HOPE CREEK GENERATING STATION

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

HCGS RERR-22

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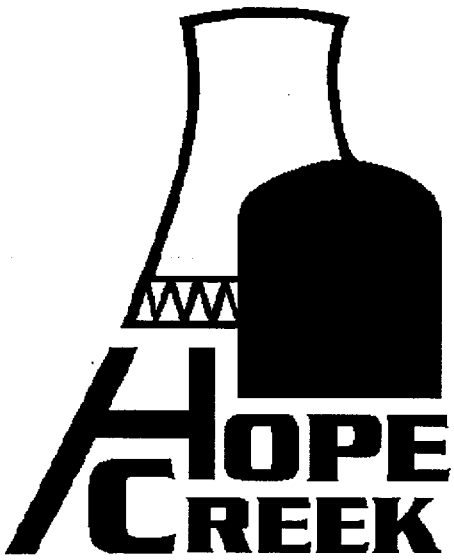

April 2000

HOPE CREEK GENERATING STATION

RADIOACTIVE EFFLUENT RELEASE REPORT

JANUARY - DECEMBER 1999

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HOPE CREEK GENERATING STATION

RADIOACTIVE EFFLUENT RELEASE REPORT

JANUARY - DECEMBER 1999

INTRODUCTION

This report, HCGS-RERR-22 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, 1999 to December 31, 1999.

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 Control 6.9.1.7 of the Hope Creek Offsite Dose Calculation Manual (ODCM). 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 **7,701,078** megawatt-hours of electrical energy (net) during the reporting period.

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 (i.e. Salem Units 1 & 2, and Hope Creek) 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 each reactor unit (i.e. Hope Creek) 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, iodine -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 -04 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 MPC's used in determining allowable release rates or concentrations for radioactive releases.

a. MPC values are not used for gaseous releases. Determination of maximum release rates for noble gases, I -131, I -133, tritium, and for all radionuclides in particulate form (with half -lives > 8 days), are based on dose rate calculations as specified in the ODCM.

b. According to current Technical Specifications, MPC values as stated in 10CFR20, Appendix B, Table II, Column 2 are to be used for liquid effluents. Since the MPC values were removed from 10CFR20 effective 1/1/94, the MPC values are now contained in the ODCM. These MPC values are added as Appendix B of this report.

c. The MPC value used for dissolved or entrained noble gases *in liquid effluents* is 2E-04 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 APPROXIMATIONS OF TOTAL RADIOACTIVITY

4.1 Liquid Effluents

Liquid effluents are monitored in accordance with Table 4.11.1.1.1-1 of the Offsite Dose Calculation Manual (ODCM). During the period of record, all batch liquid wastes were routed to the sampling tanks for monitoring prior to release. The ODCM requires these tanks to be uniformly mixed for sampling and analysis before being released. Batch releases are defined as releases from the equipment sample tanks, floor drain sample tanks, detergent drain tanks, and the condensate storage tank. A continuous liquid effluent release path exists through the circulating water dewatering sump discharge. Representative samples were obtained in accordance with Table 4.11.1.1.1-1 of the Offsite Dose Calculation Manual. Specific activities from the 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 4.11.1.1.1-1 of the ODCM are achieved or exceeded. Radionuclides measured at concentrations below the ODCM detection limit (LLD) are treated as being present. Radionuclides for which no activity was detected while meeting the required LLD's 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 ODCM. The North Plant Vent (NPV) and South Plant Vent (SPV) are the final release points for most planned gaseous effluent releases. The NPV and SPV are continuously monitored for iodine, particulates and noble gases. These monitors have moving particulate and fixed charcoal filters. The particulate filters and charcoal cartridges are replaced and analyzed weekly. These analyses are performed on a multichannel analyzer. The NPV and SPV are also sampled weekly for noble gases and tritium.

A small quantity of gaseous effluent is released via the Filtration, Recirculation, and Ventilation System (FRVS) vent during testing periods. The FRVS is continuously monitored for noble gases when in service, and has fixed particulate and charcoal filters. When the system is in vent mode for greater than two hours, samples are collected at the end of the release period. During periods of extended runs, samples are taken weekly.

The detection requirements of Tables 4.11.2.1.2-1 of the ODCM are achieved or exceeded. Radionuclides detected at concentrations below the ODCM detection limit (LLD) are treated as being present. Radionuclides for which no activity was detected while meeting the required LLDs are treated as absent.

When weekly Noble Gas grab samples yield no detectable activity, continuous mode releases are quantified by integrating Radiation Monitor System readings, and applying a 95% Critical Level Test. 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 described in the Hope Creek ODCM.

Batch Mode gaseous releases (i.e. primary containment purge) are quantified by pre-release sampling and isotopic analysis. Specific activities for each isotope are multiplied by twice the containment volume in order to estimate the total radioactivity released.

4.3 Estimated Total Error

The estimated total error of reported liquid and solid 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.

5.0 BATCH RELEASES

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

6.0 UNPLANNED/ABNORMAL RELEASES

During this reporting period, there were no unplanned/abnormal radioactive effluent releases.

7.0 ELEVATED RADIATION MONITOR RESPONSES

During this reporting period, there were no alarm conditions due to elevated effluent radiation levels.

8.0 MODIFICATION TO PREVIOUS RADIOACTIVE EFFLUENT RELEASE REPORTS

There were no modifications to previous Radioactive Effluent Release Reports during this reporting period.

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 the controlling dose pathways and age groups as described below. The estimated dose represents the maximum radiation dose that could be received by a member of the general public. 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 12-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 twelve month reporting interval.

Liquid Pathways

Type	Age Group	Location	Pathway
Total Body	Adult	Site Boundary	Seafood Ingestion
Organ	Adult	Site Boundary	Seafood Ingestion

Type	Dose		Limit
Total Body	1.97E-02	mrem	3 mrem
Organ Dose (GI-LLI)	1.13E-01	mrem	10 mrem
Population (Total)	2.37E-01	person-rem	N/A
Population (Average)	5.27E-08	mrem	N/A

Air Pathways

Type	Age Group	Location	Pathway
Total Body	All	Site Boundary	Direct Exposure
Skin	All	Site Boundary	Direct Exposure
Organ	Infant	4.9 mi. W.	Milk, Ground Plane, Inhalation

Type	Dose		Limit
Total Body	2.29E-02	mrem	500 mrem/yr*
Skin	5.60E-02	mrem	3000 mrem/yr*
Organ Dose (Thyroid)	5.62E-03	mrem	15 mrem
Population (Total)	1.50E-01	person-rem	N/A
Population (Average)	3.33E-08	mrem	N/A

* Dose Rate Limit

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 twelve-month reporting period is given below:

TLD	Location	Measurement
1S-1	0.5 mi. N	4.43 mrad/month
5S-1	1.0 mi. E	3.46 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 4.1 mrad/month for location 1S-1, 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 and;

<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 "hypothetical maximum exposed individual" have been calculated for the twelve-month reporting period. They are the sum of gaseous and liquid pathway doses for the Salem 1 and 2 and Hope Creek plants:

1.43E-01	mrem	Total Body
2.44E-01	mrem	Organ (GI-LLI)
1.27E-01	mrem	Thyroid

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

Dose to members of the public is limited to 100 mrem total effective dose equivalent (TEDE) in a year in accordance with 10CFR20.1301. The members of the public that spent the most time at the NBU for 1999 are various food vendors, who spent a few hours in front of the Security Center during lunch hours. In accordance with the requirements of ODCM Control 6.9.1.7, the dose to members of the public inside the site boundary has been calculated based on the following assumptions:

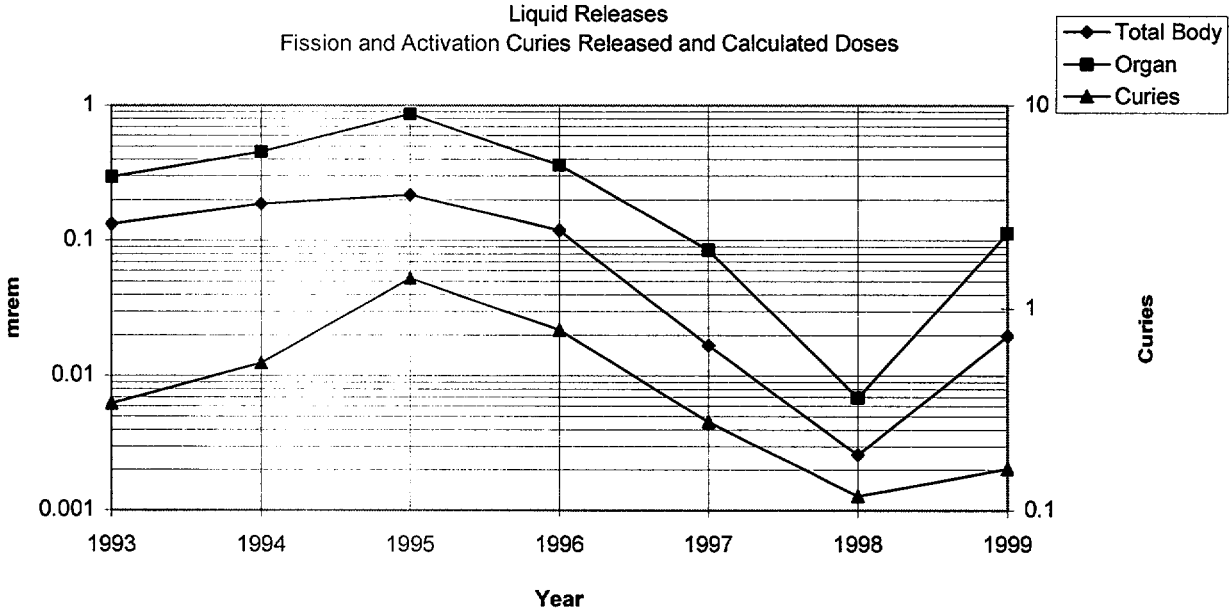
a. The food vendors deliver Monday through Friday.
b. They arrive at approximately 11:00 A.M. at the Security Center.
c. The food vendors leave the site at 12:30 P.M.
d. No deliveries are made on major holidays, making the total weeks equal 50 for the year.
e. The dose data is based on the TLD located outside the Security Center in the vicinity of the food vendors and the calculated dose due to gaseous effluents at that location.
f. For time periods where there is either zero dose or no data, no averaging was performed.

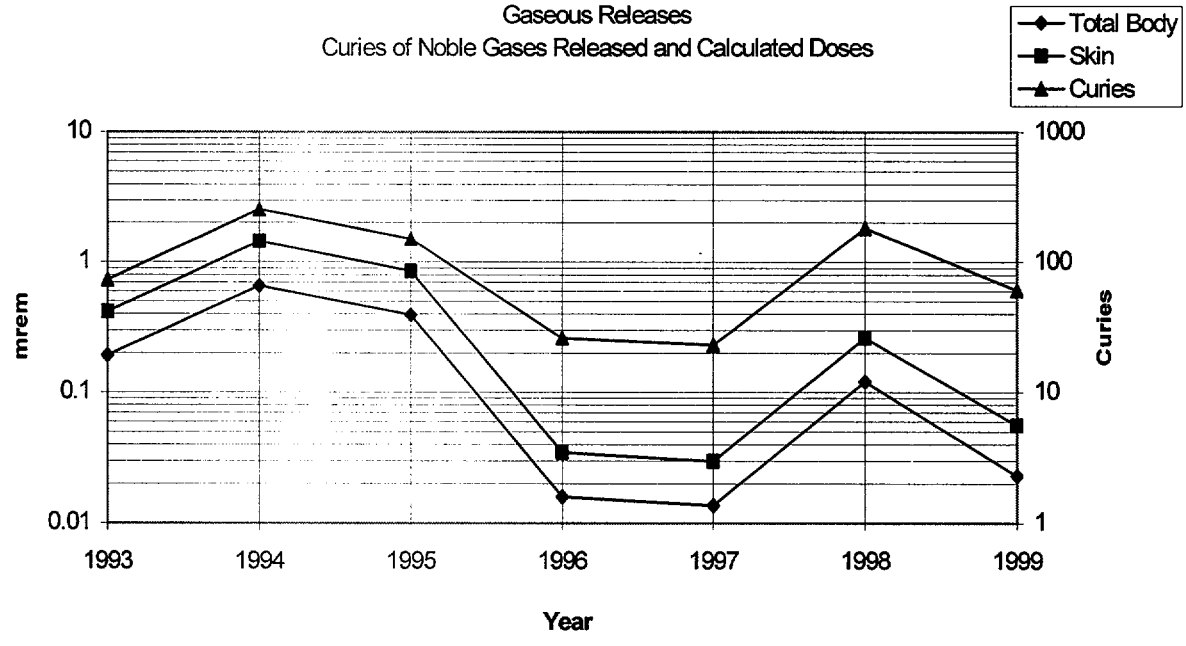
For the 12-month reporting period, January 1, 1999 to December 31, 1999 the calculated doses are:

1.47E+00	mrem	Total Body
1.52E-02	mrem	Organ (Lung)
1.56E-02	mrem	Thyroid

Trends

The following two trend graphs show the total curies of gaseous and liquid effluents released for Hope Creek from 1993 through 1999. Calculated doses in the graphs are to the maximum hypothetical individual.





Assessment

1. Liquids:

Liquid effluents released from Hope Creek station resulted in a minimal dose to the maximum hypothetical individual and were well within all applicable limits.

Although the amount of radioactivity in liquid effluents increased slightly from the previous reporting period, programmatic efforts to minimize in-leakage to the liquid radwaste processing system continue to be effective.

2. Gaseous:

Gaseous effluents released from Hope Creek resulted in a minimal dose to the maximum hypothetical individual. The dose for the 12-month period was a small fraction of all applicable limits.

Gaseous effluent releases continue to remain well within Federal limits and are comparable to other nuclear utilities. Fuel integrity and gaseous effluent processing equipment continue to be maintained in order to ensure that all releases of gaseous radioactivity are As-Low-As-Reasonably-Achievable (ALARA).

PART F. METEOROLOGICAL DATA

Cumulative joint wind frequency distributions by atmospheric stability class at the 33 foot elevation are provided for 1999 at the end of this report in Appendix A.

PART G. OFFSITE DOSE CALCULATION MANUAL (ODCM) CHANGES

HC Offsite Dose Calculation Manual was revised once in 1999. Revision 18 became effective March 23,1999, accomplishing the following:

- Added PART I, Radiological Effluent Controls, in preparation for implementation of NRC Generic Letter 89-01. Part I includes the Radiological Effluent Controls that replace the Radiological Effluent Technical Specifications (RETS).
- Revised the previous version of the ODCM to become PART II, Calculational Methodologies. There were no technical changes made to the previous version of the ODCM.

A copy of the revised ODCM is attached as Appendix C.

PART H. INOPERABLE MONITORS

During this period the following effluent radiation monitors were inoperable for greater than 30 days:

Cooling Tower Blowdown Flow Monitor (0DA FIT-2164) – The flow monitor was out of service for 30 days since there was no cooling tower blowdown flow (process flow) for this period during a refueling outage.

PART I. PROCESS CONTROL PROGRAM (PCP) CHANGES

During the reporting period, the Process Control Program was revised to reflect operational changes due to the abandonment of the use of the solid radwaste system. Revision 3 became effective February 16, 1999. Appendix D includes a copy of the revised pages.

PART J. ENVIRONMENTAL MONITORING LOCATION CHANGES

During the reporting period, no changes were made to the Radioactive Environmental Monitoring Program (REMP).

HOPE CREEK GENERATING STATION
TABLE 1A

EFFLUENTS AND WASTE DISPOSAL ANNUAL REPORT
JANUARY – DECEMBER 1999
GASEOUS EFFLUENTS – SUMMATION OF ALL RELEASES

			Units	1st Quarter	2nd Quarter	Est. Total Error[1]
A.		**Fission and Activation Products**				
	1.	Total Release	Ci	5.17E-01	4.60E-01	50%
	2.	Average Release Rate For Period	µCi/sec	6.65E-02	5.85E-02	
	3.	Percent of ODCM Limit (Control 3.11.2.2(a))	%	7.06E-03	6.28E-03	
B.		**Iodines**				
	1.	Total Iodine-131	Ci	3.65E-05	0.00E+00	50%
	2.	Average Release Rate For Period	µCi/sec	4.69E-06	0.00E+00	
	3.	Percent of ODCM Limit[2] (Control 3.11.2.3(a))	%	9.31E-03	2.50E-03	
C.		**Particulates**				
	1.	Particulates With Half-lives > 8 days	Ci	1.28E-04	4.24E-04	50%
	2.	Average Release Rate For Period	µCi/sec	1.65E-05	5.40E-05	
	3.	Percent of ODCM Limit[2] (Control 3.11.2.3(a))	%	9.31E-03	2.50E-03	
	4.	Gross Alpha	Ci	0.00E+00	0.00E+00	
D.		**Tritium**				
	1.	Total Release	Ci	1.27E+01	4.03E-01	50%
	2.	Average Release Rate For Period	µCi/sec	1.63E+00	5.13E-02	
	3.	Percent of ODCM Limit[2] (Control 3.11.2.3(a))	%	9.31E-03	2.50E-03	

1. For batch releases, the estimated overall error is 10%.
2. Iodines, Tritium, and Particulates are treated as a group.

HOPE CREEK GENERATING STATION
TABLE 1A

EFFLUENTS AND WASTE DISPOSAL ANNUAL REPORT
JANUARY – DECEMBER 1999
GASEOUS EFFLUENTS – SUMMATION OF ALL RELEASES

			Units	3rd Quarter	4th Quarter	Est. Total Error[1]
A.		**Fission and Activation Products**				
	1.	Total Release	Ci	1.13E+01	4.87E+01	50%
	2.	Average Release Rate For Period	µCi/sec	1.42E+00	6.12E+00	
	3.	Percent of ODCM Limit (Control 3.11.2.2(a))	%	1.42E-01	6.64E-01	
B.		**Iodines**				
	1.	Total Iodine-131	Ci	4.15E-04	0.00E+00	50%
	2.	Average Release Rate For Period	µCi/sec	5.22E-05	0.00E+00	
	3.	Percent of ODCM Limit[2] (Control 3.11.2.3(a))	%	6.19E-02	1.26E-03	
C.		**Particulates**				
	1.	Particulates With Half-lives > 8 days	Ci	1.67E-03	5.33E-03	50%
	2.	Average Release Rate For Period	µCi/sec	2.10E-04	6.71E-04	
	3.	Percent of ODCM Limit[2] (Control 3.11.2.3(a))	%	6.19E-02	1.26E-03	
	4.	Gross Alpha	Ci	0.00E+00	0.00E+00	
D.		**Tritium**				
	1.	Total Release	Ci	9.68E+00	4.00E-02	50%
	2.	Average Release Rate For Period	µCi/sec	1.22E+00	5.04E-03	
	3.	Percent of ODCM Limit[2] (Control 3.11.2.3(a))	%	6.19E-02	1.26E-03	

1. For batch releases, the estimated overall error is 10%.
2. Iodines, Tritium, and Particulates are treated as a group.

HOPE CREEK GENERATING STATION
TABLE 1B

EFFLUENTS AND WASTE DISPOSAL ANNUAL REPORT
JANUARY – DECEMBER 1999
GASEOUS EFFLUENTS – ELEVATED RELEASES

Hope Creek Generating Station has no elevated release points.

HOPE CREEK GENERATING STATION
TABLE 1C

EFFLUENTS AND WASTE DISPOSAL ANNUAL REPORT
JANUARY – DECEMBER 1999
GASEOUS EFFLUENTS – GROUND LEVEL RELEASES

	Nuclides Released	Units	Continuous Mode 1st Quarter	Continuous Mode 2nd Quarter	Batch Mode 1st Quarter	Batch Mode 2nd Quarter
1.	**Fission Gases**					
	Krypton-83m	Ci	5.17E-03	4.60E-03	0.00E+00	0.00E+00
	Krypton-85m	Ci	5.17E-03	4.60E-03	0.00E+00	0.00E+00
	Krypton-87	Ci	2.07E-02	1.84E-02	0.00E+00	0.00E+00
	Krypton-88	Ci	2.07E-02	1.84E-02	0.00E+00	0.00E+00
	Krypton-89	Ci	1.40E-01	1.24E-01	0.00E+00	0.00E+00
	Xenon-133	Ci	1.03E-02	9.20E-03	0.00E+00	0.00E+00
	Xenon-135	Ci	2.59E-02	2.30E-02	1.07E-05	0.00E+00
	Xenon-135m	Ci	3.12E-02	2.76E-02	0.00E+00	0.00E+00
	Xenon-137	Ci	1.60E-01	1.43E-01	0.00E+00	0.00E+00
	Xenon-138	Ci	9.82E-02	8.74E-02	0.00E+00	0.00E+00
	Totals	**Ci**	**5.17E-01**	**4.60E-01**	**1.07E-05**	**0.00E+00**
2.	**Iodine**					
	Iodine-131	Ci	3.65E-05	0.00E+00	0.00E+00	0.00E+00
	Iodine-133	Ci	2.82E-03	1.88E-03	0.00E+00	0.00E+00
	Totals	**Ci**	**2.86E-03**	**1.88E-03**	**0.00E+00**	**0.00E+00**
3.	**Particulates** (Half-life >8 days)					
	Manganese-54	Ci	8.04E-05	2.47E-04	3.29E-06	0.00E+00
	Iron-59	Ci	8.28E-06	1.12E-04	0.00E+00	0.00E+00
	Cobalt-60	Ci	3.32E-05	6.54E-05	2.82E-06	0.00E+00
	Cesium-138	Ci	0.00E+00	0.00E+00	1.52E-07	0.00E+00
	Totals	**Ci**	**1.22E-04**	**4.24E-04**	**6.26E-06**	**0.00E+00**
4.	**Tritium**	**Ci**	**1.27E+01**	**4.03E-01**	**3.35E-04**	**0.00E+00**

HOPE CREEK GENERATING STATION
TABLE 1C

EFFLUENTS AND WASTE DISPOSAL ANNUAL REPORT
JANUARY – DECEMBER 1999
GASEOUS EFFLUENTS – GROUND LEVEL RELEASES

Nuclides Released	Units	Continuous Mode 3rd Quarter	Continuous Mode 4th Quarter	Batch Mode 3rd Quarter	Batch Mode 4th Quarter
1. Fission Gases					
Krypton-83m	Ci	1.01E-01	4.87E-01	0.00E+00	0.00E+00
Krypton-85m	Ci	1.01E-01	4.87E-01	0.00E+00	0.00E+00
Krypton-87	Ci	4.04E-01	1.95E+00	0.00E+00	0.00E+00
Krypton-88	Ci	4.04E-01	1.95E+00	0.00E+00	0.00E+00
Krypton-89	Ci	2.73E+00	1.31E+01	0.00E+00	0.00E+00
Xenon-133	Ci	2.02E-01	9.74E-01	0.00E+00	0.00E+00
Xenon-135	Ci	1.66E+00	2.43E+00	0.00E+00	0.00E+00
Xenon-135m	Ci	6.06E-01	2.92E+00	0.00E+00	0.00E+00
Xenon-137	Ci	3.13E+00	1.51E+01	0.00E+00	0.00E+00
Xenon-138	Ci	1.92E+00	9.25E+00	0.00E+00	0.00E+00
Totals	**Ci**	**1.13E+01**	**4.87E+01**	**0.00E+00**	**0.00E+00**
2. Iodine					
Iodine-131	Ci	4.15E-04	0.00E+00	0.00E+00	0.00E+00
Iodine-133	Ci	5.94E-03	1.63E-04	0.00E+00	00.0E+00
Totals	**Ci**	**6.35E-03**	**1.63E-04**	**0.00E+00**	**0.00E+00**
3. Particulates (Half-life >8 days)					
Manganese-54	Ci	1.64E-03	5.24E-03	4.37E-08	0.00E+00
Cobalt-58	Ci	3.35E-06	2.04E-05	0.00E+00	0.00E+00
Cobalt-60	Ci	3.37E-05	7.35E-05	0.00E+00	0.00E+00
Totals	**Ci**	**1.68E-03**	**5.33E-03**	**4.37E-08**	**0.00E+00**
4. Tritium	**Ci**	**9.68E+00**	**4.00E-02**	**0.00E+00**	**0.00E+00**

HOPE CREEK GENERATING STATION
TABLE 2A

EFFLUENTS AND WASTE DISPOSAL ANNUAL REPORT
JANUARY – DECEMBER 1999
LIQUID EFFLUENTS – SUMMATION OF ALL RELEASES

		Units	1st Quarter	2nd Quarter	Est. Total Error
A.	**Fission and Activation Products**				
1.	Total Release	Ci	8.31E-02	4.65E-02	25%
2.	Average Release Rate For Period	µCi/ml	5.98E-09	2.98E-09	
3.	Percent of ODCM Limit (Control 3.11.1.2(a))	%	1.44E+00	6.34E-01	
B.	**Tritium**				
1.	Total Release	Ci	1.93E+01	5.46E-01	25%
2.	Average Release Rate For Period	µCi/ml	1.39E-06	3.50E-08	
3.	Percent of ODCM Limit (Control 3.11.1.1)	%	4.63E-02	1.17E-03	
C.	**Dissolved and Entrained Noble Gases**				
1.	Total Release	Ci	1.90E-04	9.96E-04	25%
2.	Average Release Rate For Period	µCi/ml	1.37E-11	6.38E-11	
3.	Percent of ODCM Limit (Control 3.11.1.1)	%	6.85E-06	3.19E-05	
D.	**Gross Alpha**	Ci	0.00E+00	4.97E-05	25%
E.	Volume of Waste Release (Prior to Dilution)	Liters	3.14E+07	5.10E+07	25%
F.	Volume of Dilution Water Used During Entire Period	Liters	1.39E+10	1.56E+10	25%

HOPE CREEK GENERATING STATION
TABLE 2A

EFFLUENTS AND WASTE DISPOSAL ANNUAL REPORT
JANUARY – DECEMBER 1999
LIQUID EFFLUENTS – SUMMATION OF ALL RELEASES

		Units	3rd Quarter	4th Quarter	Est. Total Error
A.	**Fission and Activation Products**				
1.	Total Release	Ci	2.41E-02	7.08E-03	25%
2.	Average Release Rate For Period	µCi/ml	1.21E-09	5.24E-10	
3.	Percent of ODCM Limit (Control 3.11.1.2(a))	%	1.60E-01	3.12E-02	
B.	**Tritium**				
1.	Total Release	Ci	6.51E+00	3.12E+00	25%
2.	Average Release Rate For Period	µCi/ml	3.27E-07	2.31E-7	
3.	Percent of ODCM Limit (Control 3.11.1.1)	%	1.02E-02	7.70E-03	
C.	**Dissolved and Entrained Noble Gases**				
1.	Total Release	Ci	6.04E-04	4.42E-04	25%
2.	Average Release Rate For Period	µCi/ml	3.04E-11	3.27E-11	
3.	Percent of ODCM Limit (Control 3.11.1.1)	%	1.52E-05	1.64E-05	
D.	**Gross Alpha**	Ci	0.00E+00	0.00E+00	25%
E.	Volume of Waste Release (Prior to Dilution)	Liters	5.12E+07	5.12E+07	25%
F.	Volume of Dilution Water Used During Entire Period	Liters	1.99E+10	1.35E+10	25%

HOPE CREEK GENERATING STATION
TABLE 2B

EFFLUENTS AND WASTE DISPOSAL ANNUAL REPORT
JANUARY – DECEMBER 1999
LIQUID EFFLUENTS

	Nuclides Released	Units	Continuous Mode 1st Quarter	Continuous Mode 2nd Quarter	Batch Mode 1st Quarter	Batch Mode 2nd Quarter
1.	**Fission and Activation Products**					
	Sodium-24	Ci	0.00E+00	0.00E+00	9.23E-04	1.44E-05
	Chromium-51	Ci	0.00E+00	0.00E+00	6.82E-03	2.53E-03
	Manganese-54	Ci	0.00E+00	0.00E+00	4.05E-02	1.80E-02
	Manganese-56	Ci	0.00E+00	0.00E+00	5.42E-06	0.00E+00
	Iron-55	Ci	0.00E+00	0.00E+00	4.42E-03	1.60E-02
	Iron-59	Ci	0.00E+00	0.00E+00	1.12E-02	4.76E-03
	Cobalt-58	Ci	0.00E+00	0.00E+00	2.26E-03	6.07E-04
	Cobalt-60	Ci	0.00E+00	0.00E+00	1.32E-02	4.13E-03
	Zinc-65	Ci	0.00E+00	0.00E+00	2.84E-03	1.39E-04
	Arsenic-76	Ci	0.00E+00	0.00E+00	4.08E-05	7.64E-06
	Niobium-95	Ci	0.00E+00	0.00E+00	1.59E-04	1.03E-05
	Zirconium-95	Ci	0.00E+00	0.00E+00	4.08E-05	0.00E+00
	Technicium-99m	Ci	0.00E+00	0.00E+00	1.63E-04	1.72E-04
	Ruthenium-105	Ci	0.00E+00	0.00E+00	4.45E-05	0.00E+00
	Silver-110m	Ci	0.00E+00	0.00E+00	2.57E-04	5.08E-05
	Antimony-124	Ci	0.00E+00	0.00E+00	4.63E-05	0.00E+00
	Cesium-134	Ci	0.00E+00	0.00E+00	7.13E-05	0.00E+00
	Cesium-137	Ci	0.00E+00	0.00E+00	2.23E-04	0.00E+00
	Totals	**Ci**	**0.00E+00**	**0.00E+00**	**8.31E-02**	**4.65E-02**
2.	**Tritium**	**Ci**	**1.63E-01**	**3.17E-01**	**1.92E+01**	**2.29E-01**
3.	**Dissolved and Entrained Noble Gases**					
	Xenon-133	Ci	0.00E+00	0.00E+00	2.75E-05	1.18E-04
	Xenon-135	Ci	0.00E+00	0.00E+00	1.62E-04	8.78E-04
	Totals	**Ci**	**0.00E+00**	**0.00E+00**	**1.90E-04**	**9.95E-04**

HOPE CREEK GENERATING STATION
TABLE 2B

EFFLUENTS AND WASTE DISPOSAL ANNUAL REPORT
JANUARY – DECEMBER 1999
LIQUID EFFLUENTS

	Nuclides Released	Units	Continuous Mode 3rd Quarter	Continuous Mode 4th Quarter	Batch Mode 3rd Quarter	Batch Mode 4th Quarter
1.	**Fission and Activation Products**					
	Sodium-24	Ci	0.00E+00	0.00E+00	2.16E-06	6.75E-05
	Chromium-51	Ci	0.00E+00	0.00E+00	7.02E-03	2.79E-04
	Manganese-54	Ci	0.00E+00	0.00E+00	6.99E-03	3.25E-03
	Iron-55	Ci	0.00E+00	0.00E+00	5.58E-03	2.29E-03
	Iron-59	Ci	0.00E+00	0.00E+00	1.19E-03	1.17E-05
	Cobalt-58	Ci	0.00E+00	0.00E+00	4.19E-04	1.89E-05
	Manganese-56	Ci	0.00E+00	0.00E+00	3.94E-06	0.00E+00
	Cobalt-60	Ci	0.00E+00	0.00E+00	2.11E-03	1.09E-03
	Zinc-65	Ci	0.00E+00	0.00E+00	3.51E-04	3.68E-05
	Arsenic-76	Ci	0.00E+00	0.00E+00	5.10E-05	0.00E+00
	Zinc-69m	Ci	0.00E+00	0.00E+00	2.64E-04	0.00E+00
	Strontium-89	Ci	0.00E+00	0.00E+00	0.00E+00	3.29E-05
	Silver-110m	Ci	0.00E+00	0.00E+00	7.98E-05	0.00E+00
	Lanthanum-140	Ci	0.00E+00	0.00E+00	4.82E-06	0.00E+00
	Cesium-137	Ci	0.00E+00	0.00E+00	3.14E-07	0.00E+00
	Totals	**Ci**	**0.00E+00**	**0.00E+00**	**2.41E-02**	**7.07E-03**
2.	**Tritium**	**Ci**	**5.48E-01**	**2.85E-01**	**5.96E+00**	**2.84E+00**
3.	**Dissolved and Entrained Noble Gases**					
	Xenon-133	Ci	0.00E+00	0.00E+00	8.36E-05	2.36E-05
	Xenon-135	Ci	0.00E+00	0.00E+00	5.20E-04	4.18E-04
	Totals	**Ci**	**0.00E+00**	**0.00E+00**	**6.04E-04**	**4.41E-04**

HOPE CREEK GENERATING STATION
TABLE 3

EFFLUENTS AND WASTE DISPOSAL ANNUAL REPORT
JANUARY – DECEMBER 1999
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

SOLID RADWASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL
(Not Irradiated Fuel)

1.	A	Type of Waste (Class A or less)	Units[1]	12-Month Period	Est. Total Error
	a.	Spent Resins, Filters, Sludges, Evaporator Bottoms	m^3	1.24E+02	25%
			Ci	1.67E+03	
	b.	Dry Compressible Waste, Contaminated Equipment	m^3	7.57E+02	25%
			Ci	3.12E+01	
	c.	Irradiated Components, Control Rods	m^3	0.00E+00	25%
			Ci	0.00E+00	
	d.	Others (Contaminated Oil, Contaminated Sewage Sludge, Contaminated Solvent)	m^3	3.68E+01	25%
			Ci	1.85E-03	

1. Volumes are measured, activities are estimated.

2A. Estimate of Major Nuclide Composition (>1%)

	a. Dewatered Resins		a. Solidified Resin (Bitumen)	
Nuclides	%	Ci	%	Ci
Manganese-54	8.9	1.46E+02	5.5	1.08E+00
Iron-55	82.7	1.37E+03	39.1	7.74E+00
Nickel-63	<1%		2.9	5.63E-01
Cobalt-60	6.8	1.13E+02	42.1	8.33E+00
Zinc-65	<1%		6.6	1.3E+00
Cesium-137	<1%		3.4	6.65E-01

	b. DAW		c. Oil	
Nuclides	%	Ci	%	Ci
Chromium-51	2.0	6.18E-01	<1%	
Manganese-54	4.8	1.50E+00	1.1	1.79E-05
Iron-55	87.6	2.73E+01	93.9	1.56E-03
Iron-59	1.8	5.72E-01	<1%	
Cobalt-60	3.0	9.21E-01	4.0	6.66E-05

HOPE CREEK GENERATING STATION
TABLE 3 (Continued)

EFFLUENTS AND WASTE DISPOSAL ANNUAL REPORT
JANUARY – DECEMBER 1999
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

SOLID RADWASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL

2A. Estimate of Major Nuclide Composition (>1%) –Continued

	c. Sewage Sludge		c. Solvent	
Nuclides	%	Ci	%	Ci
Manganese-54	41.3	4.35E-06	2.0	3.46E-06
Iron-55	ND		93.5	1.63E-04
Cobalt-58	14.5	1.52E-06	ND	
Cobalt-60	44.2	4.65E-06	3.8	6.65E-6

ND = Not Detected

3A. Solid Waste Disposal (Class A or less)

Number of Shipments	Mode of Transportation	Destination	Type of Containers
12	Truck	Oak Ridge, TN	High Integrity Containers
4	Truck	Barnwell, SC	Strong, Tight
3	Truck	Barnwell, SC	High Integrity Containers – Poly
2	Truck	Richland, WA	Strong, Tight
4	Truck	Memphis, TN	Strong, Tight
11	Truck	Oak Ridge, TN	Strong, Tight
1	Truck	Kingston, TN	Strong, Tight

HOPE CREEK GENERATING STATION
TABLE 3 (Continued)

EFFLUENTS AND WASTE DISPOSAL ANNUAL REPORT
JANUARY – DECEMBER 1999
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

SOLID RADWASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL

1.	B	Type of Waste (Class B)	Units[1]	12-Month Period	Est. Total Error
	a.	Spent Resins, Filters, Sludges, Evaporator Bottoms	m^3	9.24E+00	25%
			Ci	2.57E+03	
	b.	Dry Compressible Waste, Contaminated Equipment	m^3	0.00E+00	25%
			Ci	0.00E+00	
	c.	Irradiated Components, Control Rods	m^3	0.00E+00	25%
			Ci	0.00E+00	
	d.	Others	m^3	0.00E+00	25%
			Ci	0.00E+00	

1. Volumes are measured, activities are estimated.

2B. Estimate of Major Nuclide Composition (>1%)

	Resins	
Nuclides	%	Ci
Manganese-54	6.5	1.66E+02
Iron-55	84.5	2.17E+03
Cobalt-60	7.6	1.95E+02
Zinc-65	1.0	1.89E+01

3B. Solid Waste Disposal (Class B)

Number of Shipments	Mode of Transportation	Destination	Type of Containers
2	Truck	Barnwell, SC	High Integrity Containers – Poly

4. Irradiated Fuel Shipments (Disposition)

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

5. Solidification Methods

The Class A solidified resin shipped to Barnwell, SC, for burial was solidified using asphalt (bitumen).

HOPE CREEK GENERATING STATION
TABLE 4A

EFFLUENTS AND WASTE DISPOSAL ANNUAL REPORT
JANUARY – DECEMBER 1999
SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED
IN A BATCH MODE

BATCH RELEASES ONLY

1.	Dates:	January 1, 1999 – March 31, 1999	
2.	Type of release:	Gaseous	
3.	Number of releases during quarter:	11	
4.	Total time duration for all releases of type listed above:	54623	Min.
5.	Maximum duration for release of type listed above:	10350	Min.
6.	Average duration for release of type listed above:	4966	Min.
7.	Minimum duration for release of type listed above:	41	Min.
8.	Average stream flow (dilution flow) during period of release:	N/A	

HOPE CREEK GENERATING STATION
TABLE 4A

EFFLUENTS AND WASTE DISPOSAL ANNUAL REPORT
JANUARY – DECEMBER 1999
SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED
IN A BATCH MODE

BATCH RELEASES ONLY

1	Dates:	April 1, 1999 – June 30, 1999	
2.	Type of release:	Gaseous	
3.	Number of releases during quarter:	0	
4.	Total time duration for all releases of type listed above:	0	Min.
5.	Maximum duration for release of type listed above:	0	Min.
6.	Average duration for release of type listed above:	0	Min.
7.	Minimum duration for release of type listed above:	0	Min.
8.	Average stream flow (dilution flow) during period of release:	N/A	

HOPE CREEK GENERATING STATION
TABLE 4A

EFFLUENTS AND WASTE DISPOSAL ANNUAL REPORT
JANUARY – DECEMBER 1999
SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED
IN A BATCH MODE

BATCH RELEASES ONLY

1.	Dates:	July 1, 1999 – September 30, 1999	
2.	Type of release:	Gaseous	
3.	Number of releases during quarter:	1	
4.	Total time duration for all releases of type listed above:	151	Min.
5.	Maximum duration for release of type listed above:	151	Min.
6.	Average duration for release of type listed above:	151	Min.
7.	Minimum duration for release of type listed above:	151	Min.
8.	Average stream flow (dilution flow) during period of release:	N/A	

HOPE CREEK GENERATING STATION
TABLE 4A

EFFLUENTS AND WASTE DISPOSAL ANNUAL REPORT
JANUARY – DECEMBER 1999
SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED
IN A BATCH MODE

BATCH RELEASES ONLY

1.	Dates:	October 1, 1999 – December 31, 1999	
2.	Type of release:	Gaseous	
3.	Number of releases during quarter:	0	
4.	Total time duration for all releases of type listed above:	0	Min.
5.	Maximum duration for release of type listed above:	0	Min.
6.	Average duration for release of type listed above:	0	Min.
7.	Minimum duration for release of type listed above:	0	Min.
8.	Average stream flow (dilution flow) during period of release:	N/A	

HOPE CREEK GENERATING STATION
TABLE 4B

EFFLUENTS AND WASTE DISPOSAL ANNUAL REPORT
JANUARY – DECEMBER 1999
SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED
IN A BATCH MODE

BATCH RELEASES ONLY

1.	Dates:	January 1, 1999 – March 31, 1999	
2.	Type of release:	Liquid	
3.	Number of releases during quarter:	92	
4.	Total time duration for all releases of type listed above:	6102	Min.
5.	Maximum duration for release of type listed above:	90	Min.
6.	Average duration for release of type listed above:	66	Min.
7.	Minimum duration for release of type listed above:	7	Min.
8.	Average stream flow (dilution flow) during period of release:	27652	GPM

HOPE CREEK GENERATING STATION
TABLE 4B

EFFLUENTS AND WASTE DISPOSAL ANNUAL REPORT
JANUARY – DECEMBER 1999
SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED
IN A BATCH MODE

BATCH RELEASES ONLY

1.	Dates:	April 1, 1999 – June 30, 1999	
2.	Type of release:	Liquid	
3.	Number of releases during quarter:	39	
4.	Total time duration for all releases of type listed above:	2766	Min.
5.	Maximum duration for release of type listed above:	95	Min.
6.	Average duration for release of type listed above:	71	Min.
7.	Minimum duration for release of type listed above:	27	Min.
8.	Average stream flow (dilution flow) during period of release:	31201	GPM

HOPE CREEK GENERATING STATION
TABLE 4B

EFFLUENTS AND WASTE DISPOSAL ANNUAL REPORT
JANUARY – DECEMBER 1999
SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED
IN A BATCH MODE

BATCH RELEASES ONLY

1.	Dates:	July 1, 1999 – September 30, 1999	
2.	Type of release:	Liquid	
3.	Number of releases during quarter:	37	
4.	Total time duration for all releases of type listed above:	2553	Min.
5.	Maximum duration for release of type listed above:	90	Min.
6.	Average duration for release of type listed above:	69	Min.
7.	Minimum duration for release of type listed above:	11	Min.
8.	Average stream flow (dilution flow) during period of release:	39703	GPM

HOPE CREEK GENERATING STATION
TABLE 4B

EFFLUENTS AND WASTE DISPOSAL ANNUAL REPORT
JANUARY – DECEMBER 1999
SUMMARY SHEET FOR RADIOACTIVE EFFLUENTS RELEASED
IN A BATCH MODE

BATCH RELEASES ONLY

1.	Dates:	October 1, 1999 – December 31, 1999	
2.	Type of release:	Liquid	
3.	Number of releases during quarter:	18	
4.	Total time duration for all releases of type listed above:	1266	Min.
5.	Maximum duration for release of type listed above:	85	Min.
6.	Average duration for release of type listed above:	70	Min.
7.	Minimum duration for release of type listed above:	42	Min.
8.	Average stream flow (dilution flow) during period of release:	26987	GPM

APPENDIX A

METEOROLOGICAL DATA

APPENDIX B

MPC DATA

The following radionuclide concentrations were obtained from 10 CFR 20 Appendix B, Table II, Column 2 as revised January 1, 1991.

Maximum Permissible Concentrations

Element	Isotope	Soluble Conc (μCi/ml)	Insoluble Conc. (μCi/ml)
Actinium (89)	Ac-227	2E-6	3E-4
	Ac-228	9E-5	9E-5
Americium (95)	Am-241	4E-6	3E-5
	Am-242m	4E-6	9E-5
	Am-242	1E-4	1E-4
	Am-243	4E-6	3E-5
	Am-244	5E-3	5E-3
Antimony (51)	Sb-122	3E-5	3E-5
	Sb-124	2E-5	2E-5
	Sb-125	1E-4	1E-4
Arsenic (33)	As-73	5E-4	5E-4
	As-74	5E-5	5E-5
	As-76	2E-5	2E-5
	As-77	8E-5	8E-5
Astatine (85)	At-211	2E-6	7E-5
Barium (56)	Ba-131	2E-4	2E-4
	Ba-140	3E-5	2E-5
Berkelium (97)	Bk-249	6E-4	6E-4
	Bk-250	2E-4	2E-4
Beryllium (4)	Be-7	2E-3	2E-3
Bismuth (83)	Bi-206	4E-5	4E-5
	Bi-207	6E-5	6E-5
	Bi-210	4E-5	4E-5
	Bi-212	4E-4	4E-4
Bromine (35)	Br-82	3E-4	4E-5
Cadmium (48)	Cd-109	2E-4	2E-4
	Cd-115m	3E-5	3E-5
	Cd-115	3E-5	4E-5
Calcium (20)	Ca-45	9E-6	2E-4
	Ca-47	5E-5	3E-5
Californium (98)	Cf-249	4E-6	2E-5
	Cf-250	1E-5	3E-5
	Cf-251	4E-6	3E-5
	Cf-252	7E-6	7E-6

Element	Isotope	Soluble Conc. (μCi/ml)	Insoluble Conc. (μCi/ml)
Californium (98)	Cf-253	1E-4	1E-4
	Cf-254	1E-7	1E-7
Carbon (6)	C-14	8E-4	-------
Cerium (58)	Ce-141	9E-5	9E-5
	Ce-143	4E-5	4E-5
	Ce-144	1E-5	1E-5
Cesium (55)	Cs-131	2E-3	9E-4
	Cs-134m	6E-3	1E-3
	Cs-134	9E-6	4E-5
	Cs-135	1E-4	2E-4
	Cs-136	9E-5	6E-5
	Cs-137	2E-5	4E-5
Chlorine (17)	Cl-36	8E-5	6E-5
	Cl-38	4E-4	4E-4
Chromium (24)	Cr-51	2E-3	2E-3
Cobalt (27)	Co-57	5E-4	4E-4
	Co-58m	3E-3	2E-3
	Co-58	1E-4	9E-5
	Co-60	5E-5	3E-5
Copper (29)	Cu-64	3E-4	2E-4
Curium (96)	Cm-242	2E-5	2E-5
	Cm-243	5E-6	2E-5
	Cm-244	7E-6	3E-5
	Cm-245	4E-6	3E-5
	Cm-246	4E-6	3E-5
	Cm-247	4E-6	2E-5
	Cm-248	4E-7	1E-6
	Cm-249	2E-3	2E-3
Dysprosium (66)	Dy-165	4E-4	4E-4
	Dy-166	4E-5	4E-5
Einsteinium (99)	Es-253	2E-5	2E-5
	Es-254m	2E-5	2E-5
	Es-254	1E-5	1E-5
	Es-255	3E-5	3E-5
Erbium (68)	Er-169	9E-5	9E-5
	Er-171	1E-4	1E-4
Europium (63)	Eu-152(9.2 hrs)	6E-5	6E-5
	Eu-152 (13 yrs)	8E-5	8E-5

Element	Isotope	Soluble Conc. (μCi/ml)	Insoluble Conc. (μCi/ml)
Europium (63)	Eu-154	2E-5	2E-5
	Eu-155	2E-4	2E-4
Fermium (100)	Fm-254	1E-4	1E-4
	Fm-255	3E-5	3E-5
	Fm-256	9E-7	9E-7
Fluorine (9)	F-18	8E-4	5E-4
Gadolinium (64)	Gd-153	2E-4	2E-4
	Gd-159	8E-5	8E-5
Gallium (31)	Ga-72	4E-5	4E-5
Germanium (32)	Ge-71	2E-3	2E-3
Gold (79)	Au-196	2E-4	1E-4
	Au-198	5E-5	5E-5
	Au-199	2E-4	2E-4
Hafnium (72)	Hf-181	7E-5	7E-5
Holmium (67)	Ho-166	3E-5	3E-5
Hydrogen (3)	H-3	3E-3	3E-3
Indium (49)	In-113m	1E-3	1E-3
	In-114m	2E-5	2E-5
	In-115m	4E-4	4E-4
	In-115	9E-5	9E-5
Iodine (53)	I-125	2E-7	2E-4
	I-126	3E-7	9E-5
	I-129	6E-8	2E-4
	I-131	3E-7	6E-5
	I-132	8E-6	2E-4
	I-133	1E-6	4E-5
	I-134	2E-5	6E-4
	I-135	4E-6	7E-5
Iridium (77)	Ir-190	2E-4	2E-4
	Ir-192	4E-5	4E-5
	Ir-194	3E-5	3E-5
Iron (26)	Fe-55	8E-4	2E-3
	Fe-59	6E-5	5E-5
Lanthanum (57)	La-140	2E-5	2E-5
Lead (82)	Pb-203	4E-4	4E-4
	Pb-210	1E-7	2E-4
	Pb-212	2E-5	2E-5
Lutetium (71)	Lu-177	1E-4	1E-4

Element	Isotope	Soluble Conc. (μCi/ml)	Insoluble Conc. (μCi/ml)
Manganese (25)	Mn-52	3E-5	3E-5
	Mn-54	1E-4	1E-4
	Mn-56	1E-4	1E-4
Mercury (80)	Hg-197m	2E-4	2E-4
	Hg-197	3E-4	5E-4
	Hg-203	2E-5	1E-4
Molybdenum (42)	Mo-99	2E-4	4E-5
Neodymium (60)	Nd-144	7E-5	8E-5
	Nd-147	6E-5	6E-5
	Nd-149	3E-4	3E-4
Neptunium (93)	Np-237	3E-6	3E-5
	Np-239	1E-4	1E-4
Nickel (28)	Ni-59	2E-4	2E-3
	Ni-63	3E-5	7E-4
	Ni-65	1E-4	1E-4
Niobium (41)	Nb-93m	4E-4	4E-4
	Nb-95	1E-4	1E-4
	Nb-97	9E-4	9E-4
Osmium (76)	Os-185	7E-5	7E-5
	Os-191m	3E-3	2E-3
	Os-191	2E-4	2E-4
	Os-193	6E-5	5E-5
Palladium (46)	Pd-103	3E-4	3E-4
	Pd-109	9E-5	7E-5
Phosphorus (15)	P-32	2E-5	2E-5
Platinum (78)	Pt-191	1E-4	1E-4
	Pt-193m	1E-3	1E-3
	Pt-193	9E-4	2E-3
	Pt-197m	1E-3	9E-4
	Pt-197	1E-4	1E-4
Plutonium (94)	Pu-238	5E-6	3E-5
	Pu-239	5E-6	3E-5
	Pu-240	5E-6	3E-5
	Pu-241	2E-4	1E-3
	Pu-242	5E-6	3E-5
	Pu-243	3E-4	3E-4
Polonium (84)	Po-210	7E-7	3E-5

Element	Isotope	Soluble Conc. (μCi/ml)	Insoluble Conc. (μCi/ml)
Potassium (19)	K-42	3E-4	2E-5
Praseodymium (59)	Pr-142	3E-5	3E-5
	Pr-143	5E-5	5E-5
Promethium (61)	Pm-147	2E-4	2E-4
	Pm-149	4E-5	4E-5
Protactinium (91)	Pa-230	2E-4	2E-4
	Pa-231	9E-7	2E-5
	Pa-233	1E-4	1E-4
Radium (88)	Ra-223	7E-7	4E-6
	Ra-224	2E-6	5E-6
	Ra-226	3E-8	3E-5
	Ra-228	3E-8	3E-5
Rhenium (75)	Re-183	6E-4	3E-4
	Re-186	9E-5	5E-5
	Re-187	3E-3	2E-3
	Re-188	6E-5	3E-5
Rhodium (45)	Rh-103m	1E-2	1E-2
	Rh-105	1E-4	1E-4
Rubidium (37)	Rb-86	7E-5	2E-5
	Rb-87	1E-4	2E-4
Ruthenium (44)	Ru-97	4E-4	3E-4
	Ru-103	8E-5	8E-5
	Ru-105	1E-4	1E-4
	Ru-106	1E-5	1E-5
Samarium (62)	Sm-147	6E-5	7E-5
	Sm-151	4E-4	4E-4
	Sm-153	8E-5	8E-5
Scandium (21)	Sc-46	4E-5	4E-5
	Sc-47	9E-5	9E-5
	Sc-48	3E-5	3E-5
Selenium (34)	Se-75	3E-4	3E-4
Silicon (14)	Si-31	9E-4	2E-4
Silver (47)	Ag-105	1E-4	1E-4
	Ag-110m	3E-5	3E-5
	Ag-111	4E-5	4E-5
Sodium (11)	Na-22	4E-5	3E-5
	Na-24	2E-4	3E-5

Element	Isotope	Soluble Conc. (μCi/ml)	Insoluble Conc. (μCi/ml)
Strontium (38)	Sr-85m	7E-3	7E-3
	Sr-85	1E-4	2E-4
	Sr-89	3E-6	3E-5
	Sr-90	3E-7	4E-5
	Sr-91	7E-5	5E-5
	Sr-92	7E-5	6E-5
Sulfur (16)	S-35	6E-5	3E-4
Tantalum (73)	Ta-182	4E-5	4E-5
Technetium (43)	Tc-96m	1E-2	1E-2
	Tc-96	1E-4	5E-5
	Tc-97m	4E-4	2E-4
	Tc-97	2E-3	8E-4
	Tc-99m	6E-3	3E-3
	Tc-99	3E-4	2E-4
Tellurium (52)	Te-125m	2E-4	1E-4
	Te-127m	6E-5	5E-5
	Te-127	3E-4	2E-4
	Te-129m	3E-5	2E-5
	Te-129	8E-4	8E-4
	Te-131m	6E-5	4E-5
	Te-132	3E-5	2E-5
Terbium (65)	Tb-160	4E-5	4E-5
Thallium (81)	Tl-200	4E-4	2E-4
	Tl-201	3E-4	2E-4
	Tl-202	1E-4	7E-5
	Tl-204	1E-4	6E-5
Thorium (90)	Th-227	2E-5	2E-5
	Th-228	7E-6	1E-5
	Th-230	2E-6	3E-5
	Th-231	2E-4	2E-4
	Th-232	2E-6	4E-5
	Th-natural	2E-6	2E-5
	Th-234	2E-5	2E-5
Thulium (69)	Tm-170	5E-5	5E-5
	Tm-171	5E-4	5E-4
Tin (50)	Sn-113	9E-5	8E-5
	Sn-124	2E-5	2E-5

Element	Isotope	Soluble Conc. (μCi/ml)	Insoluble Conc. (μCi/ml)
Tungsten (74)	W-181	4E-4	3E-4
	W-185	1E-4	1E-4
	W-187	7E-5	6E-5
Uranium (92)	U-230	5E-6	5E-6
	U-232	3E-5	3E-5
	U-233	3E-5	3E-5
	U-234	3E-5	3E-5
	U-235	3E-5	3E-5
	U-236	3E-5	3E-5
	U-238	4E-5	4E-5
	U-240	3E-5	3E-5
	U-natural	3E-5	3E-5
Vanadium (23)	V-48	3E-5	3E-5
Ytterbium (70)	Yb-175	1E-4	1E-4
Yttrium	Y-90	2E-5	2E-5
	Y-91m	3E-3	3E-3
	Y-91	3E-5	3E-5
	Y-92	6E-5	6E-5
	Y-93	3E-5	3E-5
Zinc (30)	Zn-65	1E-4	2E-4
	Zn-69m	7E-5	6E-5
	Zn-69	2E-3	2E-3
Zirconium (40)	Zr-93	8E-4	8E-4
	Zr-95	6E-5	6E-5
	Zr-97	2E-5	2E-5
Any single radio-nuclide not listed above with decay mode other than alpha emission or spontaneous fission and with radio - active half-life greater than 2 hours		3E-6	3E-6

Element	Isotope	Soluble Conc. (μCi/ml)	Insoluble Conc. (μCi/ml)
Any single radio-nuclide not listed above, which decays by alpha emission or spontaneous fission.		3E-8	3E-8

Notes:

1. If the identity of any radionuclide is not known, the limiting values for purposes of this table shall be: 3E-8 μCi/ml.

2. If the identity and concentration of each radionuclide are known, the limiting values should be derived as follows: Determine, for each radionuclide in the mixture, the ratio between the quantity present in the mixture and the limit otherwise established in Appendix B for the specific radionuclide not in a mixture. The sum of such ratios for all the radionuclides in the mixture may not exceed "1" (i.e. "unity").

APPENDIX C

HCGS ODCM

REV 18

APPENDIX D

HCGS PCP

REV 3

APPENDIX A

METEOROLOGICAL DATA

ARTIFICIAL ISLAND 1/99 - 3/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 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		
N	0	0.0	0	0.0	0	0.0	1	0.0	4	0.2	0	0.0	0	0.0	5	0.2
NNE	0	0.0	0	0.0	0	0.0	1	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	1	0.0	0	0.0	0	0.0	1	0.0
ENE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
E	0	0.0	0	0.0	0	0.0	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	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	4	0.2	0	0.0	0	0.0	4	0.2
WNW	0	0.0	1	0.0	0	0.0	0	0.0	3	0.1	0	0.0	0	0.0	4	0.2
NW	0	0.0	0	0.0	0	0.0	1	0.0	24	1.1	5	0.2	0	0.0	30	1.4
NNW	0	0.0	0	0.0	0	0.0	0	0.0	12	0.6	4	0.2	0	0.0	16	0.7
	0	0.0	1	0.0	0	0.0	4	0.2	48	2.2	9	0.4	0	0.0	62	2.9

MEAN WIND SPEED: 15.6
MISSING: 0

ARTIFICIAL ISLAND 1/99 - 3/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 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	4	0.2	5	0.2	0	0.0	0	0.0	9	0.4
NNE	0	0.0	0	0.0	0	0.0	4	0.2	0	0.0	0	0.0	0	0.0	4	0.2
NE	0	0.0	0	0.0	0	0.0	2	0.1	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	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	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0
SW	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0
WSW	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	0	0.0	2	0.1
W	0	0.0	0	0.0	1	0.0	0	0.0	4	0.2	3	0.1	0	0.0	8	0.4
WNW	0	0.0	0	0.0	0	0.0	1	0.0	5	0.2	2	0.1	0	0.0	8	0.4
NW	0	0.0	0	0.0	0	0.0	6	0.3	13	0.6	1	0.0	0	0.0	20	0.9
NNW	0	0.0	0	0.0	0	0.0	5	0.2	9	0.4	4	0.2	0	0.0	18	0.8
	0	0.0	0	0.0	4	0.2	23	1.1	36	1.7	10	0.5	0	0.0	73	3.4

MEAN WIND SPEED: 13.5
MISSING: 0

ARTIFICIAL ISLAND 1/99 - 3/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 FT
DELTA T: (300-33FT)

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

WIND SPEED GROUPS (MPH)

DIRECTION	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6-24.5		GE 24.6		SUM	PERCENT
	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	0	0.0	2	0.1	11	0.5	7	0.3	0	0.0	0	0.0	20	0.9
NNE	0	0.0	0	0.0	1	0.0	4	0.2	1	0.0	0	0.0	0	0.0	6	0.3
NE	0	0.0	0	0.0	0	0.0	4	0.2	2	0.1	0	0.0	0	0.0	6	0.3
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	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0
WSW	0	0.0	0	0.0	3	0.1	3	0.1	1	0.0	0	0.0	0	0.0	1	0.0
W	0	0.0	0	0.0	0	0.0	0	0.0	5	0.2	1	0.0	0	0.0	7	0.3
WNW	0	0.0	0	0.0	2	0.1	1	0.0	3	0.1	1	0.0	0	0.0	6	0.3
NW	0	0.0	0	0.0	2	0.1	11	0.5	7	0.3	0	0.0	0	0.0	20	0.9
NNW	0	0.0	0	0.0	1	0.0	7	0.3	9	0.4	3	0.1	0	0.0	20	0.9
	0	0.0	0	0.0	11	0.5	42	2.0	35	1.6	5	0.2	0	0.0	93	4.3

MEAN WIND SPEED: 12.0
MISSING: 0

ARTIFICIAL ISLAND 1/99 - 3/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 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	13	0.6	27	1.3	27	1.3	1	0.0	0	0.0	71	3.3
NNE	0	0.0	2	0.1	21	1.0	29	1.4	10	0.5	2	0.1	0	0.0	64	3.0
NE	0	0.0	1	0.0	22	1.0	22	1.0	4	0.2	0	0.0	0	0.0	49	2.3
ENE	0	0.0	4	0.2	12	0.6	8	0.4	0	0.0	0	0.0	0	0.0	24	1.1
E	0	0.0	2	0.1	4	0.2	1	0.0	0	0.0	0	0.0	0	0.0	7	0.3
ESE	0	0.0	1	0.0	2	0.1	0	0.0	0	0.0	0	0.0	0	0.0	3	0.1
SE	0	0.0	5	0.2	0	0.0	6	0.3	7	0.3	0	0.0	0	0.0	18	0.8
SSE	0	0.0	0	0.0	2	0.1	6	0.3	3	0.1	0	0.0	0	0.0	11	0.5
S	0	0.0	1	0.0	1	0.0	0	0.0	1	0.0	0	0.0	0	0.0	3	0.1
SSW	0	0.0	2	0.1	1	0.0	1	0.0	0	0.0	1	0.0	0	0.0	5	0.2
SW	0	0.0	1	0.0	6	0.3	7	0.3	0	0.0	2	0.1	1	0.0	17	0.8
WSW	0	0.0	0	0.0	8	0.4	13	0.6	7	0.3	1	0.0	2	0.1	31	1.4
W	0	0.0	0	0.0	8	0.4	15	0.7	17	0.8	10	0.5	0	0.0	50	2.3
WNW	0	0.0	3	0.1	16	0.7	39	1.8	34	1.6	4	0.2	3	0.1	99	4.6
NW	0	0.0	3	0.1	12	0.6	51	2.4	45	2.1	10	0.5	1	0.0	122	5.7
NNW	0	0.0	3	0.1	10	0.5	24	1.1	43	2.0	5	0.2	0	0.0	85	4.0
	0	0.0	31	1.4	138	6.4	249	11.6	198	9.3	36	1.7	7	0.3	659	30.8

MEAN WIND SPEED: 11.0
MISSING: 6

ARTIFICIAL ISLAND 1/99 - 3/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 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	4	0.2	44	2.1	46	2.1	5	0.2	0	0.0	0	0.0	99	4.6
NNE	0	0.0	4	0.2	36	1.7	12	0.6	1	0.0	0	0.0	0	0.0	53	2.5
NE	0	0.0	6	0.3	30	1.4	2	0.1	1	0.0	1	0.0	0	0.0	40	1.9
ENE	0	0.0	4	0.2	17	0.8	1	0.0	0	0.0	0	0.0	0	0.0	22	1.0
E	0	0.0	5	0.2	13	0.6	0	0.0	0	0.0	0	0.0	0	0.0	18	0.8
ESE	0	0.0	5	0.2	15	0.7	8	0.4	2	0.1	0	0.0	1	0.0	31	1.4
SE	0	0.0	4	0.2	21	1.0	10	0.5	13	0.6	8	0.4	8	0.4	64	3.0
SSE	0	0.0	2	0.1	4	0.2	10	0.5	1	0.0	1	0.0	0	0.0	18	0.8
S	0	0.0	2	0.1	14	0.7	18	0.8	8	0.4	0	0.0	1	0.0	43	2.0
SSW	0	0.0	3	0.1	15	0.7	19	0.9	11	0.5	1	0.0	0	0.0	49	2.3
SW	0	0.0	4	0.2	19	0.9	18	0.8	4	0.2	0	0.0	0	0.0	45	2.1
WSW	0	0.0	3	0.1	16	0.7	15	0.7	0	0.0	0	0.0	0	0.0	34	1.6
W	0	0.0	1	0.0	28	1.3	22	1.0	0	0.0	1	0.0	0	0.0	52	2.4
WNW	0	0.0	2	0.1	28	1.3	40	1.9	4	0.2	1	0.0	0	0.0	75	3.5
NW	0	0.0	3	0.1	29	1.4	58	2.7	26	1.2	0	0.0	0	0.0	116	5.4
NNW	0	0.0	1	0.0	12	0.6	31	1.4	22	1.0	1	0.0	0	0.0	67	3.1
	0	0.0	53	2.5	341	15.9	310	14.5	98	4.6	14	0.7	10	0.5	826	38.6

MEAN WIND SPEED: 8.7
MISSING: 6

ARTIFICIAL ISLAND 1/99 - 3/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 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	2	0.1	13	0.6	0	0.0	0	0.0	0	0.0	0	0.0	15	0.7
NNE	0	0.0	2	0.1	4	0.2	0	0.0	0	0.0	0	0.0	0	0.0	6	0.3
NE	0	0.0	5	0.2	7	0.3	1	0.0	0	0.0	0	0.0	0	0.0	13	0.6
ENE	0	0.0	8	0.4	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	9	0.4
E	0	0.0	2	0.1	3	0.1	2	0.1	0	0.0	0	0.0	0	0.0	7	0.3
ESE	0	0.0	2	0.1	13	0.6	5	0.2	1	0.0	0	0.0	0	0.0	21	1.0
SE	0	0.0	2	0.1	18	0.8	20	0.9	11	0.5	1	0.0	1	0.0	53	2.5
SSE	0	0.0	6	0.3	14	0.7	3	0.1	3	0.1	1	0.0	0	0.0	27	1.3
S	0	0.0	2	0.1	13	0.6	9	0.4	1	0.0	1	0.0	0	0.0	26	1.2
SSW	0	0.0	1	0.0	9	0.4	7	0.3	4	0.2	2	0.1	0	0.0	23	1.1
SW	0	0.0	3	0.1	23	1.1	6	0.3	0	0.0	0	0.0	0	0.0	32	1.5
WSW	0	0.0	2	0.1	13	0.6	4	0.2	0	0.0	1	0.0	0	0.0	20	0.9
W	0	0.0	2	0.1	8	0.4	7	0.3	0	0.0	0	0.0	0	0.0	17	0.8
WNW	0	0.0	1	0.0	2	0.1	5	0.2	0	0.0	0	0.0	0	0.0	8	0.4
NW	0	0.0	2	0.1	2	0.1	3	0.1	0	0.0	0	0.0	0	0.0	7	0.3
NNW	0	0.0	1	0.0	3	0.1	0	0.0	0	0.0	0	0.0	0	0.0	4	0.2
	0	0.0	43	2.0	146	6.8	72	3.4	20	0.9	6	0.3	1	0.0	288	13.5

MEAN WIND SPEED: 7.1
MISSING: 0

ARTIFICIAL ISLAND 1/99 - 3/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 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	1	0.0	5	0.2	0	0.0	0	0.0	0	0.0	0	0.0	6	0.3
NNE	0	0.0	0	0.0	5	0.2	0	0.0	0	0.0	0	0.0	0	0.0	5	0.2
NE	0	0.0	0	0.0	5	0.2	0	0.0	0	0.0	0	0.0	0	0.0	5	0.2
ENE	0	0.0	0	0.0	2	0.1	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1
E	0	0.0	0	0.0	2	0.1	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1
ESE	0	0.0	0	0.0	8	0.4	1	0.0	0	0.0	0	0.0	0	0.0	9	0.4
SE	0	0.0	0	0.0	19	0.9	21	1.0	21	1.0	2	0.1	0	0.0	63	2.9
SSE	0	0.0	1	0.0	7	0.3	9	0.4	0	0.0	0	0.0	0	0.0	17	0.8
S	0	0.0	2	0.1	1	0.0	1	0.0	1	0.0	2	0.1	0	0.0	7	0.3
SSW	0	0.0	3	0.1	2	0.1	0	0.0	0	0.0	0	0.0	0	0.0	5	0.2
SW	0	0.0	0	0.0	7	0.3	0	0.0	0	0.0	0	0.0	0	0.0	7	0.3
WSW	0	0.0	0	0.0	7	0.3	0	0.0	0	0.0	0	0.0	0	0.0	7	0.3
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	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0
NNW	0	0.0	2	0.1	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	3	0.1
	0	0.0	9	0.4	72	3.4	32	1.5	22	1.0	4	0.2	0	0.0	139	6.5

MEAN WIND SPEED: 8.4
MISSING: 0

ARTIFICIAL ISLAND 1/99 - 3/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 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	10	0.5	77	3.6	89	4.2	48	2.2	1	0.0	0	0.0	225	10.5
NNE	0	0.0	8	0.4	67	3.1	50	2.3	12	0.6	2	0.1	0	0.0	139	6.5
NE	0	0.0	12	0.6	64	3.0	31	1.4	8	0.4	1	0.0	0	0.0	116	5.4
ENE	0	0.0	16	0.7	32	1.5	9	0.4	0	0.0	0	0.0	0	0.0	57	2.7
E	0	0.0	9	0.4	22	1.0	3	0.1	0	0.0	0	0.0	0	0.0	34	1.6
ESE	0	0.0	8	0.4	38	1.8	14	0.7	3	0.1	0	0.0	1	0.0	64	3.0
SE	0	0.0	11	0.5	58	2.7	57	2.7	52	2.4	11	0.5	9	0.4	198	9.3
SSE	0	0.0	9	0.4	27	1.3	28	1.3	7	0.3	2	0.1	0	0.0	73	3.4
S	0	0.0	7	0.3	29	1.4	28	1.3	11	0.5	3	0.1	1	0.0	79	3.7
SSW	0	0.0	9	0.4	28	1.3	27	1.3	15	0.7	4	0.2	0	0.0	83	3.9
SW	0	0.0	8	0.4	56	2.6	32	1.5	4	0.2	2	0.1	1	0.0	103	4.8
WSW	0	0.0	5	0.2	48	2.2	37	1.7	8	0.4	2	0.1	2	0.1	102	4.8
W	0	0.0	3	0.1	45	2.1	44	2.1	30	1.4	15	0.7	0	0.0	137	6.4
WNW	0	0.0	7	0.3	48	2.2	86	4.0	49	2.3	8	0.4	3	0.1	201	9.4
NW	0	0.0	8	0.4	46	2.1	130	6.1	115	5.4	16	0.7	1	0.0	316	14.8
NNW	0	0.0	7	0.3	27	1.3	67	3.1	95	4.4	17	0.8	0	0.0	213	10.0
	0	0.0	137	6.4	712	33.3	732	34.2	457	21.4	84	3.9	18	0.8	2140	100.0

MISSING HOURS: 20

MEAN WIND SPEED: 9.7

ARTIFICIAL ISLAND 1/99 - 3/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 FT
DELTA T: (300-33FT)

DIRECTION VS SPEED ONLY

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	10	0.5	77	3.6	89	4.1	48	2.2	1	0.0	0	0.0	225	10.5
NNE	0	0.0	8	0.4	67	3.1	50	2,3	12	0.6	2	0.1	0	0.0	139	6.5
NE	0	0.0	12	0.6	64	3.0	31	1.4	8	0.4	1	0.0	0	0.0	116	5.4
ENE	0	0.0	16	0.7	32	1.5	9	0.4	0	0.0	0	0.0	0	0.0	57	2.7
E	0	0.0	9	0.4	22	1.0	3	0.1	0	0.0	0	0.0	0	0.0	34	1.6
ESE	0	0.0	8	0.4	38	1.8	14	0.7	3	0.1	0	0.0	1	0.0	64	3.0
SE	0	0.0	11	0.5	58	2.7	59	2.7	54	2.5	11	0.5	9	0.4	202	9.4
SSE	0	0.0	9	0.4	27	1.3	28	1.3	8	0.4	2	0.1	0	0.0	74	3.4
S	0	0.0	7	0.3	31	1.4	28	1.3	11	0.5	3	0.1	1	0.0	81	3.8
SSW	0	0.0	9	0.4	28	1.3	27	1.3	15	0.7	4	0.2	0	0.0	83	3.9
SW	0	0.0	8	0.4	56	2.6	32	1.5	4	0.2	2	0.1	1	0.0	103	4.8
WSW	0	0.0	5	0.2	48	2.2	37	1.7	8	0.4	2	0.1	2	0.1	102	4.8
W	0	0.0	3	0.1	45	2.1	44	2.0	30	1.4	15	0.7	0	0.0	137	6.4
WNW	0	0.0	7	0.3	48	2.2	86	4.0	49	2.3	8	0.4	3	0.1	201	9.4
NW	0	0.0	8	0.4	46	2.1	130	6.1	115	5.4	16	0.7	1	0.0	316	14.7
NNW	0	0.0	7	0.3	27	1.3	67	3.1	95	4.4	17	0.8	0	0.0	213	9.9
	0	0.0	137	6.4	714	33.3	734	34.2	460	21.4	84	3.9	18	0.8	2147	100.0

MISSING HOURS: 13

MEAN WIND SPEED: 9.7

ARTIFICIAL ISLAND 4/99 - 6/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 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		
N	0	0.0	0	0.0	0	0.0	3	0.1	2	0.1	0	0.0	0	0.0	5	0.2
NNE	0	0.0	0	0.0	0	0.0	2	0.1	0	0.0	0	0.0	0	0.0	2	0.1
NE	0	0.0	0	0.0	1	0.0	9	0.4	4	0.2	1	0.0	0	0.0	15	0.7
ENE	0	0.0	0	0.0	0	0.0	11	0.5	5	0.2	0	0.0	0	0.0	16	0.7
E	0	0.0	0	0.0	0	0.0	5	0.2	0	0.0	0	0.0	0	0.0	5	0.2
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	4	0.2	2	0.1	0	0.0	0	0.0	6	0.3
SSE	0	0.0	0	0.0	0	0.0	5	0.2	3	0.1	0	0.0	0	0.0	8	0.4
S	0	0.0	0	0.0	0	0.0	3	0.1	0	0.0	0	0.0	0	0.0	3	0.1
SSW	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0
SW	0	0.0	0	0.0	3	0.1	5	0.2	0	0.0	0	0.0	0	0.0	8	0.4
WSW	0	0.0	0	0.0	1	0.0	1	0.0	3	0.1	0	0.0	0	0.0	5	0.2
W	0	0.0	0	0.0	1	0.0	11	0.5	11	0.5	0	0.0	0	0.0	23	1.1
WNW	0	0.0	0	0.0	0	0.0	6	0.3	3	0.1	0	0.0	0	0.0	9	0.4
NW	0	0.0	0	0.0	0	0.0	5	0.2	3	0.1	7	0.3	0	0.0	15	0.7
NNW	0	0.0	0	0.0	0	0.0	2	0.1	6	0.3	0	0.0	0	0.0	8	0.4
	0	0.0	0	0.0	7	0.3	72	3.3	43	2.0	8	0.4	0	0.0	130	6.0

MEAN WIND SPEED: 12.4
MISSING: 0

ARTIFICIAL ISLAND 4/99 - 6/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 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	1	0.0	5	0.2	7	0.3	0	0.0	0	0.0	13	0.6
NNE	0	0.0	0	0.0	0	0.0	5	0.2	1	0.0	0	0.0	0	0.0	6	0.3
NE	0	0.0	0	0.0	0	0.0	6	0.3	2	0.1	0	0.0	0	0.0	8	0.4
ENE	0	0.0	0	0.0	2	0.1	8	0.4	0	0.0	0	0.0	0	0.0	10	0.5
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	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0
SE	0	0.0	0	0.0	0	0.0	3	0.1	3	0.1	0	0.0	0	0.0	6	0.3
SSE	0	0.0	0	0.0	0	0.0	4	0.2	4	0.2	0	0.0	0	0.0	8	0.4
S	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	0	0.0	2	0.1
SSW	0	0.0	0	0.0	2	0.1	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1
SW	0	0.0	0	0.0	2	0.1	4	0.2	0	0.0	0	0.0	0	0.0	6	0.3
WSW	0	0.0	0	0.0	0	0.0	1	0.0	4	0.2	0	0.0	0	0.0	5	0.2
W	0	0.0	0	0.0	0	0.0	5	0.2	2	0.1	0	0.0	0	0.0	7	0.3
WNW	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	2	0.1
NW	0	0.0	0	0.0	0	0.0	3	0.1	2	0.1	3	0.1	0	0.0	8	0.4
NNW	0	0.0	0	0.0	0	0.0	4	0.2	4	0.2	0	0.0	0	0.0	8	0.4
	0	0.0	0	0.0	9	0.4	51	2.3	31	1.4	3	0.1	0	0.0	94	4.3

MEAN WIND SPEED: 11.6
MISSING: 0

ARTIFICIAL ISLAND 4/99 - 6/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 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	6	0.3	10	0.5	3	0.1	0	0.0	0	0.0	19	0.9
NNE	0	0.0	0	0.0	1	0.0	3	0.1	1	0.0	0	0.0	0	0.0	5	0.2
NE	0	0.0	0	0.0	4	0.2	9	0.4	3	0.1	0	0.0	0	0.0	16	0.7
ENE	0	0.0	0	0.0	0	0.0	7	0.3	0	0.0	0	0.0	0	0.0	7	0.3
E	0	0.0	0	0.0	2	0.1	5	0.2	0	0.0	0	0.0	0	0.0	7	0.3
ESE	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	1	0.0
SE	0	0.0	0	0.0	0	0.0	1	0.0	4	0.2	0	0.0	0	0.0	5	0.2
SSE	0	0.0	0	0.0	3	0.1	3	0.1	4	0.2	0	0.0	0	0.0	10	0.5
S	0	0.0	0	0.0	7	0.3	1	0.0	0	0.0	0	0.0	0	0.0	8	0.4
SSW	0	0.0	0	0.0	3	0.1	0	0.0	0	0.0	0	0.0	0	0.0	3	0.1
SW	0	0.0	0	0.0	3	0.1	8	0.4	2	0.1	0	0.0	0	0.0	13	0.6
WSW	0	0.0	0	0.0	2	0.1	3	0.1	3	0.1	0	0.0	0	0.0	8	0.4
W	0	0.0	0	0.0	0	0.0	8	0.4	2	0.1	0	0.0	0	0.0	10	0.5
WNW	0	0.0	0	0.0	2	0.1	4	0.2	2	0.1	0	0.0	0	0.0	8	0.4
NW	0	0.0	0	0.0	1	0.0	2	0.1	4	0.2	1	0.0	0	0.0	8	0.4
NNW	0	0.0	0	0.0	1	0.0	7	0.3	3	0.1	0	0.0	0	0.0	11	0.5
	0	0.0	0	0.0	35	1.6	72	3.3	31	1.4	1	0.0	0	0.0	139	6.4

MEAN WIND SPEED: 10.0
MISSING: 0

ARTIFICIAL ISLAND 4/99 - 6/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 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
	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	1	0.0	21	1.0	31	1.4	9	0.4	0	0.0	0	0.0	62	2.9
NNE	0	0.0	1	0.0	26	1.2	21	1.0	7	0.3	0	0.0	0	0.0	55	2.5
NE	0	0.0	1	0.0	32	1.5	56	2.6	8	0.4	0	0.0	0	0.0	97	4.5
ENE	0	0.0	7	0.3	43	2.0	28	1.3	1	0.0	0	0.0	0	0.0	79	3.6
E	0	0.0	6	0.3	25	1.2	22	1.0	0	0.0	0	0.0	0	0.0	53	2.4
ESE	0	0.0	3	0.1	10	0.5	17	0.8	3	0.1	0	0.0	0	0.0	33	1.5
SE	0	0.0	1	0.0	2	0.1	28	1.3	30	1.4	2	0.1	0	0.0	63	2.9
SSE	0	0.0	0	0.0	27	1.2	27	1.2	27	1.2	2	0.1	0	0.0	83	3.8
S	0	0.0	2	0.1	30	1.4	16	0.7	5	0.2	0	0.0	0	0.0	53	2.4
SSW	0	0.0	2	0.1	19	0.9	23	1.1	4	0.2	0	0.0	0	0.0	48	2.2
SW	0	0.0	1	0.0	16	0.7	15	0.7	2	0.1	0	0.0	0	0.0	34	1.6
WSW	0	0.0	1	0.0	8	0.4	18	0.8	2	0.1	0	0.0	0	0.0	29	1.3
W	0	0.0	0	0.0	7	0.3	17	0.8	7	0.3	0	0.0	0	0.0	31	1.4
WNW	0	0.0	2	0.1	7	0.3	10	0.5	4	0.2	0	0.0	0	0.0	23	1.1
NW	0	0.0	1	0.0	6	0.3	12	0.6	8	0.4	0	0.0	0	0.0	27	1.2
NNW	0	0.0	1	0.0	8	0.4	8	0.4	10	0.5	0	0.0	0	0.0	27	1.2
	0	0.0	30	1.4	287	13.2	349	16.1	127	5.8	4	0.2	0	0.0	797	36.7

MEAN WIND SPEED: 8.9
MISSING: 1

ARTIFICIAL ISLAND 4/99 - 6/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 FT
DELTA T: (300-33FT)

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

WIND SPEED GROUPS (MPH)

	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6-24.5		GE 24.6		SUM	PERCENT
DIRECTION	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	3	0.1	27	1.2	20	0.9	8	0.4	0	0.0	0	0.0	58	2.7
NNE	0	0.0	1	0.0	37	1.7	24	1.1	2	0.1	0	0.0	0	0.0	64	2.9
NE	0	0.0	6	0.3	48	2.2	20	0.9	0	0.0	0	0.0	0	0.0	74	3.4
ENE	0	0.0	5	0.2	37	1.7	4	0.2	0	0.0	0	0.0	0	0.0	46	2.1
E	0	0.0	4	0.2	15	0.7	5	0.2	0	0.0	0	0.0	0	0.0	24	1.1
ESE	0	0.0	3	0.1	21	1.0	7	0.3	0	0.0	0	0.0	0	0.0	31	1.4
SE	0	0.0	6	0.3	14	0.6	26	1.2	17	0.8	0	0.0	0	0.0	63	2.9
SSE	0	0.0	0	0.0	13	0.6	22	1.0	11	0.5	0	0.0	0	0.0	46	2.1
S	0	0.0	1	0.0	13	0.6	9	0.4	2	0.1	1	0.0	0	0.0	26	1.2
SSW	0	0.0	3	0.1	25	1.2	22	1.0	0	0.0	0	0.0	0	0.0	50	2.3
SW	0	0.0	3	0.1	33	1.5	24	1.1	0	0.0	0	0.0	0	0.0	60	2.8
WSW	0	0.0	5	0.2	18	0.8	11	0.5	1	0.0	0	0.0	0	0.0	35	1.6
W	0	0.0	3	0.1	13	0.6	18	0.8	1	0.0	0	0.0	0	0.0	35	1.6
WNW	0	0.0	3	0.1	9	0.4	19	0.9	2	0.1	0	0.0	0	0.0	33	1.5
NW	0	0.0	1	0.0	23	1.1	27	1.2	5	0.2	0	0.0	0	0.0	56	2.6
NNW	0	0.0	7	0.3	18	0.8	19	0.9	0	0.0	0	0.0	0	0.0	44	2.0
	0	0.0	54	2.5	364	16.8	277	12.7	49	2.3	1	0.0	0	0.0	745	34.3

MEAN WIND SPEED: 7.4
MISSING: 0

ARTIFICIAL ISLAND 4/99 - 6/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 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	8	0.4	5	0.2	0	0.0	0	0.0	0	0.0	14	0.6
NNE	0	0.0	0	0.0	11	0.5	7	0.3	0	0.0	0	0.0	0	0.0	18	0.8
NE	0	0.0	1	0.0	8	0.4	1	0.0	0	0.0	0	0.0	0	0.0	10	0.5
ENE	0	0.0	1	0.0	4	0.2	0	0.0	0	0.0	0	0.0	0	0.0	5	0.2
E	0	0.0	3	0.1	3	0.1	0	0.0	0	0.0	0	0.0	0	0.0	6	0.3
ESE	0	0.0	2	0.1	9	0.4	1	0.0	0	0.0	0	0.0	0	0.0	12	0.6
SE	0	0.0	2	0.1	13	0.6	11	0.5	2	0.1	0	0.0	0	0.0	28	1.3
SSE	0	0.0	0	0.0	10	0.5	9	0.4	0	0.0	0	0.0	0	0.0	19	0.9
S	0	0.0	1	0.0	7	0.3	1	0.0	0	0.0	0	0.0	0	0.0	9	0.4
SSW	0	0.0	4	0.2	7	0.3	3	0.1	0	0.0	0	0.0	0	0.0	14	0.6
SW	0	0.0	0	0.0	7	0.3	9	0.4	0	0.0	0	0.0	0	0.0	16	0.7
WSW	0	0.0	1	0.0	12	0.6	5	0.2	0	0.0	0	0.0	0	0.0	18	0.8
W	0	0.0	2	0.1	7	0.3	5	0.2	0	0.0	0	0.0	0	0.0	14	0.6
WNW	0	0.0	2	0.1	8	0.4	8	0.4	0	0.0	0	0.0	0	0.0	18	0.8
NW	0	0.0	0	0.0	10	0.5	6	0.3	0	0.0	0	0.0	0	0.0	16	0.7
NNW	0	0.0	0	0.0	6	0.3	2	0.1	0	0.0	0	0.0	0	0.0	8	0.4
	0	0.0	20	0.9	130	6.0	73	3.4	2	0.1	0	0.0	0	0.0	225	10.4

MEAN WIND SPEED: 6.6
MISSING: 0

ARTIFICIAL ISLAND 4/99 - 6/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 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
	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	0	0.0	2	0.1	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1
NNE	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0
NE	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	1	0.0
ENE	0	0.0	1	0.0	0	0.0	0	0.0	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	0.0	0	0.0	0	0.0	1	0.0
ESE	0	0.0	1	0.0	2	0.1	0	0.0	0	0.0	0	0.0	0	0.0	3	0.1
SE	0	0.0	0	0.0	9	0.4	3	0.1	1	0.0	0	0.0	0	0.0	13	0.6
SSE	0	0.0	2	0.1	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	3	0.1
S	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	0	0.0	2	0.1
SSW	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0
SW	0	0.0	1	0.0	3	0.1	1	0.0	0	0.0	0	0.0	0	0.0	5	0.2
WSW	0	0.0	2	0.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1
W	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	0	0.0	2	0.1
WNW	0	0.0	1	0.0	3	0.1	0	0.0	0	0.0	0	0.0	0	0.0	4	0.2
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	2	0.1	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1
	0	0.0	9	0.4	26	1.2	7	0.3	1	0.0	0	0.0	0	0.0	43	2.0

MEAN WIND SPEED: 5.5
MISSING: 0

ARTIFICIAL ISLAND 4/99 - 6/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 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	5	0.2	65	3.0	74	3.4	29	1.3	0	0.0	0	0.0	173	8.0
NNE	0	0.0	2	0.1	76	3.5	62	2.9	11	0.5	0	0.0	0	0.0	151	6.9
NE	0	0.0	8	0.4	93	4.3	102	4.7	17	0.8	1	0.0	0	0.0	221	10.2
ENE	0	0.0	14	0.6	86	4.0	58	2.7	6	0.3	0	0.0	0	0.0	164	7.5
E	0	0.0	14	0.6	45	2.1	38	1.7	1	0.0	0	0.0	0	0.0	98	4.5
ESE	0	0.0	9	0.4	43	2.0	26	1.2	4	0.2	0	0.0	0	0.0	82	3.8
SE	0	0.0	9	0.4	38	1.7	76	3.5	59	2.7	2	0.1	0	0.0	184	8.5
SSE	0	0.0	2	0.1	54	2.5	70	3.2	49	2.3	2	0.1	0	0.0	177	8.1
S	0	0.0	4	0.2	59	2.7	32	1.5	7	0.3	1	0.0	0	0.0	103	4.7
SSW	0	0.0	9	0.4	58	2.7	48	2.2	4	0.2	0	0.0	0	0.0	119	5.5
SW	0	0.0	5	0.2	67	3.1	66	3.0	4	0.2	0	0.0	0	0.0	142	6.5
WSW	0	0.0	9	0.4	41	1.9	39	1.8	13	0.6	0	0.0	0	0.0	102	4.7
W	0	0.0	5	0.2	29	1.3	65	3.0	23	1.1	0	0.0	0	0.0	122	5.6
WNW	0	0.0	8	0.4	29	1.3	48	2.2	12	0.6	0	0.0	0	0.0	97	4.5
NW	0	0.0	2	0.1	40	1.8	55	2.5	22	1.0	11	0.5	0	0.0	130	6.0
NNW	0	0.0	8	0.4	35	1.6	42	1.9	23	1.1	0	0.0	0	0.0	108	5.0
	0	0.0	113	5.2	858	39.5	901	41.5	284	13.1	17	0.8	0	0.0	2173	100.0

MISSING HOURS: 11

MEAN WIND SPEED: 8.5

ARTIFICIAL ISLAND 4/99 - 6/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 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	5	0.2	65	3.0	74	3.4	29	1.3	0	0.0	0	0.0	173	7.9
NNE	0	0.0	2	0.1	76	3.5	62	2.8	11	0.5	0	0.0	0	0.0	151	6.9
NE	0	0.0	8	0.4	93	4.3	102	4.7	17	0.8	1	0.0	0	0.0	221	10.1
ENE	0	0.0	14	0.6	86	3.9	58	2.7	6	0.3	0	0.0	0	0.0	164	7.5
E	0	0.0	14	0.6	45	2.1	38	1.7	1	0.0	0	0.0	0	0.0	98	4.5
ESE	0	0.0	9	0.4	43	2.0	26	1.2	4	0.2	0	0.0	0	0.0	82	3.8
SE	0	0.0	9	0.4	38	1.7	76	3.5	59	2.7	2	0.1	0	0.0	184	8.4
SSE	0	0.0	2	0.1	54	2.5	70	3.2	49	2.2	2	0.1	0	0.0	177	8.1
S	0	0.0	4	0.2	59	2.7	32	1.5	7	0.3	1	0.0	0	0.0	103	4.7
SSW	0	0.0	9	0.4	58	2.7	48	2.2	4	0.2	0	0.0	0	0.0	119	5.5
SW	0	0.0	5	0.2	68	3.1	66	3.0	4	0.2	0	0.0	0	0.0	143	6.6
WSW	0	0.0	9	0.4	41	1.9	39	1.8	13	0.6	0	0.0	0	0.0	102	4.7
W	0	0.0	5	0.2	29	1.3	70	3.2	24	1.1	0	0.0	0	0.0	128	5.9
WNW	0	0.0	8	0.4	29	1.3	48	2.2	14	0.6	0	0.0	0	0.0	99	4.5
NW	0	0.0	2	0.1	40	1.8	55	2.5	22	1.0	11	0.5	0	0.0	130	6.0
NNW	0	0.0	8	0.4	35	1.6	42	1.9	23	1.1	0	0.0	0	0.0	108	4.9
	0	0.0	113	5.2	859	39.4	906	41.5	287	13.2	17	0.8	0	0.0	2182	100.0

MISSING HOURS: 2

MEAN WIND SPEED: 8.5

ARTIFICIAL ISLAND 7/99 - 9/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 FT
DELTA T: (300-33FT)

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

WIND SPEED GROUPS (MPH)

	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6-24.5		GE 24.6		SUM PERCENT	
DIRECTION	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
NNE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
NE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
ENE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
E	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
ESE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SE	0	0.0	0	0.0	1	0.0	7	0.3	10	0.5	0	0.0	0	0.0	18	0.8
SSE	0	0.0	0	0.0	1	0.0	9	0.4	4	0.2	0	0.0	0	0.0	14	0.6
S	0	0.0	0	0.0	2	0.1	2	0.1	0	0.0	0	0.0	0	0.0	4	0.2
SSW	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	1	0.0
SW	0	0.0	0	0.0	0	0.0	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	4	0.2	0	0.0	0	0.0	0	0.0	4	0.2
W	0	0.0	0	0.0	0	0.0	2	0.1	1	0.0	0	0.0	0	0.0	3	0.1
WNW	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
NW	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
NNW	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	0	0.0	0	0.0	4	0.2	26	1.2	15	0.7	0	0.0	0	0.0	45	2.0

MEAN WIND SPEED: 11.2
MISSING: 0

ARTIFICIAL ISLAND 7/99 - 9/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 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
	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	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	7	0.3
SE	0	0.0	0	0.0	4	0.2	3	0.1	2	0.1	2	0.1	0	0.0	11	0.5
SSE	0	0.0	0	0.0	7	0.3	3	0.1	4	0.2	0	0.0	0	0.0	7	0.3
S	0	0.0	0	0.0	7	0.3	0	0.0	0	0.0	0	0.0	0	0.0	9	0.4
SSW	0	0.0	0	0.0	5	0.2	2	0.1	0	0.0	0	0.0	0	0.0	7	0.3
SW	0	0.0	0	0.0	0	0.0	2	0.1	0	0.0	0	0.0	0	0.0	4	0.2
WSW	0	0.0	0	0.0	0	0.0	4	0.2	0	0.0	0	0.0	0	0.0	6	0.3
W	0	0.0	0	0.0	0	0.0	5	0.2	1	0.0	0	0.0	0	0.0	2	0.1
WNW	0	0.0	0	0.0	0	0.0	2	0.1	0	0.0	0	0.0	0	0.0	6	0.3
NW	0	0.0	0	0.0	0	0.0	0	0.0	6	0.3	0	0.0	0	0.0	3	0.1
NNW	0	0.0	0	0.0	1	0.0	0	0.0	2	0.1	0	0.0	0	0.0		
	0	0.0	0	0.0	25	1.1	21	1.0	15	0.7	2	0.1	0	0.0	63	2.9

MEAN WIND SPEED: 9.9
MISSING: 0

ARTIFICIAL ISLAND 7/99 - 9/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 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	7	0.3	10	0.5	2	0.1	0	0.0	0	0.0	19	0.9
NNE	0	0.0	0	0.0	1	0.0	2	0.1	0	0.0	0	0.0	0	0.0	3	0.1
NE	0	0.0	0	0.0	2	0.1	7	0.3	3	0.1	0	0.0	0	0.0	12	0.5
ENE	0	0.0	0	0.0	3	0.1	3	0.1	0	0.0	0	0.0	0	0.0	6	0.3
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	3	0.1	0	0.0	0	0.0	0	0.0	0	0.0	3	0.1
SE	0	0.0	1	0.0	2	0.1	10	0.5	5	0.2	2	0.1	0	0.0	20	0.9
SSE	0	0.0	0	0.0	5	0.2	9	0.4	5	0.2	0	0.0	0	0.0	19	0.9
S	0	0.0	0	0.0	15	0.7	6	0.3	0	0.0	0	0.0	0	0.0	21	1.0
SSW	0	0.0	1	0.0	4	0.2	2	0.1	0	0.0	0	0.0	0	0.0	7	0.3
SW	0	0.0	0	0.0	11	0.5	1	0.0	1	0.0	0	0.0	0	0.0	13	0.6
WSW	0	0.0	1	0.0	3	0.1	5	0.2	1	0.0	0	0.0	0	0.0	10	0.5
W	0	0.0	0	0.0	4	0.2	5	0.2	0	0.0	0	0.0	0	0.0	9	0.4
WNW	0	0.0	1	0.0	2	0.1	5	0.2	1	0.0	0	0.0	0	0.0	9	0.4
NW	0	0.0	0	0.0	3	0.1	4	0.2	5	0.2	0	0.0	0	0.0	12	0.5
NNW	0	0.0	0	0.0	2	0.1	6	0.3	1	0.0	0	0.0	0	0.0	9	0.4
	0	0.0	4	0.2	67	3.0	76	3.4	24	1.1	2	0.1	0	0.0	173	7.8

MEAN WIND SPEED: 8.8
MISSING: 0

ARTIFICIAL ISLAND 7/99 - 9/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 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
	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	6	0.3	24	1.1	29	1.3	11	0.5	0	0.0	2	0.1	72	3.3
NNE	0	0.0	7	0.3	14	0.6	28	1.3	1	0.0	1	0.0	0	0.0	51	2.3
NE	0	0.0	6	0.3	12	0.5	35	1.6	24	1.1	2	0.1	0	0.0	79	3.6
ENE	0	0.0	1	0.0	16	0.7	16	0.7	5	0.2	0	0.0	0	0.0	38	1.7
E	0	0.0	1	0.0	15	0.7	17	0.8	1	0.0	0	0.0	0	0.0	34	1.5
ESE	0	0.0	0	0.0	5	0.2	11	0.5	2	0.1	0	0.0	0	0.0	18	0.8
SE	0	0.0	3	0.1	4	0.2	36	1.6	48	2.2	8	0.4	0	0.0	99	4.5
SSE	0	0.0	2	0.1	30	1.4	48	2.2	48	2.2	5	0.2	0	0.0	133	6.0
S	0	0.0	2	0.1	29	1.3	37	1.7	25	1.1	2	0.1	0	0.0	95	4.3
SSW	0	0.0	3	0.1	32	1.5	32	1.5	9	0.4	2	0.1	0	0.0	78	3.5
SW	0	0.0	0	0.0	27	1.2	28	1.3	9	0.4	0	0.0	0	0.0	64	2.9
WSW	0	0.0	2	0.1	13	0.6	14	0.6	5	0.2	0	0.0	0	0.0	34	1.5
W	0	0.0	0	0.0	12	0.5	33	1.5	8	0.4	0	0.0	0	0.0	53	2.4
WNW	0	0.0	0	0.0	9	0.4	26	1.2	4	0.2	1	0.0	0	0.0	40	1.8
NW	0	0.0	4	0.2	12	0.5	20	0.9	7	0.3	6	0.3	2	0.1	51	2.3
NNW	0	0.0	4	0.2	14	0.6	16	0.7	8	0.4	0	0.0	1	0.0	43	1.9
	0	0.0	41	1.9	268	12.1	426	19.3	215	9.7	27	1.2	5	0.2	982	44.5

MEAN WIND SPEED: 9.9
MISSING: 0

ARTIFICIAL ISLAND 7/99 - 9/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 FT
DELTA T: (300-33FT)

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

WIND SPEED GROUPS (MPH)

DIRECTION	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6-24.5		GE 24.6		SUM	PERCENT
	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	3	0.1	15	0.7	17	0.8	3	0.1	2	0.1	0	0.0	40	1.8
NNE	0	0.0	6	0.3	29	1.3	29	1.3	6	0.3	0	0.0	0	0.0	70	3.2
NE	0	0.0	4	0.2	29	1.3	24	1.1	2	0.1	2	0.1	0	0.0	61	2.8
ENE	0	0.0	7	0.3	25	1.1	5	0.2	0	0.0	0	0.0	0	0.0	37	1.7
E	0	0.0	8	0.4	23	1.0	8	0.4	1	0.0	0	0.0	0	0.0	40	1.8
ESE	0	0.0	0	0.0	25	1.1	3	0.1	0	0.0	0	0.0	0	0.0	28	1.3
SE	0	0.0	1	0.0	14	0.6	25	1.1	9	0.4	0	0.0	0	0.0	49	2.2
SSE	0	0.0	0	0.0	8	0.4	17	0.8	8	0.4	1	0.0	0	0.0	34	1.5
S	0	0.0	1	0.0	13	0.6	14	0.6	5	0.2	0	0.0	0	0.0	33	1.5
SSW	0	0.0	0	0.0	15	0.7	27	1.2	1	0.0	0	0.0	0	0.0	43	1.9
SW	0	0.0	1	0.0	31	1.4	32	1.5	2	0.1	0	0.0	0	0.0	66	3.0
WSW	0	0.0	2	0.1	24	1.1	19	0.9	1	0.0	0	0.0	0	0.0	46	2.1
W	0	0.0	5	0.2	20	0.9	8	0.4	0	0.0	0	0.0	0	0.0	33	1.5
WNW	0	0.0	2	0.1	26	1.2	20	0.9	0	0.0	0	0.0	0	0.0	48	2.2
NW	0	0.0	3	0.1	30	1.4	28	1.3	2	0.1	0	0.0	0	0.0	63	2.9
NNW	0	0.0	4	0.2	21	1.0	17	0.8	1	0.0	0	0.0	1	0.0	44	2.0
	0	0.0	47	2.1	348	15.8	293	13.3	41	1.9	5	0.2	1	0.0	735	33.3

MEAN WIND SPEED: 7.6
MISSING: 0

ARTIFICIAL ISLAND 7/99 - 9/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 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	9	0.4	15	0.7	0	0.0	0	0.0	0	0.0	25	1.1
NNE	0	0.0	2	0.1	21	1.0	8	0.4	0	0.0	0	0.0	0	0.0	31	1.4
NE	0	0.0	6	0.3	9	0.4	3	0.1	0	0.0	0	0.0	0	0.0	18	0.8
ENE	0	0.0	4	0.2	7	0.3	0	0.0	0	0.0	0	0.0	0	0.0	11	0.5
E	0	0.0	5	0.2	6	0.3	0	0.0	0	0.0	0	0.0	0	0.0	11	0.5
ESE	0	0.0	1	0.0	14	0.6	0	0.0	0	0.0	0	0.0	0	0.0	15	0.7
SE	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	2	0.1
SSE	0	0.0	0	0.0	3	0.1	2	0.1	0	0.0	0	0.0	0	0.0	5	0.2
S	0	0.0	0	0.0	2	0.1	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1
SSW	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0
SW	0	0.0	0	0.0	2	0.1	2	0.1	0	0.0	0	0.0	0	0.0	4	0.2
WSW	0	0.0	1	0.0	13	0.6	2	0.1	0	0.0	0	0.0	0	0.0	16	0.7
W	0	0.0	0	0.0	11	0.5	1	0.0	0	0.0	0	0.0	0	0.0	12	0.5
WNW	0	0.0	0	0.0	6	0.3	6	0.3	0	0.0	0	0.0	0	0.0	12	0.5
NW	0	0.0	1	0.0	7	0.3	2	0.1	0	0.0	0	0.0	0	0.0	10	0.5
NNW	0	0.0	2	0.1	14	0.6	8	0.4	0	0.0	0	0.0	0	0.0	24	1.1
	0	0.0	23	1.0	125	5.7	50	2.3	1	0.0	0	0.0	0	0.0	199	9.0

MEAN WIND SPEED: 6.2
MISSING: 0

ARTIFICIAL ISLAND 7/99 - 9/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 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	1	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1
ENE	0	0.0	0	0.0	5	0.2	0	0.0	0	0.0	0	0.0	0	0.0	5	0.2
E	0	0.0	0	0.0	2	0.1	0	0.0	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	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	1	0.0	8	0.4	0	0.0	0	0.0	0	0.0	0	0.0	9	0.4

MEAN WIND SPEED: 5.2
MISSING: 0

ARTIFICIAL ISLAND 7/99 - 9/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 FT
DELTA T: (300-33FT)

ALL STABILITY CLASSES

WIND SPEED GROUPS (MPH)

DIRECTION	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6-24.5		GE 24.6		SUM	PERCENT
	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	10	0.5	56	2.5	71	3.2	16	0.7	2	0.1	2	0.1	157	7.1
NNE	0	0.0	15	0.7	65	2.9	67	3.0	7	0.3	1	0.0	0	0.0	155	7.0
NE	0	0.0	17	0.8	53	2.4	69	3.1	29	1.3	4	0.2	0	0.0	172	7.8
ENE	0	0.0	12	0.5	56	2.5	24	1.1	5	0.2	0	0.0	0	0.0	97	4.4
E	0	0.0	14	0.6	46	2.1	26	1.2	2	0.1	0	0.0	0	0.0	88	4.0
ESE	0	0.0	1	0.0	47	2.1	14	0.6	2	0.1	0	0.0	0	0.0	64	2.9
SE	0	0.0	5	0.2	21	1.0	82	3.7	75	3.4	12	0.5	0	0.0	195	8.8
SSE	0	0.0	2	0.1	51	2.3	88	4.0	69	3.1	6	0.3	0	0.0	216	9.8
S	0	0.0	3	0.1	68	3.1	59	2.7	30	1.4	2	0.1	0	0.0	162	7.3
SSW	0	0.0	4	0.2	59	2.7	64	2.9	10	0.5	2	0.1	0	0.0	139	6.3
SW	0	0.0	1	0.0	76	3.4	66	3.0	12	0.5	0	0.0	0	0.0	155	7.0
WSW	0	0.0	6	0.3	53	2.4	48	2.2	7	0.3	0	0.0	0	0.0	114	5.2
W	0	0.0	5	0.2	47	2.1	54	2.4	10	0.5	0	0.0	0	0.0	116	5.3
WNW	0	0.0	3	0.1	43	1.9	59	2.7	5	0.2	1	0.0	0	0.0	111	5.0
NW	0	0.0	8	0.4	52	2.4	54	2.4	20	0.9	6	0.3	2	0.1	142	6.4
NNW	0	0.0	10	0.5	52	2.4	47	2.1	12	0.5	0	0.0	2	0.1	123	5.6
	0	0.0	116	5.3	845	38.3	892	40.4	311	14.1	36	1.6	6	0.3	2206	100.0

MEAN WIND SPEED: 8.7

MISSING HOURS: 2

ARTIFICIAL ISLAND 7/99 - 9/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 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	10	0.5	56	2.5	71	3.2	16	0.7	2	0.1	2	0.1	157	7.1
NNE	0	0.0	15	0.7	65	2.9	67	3.0	7	0.3	1	0.0	0	0.0	155	7.0
NE	0	0.0	17	0.8	53	2.4	69	3.1	29	1.3	4	0.2	0	0.0	172	7.8
ENE	0	0.0	12	0.5	56	2.5	24	1.1	5	0.2	0	0.0	0	0.0	97	4.4
E	0	0.0	14	0.6	46	2.1	26	1.2	2	0.1	0	0.0	0	0.0	88	4.0
ESE	0	0.0	1	0.0	47	2.1	14	0.6	2	0.1	0	0.0	0	0.0	64	2.9
SE	0	0.0	5	0.2	21	1.0	82	3.7	75	3.4	12	0.5	0	0.0	195	8.8
SSE	0	0.0	2	0.1	51	2.3	88	4.0	69	3.1	6	0.3	0	0.0	216	9.8
S	0	0.0	3	0.1	68	3.1	60	2.7	30	1.4	2	0.1	0	0.0	163	7.4
SSW	0	0.0	4	0.2	60	2.7	64	2.9	10	0.5	2	0.1	0	0.0	140	6.3
SW	0	0.0	1	0.0	76	3.4	66	3.0	12	0.5	0	0.0	0	0.0	155	7.0
WSW	0	0.0	6	0.3	53	2.4	48	2.2	7	0.3	0	0.0	0	0.0	114	5.2
W	0	0.0	5	0.2	47	2.1	54	2.4	10	0.5	0	0.0	0	0.0	116	5.3
WNW	0	0.0	3	0.1	43	1.9	59	2.7	5	0.2	1	0.0	0	0.0	111	5.0
NW	0	0.0	8	0.4	52	2.4	54	2.4	20	0.9	6	0.3	2	0.1	142	6.4
NNW	0	0.0	10	0.5	52	2.4	47	2.1	12	0.5	0	0.0	2	0.1	123	5.6
	0	0.0	116	5.3	846	38.3	893	40.4	311	14.1	36	1.6	6	0.3	2208	100.0

MISSING HOURS: 0

MEAN WIND SPEED: 8.7

ARTIFICIAL ISLAND 10/99-12/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 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		
N	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0	0	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	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	3	0.1	3	0.1	0	0.0	0	0.0	6	0.3
SSE	0	0.0	0	0.0	0	0.0	2	0.1	1	0.0	0	0.0	0	0.0	3	0.1
S	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	2	0.1
SSW	0	0.0	0	0.0	3	0.1	0	0.0	0	0.0	0	0.0	0	0.0	3	0.1
SW	0	0.0	0	0.0	0	0.0	2	0.1	0	0.0	0	0.0	0	0.0	2	0.1
WSW	0	0.0	0	0.0	0	0.0	5	0.2	0	0.0	0	0.0	0	0.0	5	0.2
W	0	0.0	0	0.0	0	0.0	4	0.2	2	0.1	0	0.0	0	0.0	6	0.3
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	6	0.3	1	0.0	0	0.0	7	0.3
NNW	0	0.0	0	0.0	0	0.0	0	0.0	5	0.2	2	0.1	0	0.0	7	0.3
	0	0.0	0	0.0	3	0.1	18	0.8	19	0.9	3	0.1	0	0.0	43	2.0

MEAN WIND SPEED: 13.2
MISSING: 0

ARTIFICIAL ISLAND 10/99-12/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 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
	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	0	0.0	0	0.0	6	0.3	3	0.1	0	0.0	0	0.0	9	0.4
NNE	0	0.0	0	0.0	0	0.0	0	0.0	1	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	2	0.1	0	0.0	0	0.0	0	0.0	2	0.1
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	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0
S	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0
SSW	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	2	0.1
SW	0	0.0	0	0.0	3	0.1	4	0.2	0	0.0	0	0.0	0	0.0	7	0.3
WSW	0	0.0	0	0.0	1	0.0	6	0.3	0	0.0	0	0.0	0	0.0	7	0.3
W	0	0.0	0	0.0	5	0.2	8	0.4	1	0.0	0	0.0	0	0.0	14	0.6
WNW	0	0.0	0	0.0	1	0.0	1	0.0	5	0.2	0	0.0	0	0.0	7	0.3
NW	0	0.0	0	0.0	0	0.0	5	0.2	10	0.5	1	0.0	0	0.0	16	0.7
NNW	0	0.0	0	0.0	1	0.0	15	0.7	11	0.5	2	0.1	0	0.0	29	1.3
	0	0.0	0	0.0	13	0.6	48	2.2	33	1.5	3	0.1	0	0.0	97	4.5

MEAN WIND SPEED: 11.8
MISSING: 0

ARTIFICIAL ISLAND 10/99-12/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 FT
DELTA T: (300-33FT)

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

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	6	0.3	7	0.3	0	0.0	0	0.0	17	0.8
NNE	0	0.0	0	0.0	3	0.1	1	0.0	1	0.0	0	0.0	0	0.0	5	0.2
NE	0	0.0	0	0.0	5	0.2	1	0.0	0	0.0	0	0.0	0	0.0	6	0.3
ENE	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0
E	0	0.0	0	0.0	1	0.0	0	0.0	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	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	5	0.2	1	0.0	1	0.0	0	0.0	0	0.0	7	0.3
S	0	0.0	0	0.0	2	0.1	1	0.0	2	0.1	0	0.0	0	0.0	5	0.2
SSW	0	0.0	1	0.0	2	0.1	1	0.0	1	0.0	0	0.0	0	0.0	5	0.2
SW	0	0.0	0	0.0	4	0.2	3	0.1	0	0.0	0	0.0	0	0.0	7	0.3
WSW	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	0	0.0	2	0.1
W	0	0.0	0	0.0	2	0.1	5	0.2	6	0.3	1	0.0	0	0.0	14	0.6
WNW	0	0.0	0	0.0	2	0.1	2	0.1	3	0.1	0	0.0	0	0.0	7	0.3
NW	0	0.0	0	0.0	2	0.1	8	0.4	3	0.1	1	0.0	0	0.0	14	0.6
NNW	0	0.0	0	0.0	4	0.2	10	0.5	5	0.2	1	0.0	0	0.0	20	0.9
	0	0.0	3	0.1	37	1.7	40	1.8	30	1.4	3	0.1	0	0.0	113	5.2

MEAN WIND SPEED: 10.2
MISSING: 0

ARTIFICIAL ISLAND 10/99-12/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 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
	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	2	0.1	17	0.8	20	0.9	23	1.1	2	0.1	0	0.0	64	2.9
NNE	0	0.0	1	0.0	11	0.5	17	0.8	4	0.2	0	0.0	0	0.0	33	1.5
NE	0	0.0	2	0.1	23	1.1	29	1.3	2	0.1	0	0.0	0	0.0	56	2.6
ENE	0	0.0	2	0.1	14	0.6	6	0.3	3	0.1	0	0.0	0	0.0	25	1.1
E	0	0.0	2	0.1	6	0.3	2	0.1	1	0.0	0	0.0	0	0.0	11	0.5
ESE	0	0.0	0	0.0	6	0.3	0	0.0	0	0.0	0	0.0	0	0.0	6	0.3
SE	0	0.0	0	0.0	3	0.1	5	0.2	6	0.3	0	0.0	0	0.0	14	0.6
SSE	0	0.0	1	0.0	15	0.7	24	1.1	3	0.1	0	0.0	0	0.0	43	2.0
S	0	0.0	0	0.0	12	0.6	23	1.1	17	0.8	0	0.0	0	0.0	52	2.4
SSW	0	0.0	3	0.1	15	0.7	17	0.8	15	0.7	0	0.0	0	0.0	50	2.3
SW	0	0.0	0	0.0	15	0.7	18	0.8	1	0.0	0	0.0	0	0.0	34	1.6
WSW	0	0.0	1	0.0	8	0.4	20	0.9	5	0.2	0	0.0	0	0.0	34	1.6
W	0	0.0	0	0.0	10	0.5	31	1.4	24	1.1	2	0.1	0	0.0	67	3.1
WNW	0	0.0	2	0.1	11	0.5	23	1.1	35	1.6	5	0.2	0	0.0	76	3.5
NW	0	0.0	2	0.1	13	0.6	30	1.4	32	1.5	2	0.1	0	0.0	79	3.6
NNW	0	0.0	1	0.0	10	0.5	45	2.1	22	1.0	3	0.1	0	0.0	81	3.7
	0	0.0	19	0.9	189	8.7	310	14.2	193	8.9	14	0.6	0	0.0	725	33.3

MEAN WIND SPEED: 10.2
MISSING: 1

ARTIFICIAL ISLAND 10/99-12/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 FT
DELTA T: (300-33FT)

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

WIND SPEED GROUPS (MPH)

DIRECTION	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6-24.5		GE 24.6		SUM	PERCENT
	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	3	0.1	14	0.6	21	1.0	1	0.0	2	0.1	0	0.0	41	1.9
NNE	0	0.0	5	0.2	21	1.0	13	0.6	1	0.0	0	0.0	0	0.0	40	1.8
NE	0	0.0	17	0.8	20	0.9	15	0.7	0	0.0	0	0.0	0	0.0	52	2.4
ENE	0	0.0	7	0.3	11	0.5	1	0.0	0	0.0	0	0.0	0	0.0	19	0.9
E	0	0.0	3	0.1	8	0.4	0	0.0	0	0.0	0	0.0	0	0.0	11	0.5
ESE	0	0.0	1	0.0	9	0.4	0	0.0	0	0.0	0	0.0	0	0.0	10	0.5
SE	0	0.0	8	0.4	25	1.1	14	0.6	2	0.1	5	0.2	2	0.1	56	2.6
SSE	0	0.0	6	0.3	23	1.1	19	0.9	1	0.0	0	0.0	1	0.0	50	2.3
S	0	0.0	5	0.2	19	0.9	25	1.1	12	0.6	0	0.0	0	0.0	61	2.8
SSW	0	0.0	6	0.3	21	1.0	36	1.7	13	0.6	2	0.1	0	0.0	78	3.6
SW	0	0.0	3	0.1	25	1.1	25	1.1	1	0.0	0	0.0	0	0.0	54	2.5
WSW	0	0.0	4	0.2	28	1.3	18	0.8	0	0.0	0	0.0	0	0.0	50	2.3
W	0	0.0	6	0.3	22	1.0	20	0.9	1	0.0	0	0.0	0	0.0	49	2.2
WNW	0	0.0	3	0.1	15	0.7	25	1.1	1	0.0	0	0.0	0	0.0	44	2.0
NW	0	0.0	7	0.3	43	2.0	42	1.9	11	0.5	1	0.0	0	0.0	104	4.8
NNW	0	0.0	1	0.0	33	1.5	55	2.5	11	0.5	1	0.0	0	0.0	101	4.6
	0	0.0	85	3.9	337	15.5	329	15.1	55	2.5	11	0.5	3	0.1	820	37.6

MEAN WIND SPEED: 7.8
MISSING: 5

ARTIFICIAL ISLAND 10/99-12/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 FT
DELTA T: (300-33FT)

ALL STABILITY CLASSES

WIND SPEED GROUPS (MPH)

DIRECTION	0.0-0.5		0.6-3.5		3.6-7.5		7.6-12.5		12.6-18.5		18.6-24.5		GE 24.6		SUM	PERCENT
	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT	SUM	PERCENT		
N	0	0.0	7	0.3	45	2.1	63	2.9	35	1.6	4	0.2	0	0.0	154	7.1
NNE	0	0.0	9	0.4	57	2.6	34	1.6	7	0.3	0	0.0	0	0.0	107	4.9
NE	0	0.0	24	1.1	67	3.1	46	2.1	2	0.1	0	0.0	0	0.0	139	6.4
ENE	0	0.0	14	0.6	37	1.7	9	0.4	3	0.1	0	0.0	0	0.0	63	2.9
E	0	0.0	13	0.6	23	1.1	2	0.1	1	0.0	0	0.0	0	0.0	39	1.8
ESE	0	0.0	3	0.1	31	1.4	2	0.1	0	0.0	0	0.0	0	0.0	36	1.7
SE	0	0.0	13	0.6	72	3.3	38	1.7	18	0.8	5	0.2	2	0.1	148	6.8
SSE	0	0.0	10	0.5	74	3.4	64	2.9	12	0.6	0	0.0	1	0.0	161	7.4
S	0	0.0	10	0.5	41	1.9	55	2.5	32	1.5	0	0.0	0	0.0	138	6.3
SSW	0	0.0	15	0.7	46	2.1	60	2.8	30	1.4	2	0.1	0	0.0	153	7.0
SW	0	0.0	5	0.2	59	2.7	57	2.6	2	0.1	0	0.0	0	0.0	123	5.6
WSW	0	0.0	6	0.3	58	2.7	59	2.7	5	0.2	0	0.0	0	0.0	128	5.9
W	0	0.0	9	0.4	44	2.0	75	3.4	34	1.6	3	0.1	0	0.0	165	7.6
WNW	0	0.0	6	0.3	35	1.6	52	2.4	44	2.0	5	0.2	0	0.0	142	6.5
NW	0	0.0	10	0.5	65	3.0	89	4.1	62	2.8	6	0.3	0	0.0	232	10.6
NNW	0	0.0	6	0.3	54	2.5	128	5.9	54	2.5	9	0.4	0	0.0	251	11.5
	0	0.0	160	7.3	808	37.1	833	38.2	341	15.6	34	1.6	3	0.1	2179	100.0

MEAN WIND SPEED: 8.7

MISSING HOURS: 29

ARTIFICIAL ISLAND 10/99-12/99

JOINT DISTRIBUTION OF WIND DIRECTION AND SPEED
BY ATMOSPHERIC STABILITY CLASS
WIND: 30 FT
DELTA T: (300-33FT)

DIRECTION VS SPEED ONLY

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	7	0.3	45	2.0	63	2.9	35	1.6	4	0.2	0	0.0	154	7.0
NNE	0	0.0	9	0.4	57	2.6	34	1.5	7	0.3	0	0.0	0	0.0	107	4.9
NE	0	0.0	24	1.1	67	3.1	46	2.1	2	0.1	0	0.0	0	0.0	139	6.3
ENE	0	0.0	14	0.6	37	1.7	9	0.4	3	0.1	0	0.0	0	0.0	63	2.9
E	0	0.0	13	0.6	23	1.0	2	0.1	1	0.0	0	0.0	0	0.0	39	1.8
ESE	0	0.0	3	0.1	31	1.4	2	0.1	0	0.0	0	0.0	0	0.0	36	1.6
SE	0	0.0	13	0.6	72	3.3	39	1.8	18	0.8	5	0.2	2	0.1	149	6.8
SSE	0	0.0	10	0.5	75	3.4	64	2.9	12	0.5	0	0.0	1	0.0	162	7.4
S	0	0.0	10	0.5	42	1.9	55	2.5	32	1.5	0	0.0	0	0.0	139	6.3
SSW	0	0.0	15	0.7	46	2.1	60	2.7	30	1.4	2	0.1	0	0.0	153	7.0
SW	0	0.0	5	0.2	60	2.7	58	2.6	2	0.1	0	0.0	0	0.0	125	5.7
WSW	0	0.0	6	0.3	59	2.7	59	2.7	5	0.2	0	0.0	0	0.0	129	5.9
W	0	0.0	9	0.4	45	2.0	75	3.4	36	1.6	3	0.1	0	0.0	168	7.7
WNW	0	0.0	6	0.3	35	1.6	52	2.4	52	2.4	5	0.2	0	0.0	150	6.8
NW	0	0.0	10	0.5	65	3.0	89	4.1	62	2.8	6	0.3	0	0.0	232	10.6
NNW	0	0.0	6	0.3	54	2.5	128	5.8	54	2.5	9	0.4	0	0.0	251	11.4
	0	0.0	160	7.3	813	37.0	835	38.0	351	16.0	34	1.5	3	0.1	2196	100.0

MEAN WIND SPEED: 8.8

MISSING HOURS: 12

APPENDIX B

MPC DATA

The following radionuclide concentrations were obtained from 10 CFR 20 Appendix B, Table II, Column 2 as revised January 1, 1991.

Maximum Permissible Concentrations

Element	Isotope	Soluble Conc (μCi/ml)	Insoluble Conc. (μCi/ml)
Actinium (89)	Ac-227	2E-6	3E-4
	Ac-228	9E-5	9E-5
Americium (95)	Am-241	4E-6	3E-5
	Am-242m	4E-6	9E-5
	Am-242	1E-4	1E-4
	Am-243	4E-6	3E-5
	Am-244	5E-3	5E-3
Antimony (51)	Sb-122	3E-5	3E-5
	Sb-124	2E-5	2E-5
	Sb-125	1E-4	1E-4
Arsenic (33)	As-73	5E-4	5E-4
	As-74	5E-5	5E-5
	As-76	2E-5	2E-5
	As-77	8E-5	8E-5
Astatine (85)	At-211	2E-6	7E-5
Barium (56)	Ba-131	2E-4	2E-4
	Ba-140	3E-5	2E-5
Berkelium (97)	Bk-249	6E-4	6E-4
	Bk-250	2E-4	2E-4
Beryllium (4)	Be-7	2E-3	2E-3
Bismuth (83)	Bi-206	4E-5	4E-5
	Bi-207	6E-5	6E-5
	Bi-210	4E-5	4E-5
	Bi-212	4E-4	4E-4
Bromine (35)	Br-82	3E-4	4E-5
Cadmium (48)	Cd-109	2E-4	2E-4
	Cd-115m	3E-5	3E-5
	Cd-115	3E-5	4E-5
Calcium (20)	Ca-45	9E-6	2E-4
	Ca-47	5E-5	3E-5
Californium (98)	Cf-249	4E-6	2E-5
	Cf-250	1E-5	3E-5
	Cf-251	4E-6	3E-5
	Cf-252	7E-6	7E-6

Element	Isotope	Soluble Conc. (μCi/ml)	Insoluble Conc. (μCi/ml)
Californium (98)	Cf-253	1E-4	1E-4
	Cf-254	1E-7	1E-7
Carbon (6)	C-14	8E-4	-------
Cerium (58)	Ce-141	9E-5	9E-5
	Ce-143	4E-5	4E-5
	Ce-144	1E-5	1E-5
Cesium (55)	Cs-131	2E-3	9E-4
	Cs-134m	6E-3	1E-3
	Cs-134	9E-6	4E-5
	Cs-135	1E-4	2E-4
	Cs-136	9E-5	6E-5
	Cs-137	2E-5	4E-5
Chlorine (17)	Cl-36	8E-5	6E-5
	Cl-38	4E-4	4E-4
Chromium (24)	Cr-51	2E-3	2E-3
Cobalt (27)	Co-57	5E-4	4E-4
	Co-58m	3E-3	2E-3
	Co-58	1E-4	9E-5
	Co-60	5E-5	3E-5
Copper (29)	Cu-64	3E-4	2E-4
Curium (96)	Cm-242	2E-5	2E-5
	Cm-243	5E-6	2E-5
	Cm-244	7E-6	3E-5
	Cm-245	4E-6	3E-5
	Cm-246	4E-6	3E-5
	Cm-247	4E-6	2E-5
	Cm-248	4E-7	1E-6
	Cm-249	2E-3	2E-3
Dysprosium (66)	Dy-165	4E-4	4E-4
	Dy-166	4E-5	4E-5
Einsteinium (99)	Es-253	2E-5	2E-5
	Es-254m	2E-5	2E-5
	Es-254	1E-5	1E-5
	Es-255	3E-5	3E-5
Erbium (68)	Er-169	9E-5	9E-5
	Er-171	1E-4	1E-4
Europium (63)	Eu-152(9.2 hrs)	6E-5	6E-5
	Eu-152 (13 yrs)	8E-5	8E-5

Element	Isotope	Soluble Conc. (μCi/ml)	Insoluble Conc. (μCi/ml)
Europium (63)	Eu-154	2E-5	2E-5
	Eu-155	2E-4	2E-4
Fermium (100)	Fm-254	1E-4	1E-4
	Fm-255	3E-5	3E-5
	Fm-256	9E-7	9E-7
Fluorine (9)	F-18	8E-4	5E-4
Gadolinium (64)	Gd-153	2E-4	2E-4
	Gd-159	8E-5	8E-5
Gallium (31)	Ga-72	4E-5	4E-5
Germanium (32)	Ge-71	2E-3	2E-3
Gold (79)	Au-196	2E-4	1E-4
	Au-198	5E-5	5E-5
	Au-199	2E-4	2E-4
Hafnium (72)	Hf-181	7E-5	7E-5
Holmium (67)	Ho-166	3E-5	3E-5
Hydrogen (3)	H-3	3E-3	3E-3
Indium (49)	In-113m	1E-3	1E-3
	In-114m	2E-5	2E-5
	In-115m	4E-4	4E-4
	In-115	9E-5	9E-5
Iodine (53)	I-125	2E-7	2E-4
	I-126	3E-7	9E-5
	I-129	6E-8	2E-4
	I-131	3E-7	6E-5
	I-132	8E-6	2E-4
	I-133	1E-6	4E-5
	I-134	2E-5	6E-4
	I-135	4E-6	7E-5
Iridium (77)	Ir-190	2E-4	2E-4
	Ir-192	4E-5	4E-5
	Ir-194	3E-5	3E-5
Iron (26)	Fe-55	8E-4	2E-3
	Fe-59	6E-5	5E-5
Lanthanum (57)	La-140	2E-5	2E-5
Lead (82)	Pb-203	4E-4	4E-4
	Pb-210	1E-7	2E-4
	Pb-212	2E-5	2E-5
Lutetium (71)	Lu-177	1E-4	1E-4

Element	Isotope	Soluble Conc. (μCi/ml)	Insoluble Conc. (μCi/ml)
Manganese (25)	Mn-52	3E-5	3E-5
	Mn-54	1E-4	1E-4
	Mn-56	1E-4	1E-4
Mercury (80)	Hg-197m	2E-4	2E-4
	Hg-197	3E-4	5E-4
	Hg-203	2E-5	1E-4
Molybdenum (42)	Mo-99	2E-4	4E-5
Neodymium (60)	Nd-144	7E-5	8E-5
	Nd-147	6E-5	6E-5
	Nd-149	3E-4	3E-4
Neptunium (93)	Np-237	3E-6	3E-5
	Np-239	1E-4	1E-4
Nickel (28)	Ni-59	2E-4	2E-3
	Ni-63	3E-5	7E-4
	Ni-65	1E-4	1E-4
Niobium (41)	Nb-93m	4E-4	4E-4
	Nb-95	1E-4	1E-4
	Nb-97	9E-4	9E-4
Osmium (76)	Os-185	7E-5	7E-5
	Os-191m	3E-3	2E-3
	Os-191	2E-4	2E-4
	Os-193	6E-5	5E-5
Palladium (46)	Pd-103	3E-4	3E-4
	Pd-109	9E-5	7E-5
Phosphorus (15)	P-32	2E-5	2E-5
Platinum (78)	Pt-191	1E-4	1E-4
	Pt-193m	1E-3	1E-3
	Pt-193	9E-4	2E-3
	Pt-197m	1E-3	9E-4
	Pt-197	1E-4	1E-4
Plutonium (94)	Pu-238	5E-6	3E-5
	Pu-239	5E-6	3E-5
	Pu-240	5E-6	3E-5
	Pu-241	2E-4	1E-3
	Pu-242	5E-6	3E-5
	Pu-243	3E-4	3E-4
Polonium (84)	Po-210	7E-7	3E-5

Element	Isotope	Soluble Conc. (μCi/ml)	Insoluble Conc. (μCi/ml)
Potassium (19)	K-42	3E-4	2E-5
Praseodymium (59)	Pr-142	3E-5	3E-5
	Pr-143	5E-5	5E-5
Promethium (61)	Pm-147	2E-4	2E-4
	Pm-149	4E-5	4E-5
Protactinium (91)	Pa-230	2E-4	2E-4
	Pa-231	9E-7	2E-5
	Pa-233	1E-4	1E-4
Radium (88)	Ra-223	7E-7	4E-6
	Ra-224	2E-6	5E-6
	Ra-226	3E-8	3E-5
	Ra-228	3E-8	3E-5
Rhenium (75)	Re-183	6E-4	3E-4
	Re-186	9E-5	5E-5
	Re-187	3E-3	2E-3
	Re-188	6E-5	3E-5
Rhodium (45)	Rh-103m	1E-2	1E-2
	Rh-105	1E-4	1E-4
Rubidium (37)	Rb-86	7E-5	2E-5
	Rb-87	1E-4	2E-4
Ruthenium (44)	Ru-97	4E-4	3E-4
	Ru-103	8E-5	8E-5
	Ru-105	1E-4	1E-4
	Ru-106	1E-5	1E-5
Samarium (62)	Sm-147	6E-5	7E-5
	Sm-151	4E-4	4E-4
	Sm-153	8E-5	8E-5
Scandium (21)	Sc-46	4E-5	4E-5
	Sc-47	9E-5	9E-5
	Sc-48	3E-5	3E-5
Selenium (34)	Se-75	3E-4	3E-4
Silicon (14)	Si-31	9E-4	2E-4
Silver (47)	Ag-105	1E-4	1E-4
	Ag-110m	3E-5	3E-5
	Ag-111	4E-5	4E-5
Sodium (11)	Na-22	4E-5	3E-5
	Na-24	2E-4	3E-5

Element	Isotope	Soluble Conc. (μCi/ml)	Insoluble Conc. (μCi/ml)
Strontium (38)	Sr-85m	7E-3	7E-3
	Sr-85	1E-4	2E-4
	Sr-89	3E-6	3E-5
	Sr-90	3E-7	4E-5
	Sr-91	7E-5	5E-5
	Sr-92	7E-5	6E-5
Sulfur (16)	S-35	6E-5	3E-4
Tantalum (73)	Ta-182	4E-5	4E-5
Technetium (43)	Tc-96m	1E-2	1E-2
	Tc-96	1E-4	5E-5
	Tc-97m	4E-4	2E-4
	Tc-97	2E-3	8E-4
	Tc-99m	6E-3	3E-3
	Tc-99	3E-4	2E-4
Tellurium (52)	Te-125m	2E-4	1E-4
	Te-127m	6E-5	5E-5
	Te-127	3E-4	2E-4
	Te-129m	3E-5	2E-5
	Te-129	8E-4	8E-4
	Te-131m	6E-5	4E-5
	Te-132	3E-5	2E-5
Terbium (65)	Tb-160	4E-5	4E-5
Thallium (81)	Tl-200	4E-4	2E-4
	Tl-201	3E-4	2E-4
	Tl-202	1E-4	7E-5
	Tl-204	1E-4	6E-5
Thorium (90)	Th-227	2E-5	2E-5
	Th-228	7E-6	1E-5
	Th-230	2E-6	3E-5
	Th-231	2E-4	2E-4
	Th-232	2E-6	4E-5
	Th-natural	2E-6	2E-5
	Th-234	2E-5	2E-5
Thulium (69)	Tm-170	5E-5	5E-5
	Tm-171	5E-4	5E-4
Tin (50)	Sn-113	9E-5	8E-5
	Sn-124	2E-5	2E-5

Element	Isotope	Soluble Conc. (μCi/ml)	Insoluble Conc. (μCi/ml)
Tungsten (74)	W-181	4E-4	3E-4
	W-185	1E-4	1E-4
	W-187	7E-5	6E-5
Uranium (92)	U-230	5E-6	5E-6
	U-232	3E-5	3E-5
	U-233	3E-5	3E-5
	U-234	3E-5	3E-5
	U-235	3E-5	3E-5
	U-236	3E-5	3E-5
	U-238	4E-5	4E-5
	U-240	3E-5	3E-5
	U-natural	3E-5	3E-5
Vanadium (23)	V-48	3E-5	3E-5
Ytterbium (70)	Yb-175	1E-4	1E-4
Yttrium	Y-90	2E-5	2E-5
	Y-91m	3E-3	3E-3
	Y-91	3E-5	3E-5
	Y-92	6E-5	6E-5
	Y-93	3E-5	3E-5
Zinc (30)	Zn-65	1E-4	2E-4
	Zn-69m	7E-5	6E-5
	Zn-69	2E-3	2E-3
Zirconium (40)	Zr-93	8E-4	8E-4
	Zr-95	6E-5	6E-5
	Zr-97	2E-5	2E-5
Any single radio-nuclide not listed above with decay mode other than alpha emission or spontaneous fission and with radio - active half-life greater than 2 hours		3E-6	3E-6

Element	Isotope	Soluble Conc. (μCi/ml)	Insoluble Conc. (μCi/ml)
Any single radio-nuclide not listed above, which decays by alpha emission or spontaneous fission.		3E-8	3E-8

Notes:

1. If the identity of any radionuclide is not known, the limiting values for purposes of this table shall be: 3E-8 μCi/ml.

2. If the identity and concentration of each radionuclide are known, the limiting values should be derived as follows: Determine, for each radionuclide in the mixture, the ratio between the quantity present in the mixture and the limit otherwise established in Appendix B for the specific radionuclide not in a mixture. The sum of such ratios for all the radionuclides in the mixture may not exceed "1" (i.e. "unity").

APPENDIX C

HCGS ODCM

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