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Electric and Gas
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NLR-N91138

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Gentlemen:

RADIOACTIVE EFFLUENT RELEASE REPORT - 11
HOPE CREEK GENERATING STATION
DOCKET NOS. ~~50-272~~ AND ~~50-311~~
50-354

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-11. This report summarizes liquid and gaseous releases and solid waste shipments from the Hope Creek Generating Station for the period January 1 through June 30, 1991.

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

Sincerely,

Thomas M. Greening
for Stanley LaBruna

Attachment

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RERR REPORT only

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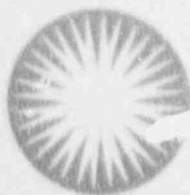
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HOPE CREEK GENERATING STATION
SEMIANNUAL RADIOACTIVE
EFFLUENT RELEASE REPORT
HCGS RERR-11

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

SEPTEMBER, 1991



PSEG

The Energy People

HOPE CREEK GENERATING STATION
RADIOACTIVE EFFLUENT RELEASE REPORT
JANUARY - JUNE 1991

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HOPE CREEK GENERATING STATION
RADIOACTIVE EFFLUENT RELEASE REPORT
JANUARY - JUNE 1991

INTRODUCTION

This report, HCGS-RERR-11, 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 January 1, 1991 to June 30, 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 2,877,886 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 second 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 last half of 1990 (refer to RERR-10) have been completed; amended pages to RERR-10 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 mrem/yr to the total body and less than or equal to 3000 mrem/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 mrem/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 mrem to any organ and,

During any calendar year: Less than or equal to 15 mrem 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 as follows:

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

During any calendar year: Less than or equal to 3 mrem to the total body, and less than or equal to 10 mrem 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 mrem to the total body or any organ (except the thyroid, which shall be limited to less than or equal to 75 mrem).

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 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 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.

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-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: $9.25E-02$ mrem

Highest organ dose: $2.47E-01$ 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: $3.68E-05$ 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

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:

0.494 mrem total body

1.46 mrem organ (GI-LLI)

0.247 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 lunch vendors, landscapers, deliverymen
- * 10 hours per week on site
- * dose due to airborne pathway (inhalation) and noble gases
- * persons are located about 1/4 mile west of plant discharge points (parking lots)
- * occupancy coincides with batch gaseous discharges

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

3.0E-04 mrem total body

1.4E-07 mrem organ (Lung, particulate only)

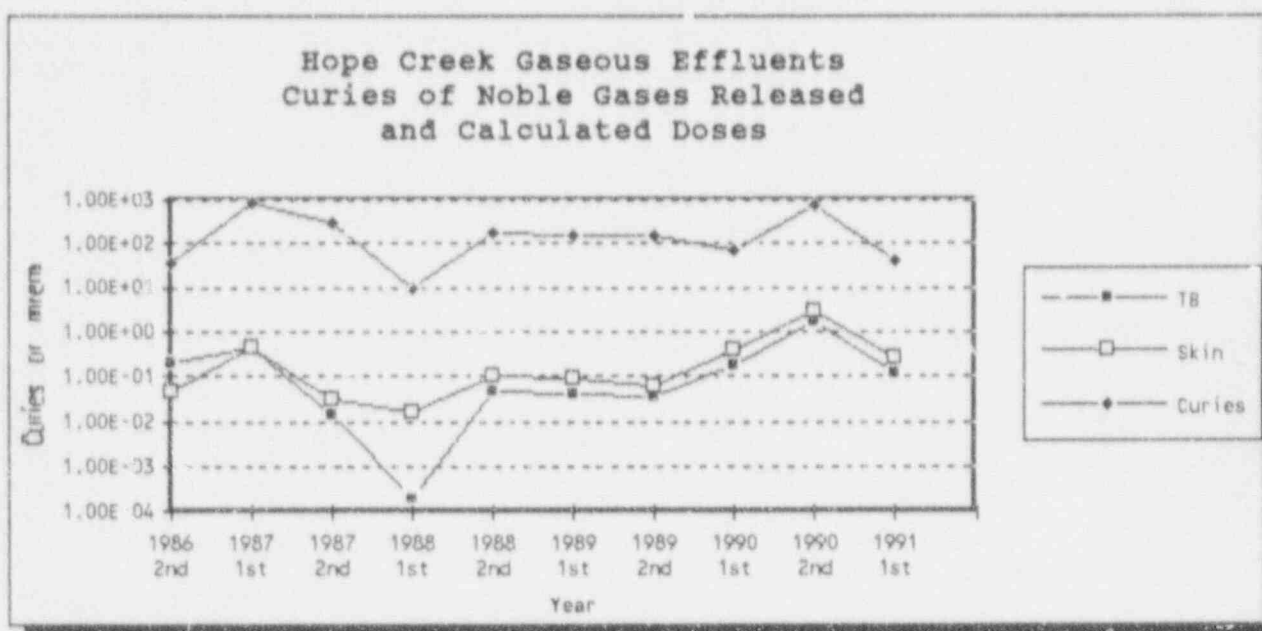
Assessment

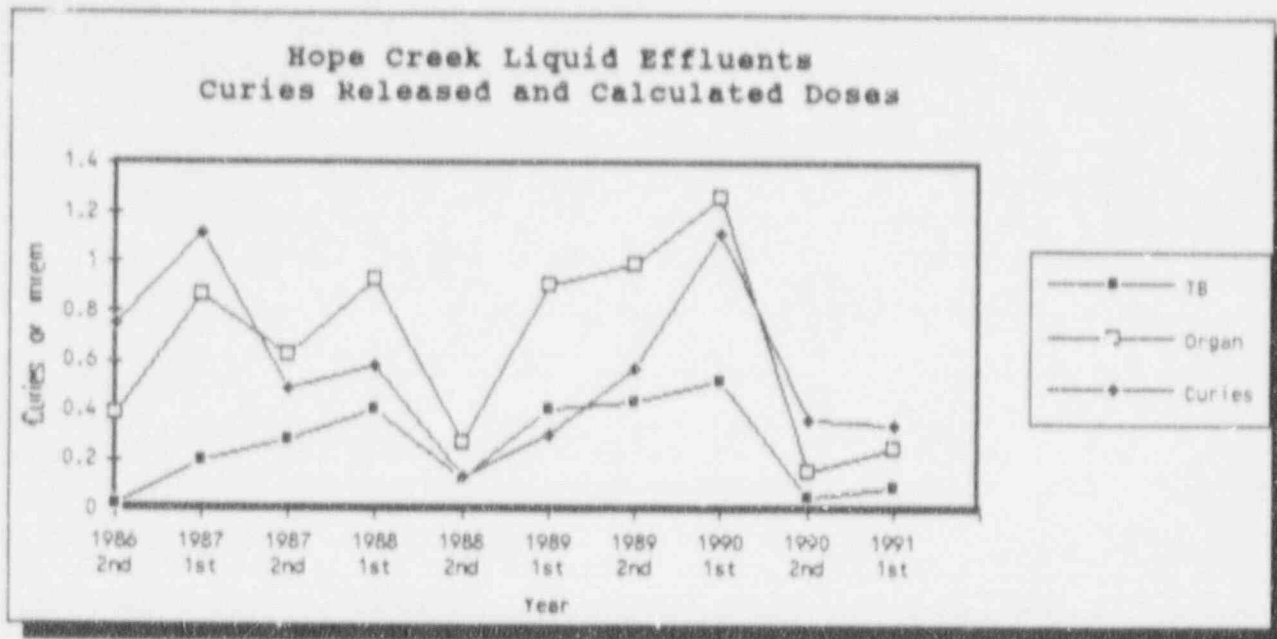
During the report period, Hope Creek gaseous effluents returned to levels which are one of the lowest of United States BWRs, with an average release rate of 5.8 microcuries per second, characteristic of a plant with no fuel cladding defects. During the previous report period, (July-Dec 1990), gaseous effluents were slightly elevated to an average release rate of 32 microcuries per second, due to a single fuel pin cladding defect. The defective fuel element was identified and replaced during the next refueling outage (Dec.1990 - Feb.1991).

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-133.

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 first and second 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 one change to the environmental monitoring sampling locations. Sampling station 14F1, a local farm 5.5 miles WNW has been replaced by station 14F4, a local farm 7.8 miles WNW. This farm provides milk and vegetable samples. The HCGS ODCM will be changed during the next reporting period.

HOPE CREEK GENERATING STATION

TABLE 1A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JANUARY - JUNE 1991

GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

	Units	1st Quarter	2nd Quarter	Est. Total Error %
A. Fission and Activation Gases				
1. Total release	Ci	1.58E+01	2.84E+01	25
2. Average release rate for period	μCi/sec	2.01E+00	3.61E+00	
3. Percent of technical specification limit (T.S. 3.11.2.2(a))	%	2.16E-01	3.88E-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))	%	8.97E-06	9.46E-07	
C. Particulates				
1. Particulates with half-lives >8 days	Ci	5.30E-05	0.00E+00	25
2. Average release rate for period	μCi/sec	6.81E-06	0.00E+00	
3. Percent of technical specification limit (2) (T.S. 3.11.2.3(a))	%	8.97E-06	9.46E-07	
4. Gross alpha	Ci	0.00E+00	0.00E+00	
D. Tritium				
1. Total Release	Ci	1.03E+01	3.72E+00	25
2. Average release rate for period	μCi/sec	1.31E+00	4.74E-01	
3. Percent of technical specification limit (2) (T.S. 3.11.2.3(a))	%	8.97E-06	9.46E-07	

(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
 JANUARY - JUNE 1991
 GASEOUS EFFLUENTS-GROUND LEVEL RELEASES

		CONTINUOUS MODE		BATCH MODE	
Nuclides Released	Unit	1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
1. Fission Gases					
Krypton-83m	Ci	1.58E-01	2.84E-01	0.00E+00	0.00E+00
Krypton-85m	Ci	1.58E-01	2.84E-01	0.00E+00	0.00E+00
Krypton-87	Ci	6.32E-01	1.14E+00	0.00E+00	0.00E+00
Krypton-88	Ci	6.32E-01	1.14E+00	0.00E+00	0.00E+00
Krypton-89	Ci	4.27E+00	7.67E+00	0.00E+00	0.00E+00
Xenon-133	Ci	3.16E-01	5.68E-01	0.00E+00	0.00E+00
Xenon-135	Ci	7.90E-01	1.42E+00	0.00E+00	0.00E+00
Xenon-135m	Ci	9.48E-01	1.70E+00	0.00E+00	0.00E+00
Xenon-137	Ci	4.90E+00	8.80E+00	0.00E+00	0.00E+00
Xenon-138	Ci	3.00E+00	5.40E+00	0.00E+00	0.00E+00
TOTALS	Ci	1.58E+01	2.84E+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	5.30E-05	0.00E+00	0.00E+00	0.00E+00
TOTALS	Ci	5.30E-05	0.00E+00	0.00E+00	0.00E+00

HOPE CREEK GENERATING STATION

TABLE 1C

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

JANUARY - JUNE 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
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	6.14E-02	25
2. Average diluted concentration during period	µCi/mL	1.36E-07	2.94E-08	
3. Percent of technical specification limit (T.S. 3.11.1.2.(a))	%	3.60E+00	2.57E+00	
B. Tritium				
1. Total release	Ci	1.01E+00	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-03	6.30E-04	
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

Nuclides Released	Unit	CONTINUOUS MODE		BATCH MODE	
		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	0.00E+00
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	6.14E-02
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

HOPE CREEK GENERATING STATION

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JANUARY - JUNE 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	7.91E+01 2.34E+03	25
b. Dry compressible waste, contaminated equipment.	m3 Ci	2.67E+01 5.13E+00	25
c. Irradiated components, control rods	m3 Ci	0.00E+00 0.00E+00	25
d. Others (described) Oil	m3 Ci	3.26E+01 1.00E-03	25

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

	(%)	RESINS (Ci)	(%)	DAW (Ci)	(%)	OIL (Ci)
Chromium-51	1.4	3.27E+01	1.4	7.16E-02	0.0	0.00E+00
Iron-55	17.9	4.18E+02	17.9	9.19E-01	79.7	7.97E-04
Iron-59	0.1	3.27E+00	0.1	7.16E-03	1.4	1.35E-05
Manganese-54	2.0	4.67E+01	2.0	1.03E-01	0.0	0.00E+00
Cobalt-58	0.1	3.50E+00	0.1	5.13E-03	0.0	0.00E+00
Cobalt-60	1.3	3.04E+01	1.3	6.65E-02	2.1	2.10E-05
Nickel-63	0.1	2.34E+00	0.1	5.13E-02	0.3	2.60E-06
Zinc-65	76.8	1.79E+03	76.8	3.94E+00	8.3	8.30E-05
Technecium-99	0.0	0.00E+00	0.0	0.00E+00	0.3	3.00E-06
Silver-110m	0.1	2.34E+00	0.1	5.13E-03	0.0	0.00E+00
Iodine-129	0.0	0.00E+00	0.0	0.00E+00	0.3	3.00E-06
Cesium-137	0.0	0.00E+00	0.0	0.00E+00	0.1	1.00E-06
Cerium-144	0.0	0.00E+00	0.0	0.00E+00	0.2	2.00E-06

(1) Volumes are measured, activities are estimated

HOPE CREEK GENERATING STATION

TABLE 3
(CONT'D)

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT JANUARY - JUNE 1991 SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination	Type of Containers
25	Truck	Barnwell, SC	HIC and 17C drums
10	Truck	Oak Ridge, TN	Strong, tight containers
2	Truck	Oak Ridge, TN	17C 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
JANUARY - JUNE 1991
SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED
IN A BATCH MODE

BATCH RELEASES ONLY

1. Dates: January 1 - March 31, 1991
2. Type of release: Gas
3. Number of releases during the 1st Quarter: 1
4. Total time duration for all releases of type listed above:
168 hours
5. Maximum duration for release of type listed above:
168 hours
6. Average duration for release of type listed above:
168 hours
7. Minimum duration for release of type listed above:
168 hours
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
JANUARY - JUNE 1991
SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED
IN A BATCH MODE

I. BACH RELEASES ONLY

1. Dates: April 1 - June 30, 1991
2. Type of release: Gas
3. Number of releases during the 2nd Quarter: 1
4. Total time duration for all releases of type listed above:
180.9 hours
5. Maximum duration for release of type listed above:
180.9 hours
6. Average duration for release of type listed above:
180.9 hours
7. Minimum duration for release of type listed above:
180.9 hours
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
JANUARY - JUNE 1991
SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED
IN A BATCH MODE

BATCH RELEASES ONLY

1. Dates: January 1 - March 31, 1991
2. Type of release: Liquid
3. Number of releases during the 1st Quarter: 100
4. Total time duration for all releases of type listed above:
396 hours
5. Maximum duration for release of type listed above:
12.8 hours
6. Average duration for release of type listed above:
3.96 hours
7. Minimum duration for release of type listed above:
0.48 hours
8. Average stream flow (dilution flow) during the period of
release: 22913 gpm

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

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

BATCH RELEASES ONLY

1. Dates: April 1 - June 30, 1991
2. Type of release: Liquid
3. Number of releases during the 2nd Quarter: 83
4. Total time duration for all releases of type listed above:
328 hours
5. Maximum duration for release of type listed above:
14.0 hours
6. Average duration for release of type listed above:
3.95 hours
7. Minimum duration for release of type listed above:
1.08 hours
8. Average stream flow (dilution flow) during the period of
release: 28210 gpm

ARTIFICIAL ISLAND 1/91- 3/91 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)																
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	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	0	0.0	2	0.1
NNE	0	0.0	0	0.0	0	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	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	1	0.0	0	0.0	0	0.0	1	0.0
SSE	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	3	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	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	0.1	0	0.0	0	0.0	0	0.0	2	0.1
W	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.1	0	0.0	2	0.1
WNW	0	0.0	0	0.0	0	0.0	0	0.0	3	0.1	2	0.1	0	0.0	5	0.2
W	0	0.0	0	0.0	0	0.0	0	0.0	11	0.5	3	0.1	5	0.2	19	0.9
WNW	0	0.0	0	0.0	0	0.0	0	0.0	3	0.1	1	0.0	1	0.0	5	0.2

0	0.0	0	0.0	0	0.2	21	1.0	9	0.4	6	0.3	40	1.9
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MEAN WIND SPEED: 18.1
 MISSING: 0

ARTIFICIAL ISLAND 1/91- 3/91

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 B

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
N	0	0	0	1	2	1	0	4
NNE	0	0	0	1	0	0	0	1
NNE	0	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0
ESE	0	0	1	0	0	0	0	1
SE	0	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0	0
SSW	0	0	0	0	0	2	0	2
SW	0	0	1	0	0	1	0	2
WSW	0	0	3	1	1	0	0	5
W	0	0	0	0	2	6	0	8
WNW	0	0	1	2	1	3	5	12
NW	0	0	0	3	15	1	5	24
NNW	0	0	0	5	4	1	1	11

MEAN WIND SPEED: 17.0

MISSING: 5

Table 5

Page 2 of 9

ARTIFICIAL ISLAND 1/91- 3/91 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

DIRECTION	WIND SPEED GROUPS (MPH)										SUM PERCENT
	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			
N	0	0.0	0	0.0	1	0.0	0	0.0	0	3	0.1
NNE	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
ENE	0	0.0	1	0.0	0	0.0	0	0.0	0	1	0.0
E	0	0.0	1	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
SE	0	0.0	1	0.0	2	0.1	0	0.0	0	6	0.3
SSE	0	0.0	1	0.0	2	0.1	0	0.0	0	5	0.2
S	0	0.0	0	0.0	1	0.0	0	0.0	0	1	0.0
SSW	0	0.0	1	0.0	3	0.1	1	0.0	0	6	0.3
SW	0	0.0	0	0.0	0	0.0	0	0.0	0	1	0.0
WSW	0	0.0	1	0.0	1	0.0	0	0.0	0	3	0.1
W	0	0.0	0	0.0	2	0.1	5	0.2	0	7	0.3
WNW	0	0.0	0	0.0	0	0.0	2	0.1	5	9	0.4
NW	0	0.0	0	0.0	18	0.9	4	0.2	0	28	1.3
NNW	0	0.0	0	0.0	7	0.3	2	0.1	1	18	0.9
	0	0.0	1	0.0	37	1.8	14	0.7	0.3	90	4.3

MEAN WIND SPEED: 14.8
 MISSING: 1

ARTIFICIAL ISLAND 1/91- 3/91

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 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	6	0.3	12	0.6	26	1.2	2	0.1	1	0.0	50	2.4
NNE	0	0.0	2	0.1	5	0.2	15	0.7	14	0.7	4	0.2	0	0.0	40	1.9
NE	0	0.0	1	0.0	2	0.1	9	0.4	17	0.8	15	0.7	0	0.0	44	2.1
ENE	0	0.0	0	0.0	6	0.3	7	0.3	12	0.6	4	0.2	0	0.0	29	1.4
E	0	0.0	1	0.0	5	0.2	10	0.5	5	0.2	0	0.0	0	0.0	21	1.0
ESE	0	0.0	1	0.0	5	0.2	2	0.1	0	0.0	0	0.0	0	0.0	8	0.4
SE	0	0.0	2	0.1	2	0.1	4	0.2	7	0.3	1	0.0	2	0.1	18	0.9
SSE	0	0.0	1	0.0	3	0.1	5	0.2	6	0.3	8	0.4	3	0.1	26	1.2
S	0	0.0	2	0.1	3	0.1	6	0.3	19	0.9	2	0.1	0	0.0	32	1.5
SSW	0	0.0	1	0.0	9	0.4	7	0.3	7	0.3	1	0.0	0	0.0	25	1.2
SW	0	0.0	0	0.0	1	0.0	5	0.2	12	0.6	1	0.0	0	0.0	19	0.9
WSW	0	0.0	1	0.0	2	0.1	6	0.3	7	0.3	2	0.1	3	0.1	21	1.0
W	0	0.0	0	0.0	2	0.1	5	0.2	16	0.8	13	0.6	8	0.4	44	2.1
WNW	0	0.0	0	0.0	5	0.2	10	0.5	22	1.1	18	0.9	31	1.5	86	4.1
NW	0	0.0	1	0.0	6	0.3	13	0.6	31	1.5	16	0.8	14	0.7	81	3.9
NNW	0	0.0	1	0.0	10	0.5	21	1.0	26	1.2	21	1.0	10	0.5	89	4.2
	0	0.0	17	0.8	72	3.4	137	6.5	227	10.8	108	5.2	72	3.4	633	30.2

MEAN WIND SPEED: 15.1
MISSING: 17

ARTIFICIAL ISLAND 1/91- 3/91 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

DIRECTION	WIND SPEED GROUPS (MPH)										SUM PERCENT	SUM PERCENT	GE 24.6	SUM PERCENT	SUM PERCENT
	0.0-0.5	0.6-3.5	3.6-7.5	7.6-12.5	12.6-18.5	18.6-24.5	24.6-30.5	30.6-36.5	36.6-42.5	42.6-48.5					
N	0	0.0	2	0.1	8	0.4	14	0.7	30	1.4	1	0.0	0	0.0	55
NNE	0	0.0	0	0.0	8	0.4	14	0.7	18	0.9	9	0.4	0	0.0	49
NE	0	0.0	3	0.1	1	0.0	13	0.6	11	0.5	1	0.0	0	0.0	29
ENE	0	0.0	0	0.0	3	0.1	10	0.5	4	0.2	1	0.0	0	0.0	18
E	0	0.0	3	0.1	5	0.2	10	0.5	14	0.7	2	0.1	0	0.0	34
ESE	0	0.0	0	0.0	4	0.2	10	0.5	7	0.3	4	0.2	1	0.0	26
SE	0	0.0	0	0.0	3	0.1	6	0.3	16	0.8	8	0.4	6	0.3	39
SSE	0	0.0	2	0.1	5	0.2	12	0.6	15	0.7	9	0.4	7	0.3	50
S	0	0.0	2	0.1	6	0.3	10	0.5	13	0.6	5	0.2	0	0.0	36
SSW	0	0.0	1	0.0	4	0.2	16	0.8	18	0.9	3	0.1	0	0.0	42
S'W	0	0.0	1	0.0	8	0.4	18	0.9	16	0.8	3	0.1	4	0.2	50
WSW	0	0.0	1	0.0	1	0.0	7	0.3	20	1.0	8	0.4	5	0.2	42
W	0	0.0	4	0.2	10	0.5	10	0.5	21	1.0	12	0.6	5	0.2	62
WNW	0	0.0	1	0.0	9	0.4	24	1.1	31	1.5	11	0.5	3	0.1	70
NW	0	0.0	2	0.1	9	0.4	21	1.0	47	2.2	26	1.2	6	0.3	111
NNW	0	0.0	0	0.0	6	0.3	13	0.6	49	2.3	20	1.0	9	0.4	97
	0	0.0	22	1.1	90	4.3	208	9.9	330	15.8	123	5.9	46	2.2	819
															39.1

ARTIFICIAL ISLAND 1/91- 3/91 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)																
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	1	0.0	3	0.1	5	0.2	3	0.1	0	0.0	0	0.0	12	0.6
NNE	0	0.0	0	0.0	1	0.0	2	0.1	3	0.1	0	0.0	0	0.0	6	0.3
NE	0	0.0	1	0.0	2	0.1	5	0.2	2	0.1	0	0.0	0	0.0	10	0.5
ENE	0	0.0	2	0.1	3	0.1	0	0.0	0	0.0	0	0.0	0	0.0	5	0.2
E	0	0.0	1	0.0	3	0.1	4	0.2	6	0.3	1	0.0	0	0.0	15	0.7
ESE	0	0.0	0	0.0	4	0.2	5	0.2	5	0.2	0	0.0	1	0.0	15	0.7
SE	0	0.0	2	0.1	5	0.2	7	0.3	15	0.7	3	0.1	5	0.2	37	1.8
SSE	0	0.0	1	0.0	2	0.1	2	0.1	12	0.6	4	0.2	4	0.2	25	1.2
S	0	0.0	0	0.0	3	0.1	6	0.3	6	0.3	5	0.2	0	0.0	20	1.0
SSW	0	0.0	1	0.0	2	0.1	11	0.5	15	0.8	21	1.0	5	0.2	56	2.7
SW	0	0.0	0	0.0	3	0.1	6	0.3	17	0.8	5	0.2	8	0.4	39	1.9
WSW	0	0.0	1	0.0	4	0.2	3	0.1	3	0.1	7	0.3	0	0.0	18	0.9
W	0	0.0	1	0.0	2	0.1	1	0.0	1	0.0	1	0.0	0	0.0	6	0.3
WNW	0	0.0	0	0.0	2	0.1	3	0.1	5	0.2	0	0.0	0	0.0	10	0.5
NW	0	0.0	3	0.1	1	0.0	6	0.3	4	0.2	2	0.1	0	0.0	16	0.8
NNW	0	0.0	0	0.0	2	0.1	4	0.2	1	0.0	1	0.0	0	0.0	8	0.4
	0	0.0	14	0.7	42	2.0	70	3.3	99	4.7	50	2.4	23	1.1	298	14.2

MEAN WIND SPEED: 14.2
 MISSING: 3

ARTIFICIAL ISLAND 1/91- 3/91 JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
 BY ATMOSPHERIC STABILITY CLASS
 WIND: 300 FT
 LAPSE RATE: GT 4.0 DEG C/100M
 CLASS G
 C TA 1: (300-33FT)

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	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	1	0.0	3	0.1	1	0.0	0	0.0	0	0.0	0	0.0	5	0.2
NE	0	0.0	1	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	2	0.1
ENE	0	0.0	2	0.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1
E	0	0.0	2	0.1	0	0.0	0	0.0	3	0.1	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	0	0.0	1	0.0	0	0.0	1	0.0	0	0.0	2	0.1	4	0.2
SSE	0	0.0	0	0.0	0	0.0	3	0.1	4	0.2	8	0.4	10	0.5	25	1.1
S	0	0.0	1	0.0	2	0.1	4	0.2	9	0.4	5	0.2	2	0.1	23	1.1
SSW	0	0.0	1	0.0	1	0.0	6	0.3	7	0.3	5	0.2	0	0.0	20	1.0
SW	0	0.0	0	0.0	3	0.1	6	0.3	6	0.3	4	0.2	0	0.0	19	0.9
WSW	0	0.0	0	0.0	1	0.0	5	0.2	4	0.2	9	0.4	0	0.0	19	0.9
W	0	0.0	0	0.0	2	0.1	0	0.0	3	0.1	0	0.0	0	0.0	5	0.2
WNW	0	0.0	1	0.0	1	0.0	1	0.0	3	0.1	2	0.1	0	0.0	8	0.4
NW	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	1	0.0
NNW	0	0.0	1	0.0	2	0.1	0	0.0	0	0.0	0	0.0	0	0.0	3	0.1
	0	0.0	11	0.5	18	0.9	27	1.3	42	2.0	33	1.6	14	0.7	145	6.9

MEAN WIND SPEED: 14.6
 MISSING: 0

ARTIFICIAL ISLAND 1/91- 3/91

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		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	19	0.9	35	1.7	63	3.0	5	0.2	1	0.0	129	6.2
NNE	0	0.0	3	0.1	17	0.8	35	1.7	35	1.7	13	0.6	0	0.0	103	4.9
NE	0	0.0	6	0.3	5	0.2	27	1.3	31	1.5	16	0.8	0	0.0	85	4.1
ENE	0	0.0	4	0.2	13	0.6	17	0.8	16	0.8	5	0.2	0	0.0	55	2.6
E	0	0.0	7	0.3	14	0.7	24	1.1	28	1.3	3	0.1	0	0.0	76	3.6
ESE	0	0.0	2	0.1	14	0.7	17	0.8	12	0.6	4	0.2	2	0.1	51	2.4
SE	0	0.0	4	0.2	12	0.6	20	1.0	42	2.0	12	0.6	15	0.7	105	5.0
SSE	0	0.0	4	0.2	11	0.5	25	1.2	41	2.0	29	1.4	24	1.1	134	6.4
S	0	0.0	5	0.2	14	0.7	26	1.2	48	2.3	17	0.8	2	0.1	112	5.3
SSW	0	0.0	5	0.2	17	0.8	40	1.9	51	2.4	33	1.6	5	0.2	151	7.2
SW	0	0.0	1	0.0	16	0.8	36	1.7	51	2.4	14	0.7	12	0.6	130	6.2
WSW	0	0.0	3	0.1	12	0.6	25	1.2	36	1.7	26	1.2	8	0.4	110	5.3
W	0	0.0	5	0.2	16	0.8	16	0.8	45	2.1	39	1.9	13	0.6	134	6.4
WNW	0	0.0	2	0.1	18	0.9	42	2.0	65	3.1	38	1.8	44	2.1	209	10.0
NW	0	0.0	6	0.3	16	0.8	49	2.3	127	6.1	52	2.5	30	1.4	280	13.4
NNW	0	0.0	2	0.1	20	1.0	51	2.4	90	4.3	46	2.2	22	1.1	231	11.0
	0	0.0	65	3.1	234	11.2	485	23.2	781	37.3	352	16.8	178	8.5	2095	100.0

MISSING HOURS: 65

MEAN WIND SPEED: 14.7

ARTIFICIAL ISLAND 1/91- 3/91

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			
W	0	0.0	6	0.3	19	0.9	35	1.7	63	3.0	5	0.2	1	0.0	129	6.2
NNE	0	0.0	3	0.1	17	0.8	35	1.7	35	1.7	13	0.6	0	0.0	103	4.9
NE	0	0.0	6	0.3	5	0.2	27	1.3	31	1.5	16	0.8	0	0.0	85	4.1
ENE	0	0.0	4	0.2	13	0.6	17	0.8	16	0.8	5	0.2	0	0.0	55	2.6
E	0	0.0	7	0.3	14	0.7	24	1.1	28	1.3	3	0.1	0	0.0	76	3.6
ESE	0	0.0	2	0.1	14	0.7	17	0.8	12	0.6	4	0.2	2	0.1	51	2.4
SE	0	0.0	4	0.2	12	0.6	20	1.0	42	2.0	12	0.6	15	0.7	105	5.0
SSE	0	0.0	4	0.2	11	0.5	25	1.2	41	2.0	29	1.4	24	1.1	134	6.4
S	0	0.0	5	0.2	14	0.7	26	1.2	48	2.3	17	0.8	2	0.1	112	5.3
SSW	0	0.0	5	0.2	17	0.8	40	1.9	51	2.4	33	1.6	5	0.2	151	7.2
SW	0	0.0	1	0.0	16	0.8	36	1.7	51	2.4	14	0.7	12	0.6	130	6.2
WSW	0	0.0	3	0.1	12	0.6	25	1.2	36	1.7	26	1.2	8	0.4	110	5.2
W	0	0.0	5	0.2	16	0.8	16	0.8	45	2.1	39	1.9	13	0.6	134	6.4
WNW	0	0.0	2	0.1	18	0.9	42	2.0	65	3.1	38	1.8	44	2.1	209	10.0
NW	0	0.0	6	0.3	16	0.8	49	2.3	127	6.1	52	2.5	30	1.4	280	13.4
NNW	0	0.0	2	0.1	20	1.0	52	2.5	90	4.3	46	2.2	22	1.0	232	11.1
	0	0.0	65	3.1	234	11.2	486	23.2	781	37.3	352	16.8	178	8.5	2096	100.0

MISSING HOURS: 64

MEAN WIND SPEED: 14.7

ARTIFICIAL ISLAND 4/91- 6/91 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)											
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	
N	0	0	0	2	3	0	0	0.0	0	5	0.2
NNE	0	0	0	0	0	1	0	0.0	0	1	0.0
NRE	0	0	0	0	0	0	0	0.0	0	0	0.0
ENE	0	0	0	0	2	0	0	0.0	0	2	0.1
E	0	0	0	2	0	0	0	0.0	0	2	0.1
ESE	0	0	0	0	0	0	0	0.0	0	0	0.0
SE	0	0	1	0	0	0	0	0.0	0	1	0.0
SSE	0	0	0	5	1	1	0	0.0	0	7	0.3
S	0	0	1	1	2	0	0	0.0	0	4	0.2
SSW	0	0	3	0	0	0	0	0.0	0	3	0.1
SW	0	0	7	2	4	0	0	0.0	0	13	0.6
WSW	0	0	3	2	0	0	0	0.0	0	5	0.2
W	0	0	0	0	3	3	1	0.0	1	7	0.3
WNW	0	0	0	0	0	2	1	0.0	1	3	0.1
NW	0	0	0	0	3	5	0	0.0	0	8	0.4
NNW	0	0	1	1	0	2	0	0.0	0	4	0.2
	0	0	16	15	18	14	2	0.6	2	65	3.0

MEAN WIND SPEED: 13.5

MISSING: 0

ARTIFICIAL ISLAND 4/91- 6/91

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 B

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
N	0	0	1	3	9	1	0	14
NNE	0	0	1	5	0	0	0	6
NE	0	0	0	1	0	0	0	1
ENE	0	0	0	0	1	0	0	1
E	0	0	0	0	0	0	0	0
ESE	0	0	0	0	1	0	0	1
SE	0	0	0	2	2	0	0	4
SSE	0	0	5	3	3	0	0	11
S	0	0	2	2	0	0	0	4
SSW	0	0	3	1	0	0	0	4
SW	0	0	4	3	2	0	0	9
WSW	0	0	2	5	5	0	0	12
W	0	0	6	7	9	0	3	25
WNW	0	0	0	4	2	2	1	9
NW	0	0	2	0	3	3	0	8
NNW	0	0	2	3	4	1	1	11
	0	0	28	39	41	7	5	120
	0	0	1.3	1.8	1.9	0.3	0.2	5.5

MEAN WIND SPEED: 12.1

MISSING: 0

ARTIFICIAL ISLAND 4/91- 6/91

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASSLAPSE RATE: -1.6 TO -1.5 DEG C/100M
CLASS C

WIND: 300 FT

DELTA T: (300-33FT)

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	SUM	PERCENT
M	0	0.0	0	0.0	7	0.3	13	0.6	1	0.0	3	0.1	0	0.0	24	1.1
NNE	0	0.0	0	0.0	1	0.0	3	0.1	3	0.1	2	0.1	0	0.0	9	0.4
NE	0	0.0	0	0.0	3	0.1	3	0.1	1	0.0	1	0.0	0	0.0	8	0.4
ENE	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1	0	0.0	0	0.0	2	0.1
E	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	2	0.1
ESE	0	0.0	0	0.0	1	0.0	3	0.1	0	0.0	0	0.0	0	0.0	4	0.2
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	0	0.0	0	0.0	4	0.2	0	0.0	0	0.0	4	0.2
S	0	0.0	0	0.0	1	0.0	1	0.0	2	0.1	0	0.0	0	0.0	4	0.2
SSW	0	0.0	1	0.0	5	0.2	0	0.0	0	0.0	0	0.0	0	0.0	6	0.3
SW	0	0.0	0	0.0	4	0.2	2	0.1	3	0.1	0	0.0	0	0.0	9	0.4
WSW	0	0.0	0	0.0	1	0.0	6	0.3	1	0.0	0	0.0	0	0.0	8	0.4
W	0	0.0	0	0.0	3	0.1	9	0.4	15	0.7	4	0.2	0	0.0	31	1.4
WNW	0	0.0	1	0.0	7	0.3	4	0.2	5	0.2	0	0.0	2	0.1	19	0.9
NW	0	0.0	0	0.0	1	0.0	4	0.2	3	0.1	0	0.0	0	0.0	8	0.4
NNW	0	0.0	0	0.0	8	0.4	8	0.4	5	0.2	2	0.1	0	0.0	23	1.1

0 0.0 2 0.1 42 1.9 58 2.7 48 2.2 12 0.6 2 0.1 164 7.6

MEAN WIND SPEED: 11.3

MISSING: 0

ARTIFICIAL ISLAND 4/91- 6/91

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 D

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
N	0	1	8	10	4	4	0	27
NNE	0	1	11	11	3	3	0	29
NE	0	0	6	19	28	8	0	61
ENE	0	0	9	25	21	5	0	60
E	0	3	7	30	8	1	0	49
ESE	0	2	4	21	11	0	0	38
SE	0	2	10	8	10	3	4	37
SSE	0	2	11	8	19	19	6	65
S	0	6	12	14	19	2	0	53
SSW	0	1	8	13	10	0	0	32
SW	0	2	5	9	19	2	0	37
WSW	0	2	10	11	11	1	0	35
W	0	5	8	24	25	8	0	70
WNW	0	0	6	10	8	5	3	32
W	0	2	10	13	20	7	3	55
NNW	0	0	6	12	5	6	2	31

0	0.0	29	1.3	131	6.0	238	11.0	221	10.2	74	3.4	18	0.8	711	32.8
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MEAN WIND SPEED: 12.1

MISSING: 0

Table 6

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ARTIFICIAL ISLAND 4/91- 6/91

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)

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
N	0	0	3	12	15	11	1	42
NNE	0	0	8	11	13	10	0	44
NW	0	0	4	4	9	2	0	20
ESE	0	0	4	6	7	6	0	26
E	0	0	10	12	1	0	0	23
ESE	0	0	4	14	5	0	0	25
SE	0	0	6	10	11	2	4	33
SSE	0	0	4	13	16	12	8	54
S	0	0	3	16	8	2	0	31
SSW	0	0	6	18	30	6	0	61
SW	0	0	9	40	64	19	0	133
WSW	0	0	13	17	39	9	0	79
W	0	0	22	27	40	4	0	94
WNW	0	0	14	21	14	2	3	55
NW	0	0	13	13	29	3	0	59
NNW	0	0	3	14	16	8	0	42
	0	0	126	248	317	96	16	821
	0	0	5.8	11.4	14.6	4.4	0.7	37.9

MEAN WIND SPEED: 13.0

MISSING: 0

Table 6

Page 5 of 9

ARTIFICIAL ISLAND 4/91 - 6/91

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)

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
N	0	0	2	7	8	0	0	17
NNE	0	0	2	5	7	0	0	14
NE	0	0	1	0	6	0	0	7
ENE	0	0	3	1	0	1	0	5
E	0	0	2	2	0	0	0	4
ESE	0	2	2	1	0	0	0	5
SE	0	1	3	1	1	0	0	6
SSE	0	0	1	5	2	4	0	12
S	0	0	1	10	5	1	0	17
SSW	0	0	8	2	5	5	0	20
SW	0	1	4	5	26	5	0	44
WSW	0	0	3	14	13	7	0	57
W	0	1	7	2	16	1	0	27
WNW	0	0	0	3	4	0	0	7
NW	0	0	0	3	5	4	0	12
NNW	0	1	4	4	2	0	0	11
	0	6	43	65	100	31	0	245
	0.0	0.3	2.0	3.0	4.6	1.4	0.0	11.3

MEAN WIND SPEED: 12.6

MISSING: 0

Table 6

Page 6 of 9

ARTIFICIAL ISLAND 4/91- 6/91

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)

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
N	0	0	0	0	1	1	0	2
NNE	0	0	1	0	0	0	0	1
NE	0	0	0	0	1	0	0	1
ENE	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0	0
S	0	0	0	1	0	0	0	1
SSW	0	0	0	3	3	8	0	14
SW	0	0	2	3	0	4	0	9
WSW	0	0	0	2	0	2	0	4
W	0	0	0	2	0	2	0	4
WNW	0	0	0	0	1	1	0	2
NW	0	0	0	0	0	0	0	0
NNW	0	0	0	0	0	2	0	2
	0	0	3	11	6	20	0	40
	0.0	0.0	0.1	0.5	0.3	0.9	0.0	1.8

MEAN WIND SPEED: 16.0

MISSING: 0

Table 6

Page 7 of 9

ARTIFICIAL ISLAND 4/91- 6/91

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	21	1.0	47	2.2	41	1.9	20	0.9	1	0.0	131	6.0
NNE	0	0.0	3	0.1	24	1.1	35	1.6	26	1.2	16	0.7	0	0.0	104	4.8
NE	0	0.0	1	0.0	14	0.6	27	1.2	45	2.1	11	0.5	0	0.0	98	4.5
ENE	0	0.0	3	0.1	16	0.7	32	1.5	33	1.5	12	0.5	0	0.0	96	4.4
E	0	0.0	3	0.1	19	0.9	47	2.2	10	0.5	1	0.0	0	0.0	80	3.7
ESE	0	0.0	6	0.3	11	0.5	39	1.8	17	0.8	0	0.0	0	0.0	73	3.4
SE	0	0.0	3	0.1	20	0.9	22	1.0	26	1.2	5	0.2	8	0.4	84	3.9
SSE	0	0.0	3	0.1	21	1.0	34	1.6	45	2.1	36	1.7	14	0.6	153	7.1
S	0	0.0	8	0.4	20	0.9	45	2.1	36	1.7	5	0.2	0	0.0	114	5.3
SSW	0	0.0	3	0.1	33	1.5	37	1.7	48	2.2	19	0.9	0	0.0	140	6.5
SW	0	0.0	4	0.2	35	1.6	64	3.0	118	5.4	33	1.5	0	0.0	254	11.7
WSW	0	0.0	3	0.1	32	1.5	57	2.6	69	3.2	19	0.9	0	0.0	180	8.3
W	0	0.0	7	0.3	46	2.1	71	3.3	108	5.0	22	1.0	4	0.2	258	11.9
WNW	0	0.0	2	0.1	27	1.2	42	1.9	34	1.6	12	0.6	10	0.5	127	5.9
NW	0	0.0	3	0.1	26	1.2	33	1.5	63	2.9	22	1.0	3	0.1	150	6.9
NNW	0	0.0	2	0.1	24	1.1	42	1.9	32	1.5	21	1.0	3	0.1	124	5.7
	0	0.0	55	2.5	389	18.0	674	31.1	751	34.7	254	11.7	43	2.0	2166	100.0

MISSING HOURS: 18

MEAN WIND SPEED: 12.5

Table 6

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ARTIFICIAL ISLAND 4/91- 6/91

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	21	1.0	47	2.2	41	1.9	20	0.9	1	0.0	131	6.0
NNE	0	0.0	3	0.1	24	1.1	35	1.6	26	1.2	16	0.7	0	0.0	104	4.8
NE	0	0.0	1	0.0	14	0.6	27	1.2	45	2.1	11	0.5	0	0.0	98	4.5
ENE	0	0.0	3	0.1	16	0.7	32	1.5	33	1.5	12	0.5	0	0.0	96	4.4
E	0	0.0	3	0.1	19	0.9	47	2.2	10	0.5	1	0.0	0	0.0	80	3.7
ESE	0	0.0	6	0.3	11	0.5	39	1.8	17	0.8	0	0.0	0	0.0	73	3.3
SE	0	0.0	3	0.1	20	0.9	22	1.0	26	1.2	5	0.2	8	0.4	84	3.8
SSE	0	0.0	3	0.1	21	1.0	34	1.6	46	2.1	36	1.6	14	0.6	154	7.1
S	0	0.0	8	0.4	20	0.9	45	2.1	36	1.6	5	0.2	0	0.0	114	5.2
SSW	0	0.0	3	0.1	33	1.5	37	1.7	48	2.2	19	0.9	0	0.0	140	6.4
SW	0	0.0	4	0.2	35	1.6	66	3.0	119	5.4	33	1.5	0	0.0	257	11.8
WSW	0	0.0	3	0.1	33	1.5	58	2.7	70	3.2	19	0.9	0	0.0	183	8.4
W	0	0.0	7	0.3	50	2.3	74	3.4	110	5.0	22	1.0	4	0.2	267	12.2
WNW	0	0.0	2	0.1	27	1.2	43	2.0	34	1.6	12	0.5	10	0.5	128	5.9
NW	0	0.0	3	0.1	26	1.2	33	1.5	63	2.9	22	1.0	3	0.1	150	6.9
NNW	0	0.0	2	0.1	25	1.1	42	1.9	32	1.5	21	1.0	3	0.1	125	5.7
	0	0.0	55	2.5	395	18.1	681	31.2	756	34.6	254	11.6	43	2.0	2184	100.0

MISSING HOURS: 0

MEAN WIND SPEED: 12.5

AMENDMENT TO RERR 10

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. The total body dose to an individual was calculated to be $6.05\text{E-}02$ mrem. The calculated highest organ dose from liquid releases was $1.76\text{E-}01$ mrem to the liver. The calculated population total body dose was $9.70\text{E-}01$ person-rem. The calculated average total body dose to the population within fifty miles of the site was $1.62\text{E-}04$ mrem/person.

Air Pathways

The resulting total body and skin doses to an individual were calculated to be $1.63\text{E+}00$ mrem and $3.03\text{E+}00$ mrem respectively. The calculated highest organ dose due to radioiodines and particulates with at greater than eight day half-life was $1.20\text{E-}02$ mrem to the thyroid. The calculated population total body dose was $2.58\text{E+}00$ person-rem. The calculated average total body dose to the population within fifty miles of the site was $4.83\text{E-}04$ 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.

TLDs at onsite locations 2S-2 and 5S-1, which are 0.3 miles and 0.9 miles from the point of origin, averaged 4.9 and 4.2 mrad/month respectively. The values for stations 2S-2 and 5S-1 are within the statistical variation associated with the pre-operational program results. The pre-operational values for these locations are 3.7 mrad/month at 2S-2 and 4.2 mrad/month at 5S-1.

Assessment

Liquid effluents during the reporting period were substantially lower than previous periods(0.367 Curie versus 1.12 Curies for Jan.-June 1990) Calculated doses from liquid effluents are principally due to isotopes of iron and zinc.

Gaseous effluents during the reporting period were higher than other reporting periods due to the unplanned release described in Part A, Section 6 of this report, and a fuel cladding defect identified during the end-of-cycle refueling. The steady state release rate was 8.8 microcuries per second, for the third quarter of 1990, compared to 32 microcuries per second for the fourth quarter. These release rates are characteristic of a BWR with no fuel cladding defects, and with a single fuel pin cladding defect, respectively. Including the unplanned release, about 70 percent of the 759 Curies of fission gases released during the reporting period are estimated to be due to the identified fuel cladding defect.

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 % (1)
<hr/>				
A. Fission and activation products				
1. Total release (not including tritium, gases, alpha)	Ci	2.75E-01	9.18E-02	25
2. Average diluted concentration during period	μCi/ml	6.54E-07	6.20E-08	
3. Percent of technical specification limit (T.S. 3.11.1.2.(a))	%	5.16E+00	1.22E+00	
<hr/>				
B. Tritium				
1. Total release	Ci	7.24E-01	3.39E+00	25
2. Average diluted concentration during period	μCi/ml	5.02E-06	9.54E-06	
3. Percent of technical specification limit (T.S. 3.11.1.1)	%	5.02E-04	9.54E-04	
<hr/>				
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	1.88E-07	6.85E-09	
3. Percent of technical specification limit (T.S. 3.11.1.1)	%	1.88E-07	6.85E-07	
<hr/>				
D. Gross alpha activity				
1. Total release	Ci	0.00E+00	0.00E+00	
<hr/>				
E. Volume of waste release (prior to dilution - Batch Release)	liters	6.05E+05	1.95E+06	
<hr/>				
F. Volume of dilution water used during entire period	liters	4.20E+08	1.47E+09	

HOPE CREEK GENERATING STATION

TABLE 2B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JULY - DECEMBER 1990

LIQUID EFFLUENTS

Nuclides Released	Units	CONTINUOUS MODE		BATCH MODE	
		3rd Quarter	4th Quarter	3rd Quarter	4th Quarter
Sodium-24	Ci	0.00E+00	0.00E+00	5.87E-06	0.00E+00
Chromium-51	Ci	0.00E+00	0.00E+00	2.47E-03	1.96E-03
Manganese-54	Ci	0.00E+00	0.00E+00	5.44E-03	3.18E-03
Iron-55	Ci	0.00E+00	0.00E+00	2.50E-01	7.80E-02
Cobalt-58	Ci	0.00E+00	0.00E+00	5.22E-05	7.25E-05
Iron-59	Ci	0.00E+00	0.00E+00	1.50E-04	6.66E-04
Cobalt-60	Ci	0.00E+00	0.00E+00	1.62E-03	7.76E-04
Zinc-65	Ci	0.00E+00	0.00E+00	1.51E-02	7.01E-03
Silver-110m	Ci	0.00E+00	0.00E+00	3.66E-05	7.48E-05
Iodine-131	Ci	0.00E+00	0.00E+00	0.00E+00	6.73E-06
TOTALS	Ci	0.00E+00	0.00E+00	2.75E-01	9.18E-02
Tritium	Ci	0.00E+00	0.00E+00	7.24E-01	3.39E+00
Xenon-133	Ci	0.00E+00	0.00E+00	9.44E-05	2.24E-03
Xenon-135	Ci	0.00E+00	0.00E+00	1.77E-04	1.93E-04
TOTALS	Ci	0.00E+00	0.00E+00	7.24E-01	3.39E+00

AMENDMENT TO RERR-9

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. The total body dose to an individual was calculated to be $6.32\text{E-}01$ mrem. The calculated highest organ dose from liquid releases was $1.50\text{E+}00$ mrem to the liver. The calculated population total body dose was $7.69\text{E+}00$ person-rem. The calculated average total body dose to the population within fifty miles of the site was $1.29\text{E-}03$ mrem/person.

Air Pathways

The resulting total body and skin doses to an individual were calculated to be $1.88\text{E-}01$ mrem and $4.08\text{E-}01$ mrem respectively. The calculated highest organ dose due to radioiodines and particulates with at greater than eight day half-life was $6.82\text{E-}04$ mrem to the liver. The calculated population total body dose was $4.74\text{E-}01$ person-rem. The calculated average total body dose to the population within fifty miles of the site was $1.74\text{E-}05$ mrem/person.

HOPE CREEK GENERATING STATION
TABLE 2A
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JANUARY - JUNE 1990
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	7.66E-01	3.56E-01	25
2. Average diluted concentration during period	μCi/ml	1.22E-06	1.86E-06	
3. Percent of technical specification limit (T.S. 3.11.1.2.(a))	%	1.53E+01	3.06E+01	
B. Tritium				
1. Total release	Ci	4.50E+00	3.17E+00	25
2. Average diluted concentration during period	μCi/ml	7.12E-06	7.47E-06	
3. Percent of technical specification limit (T.S. 3.11.1.1)	%	2.30E-01	2.50E-01	
C. Dissolved and entrained noble gases				
1. Total release	Ci	6.34E-04	1.33E-04	25
2. Average diluted concentration during period	μCi/ml	1.01E-09	3.12E-10	
3. Percent of technical specification limit (T.S. 3.11.1.1)	%	5.06E-04	1.56E-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	3.45E+06	2.45E+06	
F. Volume of dilution water used during entire period	liters	6.27E+08	4.21E+08	

HOPE CREEK GENERATING STATION

TABLE 2B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
JANUARY - JUNE 1990

LIQUID EFFLUENTS

Nuclides Released	Unit	CONTINUOUS MODE		BATCH MODE	
		1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
Sodium-24	Ci	0.00E+00	0.00E+00	0.00E+00	1.47E-05
Chromium-51	Ci	0.00E+00	0.00E+00	1.49E-02	5.55E-02
Manganese-54	Ci	0.00E+00	0.00E+00	7.13E-02	7.79E-02
Iron-55	Ci	0.00E+00	0.00E+00	5.87E-01	4.90E-03
Cobalt-58	Ci	0.00E+00	0.00E+00	3.09E-03	4.85E-03
Iron-59	Ci	0.00E+00	0.00E+00	1.15E-02	1.75E-02
Cobalt-60	Ci	0.00E+00	0.00E+00	1.54E-02	1.87E-02
Zinc-65	Ci	0.00E+00	0.00E+00	6.18E-02	1.80E-01
Strontium-89	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Strontium-90	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Strontium-92	Ci	0.00E+00	0.00E+00	5.62E-05	5.01E-04
Technetium-99m	Ci	0.00E+00	0.00E+00	0.00E+00	3.36E-05
Silver-110m	Ci	0.00E+00	0.00E+00	1.64E-04	1.24E-03
Antimony-124	Ci	0.00E+00	0.00E+00	0.00E+00	1.49E-05
TOTALS	Ci	0.00E+00	0.00E+00	7.66E-01	3.56E-01

Tritium	Ci	0.00E+00	0.00E+00	4.50E+00	3.17E+00
Xenon-133	Ci	0.00E+00	0.00E+00	8.43E-05	0.00E+00
Xenon-135	Ci	0.00E+00	0.00E+00	5.49E-04	1.33E-04
TOTALS	Ci	0.00E+00	0.00E+00	4.50E+00	3.17E+00