.8	275	13.6	234	11.6	62	3.1	12	0.6	754	37.3

MEAN WIND SPEED: 11.7
MISSING 67

TABLE 5

ARTIFICIAL ISLAND 7/91- 9/91

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 300 FT
DELTA T: (300-33FT)

LAPSE RATE: 0.4 TO 1.5 DEG C/100M
CLASS E

WIND SPEED GROUPS (MPH)

	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6-24.5		GE 24.6		SUM PERCENT	
DIRECTION	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	3	0.1	6	0.3	12	0.6	13	0.6	1	0.0	2	0.1	37	1.8
NNE	0	0.0	0	0.0	8	0.4	10	0.5	16	0.8	7	0.3	0	0.0	41	2.0
NE	0	0.0	0	0.0	4	0.2	22	1.1	21	1.0	2	0.1	0	0.0	49	2.4
ENE	0	0.0	0	0.0	7	0.3	8	0.4	3	0.1	0	0.0	0	0.0	18	0.9
E	0	0.0	1	0.0	6	0.3	10	0.5	4	0.2	0	0.0	0	0.0	21	1.0
ESE	0	0.0	4	0.2	2	0.1	7	0.3	4	0.2	4	0.2	0	0.0	21	1.0
SE	0	0.0	2	0.1	12	0.6	4	0.2	13	0.6	1	0.0	0	0.0	32	1.6
SSE	0	0.0	2	0.1	6	0.3	8	0.4	9	0.4	3	0.1	0	0.0	28	1.4
S	0	0.0	3	0.1	11	0.5	9	0.4	15	0.7	2	0.1	0	0.0	40	2.0
SSW	0	0.0	0	0.0	4	0.2	6	0.3	38	1.9	15	0.7	1	0.0	64	3.2
SW	0	0.0	2	0.1	4	0.2	34	1.7	51	2.5	13	0.6	0	0.0	104	5.1
WSW	0	0.0	3	0.1	8	0.4	25	1.2	30	1.5	3	0.1	0	0.0	69	3.4
W	0	0.0	6	0.3	10	0.5	14	0.7	15	0.7	0	0.0	0	0.0	45	2.2
WNW	0	0.0	3	0.1	21	1.0	6	0.3	9	0.4	0	0.0	0	0.0	39	1.9
NW	0	0.0	1	0.0	17	0.8	23	1.1	9	0.4	3	0.1	0	0.0	53	2.6
NNW	0	0.0	2	0.1	9	0.4	15	0.7	8	0.4	1	0.	0	0.0	35	1.7
	0	0.0	32	1.6	135	6.7	213	10.5	258	12.8	55	2.7	3	0.1	698	34.4

MEAN WIND SPEED: 11.7
MISSING: 67

TABLE 5

ARTIFICIAL ISLAND 7/91- 9/91

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 300 FT
DELTA T: (300-33FT)

LAPSE RATE: 1.6 TO 4.0 DEG C/10m
CLASS F

WIND SPEED GROUPS (MPH)

	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6-24.5		GE 24.6		SUM PERCENT	
DIRECTION	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	0	0.0	2	0.1	4	0.2	12	0.6	0	0.0	0	0.0	18	0.9
NNE	0	0.0	1	0.0	2	0.1	3	0.1	11	0.5	0	0.0	0	0.0	17	0.8
NE	0	0.0	2	0.1	3	0.1	4	0.2	7	0.3	0	0.0	0	0.0	16	0.8
ENE	0	0.0	0	0.0	3	0.1	2	0.1	2	0.1	0	0.0	0	0.0	7	0.3
E	0	0.0	0	0.0	3	0.1	10	0.5	3	0.1	0	0.0	0	0.0	16	0.8
ESE	0	0.0	0	0.0	0	0.0	3	0.1	5	0.2	2	0.1	0	0.0	10	0.5
SE	0	0.0	1	0.0	1	0.0	3	0.1	4	0.2	2	0.1	0	0.0	11	0.5
SSE	0	0.0	0	0.0	4	0.3	2	0.1	2	0.1	0	0.0	0	0.0	10	0.5
S	0	0.0	1	0.0	2	0.1	2	0.1	2	0.1	0	0.0	0	0.0	7	0.3
SSW	0	0.0	2	0.1	2	0.1	1	0.0	6	0.3	1	0.0	0	0.0	12	0.6
SW	0	0.0	2	0.1	1	0.0	6	0.3	6	0.3	0	0.0	0	0.0	15	0.7
WSW	0	0.0	2	0.1	3	0.1	1	0.0	5	0.2	0	0.0	0	0.0	11	0.5
W	0	0.0	2	0.1	3	0.1	4	0.2	2	0.1	0	0.0	0	0.0	11	0.5
WNW	0	0.0	0	0.0	2	0.1	3	0.1	1	0.0	0	0.0	0	0.0	6	0.3
NW	0	0.0	0	0.0	0	0.0	2	0.1	3	0.1	0	0.0	0	0.0	5	0.2
NNW	0	0.0	0	0.0	2	0.1	2	0.1	7	0.3	1	0.0	0	0.0	12	0.6
	0	0.0	13	0.6	35	1.7	52	2.6	78	3.9	6	0.3	0	0.0	184	9.1

MEAN WIND SPEED: 11.3
MISSING: 11

ARTIFICIAL ISLAND 7/91- 9/91

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 300 FT
DELTA T: (300-33FT)

LAPSE RATE: GT 4.0 DEG C/100M
CLASS G

WIND SPEED GROUPS (MPH)

	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6-24.5		GE 24.6		SUM PERCENT	
DIRECTION	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
NNE	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0
NE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
ENE	0	0.0	0	0.0	1	0.0	2	0.1	0	0.0	0	0.0	0	0.0	3	0.1
E	0	0.0	0	0.0	3	0.1	0	0.0	0	0.0	0	0.0	0	0.0	3	0.1
ESE	0	0.0	0	0.0	2	0.1	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1
SE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SSE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
S	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SSW	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	1	0.0
SW	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
WSW	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
W	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
WNW	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
NW	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
NNW	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	0	0.0	0	0.0	7	0.3	3	0.1	0	0.0	0	0.0	0	0.0	10	0.5

MEAN WIND SPEED: 7.0
MISSING: 0

TABLE 5

ARTIFICIAL ISLAND 10/91-12/91

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 300 FT
DELTA T: (300-33FT)

ALL STABILITY CLASSES

WIND SPEED GROUPS (MPH)

	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6-24.5		GE 24.6		SUM PERCENT	
DIRECTION	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	1	0.0	14	0.7	23	1.1	63	3.0	47	2.2	3	0.1	151	7.2
NNE	0	0.0	3	0.1	18	0.9	22	1.0	58	2.8	27	1.3	1	0.0	129	6.1
NE	0	0.0	3	0.1	9	0.4	8	0.4	24	1.1	17	0.8	0	0.0	61	2.9
ENE	0	0.0	4	0.2	8	0.4	7	0.3	6	0.3	1	0.0	0	0.0	26	1.2
E	0	0.0	13	0.6	10	0.5	13	0.6	3	0.1	1	0.0	0	0.0	40	1.9
ESE	0	0.0	8	0.4	7	0.3	6	0.3	7	0.3	0	0.0	0	0.0	28	1.3
SE	0	0.0	7	0.3	27	1.3	22	1.0	29	1.4	23	1.1	3	0.1	111	5.3
SSE	0	0.0	7	0.3	19	0.9	34	1.6	43	2.0	12	0.6	5	0.2	120	5.7
S	0	0.0	9	0.4	23	1.1	38	1.8	43	2.0	14	0.7	2	0.1	129	6.1
SSW	0	0.0	5	0.2	11	0.5	45	2.1	97	4.6	47	2.2	8	0.4	213	10.1
SW	0	0.0	5	0.2	29	1.4	48	2.3	73	3.5	39	1.9	10	0.5	204	9.7
WSW	0	0.0	5	0.2	31	1.5	36	1.7	20	0.9	17	0.8	0	0.0	109	5.2
W	0	0.0	5	0.2	13	0.6	38	1.8	48	2.3	40	1.9	15	0.7	159	7.5
WNW	0	0.0	7	0.3	9	0.4	40	1.9	70	3.3	41	1.9	26	1.2	193	9.2
NW	0	0.0	8	0.4	26	1.2	29	1.4	83	3.9	60	2.8	12	0.6	218	10.4
NNW	0	0.0	2	0.1	21	1.0	51	2.4	75	3.6	49	2.3	17	0.8	215	10.2
	0	0.0	92	4.4	275	13.1	460	21.8	742	35.2	435	20.7	102	4.8	2106	100.0

MISSING HOURS: 102

MEAN WIND SPEED: 14.3

TABLE 6

ARTIFICIAL ISLAND 10/91-12/91

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 300 FT
DELTA T: (300 33FT)

DIRECTION VS SPEED ONLY

WIND SPEED GROUPS (MPH)

	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6-24.5		GE 24.6		SUM	PERCENT
DIRECTION	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	1	0.0	14	0.7	23	1.1	63	3.0	47	2.2	3	0.1	151	7.2
NNE	0	0.0	3	0.1	18	0.9	22	1.0	58	2.8	27	1.3	1	0.0	129	6.1
NE	0	0.0	3	0.1	9	0.4	8	0.4	24	1.1	17	0.8	0	0.0	61	2.9
ENE	0	0.0	4	0.2	8	0.4	7	0.3	6	0.3	1	0.0	0	0.0	26	1.2
E	0	0.0	13	0.6	10	0.5	13	0.6	3	0.1	1	0.0	0	0.0	40	1.9
ESE	0	0.0	8	0.4	7	0.3	5	0.3	7	0.3	0	0.0	0	0.0	28	1.3
SE	0	0.0	7	0.3	27	1.3	22	1.0	29	1.4	23	1.1	3	0.1	111	5.3
SSE	0	0.0	7	0.3	19	0.9	34	1.6	43	2.0	12	0.6	5	0.2	120	5.7
S	0	0.0	9	0.4	23	1.1	38	1.8	45	2.1	14	0.7	2	0.1	131	6.2
SSW	0	0.0	5	0.2	11	0.5	45	2.1	97	4.6	47	2.2	8	0.4	213	10.1
SW	0	0.0	5	0.2	29	1.4	48	2.3	73	3.5	39	1.9	10	0.5	204	9.7
WSW	0	0.0	5	0.2	31	1.5	36	1.7	20	0.9	17	0.8	0	0.0	109	5.2
W	0	0.0	5	0.2	13	0.6	38	1.8	48	2.3	40	1.9	15	0.7	159	7.5
WNW	0	0.0	7	0.3	9	0.4	40	1.9	70	3.3	41	1.9	26	1.2	193	9.2
NW	0	0.0	8	0.4	26	1.2	29	1.4	83	3.9	60	2.8	12	0.6	218	10.3
NNW	0	0.0	2	0.1	21	1.0	51	2.4	75	3.6	49	2.3	17	0.8	215	10.2
	0	0.0	92	4.4	275	13.0	460	21.8	744	35.3	435	20.6	102	4.8	2108	100.0

MISSING HOURS: 100

MEAN WIND SPEED: 14.3

TABLE 6

ARTIFICIAL ISLAND 10/91-12/91

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 300 FT
DELTA T: (300-33FT)

LAPSE RATE: LE -1.9 DEG C/100M
CLASS A

WIND SPEED GROUPS (MPH)

	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6 24.5		GE 24.6		SUM PERCENT	
DIRECTION	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	2	0.1	0	0.0	3	0.1
NNE	0	0.0	0	0.0	0	0.0	0	0.0	3	0.1	4	0.2	0	0.0	7	0.3
NE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
ENE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
E	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
ESE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SE	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	2	0.1
SSE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
S	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	1	0.0
SSW	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1	0	0.0	0	0.0	2	0.1
SW	0	0.0	0	0.0	0	0.0	1	0.0	2	0.1	0	0.0	0	0.0	3	0.1
WSW	0	0.0	0	0.0	0	0.0	2	0.1	0	0.0	0	0.0	0	0.0	2	0.1
W	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	2	0.1
WNW	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
NW	0	0.0	0	0.0	0	0.0	1	0.0	5	0.2	1	0.0	0	0.0	7	0.3
NNW	0	0.0	0	0.0	0	0.0	2	0.1	1	0.0	3	0.1	0	0.0	6	0.3
	0	0.0	0	0.0	0	0.0	8	0.4	17	0.8	10	0.5	0	0.0	35	1.7

MEAN WIND SPEED: 15.6
MISSING: 0

TABLE 6

ARTIFICIAL ISLAND 10/91-12/91

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 300 FT
DELTA T: (300-33FT)

LAPSE RATE: -1.8 TO -1.7 DEG C/100M
CLASS 6

WIND SPEED GROUPS (MPH)

	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6-24.5		GE 24.6		SUM PERCENT	
DIRECTION	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	1	0.0
NNE	0	0.0	0	0.0	0	0.0	3	0.1	5	0.2	3	0.1	1	0.0	12	0.6
NE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
ENE	0	0.0	0	0.0	0	0.0	0	0.0	[illegible]	0.0	0	0.0	0	0.0	0	0.0
E	0	0.0	0	0.0	0	0.0	0	0.0	[illegible]	0.0	0	0.0	0	0.0	0	0.0
ESE	0	0.0	0	0.0	0	0.0	0	0.0		0.0	0	0.0	0	0.0	0	0.0
SE	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	2	0.1	0	0.0	3	0.1
SSE	0	0.0	1	0.0	1	0.0	0	0.0	2	0.1	0	0.0	0	0.0	4	0.2
S	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SSW	0	0.0	0	0.0	0	0.0	1	0.0	2	0.1	0	0.0	0	0.0	3	0.1
SW	0	0.0	0	0.0	0	0.0	2	0.1	2	0.1	0	0.0	0	0.0	4	0.2
WSW	0	0.0	0	0.0	3	0.1	1	0.0	0	0.0	0	0.0	0	0.0	4	0.2
W	0	0.0	1	0.0	0	0.0	3	0.1	1	0.0	0	0.0	0	0.0	5	0.2
WNW	0	0.0	0	0.0	2	0.1	0	0.0	3	0.1	3	0.1	0	0.0	8	0.4
NW	0	0.0	0	0.0	1	0.0	3	0.1	6	0.3	4	0.2	2	0.1	16	0.8
NNW	0	0.0	0	0.0	1	0.0	4	0.2	7	0.3	3	0.1	0	0.0	15	0.7
	0	0.0	2	0.1	8	0.4	18	0.9	29	1.4	15	0.7	3	0.1	75	3.6

MEAN WIND SPEED: 14.5
MISSING: 2

TABLE 6

ARTIFICIAL ISLAND 10/9 12/91

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 300 FT
DELTA T: (300-33FT)

LAPSE RATE: 1.6 TO 1.5 DEG C/100M
CLASS C

WIND SPEED GROUPS (MPH)

	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6-24.5		GE 24.6		SUM PERCENT	
DIRECTION	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	0	0.0	0	0.0	0	0.0	5	0.2	2	0.1	0	0.0	7	0.3
NNE	0	0.0	0	0.0	0	0.0	2	0.1	1	0.0	0	0.0	0	0.0	3	0.1
NE	0	0.0	0	0.0	1	0.0	2	0.1	0	0.0	0	0.0	0	0.0	3	0.1
ENE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
E	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0
ESE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SE	0	0.0	0	0.0	1	0.0	1	0.0	2	0.1	0	0.0	0	0.0	4	0.2
SSE	0	0.0	0	0.0	1	0.0	1	0.0	1	0.0	0	0.0	0	0.0	3	0.1
S	0	0.0	0	0.0	2	0.1	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1
SSW	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	0	0.0	2	0.1
SW	0	0.0	2	0.1	1	0.0	0	0.0	2	0.1	0	0.0	0	0.0	5	0.2
WSW	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	0	0.0	2	0.1
W	0	0.0	0	0.0	1	0.0	3	0.1	1	0.0	0	0.0	0	0.0	5	0.2
WNW	0	0.0	0	0.0	0	0.0	2	0.1	2	0.1	2	0.1	1	0.0	7	0.3
NW	0	0.0	0	0.0	1	0.0	2	0.1	6	0.3	5	0.2	1	0.0	15	0.7
NNW	0	0.0	0	0.0	1	0.0	7	0.3	7	0.3	3	0.1	0	0.0	18	0.9
	0	0.0	2	0.1	12	0.6	22	1.0	27	1.3	12	0.6	2	0.1	77	3.7

MEAN WIND SPEED: 13.1
MISSING: 4

TABLE 6

ARTIFICIAL ISLAND 10/91-12/91

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 300 ft
DELTA T: (300-33ft)

LAPSE RATE: 1.4 TO 0.5 DEG C/100M
CLASS 6

WIND SPEED GROUPS (MPH)

	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6-24.5		GE 24.6		SUM	PERCENT
DIRECTION	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	1	0.0	4	0.2	2	0.1	22	1.0	13	0.6	0	0.0	42	2.0
NNE	0	0.0	0	0.0	4	0.2	5	0.2	23	1.1	16	0.8	0	0.0	48	2.3
NE	0	0.0	1	0.0	1	0.0	0	0.0	11	0.5	10	0.5	0	0.0	23	1.1
ENE	0	0.0	1	0.0	2	0.1	0	0.0	1	0.0	0	0.0	0	0.0	4	0.2
E	0	0.0	1	0.0	2	0.1	0	0.0	0	0.0	0	0.0	0	0.0	3	0.1
ESE	0	0.0	3	0.1	0	0.0	2	0.1	3	0.1	0	0.0	0	0.0	8	0.4
SE	0	0.0	3	0.1	6	0.3	9	0.4	3	0.1	6	0.3	0	0.0	27	1.3
SSE	0	0.0	3	0.1	3	0.1	16	0.8	18	0.9	4	0.2	1	0.0	45	2.1
S	0	0.0	6	0.3	4	0.2	7	0.3	8	0.4	1	0.0	0	0.0	26	1.2
SSW	0	0.0	3	0.1	2	0.1	7	0.3	8	0.4	2	0.1	0	0.0	22	1.0
SW	0	0.0	1	0.0	5	0.2	5	0.2	4	0.2	1	0.0	0	0.0	16	0.8
WSW	0	0.0	3	0.1	6	0.3	11	0.5	5	0.2	3	0.1	0	0.0	28	1.3
W	0	0.0	3	0.1	4	0.2	14	0.7	26	1.2	30	1.4	12	0.6	89	4.2
WNW	0	0.0	2	0.1	4	0.2	15	0.7	31	1.5	20	0.9	24	1.1	96	4.6
NW	0	0.0	2	0.1	10	0.5	8	0.4	31	1.5	31	1.5	5	0.2	87	4.1
NNW	0	0.0	1	0.0	6	0.3	7	0.3	16	0.8	22	1.0	14	0.7	66	3.1
	0	0.0	34	1.6	63	3.0	108	5.1	210	10.0	159	7.5	56	2.7	630	29.9

MEAN WIND SPEED: 15.6
MISSING: 27

TABLE 6

ARTIFICIAL ISLAND 10/91-12/91

...ON OF WIND DIRECTION AND SPEED
...MOSPHERIC STABILITY CLASS
WIND: 300 FT
DELTA T: (300-33FT)

LAPSE RATE: -0.4 TO 1.5 DEG C/100M
CLASS E

WIND SPEED GROUPS (MPH)

DIRECTION	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6-24.5		GE 24.6		SUM	PERCENT
	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	0	0.0	7	0.3	11	0.5	26	1.2	23	1.1	2	0.1	69	3.3
NNE	0	0.0	2	0.1	5	0.2	6	0.3	17	0.8	3	0.1	0	0.0	33	1.6
NE	0	0.0	2	0.1	6	0.3	3	0.1	6	0.3	5	0.2	0	0.0	22	1.0
ENE	0	0.0	3	0.1	5	0.2	6	0.3	5	0.2	1	0.0	0	0.0	20	0.9
E	0	0.0	10	0.5	4	0.2	6	0.3	2	0.1	1	0.0	0	0.0	23	1.1
ESE	0	0.0	1	0.0	6	0.3	1	0.0	3	0.1	0	0.0	0	0.0	11	0.5
SE	0	0.0	1	0.0	11	0.5	6	0.3	13	0.6	8	0.4	1	0.0	40	1.9
SSE	0	0.0	1	0.0	4	0.2	12	0.6	10	0.5	6	0.3	1	0.0	34	1.6
S	0	0.0	1	0.0	7	0.3	23	1.1	15	0.7	8	0.4	0	0.0	54	2.6
SSW	0	0.0	0	0.0	4	0.2	18	0.9	38	1.8	19	0.9	0	0.0	79	3.8
SW	0	0.0	2	0.1	11	0.5	22	1.0	24	1.1	7	0.3	7	0.3	73	3.5
WSW	0	0.0	1	0.0	17	0.8	14	0.7	10	0.5	5	0.2	0	0.0	47	2.2
W	0	0.0	1	0.0	6	0.3	16	0.8	16	0.8	7	0.3	3	0.1	49	2.3
WNW	0	0.0	3	0.1	3	0.1	21	1.0	29	1.4	16	0.8	1	0.0	73	3.5
NW	0	0.0	2	0.1	12	0.6	15	0.7	33	1.6	18	0.9	4	0.2	84	4.0
NNW	0	0.0	1	0.0	11	0.5	24	1.1	33	1.6	16	0.8	3	0.1	88	4.2
	0	0.0	31	1.5	119	5.7	204	9.7	280	13.3	143	>.5	22	1.0	799	37.9

MEAN WIND SPEED: 13.6
MISSING: 50

TABLE 6

ARTIFICIAL ISLAND 10/91-12/91

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 300 FT
DELTA T: (300-33FT)

LAPSE RATE: 1.6 TO 4.0 DEG C/100M
CLASS F

WIND SPEED GROUPS (MPH)

	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6-24.5		GE 24.6		SUM PERCENT	
DIRECTION	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	0	0.0	3	0.1	9	0.4	8	0.4	6	0.3	0	0.0	26	1.2
NNE	0	0.0	1	0.0	7	0.3	4	0.2	9	0.4	0	0.0	0	0.0	21	1.0
NE	0	0.0	0	0.0	0	0.0	3	0.1	7	0.3	2	0.1	0	0.0	12	0.6
ENE	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	0	0.0	2	0.1
E	0	0.0	2	0.1	3	0.1	4	0.2	1	0.0	0	0.0	0	0.0	10	0.5
ESE	0	0.0	3	0.1	1	0.0	3	0.1	1	0.0	0	0.0	0	0.0	8	0.4
SE	0	0.0	2	0.1	7	0.3	5	0.2	8	0.4	7	0.3	2	0.1	31	1.5
SSE	0	0.0	2	0.1	9	0.4	4	0.2	10	0.5	1	0.0	1	0.0	27	1.3
S	0	0.0	1	0.0	8	0.4	7	0.3	10	0.5	2	0.1	0	0.0	28	1.3
SSW	0	0.0	1	0.0	3	0.1	7	0.3	22	1.0	22	1.0	7	0.3	62	2.9
SW	0	0.0	0	0.0	11	0.5	16	0.8	35	1.7	28	1.3	3	0.1	93	4.4
WSW	0	0.0	1	0.0	4	0.2	7	0.3	5	0.2	8	0.4	0	0.0	25	1.2
W	0	0.0	0	0.0	2	0.1	1	0.0	1	0.0	0	0.0	0	0.0	4	0.2
WNW	0	0.0	2	0.1	0	0.0	2	0.1	3	0.1	0	0.0	0	0.0	7	0.3
NW	0	0.0	4	0.2	2	0.1	0	0.0	2	0.1	1	0.0	0	0.0	9	0.4
NNW	0	0.0	0	0.0	2	0.1	7	0.3	11	0.5	2	0.1	0	0.0	22	1.0
	0	0.0	19	0.9	63	3.0	80	3.8	133	6.3	79	3.8	13	0.6	387	18.4

MEAN WIND SPEED: 13.7
MISSING: 14

TABLE 6

ARTIFICIAL ISLAND 10/91 12/91

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 300 FT
DELTA T: (300-33FT)

LAPSE RATE: GT 4.0 DEG C/100M
CLASS G

WIND SPEED GROUPS (MPH)

	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6-24.5		GE 24.6		SUM PERCENT	
DIRECTION	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0	1	0.0	3	0.1
NNE	0	0.0	0	0.0	2	0.1	2	0.1	0	0.0	1	0.0	0	0.0	5	0.2
NE	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0
ENE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
E	0	0.0	0	0.0	0	0.0	3	0.1	0	0.0	0	0.0	0	0.0	3	0.1
ESE	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0
SE	0	0.0	1	0.0	2	0.1	0	0.0	1	0.0	0	0.0	0	0.0	4	0.2
SSE	0	0.0	0	0.0	1	0.0	1	0.0	2	0.1	1	0.0	2	0.1	7	0.3
S	0	0.0	1	0.0	2	0.1	1	0.0	9	0.4	3	0.1	2	0.1	18	0.9
SSW	0	0.0	1	0.0	1	0.0	11	0.5	25	1.2	4	0.2	1	0.0	43	2.0
SW	0	0.0	0	0.0	1	0.0	2	0.1	4	0.2	3	0.1	0	0.0	10	0.5
WSW	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	1	0.0
W	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1	3	0.1	0	0.0	5	0.2
WNW	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1	0	0.0	0	0.0	2	0.1
NW	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
NNW	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	0	0.0	4	0.2	10	0.5	20	0.9	46	2.2	17	0.8	6	0.3	105	4.9

MEAN WIND SPEED: 14.5
MISSING: 0

TABLE 6

AMMENDENT TO RERR - 10

HOPE CREEK GENERATING STATION

TABLE 1A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JULY - DECEMBER 1990

GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

	Units	3rd Quarter	4th Quarter	Est. Total Error %
A. Fission and Activation Gases				
1. Total release	Ci	6.91E+01	6.87E+02	25
2. Average release rate for period	µCi/sec	8.69E+00	8.64E+01	
3. Percent of technical specification limit (T.S. 3.11.2.2(a))	%	9.43E-01	7.53E+00	
B. Iodines				
1. Total iodine-131,133	Ci	0.00E+00	1.35E-03	25
2. Average release rate for period	µCi/sec	0.00E+00	1.70E-04	
3. Percent of technical specification limit (2) (T.S. 3.11.2.3(a))	%	1.66E-05	1.60E-01	
C. Particulates				
1. Particulates with half-lives >8 days	Ci	3.83E-07	8.74E-05	25
2. Average release rate for period	µCi/sec	4.82E-08	1.10E-05	
3. Percent of technical specification limit (2) (T.S. 3.11.2.3(a))	%	1.66E-05	1.60E-01	
4. Gross alpha	Ci	0.00E+00	0.00E+00	
D. Tritium				
1. Total Release	Ci	3.16E+01	4.20E+01	25
2. Average release rate for period	µCi/sec	3.97E+00	5.28E+00	
3. Percent of technical specification limit (2) (T.S. 3.11.2.3(a))	%	1.66E-05	1.60E-01	

(1) For batch releases the estimated overall error is within 10%
(2) Iodine, tritium and particulates are treated as a group

HOPE CREEK GENERATING STATION

TABLE 2A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JULY - DECEMBER 1990

LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

	Units	3rd Quarter	4th Quarter	Est. Total Error %
A. Fission and activation products				
1. Total release (not including tritium, gases, alpha)	Ci	2.75E-01	1.38E-02	25
2. Average diluted concentration during period	µCi/mL	1.92E-06	3.91E-08	
3. Percent of technical specification limit (T.S. 3.11.1.2.(a))	%	5.16E+00	1.22E+00	
B. Tritium				
1. Total release	Ci	7.24E-01	3.39E+00	25
2. Average diluted concentration during period	µCi/mL	5.06E-06	9.60E-06	
3. Percent of technical specification limit (T.S. 3.11.1.1)	%	1.69E-01	3.20E-01	
C. Dissolved and entrained noble gases				
1. Total release	Ci	2.71E-04	2.44E-03	25
2. Average diluted concentration during period	µCi/mL	1.90E-09	6.91E-09	
3. Percent of technical specification limit (T.S. 3.11.1.1)	%	9.50E-04	3.46E-03	
D. Gross alpha activity				
1. Total release	Ci	0.00E+00	0.00E+00	
E. Volume of waste release (prior to dilution - Batch Release)	liters	6.05E+05	1.95E+06	
F. Volume of dilution water used during entire period	liters	1.43E+08	3.53E+08	

AMMENDENT TO RERR - 11

8.0 MODIFICATION TO PREVIOUS RADIOACTIVE EFFLUENT RELEASE REPORTS

Our last report (RERR-10) did not include the quarterly Sr-89, Sr-90 and Fe-55 composite data for the last half of 1990. Amended pages to RERR-10 are included at the end of this report.

Additionally, amended pages to RERR-9 are included. They were inadvertently omitted from RERR-10.

PART B. GASEOUS EFFLUENTS

See Summary Tables 1A through 1C.

PART C. LIQUID EFFLUENTS

See Summary Tables 2A through 2C.

PART D. SOLID WASTE

See Summary in Table 3.

PART E. RADIOLOGICAL IMPACT ON MAN

The calculated individual doses in this section are based on actual locations of nearby residents and farms. The population dose impact is based on historical site specific data i.e., food production, milk production, feed for milk animals and seafood production.

The doses were calculated using methods described in Regulatory Guide 1.109 and represent calculations for the six month reporting interval. Individual doses from batch and continuous releases were calculated using the annual average historic meteorological dispersion coefficients as described in the Offsite Dose Calculation Manual. Population doses were calculated using the meteorological dispersion coefficients for the six month reporting interval.

Liquid Pathways

Doses to individuals in the population from liquid releases are primarily from the seafood ingestion pathway. Calculated doses to individuals are as shown below.

Total body dose to an individual: 9.59E-02 mrem

Highest organ dose: 2.62E-01 mrem to the Liver

Dose to the 6 million individuals living within the 50 mile radius of the plant site:

Total population dose: 1.38E+00 person-rem

Average population dose: 2.31E-04 mrem/person

Air Pathways

The calculated doses to individuals via the air pathway are shown below:

Total body dose: 1.15E-01 mrem

Skin dose: 2.52E-01 mrem

Highest organ dose due to radioiodines and particulates with half lives greater than 8 days:

4.01E-06 mrem to the Lung.

Dose to the 6 million individuals living within the 50 mile radius of the plant site:

Total population dose: 1.97E-01 person-rem

Average population dose: 3.30E-05 mrem/person

Direct Radiation

Direct radiation may be estimated by Thermoluminescent dosimetric (TLD) measurements. One method for comparing TLD measurements is by comparison with pre-operational data. It should be noted that the TLDs measure direct radiation from both the Salem and Hope Creek Generating Stations at Artificial Island, and natural background radiation.

TLD data for the six month reporting period is given below:

TLD	Location	Measurement
2S-2	0.3 mile	3.6 mrad/month
5S-1	0.9 mile	3.8 mrad/month

HOPE CREEK GENERATING STATION

TABLE 2A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JANUARY - JUNE 1991

LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

	Units	1st Quarter	2nd Quarter	Est. Total Error %
A. Fission and activation products				
1. Total release (not including tritium, gases, alpha)	Ci	2.80E-01	1.13E-01	25
2. Average diluted concentration during period	µCi/mL	1.36E-07	5.38E-08	
3. Percent of technical specification limit (T.S. 3.11.1.2.(a))	%	3.60E+00	2.80E+00	
B. Tritium				
1. Total release	Ci	1.01E+01	3.97E+00	25
2. Average diluted concentration during period	µCi/mL	4.90E-06	1.89E-06	
3. Percent of technical specification limit (T.S. 3.11.1.1)	%	1.63E-01	6.30E-02	
C. Dissolved and entrained noble gases				
1. Total release	Ci	7.03E-04	2.60E-03	25
2. Average diluted concentration during period	µCi/mL	3.41E-10	1.24E-09	
3. Percent of technical specification limit (T.S. 3.11.1.1)	%	1.71E-04	6.20E-04	
D. Gross alpha activity				
1. Total release	Ci	0.00E+00	0.00E+00	
E. Volume of waste release (prior to dilution - Batch Release)	liters	4.60E+06	3.66E+06	
F. Volume of dilution water used during entire period	liters	2.06E+09	2.10E+09	

HOPE CREEK GENERATING STATION

TABLE 2B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JANUARY - JUNE 1991

LIQUID EFFLUENTS

		CONTINUOUS MODE		BATCH MODE	
Nuclides Released	Unit	1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
Sodium-24	Ci	0.00E 00	0.00E+00	2.05E-04	0.00E+00
Chromium-51	Ci	0.00E+00	0.00E+00	6.14E-04	1.95E-02
Manganese-54	Ci	0.00E+00	0.00E+00	4.41E-03	1.50E-02
Iron-55	Ci	0.00E+00	0.00E+00	2.58E-01	5.12E-02
Iron-59	Ci	0.00E+00	0.00E+00	8.42E-04	2.76E-03
Cobalt-58	Ci	0.00E+00	0.00E+00	2.08E-05	5.16E-04
Cobalt-60	Ci	0.00E+00	0.00E+00	9.12E-04	3.09E-03
Zinc-65	Ci	0.00E+00	0.00E+00	1.47E-02	2.02E-02
Arsenic-76	Ci	0.00E+00	0.00E+00	0.00E+00	8.39E-05
Yttrium-91m	Ci	0.00E+00	0.00E+00	0.00E+00	2.48E-05
Strontium-92	Ci	0.00E+00	0.00E+00	7.11E-06	1.57E-04
Technetium-99m	Ci	0.00E+00	0.00E+00	0.00E+00	1.03E-05
Iodine-133	Ci	0.00E+00	0.00E+00	0.00E+00	7.91E-06
Cesium-137	Ci	0.00E+00	0.00E+00	0.00E+00	1.01E-05
TOTALS	Ci	0.00E+00	0.00E+00	2.80E-01	1.13E-01
Tritium	Ci	0.00E+00	0.00E+00	1.01E+01	3.97E+00
Xenon-133	Ci	0.00E+00	0.00E+00	2.92E-04	4.92E-04
Xenon-135	Ci	0.00E+00	0.00E+00	4.11E-04	2.11E-04
TOTALS	Ci	0.00E+00	0.00E+00	1.01E+01	3.97E+00