April 28, 2004

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10 CFR 50.36a(a)(2)

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

KEWAUNEE NUCLEAR POWER PLANT
DOCKET 50-305
LICENSE No. DPR-43
RADIOACTIVE EFFLUENT RELEASE REPORT JANUARY - DECEMBER 2003

Enclosed please find a copy of the Kewaunee Nuclear Power Plant Radioactive Effluent Release Report for January through December 2003. This report is submitted to meet the requirements of Technical Specification 6.9.b.2.

Thomas Coutu
Site Vice-President, Kewaunee Nuclear Power Plant
Nuclear Management Company, LLC

cc: US NRC Senior Resident Inspector
US NRC Region III

Enclosure

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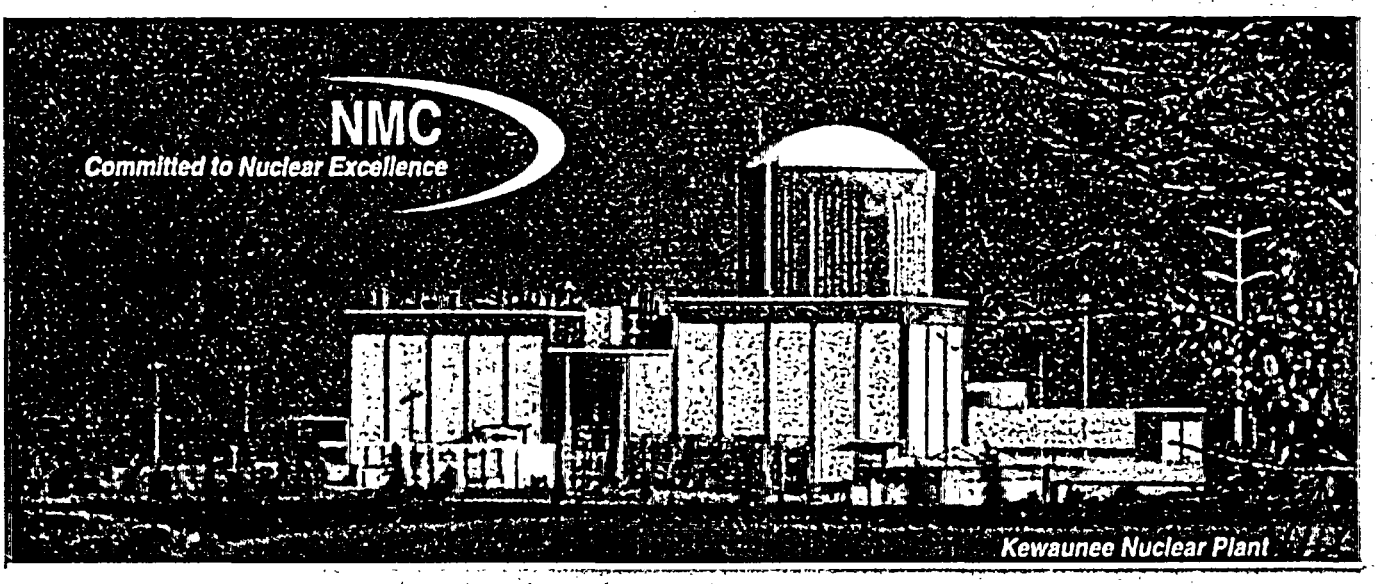
KEWAUNEE NUCLEAR POWER PLANT

RADIOACTIVE EFFLUENT RELEASE REPORT



January - December 2003

NUCLEAR MANAGEMENT COMPANY, LLC

DOCKET 50-305

KEWAUNEE NUCLEAR POWER PLANT

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

January 1 - December 31, 2003

Wisconsin Public Service Corporation
Green Bay, Wisconsin
April 19, 2004

Table of Contents

0.0 SUMMARY

During 2003 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)	0.0002131	(2rd Quarter)
	% of Specification	0.00284	
LIQUID:	Ingestion Pathway-Organ	GI-LLI	
	Quarterly Limit (mRems)	5	
	Actual Dose (mRems)	0.01925	(2nd Quarter)
	% of Limit	0.38	
SOLID:	No upper limit for solid radioactive waste applies.		
	Cubic Meters Shipped	33.76 m^3 (1192 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, 2003. 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. Values indicated as 0 (zero) in this report refer to actual values less than the detection limits. A table of these less than (LLD) values is identified in sections 2.1 and 3.1.

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 2003.

Number of batch releases.....41

Total time for all batch releases (min)..... 16981.0

Maximum time for a batch release (min)..... 1492.0

Average time for a batch release (min)..... 414.2

Minimum time for a batch release (min)..... 6.0

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 2003
Gaseous Effluents - Summation of all Releases

Fission and Activation Gases	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Total Activity Released (Ci)	2.153E-002	8.654E-002	3.402E-003	0.000E+000
Average Release Rate (µCi/sec)	2.739E-003	1.101E-002	4.327E-004	0.000E+000
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)	9.165E-001	1.009E+001	1.398E+000	7.785E-001
Average Release Rate (µCi/sec)	1.166E-001	1.283E+000	1.778E-001	9.901E-002

Table 2.2
Annual Radioactive Effluent Release Report 2003
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 2003
Gaseous Effluents

Nuclides Released (Ci)
Batch Mode

Fission Gases				
Ar-41	6.110E-006	4.438E-003	0.000E+000	0.000E+000
Kr-85m	7.234E-006	9.597E-005	0.000E+000	0.000E+000
Kr-88	0.000E+000	6.109E-005	0.000E+000	0.000E+000
Xe-133	2.052E-002	7.495E-002	3.402E-003	0.000E+000
Xe-133m	1.836E-004	1.777E-003	0.000E+000	0.000E+000
Xe-135	7.808E-004	5.213E-003	0.000E+000	0.000E+000
Xe-135m	3.312E-005	0.000E+000	0.000E+000	0.000E+000
Total	2.153E-002	8.654E-002	3.402E-003	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 2.3A
Annual Radioactive Effluent Release Report 2003
1st Quarter Gaseous Release
Total of all Releases

Noble Gasses (Curies)

Isotope	January	February	March	Total
Ar-41	0.000E+000	0.000E+000	6.110E-006	6.110E-006
Kr-85m	0.000E+000	0.000E+000	7.234E-006	7.234E-006
Xe-133	6.376E-003	0.000E+000	1.415E-002	2.052E-002
Xe-133m	0.000E+000	0.000E+000	1.836E-004	1.836E-004
Xe-135	2.376E-004	0.000E+000	5.432E-004	7.808E-004
Xe-135m	0.000E+000	0.000E+000	3.312E-005	3.312E-005
Total	6.613E-003	0.000E+000	1.492E-002	2.153E-002

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 2003
1st Quarter Gaseous Release
Total of all Releases

Summary	January	February	March	Total
Total Noble Gases (Ci)	6.613E-003	0.000E+000	1.492E-002	2.153E-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)	3.649E-001	5.455E-001	6.083E-003	9.165E-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 2003
2nd Quarter Gaseous Release
Total of all Releases

Noble Gasses (Curies)

Isotope	April	May	June	Total
Ar-41	3.560E-003	8.783E-004	0.000E+000	4.438E-003
Kr-85m	0.000E+000	9.597E-005	0.000E+000	9.597E-005
Kr-88	0.000E+000	6.109E-005	0.000E+000	6.109E-005
Xe-133	7.371E-002	1.238E-003	0.000E+000	7.495E-002
Xe-133m	1.777E-003	0.000E+000	0.000E+000	1.777E-003
Xe-135	4.328E-003	8.845E-004	0.000E+000	5.213E-003
Total	8.338E-002	3.157E-003	0.000E+000	8.654E-002

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 2003
2nd Quarter Gaseous Release
Total of all Releases

Summary	April	May	June	Total
Total Noble Gases (Ci)	8.338E-002	3.157E-003	0.000E+000	8.654E-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)	4.489E-001	9.317E+000	3.235E-001	1.009E+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 2003
3rd Quarter Gaseous Release
Total of all Releases

Noble Gasses (Curies)

Isotope	July	August	September	Total
Xe-133	3.402E-003	0.000E+000	0.000E+000	3.402E-003
Total	3.402E-003	0.000E+000	0.000E+000	3.402E-003

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 2003
3rd Quarter Gaseous Release
Total of all Releases

Summary	July	August	September	Total
Total Noble Gases (Ci)	3.402E-003	0.000E+000	0.000E+000	3.402E-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)	5.868E-004	6.851E-001	7.121E-001	1.398E+000
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 2003
4th Quarter Gaseous Release
Total of all Releases

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 2.3A (Con't)
Annual Radioactive Effluent Release Report 2003
4th Quarter Gaseous Release
Total of all Releases

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)	4.343E-001	3.401E-001	4.121E-003	7.785E-001
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 2003
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 2003
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)	3.408E-001	5.455E-001	0.000E+000	8.863E-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 2003
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 2003
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	9.315E+000	3.234E-001	9.639E+000
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 2003
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 2003
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	6.851E-001	7.121E-001	1.397E+000
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 2003
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 2003
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)	4.343E-001	3.401E-001	4.121E-003	7.784E-001
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 2003
1st Quarter Gaseous Release
Batch Mode Only

Noble Gasses (Curies)

Isotope	January	February	March	Total
Ar-41	0.000E+000	0.000E+000	6.110E-006	6.110E-006
Kr-85m	0.000E+000	0.000E+000	7.234E-006	7.234E-006
Xe-133	6.376E-003	0.000E+000	1.415E-002	2.052E-002
Xe-133m	0.000E+000	0.000E+000	1.836E-004	1.836E-004
Xe-135	2.376E-004	0.000E+000	5.432E-004	7.808E-004
Xe-135m	0.000E+000	0.000E+000	3.312E-005	3.312E-005
Total	6.613E-003	0.000E+000	1.492E-002	2.153E-002

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 2003
1st Quarter Gaseous Release
Batch Mode Only

Summary	January	February	March	Total
Total Noble Gases (Ci)	6.613E-003	0.000E+000	1.492E-002	2.153E-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)	2.408E-002	0.000E+000	6.083E-003	3.016E-002
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 2003
2nd Quarter Gaseous Release
Batch Mode Only

Noble Gasses (Curies)

Isotope	April	May	June	Total
Ar-41	3.560E-003	8.783E-004	0.000E+000	4.438E-003
Kr-85m	0.000E+000	9.597E-005	0.000E+000	9.597E-005
Kr-88	0.000E+000	6.109E-005	0.000E+000	6.109E-005
Xe-133	7.371E-002	1.238E-003	0.000E+000	7.495E-002
Xe-133m	1.777E-003	0.000E+000	0.000E+000	1.777E-003
Xe-135	4.328E-003	8.845E-004	0.000E+000	5.213E-003
Total	8.338E-002	3.157E-003	0.000E+000	8.654E-002

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 2003
2nd Quarter Gaseous Release
Batch Mode Only

Summary

	April	May	June	Total
Total Noble Gases (Ci)	8.338E-002	3.157E-003	0.000E+000	8.654E-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)	4.489E-001	1.799E-003	3.409E-005	4.508E-001
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 2003
3rd Quarter Gaseous Release
Batch Mode Only

Noble Gasses (Curies)

Isotope	July	August	September	Total
Xe-133	3.402E-003	0.000E+000	0.000E+000	3.402E-003
Total	3.402E-003	0.000E+000	0.000E+000	3.402E-003

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 2003
3rd Quarter Gaseous Release
Batch Mode Only

Summary	July	August	September	Total
Total Noble Gases (Ci)	3.402E-003	0.000E+000	0.000E+000	3.402E-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)	5.868E-004	0.000E+000	0.000E+000	5.868E-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 2003
4th Quarter Gaseous Release
Batch 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 2.3C (Con't)
Annual Radioactive Effluent Release Report 2003
4th Quarter Gaseous Release
Batch 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)	2.576E-005	0.000E+000	0.000E+000	2.576E-005
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 2003
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 2003 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)	1.025E-006	9.057E-006	1.371E-007	0.000E+000
% of Specification	2.050E-005	1.811E-004	2.741E-006	0.000E+000
2. Beta-Skin				
Specification (mRads)	1.000E+001	1.000E+001	1.000E+001	1.000E+001
Actual Dose (mRads)	2.716E-006	1.245E-005	4.077E-007	0.000E+000
% of Specification	2.716E-005	1.245E-004	4.077E-006	0.000E+000
3. Ingestion Pathway-Organ				
Specification (mRems)	7.500E+000	7.500E+000	7.500E+000	7.500E+000
Actual Dose (mRems)	1.936E-005	2.131E-004	2.953E-005	1.645E-005
% of Specification	2.581E-004	2.842E-003	3.937E-004	2.193E-004
	Liver	Liver	Liver	Liver

Table 2.4 (Con't)
Annual Radioactive Effluent Release Report 2003
Dose From Gaseous Effluents

In addition, the cumulative annual offsite doses for the period January 1 - December 31, 2003 versus the ODCM annual limits were:

	Annual
1. Gamma-Whole Body	
Specification (mRads)	1.000E+001
Actual Dose (mRads)	1.022E-005
% of Specification	1.022E-004
2. Beta-Skin	
Specification (mRads)	2.000E+001
Actual Dose (mRads)	1.557E-005
% of Specification	7.786E-005
3. Ingestion Pathway-Organ	
Specification (mRems)	1.500E+001
Actual Dose (mRems)	2.785E-004
% of Specification	1.856E-003
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 quarterly 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-08	6.56E-10	6.56E-10	6.56E-10	1.69E-08
Fe-59	1.45E-09	1.45E-09	1.45E-09	1.45E-09	1.45E-09
Co-58	6.45E-10	6.45E-10	6.45E-10	9.12E-08	2.33E-08
Co-60	9.57E-10	9.57E-10	1.35E-07	9.57E-08	5.82E-08
Zn-65	1.63E-07	2.31E-07	1.63E-07	1.63E-09	1.40E-07
Mo-99	4.65E-09	5.49E-07	4.65E-09	4.65E-09	1.41E-07
Cs-134	1.42E-07	5.17E-08	5.17E-10	8.47E-08	6.97E-08
Cs-137	6.38E-10	1.26E-07	9.02E-08	6.38E-10	5.44E-08
Ce-141	7.47E-08	6.37E-08	6.23E-08	3.90E-08	5.99E-08
Ce-144	4.50E-07	6.01E-07	1.76E-09	6.52E-07	4.26E-07
I-131	8.05E-08	4.03E-10	4.03E-10	4.03E-08	3.04E-08
H-3	2.81E-06	3.83E-06	2.98E-06	3.16E-06	3.20E-06
Sr-89	1.23E-08	2.90E-08	3.10E-08	9.10E-09	2.04E-08
Sr-90	6.90E-09	1.20E-08	5.80E-09	6.50E-09	7.80E-09
Gross Alpha	6.13E-09	9.10E-09	1.40E-08	7.40E-09	9.16E-09
Fe-55	7.07E-07	1.00E-06	9.60E-07	9.00E-07	8.92E-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	3.28E-08	3.09E-08	1.09E-10	1.09E-08	1.87E-08
Fe-59	2.41E-08	2.41E-10	5.39E-08	2.41E-10	1.96E-08
Co-58	1.07E-10	2.53E-08	2.03E-08	2.18E-08	1.69E-08
Co-60	2.87E-08	2.49E-08	3.57E-08	3.52E-08	3.11E-08
Zn-65	2.72E-10	3.00E-08	3.84E-08	3.00E-08	2.47E-08
Mo-99	1.85E-07	2.35E-07	1.91E-07	2.15E-07	2.06E-07
Cs-134	3.22E-08	1.83E-08	2.42E-08	1.90E-08	2.34E-08
Cs-137	1.06E-10	2.38E-08	3.94E-08	1.06E-10	1.59E-08
Ce-141	1.95E-08	2.70E-08	3.07E-08	4.86E-08	3.15E-08
Ce-144	1.41E-07	1.88E-07	2.93E-10	1.16E-07	1.11E-07
I-131	1.67E-08	4.16E-08	1.28E-08	2.03E-08	2.28E-08
H-3	2.81E-06	3.83E-06	2.98E-06	3.16E-06	3.20E-06
Sr-89	1.34E-08	3.00E-08	4.50E-08	9.00E-09	2.43E-08
Sr-90	7.12E-09	9.65E-09	7.85E-09	6.05E-09	7.67E-09
Gross Alpha	7.20E-09	7.65E-09	4.65E-09	1.06E-08	7.52E-09
Fe-55	7.07E-07	9.55E-07	9.50E-07	9.05E-07	8.79E-07

3.2 Liquid Batch Release Statistics

The following is a summation of all liquid batch releases made during 2003.

Release Type	Number	Gallons Released
A SGBT Monitor Tk.	10	93650.0
B SGBT Monitor Tk.	9	84704.0
A CVC Monitor	16	99365.0
B CVC Monitor	14	89215.0
Both WCTs	8	14480.0

Total time for all batch releases..... 23632.0 Min.

Maximum time for a batch release..... 837.0 Min.

Minimum time for a batch release..... 55.0 Min.

Average time for a batch release..... 414.6 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 2003
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)	6.145E-003	4.812E-002	6.719E-003	3.577E-003
Average Concentration (µCi/ml)	5.790E-011	3.051E-010	3.264E-011	2.150E-011
Tritium				
Total Release (Ci)	2.163E+002	3.794E+001	1.518E+001	1.094E+001
Average Concentration (µCi/ml)	2.038E-006	2.405E-007	7.376E-008	6.573E-008
% of Tech. Spec. Limit(3.0E-3 µCi/ml)	6.793E-002	8.017E-003	2.459E-003	2.191E-003
Dissolved Gases				
Total Release (Ci)	1.553E-004	0.000E+000	0.000E+000	0.000E+000
Average Concentration (µCi/ml)	1.464E-012	0.000E+000	0.000E+000	0.000E+000
% of Tech. Spec. Limit(2.0E-4 µCi/ml)	7.318E-007	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)	6.058E+005	5.012E+005	2.530E+005	8.374E+004
Continuous (liters)	2.315E+007	2.438E+007	1.991E+007	2.055E+007
Total (liters)	2.376E+007	2.488E+007	2.016E+007	2.064E+007
Volume of Dilution Water				
Batch (liters)	8.022E+009	8.386E+009	5.239E+009	1.761E+009
Continuous (liters)	9.812E+010	1.494E+011	2.006E+011	1.646E+011
Total (liters)	1.061E+011	1.577E+011	2.058E+011	1.664E+011

TABLE 3.2A
Annual Radioactive Effluent Release Report 2003
Liquid Effluents - Batch Releases

	January	February	March	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	8.994E-004	1.763E-003	2.094E-003	4.756E-003
Avg. Conc. (µCi/ml)	4.631E-010	6.991E-010	5.885E-010	
Tritium				
Total Release (Ci)	5.241E+001	8.403E+001	7.982E+001	2.163E+002
Avg. Conc. (µCi/ml)	2.699E-005	3.332E-005	2.243E-005	
Dissolved Gases				
Total Release (Ci)	2.895E-006	1.070E-005	1.418E-004	1.553E-004
Avg. Conc. (µCi/ml)	1.491E-012	4.242E-012	3.984E-011	
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)	1.455E+005	1.980E+005	2.623E+005	6.058E+005
Volume of Dilution Water				
(liters)	1.942E+009	2.522E+009	3.558E+009	8.022E+009

TABLE 3.2A (Con't)
Annual Radioactive Effluent Release Report 2003
Liquid Effluents - Batch Releases

Isotope (Ci)	January	February	March	Total
H-3	5.241E+001	8.403E+001	7.982E+001	2.163E+002
Fe-55	3.491E-004	1.188E-003	9.968E-004	2.534E-003
Co-58	5.353E-005	3.756E-005	1.949E-004	2.860E-004
Co-60	4.531E-005	6.684E-005	2.868E-004	3.989E-004
Sr-89	4.655E-007	0.000E+000	0.000E+000	4.655E-007
Sr-90	8.728E-008	3.960E-008	8.394E-007	9.663E-007
Ag-110m	9.400E-005	1.401E-004	1.903E-004	4.244E-004
Sb-125	3.569E-004	3.232E-004	4.244E-004	1.104E-003
Xe-133	0.000E+000	1.070E-005	1.418E-004	1.525E-004
Xe-135	2.895E-006	0.000E+000	0.000E+000	2.895E-006
Cs-137	0.000E+000	7.278E-006	0.000E+000	7.278E-006
Total	5.241E+001	8.403E+001	7.982E+001	2.163E+002

TABLE 3.2B
Annual Radioactive Effluent Release Report 2003
Liquid Effluents - Batch Releases

	April	May	June	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	2.034E-002	1.720E-002	7.538E-003	4.507E-002
Avg. Conc. (µCi/ml)	6.959E-009	1.291E-008	1.824E-009	
Tritium				
Total Release (Ci)	2.549E+001	2.987E+000	9.463E+000	3.794E+001
Avg. Conc. (µCi/ml)	8.723E-006	2.243E-006	2.290E-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)	2.413E+005	1.102E+005	1.497E+005	5.012E+005
Volume of Dilution Water				
(liters)	2.922E+009	1.332E+009	4.132E+009	8.386E+009

TABLE 3.2B (Con't)
Annual Radioactive Effluent Release Report 2003
Liquid Effluents - Batch Releases

Isotope (Ci)	April	May	June	Total
H-3	2.549E+001	2.987E+000	9.463E+000	3.794E+001
Cr-51	2.294E-004	3.848E-003	2.091E-004	4.287E-003
Mn-54	3.093E-004	9.073E-005	2.245E-006	4.023E-004
Fe-55	9.171E-003	4.186E-003	5.690E-003	1.905E-002
Co-58	1.249E-003	5.339E-003	1.382E-003	7.970E-003
Fe-59	0.000E+000	1.118E-003	1.254E-004	1.244E-003
Co-60	6.994E-003	8.813E-004	6.984E-005	7.945E-003
Sr-90	4.199E-006	1.917E-006	2.605E-006	8.722E-006
Nb-95	0.000E+000	5.280E-004	2.308E-005	5.510E-004
Zr-95	0.000E+000	3.285E-004	0.000E+000	3.285E-004
Ag-110m	2.379E-003	8.169E-004	3.418E-005	3.230E-003
Sn-113	0.000E+000	5.564E-005	0.000E+000	5.564E-005
Total	2.551E+001	3.004E+000	9.470E+000	3.799E+001

TABLE 3.2C
Annual Radioactive Effluent Release Report 2003
Liquid Effluents - Batch Releases

	July	August	September	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	1.592E-003	4.134E-004	6.729E-004	2.678E-003
Avg. Conc. (µCi/ml)	4.407E-010	8.923E-010	5.787E-010	
Tritium				
Total Release (Ci)	1.032E+001	1.222E+000	3.642E+000	1.518E+001
Avg. Conc. (µCi/ml)	2.857E-006	2.637E-006	3.131E-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)	1.773E+005	3.541E+004	4.031E+004	2.530E+005
Volume of Dilution Water				
(liters)	3.613E+009	4.633E+008	1.163E+009	5.239E+009

TABLE 3.2C (Con't)
Annual Radioactive Effluent Release Report 2003
Liquid Effluents - Batch Releases

Isotope (Ci)	July	August	September	Total
H-3	1.032E+001	1.222E+000	3.642E+000	1.518E+001
Fe-55	8.157E-004	1.629E-004	1.854E-004	1.164E-003
Co-58	4.268E-004	7.769E-005	9.718E-006	5.142E-004
Co-60	8.535E-005	1.637E-005	2.274E-005	1.245E-004
Sr-90	7.447E-007	1.487E-007	1.693E-007	1.063E-006
Ag-110m	1.828E-004	6.880E-005	1.484E-004	4.000E-004
Sb-125	8.075E-005	8.757E-005	3.064E-004	4.747E-004
Total	1.032E+001	1.222E+000	3.642E+000	1.519E+001

TABLE 3.2D
Annual Radioactive Effluent Release Report 2003
Liquid Effluents - Batch Releases

	October	November	December	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	8.103E-005	1.369E-003	2.121E-003	3.571E-003
Avg. Conc. (µCi/ml)	9.227E-010	1.166E-009	4.244E-009	
Tritium				
Total Release (Ci)	7.655E-005	4.104E+000	6.831E+000	1.094E+001
Avg. Conc. (µCi/ml)	8.717E-010	3.498E-006	1.367E-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)	7.154E+003	4.063E+004	3.595E+004	8.374E+004
Volume of Dilution Water				
(liters)	8.782E+007	1.173E+009	4.997E+008	1.761E+009

TABLE 3.2D (Con't)
Annual Radioactive Effluent Release Report 2003
Liquid Effluents - Batch Releases

Isotope (Ci)	October	November	December	Total
H-3	7.655E-005	4.104E+000	6.831E+000	1.094E+001
Fe-55	7.870E-005	4.470E-004	3.955E-004	9.211E-004
Co-58	2.277E-006	5.960E-005	1.175E-004	1.794E-004
Co-60	0.000E+000	2.789E-005	4.286E-005	7.075E-005
Sr-89	5.724E-008	3.251E-007	2.876E-007	6.699E-007
Ag-110m	0.000E+000	4.873E-004	3.897E-004	8.771E-004
Sb-125	0.000E+000	3.466E-004	1.175E-003	1.522E-003
Total	1.576E-004	4.106E+000	6.833E+000	1.094E+001

TABLE 3.3A
Annual Radioactive Effluent Release Report 2003
Liquid Effluents - Continuous Releases

	January	February	March	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	1.720E-005	9.236E-004	4.482E-004	1.389E-003
Avg. Conc. (µCi/ml)	5.089E-013	3.026E-011	1.326E-011	
Tritium				
Total Release (Ci)	2.861E-002	0.000E+000	0.000E+000	2.861E-002
Avg. Conc. (µCi/ml)	8.465E-010	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)	7.280E+006	7.411E+006	8.461E+006	2.315E+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 2003
Liquid Effluents - Continuous Releases

Isotope (Ci)	January	February	March	Total
H-3	2.861E-002	0.000E+000	0.000E+000	2.861E-002
Fe-55	0.000E+000	8.637E-004	3.587E-004	1.222E-003
Sr-89	0.000E+000	5.974E-005	8.948E-005	1.492E-004
Sr-90	1.720E-005	2.353E-007	0.000E+000	1.744E-005
Total	2.862E-002	9.236E-004	4.482E-004	3.000E-002

TABLE 3.3B
Annual Radioactive Effluent Release Report 2003
Liquid Effluents - Continuous Releases

	April	May	June	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	1.063E-003	1.020E-003	9.729E-004	3.056E-003
Avg. Conc. (µCi/ml)	3.047E-011	2.079E-011	1.487E-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)	8.030E+006	9.145E+006	7.207E+006	2.438E+007
Volume of Dilution Water				
(liters)	3.489E+010	4.906E+010	6.541E+010	1.494E+011

TABLE 3.3B (Con't)
Annual Radioactive Effluent Release Report 2003
Liquid Effluents - Continuous Releases

Isotope (Ci)	April	May	June	Total
Fe-55	1.021E-003	9.589E-004	9.369E-004	2.917E-003
Sr-89	4.157E-005	6.036E-005	3.603E-005	1.380E-004
Sr-90	8.150E-008	8.363E-007	0.000E+000	9.179E-007
Total	1.063E-003	1.020E-003	9.729E-004	3.056E-003

TABLE 3.3C
Annual Radioactive Effluent Release Report 2003
Liquid Effluents - Continuous Releases

	July	August	September	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	1.224E-003	1.337E-003	1.480E-003	4.040E-003
Avg. Conc. (µCi/ml)	1.811E-011	1.978E-011	2.262E-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)	5.684E+006	7.407E+006	6.818E+006	1.991E+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 2003
Liquid Effluents - Continuous Releases

Isotope (Ci)	July	August	September	Total
Fe-55	1.184E-003	1.291E-003	1.432E-003	3.907E-003
Sr-89	3.948E-005	4.305E-005	4.773E-005	1.302E-004
Sr-90	8.848E-008	2.516E-006	0.000E+000	2.604E-006
Total	1.224E-003	1.337E-003	1.480E-003	4.040E-003

TABLE 3.3D
Annual Radioactive Effluent Release Report 2003
Liquid Effluents - Continuous Releases

	October	November	December	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	1.716E-006	1.821E-006	2.629E-006	6.166E-006
Avg. Conc. (µCi/ml)	2.538E-014	2.879E-014	7.780E-014	
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)	5.719E+006	6.069E+006	8.765E+006	2.055E+007
Volume of Dilution Water (liters)	6.759E+010	6.323E+010	3.380E+010	1.646E+011

TABLE 3.3D (Con't)
Annual Radioactive Effluent Release Report 2003
Liquid Effluents - Continuous Releases

Isotope (Ci)	October	November	December	Total
Sr-90	1.716E-006	1.821E-006	2.629E-006	6.166E-006
Total	1.716E-006	1.821E-006	2.629E-006	6.166E-006

Table 3.4
Annual Radioactive Effluent Report 2003
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	1.641E-003	1.5	0.11
Bone	1.102E-004	5.0	0.00
Liver	1.683E-003	5.0	0.03
Thyroid	1.571E-003	5.0	0.03
Kidney	1.599E-003	5.0	0.03
Lung	1.595E-003	5.0	0.03
GI-LLI	1.647E-003	5.0	0.03

Organ 2nd Qtr Dose	Dose Total mRem	Quarterly Limit mRem	Percent of Limit
Total Body	4.582E-004	1.5	0.03
Bone	3.427E-004	5.0	0.01
Liver	5.552E-004	5.0	0.01
Thyroid	2.391E-004	5.0	0.00
Kidney	2.535E-004	5.0	0.01
Lung	3.430E-004	5.0	0.01
GI-LLI	1.925E-002	5.0	0.38

Table 3.4 (Con't)
Annual Radioactive Effluent Report 2003
Dose From Liquid Effluents

Organ 3rd Qtr Dose	Dose Total mRem	Quarterly Limit mRem	Percent of Limit
Total Body	6.937E-005	1.5	0.00
Bone	9.132E-005	5.0	0.00
Liver	8.152E-005	5.0	0.00
Thyroid	5.515E-005	5.0	0.00
Kidney	5.516E-005	5.0	0.00
Lung	6.941E-005	5.0	0.00
GI-LLI	9.459E-005	5.0	0.00

Organ 4th Qtr Dose	Dose Total mRem	Quarterly Limit mRem	Percent of Limit
Total Body	7.999E-005	1.5	0.01
Bone	6.109E-005	5.0	0.00
Liver	7.179E-005	5.0	0.00
Thyroid	6.453E-005	5.0	0.00
Kidney	6.456E-005	5.0	0.00
Lung	6.837E-005	5.0	0.00
GI-LLI	8.929E-005	5.0	0.00

Calculated Dose This Year

Organ	Dose Total mRem	Quarterly Limit mRem	Percent of Limit
Total Body	2.248E-003	3.0	0.07
Bone	6.053E-004	10.0	0.01
Liver	2.391E-003	10.0	0.02
Thyroid	1.930E-003	10.0	0.02
Kidney	1.973E-003	10.0	0.02
Lung	2.076E-003	10.0	0.02
GI-LLI	2.108E-002	10.0	0.21

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.

Corrective actions to preclude recurrence have been completed. In lieu of replacing the remotely operated vent valves WG-301 and WG-302, manual vent valve isolation capability is now used. Procedure revisions have also been completed to prevent a repeat of the previous unplanned release.

5.0 METEOROLOGICAL DATA

Meteorological data for 2003 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 2003. 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
High Integrity Container (HIC)	120.3 ft^3
LSA Box (B-25)	98 ft^3
Compactor Box (CPC 50)	50 ft^3
DOT-17H Drum	7.5 ft^3

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

Table 6.1
Annual Radioactive Effluent Report 2003
Solid Waste and Irradiated Fuel Shipments

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.	Resin	m^3	6.45E+00
	Container: HIC	Ci	5.43E+01
b.	Dewatered filter media	m^3	2.71E+00
	Container: HIC	Ci	3.85E+01
c.	DAW (Compactible)	m^3	None
	Container: Strong Tight	Ci	None
d.	DAW (Non-Compactible)	m^3	2.46E+01
	Container: Strong Tight	Ci	2.47E-03

Average Transuranics shipped (all shipments): 5.68E+00 nCi/g

2. Estimate of Major Nuclide by Composition (By Type of Waste)		%	Ci
a.	Resin	100%	5.43E+04
	Mn-54	1.68E-02	9.13E+02
	Co-58	2.52E-02	1.37E+03
	Co-60	2.24E-01	1.22E+04
	Cs-137	1.02E-02	5.55E+02
	Sb-125	7.98E-03	4.33E+02
	Fe-55	5.62E-02	3.05E+03
	C-14	2.47E-04	1.34E+01
	Ni-59	7.96E-03	4.32E+02
	Tc-99	9.45E-05	5.13E+00
	TRU	1.65E-07	8.93E-03
	Pu-241	5.25E-04	2.85E+01
	Cm-242	1.30E-07	7.07E-03
	H-3	4.74E-05	2.57E+00
	Ni-63	6.47E-01	3.51E+04
	Sr-90	6.89E-05	3.74E+00
	Sr-89	1.77E-05	9.61E-01
	W-187	3.82E-03	2.07E+02

b.	Dewatered filter media	100%	3.85E+01
	Cr-51	5.34E-05	2.06E-3
	Mn-54	8.56E-03	3.30E-01
	Co-58	1.60E-02	6.15E-01
	Co-60	2.51E-01	9.68E+00
	Zr-95	1.93E-03	7.43E-02
	Nb-95	4.54E-04	1.75E-02
	Ag-110m	4.54E-03	1.75E-01
	Cs-137	2.11E-03	8.13E-02
	Sb-125	3.37E-02	1.30E+00
	Fe-55	2.75E-01	1.06E+01
	Fe-59	7.01E-05	2.70E-03
	H-3	1.73E-02	6.66E-01
	Ni-63	3.89E-01	1.50E+01
c.	DAW (Compactible)	None	None
d.	DAW (Non-Compactible)	100%	2.47E-03
	Cr-51	2.72E-02	6.73E-05
	Mn-54	1.62E-02	4.01E-05
	Co-58	3.39E-01	8.38E-04
	Co-60	1.92E-1	4.74E-04
	Zr-95	9.06E-02	2.24E-04
	Nb-95	1.61E-01	3.97E-04
	Ag-110m	2.84E-03	7.02E-06
	Cs-137	9.75E-04	2.41E-06
	Sb-125	1.88E-02	4.64E-05
	Fe-55	7.98E-02	1.97E-04
	Fe-59	1.98E-03	4.90E-06
	H-3	4.10E-03	1.01E-05
	Ni-63	6.62E-02	1.64E-04

3. Solid Waste Disposition

a.	Date of Shipment	Mode of Transportation	Destination
	08/13/03	CNSI Cask	Studsvik Processing Facility Erwin, TN
	09/17/03	CNSI/Hittman Flatbed	Duratek Processing Facility Kingston, TN

10/31/03	CNSI Cask	Studsvik Processing Facility Erwin, TN
12/18/03	CNSI Cask	Chem/Nuclear Barnwell Burial Site Barnwell, SC

B. Irradiated Fuel Shipments

No irradiated fuel shipments were made from the Kewaunee Nuclear Power Plant during the first six months of 2003.

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

The Process Control Program was changed to allow for off site processing of solid waste prior to burial.

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

2003 Meteorological Data

Missing Data

First Quarter: 296.50 hours
Second Quarter: 775.50 hours
Third Quarter: 88.25 hours
Fourth Quarter: 10.25 hours

Note: A total of 1170.5 hours of data is missing or otherwise unavailable. This represents the availability of 86.6% of the data for the year. Continuous strip chart indication for 2003 data is available onsite.

APPENDIX A
Annual Radioactive Effluent Release Report 2003

FIRST QUARTER 2003
Total Hours Missing = 296.50 Total Hours = 2160
Stability Class A

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0.25	1	3.5	16	6.25	0.5	27.5
NNE	0	0	0	7.25	7	4.5	0	18.75
NE	0	0.25	0	19.25	21	1.5	0	42
ENE	0	0	2.5	17.25	32	1.25	0	53
E	0	0	3.75	4.75	10.25	1.5	0	20.25
ESE	0	0	2	0	1.25	0	0	3.25
SE	0	0	3	1.75	0	0	0	4.75
SSE	0	0	1.25	4.75	7.75	1.25	0	15
S	0	0	6.5	8	10.75	0.75	0.25	26.25
SSW	0	0	5.75	20.75	4.75	0	0.25	31.5
SW	0	0	5.5	8.75	7.75	5.75	0	27.75
WSW	0	0	1.5	16	13	1.25	0	31.75
W	0	0	2.75	23	20	4.5	0	50.25
WNW	0	0	1.5	32.25	31.75	0.75	0	66.25
NW	0	0	4.75	13.5	14.5	1.25	0	34
NNW	0	0	10	13	11.75	0.5	0	35.25
TOTAL	0	0.5	51.75	193.75	209.5	31	1	487.5

Stability Class B

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0.25	2	4	0	0	6.25
NNE	0	0	0	1.25	5.5	0.25	0	7
NE	0	0	0.25	1.5	1.75	0	0	3.5
ENE	0	0	0.5	0.5	0.5	0.25	0	1.75
E	0	0	1	0.75	2.5	0.25	0	4.5
ESE	0	0	0	1	3.5	0	0	4.5
SE	0	0	0	0.25	0	0	0	0.25
SSE	0	0	0.25	0	0.5	0.5	0	1.25
S	0	0	2.25	3.25	2	0	0	7.5
SSW	0	0	4.25	7.75	4	0	0	16
SW	0	0	1.75	4.75	0.75	0	0	7.25
WSW	0	0	1	5.25	4	0.5	0	10.75
W	0	0	0	3.25	2	2	0	7.25
WNW	0	0	1.5	4.75	3	0	0	9.25
NW	0	0	2.75	1.75	1.5	0.25	0	6.25
NNW	0	0	1.75	5.75	0.75	0.25	0	8.5
TOTAL	0	0	17.5	43.75	36.25	4.25	0	101.75

Stability Class C

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	0.25	2	1	0	0	3.25
NNE	0	0	0.25	3.5	3	0	0	6.75
NE	0	0	0	2.25	0.25	0	0	2.5
ENE	0	0	0.75	1.5	0.25	0	0	2.5
E	0	0	1.75	1.5	2.25	0	0	5.5
ESE	0	0	0.25	2.75	0.5	0	0	3.5
SE	0	0	0	0.25	0	0	0	0.25
SSE	0	0	1.5	1	1	0.25	0	3.75
S	0	0	2.75	2.25	0.75	0	0	5.75
SSW	0	0	5.5	7.25	2.25	0	0	15
SW	0	0	0.75	0.75	1.75	0	0	3.25
WSW	0	0	1	7.5	3	0.25	0	11.75
W	0	0	1	5.75	3	1.5	0	11.25
WNW	0	0	0.75	5.25	4.25	0.25	0	10.5
NW	0	0	1.75	5	1.75	0.25	0	8.75
NNW	0	0.25	4.25	3.75	1.75	0	0	10
TOTAL	0	0.25	22.5	52.25	26.75	2.5	0	104.25

Stability Class D

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0.25	4.75	20.25	12.25	0.25	0	37.75
NNE	0	0	2.5	6.5	4.25	7.75	3.5	24.5
NE	0	0	2.25	4.75	0.5	0	0.25	7.75
ENE	0	0.25	2	8.5	1	0	0	11.75
E	0	0	1.5	7	1.5	0	0	10
ESE	0	0.25	1.25	7.25	0.5	0	0	9.25
SE	0	0	1	0.25	0.25	0	0	1.5
SSE	0	0	3	7	3.5	0	0	13.5
S	0	0	7.75	5	1.25	0.75	0	14.75
SSW	0	0.25	12	12	1.25	0	0	25.5
SW	0	0.5	4.75	6.75	3.25	0	0	15.25
WSW	0	0.25	3.75	15.25	10.75	1	0	31
W	0	0.25	7.25	16.5	18	4.25	0	46.25
WNW	0	0.5	6.5	50.5	20.5	4	0	82
NW	0	0	6.75	20.75	15	1.25	0	43.75
NNW	0	0.25	9.25	18.25	12	0	0	39.75
TOTAL	0	2.75	76.25	206.5	105.75	19.25	3.75	414.25

Stability Class E

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	1.5	0.75	12.75	9	8.25	0	0	32.25
NNE	0	0.5	4	8	2.5	0	0	15
NE	0	1	9	3.5	0	0	0	13.5
ENE	0	0.5	6	5.75	0.5	0	0	12.75
E	0	1	5.5	4	0.75	0	0	11.25
ESE	0	0.25	3.75	3.25	0	0	0	7.25
SE	0	0.5	3.25	3.25	0.5	0	0	7.5
SSE	0	0.75	1.75	4.25	0.75	0	0	7.5
S	0	0	4.75	5	0.25	0	0	10
SSW	0	1	11.25	11.5	0.75	0	0	24.5
SW	0	5	4.25	21.5	7.5	0.25	0	38.5
WSW	0	0.75	2.5	14.75	10	1.5	0	29.5
W	0	1.25	6.5	36.75	15.25	1	0	60.75
WNW	0	0.75	16.5	38.25	26.75	1.25	0	83.5
NW	0	2	16	22	3	0.25	0	43.25
NNW	0	3.75	13.75	22.5	1.5	0	0	41.5
TOTAL	1.5	19.75	121.5	213.25	78.25	4.25	0	438.5

Stability Class F

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	8	0.25	0.25	0	0	8.5
NNE	0	0	1.5	1	0.5	0	0	3
NE	0	0	2.25	1.25	0	0	0	3.5
ENE	0	0	0.75	0	0	0	0	0.75
E	0	0.25	0.25	0.25	0	0	0	0.75
ESE	0	0.5	0.75	0.5	0	0	0	1.75
SE	0	1.25	0.25	0	0	0	0	1.5
SSE	0	1	2.25	1.5	0.5	0	0	5.25
S	0	0	1.25	0.75	0	0	0	2
SSW	0	1.75	5.75	2	0	0	0	9.5
SW	0	1.5	7.25	7.25	4.5	0	0	20.5
WSW	0	2.75	2.75	5	5.25	0	0	15.75
W	0	2.25	6.25	20.75	0	0	0	29.25
WNW	0	0.75	6	16.75	0	0	0	23.5
NW	0	0.5	9	0.25	0	0	0	9.75
NNW	0	0.25	9.5	0.5	0	0	0	10.25
TOTAL	0	12.75	63.75	58	11	0	0	145.5

Stability Class G

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0.25	9.75	0	0	0	0	10
NNE	0	0.75	3.75	0	0	0	0	4.5
NE	0	0.25	1.25	0	0	0	0	1.5
ENE	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0
ESE	0	0	0	0.25	0	0	0	0.25
SE	0	0.25	0.25	0	0	0	0	0.5
SSE	0	0	2.25	2	2	0	0	6.25
S	0	0.5	1.75	2.5	0	0	0	4.75
SSW	0	2.75	7.75	0.25	0	0	0	10.75
SW	0	1.25	14.5	2	0	0	0	17.75
WSW	0	0.75	17.5	11.25	0.5	0	0	30
W	0	2.75	20.5	10.25	0	0	0	33.5
WNW	0	1.25	13.5	5.75	0	0	0	20.5
NW	0	2.25	13	0.25	0	0	0	15.5
NNW	0	2.25	13.75	0	0	0	0	16
TOTAL	0	15.25	119.5	34.5	2.5	0	0	171.75

2nd QUARTER 2003

Total Hours Missing = 775.540 Total Hours = 2184

Stability Class A

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	2.5	4.5	3.5	1.25	0	11.75
NNE	0	0.5	7.5	35.25	30.5	6.5	3.5	83.75
NE	0	0.25	25.75	21	14.5	7.25	0	68.75
ENE	0	0.25	9.5	8.5	14.5	2	0	34.75
E	0	0.5	2.5	0	0	0.25	0	3.25
ESE	0	0.75	4.25	4.25	0	0	0	9.25
SE	0	1.25	5	1.75	0	0	0	8
SSE	0	0	7.25	1	2.25	0	0	10.5
S	0	0.75	2.25	7.25	7.5	0.25	0	18
SSW	0	0.25	1	0	0	0	0	1.25
SW	0	0	0.5	0	0	0.5	0.25	1.25
WSW	0	0.25	0.25	0	0	0	0	0.5
W	0	0	1.5	0.75	0	0	0	2.25
WNW	0	0.5	3.5	5.5	0	0	0	9.5
NW	0	0	2.25	7	3.5	3	0	15.75
NNW	0	0	4.5	4.5	3.5	0.5	0	13
TOTAL	0	5.25	80	101.25	79.75	21.5	3.75	291.5

Stability Class B

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	2	0.75	0.25	0.5	0	3.5
NNE	0	0.25	3.25	4.25	3	0	0	10.75
NE	0	0	2	4	0	0	0	6
ENE	0	0	0.25	0	0	0	0	0.25
E	0	0.5	0.75	0	0	0	0	1.25
ESE	0	0	0.5	0.5	0	0	0	1
SE	0	0	1.5	0.5	0	0	0	2
SSE	0	0	0.5	0.5	0	0	0	1
S	0	0.25	0.75	0.5	0.25	0	0	1.75
SSW	0	0	0	0.25	0	0	0	0.25
SW	0	0	0.5	0	0.5	0	0	1
WSW	0	0	0	0	0	0	0	0
W	0	0	0.75	0	0	0	0	0.75
WNW	0	0	0.5	2.25	0	0	0	2.75
NW	0	0	1	1.5	0.75	0	0	3.25
NNW	0	0.25	2.25	0.25	0.25	0	0	3
TOTAL	0	1.25	16.5	15.25	5	0.5	0	38.5

Stability Class C

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	1.25	1	1.5	0	0	3.75
NNE	0	0	2.5	6.75	5.25	0.25	0	14.75
NE	0	0.25	2.5	4.25	1.25	0	0	8.25
ENE	0	0	2.25	0.5	0	0	0	2.75
E	0	0.25	4	0	0	0	0	4.25
ESE	0	0	1.25	0.25	0	0	0	1.5
SE	0	0	1.75	0.25	0	0	0	2
SSE	0	0	2	1.25	0.25	0	0	3.5
S	0	0	0.25	2	0	0	0	2.25
SSW	0	0	1.25	0.25	0	0	0	1.5
SW	0	0	0	0	0	0	0	0
WSW	0	0	0.25	0	0	0	0	0.25
W	0	0	0.5	0.5	0	0	0	1
WNW	0	0	2	2	0.25	0	0	4.25
NW	0	0	0.75	1.75	2.25	0.25	0	5
NNW	0	0.25	0.5	0.25	2.25	0	0	3.25
TOTAL	0	0.75	23	21	13	0.5	0	58.25

Stability Class D

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0.25	3.5	10	2	0	0	15.75
NNE	0	0.25	8.75	26.5	25.25	5	0	65.75
NE	0	0	19.75	18.25	1.5	0.25	0	39.75
ENE	0	0.25	7.25	1	0	0	0	8.5
E	0	1	7	0.75	0	0	0	8.75
ESE	0	0.75	5	3	0.25	0	0	9
SE	0	0.25	1.25	0.5	0	0	0	2
SSE	0	0	3.5	3.75	0	0	0	7.25
S	0	1	1.5	2.5	2	0	0	7
SSW	0	0	2	1.75	0	0	0	3.75
SW	0	0.25	0.25	0	0	0.25	0	0.75
WSW	0	0	1	0	1.5	0.25	0	2.75
W	0	0	2	2.5	0.75	0	0	5.25
WNW	0	0.25	2.75	3.5	0.5	0.5	0	7.5
NW	0	0.5	2.5	2.75	1.5	4	0	11.25
NNW	0	0	2.5	4	1	0.75	0	8.25
TOTAL	0	4.75	70.5	80.75	36.25	11	0	203.25

Stability Class E

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	1	6.75	8.5	0	0	0	16.25
NNE	0	0.5	22.75	32.25	4.75	0.25	0	60.5
NE	0	0.75	24.75	5.75	1.5	0	0	32.75
ENE	0	0.5	5.75	3.75	2	0	0	12
E	0	0.75	6.75	7	0	0	0	14.5
ESE	0	0.75	10	5.5	0	0	0	16.25
SE	0	1.75	6.25	1.25	0	0	0	9.25
SSE	0	1	6	3.5	1.5	0	0	12
S	0	1	7.25	9.25	1	0	0	18.5
SSW	0	0.5	5.75	7.75	2.75	0.25	0	17
SW	0	0.25	2.75	1	0.5	0.75	0	5.25
WSW	0	0.5	4	0.75	0	0	0	5.25
W	0	0.25	4.75	2	4.75	0	0	11.75
WNW	0	0.5	5	5.5	8.5	3	0.25	22.75
NW	0	1.25	1.5	2.5	1	3.25	0.25	9.75
NNW	0	0.5	4	2.25	1	0	0	7.75
TOTAL	0	11.75	124	98.5	29.25	7.5	0.5	271.5

Stability Class F

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	1	9.25	1.5	0	0	0	11.75
NNE	0	2	6.75	3.75	0	0	0	12.5
NE	0	2.75	11.25	4.5	0	0	0	18.5
ENE	0	4.25	4.75	1	1.5	0	0	11.5
E	0	1.75	3.75	0	0	0	0	5.5
ESE	0	0.5	1.25	0.25	1.5	0	0	3.5
SE	0	1	6.75	0	0	0	0	7.75
SSE	0	1	8	3.25	0	0	0.25	12.5
S	0	2.5	11.5	11	0.25	0	0	25.25
SSW	0	1.5	7.5	2.75	0	0	0	11.75
SW	0	0.5	1.75	0.75	0	0	0	3
WSW	0	0.75	3.25	2	0.25	0	0	6.25
W	0	0.25	3.75	4.25	0	0	0	8.25
WNW	0	0.25	4.5	0.25	0	0	0	5
NW	0	1	7.25	0.25	0	0	0	8.5
NNW	0	0.75	7	1.75	0.5	0	0	10
TOTAL	0	21.75	98.25	37.25	4	0	0.25	161.5

Stability Class G

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	2.75	6.25	0.5	0	0	0	9.5
NNE	0	2.25	2.25	0.75	0	0	0	5.25
NE	0	2.25	8	1	0.25	0	0	11.5
ENE	0	2	2.25	1.75	3.25	0	0	9.25
E	0	1.75	4	3.5	2	0	0	11.25
ESE	0	2.75	3.25	2.5	1	0	0	9.5
SE	0	3	5.5	1.25	0.75	0	0.25	10.75
SSE	0	6.25	31.75	9.75	1	0.25	1.5	50.5
S	0	9	64.5	33.25	0	0	0	106.75
SSW	0	7.25	30.5	3.25	0	0	0	41
SW	0	2.25	28.25	0.75	0	0	0	31.25
WSW	0	3.75	14.5	1	0	0	0	19.25
W	0	2.25	4.75	3.25	0	0	0	10.25
WNW	0	2.25	10.5	1.5	0	0	0	14.25
NW	0	5.25	17.25	2.25	0	0	0	24.75
NNW	0	6	13	0	0	0	0	19
TOTAL	0	61	246.5	66.25	8.25	0.25	1.75	384

3rd QUARTER 2003
Total Hours Missing = 88.25 Total Hours = 2208
Stability Class A

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	7.5	9.25	0.5	0	0	17.25
NNE	0	0	8.25	22.75	6.25	0	0	37.25
NE	0	0	30	5	0	0	0	35
ENE	0	0	13.25	0.25	0	0	0	13.5
E	0	0	11.25	0	0	0	0	11.25
ESE	0	0	10.75	0	0	0	0	10.75
SE	0	0	8.5	1.5	0	0	0	10
SSE	0	0	4.5	2	0	0	0	6.5
S	0	0	1.25	1	0	0	0.25	2.5
SSW	0	0	3.25	4.25	0.25	0	0	7.75
SW	0	0	3	3	0	0	0	6
WSW	0	0	5	18	5	0	0	28
W	0	0	13	17.75	11	0	0	41.75
WNW	0	0	3	22.25	6	0	0	31.25
NW	0	0	3.75	18.75	0.25	0	0	22.75
NNW	0	0	5	10.5	0.75	0	0.25	16.5
TOTAL	0	0	131.25	136.25	30	0	0.5	298

Stability Class B

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	2.25	4	0	0	0	6.25
NNE	0	0	1.25	5.5	3	0	0	9.75
NE	0	0	3.75	0	0	0	0	3.75
ENE	0	0	1.5	0	0	0	0	1.5
E	0	0	0.25	0	0	0	0	0.25
ESE	0	0	1	0	0	0	0	1
SE	0	0	1	0.25	0	0	0	1.25
SSE	0	0	0.75	1	0	0	0	1.75
S	0	0	0.25	0.5	0	0	0	0.75
SSW	0	0	0.75	1.75	0	0	0	2.5
SW	0	0	1.25	0.75	0	0	0	2
WSW	0	0	1	2.75	1.5	0	0	5.25
W	0	0	2.5	3.5	0.25	0	0	6.25
WNW	0	0	1	4	4	0	0	9
NW	0	0	0.75	1.5	1	0	0	3.25
NNW	0	0	1.5	1.75	0	0	0	3.25
TOTAL	0	0	20.75	27.25	9.75	0	0	57.75

Stability Class C

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	2.25	13.5	0	0	0	15.75
NNE	0	0	2.5	5.5	2.25	0	0	10.25
NE	0	0	4.5	0.75	0	0	0	5.25
ENE	0	0	1.5	0	0	0	0	1.5
E	0	0	1.5	0	0	0	0	1.5
ESE	0	0	2.25	0	0	0	0	2.25
SE	0	0	1.25	0.25	0	0	0	1.5
SSE	0	0	1.25	0.75	0	0	0	2
S	0	0	0.25	1.25	0	0	0	1.5
SSW	0	0	1	1.25	0	0	0	2.25
SW	0	0	1	0.25	0	0	0	1.25
WSW	0	0	2.5	4.25	1.25	0	0	8
W	0	0	3.5	2.75	0	0	0	6.25
WNW	0	0	2.25	3.5	3.5	0	0	9.25
NW	0	0	3.5	2.5	0	0	0	6
NNW	0	0	1.5	3.25	0	0	0	4.75
TOTAL	0	0	32.5	39.75	7	0	0	79.25

Stability Class D

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	4.5	15.25	0.5	0	0	20.25
NNE	0	0.5	7.25	22.5	5.25	0	0	35.5
NE	0	0	7.25	2.25	0	0	0	9.5
ENE	0	0	3.5	0	0	0	0	3.5
E	0	0.5	1.75	0	0	0	0	2.25
ESE	0	0.25	6.75	0	0	0	0	7
SE	0	0.5	3.25	1	0	0	0	4.75
SSE	0	0	5.25	12.75	0.5	0	0	18.5
S	0	0	2.25	17.75	0	0	0	20
SSW	0	0	3.5	11.25	0	0	0	14.75
SW	0	0	3.25	6	0	0	0	9.25
WSW	0	0	4.75	10.75	1.5	0	0	17
W	0	0	11.75	16.5	1.5	0	0	29.75
WNW	0	0	12.25	15.75	0	0	0	28
NW	0	0	9	7.25	0	0	0	16.25
NNW	0	0	10.5	2.25	0.5	0	0	13.25
TOTAL	0	1.75	96.75	141.25	9.75	0	0	249.5

Stability Class E

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0.25	17.75	8.75	0.25	0	0	27
NNE	0	1	12.75	16.5	1.25	0	0	31.5
NE	0	2	9.75	1.75	0	0	0	13.5
ENE	0	1.25	9.75	0.5	0	0	0	11.5
E	0	1.25	5.5	0.5	0	0	0	7.25
ESE	0	3.25	10.25	5.75	0	0	0	19.25
SE	0	0.5	11	5.25	2	0	0	18.75
SSE	0	2	10.25	13	1.75	0	0	27
S	0	0.5	15	16	0.25	0	0	31.75
SSW	0	0.25	29	21	0	0	0	50.25
SW	0	0.75	5	4.5	0	0	0	10.25
WSW	0	0.75	6.25	14.75	0	0	0	21.75
W	0	0.5	10	11.25	0.75	0	0	22.5
WNW	0	0.25	11.5	12.25	0.5	0	0	24.5
NW	0	0.75	8.25	2.5	0	0	0	11.5
NNW	0	1.75	17.5	3.25	0.25	0	0	22.75
TOTAL	0	17	189.5	137.5	7	0	0	351

Stability Class F

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	1	16	2.25	0	0	0	19.25
NNE	0	0.25	6	3	0	0	0	9.25
NE	0	2.25	8	5.75	0	0	0	16
ENE	0	1.5	3.75	0	0	0	0	5.25
E	0	2.25	4.75	0.75	0	0	0	7.75
ESE	0	3.25	6.75	0	0	0	0	10
SE	0	4	17.75	12	4.5	0	0	38.25
SSE	0	6.75	24.25	13.25	4	0	0	48.25
S	0	3	18.5	17.5	1.75	0	0	40.75
SSW	0	0.5	28.5	6.5	0.25	0	0	35.75
SW	0	1.25	16	1.5	0	0	0	18.75
WSW	0	0.75	10.5	6.5	0.25	0	0	18
W	0	1	10.25	9	0.25	0	0	20.5
WNW	0	0.5	9.25	7.75	0	0	0	17.5
NW	0	1	11.25	0.5	0	0	0	12.75
NNW	0	3.75	20.25	0.75	0	0	0	24.75
TOTAL	0	33	211.75	87	11	0	0	342.75

Stability Class G

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	7.75	15.5	0	0	0	0	23.25
NNE	0	1.75	2.75	0.75	0	0	0	5.25
NE	0	2.75	3	1	0	0	0	6.75
ENE	0	1.75	1.5	0.75	0	0	0	4
E	0	5	7	1.5	0	0	0	13.5
ESE	0	4	15	4.5	0	0	0	23.5
SE	0	3.75	22.25	31.25	0	0	0	57.25
SSE	0	5.25	71.75	22.75	1	0	0.25	101
S	0	12	61.5	28.75	0	0	0	102.25
SSW	0	10.25	41.75	2	0.25	0	0	54.25
SW	0	12.75	49.25	0	0	0	0	62
WSW	0	18	59.75	5.5	0	0	0	83.25
W	0	9.25	73.5	8.25	0	0	0	91
WNW	0	7	41	6.75	0	0	0	54.75
NW	0	13	15	0.5	0	0	0	28.5
NNW	0	10.5	20	0.5	0	0	0	31
TOTAL	0	124.75	500.5	114.75	1.25	0	0.25	741.5

4th QUARTER 2002
Total Hours Missing = 10.25 Total Hours = 2208
Stability Class A

Wind Direction

	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	4.5	7.25	3.25	0	0	15
NNE	0	0	2.25	7	2.75	0	0	12
NE	0	0	3	5	8.75	0.25	0	17
ENE	0	0	0	1.75	9.75	14	0	25.5
E	0	0	4.5	0	0	1.75	0	6.25
ESE	0	0	4	0.5	0	0	0	4.5
SE	0	0	6.25	11.75	0	0	0	18
SSE	0	0	2.5	3.5	6.5	1.75	0	14.25
S	0	0	6.5	8.75	16	2.75	0	34
SSW	0	0	6	12	3.75	0	0	21.75
SW	0	0	3.75	7	5.25	0	0	16
WSW	0	0	3.75	18.5	8.5	6.25	0	37
W	0	0.25	5.5	24.75	22	11.5	0.5	64.5
WNW	0	0	3.25	28.75	27	4	0	63
NW	0	0	7.25	28.25	8.5	0.75	0	44.75
NNW	0	0	5.75	12.5	3.75	0	0	22
TOTAL	0	0.25	68.75	177.25	125.75	43	0.5	415.5

Stability Class B

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0.5	1.75	1.5	7.25	0	0	11
NNE	0	0.25	1.25	1.75	0.25	0	0	3.5
NE	0	0.5	1	2.5	1	0	0	5
ENE	0	0	2.5	3	0	0	0	5.5
E	0	0	1.25	0	0	0.5	0	1.75
ESE	0	0	1.75	0	0	0	0	1.75
SE	0	0	0.5	1.25	0	0	0	1.75
SSE	0	0	0.75	0.5	5	4.25	2	12.5
S	0	0	0	1.5	3.25	3.25	0	8
SSW	0	0	0.25	6.75	0.75	0	0	7.75
SW	0	0.25	0.5	1.25	0.25	0	0	2.25
WSW	0	0.5	0.75	1.25	2.75	0	0	5.25
W	0	0.25	0.75	2	3.25	0.25	0.75	7.25
WNW	0	0	0.75	13.75	3.5	1	0	19
NW	0	0	4	11.5	2.5	0	0	18
NNW	0	0	1.5	2.25	1	0	0	4.75
TOTAL	0	2.25	19.25	50.75	30.75	9.25	2.75	115

Stability Class C

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	1.5	1.75	0	0	0	3.25
NNE	0	0	1.25	1	0.25	0	0	2.5
NE	0	0.5	3	4	0.25	0	0	7.75
ENE	0	0	0.75	1	0	0	0	1.75
E	0	0.25	1.25	0.25	0	0.5	0	2.25
ESE	0	0.25	1.75	1.25	0.25	0	0.75	4.25
SE	0	0.5	1.75	1	0	0	0	3.25
SSE	0	0.5	2	3.5	1.75	1	0	8.75
S	0	0	0.5	3.25	3.75	0.25	0	7.75
SSW	0	0.25	0.75	5	0.5	0	0	6.5
SW	0	0.5	0	3.25	3.5	0	0	7.25
WSW	0	0	0.5	3.75	0.5	0.25	0	5
W	0	0	1	7.5	7	0.75	0	16.25
WNW	0	0	1	15.25	11.25	0.75	0	28.25
NW	0	0	1.5	10	8.25	0.25	0.25	20.25
NNW	0	0	1.75	4	2.5	0	0	8.25
TOTAL	0	2.75	20.25	65.75	39.75	3.75	1	133.25

Stability Class D

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	1.75	5.5	5.5	6	1	0	19.75
NNE	0	0	2.25	6.75	6.75	0	0	15.75
NE	0	2	5.5	4	0	0	0	11.5
ENE	0	0.5	5.5	1	0.75	0	0	7.75
E	0	1	3	5.5	5	0	0	14.5
ESE	0	1.5	5.25	5.75	2	0.75	0.75	16
SE	0	3	6.5	7	0	0	1	17.5
SSE	0	3.5	7.25	12	8.75	4	0	35.5
S	0	3.5	12.75	15.25	19.75	7	1.5	59.75
SSW	0	5	12.75	29.25	7.25	0	0	54.25
SW	0	2.25	7.5	11.75	8.25	0.75	0	30.5
WSW	0	2.25	3	15.25	6.75	1	0	28.25
W	0	2	9.5	34.25	19	1	0	65.75
WNW	0	0.5	8.75	42.75	23.25	1.5	0	76.75
NW	0	0.75	7	26.5	14.5	3.5	2	54.25
NNW	0	4.25	6.5	5.25	2.5	4	0	22.5
TOTAL	0	33.75	108.5	227.75	130.5	24.5	5.25	530.25

Stability Class E

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0.5	2	11.75	4.5	0.25	0	0	19
NNE	0	1.75	2.25	6.25	3.5	0	0	13.75
NE	0	0.25	2	1.5	0	0	0	3.75
ENE	0	0.75	4.75	1.75	0	0	0	7.25
E	0	0.5	3.25	2	2.25	0	0	8
ESE	0	1.25	0.25	1.75	0	0	0.75	4
SE	0	0.5	3.25	0.25	0	0	0	4
SSE	0	1.25	8.25	3.5	3.5	6.5	0	23
S	0	7	17	15.75	10.75	2	0	52.5
SSW	0	6.5	27.75	22.25	1	0	0	57.5
SW	0	7.5	19.5	11.75	4	0	0	42.75
WSW	0	5.75	11	12.75	2	0	0	31.5
W	0	4.5	9	35.25	7.75	0	0	56.5
WNW	0	4.5	18	28.25	7	1	0	58.75
NW	0	4.75	18.5	10.25	0.5	0	0	34
NNW	0	1.25	15.5	13.25	0	0	0	30
TOTAL	0.5	50	172	171	42.5	9.5	0.75	446.25

Stability Class F

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0.25	5.5	1	0	0	0	6.75
NNE	0	0	1	0.5	0.25	0	0	1.75
NE	0	0	0	0	0	0	0	0
ENE	0	0	0.25	0	0	0	0	0.25
E	0	0	0	0	0	0	0	0
ESE	0	0	0.25	0.5	0	0	0	0.75
SE	0	0	1	1	0	0	0	2
SSE	0	0.5	2.5	3	0.75	0	0	6.75
S	0	1.5	4.5	7	0.5	0	0	13.5
SSW	0	1.5	25.5	4	0	0	0	31
SW	0	2	19	5.5	0	0	0	26.5
WSW	0	0.75	16.5	11	1	0	0	29.25
W	0	1.5	17.75	15.25	1	0.25	0	35.75
WNW	0	0.75	34.5	19.5	0.25	0	0	55
NW	0	2.5	9.25	2.75	0	0	0	14.5
NNW	0	1.25	11	3.5	0	0	0	15.75
TOTAL	0	12.5	148.5	74.5	3.75	0.25	0	239.5

Stability Class G

Wind Direction	CALM	1-3	4-7	8-12	13-18	19-24	>24	TOTAL
N	0	0	6	0.5	0	0	0	6.5
NNE	0	0	1	0.25	0	0	0	1.25
NE	0	0	0.25	0	0	0	0	0.25
ENE	0	0	1	0	0	0	0	1
E	0	0	1	0	0	0	0	1
ESE	0	0.5	0.25	0.5	0	0	0	1.25
SE	0	1	3.75	0.75	0	0	0	5.5
SSE	0	4	18.25	6.25	0	0	0	28.5
S	0	6.5	15	12	0.25	0	0	33.75
SSW	0	8.75	15.25	2.25	0	0	0	26.25
SW	0	4.75	21.25	11.25	1	0	0	38.25
WSW	0	2.5	30.5	11.25	0	0	0	44.25
W	0	3.25	34.25	24.5	0	0	0	62
WNW	0	0.75	32	8.75	0	0	0	41.5
NW	0	0.5	11.25	0	0	0	0	11.75
NNW	0	0.75	14.25	0	0	0	0	15
TOTAL	0	33.25	205.25	78.25	1.25	0	0	318