NMC
Committed to Nuclear Excellence

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Kewaunee / Point Beach Nuclear
Operated by Nuclear Management Company, LLC

NRC-02-037

April 26, 2002

10 CFR 50.36a(a)(2)

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Ladies/Gentlemen:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant
Radioactive Effluent Release Report January - December 2001

Enclosed please find a copy of the Kewaunee Nuclear Power Plant Radioactive Effluent Release Report for January through December 2001. This report is submitted to meet the requirements of Technical Specification 6.9.b.2.

Sincerely,

Thomas Coutu
Manager-Kewaunee Plant

DFS

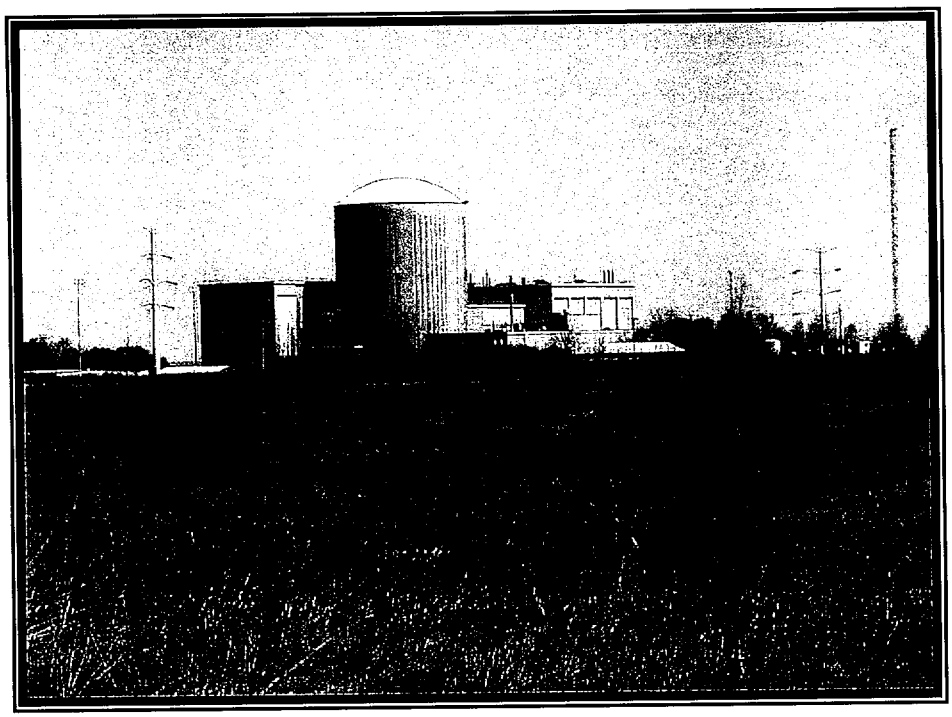
Enclosure

cc - US NRC Senior Resident Inspector
US NRC Region III

IE48

KEWAUNEE NUCLEAR POWER PLANT

RADIOACTIVE EFFLUENT RELEASE REPORT JAN-DEC 2001



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, 2001

Wisconsin Public Service Corporation
Green Bay, Wisconsin
April 11, 2002

Table of Contents

0.0 SUMMARY

During 2001 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)	0.0005632	(4^{th} Quarter)
	% of Specification	0.00751	
LIQUID:	Ingestion Pathway-Organ	Total Body	
	Quarterly Limit (mRems)	1.5	
	Actual Dose (mRems)	0.005703	(4^{th} Quarter)
	% of Limit	0.38	
SOLID:	No upper limit for solid radioactive waste applies.		
	Cubic Meters Shipped	2.72E+02	

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, 2001. 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 2001.

Number of batch releases.....37

Total time for all batch releases (min).....15986.0

Maximum time for a batch release (min).....1546.0

Average time for a batch release (min).....432.1

Minimum time for a batch release (min).....11.0

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 2001
Gaseous Effluents - Summation of all Releases

Fission and Activation Gases	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Total Activity Released (Ci)	0.000E+000	0.000E+000	1.334E-001	3.424E-003
Average Release Rate (µCi/sec)	0.000E+000	0.000E+000	1.696E-002	4.355E-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	3.418E-006	2.265E-006
Average Release Rate (µCi/sec)	0.000E+000	0.000E+000	4.347E-007	2.881E-007
Gross Alpha Released (Ci)	0.000E+000	0.000E+000	3.185E-008	4.508E-008
Tritium				
Total Activity Released (Ci)	5.260E-001	8.730E-001	3.891E+000	2.637E+001
Average Release Rate (µCi/sec)	6.690E-002	1.110E-001	4.949E-001	3.354E+000

Table 2.2
Annual Radioactive Effluent Release Report 2001
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				
Co-58	0.000E+000	0.000E+000	0.000E+000	1.241E-006
Co-60	0.000E+000	0.000E+000	0.000E+000	3.700E-007
Sr-90	0.000E+000	0.000E+000	3.418E-006	0.000E+000
Cs-137	0.000E+000	0.000E+000	0.000E+000	6.540E-007
Total	0.000E+000	0.000E+000	3.418E-006	2.265E-006

Table 2.2(cont)
Annual Radioactive Effluent Release Report 2001
Gaseous Effluents

Nuclides Released (Ci)
Batch Mode

Fission Gases				
Ar-41	0.000E+000	0.000E+000	9.369E-003	0.000E+000
Xe-133	0.000E+000	0.000E+000	9.156E-002	3.424E-003
Xe-133m	0.000E+000	0.000E+000	2.794E-003	0.000E+000
Xe-135	0.000E+000	0.000E+000	2.966E-002	0.000E+000
Total	0.000E+000	0.000E+000	1.334E-001	3.424E-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 2001
1st Quarter Gaseous Release
Total of all Releases

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 2.3A (Con't)
Annual Radioactive Effluent Release Report 2001
1st Quarter Gaseous Release
Total of all Releases

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)	2.344E-001	0.000E+000	2.916E-001	5.260E-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 2001
2nd Quarter Gaseous Release
Total of all Releases

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 2.3A (Con't)
Annual Radioactive Effluent Release Report 2001
2nd Quarter Gaseous Release
Total of all Releases

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)	0.000E+000	8.730E-001	0.000E+000	8.730E-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 2001
3rd Quarter Gaseous Release
Total of all Releases

Noble Gasses (Curies)

Isotope	July	August	September	Total
Ar-41	0.000E+000	0.000E+000	9.369E-003	9.369E-003
Xe-133	5.347E-004	1.157E-003	8.987E-002	9.156E-002
Xe-133m	0.000E+000	0.000E+000	2.794E-003	2.794E-003
Xe-135	0.000E+000	0.000E+000	2.966E-002	2.966E-002
Total	5.347E-004	1.157E-003	1.317E-001	1.334E-001

Particulates (Curies)

Isotope	July	August	September	Total
Sr-90	0.000E+000	0.000E+000	3.418E-006	3.418E-006
Total	0.000E+000	0.000E+000	3.418E-006	3.418E-006

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 2001
3rd Quarter Gaseous Release
Total of all Releases

Summary	July	August	September	Total
Total Noble Gases (Ci)	5.347E-004	1.157E-003	1.317E-001	1.334E-001
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	3.418E-006	3.418E-006
Total Tritium (Ci)	7.068E-006	3.320E-004	3.891E+000	3.891E+000
Total Particulate Gross Alpha (Ci)	0.000E+000	0.000E+000	3.185E-008	3.185E-008

Table 2.3A (Con't)
Annual Radioactive Effluent Release Report 2001
4th Quarter Gaseous Release
Total of all Releases

Noble Gasses (Curies)

Isotope	October	November	December	Total
Xe-133	2.756E-003	0.000E+000	6.683E-004	3.424E-003
Total	2.756E-003	0.000E+000	6.683E-004	3.424E-003

Particulates (Curies)

Isotope	October	November	December	Total
Co-58	0.000E+000	3.230E-008	1.209E-006	1.241E-006
Co-60	0.000E+000	3.700E-007	0.000E+000	3.700E-007
Cs-137	0.000E+000	6.540E-007	0.000E+000	6.540E-007
Total	0.000E+000	1.056E-006	1.209E-006	2.265E-006

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 2001
4th Quarter Gaseous Release
Total of all Releases

Summary	October	November	December	Total
Total Noble Gases (Ci)	2.756E-003	0.000E+000	6.683E-004	3.424E-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	1.056E-006	1.209E-006	2.265E-006
Total Tritium (Ci)	2.251E+000	4.658E+000	1.946E+001	2.637E+001
Total Particulate Gross Alpha (Ci)	4.508E-008	0.000E+000	0.000E+000	4.508E-008

Table 2.3B
Annual Radioactive Effluent Release Report 2001
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 2001
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)	2.344E-001	0.000E+000	2.916E-001	5.260E-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 2001
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 2001
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)	0.000E+000	8.722E-001	0.000E+000	8.722E-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 2001
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
Sr-90	0.000E+000	0.000E+000	3.418E-006	3.418E-006
Total	0.000E+000	0.000E+000	3.418E-006	3.418E-006

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 2001
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	3.418E-006	3.418E-006
Total Tritium (Ci)	0.000E+000	0.000E+000	1.054E+000	1.054E+000
Total Particulate Gross Alpha (Ci)	0.000E+000	0.000E+000	3.185E-008	3.185E-008

Table 2.3B (Con't)
Annual Radioactive Effluent Release Report 2001
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
Co-58	0.000E+000	3.230E-008	1.209E-006	1.241E-006
Co-60	0.000E+000	3.700E-007	0.000E+000	3.700E-007
Cs-137	0.000E+000	6.540E-007	0.000E+000	6.540E-007
Total	0.000E+000	1.056E-006	1.209E-006	2.265E-006

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 2001
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	1.056E-006	1.209E-006	2.265E-006
Total Tritium (Ci)	2.251E+000	4.658E+000	1.946E+001	2.637E+001
Total Particulate Gross Alpha (Ci)	4.508E-008	0.000E+000	0.000E+000	4.508E-008

Table 2.3C
Annual Radioactive Effluent Release Report 2001
1st Quarter Gaseous Release
Batch 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 2.3C (Con't)
Annual Radioactive Effluent Release Report 2001
1st Quarter Gaseous Release
Batch 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	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 (Con't)
Annual Radioactive Effluent Release Report 2001
2nd Quarter Gaseous Release
Batch 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 2.3C (Con't)
Annual Radioactive Effluent Release Report 2001
2nd Quarter Gaseous Release
Batch 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)	0.000E+000	8.232E-004	0.000E+000	8.232E-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 2001
3rd Quarter Gaseous Release
Batch Mode Only

Noble Gasses (Curies)

Isotope	July	August	September	Total
Ar-41	0.000E+000	0.000E+000	9.369E-003	9.369E-003
Xe-133	5.347E-004	1.157E-003	8.987E-002	9.156E-002
Xe-133m	0.000E+000	0.000E+000	2.794E-003	2.794E-003
Xe-135	0.000E+000	0.000E+000	2.966E-002	2.966E-002
Total	5.347E-004	1.157E-003	1.317E-001	1.334E-001

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 2001
3rd Quarter Gaseous Release
Batch Mode Only

Summary	July	August	September	Total
Total Noble Gases (Ci)	5.347E-004	1.157E-003	1.317E-001	1.334E-001
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)	7.068E-006	3.320E-004	2.837E+000	2.837E+000
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 2001
4th Quarter Gaseous Release
Batch Mode Only

Noble Gasses (Curies)

Isotope	October	November	December	Total
Xe-133	2.756E-003	0.000E+000	6.683E-004	3.424E-003
Total	2.756E-003	0.000E+000	6.683E-004	3.424E-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 2001
4th Quarter Gaseous Release
Batch Mode Only

Summary

	October	November	December	Total
Total Noble Gases (Ci)	2.756E-003	0.000E+000	6.683E-004	3.424E-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)	2.512E-004	2.701E-005	7.075E-005	3.490E-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 2001
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 2001 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)	0.000E+000	0.000E+000	2.024E-005	1.379E-007
% of Specification	0.000E+000	0.000E+000	4.047E-004	2.759E-006
2. Beta-Skin				
Specification (mRads)	1.000E+001	1.000E+001	1.000E+001	1.000E+001
Actual Dose (mRads)	0.000E+000	0.000E+000	2.328E-005	4.103E-007
% of Specification	0.000E+000	0.000E+000	2.328E-004	4.103E-006
3. Ingestion Pathway-Organ				
Specification (mRems)	7.500E+000	7.500E+000	7.500E+000	7.500E+000
Actual Dose (mRems)	1.111E-005	1.844E-005	9.161E-005	5.632E-004
% of Specification	1.482E-004	2.459E-004	1.221E-003	7.510E-003
	Liver	Liver	TBody	Liver

Table 2.4 (Con't)
Annual Radioactive Effluent Release Report 2001
Dose From Gaseous Effluents

In addition, the cumulative annual offsite doses for the period January 1 - December 31, 2001 versus the ODCM annual limits were:

	Annual
1. Gamma-Whole Body	
Specification (mRads)	1.000E+001
Actual Dose (mRads)	2.037E-005
% of Specification	2.037E-004
2. Beta-Skin	
Specification (mRads)	2.000E+001
Actual Dose (mRads)	2.369E-005
% of Specification	1.184E-004
3. Ingestion Pathway-Organ	
Specification (mRems)	1.500E+001
Actual Dose (mRems)	6.812E-004
% of Specification	4.541E-003
	TBody

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	6.62E-10	6.62E-08	6.62E-10	6.62E-10	1.70E-08
Fe-59	1.46E-09	1.46E-09	1.46E-09	1.46E-09	1.46E-09
Co-58	6.50E-08	6.50E-10	6.50E-10	6.50E-10	1.67E-08
Co-60	9.61E-10	9.61E-10	9.61E-08	9.61E-10	2.47E-08
Zn-65	1.64E-09	1.64E-09	1.64E-09	1.64E-09	1.64E-09
Mo-99	4.70E-09	4.69E-09	4.69E-09	4.69E-09	4.69E-09
Cs-134	5.22E-10	5.22E-10	5.22E-10	5.22E-10	5.22E-10
Cs-137	6.44E-10	6.44E-08	6.44E-10	6.44E-10	1.66E-08
Ce-141	7.62E-08	3.81E-10	4.21E-08	3.81E-10	2.98E-08
Ce-144	1.71E-07	5.90E-07	1.71E-07	4.86E-07	3.54E-07
I-131	4.06E-10	4.06E-10	4.06E-08	4.06E-08	2.05E-08
H-3	3.33E-06	3.82E-06	3.57E-06	3.76E-06	3.62E-06
Sr-89	1.63E-08	2.87E-08	1.60E-08	1.10E-08	1.80E-08
Sr-90	6.73E-09	9.27E-09	6.60E-09	7.87E-09	7.62E-09
Gross Alpha	8.23E-09	7.23E-09	5.40E-09	5.83E-09	6.68E-09
Fe-55	7.93E-07	8.40E-07	8.23E-07	9.43E-07	8.50E-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.

	Continuous Release				
Isotope	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Average a priori LLD (μCi/ml)
Mn-54	2.73E-08	1.56E-08	1.10E-08	1.91E-08	1.83E-08
Fe-59	2.43E-10	4.20E-08	2.43E-10	2.43E-10	1.07E-08
Co-58	1.20E-08	1.35E-08	2.42E-08	1.53E-08	1.63E-08
Co-60	2.04E-08	3.23E-08	2.89E-08	1.44E-08	2.40E-08
Zn-65	2.73E-08	2.73E-10	2.73E-10	3.02E-08	1.45E-08
Mo-99	1.48E-07	2.84E-07	3.19E-07	2.17E-07	2.42E-07
Cs-134	9.58E-09	8.69E-11	1.98E-08	3.88E-08	1.71E-08
Cs-137	2.90E-08	1.07E-10	3.51E-08	1.07E-10	1.61E-08
Ce-141	3.45E-08	1.56E-08	1.68E-08	1.68E-08	2.09E-08
Ce-144	7.55E-08	1.34E-07	1.67E-07	1.90E-07	1.41E-07
I-131	4.46E-08	1.33E-08	1.69E-08	6.76E-09	2.04E-08
H-3	3.33E-06	3.82E-06	3.57E-06	3.76E-06	3.62E-06
Sr-89	1.67E-08	2.70E-08	1.63E-08	1.26E-08	1.82E-08
Sr-90	7.55E-09	8.70E-09	7.68E-09	7.78E-09	7.93E-09
Gross Alpha	5.12E-09	4.77E-09	5.10E-09	4.82E-09	4.95E-09
Fe-55	7.90E-07	8.38E-07	8.22E-07	9.18E-07	8.42E-07

3.2 **Liquid Batch Release Statistics**

The following is a summation of all liquid batch releases made during 2001.

Release Type	Number	Gallons Released
A SGBT Monitor Tk.	10	93249.0
B SGBT Monitor Tk.	9	76404.0
A CVC Monitor	11	71040.0
B CVC Monitor	13	76125.0
Both WCTs	41	74905.0

Total time for all batch releases.....23937.0 Min.

Maximum time for a batch release.....1340.0 Min.

Minimum time for a batch release.....5.0 Min.

Average time for a batch release.....285.0 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 2001
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)	9.144E-003	2.281E-002	1.002E-002	2.139E-002
Average Concentration (µCi/ml)	8.967E-011	1.291E-010	5.003E-011	2.902E-010
Tritium				
Total Release (Ci)	5.154E+001	6.467E+001	8.291E+001	7.123E+001
Average Concentration (µCi/ml)	5.054E-007	3.661E-007	4.141E-007	9.663E-007
% of Tech. Spec. Limit(3.0E-3 µCi/ml)	1.685E-002	1.220E-002	1.380E-002	3.221E-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)	2.604E+005	2.271E+005	3.959E+005	5.994E+005
Continuous (liters)	4.378E+007	4.218E+007	4.277E+007	4.695E+007
Total (liters)	4.404E+007	4.240E+007	4.317E+007	4.755E+007
Volume of Dilution Water				
Batch (liters)	3.854E+009	4.396E+009	7.410E+009	5.698E+009
Continuous (liters)	9.812E+010	1.723E+011	1.928E+011	6.802E+010
Total (liters)	1.020E+011	1.766E+011	2.002E+011	7.372E+010

TABLE 3.2A
Annual Radioactive Effluent Release Report 2001
Liquid Effluents - Batch Releases

	January	February	March	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	5.944E-004	8.511E-005	9.286E-004	1.608E-003
Avg. Conc. (μCi/ml)	6.833E-010	1.538E-010	3.821E-010	
Tritium				
Total Release (Ci)	2.288E+000	1.656E+001	2.991E+001	4.875E+001
Avg. Conc. (μCi/ml)	2.630E-006	2.992E-005	1.231E-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)	7.629E+004	6.028E+004	1.238E+005	2.604E+005
Volume of Dilution Water				
(liters)	8.699E+008	5.534E+008	2.430E+009	3.854E+009

TABLE 3.2A (Con't)
Annual Radioactive Effluent Release Report 2001
Liquid Effluents - Batch Releases

Isotope (Ci)	January	February	March	Total
H-3	2.288E+000	1.656E+001	2.991E+001	4.875E+001
Mn-54	0.000E+000	1.236E-007	2.582E-005	2.594E-005
Fe-55	3.042E-004	7.035E-005	4.209E-004	7.954E-004
Co-58	8.942E-005	6.170E-007	1.124E-004	2.024E-004
Co-60	5.379E-005	1.263E-005	2.268E-004	2.932E-004
Sr-90	1.068E-007	3.108E-008	1.857E-007	3.236E-007
Ag-110m	0.000E+000	1.217E-006	9.677E-005	9.798E-005
Sb-125	5.138E-005	1.416E-007	4.578E-005	9.730E-005
Cs-137	9.547E-005	0.000E+000	0.000E+000	9.547E-005
Total	2.288E+000	1.656E+001	2.991E+001	4.876E+001

TABLE 3.2B
Annual Radioactive Effluent Release Report 2001
Liquid Effluents - Batch Releases

	April	May	June	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	7.504E-003	5.440E-003	1.271E-003	1.422E-002
Avg. Conc. (µCi/ml)	1.261E-008	4.612E-009	4.850E-010	
Tritium				
Total Release (Ci)	2.196E+000	2.466E+000	5.783E+001	6.249E+001
Avg. Conc. (µCi/ml)	3.690E-006	2.090E-006	2.206E-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)	5.679E+004	5.525E+004	1.151E+005	2.271E+005
Volume of Dilution Water				
(liters)	5.951E+008	1.180E+009	2.621E+009	4.396E+009

TABLE 3.2B (Con't)
Annual Radioactive Effluent Release Report 2001
Liquid Effluents - Batch Releases

Isotope (Ci)	April	May	June	Total
H-3	2.196E+000	2.466E+000	5.783E+001	6.249E+001
Mn-54	2.206E-004	1.646E-005	0.000E+000	2.371E-004
Fe-55	4.827E-003	4.917E-003	1.058E-003	1.080E-002
Co-57	2.416E-005	0.000E+000	0.000E+000	2.416E-005
Co-58	9.160E-004	6.844E-005	1.595E-005	1.000E-003
Co-60	1.221E-003	2.983E-004	1.368E-004	1.656E-003
Sr-89	5.679E-008	1.215E-006	6.903E-007	1.963E-006
Sr-90	0.000E+000	0.000E+000	2.416E-007	2.416E-007
Ag-110m	1.594E-004	7.082E-005	2.128E-005	2.515E-004
Sb-125	1.353E-004	6.744E-005	3.775E-005	2.405E-004
Total	2.203E+000	2.471E+000	5.783E+001	6.250E+001

TABLE 3.2C
Annual Radioactive Effluent Release Report 2001
Liquid Effluents - Batch Releases

	July	August	September	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	3.966E-004	1.277E-003	1.961E-003	3.634E-003
Avg. Conc. (µCi/ml)	1.198E-010	4.900E-010	1.312E-009	
Tritium				
Total Release (Ci)	5.626E+001	2.357E+001	2.240E+000	8.207E+001
Avg. Conc. (µCi/ml)	1.700E-005	9.045E-006	1.499E-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)	1.556E+005	1.532E+005	8.713E+004	3.959E+005
Volume of Dilution Water				
(liters)	3.310E+009	2.606E+009	1.494E+009	7.410E+009

TABLE 3.2C (Con't)
Annual Radioactive Effluent Release Report 2001
Liquid Effluents - Batch Releases

Isotope (Ci)	July	August	September	Total
H-3	5.626E+001	2.357E+001	2.240E+000	8.207E+001
Fe-55	1.867E-004	7.507E-004	1.220E-003	2.157E-003
Co-58	1.892E-005	6.711E-005	1.734E-004	2.594E-004
Co-60	8.248E-005	3.167E-004	3.569E-004	7.561E-004
Sr-89	1.556E-006	1.685E-006	0.000E+000	3.241E-006
Sr-90	0.000E+000	5.362E-007	6.970E-008	6.060E-007
Ag-110m	4.891E-005	1.160E-004	1.726E-004	3.376E-004
Sb-125	5.248E-005	0.000E+000	0.000E+000	5.248E-005
Cs-137	5.568E-006	2.399E-005	3.787E-005	6.742E-005
Total	5.626E+001	2.357E+001	2.242E+000	8.208E+001

TABLE 3.2D
Annual Radioactive Effluent Release Report 2001
Liquid Effluents - Batch Releases

	October	November	December	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	3.748E-003	4.466E-003	4.447E-003	1.266E-002
Avg. Conc. (µCi/ml)	1.744E-009	4.063E-009	1.815E-009	
Tritium				
Total Release (Ci)	5.163E+001	1.015E+001	9.448E+000	7.123E+001
Avg. Conc. (µCi/ml)	2.403E-005	9.238E-006	3.856E-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)	2.569E+005	1.639E+005	1.787E+005	5.994E+005
Volume of Dilution Water				
(liters)	2.149E+009	1.099E+009	2.450E+009	5.698E+009

TABLE 3.2D (Con't)
Annual Radioactive Effluent Release Report 2001
Liquid Effluents - Batch Releases

Isotope (Ci)	October	November	December	Total
H-3	5.163E+001	1.015E+001	9.448E+000	7.123E+001
Cr-51	1.352E-004	2.816E-004	4.088E-004	8.256E-004
Mn-54	0.000E+000	0.000E+000	3.343E-005	3.343E-005
Fe-55	2.733E-003	1.426E-003	1.286E-003	5.445E-003
Co-58	3.751E-004	1.037E-003	1.115E-003	2.527E-003
Fe-59	4.277E-005	4.174E-005	1.595E-004	2.440E-004
Co-60	2.011E-004	4.359E-004	7.114E-004	1.348E-003
Sr-89	5.421E-007	0.000E+000	6.075E-007	1.150E-006
Sr-90	8.220E-007	5.244E-007	0.000E+000	1.346E-006
Zr-95	0.000E+000	0.000E+000	7.177E-005	7.177E-005
Nb-95	0.000E+000	4.426E-005	1.944E-004	2.386E-004
Ag-110m	3.950E-005	4.928E-004	4.149E-004	9.472E-004
Sn-113	0.000E+000	0.000E+000	5.075E-005	5.075E-005
Sb-124	4.667E-005	1.347E-004	0.000E+000	1.814E-004
Sb-125	1.303E-004	5.035E-004	0.000E+000	6.337E-004
Cs-137	4.290E-005	6.818E-005	0.000E+000	1.111E-004
Total	5.163E+001	1.016E+001	9.452E+000	7.125E+001

TABLE 3.3A
Annual Radioactive Effluent Release Report 2001
Liquid Effluents - Continuous Releases

	January	February	March	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	8.066E-004	2.622E-003	4.107E-003	7.535E-003
Avg. Conc. (µCi/ml)	2.387E-011	8.590E-011	1.215E-010	
Tritium				
Total Release (Ci)	9.328E-001	9.075E-001	9.450E-001	2.785E+000
Avg. Conc. (µCi/ml)	2.760E-008	2.973E-008	2.796E-008	
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)	1.408E+007	1.358E+007	1.612E+007	4.378E+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 2001
Liquid Effluents - Continuous Releases

Isotope (Ci)	January	February	March	Total
H-3	9.328E-001	9.075E-001	9.450E-001	2.785E+000
Na-24	8.823E-005	0.000E+000	0.000E+000	8.823E-005
Fe-55	6.269E-004	2.239E-003	3.981E-003	6.847E-003
Co-58	0.000E+000	3.947E-005	0.000E+000	3.947E-005
Co-60	0.000E+000	7.975E-005	0.000E+000	7.975E-005
Br-82	0.000E+000	9.332E-006	0.000E+000	9.332E-006
Sr-89	7.111E-005	6.453E-005	2.114E-005	1.568E-004
Sr-90	2.036E-005	0.000E+000	0.000E+000	2.036E-005
I-133	0.000E+000	1.438E-004	1.044E-004	2.482E-004
I-135	0.000E+000	4.609E-005	0.000E+000	4.609E-005
Total	9.336E-001	9.101E-001	9.491E-001	2.793E+000

TABLE 3.3B
Annual Radioactive Effluent Release Report 2001
Liquid Effluents - Continuous Releases

	April	May	June	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	3.104E-003	1.044E-003	4.450E-003	8.598E-003
Avg. Conc. (µCi/ml)	7.764E-011	1.561E-011	6.804E-011	
Tritium				
Total Release (Ci)	8.402E-001	7.354E-001	6.048E-001	2.180E+000
Avg. Conc. (µCi/ml)	2.102E-008	1.100E-008	9.246E-009	
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)	1.418E+007	1.298E+007	1.502E+007	4.218E+007
Volume of Dilution Water				
(liters)	3.997E+010	6.687E+010	6.541E+010	1.723E+011

TABLE 3.3B (Con't)
Annual Radioactive Effluent Release Report 2001
Liquid Effluents - Continuous Releases

Isotope (Ci)	April	May	June	Total
H-3	8.402E-001	7.354E-001	6.048E-001	2.180E+000
Fe-55	2.996E-003	8.890E-004	4.389E-003	8.274E-003
Br-82	0.000E+000	1.343E-004	0.000E+000	1.343E-004
Sr-89	2.129E-005	0.000E+000	0.000E+000	2.129E-005
Sr-90	9.745E-006	2.043E-005	6.137E-005	9.155E-005
I-133	7.647E-005	0.000E+000	0.000E+000	7.647E-005
Total	8.433E-001	7.364E-001	6.093E-001	2.189E+000

TABLE 3.3C
Annual Radioactive Effluent Release Report 2001
Liquid Effluents - Continuous Releases

	July	August	September	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	1.294E-003	2.647E-003	2.441E-003	6.382E-003
Avg. Conc. (µCi/ml)	1.914E-011	3.915E-011	4.239E-011	
Tritium				
Total Release (Ci)	3.375E-001	3.061E-001	1.921E-001	8.358E-001
Avg. Conc. (µCi/ml)	4.994E-009	4.529E-009	3.335E-009	
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)	1.373E+007	1.273E+007	1.631E+007	4.277E+007
Volume of Dilution Water				
(liters)	6.759E+010	6.759E+010	5.760E+010	1.928E+011

TABLE 3.3C (Con't)
Annual Radioactive Effluent Release Report 2001
Liquid Effluents - Continuous Releases

Isotope (Ci)	July	August	September	Total
H-3	3.375E-001	3.061E-001	1.921E-001	8.358E-001
Na-24	1.123E-004	0.000E+000	1.713E-005	1.294E-004
Fe-55	8.760E-004	2.527E-003	2.204E-003	5.607E-003
Co-58	0.000E+000	0.000E+000	3.422E-005	3.422E-005
Co-60	0.000E+000	8.300E-005	9.340E-005	1.764E-004
Sr-89	0.000E+000	0.000E+000	1.477E-005	1.477E-005
Sr-90	5.304E-005	3.679E-005	2.185E-005	1.117E-004
I-132	7.749E-008	0.000E+000	0.000E+000	7.749E-008
I-133	2.522E-004	0.000E+000	5.565E-005	3.078E-004
Total	3.388E-001	3.088E-001	1.946E-001	8.422E-001

TABLE 3.3D
Annual Radioactive Effluent Release Report 2001
Liquid Effluents - Continuous Releases

	October	November	December	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	2.818E-005	3.981E-003	4.722E-003	8.731E-003
Avg. Conc. (µCi/ml)	1.208E-012	3.657E-010	1.397E-010	
Tritium				
Total Release (Ci)	2.968E-004	0.000E+000	0.000E+000	2.968E-004
Avg. Conc. (µCi/ml)	1.272E-011	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)	9.398E+006	1.309E+007	2.446E+007	4.695E+007
Volume of Dilution Water				
(liters)	2.333E+010	1.089E+010	3.380E+010	6.802E+010

TABLE 3.3D (Con't)
Annual Radioactive Effluent Release Report 2001
Liquid Effluents - Continuous Releases

Isotope (Ci)	October	November	December	Total
H-3	2.968E-004	0.000E+000	0.000E+000	2.968E-004
Fe-55	0.000E+000	3.941E-003	4.678E-003	8.619E-003
Co-58	0.000E+000	2.859E-005	0.000E+000	2.859E-005
Sr-89	2.816E-005	0.000E+000	3.155E-005	5.970E-005
Sr-90	2.874E-008	1.111E-005	1.258E-005	2.372E-005
Total	3.250E-004	3.981E-003	4.722E-003	9.028E-003

Table 3.4
Annual Radioactive Effluent Report 2001
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	1.081E-003	1.5	0.07
Bone	8.183E-004	5.0	0.02
Liver	1.464E-003	5.0	0.03
Thyroid	3.542E-004	5.0	0.01
Kidney	7.269E-004	5.0	0.01
Lung	4.824E-004	5.0	0.01
GI-LLI	4.281E-004	5.0	0.01

Organ 2nd Qtr Dose	Dose Total mRem	Quarterly Limit mRem	Percent of Limit
Total Body	2.801E-004	1.5	0.02
Bone	1.157E-004	5.0	0.00
Liver	3.457E-004	5.0	0.01
Thyroid	2.349E-004	5.0	0.00
Kidney	2.415E-004	5.0	0.00
Lung	2.788E-004	5.0	0.01
GI-LLI	5.420E-004	5.0	0.01

Table 3.4 (Con't)
Annual Radioactive Effluent Report 2001
Dose From Liquid Effluents

Organ 3rd Qtr Dose	Dose Total mRem	Quarterly Limit mRem	Percent of Limit
Total Body	6.695E-004	1.5	0.04
Bone	5.414E-004	5.0	0.01
Liver	8.153E-004	5.0	0.02
Thyroid	3.124E-004	5.0	0.01
Kidney	4.678E-004	5.0	0.01
Lung	3.727E-004	5.0	0.01
GI-LLI	4.005E-004	5.0	0.01

Organ 4th Qtr Dose	Dose Total mRem	Quarterly Limit mRem	Percent of Limit
Total Body	5.703E-003	1.5	0.38
Bone	6.577E-003	5.0	0.13
Liver	6.396E-003	5.0	0.13
Thyroid	3.660E-003	5.0	0.07
Kidney	4.095E-003	5.0	0.08
Lung	4.605E-003	5.0	0.09
GI-LLI	1.289E-002	5.0	0.26

Calculated Dose This Year

Organ	Dose Total mRem	Quarterly Limit mRem	Percent of Limit
Total Body	7.734E-003	3.0	0.26
Bone	8.052E-003	10.0	0.08
Liver	9.021E-003	10.0	0.09
Thyroid	4.561E-003	10.0	0.05
Kidney	5.531E-003	10.0	0.06
Lung	5.739E-003	10.0	0.06
GI-LLI	1.426E-002	10.0	0.14

4.0 UNPLANNED RELEASES

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

5.0 METEOROLOGICAL DATA

Meteorological data for 2001 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 2001. 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 2001 dewatered resin shipments was analyzed by a contractor for transuranic nuclides. The results showed an average transuranic concentration of 2.80E+00 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.

Included in Table 6.1 are masses and activities from the steam generator lower assemblies removed from the Kewaunee Nuclear Power Plant during the Fall 2001 steam generator replacement outage.

Table 6.1
Annual Radioactive Effluent Report 2001
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	None
	Container: HIC	Ci	None
b.	Dewatered filter media	m^3	3.96E+00
	Container: HIC	Ci	4.91E+00
c.	DAW (Compactible)	m^3	1.70E+01
	Container: Strong Type	Ci	4.75E-01
d.	DAW (Non-Compactible)	m^3	2.51E+02
	Container: Strong Type	Ci	4.11E+02

Average Transuranics shipped (all shipments): 2.43E+01 nCi/g

2. Estimate of Major Nuclide by Composition (By Type of Waste)		%	Ci
a.	Dewatered resin	None	None
b.	Dewatered filter media	100%	4.91E+00
	Mn-54	5.86E-01	2.88E-02
	Co-58	2.99E-01	1.47E-02
	Co-60	3.91E+01	1.92E+00
	Zr-95	5.05E-03	2.48E-04
	Nb-95	1.49E-04	7.33E-06
	Ag-110m	2.14E-01	1.05E-02
	Cs-137	1.67E-01	8.21E-03
	Sb-125	3.03E+00	1.49E-01
	*Fe-55	1.64E+01	8.06E-01
	*C-14	2.12E-01	1.04E-02
	*Pu-241	3.28E-01	1.61E-02
	*Ni-63	3.95E+01	1.94E+00
	Zn-65	7.16E-02	3.52E-03
	Ce-144	1.44E-01	7.07E-03

c.	DAW (Compactible)	100%	4.75E-01
	Mn-54	1.06E+00	5.01E-03
	Co-58	2.34E+00	1.11E-02
	Co-60	2.39E+01	1.14E-01
	Zr-95	5.36E-02	2.55E-04
	Nb-95	1.97E-02	9.33E-05
	Ag-110m	8.59E-02	4.08E-04
	Cs-137	5.62E-02	2.67E-04
	Sb-125	7.24E-01	3.44E-03
	*Fe-55	2.76E+01	1.31E-01
	*C-14	3.97E-02	1.89E-04
	Ni-59	3.85E-01	1.83E-03
	U-233	2.70E-04	1.28E-06
	*Pu-241	4.77E-02	2.27E-04
	*Cm-242	5.78E-05	2.74E-07
	T	1.02E-01	4.82E-04
	*Ni-63	4.32E+01	2.05E-01
	Zn-65	1.64E-01	7.77E-04
	Np-237	7.87E-02	3.74E-04
	Ce-144	5.99E-02	2.84E-04
d.	DAW (Non-Compactible)	100%	4.11E+02
	Cr-51	2.72E-03	1.12E-02
	Mn-54	2.33E+00	9.58E+00
	Co-57	1.14E-03	4.70E-03
	Co-58	6.27E+01	2.58E+02
	Co-60	1.21E+01	4.98E+01
	Zr-95	1.81E-05	7.43E-05
	Nb-95	1.76E+00	7.24E+00
	Ag-110m	4.35E-01	1.79E+00
	Cs-137	5.15E-03	2.12E-02
	Sb-125	6.78E-01	2.79E+00
	*Fe-55	1.73E+01	7.11E+01
	*C-14	6.49E-02	2.67E-01
	Ni-59	1.92E-02	7.91E-02
	*Tc-99	6.76E-04	2.78E-03
	U-233	5.66E-09	2.33E-08
	*Pu-241	2.89E-03	1.19E-02
	*Cm-242	9.95E-06	4.09E-05
	T	2.32E-06	9.54E-06
	*Ni-63	2.35E+00	9.65E+00
	Zn-65	2.44E-01	1.00E+00
	Np-237	1.65E-06	6.77E-06

d. DAW (Non-Compactible) – (Cont'd)

Am-241	3.11E-04	1.28E-03
Cm-243	4.48E-05	1.84E-04
Pu-238	1.35E-04	5.55E-04
Pu-239	1.21E-04	4.99E-04
Ce-144	3.09E-06	1.27E-05

3. Solid Waste Disposition

a.

Date of Shipment	Mode of Transportation	Destination
06/05/01	CNSI Van	Barnwell, SC
06/14/01	CNSI 14-190H Cask	Barnwell, SC
11/02/01	Barge	Memphis, TN
11/05/01	Barge	Memphis, TN

B. Irradiated Fuel Shipments

No irradiated fuel shipments were made from the Kewaunee Nuclear Power Plant during the first six months of 2001.

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

None.

Appendix A

Kewaunee Nuclear Power Plant

2001 Meteorological Data

Missing Data

First Quarter: 0.75 hours
Second Quarter: 69.75 hours
Third Quarter: 617.25 hours
Fourth Quarter: 72 hours

Note: A total of 759.75 hours of data is missing or otherwise unavailable. This represents the availability of 91.3% of the data for the year. Continuous strip chart indication for 2001 data is available onsite.

FIRST QUARTER 2001
Total Hours Missing = 0.75 Total Hours = 2160
Stability Class A

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	1.5	5.25	7.5	7.5	0.75	0	22.5
NNE	0	0	2	15.5	7.5	2.25	5	32.25
NE	0	0	4.5	11.25	18.5	2.25	0	36.5
ENE	0	0	1.5	4.25	2	0	0	7.75
E	0	0.75	3.5	1.25	0.75	0.5	0	6.75
ESE	0	1.25	7	4.5	0.5	3	0	16.25
SE	0	1	4.75	2.25	7.75	1.25	0	17
SSE	0	0.25	3.25	9	2.25	0	0	14.75
S	0	0	1.75	5	0.75	0	0	7.5
SSW	0	0	0.75	8.5	0	0	0	9.25
SW	0	0.25	6.25	13	7.5	0.25	0	27.25
WSW	0	0.75	3.75	11.75	12.25	0	0	28.5
W	0	0.5	7.5	25.25	15.25	5.5	0	54
WNW	0	0.5	7.75	46.75	14.5	0.75	0	70.25
NW	0	0	3.75	22	6.5	4.75	0	37
NNW	0	0.5	7.75	13.5	12.75	2.75	0	37.25
TOTAL	0	7.25	71	201.25	116.25	24	5	424.75

Stability Class B

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0	4.75	2	0.25	0	7
NNE	0	0	0	1	0.75	1.75	0	3.5
NE	0	0	0	0.25	0	0	0	0.25
ENE	0	0	0	0	0	0	0	0
E	0	0	0.5	0	5	0.25	0	5.75
ESE	0	0.25	0.25	0	2.5	0	0	3
SE	0	0.5	0.5	0.75	3.5	2.75	0	8
SSE	0	0.25	1	0.5	0.25	0	0	2
S	0	0	0.5	1.5	0.5	0	0	2.5
SSW	0	0.25	1.75	2	1.25	0	0	5.25
SW	0	0.25	1.5	4.25	0.75	0	0	6.75
WSW	0	0.5	2.75	6.75	2.5	0	0	12.5
W	0	0	1.75	2.75	6.75	1.25	0	12.5
WNW	0	0	3.25	8.25	5.25	0.5	0	17.25
NW	0	0	2	4	1.5	0.25	0	7.75
NNW	0	0	2	7.75	4.5	0.25	0	14.5
TOTAL	0	2	17.75	44.5	37	7.25	0	108.5

Stability Class C

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0.25	0.25	9	7	0	0	16.5
NNE	0	0.75	0	1.25	2.5	0.75	0	5.25
NE	0	0.25	0	0.75	2.75	0	0	3.75
ENE	0	0.25	1.25	0.25	0	0	0	1.75
E	0	1	2.75	2.25	2	0	0	8
ESE	0	1.5	0.75	0	0.5	0	0	2.75
SE	0	0.25	0.5	0	0.5	1.25	0	2.5
SSE	0	0	1	0.5	1.75	0.25	0	3.5
S	0	1.25	1	1	0.25	0	0	3.5
SSW	0	0.5	4	1.5	1	0	0	7
SW	0	1	5	3.75	0.75	0	0	10.5
WSW	0	0.5	2.75	6.25	2	0	0	11.5
W	0	0.25	2.25	4.75	6.25	4.25	0	17.75
WNW	0	0.25	3.5	7.75	7.5	1	0	20
NW	0	0.25	4	4.5	1.75	0	0	10.5
NNW	0	1	0.75	10.75	5.75	0.5	0	18.75
TOTAL	0	9.25	29.75	54.25	42.25	8	0	143.5

Stability Class D

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0.75	4.75	22.25	12	1	0	40.75
NNE	0	0	2.25	8.5	1	0	0	11.75
NE	0	0.25	7.75	0.75	1	0.25	0	10
ENE	0	0.25	4	0	0	0	0	4.25
E	0	1	4.5	3.25	0	0	0	8.75
ESE	0	1.5	4.75	6.25	5	0.25	0	17.75
SE	0	0.5	2.75	7.25	9.5	1.75	0	21.75
SSE	0	0.75	1.25	1.25	9.5	4.25	0.25	17.25
S	0	0.25	4.25	4	3	0	0	11.5
SSW	0	1.25	15.5	19.25	2.25	0	0	38.25
SW	0	1.5	18	17	12.25	0.25	1.75	50.75
WSW	0	1	8.75	31.25	14.25	2	3	60.25
W	0	0	10.25	50	24.75	7.75	2.5	95.25
WNW	0	1.5	14.5	56.75	25.75	0	0	98.5
NW	0	1	14.25	30	11.25	0.5	0	57
NNW	0	0.25	8	25.5	18.25	1.75	0	53.75
TOTAL	0	11.75	125.5	283.25	149.75	19.75	7.5	597.5

Stability Class E

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	2.25	11.75	7.5	0.5	0	0	22
NNE	0	0.5	3.5	1.75	0	0	0	5.75
NE	0	0.75	6.75	0.5	0	0	0	8
ENE	0	0.5	1.75	0	0	0	0	2.25
E	0	1.5	1.5	1.5	3.25	0	0	7.75
ESE	0	1.5	1.25	2.5	2.25	0.75	0	8.25
SE	0	1.25	2	9.25	4	0	0	16.5
SSE	0	2.25	3.25	4.25	4	0	0	13.75
S	0	0.5	4.75	2.25	0.25	0	0	7.75
SSW	0	2	21	20	0	0	0	43
SW	0	4	18	20.75	5.75	0	0	48.5
WSW	0	3.5	17	15.5	9.75	1	0	46.75
W	0	3.5	14.5	42.75	30.75	9	1	101.5
WNW	0	2.5	16.75	34.5	10	0.25	0	64
NW	0	3.75	14	22.75	3.5	1	0	45
NNW	0	2.5	11	21.5	4.5	1	0	40.5
TOTAL	0	32.75	148.75	207.25	78.5	13	1	481.25

Stability Class F

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	1.75	7.5	1.5	0	0	0	10.75
NNE	0	0.5	1.25	0	0	0	0	1.75
NE	0	0	0	0	0	0	0	0
ENE	0	0.25	0	0	0	0	0	0.25
E	0	0.25	0	0	0	0	0	0.25
ESE	0	0.5	0	0	0	0	0	0.5
SE	0	0.75	0.25	0	1	0.75	0	2.75
SSE	0	1	1.75	2.25	0.5	1	0	6.5
S	0	1	1.5	1.25	0.5	0	0	4.25
SSW	0	1.75	10.25	2.75	0	0	0	14.75
SW	0	0.75	13.75	3.5	0	0	0	18
WSW	0	2.25	11.75	4.25	0	0	0	18.25
W	0	1.5	5.75	15.75	3.5	0	0	26.5
WNW	0	1	3.75	16	0.75	0	0	21.5
NW	0	1.75	10.75	7.75	0.25	0	0	20.5
NNW	0	3	12.25	5.75	0	0	0	21
TOTAL	0	18	80.5	60.75	6.5	1.75	0	167.5

Stability Class G

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	1	4	0.25	0	0	0	5.25
NNE	0	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0
ESE	0	0.75	0	0	0	0	0	0.75
SE	0	0.75	0	0	0	0	0	0.75
SSE	0	1.5	1.25	1.75	0	0	0	4.5
S	0	1	4	0.25	0	0	0	5.25
SSW	0	1	5	0	0	0	0	6
SW	0	1.5	16	1.75	0	0	0	19.25
WSW	0	4.75	36	11.5	0	0	0	52.25
W	0	2.5	27.5	27.25	1.25	0	0	58.5
WNW	0	1.75	24	14.5	0	0	0	40.25
NW	0	2.25	16.5	3.25	0	0	0	22
NNW	0	1.25	17	3.25	0	0	0	21.5
TOTAL	0	20	151.25	63.75	1.25	0	0	236.25

2nd QUARTER 2001
Total Hours Missing = 69.75 Total Hours = 2184
Stability Class A

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0.25	1.25	2.75	2.75	2.75	0	9.75
NNE	0	0	3.25	18.25	6.75	1.75	0.25	30.25
NE	0	0	3	23.5	3.5	0	0	30
ENE	0	0.25	4.5	13.25	1.25	0	0	19.25
E	0	0.25	10.5	1.5	1	0	0	13.25
ESE	0	1.5	10.25	1	0	0	0	12.75
SE	0	0.5	21.5	2	0	0	0	24
SSE	0	0.25	9.25	4.25	2	0.25	0	16
S	0	0.25	0	3.75	11.25	0	0	15.25
SSW	0	0.25	0.25	0.5	2	0	0	3
SW	0	0	2.25	6.5	3.5	4.25	0.75	17.25
WSW	0	0	2.25	8.25	4.75	2.5	1.75	19.5
W	0	0	0.75	7	5.5	0	0	13.25
WNW	0	0	2	13	11.75	0.25	0	27
NW	0	0	0.25	8.75	4.5	0.25	0	13.75
NNW	0	0	0.75	5.75	1	0	0	7.5
TOTAL	0	3.5	72	120	61.5	12	2.75	271.75

Stability Class B

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0.25	0.25	0.5	0.25	0	1.25
NNE	0	0	0.5	2.75	7.75	0.5	0	11.5
NE	0	0	0.5	1	0	0	0	1.5
ENE	0	0	0.5	0	0.25	0	0	0.75
E	0	0	1	0.5	0	0	0	1.5
ESE	0	0	0.5	0.5	0	0	0	1
SE	0	0	2.5	0.25	0	0	0	2.75
SSE	0	0.25	3.75	0.75	0.25	0	0	5
S	0	0	1.75	0.75	2	0.25	0	4.75
SSW	0	0.25	0.5	0.75	1	0.25	0	2.75
SW	0	0	0.5	0.25	0.75	1	1.25	3.75
WSW	0	0	0.25	0.25	0	0.5	0.25	1.25
W	0	0	0	0.5	0.25	0	0	0.75
WNW	0	0	0	0.75	1.25	0	0	2
NW	0	0	1.5	5.25	2.5	0	0	9.25
NNW	0	0	0.5	1.5	0	0	0	2
TOTAL	0	0.5	14.5	16	16.5	2.75	1.5	51.75

Stability Class C

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0.5	1	0.75	0.25	0	2.5
NNE	0	0.25	1.25	3.75	4.5	0	0	9.75
NE	0	0	0.5	0.25	0	0	0	0.75
ENE	0	0	1.5	0	0.25	0	0	1.75
E	0	0.25	1.75	0	0	0	0	2
ESE	0	0.25	1.25	0	0	0	0	1.5
SE	0	0.25	4.25	0.25	0	0	0	4.75
SSE	0	0.5	2.75	0.5	0.5	0	0	4.25
S	0	0	4.75	1.5	1.25	0	0	7.5
SSW	0	0	0	0.5	0.5	0	0	1
SW	0	0	0.25	0.25	0	0.25	0.5	1.25
WSW	0	0	0.5	0.75	0	1	1.5	3.75
W	0	0	0	0.25	0.75	0	0	1
WNW	0	0	0	0.75	1.25	0	0	2
NW	0	0	1.5	0.25	0.25	0	0	2
NNW	0	0	1.25	2	0	0	0	3.25
TOTAL	0	1.5	22	12	10	1.5	2	49

Stability Class D

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	2.75	12.75	7.25	2.25	0	25
NNE	0	0.5	2.5	31.25	18.5	1.5	0	54.25
NE	0	0.25	5.5	11	0.5	0	0	17.25
ENE	0	0	3	2.75	0	0	0	5.75
E	0	0.25	3.25	1.25	0.25	0	0	5
ESE	0	0.25	3.5	2.5	0	0	0	6.25
SE	0	0.5	8.5	1	0	0	0	10
SSE	0	1.25	14.5	2.5	3.75	0.25	0	22.25
S	0	3.75	7.25	20.5	4	0	0	35.5
SSW	0	3.5	4.5	5.5	1	0	0	14.5
SW	0	0	2.5	0.5	0.5	2.25	1	6.75
WSW	0	0	3	2.75	1	2.25	1	10
W	0	0	2.25	1.75	5	1.75	0.75	11.5
WNW	0	0	2.75	5.75	3.5	0	0	12
NW	0	0	2.25	8.5	0.75	0	0	11.5
NNW	0	0	1.75	11.25	2	0.25	0	15.25
TOTAL	0	10.25	69.75	121.5	48	10.5	2.75	262.75

Stability Class E

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0.5	0.75	3.5	3	2.25	0.5	0	10.5
NNE	0	0.25	6	24	14.25	1.25	0	45.75
NE	0	1	8	17	2.25	0	0	28.25
ENE	0	0	7.25	7.25	0.25	0	0	14.75
E	0	1	10.5	3.25	1.5	0	0	16.25
ESE	0	1.5	10	3.75	0.75	0	0	16
SE	0	1.25	15.75	2.75	0.25	0	0	20
SSE	0	5.25	24.25	12	16.5	2.5	0.75	61.25
S	0	10	31	31.5	10	0.75	0.5	83.75
SSW	0	2.25	14.5	20.5	4.75	0.5	0	42.5
SW	0	0	2.5	4	1.25	1.75	1.5	11
WSW	0	2.75	3.75	4.75	3.75	1.25	1.75	18
W	0	2.25	5	16	4.25	0.5	0	28
WNW	0	0	7.25	12.75	6.5	0	0	26.5
NW	0	0.25	3.75	7	2.5	1.25	0	14.75
NNW	0.25	0	4.75	10	7	1	0	23
TOTAL	0.75	28.5	157.75	179.5	78	11.25	4.5	460.25

Stability Class F

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0.5	5.25	0.5	0	0	0	6.25
NNE	0	0.25	7.5	1.25	0.25	0.25	0	9.5
NE	0	0	4.5	3.5	0.75	0	0	8.75
ENE	0	0	2.25	2.5	0	0	0	4.75
E	0	0.75	4.5	1.25	1	0	0	7.5
ESE	0	0.5	6	0.75	1	0	0	8.25
SE	0	0.5	7	1.75	0.5	0	0	9.75
SSE	0	7	20.5	11.25	8.25	2.25	0	49.25
S	1.25	50.5	21.75	29.25	5	0.25	0.25	108.25
SSW	0	2.25	15.25	12.5	0.5	0	0.25	30.75
SW	0	0	5.5	9	0.75	0.5	0.5	16.25
WSW	0	0.25	13.25	7.25	1.25	0	0	22
W	0	2.5	16.5	5	0.25	0	0	24.25
WNW	0	0.75	7.25	4	1.5	0	0	13.5
NW	0	0.5	6.75	4.75	0.5	0.75	0	13.25
NNW	0	0.75	4	3.5	0	0	0	8.25
TOTAL	1.25	67	147.75	98	21.5	4	1	340.5

Stability Class G

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	1.5	2.75	1	0	0	0	5.25
NNE	0	0.75	1.25	0.25	0	0	0	2.25
NE	0	0	2.5	1.75	0	0	0	4.25
ENE	0	0	3.5	1.5	0.25	0	0	5.25
E	0	1	2.75	2.25	0.75	0	0	6.75
ESE	0	1	3.5	1.5	1	0	0	7
SE	0	1	5	2	1.75	0	0	9.75
SSE	0	6.75	30.75	22	5.75	0.5	0	65.75
S	0	44	83.75	55	2	0	0	184.75
SSW	0	19.5	44	5.5	0	0	0	69
SW	0	5.75	44.75	19.5	0.75	0	0	70.75
WSW	0	10.5	52.25	32	3	0	0	97.75
W	0	13.5	59	22.25	0.25	0	0	95
WNW	0	9	21	8.25	0	0	0	38.25
NW	0	3.75	3.75	1.5	0	0	0	9
NNW	0	1.25	2.25	4	0	0	0	7.5
TOTAL	0	119.25	362.75	180.25	15.5	0.5	0	678.25

3rd QUARTER 2001
Total Hours Missing = 617.25 Total Hours = 2208
Stability Class A

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	5.5	13	5.5	2.75	0	26.75
NNE	0	0	2.5	12	2.5	0	0	17
NE	0	0	4.5	7.5	1.25	0	0	13.25
ENE	0	0	3.5	7.25	3.75	0	0	14.5
E	0	0	4.75	17	4.25	0	0	26
ESE	0	0	10.25	10.75	0.25	0	0	21.25
SE	0	0	10	7	2.25	0	0	19.25
SSE	0	0	9	4.75	0	0	0	13.75
S	0	0	16.75	3.75	0	0	0	20.5
SSW	0	0.25	23	8.75	3.25	0	0	35.25
SW	0	0	8.5	10.5	6	0	0	25
WSW	0	0	1.75	4	1.5	0	0	7.25
W	0	0	5.25	2.75	0.25	0	0	8.25
WNW	0	0	5.75	4.25	2	0	0	12
NW	0	0	6	13	1	0	0	20
NNW	0	0	4.75	20	6.75	2	0	33.5
TOTAL	0	0.25	121.75	146.25	40.5	4.75	0	313.5

Stability Class B

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0.5	1	1.25	0.25	0	3
NNE	0	0	1	0.5	0.25	0	0	1.75
NE	0	0	0.25	0.5	0	0	0	0.75
ENE	0	0	0.5	0.75	0.5	0	0	1.75
E	0	0	0	0.75	0	0	0	0.75
ESE	0	0	0.25	0.75	0	0	0	1
SE	0	0	1.25	0.5	0.75	0	0	2.5
SSE	0	0	0.75	0.25	0	0	0	1
S	0	0	2.5	1	0	0	0	3.5
SSW	0	0	1.5	0.5	1	0	0	3
SW	0	0.25	0.5	3	1.25	0	0	5
WSW	0	0	0.75	1	0	0	0	1.75
W	0	0	0.75	0.75	0	0	0	1.5
WNW	0	0	1.25	0	0	0	0	1.25
NW	0	0	1.75	1	0.25	0	0	3
NNW	0	0	0.25	1.25	1.75	0	0	3.25
TOTAL	0	0.25	13.75	13.5	7	0.25	0	34.75

Stability Class C

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0.5	1.5	3	0.5	0	5.5
NNE	0	0	0.75	0.75	0.25	0	0	1.75
NE	0	0	0	0.25	0.25	0	0	0.5
ENE	0	0	0.25	1.5	1.5	0	0	3.25
E	0	0	0	0.75	0.25	0	0	1
ESE	0	0	0.75	0.25	0	0	0	1
SE	0	0	0.75	0.75	0.5	0	0	2
SSE	0	0	0.5	0	0	0	0	0.5
S	0	0	1.75	0.75	0	0	0	2.5
SSW	0	0	3	1.5	0.75	0	0	5.25
SW	0	0	1.25	2.75	0.25	0	0	4.25
WSW	0	0	1.25	1.25	0	0	0	2.5
W	0	0	0.75	0.5	0	0	0	1.25
WNW	0	0	0.75	0.25	0.25	0	0	1.25
NW	0	0	2	1	0	0	0	3
NNW	0	0	1.25	0.5	0.75	0.5	0	3
TOTAL	0	0	15.5	14.25	7.75	1	0	38.5

Stability Class D

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	1.5	6	3.5	0.25	0.25	11.5
NNE	0	0	2.25	3.25	0.75	0	0	6.25
NE	0	0.25	1.25	3.75	0.25	0	0	5.5
ENE	0	0	1.75	6.25	6.75	0	0	14.75
E	0	0	1	4.5	5.25	0.5	0	11.25
ESE	0	0	0.75	3	0.5	0	0	4.25
SE	0	0.25	2.25	4.5	1	0	0	8
SSE	0	0	5	2	0.75	0	0	7.75
S	0	0	1.5	1	0	0	0	2.5
SSW	0	0.75	9.5	5.25	0.75	0	0	16.25
SW	0	1.75	11.75	15.25	1	0	0	29.75
WSW	0	0.25	4.5	1.75	0.25	0	0	6.75
W	0	0.75	8	2.25	0	0	0	11
WNW	0	0.25	6.75	3.5	0.5	0	0	11
NW	0	0	7.75	5.75	0.25	0	0	13.75
NNW	0	0	3.5	6.25	4	0	0	13.75
TOTAL	0	4.25	69	74.25	25.5	0.75	0.25	174

Stability Class E

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0.25	0.5	4	3.75	2.75	0.25	0	11.5
NNE	0	0.25	2.5	1.75	1	0	0	5.5
NE	0	0	3	2	0	0	0	5
ENE	0	1.75	2.25	2.75	2.25	1	0	10
E	0	1	6.25	3.25	0.25	0.25	0	11
ESE	0	0.5	3	3	0.5	0.5	0	7.5
SE	0	3	3.75	4.25	1.25	0	0	12.25
SSE	0	4.5	7.75	4.75	0.75	0	0	17.75
S	0	1.75	5.5	0.25	0	0	0	7.5
SSW	0	3.75	11.25	2.5	0	0	0	17.5
SW	0	5	15	9.5	0.75	0	0	30.25
WSW	0	7.25	32.5	14.75	0	0.25	0	54.75
W	0	7.5	20	6.5	0	0	0	34
WNW	0	0.5	5.75	4.75	0.25	0	0	11.25
NW	0	0.5	8.25	9.75	0	0	0	18.5
NNW	0	0.25	7.25	20.5	7.25	0	0	35.25
TOTAL	0.25	38	138	94	17	2.25	0	289.5

Stability Class F

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0.25	3.25	0	0	0	0	3.5
NNE	0	0.25	4.5	0.5	0	0	0	5.25
NE	0	0.5	3	1	0	0	0	4.5
ENE	0	0.25	3.25	1	0.5	0	0	5
E	0	0	2	0	0	0	0	2
ESE	0	0	3.5	0.25	0	0	0	3.75
SE	0	0	6	0.75	0	0	0	6.75
SSE	0	4.5	4.25	0.25	0	0	0	9
S	0	2.25	6.75	1.25	0	0	0	10.25
SSW	0	0	8.25	2.75	0.5	0	0	11.5
SW	0	3	20.5	9.25	1.75	0	0	34.5
WSW	0.25	18.75	51.25	6.5	0	0	0	76.75
W	0	7.5	23.75	5.25	0	0	0	36.5
WNW	0	2	12	5	0.75	0	0	19.75
NW	0	1	12.5	14	0.25	0	0	27.75
NNW	0	1.25	6.75	2	0	0	0	10
TOTAL	0.25	41.5	171.5	49.75	3.75	0	0	266.75

Stability Class G

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	1	8.75	0	0	0	0	9.75
NNE	0	0	2.5	0.25	0	0	0	2.75
NE	0	0	0	0.25	0	0	0	0.25
ENE	0	0.25	0.75	0.25	0	0	0	1.25
E	0	0	1	0	0	0	0	1
ESE	0	0	1.5	0	0.25	0	0	1.75
SE	0	1.5	5.25	4.25	0.5	0	0	11.5
SSE	0	8.25	10	0.25	0	0	0	18.5
S	0.75	5.5	16.5	3.5	0	0	0	26.25
SSW	0	7.25	31.75	6.75	1.25	0	0	47
SW	0	2.25	39.25	16.75	3.5	0	0	61.75
WSW	0	23.5	53.5	9.5	0.25	0	0	86.75
W	0	14.5	33.75	7	0	0	0	55.25
WNW	0	9.25	54	5.5	0	0	0	68.75
NW	0	5.25	48.25	8	0	0	0	61.5
NNW	0	2.5	16	1.25	0	0	0	19.75
TOTAL	0.75	81	322.75	63.5	5.75	0	0	473.75

4th QUARTER 2001
Total Hours Missing = 72 Total Hours = 2208
Stability Class A

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	1.75	5.75	7.75	0	0	15.25
NNE	0	0	2.25	8.25	4	0	0	14.5
NE	0	0	2.25	7.25	1	0.5	0	11
ENE	0	0	1.25	5	4.5	0.5	0	11.25
E	0	0	0.5	3	2.25	0.5	0	6.25
ESE	0	0	0	5.5	0	0.75	0	6.25
SE	0	0	0	0.5	0	0	0	0.5
SSE	0	0	0.25	1.75	0	2.25	3.75	8
S	0	0	1.5	7.75	6.5	2.5	2	20.25
SSW	0	0	3.75	10	2.25	0	0	16
SW	0	0	4.5	13.25	7.5	0.25	0	25.5
WSW	0	0	4.5	24	20.75	2.5	0.25	52
W	0	0	5.25	35.25	21	0	0	61.5
WNW	0	0.25	5.5	44	34	2	0	85.75
NW	0	0	6.75	27.5	10.75	2.5	0	47.5
NNW	0	0	3.5	12.5	12.75	2.75	0	31.5
TOTAL	0	0.25	43.5	211.25	135	17	6	413

Stability Class B

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0.25	1.25	0.5	0	0	0	2
NNE	0	0	1	1.75	0.75	0	0	3.5
NE	0	0	0.75	1.5	0.5	0	0	2.75
ENE	0	0	0.25	1.25	4.5	0	0	6
E	0	0	0	1.25	7.25	3.25	0	11.75
ESE	0	0	0	4.5	1	0.5	0	6
SE	0	0	0	2.25	0.25	0	0	2.5
SSE	0	0	0.25	1.25	0	0.25	2.75	4.5
S	0	0	0.25	4.75	1.5	2	1.25	9.75
SSW	0	0.25	0.75	1.25	0.5	0	0	2.75
SW	0	0	1	4.25	0.75	0	0	6
WSW	0	0	0.25	2.75	4.5	1.75	3.25	12.5
W	0	0.5	0.25	10.25	1	0	0	12
WNW	0	0.25	1.5	10	5.75	0.25	0	17.75
NW	0	0	0.5	4.25	0.75	0.25	0	5.75
NNW	0	0	2.25	1.75	1.25	0.75	0	6
TOTAL	0	1.25	10.25	53.5	30.25	9	7.25	111.5

Stability Class C

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	1	1	0	0	0	2
NNE	0	0	0.75	2.25	4.5	0	0	7.5
NE	0	0	1.25	4	6.75	0	0	12
ENE	0	0	0.25	2	0	0	0	2.25
E	0	0	0	0.5	4.25	0.75	0	5.5
ESE	0	0	0	0.25	0	0.25	0	0.5
SE	0	0	0	0.75	0	0	0	0.75
SSE	0	0	0	0.25	0	0.25	1.5	2
S	0	0	0.5	3.5	3	4.25	1	12.25
SSW	0	0.25	1.75	3.25	0.25	0	0	5.5
SW	0	0.5	3.25	3	2	0	0	8.75
WSW	0	0	2.75	4.5	2.25	2.25	3.5	15.25
W	0	0	2	12.75	5.5	1.5	0.25	22
WNW	0	0.25	7	9	7.25	0.5	0	24
NW	0	0	2.75	3.5	0.5	0	0	6.75
NNW	0	0	2	0.75	1	0	0	3.75
TOTAL	0	1	25.25	51.25	37.25	9.75	6.25	130.75

Stability Class D

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	1.5	14.25	3.25	0	0	19
NNE	0	0	2.25	4	7.25	2.25	0	15.75
NE	0	0	4.75	3.25	1	0	0	9
ENE	0	0	2	4.5	0	0	0	6.5
E	0	0.25	1	2.5	1	0	0	4.75
ESE	0	0	1	6.75	1.75	1.25	0	10.75
SE	0	0	0.5	3.5	0.5	0	0	4.5
SSE	0	0	2	4	7	6	5.25	24.25
S	0	0	2.5	26	9.75	3.25	0	41.5
SSW	0	0.75	9	27	3.25	0	0	40
SW	0	1.75	5.5	11.75	6.5	0.75	0	26.25
WSW	0	1.5	3.5	7	10.25	11	2	35.25
W	0	1	5.75	29.25	19.5	4.5	2.5	62.5
WNW	0	1.25	14.25	24	20	7.25	0.25	67
NW	0	0	6.5	10	5	0.25	0	21.75
NNW	0	0	2.75	6.75	2.5	0.5	0	12.5
TOTAL	0	6.5	64.75	184.5	98.5	37	10	401.25

Stability Class E

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	1	4	5.75	0	0.25	0	11
NNE	0	0.25	1.75	2.5	1.75	0	0	6.25
NE	0	0.25	4.75	0.25	0	0	0	5.25
ENE	0	0.25	3.25	0.25	0	0	0	3.75
E	0	0	2.25	0.25	2.75	0	0	5.25
ESE	0	1	0.75	4.25	3	1.5	0	10.5
SE	0	0	0.75	3	1.25	0	0	5
SSE	0	1.5	10.75	14	5.5	0.75	0.25	32.75
S	0	2	25.25	30.25	7.25	2	0.25	67
SSW	0	3.5	30.25	45.5	4.5	0	0	83.75
SW	0	0.5	9.25	13.25	2	0.25	0.25	25.5
WSW	0	0.75	6	10.25	10.75	2.25	1	31
W	0	1	13.5	27	2	0.5	1	45
WNW	0	0	15.25	25.75	6	0	0	47
NW	0	0.5	11.5	15.5	7	0	0	34.5
NNW	0	0.25	10.25	19	1.25	0.75	0	31.5
TOTAL	0	12.75	149.5	216.75	55	8.25	2.75	445

Stability Class F

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0.25	0.25	2.5	3	0.5	0	0	6.5
NNE	0	0.75	0.25	2	0	0	0	3
NE	0	1	0.25	0	0	0	0	1.25
ENE	0	0.5	1.5	0.25	0	0	0	2.25
E	0	0.75	0.5	1	0.25	0	0	2.5
ESE	0	0.5	1.5	0.5	2	0.75	0	5.25
SE	0	1.5	5.25	0.75	1	0.5	0.5	9.5
SSE	0	1.25	10.75	6.75	3	1	0.25	23
S	0	1.75	22.5	6.25	1	0.25	0	31.75
SSW	0	2	25	15.5	2.25	0	0	44.75
SW	0	1.75	11	13.75	2	0	0	28.5
WSW	0	0	12	10.75	1	0	0	23.75
W	0.25	2.75	21	10.75	2.5	0	0	37.25
WNW	0	3	15.25	12.5	0.25	0	0	31
NW	0	0	4.25	3.5	2.5	0	0	10.25
NNW	0	0.5	3.5	6.75	1.5	0	0	12.25
TOTAL	0.5	18.25	137	94	19.75	2.5	0.75	272.75

Stability Class G

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0.25	1.5	2.5	3.25	0	0	0	7.5
NNE	0	1.25	3.75	1.5	0	0	0	6.5
NE	0	0.25	0.5	0	0	0	0	0.75
ENE	0	1.25	1.75	0.5	0	0	0	3.5
E	0	0.5	2.25	1.25	0	0	0	4
ESE	0	0.75	1	1.25	0.75	0.25	0	4
SE	0.25	2.75	2	3.25	2.25	0	0	10.5
SSE	0	1	6.5	4.75	0.5	0	0	12.75
S	0	4.5	16.75	2	0	0	0	23.25
SSW	0	4.5	46	4.75	0	0	0	55.25
SW	0	4.25	40.25	9.75	0.25	0	0	54.5
WSW	0	2.75	33	18.75	0.75	0	0	55.25
W	0	3.5	27	15.25	0.75	0	0	46.5
WNW	0.25	4.25	22.75	7	0	0	0	34.25
NW	0	3	11.25	1.5	0	0	0	15.75
NNW	0	1.5	17.75	8.25	0	0	0	27.5
TOTAL	0.75	37.5	235	83	5.25	0.25	0	361.75