



Kewaunee Nuclear Power Plant
N490, State Highway 42
Kewaunee, WI 54216-9511
920-388-2560

Operated by
Nuclear Management Company, LLC



April 26, 2001

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 2000

Enclosed please find a copy of the Kewaunee Nuclear Power Plant Radioactive Effluent Release Report for January through December, 2000. This report is submitted to meet the requirements of Technical Specification 6.9.b.2.

Sincerely,

Kyle A. Hoops
Manager-Kewaunee Plant

DFS

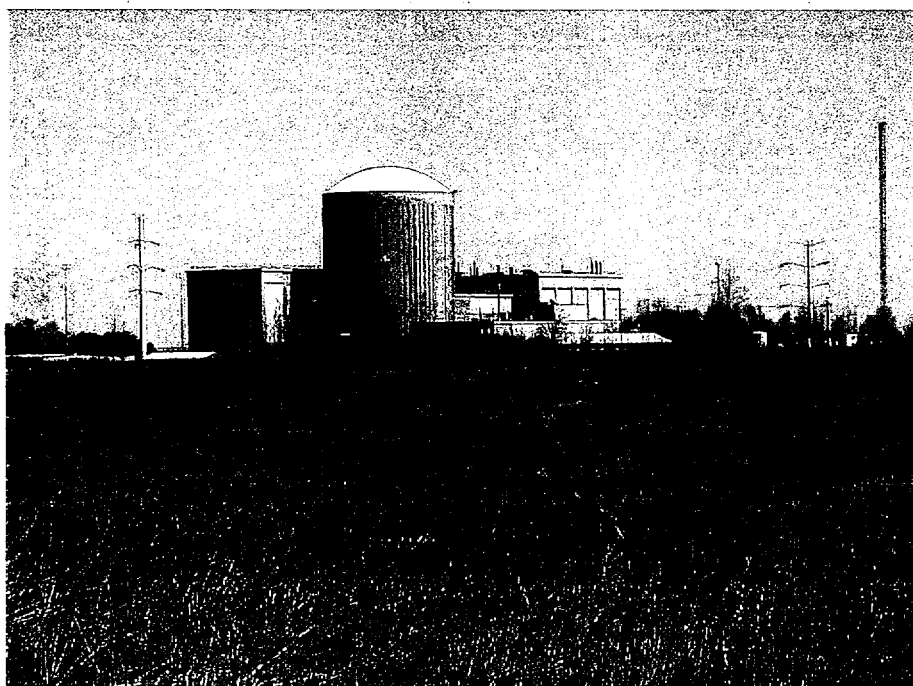
Enc.

cc - US NRC Senior Resident Inspector
US NRC Region III

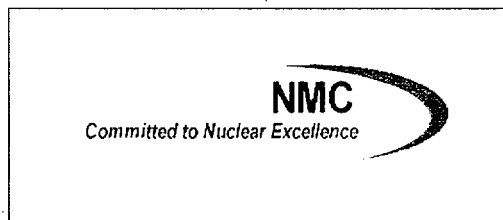
IE48

KEWAUNEE NUCLEAR POWER PLANT

RADIOACTIVE EFFLUENT RELEASE REPORT JAN-DEC 2000



**OPERATED BY THE
NUCLEAR MANAGEMENT COMPANY, LLC**



DOCKET 50-305

KEWAUNEE NUCLEAR POWER PLANT

**ANNUAL RADIOACTIVE
EFFLUENT RELEASE REPORT**

January 1 - December 31, 2000

Wisconsin Public Service Corporation
Green Bay, Wisconsin
April 20, 2001

Table of Contents

Section	Description	
0.0	Summary	3
1.0	Introduction.....	3
1.1	Effluent Dose	3
2.0	Gaseous Effluents	4
2.1	Lower Limits of Detection (LLD) for Gaseous Effluents	4
2.2	Gaseous Batch Release Statistics.....	4
2.3	Gaseous Effluent Data	4
	Table 2.1 Gaseous Effluents - Summation of all Releases	5
	Table 2.2 Gaseous Effluents - Elevated Releases	6
	Table 2.3A Gaseous Release Total	8
	Table 2.3B Gaseous Release Continuous	16
	Table 2.3C Gaseous Release Batch	24
	Table 2.4 Dose From Gaseous Effluents	32
3.0	Liquid Effluents	34
3.1	Lower Limits of Detection (LLD) for Liquid Effluents	34
3.2	Liquid Batch Release Statistics	36
3.3	Liquid Effluent Data	36
	Table 3.1 Liquid Effluents - Summation of all Releases.....	37
	Table 3.2A Liquid Effluents - Batch Releases 1st Quarter.....	38
	Table 3.2B Liquid Effluents - Batch Releases 2nd Quarter	40
	Table 3.2C Liquid Effluents - Batch Releases 3rd Quarter	42
	Table 3.2D Liquid Effluents - Batch Releases 4th Quarter	44
	Table 3.3A Liquid Effluents - Continuous Releases 1st Quarter	46
	Table 3.3B Liquid Effluents - Continuous Releases 2nd Quarter	48
	Table 3.3C Liquid Effluents - Continuous Releases 3rd Quarter	50
	Table 3.3D Liquid Effluents - Continuous Releases 4th Quarter	52
	Table 3.4 Dose From Liquid Effluents	54
4.0	Unplanned Releases	56
5.0	Meteorological Data	56
6.0	Solid Waste Disposal	56
	Table 6.1 Solid Waste and Irradiated Fuel Shipments.....	57
7.0	Program Revisions.....	58
8.0	Reportable Occurrences	58
Appendix A	Meteorological Data	
Appendix B	Addendum to the 1999 Annual Effluent Release Report	

0.0 SUMMARY

During 2000 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:

<u>GASEOUS:</u>	Ingestion Pathway-Organ	Liver
	Quarterly Limit (mRems)	7.5
	Actual Dose (mRems)	0.0002948 (2 nd Quarter)
	% of Specification	0.003930
<u>LIQUID:</u>	Ingestion Pathway-Organ	GI-LLI
	Quarterly Limit (mRems)	5
	Actual Dose (mRems)	0.04544 (2 nd Quarter)
	% of Limit	0.91
<u>SOLID:</u>	No upper limit for solid radioactive waste applies.	
	Cubic Meters Shipped	0 m ³ (0 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, 2000. 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 ($\mu\text{Ci/ml}$)
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

2.2 Gaseous Batch Release Statistics

The following is a summation of all gaseous batch releases made during 2000.

Number of batch releases	24
Total time for all batch releases (min)	12140.0
Maximum time for a batch release (min)	1447.0
Average time for a batch release (min)	505.8
Minimum time for a batch release (min)	9.0

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 2000
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	3.917E-002	2.543E-004	0.000E+000
Average Release Rate (μCi/sec)	0.000E+000	4.981E-003	3.234E-005	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	1.528E-005	5.031E-008	1.470E-007

Tritium

Total Activity Released (Ci)	4.729E-001	1.395E+001	9.791E-001	9.150E-001
Average Release Rate (μCi/sec)	6.015E-002	1.775E+000	1.245E-001	1.164E-001

Table 2.2
Annual Radioactive Effluent Release Report 2000
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 2000
Gaseous Effluents

Nuclides Released (Ci)
Batch Mode

Fission Gases

Ar-41	0.000E+000	1.401E-002	0.000E+000	0.000E+000
Xe-133	0.000E+000	2.504E-002	2.543E-004	0.000E+000
Xe-135	0.000E+000	1.135E-004	0.000E+000	0.000E+000
Total	0.000E+000	3.917E-002	2.543E-004	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 2000
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 2000
1st Quarter Gaseous Release
Total of all Releases

Summary	January	February	March	<u>Total</u>
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	4.729E-001	0.000E+000	4.729E-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 2000
2nd Quarter Gaseous Release
Total of all Releases

Noble Gasses (Curies)

Isotope	April	May	June	Total
Ar-41	1.401E-002	0.000E+000	0.000E+000	1.401E-002
Xe-133	2.455E-002	4.925E-004	0.000E+000	2.504E-002
Xe-135	1.135E-004	0.000E+000	0.000E+000	1.135E-004
Total	3.867E-002	4.925E-004	0.000E+000	3.917E-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 2000
2nd Quarter Gaseous Release
Total of all Releases

Summary	April	May	June	<u>Total</u>
Total Noble Gases (Ci)	3.867E-002	4.925E-004	0.000E+000	3.917E-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)	7.850E+000	1.497E+000	4.606E+000	1.395E+001
Total Particulate Gross Alpha (Ci)	2.370E-007	1.504E-005	0.000E+000	1.528E-005

Table 2.3A (con't)
Annual Radioactive Effluent Release Report 2000
3rd Quarter Gaseous Release
Total of all Releases

Noble Gasses (Curies)

Isotope	July	August	September	Total
Xe-133	0.000E+000	0.000E+000	2.543E-004	2.543E-004
Total	0.000E+000	0.000E+000	2.543E-004	2.543E-004

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 2000
3rd Quarter Gaseous Release
Total of all Releases

Summary	July	August	September	<u>Total</u>
Total Noble Gases (Ci)	0.000E+000	0.000E+000	2.543E-004	2.543E-004
Total Halogens (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Particulate Gross Beta-Gamma Half-Lives>8 Days (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Tritium (Ci)	0.000E+000	2.827E-001	6.963E-001	9.791E-001
Total Particulate Gross Alpha (Ci)	0.000E+000	5.031E-008	0.000E+000	5.031E-008

Table 2.3A (Con't)
Annual Radioactive Effluent Release Report 2000
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 2000
4th Quarter Gaseous Release
Total of all Releases

Summary	October	November	December	<u>Total</u>
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	4.106E-001	5.044E-001	9.150E-001
Total Particulate Gross Alpha (Ci)	0.000E+000	0.000E+000	1.470E-007	1.470E-007

Table 2.3B
Annual Radioactive Effluent Release Report 2000
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 2000
1st Quarter Gaseous Release
Continuous Mode Only

Summary	January	February	March	<u>Total</u>
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	4.729E-001	0.000E+000	4.729E-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 2000
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 2000
2nd Quarter Gaseous Release
Continuous Mode Only

Summary	April	May	June	<u>Total</u>
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)	2.786E-001	1.495E+000	4.606E+000	6.380E+000
Total Particulate Gross Alpha (Ci)	2.370E-007	1.504E-005	0.000E+000	1.528E-005

Table 2.3B (con't)
Annual Radioactive Effluent Release Report 2000
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 2000
3rd Quarter Gaseous Release
Continuous Mode Only

Summary	July	August	September	<u>Total</u>
Total Noble Gases (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Halogens (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Particulate Gross Beta-Gamma Half-Lives>8 Days (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Total Tritium (Ci)	0.000E+000	2.762E-001	6.960E-001	9.722E-001
Total Particulate Gross Alpha (Ci)	0.000E+000	5.031E-008	0.000E+000	5.031E-008

Table 2.3B (Con't)
Annual Radioactive Effluent Release Report 2000
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 2000
4th Quarter Gaseous Release
Continuous Mode Only

Summary	October	November	December	<u>Total</u>
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	4.106E-001	5.044E-001	9.150E-001
Total Particulate Gross Alpha (Ci)	0.000E+000	0.000E+000	1.470E-007	1.470E-007

Table 2.3C
Annual Radioactive Effluent Release Report 2000
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 2000
1st Quarter Gaseous Release
Batch Mode Only

Summary	January	February	March	<u>Total</u>
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 2000
2nd Quarter Gaseous Release
Batch Mode Only

Noble Gasses (Curies)

Isotope	April	May	June	Total
Ar-41	1.401E-002	0.000E+000	0.000E+000	1.401E-002
Xe-133	2.455E-002	4.925E-004	0.000E+000	2.504E-002
Xe-135	1.135E-004	0.000E+000	0.000E+000	1.135E-004
Total	3.867E-002	4.925E-004	0.000E+000	3.917E-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 2000
2nd Quarter Gaseous Release
Batch Mode Only

Summary	April	May	June	<u>Total</u>
Total Noble Gases (Ci)	3.867E-002	4.925E-004	0.000E+000	3.917E-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)	7.571E+000	1.751E-003	0.000E+000	7.573E+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 2000
3rd Quarter Gaseous Release
Batch Mode Only

Noble Gasses (Curies)

Isotope	July	August	September	Total
Xe-133	0.000E+000	0.000E+000	2.543E-004	2.543E-004
Total	0.000E+000	0.000E+000	2.543E-004	2.543E-004

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 2000
3rd Quarter Gaseous Release
Batch Mode Only

Summary	July	August	September	<u>Total</u>
Total Noble Gases (Ci)	0.000E+000	0.000E+000	2.543E-004	2.543E-004
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	6.510E-003	3.581E-004	6.868E-003
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 2000
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 2000
4th Quarter Gaseous Release
Batch Mode Only

Summary	October	November	December	<u>Total</u>
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 2.4
Annual Radioactive Effluent Release Report 2000
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 2000 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	1.590E-005	1.024E-008	0.000E+000
% of Specification	0.000E+000	3.181E-004	2.049E-007	0.000E+000
2. Beta-Skin				
Specification (mRads)	1.000E+001	1.000E+001	1.000E+001	1.000E+001
Actual Dose (mRads)	0.000E+000	8.277E-006	3.047E-008	0.000E+000
% of Specification	0.000E+000	8.277E-005	3.047E-007	0.000E+000
3. Ingestion Pathway-Organ				
Specification (mRems)	7.500E+000	7.500E+000	7.500E+000	7.500E+000
Actual Dose (mRems)	9.991E-006	2.948E-004	2.068E-005	1.933E-005
% of Specification	1.332E-004	3.930E-003	2.758E-004	2.577E-004
	Liver	Liver	Liver	Liver

Table 2.4 (Con't)
Annual Radioactive Effluent Release Report 2000
Dose From Gaseous Effluents

In addition, the cumulative annual offsite doses for the period January 1 - December 31, 2000 versus the ODCM annual limits were:

	Annual
1. Gamma-Whole Body	
Specification (mRads)	1.000E+001
Actual Dose (mRads)	1.592E-005
% of Specification	1.592E-004
2. Beta-Skin	
Specification (mRads)	2.000E+001
Actual Dose (mRads)	8.308E-006
% of Specification	4.154E-005
3. Ingestion Pathway-Organ	
Specification (mRems)	1.500E+001
Actual Dose (mRems)	3.448E-004
% of Specification	2.298E-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 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:

<u>Analysis</u>	<u>LLD ($\mu\text{Ci/ml}$)</u>
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 ($\mu\text{Ci/ml}$)
Mn-54	6.62E-10	6.62E-10	6.62E-10	6.62E-10	6.62E-10
Fe-59	1.46E-09	1.46E-09	1.46E-09	1.46E-09	1.46E-09
Co-58	6.51E-10	9.20E-08	9.20E-08	6.50E-10	4.63E-08
Co-60	8.67E-10	9.61E-10	9.61E-10	9.61E-10	9.37E-10
Zn-65	1.64E-09	1.64E-09	1.64E-09	1.64E-09	1.64E-09
Mo-99	7.82E-07	4.69E-09	4.70E-09	4.69E-09	1.99E-07
Cs-134	1.09E-07	5.22E-10	5.22E-10	5.22E-10	2.75E-08
Cs-137	6.44E-08	6.44E-08	6.44E-08	6.44E-08	6.44E-08
Ce-141	4.22E-08	4.21E-08	4.21E-08	4.21E-08	4.21E-08
Ce-144	4.53E-07	1.71E-09	3.58E-07	5.14E-07	3.32E-07
I-131	4.09E-10	4.06E-08	5.74E-08	4.06E-10	2.47E-08
H-3	3.48E-06	3.29E-06	3.66E-06	3.35E-06	3.45E-06
Sr-89	1.04E-08	1.60E-08	1.17E-08	1.31E-08	1.28E-08
Sr-90	8.17E-09	6.30E-09	8.33E-09	7.60E-09	7.60E-09
Gross Alpha	7.83E-09	7.03E-09	6.33E-09	7.10E-09	7.08E-09
Fe-55	7.87E-07	7.23E-07	7.97E-07	8.53E-07	7.90E-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	3 rd Quarter	4th Quarter	Average a priori LLD (μCi/ml)
Mn-54	1.22E-08	2.70E-08	3.49E-08	1.10E-08	2.13E-08
Fe-59	4.28E-08	2.43E-10	2.43E-08	2.43E-10	1.69E-08
Co-58	1.08E-08	1.91E-08	1.88E-08	1.08E-08	1.49E-08
Co-60	2.50E-08	2.27E-08	2.26E-08	4.96E-08	3.00E-08
Zn-65	2.73E-10	2.73E-10	4.37E-08	3.02E-08	1.86E-08
Mo-99	1.97E-07	1.92E-07	7.87E-08	7.86E-10	1.17E-07
Cs-134	1.55E-08	8.69E-11	8.69E-11	1.94E-08	8.76E-09
Cs-137	2.84E-08	3.44E-08	2.10E-08	1.07E-10	2.10E-08
Ce-141	4.80E-08	2.70E-08	2.01E-08	1.91E-08	2.85E-08
Ce-144	1.28E-07	2.37E-07	7.55E-08	5.68E-07	2.52E-07
I-131	1.85E-08	1.17E-08	6.76E-09	1.79E-08	1.37E-08
H-3	3.48E-07	3.29E-06	3.66E-06	3.35E-06	2.66E-06
Sr-89	1.25E-08	1.30E-08	1.63E-08	1.62E-08	1.45E-08
Sr-90	7.35E-09	7.43E-09	8.70E-09	8.88E-09	8.09E-09
Gross Alpha	7.20E-09	5.35E-09	5.07E-09	5.72E-09	5.83E-09
Fe-55	7.83E-07	7.28E-07	8.22E-07	8.55E-07	7.97E-07

3.2 Liquid Batch Release Statistics

The following is a summation of all liquid batch releases made during 2000.

<u>Release Type</u>	<u>Number</u>	<u>Gallons Released</u>
A SGBT Monitor Tk.	12	105195.0
B SGBT Monitor Tk.	8	75636.0
A CVC Monitor 17	112455.0	
B CVC Monitor 13	79125.0	
Both WCTs 60	106935.0	

Total time for all batch releases..... 24994.0 Min.

Maximum time for a batch release..... 811.0 Min.

Minimum time for a batch release..... 22.0 Min.

Average time for a batch release..... 227.2 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 2000
Liquid Effluents - Summation of all Releases

	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
Fission and Activation Products				
Total Release Excluding H3 and Dissolved Gases (Ci)	2.845E-002	2.320E-002	1.791E-002	5.056E-003
Average Concentration (μCi/ml)	2.801E-010	1.858E-010	8.662E-011	2.919E-011
Tritium				
Total Release (Ci)	1.012E+002	9.491E+001	2.651E+001	4.359E+001
Average Concentration (μCi/ml)	9.967E-007	7.600E-007	1.282E-007	2.517E-007
% of Tech. Spec. Limit(3.0E-3 μCi/ml)	3.322E-002	2.533E-002	4.274E-003	8.388E-003
Dissolved Gases				
Total Release (Ci)	0.000E+000	1.577E-005	0.000E+000	0.000E+000
Average Concentration (μCi/ml)	0.000E+000	1.263E-013	0.000E+000	0.000E+000
% of Tech. Spec. Limit(2.0E-4 μCi/ml)	0.000E+000	6.314E-008	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)	2.350E+005	9.537E+005	2.955E+005	3.303E+005
Continuous (liters)	4.470E+007	3.125E+007	4.151E+007	4.274E+007
Total (liters)	4.494E+007	3.220E+007	4.181E+007	4.307E+007
Volume of Dilution Water				
Batch (liters)	2.365E+009	1.127E+010	6.140E+009	5.336E+009
Continuous (liters)	9.921E+010	1.136E+011	2.006E+011	1.679E+011
Total (liters)	1.016E+011	1.249E+011	2.067E+011	1.732E+011

TABLE 3.2A
Annual Radioactive Effluent Release Report 2000
Liquid Effluents - Batch Releases

	January	February	March	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)				
	9.166E-003	1.818E-002	2.364E-005	2.737E-002
Avg. Conc. (μ Ci/ml)				
	1.985E-008	2.232E-008	2.172E-011	
Tritium				
Total Release (Ci)				
	4.149E+000	4.371E+001	5.200E+001	9.986E+001
Avg. Conc. (μ Ci/ml)				
	8.984E-006	5.366E-005	4.776E-005	
Dissolved Gases				
Total Release (Ci)				
	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Avg. Conc. (μ Ci/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. (μ Ci/ml)				
	0.000E+000	0.000E+000	0.000E+000	
Volume of Waste Released				
(liters)	4.114E+004	8.583E+004	1.080E+005	2.350E+005
Volume of Dilution Water				
(liters)	4.618E+008	8.146E+008	1.089E+009	2.365E+009

TABLE 3.2A (Con't)
Annual Radioactive Effluent Release Report 2000
Liquid Effluents - Batch Releases

Isotope (Ci)	January	February	March	Total
H-3	4.149E+000	4.371E+001	5.200E+001	9.986E+001
Mn-54	0.000E+000	0.000E+000	2.687E-006	2.687E-006
Fe-55	8.639E-003	1.803E-002	1.404E-005	2.668E-002
Co-58	2.277E-005	0.000E+000	0.000E+000	2.277E-005
Co-60	3.296E-004	1.123E-004	5.932E-006	4.479E-004
Sr-89	2.345E-007	4.893E-007	9.828E-007	1.707E-006
Sr-90	1.645E-008	0.000E+000	0.000E+000	1.645E-008
Ag-110m	8.767E-005	4.401E-005	0.000E+000	1.317E-004
Sb-125	8.665E-005	0.000E+000	0.000E+000	8.665E-005
Total	4.158E+000	4.373E+001	5.200E+001	9.989E+001

TABLE 3.2B
Annual Radioactive Effluent Release Report 2000
Liquid Effluents - Batch Releases

	April	May	June	<u>Total</u>
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	2.908E-003	6.220E-003	9.600E-003	1.873E-002
Avg. Conc. (μ Ci/ml)	9.668E-010	1.635E-009	2.156E-009	
Tritium				
Total Release (Ci)	5.753E+001	2.957E+001	7.547E+000	9.465E+001
Avg. Conc. (μ Ci/ml)	1.913E-005	7.772E-006	1.694E-006	
Dissolved Gases				
Total Release (Ci)	1.577E-005	0.000E+000	0.000E+000	1.577E-005
Avg. Conc. (μ Ci/ml)	5.243E-012	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. (μ Ci/ml)	0.000E+000	0.000E+000	0.000E+000	
Volume of Waste Released				
(liters)	2.729E+005	4.246E+005	2.562E+005	9.537E+005
Volume of Dilution Water				
(liters)	3.008E+009	3.805E+009	4.454E+009	1.127E+010

TABLE 3.2B (Con't)
Annual Radioactive Effluent Release Report 2000
Liquid Effluents - Batch Releases

Isotope (Ci)	April	May	June	Total
H-3	5.753E+001	2.957E+001	7.547E+000	9.465E+001
Cr-51	0.000E+000	8.565E-004	5.866E-004	1.443E-003
Mn-54	3.407E-005	7.964E-006	9.197E-005	1.340E-004
Fe-55	1.938E-003	2.293E-003	1.030E-003	5.261E-003
Co-58	1.132E-004	2.127E-003	2.336E-003	4.577E-003
Fe-59	0.000E+000	8.067E-005	1.958E-004	2.765E-004
Co-60	6.361E-004	3.328E-004	1.840E-003	2.809E-003
Sr-89	0.000E+000	3.822E-006	3.876E-007	4.209E-006
Sr-90	3.275E-007	7.219E-007	2.306E-007	1.280E-006
Nb-95	0.000E+000	6.705E-005	2.703E-004	3.373E-004
Zr-95	0.000E+000	1.520E-005	1.006E-004	1.158E-004
Ag-110m	1.561E-004	1.556E-004	1.863E-003	2.175E-003
Sn-113	0.000E+000	0.000E+000	9.652E-005	9.652E-005
Sb-124	0.000E+000	0.000E+000	2.143E-004	2.143E-004
Sb-125	3.077E-005	2.796E-004	9.736E-004	1.284E-003
Xe-133	1.577E-005	0.000E+000	0.000E+000	1.577E-005
Total	5.753E+001	2.958E+001	7.557E+000	9.467E+001

TABLE 3.2C
Annual Radioactive Effluent Release Report 2000
Liquid Effluents - Batch Releases

	July	August	September	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	3.170E-003	2.757E-003	1.576E-003	7.503E-003
Avg. Conc. (μ Ci/ml)	5.832E-009	2.248E-009	3.607E-010	
Tritium				
Total Release (Ci)	5.391E-001	3.518E+000	2.020E+001	2.426E+001
Avg. Conc. (μ Ci/ml)	9.917E-007	2.869E-006	4.623E-006	
Dissolved Gases				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Avg. Conc. (μ Ci/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. (μ Ci/ml)	0.000E+000	0.000E+000	0.000E+000	
Volume of Waste Released				
(liters)	4.485E+004	6.984E+004	1.808E+005	2.955E+005
Volume of Dilution Water				
(liters)	5.436E+008	1.226E+009	4.370E+009	6.140E+009

TABLE 3.2C (Con't)
Annual Radioactive Effluent Release Report 2000
Liquid Effluents - Batch Releases

Isotope (Ci)	July	August	September	Total
H-3	5.391E-001	3.518E+000	2.020E+001	2.426E+001
Na-24	1.372E-005	0.000E+000	0.000E+000	1.372E-005
Mn-54	1.248E-005	0.000E+000	0.000E+000	1.248E-005
Fe-55	3.632E-004	6.565E-004	1.808E-004	1.201E-003
Co-58	2.796E-004	8.843E-004	7.703E-004	1.934E-003
Co-60	7.614E-005	1.375E-004	2.140E-004	4.277E-004
Sr-89	0.000E+000	1.956E-007	1.085E-006	1.280E-006
Sr-90	1.121E-007	3.003E-007	0.000E+000	4.124E-007
Ag-110m	2.420E-004	8.077E-005	6.438E-005	3.871E-004
Sb-124	2.495E-004	9.714E-005	0.000E+000	3.467E-004
Sb-125	1.934E-003	8.405E-004	2.994E-004	3.073E-003
Cs-137	0.000E+000	5.937E-005	4.602E-005	1.054E-004
Total	5.423E-001	3.521E+000	2.020E+001	2.426E+001

TABLE 3.2D
Annual Radioactive Effluent Release Report 2000
Liquid Effluents - Batch Releases

	October	November	December	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	1.948E-003	4.916E-004	5.964E-004	3.037E-003
Avg. Conc. (μ Ci/ml)	8.567E-010	3.180E-010	3.935E-010	
Tritium				
Total Release (Ci)	6.541E+000	5.259E+000	2.353E+001	3.533E+001
Avg. Conc. (μ Ci/ml)	2.876E-006	3.402E-006	1.552E-005	
Dissolved Gases				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Avg. Conc. (μ Ci/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. (μ Ci/ml)	0.000E+000	0.000E+000	0.000E+000	
Volume of Waste Released				
(liters)	1.468E+005	9.358E+004	8.994E+004	3.303E+005
Volume of Dilution Water				
(liters)	2.274E+009	1.546E+009	1.516E+009	5.336E+009

TABLE 3.2D (Con't)
Annual Radioactive Effluent Release Report 2000
Liquid Effluents - Batch Releases

Isotope (Ci)	October	November	December	Total
H-3	6.541E+000	5.259E+000	2.353E+001	3.533E+001
Fe-55	3.964E-004	1.123E-004	8.994E-005	5.986E-004
Co-58	7.416E-004	1.896E-004	2.833E-004	1.215E-003
Co-60	2.265E-004	5.057E-005	1.047E-004	3.817E-004
Sr-89	1.909E-006	0.000E+000	1.079E-007	2.017E-006
Sr-90	1.615E-007	2.995E-007	1.529E-007	6.139E-007
Nb-95	1.883E-006	0.000E+000	1.553E-006	3.436E-006
Ag-110m	1.307E-004	1.927E-005	1.396E-006	1.514E-004
Sb-125	3.837E-004	3.608E-005	0.000E+000	4.198E-004
Cs-137	6.553E-005	8.356E-005	1.153E-004	2.644E-004
Total	6.543E+000	5.259E+000	2.353E+001	3.533E+001

TABLE 3.3A
Annual Radioactive Effluent Release Report 2000
Liquid Effluents - Continuous Releases

	January	February	March	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	4.877E-004	4.190E-004	1.722E-004	1.079E-003
Avg. Conc. (μ Ci/ml)	1.443E-011	1.325E-011	5.096E-012	
Tritium				
Total Release (Ci)	6.740E-001	3.881E-001	3.159E-001	1.378E+000
Avg. Conc. (μ Ci/ml)	1.994E-008	1.228E-008	9.347E-009	
Dissolved Gases				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Avg. Conc. (μ Ci/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. (μ Ci/ml)	0.000E+000	0.000E+000	0.000E+000	
Volume of Waste Released				
(liters)	1.502E+007	1.403E+007	1.565E+007	4.470E+007
Volume of Dilution Water				
(liters)	3.380E+010	3.162E+010	3.380E+010	9.921E+010

TABLE 3.3A (Con't)
Annual Radioactive Effluent Release Report 2000
Liquid Effluents - Continuous Releases

Isotope (Ci)	January	February	March	Total
H-3	6.740E-001	3.881E-001	3.159E-001	1.378E+000
Fe-55	4.469E-004	0.000E+000	0.000E+000	4.469E-004
Br-82	0.000E+000	1.773E-004	0.000E+000	1.773E-004
Sr-89	3.648E-006	1.097E-005	0.000E+000	1.462E-005
Sr-90	3.713E-005	3.143E-005	2.191E-005	9.047E-005
I-133	0.000E+000	1.993E-004	1.503E-004	3.496E-004
Total	6.745E-001	3.885E-001	3.161E-001	1.379E+000

TABLE 3.3B
Annual Radioactive Effluent Release Report 2000
Liquid Effluents - Continuous Releases

	April	May	June	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	1.879E-003	1.364E-003	1.232E-003	4.475E-003
Avg. Conc. (μ Ci/ml)	5.745E-011	8.528E-011	1.897E-011	
Tritium				
Total Release (Ci)	9.553E-002	5.299E-002	1.102E-001	2.587E-001
Avg. Conc. (μ Ci/ml)	2.921E-009	3.313E-009	1.697E-009	
Dissolved Gases				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Avg. Conc. (μ Ci/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. (μ Ci/ml)	0.000E+000	0.000E+000	0.000E+000	
Volume of Waste Released				
(liters)	1.000E+007	4.979E+006	1.627E+007	3.125E+007
Volume of Dilution Water				
(liters)	3.271E+010	1.599E+010	6.491E+010	1.136E+011

TABLE 3.3B (Con't)
Annual Radioactive Effluent Release Report 2000
Liquid Effluents - Continuous Releases

Isotope (Ci)	April	May	June	Total
H-3	9.553E-002	5.299E-002	1.102E-001	2.587E-001
Na-24	0.000E+000	0.000E+000	1.364E-004	1.364E-004
Fe-55	1.712E-003	1.245E-003	5.236E-004	3.480E-003
Co-58	1.760E-005	8.487E-006	1.425E-004	1.686E-004
Co-60	0.000E+000	5.352E-006	1.615E-004	1.668E-004
Br-82	0.000E+000	0.000E+000	1.200E-004	1.200E-004
Sr-89	5.775E-006	9.198E-005	4.253E-005	1.403E-004
Sr-90	2.134E-005	1.362E-005	3.344E-005	6.841E-005
I-133	1.225E-004	0.000E+000	7.162E-005	1.941E-004
Total	9.740E-002	5.436E-002	1.114E-001	2.632E-001

TABLE 3.3C
Annual Radioactive Effluent Release Report 2000
Liquid Effluents - Continuous Releases

	July	August	September	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	6.114E-003	2.786E-003	1.504E-003	1.040E-002
Avg. Conc. (μ Ci/ml)	9.046E-011	4.122E-011	2.299E-011	
Tritium				
Total Release (Ci)	5.681E-001	7.880E-001	8.952E-001	2.251E+000
Avg. Conc. (μ Ci/ml)	8.405E-009	1.166E-008	1.369E-008	
Dissolved Gases				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Avg. Conc. (μ Ci/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. (μ Ci/ml)	0.000E+000	0.000E+000	0.000E+000	
Volume of Waste Released				
(liters)	1.337E+007	1.350E+007	1.465E+007	4.151E+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 2000
Liquid Effluents - Continuous Releases

Isotope (Ci)	July	August	September	Total
H-3	5.681E-001	7.880E-001	8.952E-001	2.251E+000
Na-24	2.158E-004	2.980E-004	1.815E-004	6.953E-004
Fe-55	5.740E-003	2.321E-003	1.100E-003	9.160E-003
Co-58	2.951E-005	1.253E-004	0.000E+000	1.548E-004
Co-60	7.052E-005	0.000E+000	1.137E-004	1.842E-004
Br-82	0.000E+000	0.000E+000	7.628E-005	7.628E-005
Sr-89	4.358E-005	2.434E-005	3.299E-005	1.009E-004
Sr-90	1.516E-005	1.765E-005	0.000E+000	3.280E-005
Total	5.742E-001	7.907E-001	8.967E-001	2.262E+000

TABLE 3.3D
Annual Radioactive Effluent Release Report 2000
Liquid Effluents - Continuous Releases

	October	November	December	Total
Gross Radioactivity				
Total Release Excluding H3 and Dissolved Gases (Ci)	1.369E-003	2.587E-004	3.926E-004	2.020E-003
Avg. Conc. (μ Ci/ml)	2.025E-011	3.955E-012	1.125E-011	
Tritium				
Total Release (Ci)	9.010E-001	8.655E-001	6.501E+000	8.267E+000
Avg. Conc. (μ Ci/ml)	1.333E-008	1.323E-008	1.863E-007	
Dissolved Gases				
Total Release (Ci)	0.000E+000	0.000E+000	0.000E+000	0.000E+000
Avg. Conc. (μ Ci/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. (μ Ci/ml)	0.000E+000	0.000E+000	0.000E+000	
Volume of Waste Released				
(liters)	1.278E+007	1.330E+007	1.667E+007	4.274E+007
Volume of Dilution Water				
(liters)	6.759E+010	6.541E+010	3.489E+010	1.679E+011

TABLE 3.3D (Con't)
Annual Radioactive Effluent Release Report 2000
Liquid Effluents - Continuous Releases

Isotope (Ci)	October	November	December	Total
H-3	9.010E-001	8.655E-001	6.501E+000	8.267E+000
Na-24	1.843E-004	0.000E+000	0.000E+000	1.843E-004
Fe-55	8.588E-004	1.364E-004	2.460E-004	1.241E-003
Co-60	2.942E-004	0.000E+000	0.000E+000	2.942E-004
Br-82	0.000E+000	1.203E-004	0.000E+000	1.203E-004
Sr-89	5.009E-007	1.943E-006	7.429E-005	7.673E-005
Sr-90	3.080E-005	0.000E+000	0.000E+000	3.080E-005
I-133	0.000E+000	0.000E+000	7.226E-005	7.226E-005
Total	9.024E-001	8.658E-001	6.501E+000	8.269E+000

Table 3.4
Annual Radioactive Effluent Report 2000
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 mrem to the total body and less than or equal to 5 mrem 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 mrem to the total body and less than or equal to 10 mrem 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	7.935E-004	1.5	0.05
Bone	3.892E-004	5.0	0.01
Liver	9.966E-004	5.0	0.02
Thyroid	7.254E-004	5.0	0.01
Kidney	7.255E-004	5.0	0.01
Lung	8.751E-004	5.0	0.02
GI-LLI	9.302E-004	5.0	0.02

Organ 2nd Qtr Dose	Dose Total mRem	Quarterly Limit mRem	Percent of Limit
Total Body	8.062E-004	1.5	0.05
Bone	3.204E-004	5.0	0.01
Liver	8.864E-004	5.0	0.02
Thyroid	6.610E-004	5.0	0.01
Kidney	6.708E-004	5.0	0.01
Lung	7.545E-004	5.0	0.02
GI-LLI	4.544E-002	5.0	0.91

Table 3.4 (Con't)
Annual Radioactive Effluent Report 2000
Dose From Liquid Effluents

Organ 3rd Qtr Dose	Dose Total mRem	Quarterly Limit mRem	Percent of Limit
Total Body	4.941E-004	1.5	0.03
Bone	4.550E-004	5.0	0.01
Liver	7.034E-004	5.0	0.01
Thyroid	8.817E-005	5.0	0.00
Kidney	2.937E-004	5.0	0.01
Lung	1.600E-004	5.0	0.00
GI-LLI	1.718E-004	5.0	0.00

Organ 4th Qtr Dose	Dose Total mRem	Quarterly Limit mRem	Percent of Limit
Total Body	1.680E-003	1.5	0.11
Bone	1.839E-003	5.0	0.04
Liver	2.385E-003	5.0	0.05
Thyroid	2.021E-004	5.0	0.00
Kidney	9.290E-004	5.0	0.02
Lung	4.413E-004	5.0	0.01
GI-LLI	4.076E-004	5.0	0.01

Calculated Dose This Year			
Organ	Dose Total mRem	Quarterly Limit mRem	Percent of Limit
Total Body	3.773E-003	3.0	0.13
Bone	3.003E-003	10.0	0.03
Liver	4.971E-003	10.0	0.05
Thyroid	1.677E-003	10.0	0.02
Kidney	2.619E-003	10.0	0.03
Lung	2.231E-003	10.0	0.02
GI-LLI	4.695E-002	10.0	0.47

4.0 UNPLANNED RELEASES

No unplanned releases were made from the Kewaunee Nuclear Power Plant (KNPP) during the report period.

The January-June 1991 Semi-Annual Effluent Release Report described an unplanned release which occurred on April 25, 1991. Offsite doses attributed to this release were well below the established ODCM (Technical Specifications at the time) limits. As corrective action, KNPP stated in this report that valves WG-301 and WG-302 were scheduled to be replaced during 1992. KNPP has continued to provide status updates on this issue in the Effluent Release Reports until resolution of this incident and completion of the corrective actions. A plant design change request, DCR-2349, was issued to address this concern. Since that time, Safety Evaluation 00-51 documents the practice of system operation via manual valve positioning. Such system operation has proven successful and has led to the cancellation of the DCR. This issue is consider closed and this comment will no longer be included in the Annual Effluent Release Report.

5.0 METEOROLOGICAL DATA

Meteorological data for 2000 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 2000. 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)	0 ft ³
LSA Box (B-25)	0 ft ³
Compactor Boxes	0 ft ³
DOT-17H Drum	0 ft ³

There were no resin shipments, thus no samples were taken and analyzed for transuranic nuclides.

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

Table 6.1
Annual Radioactive Effluent Report 2000
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 - m³ 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	None
Container: HIC	Ci	None
c. DAW (Compactible)	m ³	None
Container: Compactor Box	Ci	None
d. DAW (Non-Compactible)	m ³	None
Container: Compactor Box	Ci	None

Average Transuranics shipped (all shipments): 0.00E+00 nCi/g

2. Estimate of Major Nuclide by Composition
 (By Type of Waste)

	<u>%</u>	<u>Ci</u>
a. Dewatered resin	None	None
b. Dewatered filter media	None	None
c. DAW (Compactible)	None	None
d. DAW (Non-Compactible)	None	None

3. Solid Waste Disposition

a. Date of Shipment	Mode of Transportation	Destination
None	None	None

B. Irradiated Fuel Shipments

No irradiated fuel shipments were made from the Kewaunee Nuclear Power Plant during 2000.

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

2000 Meteorological Data

Missing Data

First Quarter: 0 hours
Second Quarter: 8.25 hours
Third Quarter: 15 hours
Fourth Quarter: 194.25 hours

Note: A total of 217.5 hours of data is missing or otherwise unavailable. This represents the availability of 97.5% of the data for the year. Continuous strip chart indication for 2000 data is available onsite.

First Quarter 2000

Stability Class A

Total hours Missing = 0
Total hours in Period = 2184

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	0	1.25	6	7.25	2.5	0	17
NNE	0	0	2.75	10.5	5	0.5	0	18.75
NE	0	0	2.5	22.75	13.75	0.25	0	39.25
ENE	0	0	4.5	11.75	15	3.25	0	34.5
E	0	0	4	3	1.5	0	0	8.5
ESE	0	0	3	1	2	1	0	7
SE	0	0	2.5	1	2.5	1	0	7
SSE	0	0	2.5	3.75	3.5	9	3.25	22
S	0	0	1.25	5	4.75	3	0	14
SSW	0	0	1	4.5	0.25	0.25	0	6
SW	0	0	1.25	7.25	8.25	0.5	0	17.25
WSW	0	0	3	7.5	10.5	0	0.25	21.25
W	0	0	4.25	9.25	9.25	4.5	6.25	33.5
WNW	0	0	2.5	8.75	6.25	2	0	19.5
NW	0	0	7.25	8.25	2.75	0	0	18.25
NNW	0	0	3.25	14.25	6.5	0.75	0	24.75
TOTAL	0	0	46.75	124.5	99	28.5	9.75	308.5

Stability Class B

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	0	0.5	2.75	3.25	0.25	0	6.75
NNE	0	0	1	4	3	2.25	0	10.25
NE	0	0	1.25	4.75	5.25	0.25	0	11.5
ENE	0	0.25	1	1.75	5.5	0.5	0	9
E	0	0	0.75	1.75	2.25	0	0	4.75
ESE	0	0	0	2.5	1.25	0	0	3.75
SE	0	0	1.25	0	0.5	0	0	1.75
SSE	0	0	0.25	0.75	0.75	0.25	0	2
S	0	0	1.75	2.25	0.5	0.25	1	5.75
SSW	0	0	0	1	0	0	0	1
SW	0	0.25	1.25	4	1	0	0	6.5
WSW	0	0	0.75	1.75	2	0	0	4.5
W	0	0	0.25	2.25	2.25	1.25	0.5	6.5
WNW	0	0	1	3.25	1.5	0.5	0	6.25
NW	0	0	2.25	5	1.25	0	0	8.5
NNW	0	0	1.25	4.25	5.75	0	0	11.25
TOTAL	0	0.5	14.5	42	36	5.5	1.5	100

Stability Class C

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	0.25	0.75	4.25	3.25	0	0	8.5
NNE	0	0	0.25	3.5	2	0.25	0.25	6.25
NE	0	0.25	0.25	2.75	4.25	0.5	0	8
ENE	0	0	0.25	2.75	1.5	0.25	0	4.75
E	0	0	0.75	0	0	0	0	0.75
ESE	0	0	1	0	0.5	0	0	1.5
SE	0	0	0.5	0.25	0.5	0	0	1.25
SSE	0	0	0.75	1.25	1	0	0	3
S	0	0	0.25	1.5	2.75	0.25	0	4.75
SSW	0	0.25	1.5	1	1	0	0	3.75
SW	0	0.25	1.75	4.5	0.25	0	0	6.75
WSW	0	0	1.25	18.5	2	0.25	0	22
W	0	0	0	18.75	1.5	1.25	0.5	22
WNW	0	0	0	17.5	2	0.25	0	19.75
NW	0	0	2.5	5.25	0.75	0	0	8.5
NNW	0	0.25	1.25	6.75	4	0	0	12.25
TOTAL	0	1.25	13	88.5	27.25	3	0.75	133.75

Stability Class D

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	2	1.5	3	14.75	24.25	1	0	46.5
NNE	0.25	0	3.25	13	7.25	1	0	24.75
NE	0	0.5	3.5	3	0.75	0	0	7.75
ENE	0	0	4.5	2	3	0	0	9.5
E	0	0.25	4	0.75	3	0	0	8
ESE	0.25	0.25	1.5	1.25	1.5	0	0	4.75
SE	0.25	0	2	1.25	1.5	0	0	5
SSE	0	0.25	1.75	3.25	2.75	0.25	0	8.25
S	0	1.75	5.5	15.75	12.5	1.25	0	36.75
SSW	0	2	12.75	23	5.25	0	0	43
SW	0	0.5	5	16.25	6	0.25	0	28
WSW	0.5	0.5	3.75	14.5	17.25	1.25	0	37.75
W	0.75	1.25	3.5	11.75	21.5	9.25	0.5	48.5
WNW	0	0.25	3.75	13.5	14.25	1.25	0	33
NW	0	0.25	6	27.75	12.25	0.5	0	46.75
NNW	1.5	1	8.25	48.75	26.25	3	0	88.75
TOTAL	5.5	10.25	72	210.5	159.25	19	0.5	477

Stability Class E

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	1.75	6.25	12.5	2.75	0.25	0	23.5
NNE	0	0.75	7.5	9	2	0	0	19.25
NE	0	0.5	9.75	3.75	0.5	0	0	14.5
ENE	0	0.75	4	2.75	1	0	0	8.5
E	0	1.75	3.5	0.5	0	0	0	5.75
ESE	0	0.75	3.25	1	0	0	0	5
SE	0	2	2.5	2.25	0	0	0	6.75
SSE	0	1.25	3.25	7.75	3.75	0	0	16
S	0	1.75	15.25	24.25	4.75	0	0	46
SSW	0	2	24.5	15.75	1.75	0.25	0	44.25
SW	0	3	15.5	17.75	8.75	0.25	0	45.25
WSW	0	4	7.75	22	12.25	0.75	0	46.75
W	0	2.75	5.5	19.25	19.5	10.5	0.25	57.75
WNW	0	0.75	7.25	27	10.75	2	0	47.75
NW	0	1.75	9.75	13.75	5.25	0	0	30.5
NNW	0	1	8.75	25.5	13.75	0	0	49
TOTAL	0	26.5	134.25	204.75	86.75	14	0.25	466.5

Stability Class F

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	1	5.25	1.75	0.5	0	0	8.5
NNE	0	1.25	3	0.25	0	0	0	4.5
NE	0	3.25	6.5	0	0	0	0	9.75
ENE	0	0.5	4.75	0	0	0	0	5.25
E	0	1	4.25	0.25	0	0	0	5.5
ESE	0	0.75	2	3	0	0	0	5.75
SE	0	1	3.25	4	0	0	0	8.25
SSE	0	0.5	4	5.5	7	0	0	17
S	0	1.5	26.25	3.5	1	0	0	32.25
SSW	0	3.75	19.75	9.75	0.5	0	0	33.75
SW	0	0.75	11.75	7	3	0.25	0	22.75
WSW	0	1	7	14.25	3	0	0	25.25
W	0	1.5	8	25.5	11	2	0	48
WNW	0	1	12	11.25	1	0	0	25.25
NW	0	2.75	9.5	6	1.5	0	0	19.75
NNW	0	1.5	7	2.25	0.25	0	0	11
TOTAL	0	23	134.25	94.25	28.75	2.25	0	282.5

Stability Class G

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	0.5	5.5	7.25	0.25	0	0	13.5
NNE	0	0	0.5	0.5	0	0	0	1
NE	0	0.25	1	0	0	0	0	1.25
ENE	0	0.75	0.25	0.25	0	0	0	1.25
E	0	0	1.25	0	0	0	0	1.25
ESE	0	0.75	0.5	0	0	0	0	1.25
SE	0	0.25	4	0.75	0	0	0	5
SSE	0	2	10.5	9.25	4.75	0	0	26.5
S	0	2.5	10.75	13	2	0	0	28.25
SSW	0	3	19.25	2.5	0	0	0	24.75
SW	0	4.25	21	10.75	0.5	0	0	36.5
WSW	0	2.75	20	20.75	0	0	0	43.5
W	0	4.75	32.5	42	0.75	0	0	80
WNW	0	3	43.5	27.25	0.75	0	0	74.5
NW	0	3.75	34.5	4.75	0	0	0	43
NNW	0	4	24	6.25	0	0	0	34.25
TOTAL	0	32.5	229	145.25	9	0	0	415.75

Second Quarter 2000

Stability Class A

Total hours Missing = 8.25
Total hours in Period = 2184

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	0.25	3.5	13.5	10.75	2.25	0	30.25
NNE	0	0	6.25	24.25	26.75	16.5	5.75	79.5
NE	0	0	5.5	22.25	27.25	8	0	63
ENE	0	0	2.25	16.5	5.75	1	0	25.5
E	0	0	3.5	1.75	1.25	0	0	6.5
ESE	0	0.25	4.25	19.25	10.25	0	0	34
SE	0	0.25	6.25	8	0	0	0	14.5
SSE	0	0.5	7.5	15.25	14.5	5.25	0	43
S	0	0	1.75	0.5	3.75	1.25	0.25	7.5
SSW	0	0.25	1.5	1.25	0	0	0	3
SW	0	0.25	2.5	2.75	1.25	0	0	6.75
WSW	0	0.5	3.5	7.5	3.25	1.25	0.25	16.25
W	0	0	1.25	3	4.5	5.5	0.5	14.75
WNW	0	0	0.5	3.25	9.25	3.25	1.5	17.75
NW	0	0	1.5	8.25	10.25	6.75	1	27.75
NNW	0	0	1.75	15.25	14.5	3.75	0	35.25
TOTAL	0	2.25	53.25	162.5	143.25	54.75	9.25	425.25

Stability Class B

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	0	0	2.5	3	0.75	0	6.25
NNE	0	0	1	4	7	0.75	0.75	13.5
NE	0	0	1.5	0.5	1.5	0	0	3.5
ENE	0	0	0.5	0.75	0	0.5	0	1.75
E	0	0	1	0.25	0	0	0	1.25
ESE	0	0	1.5	6	0	0	0	7.5
SE	0	0	2.25	0.5	0	0	0	2.75
SSE	0	0	2.5	1.25	2.75	1.25	0	7.75
S	0	0.25	0.5	1.5	0.5	0	0	2.75
SSW	0	0.5	0.5	0.25	0	0	0	1.25
SW	0	0	0.5	0.5	0	0	0	1
WSW	0	0	0.25	0.5	0	0	0	0.75
W	0	0	0	1.5	0.5	1.25	0	3.25
WNW	0	0	1.5	0.75	0.5	0.25	0	3
NW	0	0.5	1.25	1	1.25	1.5	0	5.5
NNW	0	0	0.5	2.25	2	0.75	0.25	5.75
TOTAL	0	1.25	15.25	24	19	7	1	67.5

Stability Class C

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	0	0.25	2.75	2	1.25	0	6.25
NNE	0	0	0.5	6.25	3.75	4.5	1	16
NE	0	0	1.25	1.75	4.5	0.75	0	8.25
ENE	0	0	1.25	0.75	0	0	0	2
E	0	0	1	1	0	0	0	2
ESE	0	0	0.75	2.75	0.75	0	0	4.25
SE	0	0.5	3.5	0.5	0	0	0	4.5
SSE	0	0	3.25	2.25	5	1	0	11.5
S	0	0.25	0.5	1.5	1	0	0	3.25
SSW	0	0	0.25	0	0	0	0	0.25
SW	0	0.25	1	0	0	0	0	1.25
WSW	0	0	2	1.25	0.5	0	0	3.75
W	0	0	0	1.5	2.25	1.5	0.25	5.5
WNW	0	0.25	0.25	0.5	2.5	0.5	0	4
NW	0	0	1.75	2.25	5.75	0	0	9.75
NNW	0	0	1.5	1.5	5	0.75	0	8.75
TOTAL	0	1.25	19	26.5	33	10.25	1.25	91.25

Stability Class D

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	0	2.25	11.25	6.75	3.25	0	23.5
NNE	0	0	4.5	12	29.25	3.25	13.75	62.75
NE	0	1	7.75	10.5	4.75	0.25	0	24.25
ENE	0	0.75	2.25	4	0.25	0	0	7.25
E	0	0.5	7.25	4	0	0	0	11.75
ESE	0	0.75	9.5	6.5	2.5	0.25	0	19.5
SE	0	1.75	9	1.75	0.25	0	0	12.75
SSE	0	1.5	14	17	12.75	4.25	0	49.5
S	0	0	6.5	11.75	1.75	0	0	20
SSW	0	0	7.5	6	0.25	0	0	13.75
SW	0	0	1.25	2.75	0.75	0	0	4.75
WSW	0	0	3.25	3.5	3.5	0	0	10.25
W	0	0	1.5	3.75	7.25	3.5	2.25	18.25
WNW	0	0.25	1.25	1.75	1.75	0.25	0.75	6
NW	0	1	4.25	6	5.5	2.5	0.75	20
NNW	0	0	3.25	4.25	9.25	2.5	0	19.25
TOTAL	0	7.5	85.25	106.75	86.5	20	17.5	323.5

Stability Class E

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	1	12.75	10.25	3.25	0	0	27.25
NNE	1	1	5	18	15.75	0.5	0	41.25
NE	0.25	0.5	4.5	13.25	2.5	0	0	21
ENE	0	0.5	6	3.25	0	0	0	9.75
E	0	1.75	7.75	5.25	0	0	0	14.75
ESE	0	2.25	7	8.25	3	0	0	20.5
SE	0	1.25	6	1.75	0.5	0.75	0	10.25
SSE	0	1.25	16	21.25	5.25	1	1	45.75
S	0	0.5	19.5	8	3.25	0.25	0	31.5
SSW	0	2	15.25	7.75	4	0	0	29
SW	0	3	5.75	3.5	0	0	0	12.25
WSW	0	4.25	7	6.25	2.5	0.25	0	20.25
W	0	3.25	7.25	12.25	7.25	1.25	0	31.25
WNW	0	2.75	6.5	7.5	1.75	0.5	0	19
NW	0	1	5	7.75	4.5	0.25	0	18.5
NNW	0	1.25	7.75	15	6.25	0.25	0	30.5
TOTAL	1.25	27.5	139	149.25	59.75	5	1	382.75

Stability Class F

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	0.5	12	9.75	1.25	0	0	23.5
NNE	0	1.25	7	7.25	0.5	0	0	16
NE	0	1.5	7.5	3.25	0.25	0	0	12.5
ENE	0	1.5	5	2	0	0	0	8.5
E	0	1.25	1.5	1	0	0	0	3.75
ESE	0	2.5	3.75	2	0	0	0	8.25
SE	0	1.5	5.25	1	0.5	0	0	8.25
SSE	0	3.75	24.5	15.75	3	0	0	47
S	0	1.5	10.25	4.5	0.5	0	0	16.75
SSW	0	1	15.25	5.25	0	0	0	21.5
SW	0	1.25	7.75	2.25	0.25	0	0	11.5
WSW	0	0.25	9.25	4.75	5.75	1	0	21
W	0	1	12.5	9.25	3.25	0.5	0	26.5
WNW	0	0.75	8.75	5.25	0.5	0.25	0	15.5
NW	0	0.5	10.5	9.75	0.5	0	0	21.25
NNW	0	0.75	14.5	11.25	1	0	0	27.5
TOTAL	0	20.75	155.25	94.25	17.25	1.75	0	289.25

Stability Class G

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	6.25	30.5	6.5	0	0	0	43.25
NNE	0	4.75	6.75	0.25	0	0	0	11.75
NE	0	1.25	8.25	0.25	0.25	0	0	10
ENE	0	2.25	4	0	0.75	0	0	7
E	0	0.75	2.25	0.75	0	0	0	3.75
ESE	0	1.75	2.75	2.25	0.5	0	0	7.25
SE	0	2.25	4.75	0.75	2	0	0	9.75
SSE	0	7.75	42	25.75	11.5	0	0	87
S	0	3.25	19.25	11.75	2.5	0	0	36.75
SSW	0	1.5	21.75	1.5	0	0	0	24.75
SW	0	3.5	21.25	4.5	0.75	0	0	30
WSW	0	5.25	46.5	39.75	3	0	0	94.5
W	0	3.25	42	33.5	1	0	0	79.75
WNW	0	4.25	36.75	4.5	0	0	0	45.5
NW	0	2	22.75	4.75	0	0	0	29.5
NNW	0	4	49.75	22	0	0	0	75.75
TOTAL	0	54	361.25	158.75	22.25	0	0	596.25

Third Quarter 2000

Stability Class A

Total hours Missing = 15
Total hours in Period = 2208

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	0	5.25	17.75	11.25	0.75	0	35
NNE	0	1.25	11	14	14	0.25	0	40.5
NE	0	0.25	18	12.75	4.25	0	0	35.25
ENE	0	0	27.5	11.5	1.5	0	0	40.5
E	0	0	27.5	9.75	1	0	0	38.25
ESE	0	0.75	19.5	13.75	0.75	0	0	34.75
SE	0	0.5	7.75	8.5	9.25	3	0.25	29.25
SSE	0	0.25	3.25	8	14.25	0.5	0	26.25
S	0	0	2	4.5	0.5	0	0	7
SSW	0	0	2.75	5.75	6.25	0.25	0	15
SW	0	0	1.5	6.75	4.25	0	0	12.5
WSW	0	0.25	2.75	11.75	2.5	0	0	17.25
W	0	0.25	8.25	5.25	1.75	0	0	15.5
WNW	0	0	5.25	11.5	2.75	0	0	19.5
NW	0	0	5.25	15.5	0.5	0	0	21.25
NNW	0	0.5	7.25	13.25	6.75	0	0	27.75
TOTAL	0	4	154.75	170.25	81.5	4.75	0.25	415.5

Stability Class B

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	0.25	1.25	2.5	0.75	0	0	4.75
NNE	0	0.25	1.75	5	2.75	0	0	9.75
NE	0	0	3.25	5.5	0.25	0	0	9
ENE	0	0	2.75	0.5	0.75	0	0	4
E	0	0	3.5	0.75	0.5	0	0	4.75
ESE	0	0.5	3.5	1.5	0	0	0	5.5
SE	0	0	1.75	2.25	2.5	0	0	6.5
SSE	0	0.25	0.75	2.25	2.5	0	0	5.75
S	0	0.5	1	0.5	0.25	0	0	2.25
SSW	0	0.25	1.75	1	1	0	0	4
SW	0	0	1	2.25	0	0	0	3.25
WSW	0	0.25	0.25	1.25	0	0	0	1.75
W	0	0	0.5	1.5	0.5	0	0	2.5
WNW	0	0	0.75	3.75	0.75	0	0	5.25
NW	0	0	1.5	1.75	0	0	0	3.25
NNW	0	0.25	1	3.25	1.5	0	0	6
TOTAL	0	2.5	26.25	35.5	14	0	0	78.25

Stability Class C

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	0.25	1.25	6	0.25	0	0	7.75
NNE	0	0.25	3.25	19	7.25	0	0	29.75
NE	0	0	7	6.5	0.25	0	0	13.75
ENE	0	0	4	2.75	0.5	0	0	7.25
E	0	0	3.5	3	0.25	0	0	6.75
ESE	0	0	2.5	2.75	0.25	0	0	5.5
SE	0	0.25	1.5	2.25	3	0	0	7
SSE	0	1	1	2.75	2.25	0	0	7
S	0	0.5	1	0.5	0.25	0	0	2.25
SSW	0	0.5	1.5	1.5	1	0	0	4.5
SW	0	0	0.25	0.75	0.75	0	0	1.75
WSW	0	0.25	1.25	1	0.5	0	0	3
W	0	0.25	0.5	1.5	0	0	0	2.25
WNW	0	0	0	1.25	0.5	0	0	1.75
NW	0	0.25	0.25	1.75	0.25	0	0	2.5
NNW	0	0	1	3.25	1.25	0	0	5.5
TOTAL	0	3.5	29.75	56.5	18.5	0	0	108.25

Stability Class D

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	0.75	5	15.5	4.25	0	0.25	25.75
NNE	0	1.5	11.5	31	34.75	1.25	0	80
NE	0	1	7.5	5.25	1.5	0	0	15.25
ENE	0	1	6.75	14.75	1.75	0	0	24.25
E	0	1.25	13.25	20.25	9	0.25	0	44
ESE	0	0.75	13	5.5	1	0	0	20.25
SE	0	1.75	6.5	9.75	13.75	3.25	0	35
SSE	0	0.25	11.5	21.5	7.75	1	0	42
S	0	1.25	11	10.75	1.75	0	0	24.75
SSW	0	0.75	4.75	7.75	4.5	0	0	17.75
SW	0	0	2	5.75	1.75	0.75	0	10.25
WSW	0	0.75	2.75	4.25	3	0.25	0	11
W	0	0.5	3.25	9.5	1	0	0	14.25
WNW	0	2	4	10.25	3.5	0	0	19.75
NW	0	2.25	3	2.25	0.75	0	0.25	8.5
NNW	0	0.25	5.25	8	3.25	0	0	16.75
TOTAL	0	16	111	182	93.25	6.75	0.5	409.5

Stability Class E

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	1	12.75	8.25	2.75	0	0	24.75
NNE	0	1.25	12	24.5	9	0	0	46.75
NE	0	0.5	9	5	0.75	0	0	15.25
ENE	0	0.75	5.75	3	0.75	0	0	10.25
E	0	1.5	6.75	16.25	1.25	0	0	25.75
ESE	0	1	5.25	8.5	5.5	0.5	0	20.75
SE	0	2.25	12.5	12	4.5	0	0.75	32
SSE	0	2.75	38.75	25.75	2	0	0	69.25
S	0	2.5	29.25	15.75	0.75	0	0	48.25
SSW	0	1.25	13	19.5	2	0	0	35.75
SW	0	1.75	9.25	9.25	2.25	0	0	22.5
WSW	0	2	11	9	3.75	0.25	0	26
W	0	3	10	15.25	3.25	0	0.25	31.75
WNW	0	3.5	7	9	0.75	0	0	20.25
NW	0	2.5	6.75	4.5	1.25	0	0	15
NNW	0	2	13.5	8	2.75	0.5	0	26.75
TOTAL	0	29.5	202.5	193.5	43.25	1.25	1	471

Stability Class F

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	2	7.5	2.5	0.25	0	0	12.25
NNE	0	1	2.5	0.75	0	0	0	4.25
NE	0	1	3.25	0.25	0	0	0	4.5
ENE	0	1.75	4.5	0.25	0	0	0	6.5
E	0	0	5.5	2	0	0	0	7.5
ESE	0	0.25	8	4.5	2	0.25	0	15
SE	0	1.25	2.75	4	6.5	0	0	14.5
SSE	0	3.25	13.5	14.5	0.75	0	0	32
S	0	2.75	24.25	9.5	0	0	0	36.5
SSW	0	2.25	24.25	8.5	0	0	0	35
SW	0	2	12.75	7.75	0	0	0	22.5
WSW	0	3	11	10.5	0.25	0	0	24.75
W	0	2.5	10	6	1.5	0	0	20
WNW	0	1.5	12	5.75	0.5	0	0	19.75
NW	0	2.25	14.25	4	0	0	0	20.5
NNW	0	4	16.25	4.5	0	0	0	24.75
TOTAL	0	30.75	172.25	85.25	11.75	0.25	0	300.25

Stability Class G

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	3	7	0.25	0	0	0	10.25
NNE	0	4.5	1.5	0	0	0	0	6
NE	0	2.75	0.75	0	0	0	0	3.5
ENE	0	1	0.75	0	0	0	0	1.75
E	0	0.5	5.25	0	0	0	0	5.75
ESE	0	1	3.25	0.5	0	0	0	4.75
SE	0	0.5	5.25	4.25	2	0	0	12
SSE	0	1.5	7.5	4.75	0	0	0	13.75
S	0	2.75	21.25	4.25	0	0	0	28.25
SSW	0	3.5	30	1.5	0	0	0	35
SW	0	4	39.75	6.75	0	0	0	50.5
WSW	0	10.5	39.5	13.75	1	0	0	64.75
W	0	5.75	29.25	11.25	0.5	0	0	46.75
WNW	0	4.5	39.75	9.25	0	0	0	53.5
NW	0	5	24	1.5	0	0	0	30.5
NNW	0	7.5	25	10	0.75	0	0	43.25
TOTAL	0	58.25	279.75	68	4.25	0	0	410.25

Fourth Quarter 2000

Stability Class A

Total hours Missing = 194.25

Total hours in Period = 2208

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	0	0.75	3.5	4	1.25	0	9.5
NNE	0	0	3	9.25	5.25	0	0	17.5
NE	0	0	3.75	9	6.25	0	0	19
ENE	0	0	0.5	7.75	4	0	0	12.25
E	0	1	2.5	3.25	0	0	0	6.75
ESE	0	0.25	4	9.75	2.25	2.5	0.75	19.5
SE	0	0.5	0.75	10.5	11	3.25	0.25	26.25
SSE	0	0.25	0	1	1.5	3.5	0	6.25
S	0	0	1.25	1.25	1	0	0	3.5
SSW	0	0	1.25	5.5	2.25	0	0	9
SW	0	0	0.25	14.25	6.75	0	0	21.25
WSW	0	0	1	14.25	13	0.25	0	28.5
W	0	0	3.5	17.5	15.5	0	0	36.5
WNW	0	0	2.5	16.5	8.75	0	0	27.75
NW	0	0	1.5	7.25	5.75	0.25	0	14.75
NNW	0	0	0.5	6.5	2.75	0.25	0	10
TOTAL	0	2	27	137	90	11.25	1	268.25

Stability Class B

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	0	0.25	2.75	7.5	0	0	10.5
NNE	0	0.25	0.5	0.75	4.5	0.25	0	6.25
NE	0	0	1	0.25	0.75	0	0	2
ENE	0	0	0.5	3	0.5	0	0	4
E	0	0	0.5	0.75	0.25	0	0	1.5
ESE	0	0	0	3.25	5.25	0.25	0	8.75
SE	0	0	1.25	2.25	5.25	2.25	0	11
SSE	0	0.5	0	0.75	2.5	0.5	0	4.25
S	0	0	0.25	0.25	0	0	0	0.5
SSW	0	0	0	1.25	0.75	0	0	2
SW	0	0	0	4	1.5	0	0	5.5
WSW	0	0	0.25	2.25	1.75	0	0	4.25
W	0	0.25	1.25	7.75	3	0	0	12.25
WNW	0	0	0.25	3.75	1.5	0	0	5.5
NW	0	0.25	0.75	4.5	1.25	0.5	0	7.25
NNW	0	0.25	0.5	6.5	4.75	0	0	12
TOTAL	0	1.5	7.25	44	41	3.75	0	97.5

Stability Class C

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	0.75	1.75	3.5	6.5	0.25	0	12.75
NNE	0	0	1	2.5	3.75	0	0	7.25
NE	0	0	1	2	0.5	0	0	3.5
ENE	0	0	0	1.5	0.75	0	0	2.25
E	0	0	0.25	1.25	0	0	0	1.5
ESE	0	0	0.25	2.75	0	0	0.25	3.25
SE	0	0	0.25	1	2.25	1.75	0	5.25
SSE	0	0	0.25	0.5	1.25	0	0	2
S	0	0	0.75	0.25	0	0	0	1
SSW	0	0	1.25	1.75	0.5	0	0	3.5
SW	0	0	0.25	2.75	1.25	0	0	4.25
WSW	0	0	1	6.25	2.75	0	0	10
W	0	0	3.5	10	3.25	0	0	16.75
WNW	0	0	1.75	7.5	1.75	0	0	11
NW	0	0	0.5	5.25	3	1	0	9.75
NNW	0	0.25	1	3.75	2.25	0	0	7.25
TOTAL	0	1	14.75	52.5	29.75	3	0.25	101.25

Stability Class D

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	2.75	1.75	5	14.25	20.25	3.25	0.75	48
NNE	0.75	2.25	7.5	5.25	4.75	0.75	0	21.25
NE	0	1.5	3.25	12	0.5	0	0	17.25
ENE	0	0.25	2.75	1.75	1.75	0	0	6.5
E	0	0.25	1	5.25	0.75	0.25	0	7.5
ESE	0	0.25	2	7	1	0.5	0.5	11.25
SE	0	0.25	1.75	5	10.5	2.5	0	20
SSE	0	0.75	11	13	5.25	0.25	0	30.25
S	0	0.25	11	8.5	0.25	0	0	20
SSW	0	0	6	11.25	3	0	0	20.25
SW	0	1	12.5	21.75	9.25	0	0	44.5
WSW	0	0.75	12	23.75	9.75	0.5	0	46.75
W	0	0.75	8	38	19.5	4.25	0	70.5
WNW	0	1.25	6.5	56.5	25.25	0	0	89.5
NW	2.25	2	11.5	15	15.5	1	0	47.25
NNW	12	2.5	8.5	21	10.75	3	0	57.75
TOTAL	17.75	15.75	110.25	259.25	138	16.25	1.25	558.5

Stability Class E

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	1.75	7.25	14.25	0.75	0	0	24
NNE	0	2.75	5	2.5	0.75	0	0	11
NE	0	1.5	3	0.25	0.25	0	0	5
ENE	0	1	1.5	0	0	0	0	2.5
E	0	0.25	1.25	0.5	2	1	0	5
ESE	0	0.75	2.5	1.25	1.75	0.75	0	7
SE	0	0.75	3.75	7	18	4.75	0.5	34.75
SSE	0	0.25	13.75	18.75	6.75	1.5	0	41
S	0	0.75	10.75	7.75	0.5	0.25	0.25	20.25
SSW	0	3.25	13	9	0.25	0	0	25.5
SW	0	1.5	12.5	15	2.75	1.5	0	33.25
WSW	0	2.5	6.75	15.75	4.5	0.25	0	29.75
W	0	2	10	25.5	9.5	0.5	0	47.5
WNW	0	2.75	13.75	46.75	13.25	0	0	76.5
NW	3.25	1.75	10.5	22.5	3.25	0	0	41.25
NNW	0	0.75	10.25	32.25	5.25	0.5	0	49
TOTAL	3.25	24.25	125.5	219	69.5	11	0.75	453.25

Stability Class F

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	0.25	8.25	2.5	0	0	0	11
NNE	0	0.5	1	1	0	0	0	2.5
NE	0	0	1.25	0	0	0	0	1.25
ENE	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0
ESE	0	0.25	0	0	0	0	0	0.25
SE	0	0	1	2.5	0.25	0	0	3.75
SSE	0	0.25	4.5	4.75	1	0	0	10.5
S	0	0.25	10.5	6	0	0	0	16.75
SSW	0	0.75	14.5	5.75	0	0	0	21
SW	0	0.5	7.75	9.25	3	1.5	0	22
WSW	0	1.25	8.75	9.5	0.25	0	0	19.75
W	0	0.5	6.5	13.5	1.5	0	0	22
WNW	0.5	0.75	4.75	22	2	0	0	30
NW	3	0.25	6.5	8.75	4.25	0	0	22.75
NNW	0	1	6.25	5.75	0.75	0	0	13.75
TOTAL	3.5	6.5	81.5	91.25	13	1.5	0	197.25

Stability Class G

Wind Direction	Calm	1-3	4-7	8-12	13-18	19-24	>24	Totals
N	0	0.75	9	1	0	0	0	10.75
NNE	0	0.25	0.75	0	0	0	0	1
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	0.5	0	0	0	0	0.5
SE	0	0	2.75	0	0	0	0	2.75
SSE	0	0.75	5.25	4	0.25	0	0	10.25
S	0	2.75	18.25	2.25	0	0	0	23.25
SSW	0	2.75	23.5	2	0	0	0	28.25
SW	0	2.25	28.75	9.25	1.25	0	0	41.5
WSW	0	2.25	32	16.75	0	0	0	51
W	5.25	1.5	27.25	35.75	0.25	0	0	70
WNW	2.25	1.5	20.25	29.25	0	0	0	53.25
NW	1.5	0.5	10.25	14	0.5	0	0	26.75
NNW	0	1.75	14.25	2.5	0	0	0	18.5
TOTAL	9	17	192.75	116.75	2.25	0	0	337.75

Appendix B

**An Addendum to the
KEWAUNEE NUCLEAR POWER PLANT
ANNUAL RADIOACTIVE
EFFLUENT RELEASE REPORT
for
January 1 - December 31, 1999**

Note: Following is a resubmitted page for the 1999 Annual Effluent Release Report page number 3 of 61. The "0.0 SUMMARY" section was not properly updated to reflect the 1999 data as it appeared in the balance of the report. The balance of the report was properly submitted. This condition was identified internally and a Kewaunee Assessment Process (KAP-WO-00-001200) was issued to document the situation and a corrective action to resubmit the information was generated. The following page, a resubmitted single page, brings to closure this corrective action.

0.0 SUMMARY

During 1999 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:

<u>GASEOUS:</u>	Ingestion Pathway-Organ	Liver	
	Quarterly Limit (mRems)	7.5	
	Actual Dose (mRems)	0.0001150	(2 nd Quarter)
	% of Specification	0.001533	
<u>LIQUID:</u>	Ingestion Pathway-Organ	Total Body	
	Quarterly Limit (mRems)	1.5	
	Actual Dose (mRems)	0.0008274	(4 th Quarter)
	% of Limit	0.05516	
<u>SOLID:</u>	No upper limit for solid radioactive waste applies.		
	Cubic Meters Shipped	35.1 m ³	(1240 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, 1999. 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.