Public Service
Electric and Gas
Company

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FEB 28 1994

NLR-N94030

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

Gentlemen:

RADIOACTIVE EFFLUENT RELEASE REPORT - 16
HOPE CREEK GENERATING STATION
DOCKET NO. 50-354

In accordance with Section 6.9.1.7 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-16. This report summarizes liquid and gaseous releases and solid waste shipments from the Hope Creek Generating Station for the period of July 1 through December 31, 1993.

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

Sincerely,

Steven E Miltenberger

Attachment (1)

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RERR REPORT only

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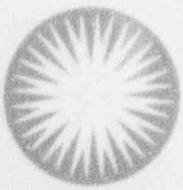
HOPE CREEK GENERATING STATION
SEMIANNUAL RADIOACTIVE
EFFLUENT RELEASE REPORT
HCGS RERR-16

DOCKET NO. 50-354
OPERATING LICENSE NO. NFP-57

FEBRUARY 1994



PSE&G

The Energy People

HOPE CREEK GENERATING STATION
RADIOACTIVE EFFLUENT RELEASE REPORT
JULY - DECEMBER 1993

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HOPE CREEK GENERATING STATION
RADIOACTIVE EFFLUENT RELEASE REPORT
JULY - DECEMBER 1993

INTRODUCTION

This report, HCGS-RERR-16, 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, 1993 to December 31, 1993.

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. Our responses to parts A-F of the "Supplemental Information" section of Regulatory Guide 1.21, Appendix B, are included in the following pages.

As required by Regulatory Guide 1.21, the Hope Creek Technical Specification limits are described in detail within this report along with a summary description of how total radioactivity 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 **4,417,512** 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 1993 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 1993 (refer to RERR-15) have been completed; amended pages to RERR-15 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,iodine-133, tritium, and all radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents released, from each reactor unit, 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 batch 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 4.11.1.1-1 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 for which no activity was detected while meeting the required LLDs are treated as absent.

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 detected at concentrations below the Technical Specification detection limit (LLDs) are treated as being present. Radionuclides for which no activity was detected while meeting the required LLDs are treated as absent.

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 for that batch 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 3 unplanned releases. The contamination of the Auxiliary Boilers due to a small leak in the radwaste evaporators resulted in three unplanned liquid releases during this reporting period. The unplanned releases were liquid batch releases from the Auxiliary Boiler to the Cooling Tower Blowdown line which discharges to the Delaware River. Representative samples were taken before each release and each batch release was monitored by a Radiation Monitor equipped with an Alarm function to insure 10 CFR 20 Appendix B values were not exceeded. A total of 1.22E-3 curies of radioactivity was released due to the contamination of the Auxiliary Boilers. Air samples taken during steaming operations did not detect any gaseous radioactivity above its Lower Limit of Detection (LLD). Table 2 radionuclide summaries include the values from the unplanned releases.

7.0 ELEVATED RADIATION MONITOR RESPONSES

During this reporting period, there were no elevated radiation monitor readings.

8.0 MODIFICATION TO PREVIOUS RADIOACTIVE EFFLUENT RELEASE REPORTS

Our last report (RERR-15) did not include the quarterly Sr-89, Sr-90 and Fe-55 composite data for the first half of 1993. Amended pages to RERR-15 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 2B.

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 the "maximum hypothetical individual" in the population from liquid releases are primarily from the seafood ingestion pathway. Calculated doses are as shown below.

Total body dose : 4.73E-02 mrem

Highest organ dose (LIVER): 1.08E-01 mrem

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

Total population dose: 5.33E-01 person-rem

Average population dose: 8.93E-05 mrem/person

Air Pathways

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

Total body dose: 1.57E-01 mrem

Skin dose: 3.43E-01 mrem

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

1.54E-04 mrem to the LIVER

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

Total population dose: 3.01E-01 person-rem

Average population dose: 5.04E-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	5.8 mrad/month
5S-1	0.9 mile	6.3 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 "maximum hypothetical individual " 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:

0.723 mrem total body
2.030 mrem organ (GI-LLI)
0.587 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:

a. Such persons are participating or spectators in company softball league
b. 10 hours per week on site
c. dose due to airborne pathway (inhalation and immersion)
d. persons are located about 3/4 mile east of plant discharge points (baseball fields)
e. occupancy coincides with batch gaseous discharges

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

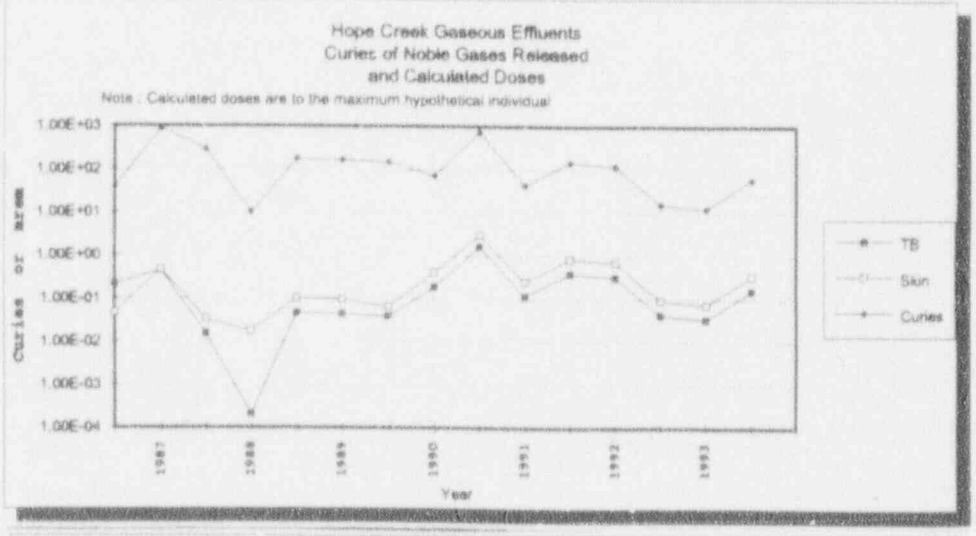
3.17E-04 mrem total body
3.22E-04 mrem organ (Lung)
3.17E-04 mrem thyroid

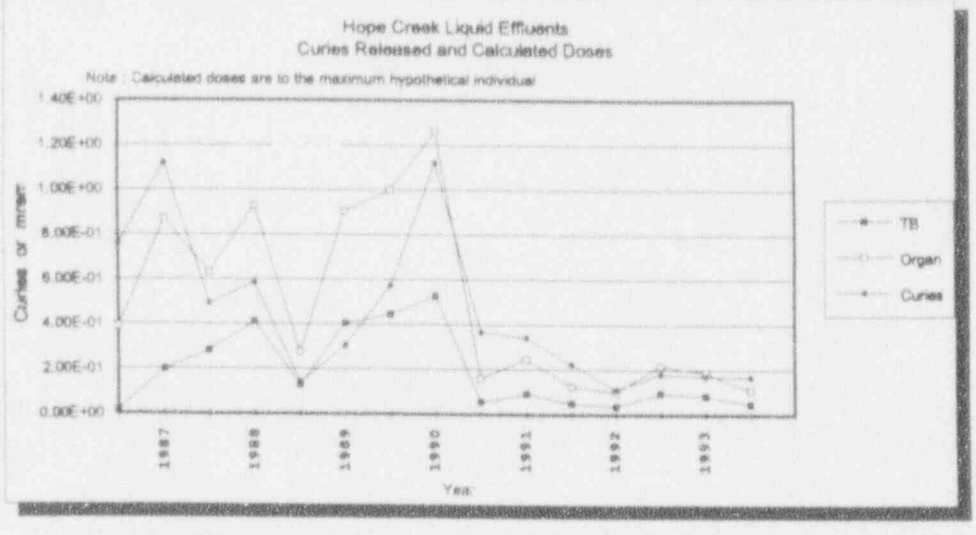
Assessment

Gaseous and liquid effluents released from Hope Creek resulted in a minimal dose to the maximum hypothetical individual. The dose for the 6 month period was a small fraction of all applicable limits.

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.

The following two trend graphs show the total curies of gaseous and liquid effluents released for Hope Creek since plant operation in 1986. Calculated doses in the graphs are to the maximum hypothetical individual.





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 1993 in Tables 5 and 6.

PART G. OFFSITE DOSE CALCULATION MANUAL (ODCM) CHANGES

During this period, there was a revision to the HCGS Off-site Dose Calculation Manual. The revision consisted of updating the ODCM to reflect current Environmental Sampling Locations. Copies of the revised ODCM pages are attached to the end of this report.

PART H. INOPERABLE MONITORS

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

PART I. PROCESS CONTROL PROGRAM (PCP) CHANGES

During the reporting period, there were no changes to the process control program.

PART J. ENVIRONMENTAL MONITORING LOCATION CHANGES

During the reporting period, 2 additional TLD's were added to the Environmental Monitoring program. The new TLD locations, 3.8 miles NW and 6.0 miles ENE of the plant ventilation discharge, were added for program enhancement purposes. The ODCM for Salem and Hope Creek stations were updated to reflect the added locations. A complete list of the current sampling locations is included in the ODCM attached to the end of this report.

HOPE CREEK GENERATING STATION

TABLE 1A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JULY - DECEMBER 1993

GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

	Units	3rd Quarter	4th Quarter	Est. Total Error %
A. Fission and Activation Gases				
1. Total release	Ci	4.22E+01	1.80E+01	25
2. Average release rate for period	µCi/sec	5.37E+00	2.29E+00	
3. Percent of technical specification limit (T.S. 3.11.2.2(a))	%	5.76E-01	2.46E-01	
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))	%	9.01E-04	1.14E-03	
C. Particulates				
1. Particulates with half-lives >8 days	Ci	1.28E-03	0.00E+00	25
2. Average release rate for period	µCi/sec	1.63E-04	0.00E+00	-
3. Percent of technical specification limit (2) (T.S. 3.11.2.3(a))	%	9.01E-04	1.14E-03	
4. Gross alpha	Ci	5.99E-07	0.00E+00	
D. Tritium				
1. Total Release	Ci	3.53E+01	2.76E+01	25
2. Average release rate for period	µCi/sec	4.49E+00	3.51E+00	
3. Percent of technical specification limit (2) (T.S. 3.11.2.3(a))	%	9.01E-04	1.14E-03	

(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 1993
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	4.24E-01	1.80E-01	0.00E+00	0.00E+00
Krypton-85m	Ci	4.24E-01	1.80E-01	0.00E+00	0.00E+00
Krypton-87	Ci	1.69E+00	7.21E-01	0.00E+00	0.00E+00
Krypton-88	Ci	1.69E+00	7.21E-01	0.00E+00	0.00E+00
Krypton-89	Ci	1.14E+01	4.88E+00	0.00E+00	0.00E+00
Xenon-133	Ci	8.44E-01	3.61E-01	0.00E+00	0.00E+00
Xenon-135	Ci	2.12E+00	9.01E-01	0.00E+00	0.00E+00
Xenon-135m	Ci	2.55E+00	1.08E+00	0.00E+00	0.00E+00
Xenon-137	Ci	1.31E+01	5.57E+00	0.00E+00	0.00E+00
Xenon-138	Ci	8.01E+00	3.43E+00	0.00E+00	0.00E+00
TOTALS	Ci	4.22E+01	1.80E+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-life >8 days)					
Manganese-54	Ci	9.09E-05	0.00E+00	0.00E+00	0.00E+00
Cobalt-60	Ci	5.05E-05	0.00E+00	0.00E+00	0.00E+00
Chromium-51	Ci	7.83E-04	0.00E+00	0.00E+00	0.00E+00
Zinc-65	Ci	3.53E-04	0.00E+00	0.00E+00	0.00E+00
TOTALS	Ci	1.28E-03	0.00E+00	0.00E+00	0.00E+00

HOPE CREEK GENERATING STATION

TABLE 1C

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

JULY - DECEMBER 1993

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 1993

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	8.76E-02	8.11E-02	25
2. Average diluted concentration during release period.	µCi/mL	5.58E-08	1.40E-07	
3. Percent of technical specification limit (T.S. 3.11.1.2.(a))	%	1.44E+00	1.71E+00	
B. Tritium				
1. Total release	Ci	2.22E+01	1.31E+01	25
2. Average diluted concentration during release period	µCi/mL	1.42E-05	2.26E-05	
3. Percent of technical specification limit (T.S. 3.11.1.1)	%	4.73E-01	7.53E-01	
C. Dissolved and entrained noble gases				
1. Total release	Ci	2.42E-03	1.28E-03	25
2. Average diluted concentration during release period.	µCi/mL	1.54E-09	2.21E-09	
3. Percent of technical specification limit (T.S. 3.11.1.1)	%	7.70E-04	1.11E-03	
D. Gross alpha activity				
1. Total release	Ci	0.00E+00	0.00E+00	25
E. Volume of waste release (prior to dilution - Batch Release)	liters	4.58E+06	2.98E+06	25
F. Volume of dilution water used during entire period	liters	1.90E+10	1.22E+10	25

HOPE CREEK GENERATING STATION

TABLE 2B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JULY - DECEMBER 1993

LIQUID EFFLUENTS

		CONTINUOUS MODE		BATCH MODE	
Nuclides Released	Unit	3rd Quarter	4th Quarter	3rd Quarter	4th Quarter
Niobium-97	Ci	0.00E+00	0.00E+00	4.33E-04	0.00E+00
Chromium-51	Ci	0.00E+00	0.00E+00	3.64E-02	4.44E-02
Manganese-54	Ci	0.00E+00	0.00E+00	1.53E-02	1.68E-02
Iron-55	Ci	0.00E+00	0.00E+00	1.44E-02	0.00E+00
Iron-59	Ci	0.00E+00	0.00E+00	1.76E-03	4.94E-03
Cobalt-58	Ci	0.00E+00	0.00E+00	1.22E-04	9.69E-04
Cobalt-60	Ci	0.00E+00	0.00E+00	2.85E-03	2.61E-03
Zinc-65	Ci	0.00E+00	0.00E+00	1.50E-02	1.05E-02
Zinc-69m	Ci	0.00E+00	0.00E+00	0.00E+00	2.33E-05
Silver-110m	Ci	0.00E+00	0.00E+00	9.05E-04	4.13E-04
Sodium-24	Ci	0.00E+00	0.00E+00	4.40E-06	6.10E-07
Technetium-99m	Ci	0.00E+00	0.00E+00	4.50E-04	4.10E-04
Arsenic-76	Ci	0.00E+00	0.00E+00	1.03E-05	0.00E+00
Cesium-137	Ci	0.00E+00	0.00E+00	3.34E-07	4.82E-05
Zirconium-97	Ci	0.00E+00	0.00E+00	1.45E-05	0.00E+00
TOTALS	Ci	0.00E+00	0.00E+00	8.76E-02	8.11E-02
Tritium	Ci	0.00E+00	0.00E+00	2.22E+01	1.31E+01
Xenon-133	Ci	0.00E+00	0.00E+00	3.14E-04	9.26E-05
Xenon-135	Ci	0.00E+00	0.00E+00	2.10E-03	1.19E-03
TOTALS	Ci	0.00E+00	0.00E+00	2.22E+01	1.31E+01

HOPE CREEK GENERATING STATION

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JULY - DECEMBER 1993
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	7.18E+01	
	Ci	4.66E+03	25
b. Dry compressible waste, contaminated equipment.	m3	4.00E+00	
	Ci	5.90E-01	25
c. Irradiated components, control rods	m3	0.00E+00	
	Ci	0.00E+00	25
d. Others (described)	m3	0.00E+00	
	Ci	0.00E+00	25

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

	RESINS		DAW	
	(%)	(Ci)	(%)	(Ci)
Zinc-65	83.0	3.87E+03	2.2	1.00E-02
Iron-55	13.5	6.28E+02	71.2	4.20E-01
Manganese-54	2.5	1.17E+02	8.3	5.00E-02
Cobalt-60	1.0	4.66E+01	1.6	1.00E-02
Chromium-51	0.0	0.00E+00	10.9	6.00E-02
Iron-59	0.0	0.00E+00	5.2	3.00E-02

(1) Volumes are measured, activities are estimated

HOPE CREEK GENERATING STATION

TABLE 3
(CONT'D)

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JULY - DECEMBER 1993
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination	Type of Containers
24	Truck	Barnwell, SC	HIC and 17E Drums
4	Truck	Oak Ridge, TN	Strong,Tight Containers

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 1993
SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED
IN A BATCH MODE

BATCH RELEASES ONLY

1. Dates: July 1 - September 30, 1993

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 1993
SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED
IN A BATCH MODE

BATCH RELEASES ONLY

1. Dates: October 1 - December 31, 1993

2. Type of release: Gas

3. Number of releases during the 4th Quarter: 1

4. Total time duration for all releases of type listed above:
4.79E+02 min

5. Maximum duration for release of type listed above:
4.79E+02 min

6. Average duration for release of type listed above:
4.79E+02 min

7. Minimum duration for release of type listed above:
4.79E+02 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 1993
SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED
IN A BATCH MODE

BATCH RELEASES ONLY

1. Dates: July 1 - September 30, 1993

2. Type of release: Liquid

3. Number of releases during the 3rd Quarter: 111

4. Total time duration for all releases of type listed above: 8.84E+03 min

5. Maximum duration for release of type listed above: 1.34E+02 min

6. Average duration for release of type listed above: 8.00E+01 min

7. Minimum duration for release of type listed above: 1.2E+01 min

8. Average stream flow (dilution flow) during the period of release: 38445 gpm

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JULY - DECEMBER 1993
SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED
IN A BATCH MODE

BATCH RELEASES ONLY

1. Dates: October 1 - December 31, 1993

2. Type of release: Liquid

3. Number of releases during the 4th Quarter: 76

4. Total time duration for all releases of type listed above:
6.16E+03 min

5. Maximum duration for release of type listed above:
1.19E+02 min

6. Average duration for release of type listed above:
8.11E+01 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: 24371 gpm

ARTIFICIAL ISLAND 7/93 - 9/93

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	1	0.0	0	0.0	0	0.0	0	0.0	1	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	1	0.0	2	0.1	1	0.0	2	0.1	0	0.0	6	0.3
SSE	0	0.0	0	0.0	1	0.0	4	0.2	10	0.5	0	0.0	0	0.0	15	0.7
S	0	0.0	0	0.0	4	0.2	4	0.2	1	0.0	0	0.0	0	0.0	9	0.4
SSW	0	0.0	2	0.1	2	0.1	3	0.1	0	0.0	0	0.0	0	0.0	7	0.3
SW	0	0.0	0	0.0	4	0.2	5	0.2	2	0.1	0	0.0	0	0.0	11	0.5
WSW	0	0.0	0	0.0	3	0.1	5	0.2	6	0.3	1	0.0	0	0.0	15	0.7
W	0	0.0	0	0.0	0	0.0	3	0.1	4	0.2	0	0.0	0	0.0	7	0.3
WNW	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	1	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	2	0.1	15	0.7	28	1.3	25	1.2	4	0.2	0	0.0	74	3.5

MEAN WIND SPEED: 11.5
MISSING: 9

ARTIFICIAL ISLAND 7/93 - 9/93

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 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		> 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	1	0.0	0	0.0	0	0.0	0	0.0	3	0.1
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	2	0.1	0	0.0	0	0.0	0	0.0	0	0.0	2	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	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
ESE	0	0.0	2	0.1	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	3	0.1
SE	0	0.0	1	0.0	1	0.0	0	0.0	4	0.2	1	0.0	0	0.0	7	0.3
SSE	0	0.0	2	0.1	4	0.2	4	0.2	6	0.3	3	0.1	0	0.0	19	0.9
S	0	0.0	1	0.0	5	0.2	5	0.2	0	0.0	0	0.0	0	0.0	11	0.5
SSW	0	0.0	0	0.0	4	0.2	2	0.1	2	0.1	0	0.0	0	0.0	8	0.4
SW	0	0.0	0	0.0	5	0.2	0	0.0	1	0.0	3	0.1	0	0.0	9	0.4
WSW	0	0.0	0	0.0	7	0.3	3	0.1	0	0.0	0	0.0	0	0.0	10	0.5
W	0	0.0	0	0.0	2	0.1	0	0.0	6	0.3	2	0.1	0	0.0	10	0.5
WNW	0	0.0	0	0.0	0	0.0	3	0.1	5	0.2	2	0.1	0	0.0	10	0.5
NW	0	0.0	0	0.0	3	0.1	0	0.0	3	0.1	4	0.2	0	0.0	10	0.5
NNW	0	0.0	0	0.0	3	0.1	3	0.1	2	0.1	0	0.0	0	0.0	8	0.4
	0	0.0	6	0.3	38	1.8	22	1.0	29	1.4	15	0.7	0	0.0	110	5.2

MEAN WIND SPEED: 10.7
MISSING: 4

ARTIFICIAL ISLAND 7/93 - 9/93

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	15	0.7	16	0.8	5	0.2	0	0.0	0	0.0	36	1.7
NNE	0	0.0	0	0.0	4	0.2	3	0.1	0	0.0	0	0.0	0	0.0	7	0.3
NE	0	0.0	0	0.0	5	0.2	2	0.1	0	0.0	0	0.0	0	0.0	7	0.3
ENE	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1
E	0	0.0	2	0.1	3	0.1	0	0.0	0	0.0	0	0.0	0	0.0	5	0.2
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	0	0.0	0	0.0	2	0.1	1	0.0	3	0.1	7	0.3
SSE	0	0.0	0	0.0	11	0.5	7	0.3	6	0.3	5	0.2	0	0.0	29	1.4
S	0	0.0	2	0.1	8	0.4	1	0.0	2	0.1	0	0.0	0	0.0	13	0.6
SSW	0	0.0	1	0.0	6	0.3	2	0.1	2	0.1	0	0.0	0	0.0	11	0.5
SW	0	0.0	1	0.0	6	0.3	2	0.1	1	0.0	2	0.1	0	0.0	12	0.6
WSW	0	0.0	1	0.0	5	0.2	1	0.0	1	0.0	0	0.0	0	0.0	8	0.4
W	0	0.0	1	0.0	2	0.1	4	0.2	6	0.3	1	0.0	0	0.0	14	0.7
WNW	0	0.0	1	0.0	3	0.1	4	0.2	8	0.4	0	0.0	0	0.0	16	0.8
NW	0	0.0	0	0.0	6	0.3	5	0.2	2	0.1	0	0.0	0	0.0	13	0.6
NNW	0	0.0	0	0.0	7	0.3	6	0.3	11	0.5	0	0.0	0	0.0	24	1.1
	0	0.0	12	0.6	82	3.9	53	2.5	46	2.2	9	0.4	3	0.1	205	9.6

MEAN WIND SPEED: 9.7
MISSING: 7

ARTIFICIAL ISLAND 7/93 - 9/93

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 D

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	16	0.8	34	1.6	8	0.4	2	0.1	0	0.0	63	3.0
NNE	0	0.0	2	0.1	13	0.6	37	1.7	15	0.7	0	0.0	0	0.0	67	3.2
NE	0	0.0	1	0.0	6	0.3	22	1.0	19	0.9	0	0.0	0	0.0	48	2.3
ENE	0	0.0	5	0.2	11	0.5	11	0.5	8	0.4	0	0.0	0	0.0	35	1.6
E	0	0.0	1	0.0	3	0.1	4	0.2	3	0.1	0	0.0	0	0.0	11	0.5
ESE	0	0.0	2	0.1	1	0.0	4	0.2	11	0.5	0	0.0	0	0.0	18	0.8
SE	0	0.0	1	0.0	4	0.2	2	0.1	14	0.7	19	0.9	1	0.0	41	1.9
SSE	0	0.0	2	0.1	8	0.4	14	0.7	61	2.9	39	1.8	5	0.2	129	6.1
S	0	0.0	2	0.1	11	0.5	35	1.6	52	2.4	18	0.8	4	0.2	122	5.7
SSW	0	0.0	2	0.1	15	0.7	34	1.6	37	1.7	8	0.4	2	0.1	98	4.6
SW	0	0.0	2	0.1	10	0.5	13	0.6	11	0.5	14	0.7	1	0.0	51	2.4
WSW	0	0.0	3	0.1	5	0.2	9	0.4	7	0.3	2	0.1	0	0.0	26	1.2
W	0	0.0	3	0.1	5	0.2	14	0.7	14	0.7	3	0.1	0	0.0	39	1.8
WNW	0	0.0	1	0.0	11	0.5	19	0.9	13	0.6	1	0.0	2	0.1	47	2.2
NW	0	0.0	1	0.0	7	0.3	18	0.8	8	0.4	0	0.0	0	0.0	34	1.6
NNW	0	0.0	1	0.0	14	0.7	28	1.3	15	0.7	4	0.2	0	0.0	62	2.9
	0	0.0	32	1.5	140	6.6	298	14.0	296	13.9	110	5.2	15	0.7	891	41.9

MEAN WIND SPEED: 12.5
MISSING: 29

ARTIFICIAL ISLAND 7/93 - 9/93

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	2	0.1	16	0.8	17	0.8	16	0.8	5	0.2	0	0.0	56	2.6
NNE	0	0.0	2	0.1	10	0.5	23	1.1	15	0.7	0	0.0	0	0.0	50	2.4
NE	0	0.0	2	0.1	1	0.0	9	0.4	8	0.4	0	0.0	0	0.0	20	0.9
ENE	0	0.0	2	0.1	4	0.2	13	0.6	5	0.2	0	0.0	0	0.0	24	1.1
E	0	0.0	0	0.0	5	0.2	16	0.8	1	0.0	0	0.0	0	0.0	22	1.0
ESE	0	0.0	1	0.0	3	0.1	9	0.4	7	0.3	0	0.0	0	0.0	20	0.9
SE	0	0.0	0	0.0	4	0.2	5	0.2	7	0.3	4	0.2	0	0.0	20	0.9
SSE	0	0.0	1	0.0	4	0.2	11	0.5	7	0.3	2	0.1	0	0.0	25	1.2
S	0	0.0	2	0.1	6	0.3	7	0.3	18	0.8	5	0.2	1	0.0	39	1.8
SSW	0	0.0	3	0.1	9	0.4	9	0.4	12	0.6	9	0.4	0	0.0	42	2.0
SW	0	0.0	1	0.0	11	0.5	23	1.1	18	0.8	5	0.2	0	0.0	58	2.7
WSW	0	0.0	4	0.2	12	0.6	15	0.7	20	0.9	0	0.0	0	0.0	51	2.4
W	0	0.0	4	0.2	7	0.3	25	1.2	24	1.1	3	0.1	0	0.0	63	3.0
WNW	0	0.0	2	0.1	11	0.5	25	1.2	5	0.2	0	0.0	0	0.0	43	2.0
NW	0	0.0	1	0.0	8	0.4	24	1.1	22	1.0	1	0.0	1	0.0	57	2.7
NNW	0	0.0	3	0.1	8	0.4	24	1.1	33	1.6	3	0.1	1	0.0	72	3.4
	0	0.0	30	1.4	119	5.6	255	12.0	218	10.3	37	1.7	3	0.1	662	31.1

MEAN WIND SPEED: 11.3
MISSING: 25

ARTIFICIAL ISLAND 7/93 - 9/93

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	1	0.0	5	0.2	10	0.5	7	0.3	0	0.0	0	0.0	23	1.1
NNE	0	0.0	1	0.0	2	0.1	5	0.2	16	0.8	7	0.3	0	0.0	31	1.5
NE	0	0.0	2	0.1	3	0.1	3	0.1	2	0.1	1	0.0	0	0.0	11	0.5
ENE	0	0.0	1	0.0	3	0.1	2	0.1	3	0.1	0	0.0	0	0.0	9	0.4
E	0	0.0	0	0.0	1	0.0	1	0.0	2	0.1	0	0.0	0	0.0	4	0.2
ESE	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1
SE	0	0.0	0	0.0	1	0.0	0	0.0	1	0.0	0	0.0	0	0.0	2	0.1
SSE	0	0.0	0	0.0	9	0.4	3	0.1	2	0.1	0	0.0	0	0.0	14	0.7
S	0	0.0	5	0.2	7	0.3	4	0.2	0	0.0	1	0.0	0	0.0	17	0.8
SSW	0	0.0	1	0.0	3	0.1	3	0.1	3	0.1	0	0.0	0	0.0	10	0.5
SW	0	0.0	0	0.0	4	0.2	1	0.0	4	0.2	2	0.1	0	0.0	11	0.5
WSW	0	0.0	1	0.0	0	0.0	1	0.0	3	0.1	1	0.0	0	0.0	6	0.3
W	0	0.0	0	0.0	1	0.0	6	0.3	7	0.3	0	0.0	0	0.0	14	0.7
WNW	0	0.0	1	0.0	2	0.1	2	0.1	2	0.1	0	0.0	0	0.0	7	0.3
NW	0	0.0	0	0.0	0	0.0	2	0.1	1	0.0	0	0.0	0	0.0	3	0.1
NNW	0	0.0	2	0.1	1	0.0	5	0.2	11	0.5	1	0.0	0	0.0	20	0.9
	0	0.0	16	0.8	43	2.0	48	2.3	64	3.0	13	0.6	0	0.0	184	8.7

MEAN WIND SPEED: 11.0
MISSING: 6

ARTIFICIAL ISLAND 7/93 - 9/93

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	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	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	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	0	0.0	0	0.0	0	0.0	0	0.0	0	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	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

MEAN WIND SPEED: 0.0
MISSING: 0

ARTIFICIAL ISLAND 7/93 - 9/93

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	6	0.3	54	2.5	78	3.7	36	1.7	7	0.3	0	0.0	181	8.5
NNE	0	0.0	5	0.2	29	1.4	68	3.2	46	2.2	7	0.3	0	0.0	155	7.3
NE	0	0.0	5	0.2	17	0.8	36	1.7	29	1.4	1	0.0	0	0.0	88	4.1
ENE	0	0.0	9	0.4	19	0.9	26	1.2	16	0.8	0	0.0	0	0.0	70	3.3
E	0	0.0	3	0.1	12	0.6	22	1.0	6	0.3	0	0.0	0	0.0	43	2.0
ESE	0	0.0	7	0.3	5	0.2	15	0.7	18	0.8	0	0.0	0	0.0	45	2.1
SE	0	0.0	3	0.1	11	0.5	9	0.4	29	1.4	27	1.3	4	0.2	83	3.9
SSE	0	0.0	5	0.2	37	1.7	43	2.0	92	4.3	49	2.3	5	0.2	231	10.9
S	0	0.0	12	0.6	41	1.9	56	2.6	73	3.4	24	1.1	5	0.2	211	9.9
SSW	0	0.0	9	0.4	39	1.8	53	2.5	56	2.6	17	0.8	2	0.1	176	8.3
SW	0	0.0	4	0.2	40	1.9	44	2.1	37	1.7	26	1.2	1	0.0	152	7.1
WSW	0	0.0	9	0.4	32	1.5	34	1.6	37	1.7	4	0.2	0	0.0	116	5.5
W	0	0.0	8	0.4	17	0.8	52	2.4	61	2.9	9	0.4	0	0.0	147	6.9
WNW	0	0.0	5	0.2	27	1.3	53	2.5	34	1.6	4	0.2	2	0.1	125	5.9
NW	0	0.0	2	0.1	24	1.1	49	2.3	36	1.7	5	0.2	1	0.0	117	5.5
NNW	0	0.0	6	0.3	33	1.6	66	3.1	72	3.4	8	0.4	1	0.0	186	8.7
	0	0.0	98	4.6	437	20.6	704	33.1	678	31.9	188	8.8	21	1.0	2126	100.0

MISSING HOURS: 82

MEAN WIND SPEED: 11.6

ARTIFICIAL ISLAND 7/93 - 9/93

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	6	0.3	54	2.5	78	3.7	36	1.7	7	0.3	0	0.0	181	8.5
NNE	0	0.0	5	0.2	29	1.4	68	3.2	46	2.2	7	0.3	0	0.0	155	7.3
NE	0	0.0	5	0.2	17	0.8	36	1.7	29	1.4	1	0.0	0	0.0	88	4.1
ENE	0	0.0	9	0.4	19	0.9	26	1.2	16	0.8	0	0.0	0	0.0	70	3.3
E	0	0.0	3	0.1	12	0.6	22	1.0	6	0.3	0	0.0	0	0.0	43	2.0
ESE	0	0.0	7	0.3	5	0.2	15	0.7	18	0.8	0	0.0	0	0.0	45	2.1
SE	0	0.0	3	0.1	11	0.5	9	0.4	29	1.4	27	1.3	4	0.2	83	3.9
SSE	0	0.0	5	0.2	37	1.7	44	2.1	93	4.4	49	2.3	5	0.2	233	10.9
S	0	0.0	12	0.6	41	1.9	56	2.6	73	3.4	24	1.1	5	0.2	211	9.9
SSW	0	0.0	9	0.4	39	1.8	53	2.5	56	2.6	17	0.8	2	0.1	176	8.3
SW	0	0.0	4	0.2	40	1.9	44	2.1	37	1.7	26	1.2	1	0.0	152	7.1
WSW	0	0.0	9	0.4	32	1.5	34	1.6	37	1.7	4	0.2	0	0.0	116	5.5
W	0	0.0	8	0.4	17	0.8	52	2.4	61	2.9	9	0.4	0	0.0	147	6.9
WNW	0	0.0	5	0.2	27	1.3	53	2.5	34	1.6	4	0.2	2	0.1	125	5.9
NW	0	0.0	2	0.1	24	1.1	49	2.3	36	1.7	5	0.2	1	0.0	117	5.5
NNW	0	0.0	6	0.3	33	1.6	66	3.1	72	3.4	8	0.4	1	0.0	186	8.7
	0	0.0	98	4.6	437	20.5	705	33.1	679	31.9	188	8.8	21	1.0	2128	100.0

MISSING HOURS: 80

MEAN WIND SPEED: 11.6

ARTIFICIAL ISLAND 10/93-12/93

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	1	0.0	0	0.0	0	0.0	0	0.0	1	0.0
E	0	0.0	0	0.0	0	0.0	1	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	0	0.0	1	0.0	2	0.1	0	0.0	0	0.0	3	0.1
SSE	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0	1	0.0	0	0.0	3	0.1
S	0	0.0	0	0.0	1	0.0	2	0.1	1	0.0	0	0.0	0	0.0	4	0.2
SSW	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	1	0.0
SW	0	0.0	0	0.0	0	0.0	4	0.2	1	0.0	0	0.0	0	0.0	5	0.2
WSW	0	0.0	0	0.0	0	0.0	5	0.2	1	0.0	0	0.0	0	0.0	6	0.3
W	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0	2	0.1
WNW	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	1	0.0
NW	0	0.0	0	0.0	0	0.0	0	0.0	3	0.1	3	0.1	0	0.0	6	0.3
NNW	0	0.0	0	0.0	0	0.0	0	0.0	3	0.1	2	0.1	0	0.0	5	0.2
	0	0.0	0	0.0	2	0.1	16	0.8	11	0.5	8	0.4	1	0.0	38	1.8

MEAN WIND SPEED: 14.2
MISSING: 2

ARTIFICIAL ISLAND 10/93-12/93

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 B

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	2	0.1	5	0.2	0	0.0	0	0.0	7	0.3
NNE	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0	2	0.1	0	0.0	4	0.2
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	1	0.0	0	0.0	0	0.0	0	0.0	1	0.0
E	0	0.0	0	0.0	0	0.0	2	0.1	0	0.0	0	0.0	0	0.0	2	0.1
ESE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0
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	1	0.0	0	0.0	0	0.0	0	0.0	1	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	1	0.0	2	0.1	1	0.0	0	0.0	0	0.0	4	0.2
WSW	0	0.0	0	0.0	0	0.0	6	0.3	3	0.1	0	0.0	0	0.0	9	0.4
W	0	0.0	0	0.0	1	0.0	0	0.0	2	0.1	4	0.2	4	0.2	11	0.5
WNW	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1	0	0.0	1	0.0	3	0.1
NW	0	0.0	0	0.0	1	0.0	0	0.0	8	0.4	1	0.0	1	0.0	11	0.5
NNW	0	0.0	0	0.0	0	0.0	2	0.1	8	0.4	2	0.1	2	0.1	14	0.7
	0	0.0	0	0.0	3	0.1	17	0.8	33	1.6	9	0.4	9	0.4	71	3.4

MEAN WIND SPEED: 16.1
MISSING: 3

ARTIFICIAL ISLAND 10/93-12/93

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	2	0.1	8	0.4	2	0.1	1	0.0	0	0.0	13	0.6
NNE	0	0.0	0	0.0	0	0.0	4	0.2	3	0.1	0	0.0	0	0.0	7	0.3
NE	0	0.0	0	0.0	0	0.0	2	0.1	2	0.1	1	0.0	0	0.0	5	0.2
ENE	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	2	0.1
E	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0	1	0.0	0	0.0	3	0.1
ESE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	1	0.0
SE	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0	1	0.0	0	0.0	3	0.1
SSE	0	0.0	0	0.0	0	0.0	1	0.0	2	0.1	0	0.0	0	0.0	3	0.1
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	2	0.1	0	0.0	0	0.0	0	0.0	2	0.1
SW	0	0.0	1	0.0	1	0.0	3	0.1	2	0.1	0	0.0	0	0.0	7	0.3
WSW	0	0.0	0	0.0	3	0.1	3	0.1	2	0.1	1	0.0	0	0.0	9	0.4
W	0	0.0	0	0.0	0	0.0	1	0.0	3	0.1	1	0.0	1	0.1	6	0.3
WNW	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0	4	0.2	6	0.3
NW	0	0.0	0	0.0	4	0.2	2	0.1	3	0.1	2	0.1	1	0.0	12	0.6
NNW	0	0.0	0	0.0	5	0.2	3	0.1	7	0.3	1	0.0	6	0.3	22	1.1
	0	0.0	1	0.0	16	0.8	32	1.5	30	1.4	11	0.5	12	0.6	102	4.9

MEAN WIND SPEED: 14.2
MISSING: 5

ARTIFICIAL ISLAND 10/93-12/93

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 D

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	6	0.3	9	0.4	14	0.7	15	0.7	2	0.1	47	2.3
NNE	0	0.0	0	0.0	3	0.1	31	1.5	11	0.5	17	0.8	6	0.3	68	3.3
NE	0	0.0	0	0.0	15	0.7	24	1.2	27	1.3	16	0.8	0	0.0	82	3.9
ENE	0	0.0	0	0.0	9	0.4	14	0.7	16	0.8	4	0.2	0	0.0	43	2.1
E	0	0.0	2	0.1	7	0.3	8	0.4	1	0.0	0	0.0	0	0.0	18	0.9
ESE	0	0.0	1	0.0	3	0.1	4	0.2	0	0.0	0	0.0	8	0.4	16	0.8
SE	0	0.0	1	0.0	4	0.2	6	0.3	7	0.3	0	0.0	1	0.0	19	0.9
SSE	0	0.0	1	0.0	2	0.1	13	0.6	12	0.6	7	0.3	0	0.0	35	1.7
S	0	0.0	0	0.0	7	0.3	10	0.5	15	0.7	10	0.5	0	0.0	42	2.0
SSW	0	0.0	3	0.1	4	0.2	9	0.4	18	0.9	4	0.2	0	0.0	38	1.8
SW	0	0.0	5	0.2	4	0.2	15	0.7	6	0.3	1	0.0	0	0.0	31	1.5
WSW	0	0.0	1	0.0	2	0.1	10	0.5	14	0.7	9	0.4	0	0.0	36	1.7
W	0	0.0	0	0.0	8	0.4	6	0.3	13	0.6	22	1.1	18	0.9	67	3.2
WNW	0	0.0	1	0.0	2	0.1	4	0.2	10	0.5	13	0.6	13	0.6	43	2.1
NW	0	0.0	3	0.1	14	0.7	9	0.4	27	1.3	22	1.1	10	0.5	85	4.1
NNW	0	0.0	1	0.0	14	0.7	5	0.2	15	0.7	7	0.3	27	1.3	69	3.3
	0	0.0	20	[illegible]	104	5.0	177	8.5	206	9.9	147	7.1	85	4.1	739	35.5

MEAN WIND SPEED: 15.2
MISSING: 38

ARTIFICIAL ISLAND 10/93-12/93

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	1	0.0	7	0.3	12	0.6	13	0.6	8	0.4	3	0.1	44	2.1
NNE	0	0.0	2	0.1	2	0.1	12	0.6	21	1.0	6	0.3	1	0.0	44	2.1
NE	0	0.0	0	0.0	3	0.1	13	0.6	19	0.9	8	0.4	0	0.0	43	2.1
ENE	0	0.0	1	0.0	5	0.2	12	0.6	18	0.9	4	0.2	0	0.0	40	1.9
E	0	0.0	3	0.1	6	0.3	12	0.6	2	0.1	0	0.0	0	0.0	23	1.1
ESE	0	0.0	2	0.1	2	0.1	10	0.5	3	0.1	0	0.0	0	0.0	17	0.8
SE	0	0.0	2	0.1	1	0.0	9	0.4	9	0.4	5	0.4	10	0.5	39	1.9
SSE	0	0.0	0	0.0	1	0.0	12	0.6	10	0.5	8	0.4	3	0.1	34	1.6
S	0	0.0	1	0.0	3	0.1	7	0.3	15	0.7	25	1.2	1	0.0	52	2.5
SSW	0	0.0	2	0.1	7	0.3	13	0.6	46	2.2	16	0.8	0	0.0	84	4.0
SW	0	0.0	2	0.1	8	0.4	29	1.4	37	1.8	5	0.2	7	0.3	88	4.2
WSW	0	0.0	4	0.2	6	0.3	15	0.7	21	1.0	11	0.5	1	0.0	58	2.8
W	0	0.0	4	0.2	8	0.4	22	1.1	38	1.8	9	0.4	2	0.1	83	4.0
WNW	0	0.0	4	0.2	9	0.4	16	0.8	12	0.6	2	0.1	0	0.0	43	2.1
NW	0	0.0	2	0.1	11	0.5	14	0.7	50	2.4	20	1.0	0	0.0	97	4.7
NNW	0	0.0	3	0.1	2	0.1	16	0.8	31	1.5	23	1.1	6	0.3	81	3.9
	0	0.0	33	1.6	81	3.9	224	10.8	345	16.6	153	7.4	34	1.6	870	41.8

MEAN WIND SPEED: 14.3
MISSING: 44

ARTIFICIAL ISLAND 10/93-12/93

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	2	0.1	5	0.2	14	0.7	1	0.0	0	0.0	22	1.1
NNE	0	0.0	0	0.0	1	0.0	4	0.2	6	0.3	5	0.2	0	0.0	16	0.8
NE	0	0.0	0	0.0	2	0.1	2	0.1	8	0.4	7	0.3	0	0.0	19	0.9
ENE	0	0.0	0	0.0	1	0.0	2	0.1	9	0.4	2	0.1	0	0.0	14	0.7
E	0	0.0	0	0.0	2	0.1	4	0.2	4	0.2	0	0.0	0	0.0	10	0.5
ESE	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1	0	0.0	0	0.0	2	0.1
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	1	0.0	1	0.0	6	0.3	5	0.2	1	0.0	4	0.2	18	0.9
S	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1	1	0.0	1	0.0	4	0.2
SSW	0	0.0	0	0.0	5	0.2	3	0.1	10	0.5	7	0.3	1	0.0	26	1.3
SW	0	0.0	2	0.1	4	0.2	8	0.4	10	0.5	0	0.0	0	0.0	24	1.2
WSW	0	0.0	1	0.0	0	0.0	5	0.2	3	0.1	0	0.0	0	0.0	9	0.4
W	0	0.0	3	0.1	2	0.1	5	0.2	9	0.4	4	0.2	0	0.0	23	1.1
WNW	0	0.0	0	0.0	1	0.0	2	0.1	3	0.1	1	0.0	0	0.0	7	0.3
NW	0	0.0	1	0.0	1	0.0	5	0.2	1	0.0	0	0.0	0	0.0	8	0.4
NNW	0	0.0	0	0.0	2	0.1	12	0.6	3	0.1	4	0.2	0	0.0	21	1.0
	0	0.0	8	0.4	25	1.2	64	3.1	91	4.4	33	1.6	6	0.3	227	10.9

MEAN WIND SPEED: 13.3
MISSING: 29

ARTIFICIAL ISLAND 10/93-12/93

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	2	0.1	0	0.0	0	0.0	2	0.1
NNE	0	0.0	0	0.0	1	0.0	3	0.1	2	0.1	0	0.0	0	0.0	6	0.3
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	2	0.1	1	0.0	0	0.0	0	0.0	3	0.1
E	0	0.0	1	0.0	0	0.0	3	0.1	6	0.3	0	0.0	0	0.0	10	0.5
ESE	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	1	0.0
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	1	0.0	0	0.0	0	0.0	1	0.0	0	0.0	2	0.1
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	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SW	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	1	0.0
WSW	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	1	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	1	0.0	0	0.0	0	0.0	0	0.0	1	0.0
NW	0	0.0	0	0.0	3	0.1	1	0.0	0	0.0	0	0.0	0	0.0	4	0.2
NNW	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0
	0	0.0	1	0.0	7	0.3	12	0.6	12	0.6	1	0.0	0	0.0	33	1.6

MEAN WIND SPEED: 10.9
MISSING: 6

ARTIFICIAL ISLAND 10/93-12/93

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	2	0.1	17	0.8	36	1.7	50	2.4	25	1.2	5	0.2	135	6.5
NNE	0	0.0	2	0.1	7	0.3	55	2.6	44	2.1	30	1.4	7	0.3	145	7.0
NE	0	0.0	0	0.0	21	1.0	41	2.0	56	2.7	32	1.5	0	0.0	150	7.2
ENE	0	0.0	1	0.0	15	0.7	33	1.6	45	2.2	10	0.5	0	0.0	104	5.0
E	0	0.0	6	0.3	16	0.8	31	1.5	13	0.6	1	0.0	0	0.0	67	3.2
ESE	0	0.0	3	0.1	5	0.2	14	0.7	6	0.3	1	0.0	9	0.4	38	1.8
SE	0	0.0	3	0.1	6	0.3	18	0.9	21	1.0	9	0.4	11	0.5	68	3.3
SSE	0	0.0	2	0.1	6	0.3	34	1.6	29	1.4	18	0.9	7	0.3	96	4.6
S	0	0.0	1	0.0	11	0.5	19	0.9	35	1.7	36	1.7	2	0.1	104	5.0
SSW	0	0.0	5	0.2	16	0.8	27	1.3	76	3.7	28	1.3	1	0.0	153	7.4
SW	0	0.0	10	0.5	18	0.9	62	3.0	57	2.7	6	0.3	7	0.3	160	7.7
WSW	0	0.0	6	0.3	11	0.5	45	2.2	44	2.1	21	1.0	1	0.0	128	6.2
W	0	0.0	7	0.3	19	0.9	34	1.6	65	3.1	41	2.0	26	1.3	192	9.2
WNW	0	0.0	5	0.2	12	0.6	24	1.2	28	1.3	17	0.8	18	0.9	104	5.0
NW	0	0.0	6	0.3	34	1.6	31	1.5	92	4.4	48	2.3	12	0.6	223	10.7
NNW	0	0.0	4	0.2	24	1.2	38	1.8	67	3.2	39	1.9	41	2.0	213	10.2
	0	0.0	63	3.0	238	11.4	542	26.1	728	35.0	362	17.4	147	7.1	2080	100.0

MISSING HOURS: 128

MEAN WIND SPEED: 14.5

ARTIFICIAL ISLAND 10/93-12/93

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	2	0.1	17	0.8	37	1.8	50	2.4	25	1.2	5	0.2	136	6.5
NNE	0	0.0	2	0.1	7	0.3	55	2.6	44	2.1	30	1.4	7	0.3	145	7.0
NE	0	0.0	0	0.0	21	1.0	41	2.0	56	2.7	32	1.5	0	0.0	150	7.2
ENE	0	0.0	1	0.0	15	0.7	33	1.6	45	2.2	10	0.5	0	0.0	104	5.0
E	0	0.0	6	0.3	16	0.8	31	1.5	13	0.6	1	0.0	0	0.0	67	3.2
ESE	0	0.0	3	0.1	5	0.2	14	0.7	6	0.3	1	0.0	9	0.4	38	1.8
SE	0	0.0	3	0.1	6	0.3	18	0.9	21	1.0	9	0.4	11	0.5	68	3.3
SSE	0	0.0	2	0.1	6	0.3	34	1.6	29	1.4	18	0.9	7	0.3	96	4.6
S	0	0.0	1	0.0	11	0.5	19	0.9	35	1.7	36	1.7	2	0.1	104	5.0
SSW	0	0.0	5	0.2	16	0.8	27	1.3	76	3.7	28	1.3	1	0.0	153	7.4
SW	0	0.0	10	0.5	18	0.9	62	3.0	57	2.7	6	0.3	7	0.3	160	7.7
WSW	0	0.0	6	0.3	11	0.5	45	2.2	44	2.1	21	1.0	1	0.0	128	6.2
W	0	0.0	7	0.3	19	0.9	34	1.6	65	3.1	41	2.0	26	1.2	192	9.2
WNW	0	0.0	5	0.2	12	0.6	24	1.2	28	1.3	17	0.8	18	0.9	104	5.0
NW	0	0.0	6	0.3	34	1.6	31	1.5	92	4.4	48	2.3	12	0.6	223	10.7
NNW	0	0.0	4	0.2	24	1.2	38	1.8	67	3.2	39	1.9	41	2.0	213	10.2
	0	0.0	63	3.0	238	11.4	543	26.1	728	35.0	362	17.4	147	7.1	2081	100.0

MISSING HOURS: 127

MEAN WIND SPEED: 14.5

AMENDMENT TO RERR 15

PART B. GASEOUS EFFLUENTS

See Summary Tables 1A through 1C.

PART C. LIQUID EFFLUENTS

See Summary Tables 2A through 2B.

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 the "maximum hypothetical individual" in the population from liquid releases are primarily from the seafood ingestion pathway. Calculated doses are as shown below.

Total body dose : 8.54E-02 mrem

Highest organ dose (LIVER): 1.93E-01 mrem

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

Total population dose: 9.80E-01 person-rem

Average population dose: 1.64E-04 mrem/person

HOPE CREEK GENERATING STATION

TABLE 2A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JANUARY - JUNE 1993

LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

	Units	1st Quarter	2nd Quarter	Est. Total Error %
Fission and activation products				
1. Total release (not including tritium, gases, alpha)	Ci	6.31E-02	1.21E-01	25
2. Average diluted concentration during release period.	µCi/mL	8.94E-08	1.41E-07	
3. Percent of technical specification limit (T.S. 3.11.1.2.(a))	%	2.53E+00	3.23E+00	
B. Tritium				
1. Total release	Ci	1.37E+01	1.27E+01	25
2. Average diluted concentration during release period	µCi/mL	1.95E-05	1.47E-05	
3. Percent of technical specification limit (T.S. 3.11.1.1)	%	6.50E-01	4.90E-01	
C. Dissolved and entrained noble gases				
1. Total release	Ci	2.32E-03	2.54E-03	25
2. Average diluted concentration during release period.	µCi/mL	3.?8E-09	2.94E-09	
3. Percent of technical specification limit (T.S. 3.11.1.1)	%	1.64E-03	1.47E-03	
D. Gross alpha activity				
1. Total release	Ci	0.00E+00	0.00E+00	25
E. Volume of waste release (prior to dilution - Batch Release)	liters	3.90E+06	3.65E+06	25
F. Volume of dilution water used during entire period	liters	1.17E+10	1.55E+10	25

HOPE CREEK GENERATING STATION

TABLE 2B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JANUARY - JUNE 1993

LIQUID EFFLUENTS

		CONTINUOUS MODE		BATCH MODE	
Nuclides Released	Unit	1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
Niobium-97	Ci	0.00E+00	0.00E+00	0.00E+00	3.50E-07
Chromium-51	Ci	0.00E+00	0.00E+00	2.65E-02	4.92E-02
Manganese-54	Ci	0.00E+00	0.00E+00	1.19E-02	1.90E-02
Iron-55	Ci	0.00E+00	0.00E+00	4.02E-03	1.86E-02
Iron-59	Ci	0.00E+00	0.00E+00	5.33E-04	1.51E-03
Cobalt-58	Ci	0.00E+00	0.00E+00	3.46E-05	2.22E-04
Cobalt-60	Ci	0.00E+00	0.00E+00	2.69E-03	3.32E-03
Zinc-65	Ci	0.00E+00	0.00E+00	1.65E-02	2.81E-02
Silver-110m	Ci	0.00E+00	0.00E+00	4.90E-04	3.55E-04
Sodium-24	Ci	0.00E+00	0.00E+00	0.00E+00	1.15E-04
Technetium-99m	Ci	0.00E+00	0.00E+00	4.37E-04	4.90E-04
TOTALS	Ci	0.00E+00	0.00E+00	6.31E-02	1.21E-01
Tritium	Ci	0.00E+00	0.00E+00	1.37E+01	1.27E+01
Xenon-133	Ci	0.00E+00	0.00E+00	1.01E-04	2.20E-04
Xenon-135	Ci	0.00E+00	0.00E+00	2.21E-03	2.32E-03
TOTALS	Ci	0.00E+00	0.00E+00	1.37E+01	1.27E+01

HOPE CREEK ODCM

REVISION 13

REVISION 13 OF THE HOPE CREEK OFFSITE DOSE CALCULATION MANUAL

Attached is a breakdown of the revisions made to the Hope Creek Generating Station Offsite Dose Calculation Manual (ODCM). The revision was made to correct previous typographical errors and to update information contained in the ODCM.

Change #1 ENVIRONMENTAL SAMPLING LOCATIONS

Appendix E Page E-3,E-4,E-5

PAGE	LOCATION	CHANGE	COMMENTS
E-3	15D1	New Location (TLD)	Added new TLD location (Delaware)
E-3	3E1	Added "Farm"	Typographical Error
E-3	2F4	Added "Farm"	Typographical Error
E-4	4F2	New Location (TLD)	Added new TLD location (New Jersey)
E-5	2G1	New Location (Vegetable)	Added location to REMP for vegetable samples

OFFSITE DOSE CALCULATION MANUAL

FOR

PUBLIC SERVICE ELECTRIC AND GAS COMPANY

HOPE CREEK GENERATING STATION

Revision 13

December 1993

Approval:

SORC Chairman: _____ Date: 12/29/93 Mtg.# 93-066

TABLE E-1 (Cont'd)

STATION CODE	STATION LOCATION	SAMPLE TYPES
11D1	3.5 mi. SW of vent	GAM
14D1	3.4 mi. WNW of vent; Bay View, Delaware	IDM
15D1	3.8 mi. NW of vent; Augustine Beach, Del.	IDM
2E1	4.4 mi. NNE of vent; local farm	IDM
3E1	4.1 mi. NE of vent; local farm	FPB, FPV, GAM, IDM, VGT, WWA
3E3	5.6 mi. NE of vent; local farm	FPV
7E1	4.5 mi. SE of vent; 1 mi. W of Mad Horse Creek	ESF, ESS, SWA
9E1	5.0 mi. SW of vent	IDM
11E2	5.0 mi. SW of vent	IDM
12E1	4.4 mi. WSW of vent; Thomas Landing	IDM
13E1	4.2 mi. W of vent; Diehl House Lab	IDM
16E1	4.1 mi. NNW of vent; Port Penn	AIO, APT, IDM SOL
1F1	5.8 mi. N of vent; Fort Elfsborg	AIO, APT, IDM SOL
1F2	7.1 mi. N of vent; midpoint of Delaware	SWA
2F2	8.7mi. NNE of vent; Salem Substation	AIO, APT, IDM, RWA
2F3	8.0 mi. NNE of vent; Salem Water Co.	PWR,PWT
2F4	6.3 mi. NNE of vent; local farm	FPV,FPL,SOL
2F5	7.5 mi. NNE of vent; Salem High School	IDM

TABLE E-1 (Cont'd)

STATION CODE	STATION LOCATION	SAMPLE TYPES
2F6	7.3 mi. NNE of vent; Southern Training Center	IDM
2F7	5.7 mi. NNE of vent; local farm	MLK,VGT,SOL
3F2	5.1 mi. NE of vent; Hancocks Bridge Municipal Building	IDM
3F3	8.6 mi. NE of vent; Quinton Township School	IDM
4F2	6.0 mi. ENE of vent; LAC Township	IDM
5F1	6.5 mi. E of vent	SOL,IDM
5F3	6.5 mi. E of vent; local farm	FPL
6F1	6.4 mi. ESE of vent; Stow Neck Road	IDM
7F2	9.1 mi. SE of vent; Bayside, NJ	IDM
10F2	5.8 mi. SSW of vent	IDM
11F1	6.2 mi. SW of vent; Taylor's Bridge Delaware	IDM
11F3	5.3 mi. SW of vent; Townsend, DE	MLK,VGT,SOL
12F1	9.4 mi. WSW of vent; Townsend Elem. School	IDM
13F2	6.5 mi. W of vent; Odessa, DE	IDM
13F3	9.3 mi. W of vent; Redding Middle School, Middletown, DE	IDM
13F4	9.8 mi. W of vent; Middletown, DE	IDM
14F2	6.6 mi. WNW of vent; Boyds Corner	IDM
14F3	5.4 mi. WNW of vent; local farm	FPV
14F4	7.6 mi. WNW of vent; local farm	MLK,SOL,VGT
15F3	5.4 mi. NW of vent	IDM

TABLE E-1 (Cont'd)

STATION CODE	STATION LOCATION	SAMPLE TYPES
16F1	6.9 mi. NNW of vent; C&D Canal	ESS, SWA
16F2	8.1 mi. NNW of vent; Delaware City Public School	IDM
1G1	10.3 mi. N of vent; local farm	FPV
1G3	19 mi. N of vent; Wilmington, DE	IDM
2G1	12 mi. NNE of vent; Wilmington, DE	FPV
2G2	13.5 mi. NNE of vent; local farm	FPV
3G1	17 mi. NE of vent; local farm	IDM, MLK, VGT SOL
10G1	12 mi. SSW of vent; Smyrna, DE	IDM
16G1	15 mi. NNW of vent; Greater Wilmington Airport	IDM
3H1	32 mi. NE of vent; National Park, NJ	IDM
3H3	110 mi. NE of vent; Research and Testing Laboratory	AIO, APT, IDM
3H5	25 mi. NE of vent; local farm	FPL, FPV