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Kewaunee Nuclear Power Plant
Operated by Nuclear Management Company, LLC

NRC-03-044

10 CFR 50.36a(a)(2)

April 29, 2003

U.S. Nuclear Regulatory Commission
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KEWAUNEE NUCLEAR POWER PLANT
DOCKET 50-305
LICENSE No. DPR-43
RADIOACTIVE EFFLUENT RELEASE REPORT JANUARY - DECEMBER 2002

Enclosed please find a copy of the Kewaunee Nuclear Power Plant Radioactive Effluent Release Report for January through December 2002. This report is submitted to meet the requirements of Technical Specification 6.9.b.2.

Thomas Coutu
Site Vice-President, Kewaunee Plant

DFS

cc US NRC Senior Resident Inspector
US NRC Region III

Enclosure

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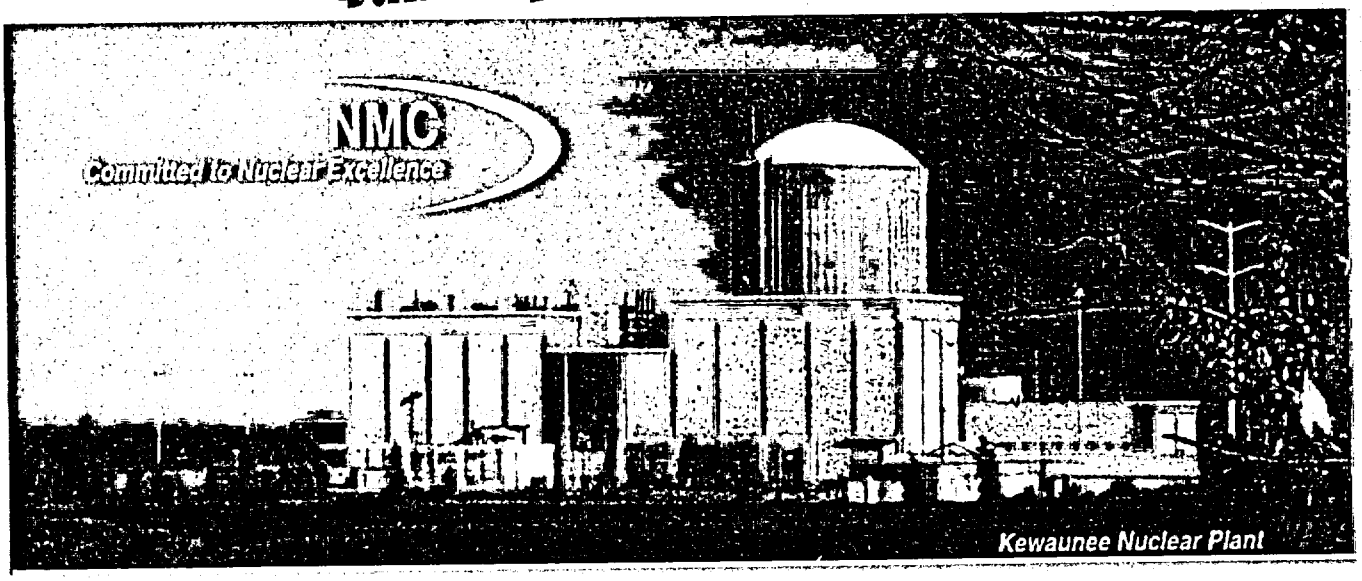
KEWAUNEE NUCLEAR POWER PLANT

RADIOACTIVE EFFLUENT RELEASE REPORT

January/December 2002



NUCLEAR MANAGEMENT COMPANY, LLC

NMC
Committed to Nuclear Excellence

DOCKET 50-305

KEWAUNEE NUCLEAR POWER PLANT

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

January 1 - December 31, 2002

Wisconsin Public Service Corporation
Green Bay, Wisconsin
April 16, 2003

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Appendix A Meteorological Data

0.0 SUMMARY

During 2002 all solid, liquid, and gaseous radioactive effluents from the Kewaunee Nuclear Plant were well below regulatory limits. For individual effluent streams , the quarterly limit most closely approached was:

GASEOUS:	Ingestion Pathway-Organ	Liver	
	Quarterly Limit (mRems)	7.5	
	Actual Dose (mRems)	0.00002016	(2^{nd} Quarter)
	% of Specification	0.0002689	
LIQUID:	Ingestion Pathway-Organ	GI-LLI	
	Quarterly Limit (mRems)	5	
	Actual Dose (mRems)	0.008593	(1^{st} Quarter)
	% of Limit	0.17	
SOLID:	No upper limit for solid radioactive waste applies.		
	Cubic Meters Shipped	18.4 m^3 (650 ft^3)	

1.0 INTRODUCTION

This report is being submitted in accordance with the requirements of Kewaunee Technical Specifications, Section 6.9.b.2 and the Offsite Dose Calculation Manual, Section 3/4.7. It includes data from all effluent releases made from January 1 - December 31, 2002. The report contains summaries of the gaseous and liquid releases made to the environment including the quantity, characterization, time duration and calculated radiation dose at the site boundary resulting from these releases. The report also includes a summation of solid waste disposal, revisions to the Process Control Program and the Offsite Dose Calculation Manual, and addresses the cumulative meteorological data.

1.1 Effluent Dose Limits

Specifications are set to insure that offsite doses are maintained as low as reasonably achievable while still allowing for practical and dependable operation of the Kewaunee Plant.

The Kewaunee Offsite Dose Calculation Manual (ODCM) describes the methodology and parameters used in:

1.) The calculation of radioactive liquid and gaseous effluent monitoring instrumentation alarm/trip setpoints.

2.) The calculation of radioactive liquid and gaseous concentrations, dose rates and cumulative quarterly and annual doses. The ODCM methodology is acceptable for use in demonstrating compliance with 10 CFR 20.106; 10 CFR 50, Appendix I; and 40 CFR 190.

2.0 GASEOUS EFFLUENTS

2.1 Lower Limits of Detection (LLD) for Gaseous Effluents

Gaseous radioactive effluents are released in both the continuous mode and the batch mode. The auxiliary building stack is sampled continuously for particulates, halogens and Strontium by an "off-line" sample train. This stack is also grab-sampled daily for gaseous gamma emitters. Batch releases are sampled prior to release for principal gaseous and particulate gamma emitters, halogens and tritium.

The LLD's for gaseous radioanalyses, as listed in Table 4.4 of the Kewaunee ODCM are:

Analysis	LLD (μCi/ml)
Gaseous Gamma Emitters	1.00 E-04
Iodine 131	3.00 E-12
Particulate Gamma Emitters	1.00 E-11
Particulate Gross Alpha	1.00 E-11
Strontium 89, 90	1.00 E-11
Noble Gases, Gross Beta or Gamma	1.00 E-06

The nominal "a priori" LLD values are shown below.

Isotope	a priori LLD (μCi/ml)
a. Gaseous emissions:	
Kr-87	5.61E-08
Kr-88	1.02E-07
Xe-133	6.68E-08
Xe-133m	2.75E-07
Xe-135	2.99E-08
Xe-138	1.13E-07

b. Particulate emissions:

Mn-54	1.11E-13
Fe-59	2.27E-13
Co-58	2.28E-13
Co-60	3.57E-13
Zn-65	1.68E-13
Mo-99	2.73E-13
Cs-134	4.69E-13
Cs-137	1.68E-13
Ce-141	2.08E-13
Ce-144	1.24E-12

c. Other identifiable gamma emitters:

Ar-41	3.97E-10
Kr-85	8.63E-05
Kr-85m	4.62E-08
Kr-89	2.04E-06
Xe-127	4.20E-08
Xe-131m	1.82E-06
Xe-135m	1.90E-08
Xe-137	2.88E-07
I-131	1.32E-13

d. Composite particulate samples:

Sr-89	1 E-14
Sr-90	1 E-14
Gross Alpha	1.00 E-14

These "a priori" LLDs represent the capabilities of the counting systems in use, not an after the fact "a posteriori" limit for a particular measurement.

2.2 Gaseous Batch Release Statistics

The following is a summation of all gaseous batch releases made during 2002.

Number of batch releases.....34

Total time for all batch releases (min)..... 11264.0

Maximum time for a batch release (min)..... 1219.0

Average time for a batch release (min)..... 331.3

Minimum time for a batch release (min)..... 8.0

2.3 Gaseous Effluent Data

The following table 2.1 presents a quarterly summation of the total activity released and average release rates of four categories of gaseous effluents. Table 2.2 lists the quarterly sums of individual gaseous radionuclides released by continuous and batch modes. Table 2.3 is essentially the same data, but is presented as monthly summations. Table 2.4 presents the dose limits for gaseous effluents, and the calculated doses this year from gaseous effluents.

Table 2.1
Annual Radioactive Effluent Release Report 2002
Gaseous Effluents - Summation of all Releases

Fission and Activation Gases	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Total Activity Released (Ci)	3.163E-003	6.076E-003	1.494E-002	4.151E-003
Average Release Rate (μCi/sec)	4.023E-004	7.727E-004	1.900E-003	5.279E-004
Iodines				
Total Activity Released (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Average Release Rate (μCi/sec)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Particulates				
Total Activity Released (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Average Release Rate (μCi/sec)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Gross Alpha Released (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Tritium				
Total Activity Released (Ci)	6.721E-001	9.545E-001	7.376E-001	4.751E-004
Average Release Rate (μCi/sec)	8.548E-002	1.214E-001	9.382E-002	6.042E-005

Table 2.2
Annual Radioactive Effluent Release Report 2002
Gaseous Effluents

Nuclides Released (Ci)
Continuous Mode

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Fission Gases				
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Iodines				
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Particulates				
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.2(cont)
Annual Radioactive Effluent Release Report 2002
Gaseous Effluents

Nuclides Released (Ci)
Batch Mode

Fission Gases				
Ar-41	2.262E-005	0.000E+000	1.643E-003	6.988E-004
Kr-85m	0.000E+000	0.000E+000	3.663E-004	4.389E-005
Kr-87	0.000E+000	0.000E+000	0.000E+000	1.722E-005
Kr-88	0.000E+000	0.000E+000	3.408E-004	5.831E-005
Xe-133m	0.000E+000	1.009E-004	0.000E+000	0.000E+000
Xe-133	3.103E-003	5.901E-003	8.908E-003	3.011E-003
Xe-135	3.775E-005	7.374E-005	3.683E-003	3.217E-004
Total	3.163E-003	6.076E-003	1.494E-002	4.151E-003
Iodines				
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Particulates				
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.3A
Annual Radioactive Effluent Release Report 2002
1st Quarter Gaseous Release
Total of all Releases

Noble Gasses (Curies)

Isotope	January	February	March	Total
Ar-41	2.262E-005	0.000E+000	0.000E+000	2.262E-005
Xe-133	8.740E-005	0.000E+000	3.016E-003	3.103E-003
Xe-135	3.775E-005	0.000E+000	0.000E+000	3.775E-005
Total	1.478E-004	0.000E+000	3.016E-003	3.163E-003

Particulates (Curies)

Isotope	January	February	March	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Halogens (Curies)

Isotope	January	February	March	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.3A (Con't)
Annual Radioactive Effluent Release Report 2002
1st Quarter Gaseous Release
Total of all Releases

Summary	January	February	March	Total
Total Noble Gases (Ci)	1.478E-004	0.000E+000	3.016E-003	3.163E-003
Total Halogens (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Particulate Gross Beta-Gamma Half-Lives>8 Days (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Tritium (Ci)	1.530E-005	3.655E-001	3.066E-001	6.721E-001
Total Particulate Gross Alpha (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.3A (Con't)
Annual Radioactive Effluent Release Report 2002
2nd Quarter Gaseous Release
Total of all Releases

Noble Gasses (Curies)

Isotope	April	May	June	Total
Xe-133m	0.000E+000	1.009E-004	0.000E+000	1.009E-004
Xe-133	3.338E-004	5.469E-003	9.804E-005	5.901E-003
Xe-135	0.000E+000	7.374E-005	0.000E+000	7.374E-005
Total	3.338E-004	5.644E-003	9.804E-005	6.076E-003

Particulates (Curies)

Isotope	April	May	June	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Halogens (Curies)

Isotope	April	May	June	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.3A (Con't)
Annual Radioactive Effluent Release Report 2002
2nd Quarter Gaseous Release
Total of all Releases

Summary	April	May	June	Total
Total Noble Gases (Ci)	3.338E-004	5.644E-003	9.804E-005	6.076E-003
Total Halogens (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Particulate Gross Beta-Gamma Half-Lives>8 Days (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Tritium (Ci)	6.828E-001	2.717E-001	3.949E-005	9.545E-001
Total Particulate Gross Alpha (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.3A (con't)
Annual Radioactive Effluent Release Report 2002
3rd Quarter Gaseous Release
Total of all Releases

Noble Gasses (Curies)

Isotope	July	August	September	Total
Ar-41	0.000E+000	1.643E-003	0.000E+000	1.643E-003
Kr-85m	0.000E+000	3.663E-004	0.000E+000	3.663E-004
Kr-88	0.000E+000	3.408E-004	0.000E+000	3.408E-004
Xe-133	0.000E+000	6.213E-003	2.695E-003	8.908E-003
Xe-135	0.000E+000	3.674E-003	8.863E-006	3.683E-003
Total	0.000E+000	1.224E-002	2.704E-003	1.494E-002

Particulates (Curies)

Isotope	July	August	September	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Halogens (Curies)

Isotope	July	August	September	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.3A (Con't)
Annual Radioactive Effluent Release Report 2002
3rd Quarter Gaseous Release
Total of all Releases

Summary	July	August	September	Total
Total Noble Gases (Ci)	0.000E+000	1.224E-002	2.704E-003	1.494E-002
Total Halogens (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Particulate Gross Beta-Gamma Half-Lives>8 Days (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Tritium (Ci)	0.000E+000	2.999E-001	4.377E-001	7.376E-001
Total Particulate Gross Alpha (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.3A (Con't)
Annual Radioactive Effluent Release Report 2002
4th Quarter Gaseous Release
Total of all Releases

Noble Gasses (Curies)

Isotope	October	November	December	Total
Ar-41	6.988E-004	0.000E+000	0.000E+000	6.988E-004
Kr-85m	4.389E-005	0.000E+000	0.000E+000	4.389E-005
Kr-87	1.722E-005	0.000E+000	0.000E+000	1.722E-005
Kr-88	5.831E-005	0.000E+000	0.000E+000	5.831E-005
Xe-133	2.376E-003	6.348E-004	0.000E+000	3.011E-003
Xe-135	3.217E-004	0.000E+000	0.000E+000	3.217E-004
Total	3.516E-003	6.348E-004	0.000E+000	4.151E-003

Particulates (Curies)

Isotope	October	November	December	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Halogens (Curies)

Isotope	October	November	December	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.3A (Con't)
Annual Radioactive Effluent Release Report 2002
4th Quarter Gaseous Release
Total of all Releases

Summary	October	November	December	Total
Total Noble Gases (Ci)	3.516E-003	6.348E-004	0.000E+000	4.151E-003
Total Halogens (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Particulate Gross Beta-Gamma Half-Lives>8 Days (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Tritium (Ci)	1.886E-004	2.864E-004	0.000E+000	4.751E-004
Total Particulate Gross Alpha (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.3B
Annual Radioactive Effluent Release Report 2002
1st Quarter Gaseous Release
Continuous Mode Only

Noble Gasses (Curies)

Isotope	January	February	March	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Particulates (Curies)

Isotope	January	February	March	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Halogens (Curies)

Isotope	January	February	March	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.3B (Con't)
Annual Radioactive Effluent Release Report 2002
1st Quarter Gaseous Release
Continuous Mode Only

Summary	January	February	March	Total
Total Noble Gases (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Halogens (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Particulate Gross Beta-Gamma Half-Lives>8 Days (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Tritium (Ci)	0.000E+000	3.655E-001	3.066E-001	6.720E-001
Total Particulate Gross Alpha (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.3B (Con't)
Annual Radioactive Effluent Release Report 2002
2nd Quarter Gaseous Release
Continuous Mode Only

Noble Gasses (Curies)

Isotope	April	May	June	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Particulates (Curies)

Isotope	April	May	June	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Halogens (Curies)

Isotope	April	May	June	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.3B (Con't)
Annual Radioactive Effluent Release Report 2002
2nd Quarter Gaseous Release
Continuous Mode Only

Summary	April	May	June	Total
Total Noble Gases (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Halogens (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Particulate Gross Beta-Gamma Half-Lives>8 Days (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Tritium (Ci)	6.828E-001	2.712E-001	0.000E+000	9.540E-001
Total Particulate Gross Alpha (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.3B (con't)
Annual Radioactive Effluent Release Report 2002
3rd Quarter Gaseous Release
Continuous Mode Only

Noble Gasses (Curies)

Isotope	July	August	September	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Particulates (Curies)

Isotope	July	August	September	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Halogens (Curies)

Isotope	July	August	September	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.3B (Con't)
Annual Radioactive Effluent Release Report 2002
3rd Quarter Gaseous Release
Continuous Mode Only

Summary	July	August	September	Total
Total Noble Gases (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Halogens (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Particulate Gross Beta-Gamma Half-Lives>8 Days (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Tritium (Ci)	0.000E+000	2.998E-001	4.375E-001	7.374E-001
Total Particulate Gross Alpha (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.3B (Con't)
Annual Radioactive Effluent Release Report 2002
4th Quarter Gaseous Release
Continuous Mode Only

Noble Gasses (Curies)

Isotope	October	November	December	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Particulates (Curies)

Isotope	October	November	December	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Halogens (Curies)

Isotope	October	November	December	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.3B (Con't)
Annual Radioactive Effluent Release Report 2002
4th Quarter Gaseous Release
Continuous Mode Only

Summary	October	November	December	Total
Total Noble Gases (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Halogens (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Particulate Gross Beta-Gamma Half-Lives>8 Days (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Tritium (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Particulate Gross Alpha (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.3C
Annual Radioactive Effluent Release Report 2002
1st Quarter Gaseous Release
Batch Mode Only

Noble Gasses (Curies)

Isotope	January	February	March	Total
Ar-41	2.262E-005	0.000E+000	0.000E+000	2.262E-005
Xe-133	8.740E-005	0.000E+000	3.016E-003	3.103E-003
Xe-135	3.775E-005	0.000E+000	0.000E+000	3.775E-005
Total	1.478E-004	0.000E+000	3.016E-003	3.163E-003

Particulates (Curies)

Isotope	January	February	March	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Halogens (Curies)

Isotope	January	February	March	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.3C (Con't)
Annual Radioactive Effluent Release Report 2002
1st Quarter Gaseous Release
Batch Mode Only

Summary	January	February	March	Total
Total Noble Gases (Ci)	1.478E-004	0.000E+000	3.016E-003	3.163E-003
Total Halogens (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Particulate Gross Beta-Gamma Half-Lives>8 Days (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Tritium (Ci)	1.530E-005	0.000E+000	1.194E-005	2.724E-005
Total Particulate Gross Alpha (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.3C (Con't)
Annual Radioactive Effluent Release Report 2002
2nd Quarter Gaseous Release
Batch Mode Only

Noble Gasses (Curies)

Isotope	April	May	June	Total
Xe-133m	0.000E+000	1.009E-004	0.000E+000	1.009E-004
Xe-133	3.338E-004	5.469E-003	9.804E-005	5.901E-003
Xe-135	0.000E+000	7.374E-005	0.000E+000	7.374E-005
Total	3.338E-004	5.644E-003	9.804E-005	6.076E-003

Particulates (Curies)

Isotope	April	May	June	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Halogens (Curies)

Isotope	April	May	June	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.3C (Con't)
Annual Radioactive Effluent Release Report 2002
2nd Quarter Gaseous Release
Batch Mode Only

Summary	April	May	June	Total
Total Noble Gases (Ci)	3.338E-004	5.644E-003	9.804E-005	6.076E-003
Total Halogens (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Particulate Gross Beta-Gamma Half-Lives>8 Days (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Tritium (Ci)	1.450E-005	4.878E-004	3.949E-005	5.418E-004
Total Particulate Gross Alpha (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.3C (con't)
Annual Radioactive Effluent Release Report 2002
3rd Quarter Gaseous Release
Batch Mode Only

Noble Gasses (Curies)

Isotope	July	August	September	Total
Ar-41	0.000E+000	1.643E-003	0.000E+000	1.643E-003
Kr-85m	0.000E+000	3.663E-004	0.000E+000	3.663E-004
Kr-88	0.000E+000	3.408E-004	0.000E+000	3.408E-004
Xe-133	0.000E+000	6.213E-003	2.695E-003	8.908E-003
Xe-135	0.000E+000	3.674E-003	8.863E-006	3.683E-003
Total	0.000E+000	1.224E-002	2.704E-003	1.494E-002

Particulates (Curies)

Isotope	July	August	September	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Halogens (Curies)

Isotope	July	August	September	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.3C (Con't)
Annual Radioactive Effluent Release Report 2002
3rd Quarter Gaseous Release
Batch Mode Only

Summary	July	August	September	Total
Total Noble Gases (Ci)	0.000E+000	1.224E-002	2.704E-003	1.494E-002
Total Halogens (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Particulate Gross Beta-Gamma Half-Lives>8 Days (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Tritium (Ci)	0.000E+000	1.024E-004	1.479E-004	2.503E-004
Total Particulate Gross Alpha (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.3C (Con't)
Annual Radioactive Effluent Release Report 2002
4th Quarter Gaseous Release
Batch Mode Only

Noble Gasses (Curies)

Isotope	October	November	December	Total
Ar-41	6.988E-004	0.000E+000	0.000E+000	6.988E-004
Kr-85m	4.389E-005	0.000E+000	0.000E+000	4.389E-005
Kr-87	1.722E-005	0.000E+000	0.000E+000	1.722E-005
Kr-88	5.831E-005	0.000E+000	0.000E+000	5.831E-005
Xe-133	2.376E-003	6.348E-004	0.000E+000	3.011E-003
Xe-135	3.217E-004	0.000E+000	0.000E+000	3.217E-004
Total	3.516E-003	6.348E-004	0.000E+000	4.151E-003

Particulates (Curies)

Isotope	October	November	December	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Halogens (Curies)

Isotope	October	November	December	Total
Total	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.3C (Con't)
Annual Radioactive Effluent Release Report 2002
4th Quarter Gaseous Release
Batch Mode Only

Summary	October	November	December	Total
Total Noble Gases (Ci)	3.516E-003	6.348E-004	0.000E+000	4.151E-003
Total Halogens (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Particulate Gross Beta-Gamma Half-Lives>8 Days (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Tritium (Ci)	1.886E-004	2.864E-004	0.000E+000	4.751E-004
Total Particulate Gross Alpha (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000

Table 2.4
Annual Radioactive Effluent Release Report 2002
Dose From Gaseous Effluents

The offsite dose limits from radioactive materials in gaseous effluents are specified in Section 3/4.4 of the Kewaunee ODCM and can be summarized as follows:

Limit	Whole Body Gamma	Skin Beta	Organ
Quarterly	5.0 mRad	10.0 mRad	7.5 mRem
Annual	10.0 mRad	20.0 mRad	15.0 mRem

The total release of gaseous effluents during each quarter of 2002 was within limits. The following offsite doses were calculated using equations 2.7, 2.8, and 2.11 from the Kewaunee ODCM. Calculated offsite doses versus quarterly limits are shown below:

	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
1. Gamma-Whole Body				
Specification (mRads)	5.000E+000	5.000E+000	5.000E+000	5.000E+000
Actual Dose (mRads)	1.573E-007	2.576E-007	3.552E-006	1.053E-006
% of Specification	3.146E-006	5.153E-006	7.104E-005	2.106E-005
2. Beta-Skin				
Specification (mRads)	1.000E+001	1.000E+001	1.000E+001	1.000E+001
Actual Dose (mRads)	3.909E-007	7.448E-007	2.913E-006	7.623E-007
% of Specification	3.909E-006	7.448E-006	2.913E-005	7.623E-006
3. Ingestion Pathway-Organ				
Specification (mRems)	7.500E+000	7.500E+000	7.500E+000	7.500E+000
Actual Dose (mRems)	1.420E-005	2.016E-005	1.558E-005	1.004E-008
% of Specification	1.893E-004	2.689E-004	2.078E-004	1.338E-007
	Liver	Liver	Liver	Liver

Table 2.4 (Con't)
Annual Radioactive Effluent Release Report 2002
Dose From Gaseous Effluents

In addition, the cumulative annual offsite doses for the period January 1 - December 31, 2002 versus the ODCM annual limits were:

	Annual
1. Gamma-Whole Body	
Specification (mRads)	1.000E+001
Actual Dose (mRads)	5.020E-006
% of Specification	5.020E-005
2. Beta-Skin	
Specification (mRads)	2.000E+001
Actual Dose (mRads)	4.811E-006
% of Specification	2.405E-005
3. Ingestion Pathway-Organ	
Specification (mRems)	1.500E+001
Actual Dose (mRems)	4.996E-005
% of Specification	3.330E-004
Liver	

3.0 LIQUID EFFLUENTS

3.1 Lower Limits of Detection (LLD) for Liquid Effluents

Liquid radioactive effluents are released as both batch releases and continuous releases. Each batch is sampled prior to release and analyzed for gamma emitters and tritium. A fraction of each sample is retained for a monthly proportional composite which is then analyzed for Gross Alpha, Strontium 89, Strontium 90 and Iron 55.

The LLD's for liquid batch release radioanalyses, as listed in Table 4.3 of the Kewaunee Nuclear Power Plant Off-Site Dose Calculation Manual, are:

Analysis	LLD (μCi/ml)
Principal Gamma Emitters	1.00 E-06
Iodine 131	1.00 E-06
Tritium	1.00 E-05
Gross Alpha	5.00 E-07
Strontium 89, 90	5.00 E-08
Iron 55	1.00 E-06

The actual obtained "a priori" LLD values for batch releases are shown below.

Isotope	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Average a priori LLD (μCi/ml)
Mn-54	6.56E-10	6.56E-10	6.56E-08	6.56E-10	1.69E-08
Fe-59	1.45E-09	1.44E-09	1.45E-09	1.45E-09	1.45E-09
Co-58	6.45E-10	6.44E-10	6.45E-10	6.45E-10	6.45E-10
Co-60	9.57E-10	9.56E-10	9.57E-10	8.62E-08	2.23E-08
Zn-65	1.63E-09	1.63E-07	1.63E-09	1.63E-09	4.20E-08
Mo-99	4.65E-09	4.64E-09	4.65E-07	4.65E-09	1.20E-07
Cs-134	5.17E-08	7.83E-08	5.71E-08	5.17E-10	4.69E-08
Cs-137	6.38E-08	6.38E-10	6.38E-10	6.38E-10	1.64E-08
Ce-141	3.90E-08	5.51E-08	1.10E-07	3.90E-10	5.11E-08
Ce-144	1.76E-09	1.75E-09	1.76E-09	1.76E-07	4.53E-08
I-131	4.45E-08	6.97E-08	4.03E-10	4.03E-10	2.88E-08
H-3	3.43E-06	3.12E-06	3.66E-06	3.77E-06	3.50E-06
Sr-89	1.43E-08	3.53E-08	1.83E-08	1.23E-08	2.01E-08
Sr-90	1.05E-08	7.37E-09	7.53E-09	7.60E-09	8.25E-09
Gross Alpha	7.57E-09	5.83E-09	6.47E-09	7.50E-09	6.84E-09
Fe-55	9.23E-07	9.30E-07	7.73E-07	6.20E-07	8.12E-07

Continuous liquid releases are grab sampled weekly and analyzed for principal gamma emitters. A fraction of each weekly sample is retained for a monthly proportional composite which is then analyzed for Tritium, Gross Alpha, Strontium 89, Strontium 90 and Iron 55.

The LLD's for liquid continuous release radioanalyses, as listed in Table 4.3 of the Kewaunee Nuclear Power Plant Off-Site Dose Calculation Manual, are:

Analysis	LLD (μCi/ml)
Principal Gamma Emitters	5.00 E-07
Iodine 131	1.00 E-06
Tritium	1.00 E-05
Gross Alpha	5.00 E-07
Strontium 89, 90	5.00 E-08
Iron 55	1.00 E-06

The actual obtained "a priori" LLD values for continuous releases are shown below.

Isotope	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Average a priori LLD (μCi/ml)
Mn-54	1.09E-08	2.67E-08	1.09E-10	1.55E-08	1.33E-08
Fe-59	2.41E-08	2.41E-10	2.41E-10	6.82E-08	2.32E-08
Co-58	3.56E-08	2.75E-08	1.86E-08	1.07E-08	2.31E-08
Co-60	2.26E-08	4.84E-08	2.76E-08	1.99E-08	2.96E-08
Zn-65	2.72E-10	4.55E-08	5.12E-08	2.72E-10	2.43E-08
Mo-99	2.11E-07	1.99E-07	7.79E-08	1.27E-07	1.54E-07
Cs-134	8.61E-11	3.38E-08	8.61E-11	3.66E-08	1.77E-08
Cs-137	1.06E-10	4.18E-08	2.86E-08	1.36E-07	5.17E-08
Ce-141	1.95E-08	6.50E-11	1.84E-08	1.72E-08	1.38E-08
Ce-144	7.18E-08	9.71E-08	1.31E-07	2.93E-10	7.50E-08
I-131	1.69E-08	2.27E-08	1.34E-08	2.27E-08	1.89E-08
H-3	3.43E-06	3.12E-06	3.66E-06	3.77E-06	3.50E-06
Sr-89	1.35E-08	2.97E-08	1.82E-08	1.17E-08	1.83E-08
Sr-90	7.57E-09	6.13E-09	7.92E-09	7.23E-09	7.21E-09
Gross Alpha	5.85E-09	6.18E-09	7.73E-09	5.10E-09	6.22E-09
Fe-55	9.52E-07	2.35E-06	7.65E-07	6.28E-07	1.17E-06

3.2 **Liquid Batch Release Statistics**

The following is a summation of all liquid batch releases made during 2002.

Release Type	Number	Gallons Released
A SGBT Monitor Tk.	12	105900.0
B SGBT Monitor Tk.	12	107562.0
A CVC Monitor	3	18025.0
B CVC Monitor	4	20545.0
miscellaneous	1	911.0
Both WCTs	7	10405.0

Total time for all batch releases..... 14586.0 Min.

Maximum time for a batch release..... 694.0 Min.

Minimum time for a batch release..... 1.0 Min.

Average time for a batch release..... 374.0 Min.

3.3 **Liquid Effluent Data**

The following Table 3.1 presents a quarterly summation of the total activity released and average concentration for all liquid effluents. It also presents the gross alpha activity released, volume of waste released and volume of dilution water used. Tables 3.2 and 3.3 are monthly summations of the same information in Table 3.1. Table 3.2 contains the quantity of the individual isotopes released to the unrestricted area for batch releases. Table 3.3 presents a monthly summation of gross radioactivity, tritium, gross alpha and isotopic activity for the secondary blowdown and leakage releases. It also presents the monthly total volume for these releases and dilution volumes. Table 3.4 presents the doses from liquid effluents for each quarter and the calculated doses this year from liquid effluents.

TABLE 3.1
Annual Radioactive Effluent Release Report 2002
Liquid Effluents - Summation of all Releases

	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
Fission and Activation Products				
Total Release Excluding H3 and Dissolved Gases (Ci)	2.424E-002	1.152E-002	7.489E-003	7.318E-003
Average Concentration (µCi/ml)	2.422E-010	7.111E-011	3.673E-011	4.325E-011
Tritium				
Total Release (Ci)	1.016E+001	5.402E+001	9.431E+000	6.486E+001
Average Concentration (µCi/ml)	1.015E-007	3.334E-007	4.625E-008	3.834E-007
% of Tech. Spec. Limit(3.0E-3 µCi/ml)	3.383E-003	1.111E-002	1.542E-003	1.278E-002
Dissolved Gases				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Average Concentration (µCi/ml)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
% of Tech. Spec. Limit(2.0E-4 µCi/ml)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Gross Alpha Activity				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Volume of Waste Released				
Batch (liters)	1.831E+005	3.379E+005	2.034E+005	2.725E+005
Continuous (liters)	4.464E+007	2.655E+007	2.099E+007	2.520E+007
Total (liters)	4.482E+007	2.689E+007	2.119E+007	2.547E+007
Volume of Dilution Water				
Batch (liters)	1.969E+009	4.920E+009	3.331E+009	4.579E+009
Continuous (liters)	9.812E+010	1.571E+011	2.006E+011	1.646E+011
Total (liters)	1.001E+011	1.620E+011	2.039E+011	1.692E+011

TABLE 3.2A
Annual Radioactive Effluent Release Report 2002
Liquid Effluents - Batch Releases

	January	February	March	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	3.570E-003	4.730E-003	1.355E-003	9.655E-003
Avg. Conc. (µCi/ml)	6.196E-009	4.673E-009	3.559E-009	
Tritium				
Total Release (Ci)	1.182E+000	5.121E+000	3.855E+000	1.016E+001
Avg. Conc. (µCi/ml)	2.052E-006	5.059E-006	1.012E-005	
Dissolved Gases				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Avg. Conc. (µCi/ml)	0.000E+000	0.000E+000	0.000E+000	
Gross Alpha Activity				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Avg. Conc. (µCi/ml)	0.000E+000	0.000E+000	0.000E+000	
Volume of Waste Released				
(liters)	6.754E+004	7.899E+004	3.654E+004	1.831E+005
Volume of Dilution Water				
(liters)	5.761E+008	1.012E+009	3.808E+008	1.969E+009

TABLE 3.2A (Con't)
Annual Radioactive Effluent Release Report 2002
Liquid Effluents - Batch Releases

Isotope (Ci)	January	February	March	Total
H-3	1.182E+000	5.121E+000	3.855E+000	1.016E+001
Mn-54	1.719E-005	2.901E-005	1.794E-005	6.414E-005
Fe-55	8.780E-004	1.501E-003	4.750E-004	2.854E-003
Co-58	1.205E-003	1.954E-003	4.951E-004	3.654E-003
Fe-59	1.446E-004	2.081E-005	0.000E+000	1.654E-004
Co-60	5.994E-004	5.151E-004	2.702E-004	1.385E-003
Sr-89	0.000E+000	0.000E+000	2.558E-007	2.558E-007
Sr-90	2.364E-007	1.027E-006	0.000E+000	1.263E-006
Zr-95	5.236E-005	0.000E+000	0.000E+000	5.236E-005
Nb-95	1.560E-004	5.883E-005	3.038E-005	2.452E-004
Ag-110m	4.675E-004	3.699E-004	6.648E-005	9.038E-004
Sn-113	4.953E-005	0.000E+000	0.000E+000	4.953E-005
Sb-124	0.000E+000	4.339E-005	0.000E+000	4.339E-005
Sb-125	0.000E+000	2.372E-004	0.000E+000	2.372E-004
Total	1.186E+000	5.126E+000	3.856E+000	1.017E+001

TABLE 3.2B
Annual Radioactive Effluent Release Report 2002
Liquid Effluents - Batch Releases

	April	May	June	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	2.189E-003	7.063E-004	6.442E-004	3.540E-003
Avg. Conc. (µCi/ml)	1.171E-009	3.297E-010	7.091E-010	
Tritium				
Total Release (Ci)	1.322E+001	3.699E+001	3.729E+000	5.393E+001
Avg. Conc. (µCi/ml)	7.069E-006	1.727E-005	4.105E-006	
Dissolved Gases				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Avg. Conc. (µCi/ml)	0.000E+000	0.000E+000	0.000E+000	
Gross Alpha Activity				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Avg. Conc. (µCi/ml)	0.000E+000	0.000E+000	0.000E+000	
Volume of Waste Released				
(liters)	1.772E+005	1.313E+005	2.930E+004	3.379E+005
Volume of Dilution Water				
(liters)	1.870E+009	2.142E+009	9.085E+008	4.920E+009

TABLE 3.2B (Con't)
Annual Radioactive Effluent Release Report 2002
Liquid Effluents - Batch Releases

Isotope (Ci)	April	May	June	Total
H-3	1.322E+001	3.699E+001	3.729E+000	5.393E+001
Fe-55	1.152E-003	4.597E-004	4.687E-004	2.080E-003
Co-58	3.039E-004	8.861E-005	2.473E-005	4.173E-004
Co-60	3.897E-004	4.218E-005	1.092E-005	4.428E-004
Sr-89	4.076E-006	1.576E-006	4.101E-007	6.062E-006
Sr-90	0.000E+000	0.000E+000	2.080E-007	2.080E-007
Ag-110m	3.187E-004	1.142E-004	8.733E-005	5.202E-004
Sn-113	2.107E-005	0.000E+000	0.000E+000	2.107E-005
Sb-125	0.000E+000	0.000E+000	5.185E-005	5.185E-005
Total	1.322E+001	3.699E+001	3.730E+000	5.394E+001

TABLE 3.2C
Annual Radioactive Effluent Release Report 2002
Liquid Effluents - Batch Releases

	July	August	September	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	1.610E-003	8.044E-004	6.421E-004	3.057E-003
Avg. Conc. (µCi/ml)	1.110E-009	9.239E-010	6.357E-010	
Tritium				
Total Release (Ci)	5.221E+000	1.948E+000	2.248E+000	9.417E+000
Avg. Conc. (µCi/ml)	3.600E-006	2.237E-006	2.226E-006	
Dissolved Gases				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Avg. Conc. (µCi/ml)	0.000E+000	0.000E+000	0.000E+000	
Gross Alpha Activity				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Avg. Conc. (µCi/ml)	0.000E+000	0.000E+000	0.000E+000	
Volume of Waste Released				
(liters)	6.659E+004	6.492E+004	7.189E+004	2.034E+005
Volume of Dilution Water				
(liters)	1.451E+009	8.706E+008	1.010E+009	3.331E+009

TABLE 3.2C (Con't)
Annual Radioactive Effluent Release Report 2002
Liquid Effluents - Batch Releases

Isotope (Ci)	July	August	September	Total
H-3	5.221E+000	1.948E+000	2.248E+000	9.417E+000
Fe-55	3.196E-004	3.116E-004	1.078E-004	7.391E-004
Co-58	5.205E-004	1.125E-004	3.960E-005	6.726E-004
Co-60	1.253E-004	4.586E-005	8.213E-006	1.794E-004
Sr-90	1.199E-007	9.089E-008	7.908E-008	2.898E-007
Ag-110m	5.685E-004	2.197E-004	2.061E-004	9.943E-004
Sb-125	7.639E-005	1.147E-004	2.803E-004	4.713E-004
Total	5.223E+000	1.949E+000	2.249E+000	9.420E+000

TABLE 3.2D
Annual Radioactive Effluent Release Report 2002
Liquid Effluents - Batch Releases

	October	November	December	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	9.030E-004	1.156E-003	1.180E-003	3.239E-003
Avg. Conc. (µCi/ml)	1.056E-009	8.079E-010	5.148E-010	
Tritium				
Total Release (Ci)	1.821E+000	1.483E+000	6.152E+001	6.483E+001
Avg. Conc. (µCi/ml)	2.128E-006	1.037E-006	2.684E-005	
Dissolved Gases				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Avg. Conc. (µCi/ml)	0.000E+000	0.000E+000	0.000E+000	
Gross Alpha Activity				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Avg. Conc. (µCi/ml)	0.000E+000	0.000E+000	0.000E+000	
Volume of Waste Released				
(liters)	3.372E+004	6.851E+004	1.703E+005	2.725E+005
Volume of Dilution Water				
(liters)	8.555E+008	1.431E+009	2.292E+009	4.579E+009

TABLE 3.2D (Con't)
Annual Radioactive Effluent Release Report 2002
Liquid Effluents - Batch Releases

Isotope (Ci)	October	November	December	Total
H-3	1.821E+000	1.483E+000	6.152E+001	6.483E+001
Fe-55	3.372E-004	2.192E-004	2.895E-004	8.460E-004
Co-58	5.459E-005	7.175E-005	6.984E-005	1.962E-004
Co-60	1.315E-005	2.337E-005	2.367E-005	6.019E-005
Sr-89	6.744E-008	1.370E-007	0.000E+000	2.045E-007
Sr-90	3.372E-008	0.000E+000	2.214E-007	2.551E-007
Ag-110m	1.497E-004	1.288E-004	1.599E-004	4.383E-004
Sb-125	3.483E-004	7.106E-004	6.360E-004	1.695E-003
Cs-137	0.000E+000	2.092E-006	9.501E-007	3.042E-006
Total	1.822E+000	1.484E+000	6.152E+001	6.483E+001

TABLE 3.3A
Annual Radioactive Effluent Release Report 2002
Liquid Effluents - Continuous Releases

	January	February	March	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	4.346E-005	1.188E-002	2.654E-003	1.458E-002
Avg. Conc. (µCi/ml)	1.286E-012	3.893E-010	7.854E-011	
Tritium				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Avg. Conc. (µCi/ml)	0.000E+000	0.000E+000	0.000E+000	
Dissolved Gases				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Avg. Conc. (µCi/ml)	0.000E+000	0.000E+000	0.000E+000	
Gross Alpha Activity				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Avg. Conc. (µCi/ml)	0.000E+000	0.000E+000	0.000E+000	
Volume of Waste Released				
(liters)	1.642E+007	1.846E+007	9.754E+006	4.464E+007
Volume of Dilution Water				
(liters)	3.380E+010	3.053E+010	3.380E+010	9.812E+010

TABLE 3.3A (Con't)
Annual Radioactive Effluent Release Report 2002
Liquid Effluents - Continuous Releases

Isotope (Ci)	January	February	March	Total
Fe-55	0.000E+000	1.169E-002	2.625E-003	1.431E-002
Sr-89	2.813E-005	1.973E-004	1.928E-005	2.447E-004
Sr-90	1.534E-005	0.000E+000	1.048E-005	2.581E-005
Total	4.346E-005	1.188E-002	2.654E-003	1.458E-002

TABLE 3.3B
Annual Radioactive Effluent Release Report 2002
Liquid Effluents - Continuous Releases

	April	May	June	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	2.368E-003	4.401E-003	1.215E-003	7.984E-003
Avg. Conc. (µCi/ml)	5.852E-011	8.589E-011	1.857E-011	
Tritium				
Total Release (Ci)	9.518E-003	7.896E-002	0.000E+000	8.848E-002
Avg. Conc. (µCi/ml)	2.352E-010	1.541E-009	0.000E+000	
Dissolved Gases				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Avg. Conc. (µCi/ml)	0.000E+000	0.000E+000	0.000E+000	
Gross Alpha Activity				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Avg. Conc. (µCi/ml)	0.000E+000	0.000E+000	0.000E+000	
Volume of Waste Released				
(liters)	7.300E+006	1.138E+007	7.877E+006	2.655E+007
Volume of Dilution Water				
(liters)	4.047E+010	5.124E+010	6.541E+010	1.571E+011

TABLE 3.3B (Con't)
Annual Radioactive Effluent Release Report 2002
Liquid Effluents - Continuous Releases

Isotope (Ci)	April	May	June	Total
H-3	9.518E-003	7.896E-002	0.000E+000	8.848E-002
Fe-55	2.271E-003	4.180E-003	1.202E-003	7.653E-003
Sr-89	9.704E-005	2.207E-004	0.000E+000	3.177E-004
Sr-90	0.000E+000	0.000E+000	1.295E-005	1.295E-005
Total	1.189E-002	8.336E-002	1.215E-003	9.646E-002

TABLE 3.3C
Annual Radioactive Effluent Release Report 2002
Liquid Effluents - Continuous Releases

	July	August	September	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	1.942E-004	3.370E-003	8.677E-004	4.432E-003
Avg. Conc. (µCi/ml)	2.873E-012	4.986E-011	1.326E-011	
Tritium				
Total Release (Ci)	5.947E-003	0.000E+000	7.836E-003	1.378E-002
Avg. Conc. (µCi/ml)	8.799E-011	0.000E+000	1.198E-010	
Dissolved Gases				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Avg. Conc. (µCi/ml)	0.000E+000	0.000E+000	0.000E+000	
Gross Alpha Activity				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Avg. Conc. (µCi/ml)	0.000E+000	0.000E+000	0.000E+000	
Volume of Waste Released				
(liters)	6.679E+006	7.737E+006	6.569E+006	2.099E+007
Volume of Dilution Water				
(liters)	6.759E+010	6.759E+010	6.541E+010	2.006E+011

TABLE 3.3C (Con't)
Annual Radioactive Effluent Release Report 2002
Liquid Effluents - Continuous Releases

Isotope (Ci)	July	August	September	Total
H-3	5.947E-003	0.000E+000	7.836E-003	1.378E-002
Fe-55	1.853E-004	3.350E-003	8.499E-004	4.385E-003
Sr-89	0.000E+000	8.354E-006	1.447E-005	2.283E-005
Sr-90	8.910E-006	1.205E-005	3.316E-006	2.428E-005
Total	6.141E-003	3.370E-003	8.704E-003	1.822E-002

TABLE 3.3D
Annual Radioactive Effluent Release Report 2002
Liquid Effluents - Continuous Releases

	October	November	December	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	9.046E-004	1.517E-005	3.159E-003	4.079E-003
Avg. Conc. (µCi/ml)	1.338E-011	2.577E-013	8.280E-011	
Tritium				
Total Release (Ci)	3.610E-002	0.000E+000	4.675E-004	3.657E-002
Avg. Conc. (µCi/ml)	5.341E-010	0.000E+000	1.225E-011	
Dissolved Gases				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Avg. Conc. (µCi/ml)	0.000E+000	0.000E+000	0.000E+000	
Gross Alpha Activity				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Avg. Conc. (µCi/ml)	0.000E+000	0.000E+000	0.000E+000	
Volume of Waste Released				
(liters)	8.449E+006	7.062E+006	9.685E+006	2.520E+007
Volume of Dilution Water				
(liters)	6.759E+010	5.887E+010	3.816E+010	1.646E+011

TABLE 3.3D (Con't)
Annual Radioactive Effluent Release Report 2002
Liquid Effluents - Continuous Releases

Isotope (Ci)	October	November	December	Total
H-3	3.610E-002	0.000E+000	4.675E-004	3.657E-002
Fe-55	8.892E-004	0.000E+000	3.151E-003	4.040E-003
Sr-89	0.000E+000	0.000E+000	6.673E-006	6.673E-006
Sr-90	1.539E-005	1.517E-005	1.983E-006	3.254E-005
Total	3.700E-002	1.517E-005	3.627E-003	4.065E-002

Table 3.4
Annual Radioactive Effluent Report 2002
Dose From Liquid Effluents

The dose to a member of the public from total liquid radioactive releases for each quarter was below the ODCM limits of 1.5 mrems to the total body and less than or equal to 5 mrems to any organ. Additionally, the dose to a member of the public from total liquid radioactive releases for the year was below the ODCM limits of 3 mrems to the total body and less than or equal to 10 mrems to any organ.

Instantaneous release concentrations are limited by the individual radionuclide concentrations established in 10 CFR 20, Appendix B, for unrestricted areas. During the report period, none of the isotopes released exceed the concentrations specified in Appendix B. The following offsite doses were calculated using equation 1.5 from the Kewaunee ODCM.

Organ 1st Qtr Dose	Dose Total mRem	Quarterly Limit mRem	Percent of Limit
Total Body	1.232E-004	1.5	0.01
Bone	6.326E-005	5.0	0.00
Liver	1.341E-004	5.0	0.00
Thyroid	7.379E-005	5.0	0.00
Kidney	7.699E-005	5.0	0.00
Lung	9.233E-005	5.0	0.00
GI-LLI	8.593E-003	5.0	0.17

Organ 2nd Qtr Dose	Dose Total mRem	Quarterly Limit mRem	Percent of Limit
Total Body	3.702E-004	1.5	0.02
Bone	2.983E-005	5.0	0.00
Liver	3.797E-004	5.0	0.01
Thyroid	3.587E-004	5.0	0.01
Kidney	3.587E-004	5.0	0.01
Lung	3.687E-004	5.0	0.01
GI-LLI	4.332E-004	5.0	0.01

Table 3.4 (Con't)
Annual Radioactive Effluent Report 2002
Dose From Liquid Effluents

Organ 3rd Qtr Dose	Dose Total mRem	Quarterly Limit mRem	Percent of Limit
Total Body	4.418E-005	1.5	0.00
Bone	3.708E-005	5.0	0.00
Liver	4.341E-005	5.0	0.00
Thyroid	3.423E-005	5.0	0.00
Kidney	3.425E-005	5.0	0.00
Lung	3.872E-005	5.0	0.00
GI-LLI	6.771E-005	5.0	0.00

Organ 4th Qtr Dose	Dose Total mRem	Quarterly Limit mRem	Percent of Limit
Total Body	5.361E-004	1.5	0.04
Bone	2.882E-004	5.0	0.01
Liver	5.218E-004	5.0	0.01
Thyroid	4.590E-004	5.0	0.01
Kidney	4.668E-004	5.0	0.01
Lung	4.837E-004	5.0	0.01
GI-LLI	5.027E-004	5.0	0.01

Calculated Dose This Year

Organ	Dose Total mRem	Quarterly Limit mRem	Percent of Limit
Total Body	1.074E-003	3.0	0.04
Bone	4.183E-004	10.0	0.00
Liver	1.079E-003	10.0	0.01
Thyroid	9.258E-004	10.0	0.01
Kidney	9.368E-004	10.0	0.01
Lung	9.834E-004	10.0	0.01
GI-LLI	9.597E-003	10.0	0.10

4.0 UNPLANNED RELEASES

No unplanned releases were made from the Kewaunee Plant during the report period.

The January-June 1991 Semi-Annual Effluent Release Report described an unplanned release which occurred on April 25, 1991. Offsite doses attributed to this release were well below the established ODCM (Technical Specifications at the time) limits.

As corrective action, WPSC stated in this report that valves WG-301 and WG-302 were scheduled to be replaced during 1992. Also, a new vent line was added between valves WG-300 and WG-301 to allow local leak rate testing with the Waste Gas Decay Tanks isolated. The valves were to be replaced with like-for-like replacements. However, after receipt inspection, the replacement valves failed to pass the seat leakage tests. WPSC is continuing to evaluate options associated with these valves and will continue to provide status updates in the Effluent Release Reports until resolution of this incident and completion of the corrective actions. A plant design change request, DCR-2349, was issued to address this concern.

5.0 METEOROLOGICAL DATA

Meteorological data for 2002 is retained on file at the Kewaunee Nuclear Power Plant. The data on file includes a continuous strip chart recording and a 15-minute interval listing of wind speed, wind direction and atmospheric stability. This is more conservative than the requirements of ODCM Section 3/4.7. See Appendix A for missing meteorological data and the joint frequency distribution tables.

6.0 SOLID WASTE DISPOSAL

Table 6.1 is a summation of solid wastes shipped during 2002. Presented are the types of wastes, major nuclide composition, disposition of the wastes and shipping containers used.

The containers utilized at Kewaunee Nuclear Power Plant have the following volumes:

High Integrity Container (HIC)	158 ft^3
LSA Box (B-25)	98 ft^3
Compactor Boxes	50 ft^3
DOT-17H Drum	7.5 ft^3

A composite sample from the 1993 dewatered resin shipments was analyzed by a contractor for transuranic nuclides. The results showed an average transuranic concentration of 4.24 E-2 nanocuries/gram, well within the disposal site limit of 10 nanocuries/gram.

Table 6.1 contains the radionuclide content (curies) and percent abundance for each type of waste.

Table 6.1
Annual Radioactive Effluent Report 2002
Solid Waste and Irradiated Fuel Shipments

Isotopes denoted by an asterisk (*) in Table 6.1 are correlated values.

A. Solid Waste Shipped Off-Site for Burial or Disposal
(Not Irradiated Fuel - m^3 is actual waste volume not burial volume)

1. Type of Waste	Unit	Quantity
a. Dewatered resin	m^3	3.94E+00
Container: HIC	Ci	3.30E+01
b. Dewatered filter media	m^3	None
Container: HIC	Ci	None
c. DAW (Compactible)	m^3	9.12E+01
Container: Compactor Box	Ci	5.98E-01
d. DAW (Non-Compactible)	m^3	None
Container: Compactor Box	Ci	None

Average Transuranics shipped (all shipments): 7.38E-01 nCi/g

2. Estimate of Major Nuclide by Composition (By Type of Waste)	%	Ci
a. Dewatered resin	100%	3.30E+01
Mn-54	4.99E+00	1.65E+00
Co-58	7.29E-01	2.41E-01
Co-60	4.39E+01	1.45E+01
Cs-137	1.40E+00	4.63E-01
Sb-125	2.29E+00	7.58E-01
**Fe-55*	*8.78E+00*	*2.90E+00*
**C-14*	*4.81E-02*	*1.59E-02*
Ni-59	3.57E-01	1.18E-01
**Pu-241*	*3.84E-02*	*1.27E-02*
T	1.92E-02	6.34E-03
**Ni-63*	*3.72E+01*	*1.23E+01*
Np-237	1.00E-01	3.31E-02
Ce-144	1.20E-01	3.95E-02
b. Dewatered filter media	None	None

c.	DAW (Compactible)	100%	5.98E-01
	Mn-54	1.61E+00	9.65E-03
	Co-58	1.34E+01	8.02E-02
	Co-60	2.60E+01	1.55E-01
	Zr-95	3.78E-01	2.26E-03
	Nb-95	7.30E-01	4.37E-03
	Ag-110m	1.41E-01	8.45E-04
	Cs-137	1.33E-01	7.98E-04
	Sb-125	8.48E-01	5.07E-03
	*Fe-55	*1.31E+01*	*7.85E-02*
	*C-14	*3.79E-02*	*2.27E-04*
	Ni-59	3.67E-01	2.19E-03
	*Pu-241	*4.77E-02*	*2.85E-04*
	*Cm-242	*1.19E-04*	*7.11E-07*
	T	1.02E-01	6.12E-04
	*Ni-63	*4.14E+01*	*2.48E-01*
	Zn-65	2.81E-01	1.68E-03
	Be-7	1.49E-02	8.92E-05
	K-40	1.20E+00	7.20E-03
	U-233	2.57E-04	1.54E-06
	Np-237	7.49E-02	4.48E-04
	Ce-144	9.40E-02	5.62E-04
d.	DAW (Non-Compactible)	None	None

3. Solid Waste Disposition

a. Date of Shipment	Mode of Transportation	Destination
06/06/02	R & R Trucking (Flatbed)	US Ecology Oak Ridge, TN
08/06/02	CNSI 14-190H CASK	Studsvik Processing Facility Erwin, TN
09/24/02	R & R Trucking (Flatbed)	US Ecology Oak Ridge, TN
12/09/02	R & R Trucking (Sealand)	RACE LLC Memphis, TN
12/16/02	R & R Trucking (Sealand)	RACE LLC Memphis, TN
12/18/02	R & R Trucking (Sealand)	RACE LLC Memphis, TN

B. Irradiated Fuel Shipments

No irradiated fuel shipments were made from the Kewaunee Nuclear Power Plant during 2002.

7.0 PROGRAM REVISIONS

In accordance with Technical Specifications 6.18.b.3 and 6.19.a, the revisions to the Process Control Program, Offsite Dose Calculation Manual and radioactive waste treatment systems are listed below.

7.1 Offsite Dose Calculation Manual

The Offsite Dose Calculation Manual (ODCM) has not been revised during this report period.

7.2 Major Changes to the Radioactive Liquid, Gaseous and Solid Waste Treatment Systems

Major changes to the radioactive liquid, gaseous or solid waste systems are submitted in the annual Updated Final Safety Analysis Report consistent with Technical Specification 6.19.

8.0 REPORTABLE OCCURRENCES

Approximately 911 gallons of Component Cooling Water was released through a leak in "A" Component Cooling Water Heat Exchanger and discharged to Lake Michigan from May 1, 2002 through May 3, 2002. A miscellaneous discharge permit was generated to capture this event.

This occurrence is being reported per Activity Request #CA007753.

Appendix A

Kewaunee Nuclear Power Plant

2002 Meteorological Data

Missing Data

First Quarter: 3.00 hours
Second Quarter: 44.75 hours
Third Quarter: 130.75 hours
Fourth Quarter: 117.25 hours

Note: A total of 295.75 hours of data is missing or otherwise unavailable. This represents the availability of 96.6% of the data for the year. Continuous strip chart indication for 2002 data is available onsite.

FIRST QUARTER 2002
Total Hours Missing = 3.00 Total Hours = 2160

Stabitity Class A

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	4.25	16.5	4.5	0.5	0	25.75
NNE	0	0	1.75	14.75	8.25	1	1	26.75
NE	0	0.25	6.75	28.75	9	0.75	0	45.5
ENE	0	0	4	11	10	3.5	1.25	29.75
E	0	0	8.75	7.5	4.5	1	0	21.75
ESE	0	0	7	8.75	9.5	0.75	0	26
SE	0	0	10.5	8	10.25	0.25	0	29
SSE	0	1.75	7.5	20.25	14.75	4.5	0	48.75
S	0	1	3.25	11.5	16.25	3.5	0.25	35.75
SSW	0	0	4	6	6.25	0	0	16.25
SW	0	0	2.25	3.5	1.5	0	0	7.25
WSW	0	0	2.5	4.75	5.25	3.75	0	16.25
W	0	0	1.75	3.25	5.5	3.75	1.5	15.75
WNW	0	0	3.25	5	7	4.75	0.75	20.75
NW	0	0	5.5	17.25	7.25	3	0.75	33.75
NNW	0	0	6.25	29.75	3.5	1.5	0	41
TOTAL	0	3	79.25	196.5	123.25	32.5	5.5	440

Stabitity Class B

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0.75	4	0.25	0	0	5
NNE	0	0	0	1	0	0.5	1	2.5
NE	0	0	0.75	2	0.75	0.75	0	4.25
ENE	0	0	0.75	1.5	0.75	0.5	0.75	4.25
E	0	0.25	0.25	1.25	0.25	0	0	2
ESE	0	0	0.5	1.25	1.25	0	0	3
SE	0	0	2	6	1.75	0	0	9.75
SSE	0	0	0.5	2.5	1.75	0	0	4.75
S	0	0	1.25	2.75	1.75	0.75	0	6.5
SSW	0	0	2	3.75	1.75	0.5	0	8
SW	0	0.25	0.75	1	0.25	0	0	2.25
WSW	0	0	0	0.5	0.25	0	0	0.75
W	0	0	0	0.75	1.5	1	0.25	3.5
WNW	0	0	0.5	0.75	0.75	0	0	2
NW	0	0	0	2.75	0	0	0	2.75
NNW	0	0.25	1.75	6	2.5	0	0	10.5
TOTAL	0	0.75	11.75	37.75	15.5	4	2	71.75

Stabitity Class C

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0.5	3	0.5	0	0	4
NNE	0	0	0.25	1.75	2.5	2	0.75	7.25
NE	0	0.25	1.25	2.5	0.25	0.25	0	4.5
ENE	0	0	1	4.75	0.25	0	0.75	6.75
E	0	0	0.75	1	0.25	0	0.25	2.25
ESE	0	0	0.75	2.5	1.5	0	0	4.75
SE	0	0	0.5	4.25	1.25	0.25	0	6.25
SSE	0	0	1	2.75	1.5	0	0.25	5.5
S	0	0	0.5	1.75	2.25	1	0	5.5
SSW	0	0	2.25	4.5	1	0	0	7.75
SW	0	0	1	0.75	0.25	0	0	2
WSW	0	0	0.25	0.75	0.25	0	0	1.25
W	0	0	0.5	1	3.25	3.25	0.75	8.75
WNW	0	0	1	0.75	5.75	0.5	0	8
NW	0	0	0.5	3.25	0.5	0	0	4.25
NNW	0	0.5	2.25	4.75	2.5	1.75	0	11.75
TOTAL	0	0.75	14.25	40	23.75	9	2.75	90.5

Stabitity Class D

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0.25	8	12.5	7.75	0.25	0	28.75
NNE	0	0.75	3	14.75	13	3.75	0.5	35.75
NE	0	1.5	6.75	12.25	2.25	0.25	0	23
ENE	0	0	4.5	10.25	4	0.5	0	19.25
E	0	0	4.25	11	4.5	1.75	0.75	22.25
ESE	0	0.75	5.5	9.5	7.5	0.75	0	24
SE	0	0	5.25	5.5	5.5	0.25	0	16.5
SSE	0	0.25	4.5	9.25	8.5	0.25	0	22.75
S	0	0.5	2.25	7.25	9	1	0.25	20.25
SSW	0	0	13.75	9.5	1.75	0	0	25
SW	0	0.25	1.5	1.25	0.5	0	0	3.5
WSW	0	0.25	1.5	2.5	3.5	0.5	0	8.25
W	0	0.25	3.75	9.75	8.25	4.25	1	27.25
WNW	0	0.25	5.25	6.75	2.5	1.75	0	16.5
NW	0	0.5	3.75	4	1	0	0	9.25
NNW	0	2.5	12.5	24.75	4.25	0	0	44
TOTAL	0	8	86	150.75	83.75	15.25	2.5	346.25

Stabitity Class E

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2.25	0.75	7.75	14.25	4.25	0	0	29.25
NNE	0	1	5.25	7	9.5	3.75	0.75	27.25
NE	0	1	8.5	5.5	0	0.25	0	15.25
ENE	0	1.75	6.75	1.75	0.25	0	0	10.5
E	0	1.25	10.5	3.25	1.25	0	0	16.25
ESE	0	1.5	11	8.75	4.25	0.5	0	26
SE	0	3.25	13	2.25	0.25	0	0	18.75
SSE	0	6	21	4.25	4.75	4	0	40
S	0	3.25	11.75	9.75	4.5	0.75	0	30
SSW	0	2	16	9.25	1.5	0	0	28.75
SW	0	1.25	7.75	4.25	1	0	0	14.25
WSW	0	1.5	5	6.75	2	2.25	0.25	17.75
W	0	0.75	6.75	12.75	3	6	1.75	31
WNW	0.25	1.5	11	17.75	4.5	0	0	35
NW	0	0.5	5.5	1.25	2	0	0	9.25
NNW	0	8.5	18.75	8.5	1.25	0	0	37
TOTAL	2.5	35.75	166.25	117.25	44.25	17.5	2.75	386.25

Stabitity Class F

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	1.5	6.5	5.75	0.25	0	0	14
NNE	0.5	1.5	3.5	2.5	0.25	0.75	0	9
NE	0	1	5.25	1.5	0	0	0	7.75
ENE	0	0.75	4	0.25	0	0	0	5
E	0	1.25	4.5	0.25	0	0	0	6
ESE	0	2.5	6.5	3	1.25	0.25	0.25	13.75
SE	0	1.75	11.5	2.25	0.25	0	0	15.75
SSE	0	5.5	12.5	5.5	8.25	0.75	0	32.5
S	0	2.5	8.5	6.75	4	0	0	21.75
SSW	0	3	19	11.5	0.5	0	0	34
SW	0	1	8.75	4.75	1.75	0	0.25	16.5
WSW	0	2.5	5.5	2.25	4	0.5	0	14.75
W	0	1.75	10	4	0.75	0.25	0	16.75
WNW	0	2	14.75	10	0.25	0	0	27
NW	0	1.25	6	4.25	0.75	0	0	12.25
NNW	0	8.25	32.5	6.25	1.75	0	0	48.75
TOTAL	0.5	38	159.25	70.75	24	2.5	0.5	295.5

Stabitity Class G

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	6.5	9.5	9	0.25	0	0	25.25
NNE	0	3.5	7.25	4	0	0	0	14.75
NE	0	3	2.25	0.5	0	0	0	5.75
ENE	0	2.25	2.75	0.25	0	0	0	5.25
E	0	4.75	3.75	0.5	0	0	0	9
ESE	0	3.5	6.25	1.75	0.5	0	0	12
SE	0	5	18	4.75	0	0	0	27.75
SSE	0.25	14.25	24	7.75	1.5	1	0	48.75
S	0	2.75	20.5	12.25	2.25	0.25	0	38
SSW	0	3.5	15	2	0	0	0	20.5
SW	0	4.25	26.25	16.75	0.25	0	0	47.5
WSW	0	4	36.75	27.25	0.75	0	0	68.75
W	0	4.25	43.25	16.25	1.75	0.25	0	65.75
WNW	0	4	19	4	0.25	0.25	0.25	27.75
NW	0	3.25	12.5	1.75	0.5	0.25	0	18.25
NNW	0	11.5	42	19.25	0.5	0.75	0	74
TOTAL	0.25	80.25	289	128	8.5	2.75	0.25	509

2nd QUARTER 2002
Total Hours Missing = 44.75 Total Hours = 2184
Stabitity Class A

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	4.25	16.5	4.5	0.5	0	25.75
NNE	0	0	1.75	14.75	8.25	1	1	26.75
NE	0	0.25	6.75	28.75	9	0.75	0	45.5
ENE	0	0	4	11	10	3.5	1.25	29.75
E	0	0	8.75	7.5	4.5	1	0	21.75
ESE	0	0	7	8.75	9.5	0.75	0	26
SE	0	0	10.5	8	10.25	0.25	0	29
SSE	0	1.75	7.5	20.25	14.75	4.5	0	48.75
S	0	1	3.25	11.5	16.25	3.5	0.25	35.75
SSW	0	0	4	6	6.25	0	0	16.25
SW	0	0	2.25	3.5	1.5	0	0	7.25
WSW	0	0	2.5	4.75	5.25	3.75	0	16.25
W	0	0	1.75	3.25	5.5	3.75	1.5	15.75
WNW	0	0	3.25	5	7	4.75	0.75	20.75
NW	0	0	5.5	17.25	7.25	3	0.75	33.75
NNW	0	0	6.25	29.75	3.5	1.5	0	41
TOTAL	0	3	79.25	196.5	123.25	32.5	5.5	440

Stabitity Class B

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0.75	4	0.25	0	0	5
NNE	0	0	0	1	0	0.5	1	2.5
NE	0	0	0.75	2	0.75	0.75	0	4.25
ENE	0	0	0.75	1.5	0.75	0.5	0.75	4.25
E	0	0.25	0.25	1.25	0.25	0	0	2
ESE	0	0	0.5	1.25	1.25	0	0	3
SE	0	0	2	6	1.75	0	0	9.75
SSE	0	0	0.5	2.5	1.75	0	0	4.75
S	0	0	1.25	2.75	1.75	0.75	0	6.5
SSW	0	0	2	3.75	1.75	0.5	0	8
SW	0	0.25	0.75	1	0.25	0	0	2.25
WSW	0	0	0	0.5	0.25	0	0	0.75
W	0	0	0	0.75	1.5	1	0.25	3.5
WNW	0	0	0.5	0.75	0.75	0	0	2
NW	0	0	0	2.75	0	0	0	2.75
NNW	0	0.25	1.75	6	2.5	0	0	10.5
TOTAL	0	0.75	11.75	37.75	15.5	4	2	71.75

Stabitity Class C

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0.5	3	0.5	0	0	4
NNE	0	0	0.25	1.75	2.5	2	0.75	7.25
NE	0	0.25	1.25	2.5	0.25	0.25	0	4.5
ENE	0	0	1	4.75	0.25	0	0.75	6.75
E	0	0	0.75	1	0.25	0	0.25	2.25
ESE	0	0	0.75	2.5	1.5	0	0	4.75
SE	0	0	0.5	4.25	1.25	0.25	0	6.25
SSE	0	0	1	2.75	1.5	0	0.25	5.5
S	0	0	0.5	1.75	2.25	1	0	5.5
SSW	0	0	2.25	4.5	1	0	0	7.75
SW	0	0	1	0.75	0.25	0	0	2
WSW	0	0	0.25	0.75	0.25	0	0	1.25
W	0	0	0.5	1	3.25	3.25	0.75	8.75
WNW	0	0	1	0.75	5.75	0.5	0	8
NW	0	0	0.5	3.25	0.5	0	0	4.25
NNW	0	0.5	2.25	4.75	2.5	1.75	0	11.75
TOTAL	0	0.75	14.25	40	23.75	9	2.75	90.5

Stabitity Class D

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0.25	8	12.5	7.75	0.25	0	28.75
NNE	0	0.75	3	14.75	13	3.75	0.5	35.75
NE	0	1.5	6.75	12.25	2.25	0.25	0	23
ENE	0	0	4.5	10.25	4	0.5	0	19.25
E	0	0	4.25	11	4.5	1.75	0.75	22.25
ESE	0	0.75	5.5	9.5	7.5	0.75	0	24
SE	0	0	5.25	5.5	5.5	0.25	0	16.5
SSE	0	0.25	4.5	9.25	8.5	0.25	0	22.75
S	0	0.5	2.25	7.25	9	1	0.25	20.25
SSW	0	0	13.75	9.5	1.75	0	0	25
SW	0	0.25	1.5	1.25	0.5	0	0	3.5
WSW	0	0.25	1.5	2.5	3.5	0.5	0	8.25
W	0	0.25	3.75	9.75	8.25	4.25	1	27.25
WNW	0	0.25	5.25	6.75	2.5	1.75	0	16.5
NW	0	0.5	3.75	4	1	0	0	9.25
NNW	0	2.5	12.5	24.75	4.25	0	0	44
TOTAL	0	8	86	150.75	83.75	15.25	2.5	346.25

Stabitity Class E

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	2.25	0.75	7.75	14.25	4.25	0	0	29.25
NNE	0	1	5.25	7	9.5	3.75	0.75	27.25
NE	0	1	8.5	5.5	0	0.25	0	15.25
ENE	0	1.75	6.75	1.75	0.25	0	0	10.5
E	0	1.25	10.5	3.25	1.25	0	0	16.25
ESE	0	1.5	11	8.75	4.25	0.5	0	26
SE	0	3.25	13	2.25	0.25	0	0	18.75
SSE	0	6	21	4.25	4.75	4	0	40
S	0	3.25	11.75	9.75	4.5	0.75	0	30
SSW	0	2	16	9.25	1.5	0	0	28.75
SW	0	1.25	7.75	4.25	1	0	0	14.25
WSW	0	1.5	5	6.75	2	2.25	0.25	17.75
W	0	0.75	6.75	12.75	3	6	1.75	31
WNW	0.25	1.5	11	17.75	4.5	0	0	35
NW	0	0.5	5.5	1.25	2	0	0	9.25
NNW	0	8.5	18.75	8.5	1.25	0	0	37
TOTAL	2.5	35.75	166.25	117.25	44.25	17.5	2.75	386.25

Stabitity Class F

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	≥24	TOTAL
N	0	1.5	6.5	5.75	0.25	0	0	14
NNE	0.5	1.5	3.5	2.5	0.25	0.75	0	9
NE	0	1	5.25	1.5	0	0	0	7.75
ENE	0	0.75	4	0.25	0	0	0	5
E	0	1.25	4.5	0.25	0	0	0	6
ESE	0	2.5	6.5	3	1.25	0.25	0.25	13.75
SE	0	1.75	11.5	2.25	0.25	0	0	15.75
SSE	0	5.5	12.5	5.5	8.25	0.75	0	32.5
S	0	2.5	8.5	6.75	4	0	0	21.75
SSW	0	3	19	11.5	0.5	0	0	34
SW	0	1	8.75	4.75	1.75	0	0.25	16.5
WSW	0	2.5	5.5	2.25	4	0.5	0	14.75
W	0	1.75	10	4	0.75	0.25	0	16.75
WNW	0	2	14.75	10	0.25	0	0	27
NW	0	1.25	6	4.25	0.75	0	0	12.25
NNW	0	8.25	32.5	6.25	1.75	0	0	48.75
TOTAL	0.5	38	159.25	70.75	24	2.5	0.5	295.5

Stabitity Class G

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	≥24	TOTAL
N	0	6.5	9.5	9	0.25	0	0	25.25
NNE	0	3.5	7.25	4	0	0	0	14.75
NE	0	3	2.25	0.5	0	0	0	5.75
ENE	0	2.25	2.75	0.25	0	0	0	5.25
E	0	4.75	3.75	0.5	0	0	0	9
ESE	0	3.5	6.25	1.75	0.5	0	0	12
SE	0	5	18	4.75	0	0	0	27.75
SSE	0.25	14.25	24	7.75	1.5	1	0	48.75
S	0	2.75	20.5	12.25	2.25	0.25	0	38
SSW	0	3.5	15	2	0	0	0	20.5
SW	0	4.25	26.25	16.75	0.25	0	0	47.5
WSW	0	4	36.75	27.25	0.75	0	0	68.75
W	0	4.25	43.25	16.25	1.75	0.25	0	65.75
WNW	0	4	19	4	0.25	0.25	0.25	27.75
NW	0	3.25	12.5	1.75	0.5	0.25	0	18.25
NNW	0	11.5	42	19.25	0.5	0.75	0	74
TOTAL	0.25	80.25	289	128	8.5	2.75	0.25	509

3rd QUARTER 2002
Total Hours Missing = 130.75 Total Hours = 2208
Stabitity Class A

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	6	5	0	0	0	11
NNE	0	0	0.25	7	0.5	0	0	7.75
NE	0	0	0.25	0	0	0	0	0.25
ENE	0	0.25	0.5	0	0	0	0	0.75
E	0	0	0	2.5	0.5	0	0	3
ESE	0	0	2.75	2.5	0	0	0	5.25
SE	0	0.5	5.5	3.5	0	0	0	9.5
SSE	0	0.5	21.75	20.25	8.5	2	0	53
S	0	0	8.25	0.5	0	0	0	8.75
SSW	0	0	5.75	0.75	0	0	0	6.5
SW	0	0	3	1	0.25	0.25	0	4.5
WSW	0	0	0.5	1.25	0	0	0	1.75
W	0	0	0.25	1.5	0	0	0	1.75
WNW	0	0	2.5	8.25	0.25	0	0	11
NW	0	0	4	10	1	0	0	15
NNW	0	1.25	47.25	51.5	16.75	0	0	116.75
TOTAL	0	2.5	108.5	115.5	27.75	2.25	0	256.5

Stabitity Class B

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	1	2.75	0.25	0	0	4
NNE	0	0	1	3.5	1.5	0	0	6
NE	0	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0	0
E	0	0	0.5	0.75	0	0	0	1.25
ESE	0	0	0.5	0	0	0	0	0.5
SE	0	0	0.5	0	0	0	0	0.5
SSE	0	0	1.75	3.25	0.5	0.5	0	6
S	0	0	0.25	0.25	0	0	0	0.5
SSW	0	0	0.5	0	0	0	0	0.5
SW	0	0	0.5	0.25	0	0	0	0.75
WSW	0	0	0.25	0.25	0.5	0	0	1
W	0	0	0	0.25	0	0	0	0.25
WNW	0	0	0.75	0.5	0	0	0	1.25
NW	0	0	0.5	1.25	0.25	0	0	2
NNW	0	0.25	7.25	13.5	2	0.5	0	23.5
TOTAL	0	0.25	15.25	26.5	5	1	0	48

Stabitity Class C

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0.5	4.75	0	0	0	5.25
NNE	0	0	1	0.5	1	0.25	0	2.75
NE	0	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0	0
E	0	0	1	1	0.5	0	0	2.5
ESE	0	0	0	0	0	0	0	0
SE	0	0	2.25	0	0	0	0	2.25
SSE	0	0.5	4.75	2.5	0.5	0.75	0	9
S	0	0	1	1	0.5	0	0	2.5
SSW	0	0	2.25	0.25	0	0	0	2.5
SW	0	0	1	0	0	0	0	1
WSW	0	0	0.5	0.25	0.25	0	0	1
W	0	0	1	0	0	0	0	1
WNW	0	0	0.25	1.25	0	0	0	1.5
NW	0	0	0.5	1.25	1	0	0	2.75
NNW	0	0.25	8	7	2	0	0	17.25
TOTAL	0	0.75	24	19.75	5.75	1	0	51.25

Stabitity Class D

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	3.75	13	0.75	0	0	17.5
NNE	0	0.25	2	7.5	4	0.25	0	14
NE	0	0	1	0.5	0	0	0	1.5
ENE	0	0.25	2	0	0.25	0	0	2.5
E	0	0.25	1.25	4.75	3.75	0	0	10
ESE	0	0.25	1	3	0	0	0	4.25
SE	0	0.75	2.25	0	0	0	0	3
SSE	0	1	22.5	14.5	4.5	1	0	43.5
S	0	0	2	4.25	1	0	0	7.25
SSW	0	0	2.75	2.5	0.5	0	0	5.75
SW	0	0	2.5	1.25	0	0	0	3.75
WSW	0	0	0.25	2.5	1.5	0	0	4.25
W	0	0	0.5	1.75	0	0	0	2.25
WNW	0	0	0.75	2.25	0.25	0	0	3.25
NW	0	0	1.5	5.75	2	0	0	9.25
NNW	0	2.5	32.75	34.5	4.75	0.5	0	75
TOTAL	0	5.25	78.75	98	23.25	1.75	0	207

Stabitity Class E

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	10	6.25	0.25	0	0	16.5
NNE	0	0	4.25	11.25	4.5	0	0	20
NE	0	0	9	1.5	0	0	0	10.5
ENE	0	0	4.75	4	0	0	0	8.75
E	0	0.5	7.75	5.75	3.75	0	0	17.75
ESE	0	0.5	4	11.25	0.5	0	0	16.25
SE	0	0.5	3.75	0	0	0	0	4.25
SSE	0	9.5	63.25	35	6.5	0	0	114.25
S	0	0.25	2.75	3.25	2.5	0	0	8.75
SSW	0	0.25	6.5	1.5	0	0	0	8.25
SW	0	0	4	1.5	0	0	0	5.5
WSW	0	0.25	4	5.5	0	0	0	9.75
W	0	0	2.5	4.75	0.25	0	0	7.5
WNW	0	0	1.75	2.75	0.25	0	0	4.75
NW	0	0	2.25	4.5	0.75	0	0	7.5
NNW	0	5.5	78.75	53.5	7.5	1.25	0	146.5
TOTAL	0	17.25	209.25	152.25	26.75	1.25	0	406.75

Stabitity Class F

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	1	3.5	2.5	0	0	0	7
NNE	0	1	4	1.75	0	0	0	6.75
NE	0	0.5	3	1	0	0	0	4.5
ENE	0	0.25	2.5	3	0	0	0	5.75
E	0	2	1.5	0.25	0	0	0	3.75
ESE	0	2.25	2.5	2.5	0	0	0	7.25
SE	0	1.25	2.5	0	0	0	0	3.75
SSE	0	8.5	46	24.25	6	0	0	84.75
S	0	1.5	8.25	3.5	0.75	0	0	14
SSW	0	2.5	10.5	2.25	0.5	0	0	15.75
SW	0	0.5	8.25	2	0	0	0	10.75
WSW	0	0.75	9.75	3	0.75	0	0	14.25
W	0	1	8.75	4.75	0	0	0	14.5
WNW	0	0.25	2.25	1	0	0	0	3.5
NW	0	0.25	6.75	8.25	0	0	0	15.25
NNW	0	10.75	70	25	1.5	0	0.25	107.5
TOTAL	0	34.25	190	85	9.5	0	0.25	319

Stabitity Class G

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	3.25	16.5	7	0	0	0	26.75
NNE	0	6	5.5	0	0	0	0	11.5
NE	0	5.25	7.75	0.25	0	0	0	13.25
ENE	0	4.25	3.75	0	0	0	0	8
E	0	3.5	2	0	0	0	0	5.5
ESE	0	2.25	1.75	0.75	0	0	0	4.75
SE	0	1.25	9.5	7	0	0	0	17.75
SSE	0	17	92.25	36.25	3.5	0.5	0	149.5
S	0	7	19.25	3.25	0	0	0	29.5
SSW	0	9.25	13.5	2.75	0.25	0	0	25.75
SW	0	7.5	26	15	0.5	0	0	49
WSW	0	2.5	21.75	7	0.75	0	0	32
W	0	3.75	12.75	7	0.75	0	0	24.25
WNW	0	4.5	17.75	0.5	0	0	0	22.75
NW	0	3	27.5	6.5	0	0	0	37
NNW	0	61	220.5	47.75	2.25	0	0	331.5
TOTAL	0	141.25	498	141	8	0.5	0	788.75

4th QUARTER 2002
Total Hours Missing = 117.25 Total Hours = 2208
Stabitity Class A

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	5.5	21	7.75	1	0	35.25
NNE	0	0	3	9	2	0	0	14
NE	0	0	2.25	4.75	0.75	0	0	7.75
ENE	0	0	4.75	12.75	5	0	0	22.5
E	0	0	5	14.5	3.25	0	0	22.75
ESE	0	0	3.75	6.25	8	8.5	0.5	27
SE	0	0.25	3.25	2.75	17.5	3.75	0.5	28
SSE	0	0	1.5	1.25	4.5	0	0.75	8
S	0	0	2.5	4.75	7.5	1.5	0.5	16.75
SSW	0	0	1.75	10.25	2	0.25	0	14.25
SW	0	0.25	5.25	17.25	10.25	1	0	34
WSW	0	0	5.75	20.75	20.25	1	0	47.75
W	0	0	7	22	24	10.75	1	64.75
WNW	0	0	10.25	34.25	19	1.75	0	65.25
NW	0	0	13	19.5	4.5	1	0	38
NNW	0	0	10.5	26	4.25	0.75	0	41.5
TOTAL	0	0.5	85	227	140.5	31.25	3.25	487.5

Stabitity Class B

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	1.75	7.5	4.5	0.25	0	14
NNE	0	0	1	0	0.5	0	0	1.5
NE	0	0	0.25	0.25	1	0	0	1.5
ENE	0	0	0.5	0.5	1	0	0	2
E	0	0	0.5	2.5	1.5	0	0	4.5
ESE	0	0	1.25	0.75	0	0	0	2
SE	0	0	1	0.25	1.75	1	0	4
SSE	0	0	0	1.25	0.75	0.75	0	2.75
S	0	0	0.25	0.5	1.5	1	0	3.25
SSW	0	0	0.5	2.25	0.25	0	0	3
SW	0	0	0.25	1.75	2.25	0	0	4.25
WSW	0	0	1	2.75	3.5	0	0	7.25
W	0	0	0	4.25	3.5	2.25	0	10
WNW	0	0	2.25	8	1.75	0.25	0	12.25
NW	0	0	3.75	4	0.25	0.25	0	8.25
NNW	0	0	2.75	7.75	5	0.25	0	15.75
TOTAL	0	0	17	44.25	29	6	0	96.25

Stabitity Class C

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0.25	2.25	7.75	2.25	0	0	12.5
NNE	0	0.25	0.5	1	0.25	0	0	2
NE	0	0	0.25	0.75	0	0	0	1
ENE	0	0	0.75	0.5	0	0	0	1.25
E	0	0	0	0	0	0	0	0
ESE	0	0	1.5	0.25	0	0	0	1.75
SE	0	0	1	1.25	1.75	1	0.25	5.25
SSE	0	0	0.25	0.25	1	1.75	0	3.25
S	0	0	0	0.5	0.75	0.75	0	2
SSW	0	0	0.75	3.25	0.25	0	0	4.25
SW	0	0	0.75	1	1.5	0	0	3.25
WSW	0	0.25	0.5	4.25	2	0	0	7
W	0	0.25	0.5	3.5	9.5	7.75	0.5	22
WNW	0	0	2	7.75	4.5	0.5	0	14.75
NW	0	0.25	1.25	3.5	0.5	0	0	5.5
NNW	0	0	2.25	4.25	5.25	0.75	0.25	12.75
TOTAL	0	1.25	14.5	39.75	29.5	12.5	1	98.5

Stabitity Class D

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	16.5	25.5	7.25	0	0	49.25
NNE	0	0	3.75	7.5	3.25	0	0	14.5
NE	0	0	1.5	3.75	0.25	0	0	5.5
ENE	0	0	4.25	1	0.25	0	0	5.5
E	0	0	1.25	4.5	0.25	0	0	6
ESE	0	0.5	1.25	0.5	0.25	0	0	2.5
SE	0	0	2.75	8.25	6.75	4	0	21.75
SSE	0	0	0.75	2.75	3.5	11.5	2.5	21
S	0	0	2	10.5	4.5	1.25	0.25	18.5
SSW	0	0	7	20	1	0	0	28
SW	0	0	3.75	12.5	4	0.25	0	20.5
WSW	0	0.25	7	13.75	5.25	0	0	26.25
W	0	1.25	10.5	28.75	37.75	4.5	0	82.75
WNW	0	0.5	11.75	33.75	5.75	0	0	51.75
NW	0	0.25	8	12	6	0.5	0	26.75
NNW	0	0.5	21.75	23	7.5	1.25	0	54
TOTAL	0	3.25	103.75	208	93.5	23.25	2.75	434.5

Stabitity Class E

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	1	12.25	15.75	2.75	0	0	31.75
NNE	0	0.5	1	4.75	3	0	0	9.25
NE	0	0	0.5	1	0.75	0	0	2.25
ENE	0	0.25	0.5	0.25	0	0	0	1
E	0	0	1.25	3	0	0	0	4.25
ESE	0	0.25	1.25	1	0.25	0.5	0	3.25
SE	0	1	3	7.25	4.5	2.75	0.25	18.75
SSE	0	1.5	3.25	7.5	4.5	5.5	2.75	25
S	0	0.5	9.5	10	9.75	3	0	32.75
SSW	0	0.5	29.25	11.5	1.75	0	0	43
SW	0	1.75	19	15.75	11.75	2	0	50.25
WSW	0	1	10	23	10.25	3	0	47.25
W	0	3.75	14.5	37.75	16.5	3.5	0	76
WNW	0	8	13.75	33.25	7.25	0.75	0	63
NW	0	5.75	13.75	7.75	1	0	0	28.25
NNW	0	4	23.25	20.5	0.75	0	0	48.5
TOTAL	0	29.75	156	200	74.75	21	3	484.5

Stabitity Class F

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0.75	2.5	1.5	0	0	0	4.75
NNE	0	0.5	0.25	0.5	0.25	0	0	1.5
NE	0	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0	0
E	0	0.5	0.25	0.25	0	0	0	1
ESE	0	0.25	0	0	0	0	0	0.25
SE	0	0.75	1	0	0.5	0	0	2.25
SSE	0	2.5	7.25	3.5	1.25	0.25	0	14.75
S	0	2.75	11	2	0.25	0	0	16
SSW	0	1.25	14.25	5.5	0.75	0	0	21.75
SW	0	0.25	22	8.25	8.25	1	0	39.75
WSW	0	1.75	7.75	7.5	6	0.25	0	23.25
W	0	4	20.5	6.75	0.75	0	0	32
WNW	0	1.25	21.5	11	0	0	0	33.75
NW	0	1	14.5	4.25	0	0	0	19.75
NNW	0	2.5	7.75	10.75	0	0	0	21
TOTAL	0	20	130.5	61.75	18	1.5	0	231.75

Stabitity Class G

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	1.5	4	0	0	0	0	5.5
NNE	0	0.25	0	0.25	0	0	0	0.5
NE	0	0.5	0	0	0	0	0	0.5
ENE	0	0.25	0.25	0	0	0	0	0.5
E	0	0.25	0	0	0	0	0	0.25
ESE	0	0.25	0	0	0	0	0	0.25
SE	0	0.25	1.25	0.25	0	0	0	1.75
SSE	0	2.25	5	3.5	0	0	0	10.75
S	0	1.5	6.75	0.25	0	0	0	8.5
SSW	0	1.25	16.75	1.25	0	0	0	19.25
SW	0	4	13	3.75	0	0.25	0	21
WSW	0	8	32.5	13.5	0	0	0	54
W	0	5	61.5	4	0	0	0	70.5
WNW	0	5	31.25	4.25	0	0	0	40.5
NW	0	3.25	9.75	1	0	0	0	14
NNW	0	2.25	4.75	3	0	0	0	10
TOTAL	0	35.75	186.75	35	0	0.25	0	257.75