-NOTICE-

THE ATTACHED FILES ARE OFFICIAL RECORDS OF THE RECORDS & REPORTS MANAGEMENT BRANCH. THEY HAVE BEEN CHARGED TO YOU FOR A LIMITED TIME PERIOD AND MUST BE RETURNED TO THE RECORDS & ARCHIVES SERVICES SECTION P1-122 WHITE FLINT. PLEASE DO NOT SEND DOCUMENTS CHARGED OUT THROUGH THE MAIL. REMOVAL OF ANY PAGE(S) FROM DOCUMENT FOR REPRODUCTION MUST BE REFERRED TO FILE PERSONNEL.

-NOTICE-

KEWAUNEE NUCLEAR POWER PLANT

SEMI-ANNUAL
EFFLUENT RELEASE REPORT
JULY - DECEMBER 1989

WISCONSIN PUBLIC SERVICE CORPORATION

WISCONSIN POWER & LIGHT COMPANY

MADISON GAS & ELECTRIC COMPANY

SJDTOC

DOCKET 50-305

KEWAUNEE NUCLEAR POWER PLANT

SEMIANNUAL RADIOACTIVE

EFFLUENT RELEASE REPORT

JULY - DECEMBER 1989

WISCONSIN PUBLIC SERVICE CORPORATION
GREEN BAY, WISCONSIN
FEBRUARY 1990

TABLE OF CONTENTS

TABLE OF CONTENTS

1.0 INTRODUCTION

This report is being submitted in accordance with the requirements of Kewaunee Technical Specifications, Section 6.9.3.b. It includes data from all effluent releases made from July through December 1989. 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 Technical Specification 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) is used in conjunction with Section 7 of the Technical Specifications. The 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 5D, 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 December 1989 proportional composites for Gross Alpha, Strontium 89, Strontium 90 and Iron 55 were not available at the time that this report was written. When these values are available, applicable revisions shall be submitted.

The LLD's for gaseous radioanalyses, as listed in Table 8.4 of the Kewaunee Technical Specifications, are:

Analysis	LLD (uCi/ml)
Gaseous Gamma Emitters	1.00 E-04
Iodine 131	3.00 E-12
Particulate Gamma Emitters	1.0D 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 the second half of 1989.

Number of batch releases 9

Total time for all batch releases (Sec) . . 2.40 E+5

Maximum time for one batch release (Sec) . . 3.91 E+4

Average time for a batch release (Sec) . . . 2.67 E+4

Minimum time for a batch release (Sec) . . . 1.32 E+3

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 for the 3rd and 4th quarters, and the calculated doses this year from gaseous effluents.

TABLE 2.1
Semiannual Radioactive Effluent Report 1989
Gaseous Effluents-Summation of all Releases

	3rd Quarter	4th Quarter
Fission and Activation Gases		
Total Activity Released (Ci)	2.39 E-1	-0-
Average Release Rate (uCi/Sec)	3.01 E-2	-0-
Iodines		
Total Activity Released (Ci)	-0-	-0-
Average Release Rate (uCi/Sec)	-0-	-0-
Particulates		
Total Activity Released (Ci)	9.91 E-4	5.77 E-4
Average Release Rate (uCi/Sec)	1.25 E-4	7.26 E-5
Gross Alpha Released (Ci)	4.75 E-4	3.16 E-4
Tritium		
Total Activity Released (Ci)	3.05 E-1	1.71 E+0
Average Release Rate (uCi/Sec)	3.84 E-2	2.15 E-1

TABLE 2.2
Semiannual Radioactive Effluent Report 1989
Gaseous Effluents

Nuclides Released (Ci)	Continuous Mode		Batch Mode	
	3rd Qtr	4th Qtr	3rd Qtr	4th Qtr
Fission Gases				
Kr-85	-	-	6.25 E-2	-
Xe-133	1.00 E-2	-	4.80 E-5	-
Xe-133m	1.66 E-1	-	-	-
Xe-135	-	-	-	-
Unidentified	-	-	-	-
Total for Period	1.76 E-1	-	6.25 E-2	-
Iodines				
I-131	-	-	-	-
I-132	-	-	-	-
I-133	-	-	-	-
Total for Period	-	-	-	-
Particulates				
Co-60	9.01 E-7	1.04 E-6	-	-
Cs-137	4.48 E-7	2.14 E-7	-	-
Sr-89	-	***	-	-
Sr-90	-	***	-	-
Unidentified	2.32 E-6	1.14 E-7	9.87 E-4	5.76 E-4
Total for Period	3.67 E-6	1.36 E-6	9.87 E-4	5.76 E-4

TABLE 2.3A
Semiannual Radioactive Effluent Report 1989
3rd Quarter Gaseous Release
Total of all Releases

Noble Gases (Curies)

Isotope	July	August	September	Total
Kr-85	-	6.25 E-2	-	6.25 E-2
Xe-133	-	4.80 E-5	1.00 E-2	1.00 E-2
Xe-133m	-	-	1.66 E-1	1.66 E-1
Xe-135	-	-	-	-
Unidentified	-	-	-	-
Total	-	6.25 E-2	1.76 E-1	2.39 E-1

Particulates (Curies)

Isotope	July	August	September	Total
Co-60	9.01 E-7	-	-	9.01 E-7
Cs-137	2.96 E-7	1.52 E-7	-	4.48 E-7
Sr-89	-	-	-	-
Sr-90	-	-	-	-
Unidentified	4.29 E-4	5.60 E-4	1.23 E-7	9.89 E-4
Total	4.30 E-4	5.61 E-4	1.23 E-7	9.91 E-4

Halogens (Curies)

Isotope	July	August	September	Total
I-131	-	-	-	-
I-132	-	-	-	-
I-133	-	-	-	-
Total	-	-	-	-

TABLE 2.3A (con't)
Semiannual Radioactive Effluent Report 1989
3rd Quarter Gaseous Release
Total of all Releases

Summary

	July	August	September	Total
Total Noble Gases (Ci)	-	6.25 E-2	1.76 E-1	2.39 E-1
Total Halogens (Ci)	-	-	-	-
Total Particulate Gross Beta-Gamma (Ci)	4.30 E-4	5.61 E-4	1.23 E-7	9.91 E-4
Total Particulate Gross Beta-Gamma Half-Lives >8 Days (Ci)	1.20 E-6	1.52 E-7	-	1.35 E-6
Total Tritium (Ci)	-	1.57 E-4	3.05 E-1	3.05 E-1
Total Particulate Gross Alpha (Ci)	1.98 E-4	2.77 E-4	2.68 E-7	4.75 E-4
Maximum Noble Gas Release Rate (uCi/Sec)	$\leq$1.68 E+0	$\leq$3.68 E+1	$\leq$2.05 E+0	-

TABLE 2.3A (con't)
Semiannual Radioactive Effluent Report 1989
4th Quarter Gaseous Release
Total of all Releases

Noble Gases (Curies)

Isotope	October	November	December	Total
Kr-85	-	-	-	-
Xe-133	-	-	-	-
Xe-133m	-	-	-	-
Xe-135	-	-	-	-
Unidentified	-	-	-	-
Total	-	-	-	-

Particulates (Curies)

Isotope	October	November	December	Total
Co-60	4.43 E-7	3.14 E-7	2.78 E-7	1.04 E-6
Cs-137	-	1.05 E-7	1.09 E-7	2.14 E-7
Sr-89	-	-	***	-
Sr-90	-	-	***	-
Unidentified	2.78 E-4	1.47 E-4	1.51 E-4	5.76 E-4
Total	2.79 E-4	1.47 E-4	1.51 E-4	5.77 E-4

Halogens (Curies)

Isotope	October	November	December	Total
I-131	-	-	-	-
I-132	-	-	-	-
I-133	-	-	-	-
Total	-	-	-	-

TABLE 2.3A (con't)
Semiannual Radioactive Effluent Report 1989
4th Quarter Gaseous Release
Total of all Releases

Summary

	October	November	December	Total
Total Noble Gases (Ci)	-	-	-	-
Total Halogens (Ci)	-	-	-	-
Total Particulate Gross Beta-Gamma (Ci)	2.79 E-4	1.47 E-4	1.51 E-4	5.77 E-4
Total Particulate Gross Beta-Gamma Half-Lives >8 Days (Ci)	4.43 E-7	4.19 E-7	3.87 E-7	1.25 E-6
Total Tritium (Ci)	4.64 E-1	3.79 E-1	8.67 E-1	1.71 E+0
Total Particulate Gross Alpha (Ci)	1.54 E-4	7.96 E-5	8.25 E-5	3.16 E-4
Maximum Noble Gas Release Rate (uCi/Sec)	$\leq$1.31 E+0	$\leq$8.39 E-1	$\leq$8.33 E-1	-

TABLE 2.38
Semiannual Radioactive Effluent Report 1989
3rd Quarter Gaseous Release
Continuous Mode Only

Noble Gases (Curies)

Isotope	July	August	September	Total
Kr-85	-	-	-	-
Xe-133	-	-	1.00 E-2	1.00 E-2
Xe-133m	-	-	1.66 E-1	1.66 E-1
Xe-135	-	-	-	-
Unidentified	-	-	-	-
Total	-	-	1.76 E-1	1.76 E-1

Particulates (Curies)

Isotope	July	August	September	Total
Co-60	9.01 E-7	-	-	9.01 E-7
Cs-137	2.96 E-7	1.52 E-7	-	4.48 E-7
Sr-89	-	-	-	-
Sr-90	-	-	-	-
Unidentified	1.82 E-6	3.78 E-7	1.23 E-7	2.32 E-6
Total	3.02 E-6	5.30 E-7	1.23 E-7	3.67 E-6

Halogens (Curies)

Isotope	July	August	September	Total
I-131	-	-	-	-
I-132	-	-	-	-
I-133	-	-	-	-
Total	-	-	-	-

TABLE 2.3B (con't)
Semiannual Radioactive Effluent Report 1989
3rd Quarter Gaseous Release
Continuous Mode Only

Summary

	July	August	September	Total
Total Noble Gases (Ci)	-	-	1.76 E-1	1.76 E-1
Total Halogens (Ci)	-	-	-	-
Total Particulate Gross Beta-Gamma (Ci)	3.02 E-6	5.30 E-7	1.23 E-7	3.67 E-6
Total Particulate Gross Beta-Gamma Half-Lives >8 Days (Ci)	1.20 E-6	1.52 E-7	-	1.35 E-6
Total Tritium (Ci)	-	-	3.05 E-1	3.05 E-1
Total Particulate Gross Alpha (Ci)	9.72 E-7	3.98 E-7	2.68 E-7	1.64 E-6
Maximum Noble Gas Release Rate (uCi/Sec)	$\leq$1.57 E+0	$\leq$1.15 E+0	1.92 E+0	-

TABLE 2.3B (con't)
Semiannual Radioactive Effluent Report 1989
4th Quarter Gaseous Release
Continuous Mode Only

Noble Gases (Curies)

Isotope	October	November	December	Total
Kr-85	-	-	-	-
Xe-133	-	-	-	-
Xe-133m	-	-	-	-
Xe-135	-	-	-	-
Unidentified	-	-	-	-
Total	-	-	-	-

Particulates (Curies)

Isotope	October	November	December	Total
Co-60	4.43 E-7	3.14 E-7	2.78 E-7	1.04 E-6
Cs-137	-	1.05 E-7	1.09 E-7	2.14 E-7
Sr-89	-	-	***	-
Sr-90	-	-	***	-
Unidentified	1.14 E-7	-	-	1.14 E-7
Total	5.57 E-7	4.19 E-7	3.87 E-7	1.36 E-6

Halogens (Curies)

Isotope	October	November	December	Total
I-131	-	-	-	-
I-132	-	-	-	-
I-133	-	-	-	-
Total	-	-	-	-

TABLE 2.3B (con't)
Semiannual Radioactive Effluent Report 1989
4th Quarter Gaseous Release
Continuous Mode Only

Summary

	October	November	December	Total
Total Noble Gases (Ci)	-	-	-	-
Total Halogens (Ci)	-	-	-	-
Total Particulate Gross Beta-Gamma (Ci)	5.57 E-7	4.19 E-7	3.87 E-7	1.36 E-6
Total Particulate Gross Beta-Gamma Half-Lives >8 Days (Ci)	4.43 E-7	4.19 E-7	3.87 E-7	1.25 E-6
Total Tritium (Ci)	4.54 E-1	3.79 E-1	8.50 E-1	1.68 E+0
Total Particulate Gross Alpha (Ci)	2.11 E-7	1.19 E-7	1.13 E-7	4.43 E-7
Maximum Noble Gas Release Rate (uCi/Sec)	$\leq$1.16 E+0	$\leq$7.06 E-1	$\leq$7.29 E-1	-

TABLE 2.3C
Semiannual Radioactive Effluent Report 1989
3rd Quarter Gaseous Release
Batch Mode Only

Noble Gases (Curies)

Isotope	July	August	September	Total
Kr-85	-	6.25 E-2	-	6.25 E-2
Xe-133	-	4.80 E-5	-	4.80 E-5
Xe-133m	-	-	-	-
Xe-135	-	-	-	-
Unidentified	-	-	-	-
Total	-	6.25 E-2	-	6.25 E-2

Particulates (Curies)

Isotope	July	August	September	Total
Co-60	-	-	-	-
Cs-137	-	-	-	-
Sr-89	-	-	-	-
Sr-90	-	-	-	-
Unidentified	4.27 E-4	5.60 E-4	-	9.87 E-4
Total	4.27 E-4	5.60 E-4	-	9.87 E-4

Halogens (Curies)

Isotope	July	August	September	Total
I-131	-	-	-	-
I-132	-	-	-	-
I-133	-	-	-	-
Total	-	-	-	-

TABLE 2.3C (con't)
Semiannual Radioactive Effluent Report 1989
3rd Quarter Gaseous Release
Batch Mode Only

Summary

	July	August	September	Total
Total Noble Gases (Ci)	-	6.25 E-2	-	6.25 E-2
Total Halogens (Ci)	-	-	-	-
Total Particulate Gross Beta-Gamma (Ci)	4.27 E-4	5.60 E-4	-	9.87 E-4
Total Particulate Gross Beta-Gamma Half-Lives >8 Days (Ci)	-	-	-	-
Total Tritium (Ci)	-	1.57 E-4	-	1.57 E-4
Total Particulate Gross Alpha (Ci)	1.97 E-4	2.77 E-4	-	4.74 E-4
Maximum Noble Gas Release Rate (uCi/Sec)	$\leq$1.11 E-1	3.56 E+1	$\leq$1.31 E-1	-

TABLE 2.3C (con't)
Semiannual Radioactive Effluent Report 1989
4th Quarter Gaseous Release
Batch Mode Only

Noble Gases (Curies)

Isotope	October	November	December	Total
Kr-85	-	-	-	-
Xe-133	-	-	-	-
Xe-133m	-	-	-	-
Xe-135	-	-	-	-
Unidentified	-	-	-	-
Total	-	-	-	-

Particulates (Curies)

Isotope	October	November	December	Total
Co-60	-	-	-	-
Cs-137	-	-	-	-
Sr-89	-	-	-	-
Sr-90	-	-	-	-
Unidentified	2.78 E-4	1.47 E-4	1.51 E-4	5.76 E-4
Total	2.78 E-4	1.47 E-4	1.51 E-4	5.76 E-4

Halogens (Curies)

Isotope	October	November	December	Total
I-131	-	-	-	-
I-132	-	-	-	-
I-133	-	-	-	-
Total	-	-	-	-

TABLE 2.3C (con't)
Semiannual Radioactive Effluent Report 1989
4th Quarter Gaseous Release
Batch Mode Only

Summary

	October	November	December	Total
Total Noble Gases (Ci)	-	-	-	-
Total Halogens (Ci)	-	-	-	-
Total Particulate Gross Beta-Gamma (Ci)	2.78 E-4	1.47 E-4	1.51 E-4	5.76 E-4
Total Particulate Gross Beta-Gamma Half-Lives >8 Days (Ci)	-	-	-	-
Total Tritium (Ci)	1.04 E-2	-	1.72 E-2	2.76 E-2
Total Particulate Gross Alpha (Ci)	1.54 E-4	7.95 E-5	8.24 E-5	3.16 E-4
Maximum Noble Gas Release Rate (uCi/Sec)	$\leq$1.48 E-1	$\leq$1.33 E-1	$\leq$1.04 E-1	-

TABLE 2.4
Semiannual Radioactive Effluent Report 1989
Dose From Gaseous Effluents

The offsite dose limits from radioactive materials in gaseous effluents are specified in Section 7 of the Kewaunee Technical Specifications and can be summarized as follows:

	Whole Body Gamma	Skin Beta	Organ
Quarterly	5 mRad	10 mRad	7.5 mRem
Annual	10 mRad	20 mRad	15.0 mRem

The total release of gaseous effluents during the second six months of 1989 was well within Technical Specification 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 Technical Specification limits are shown below:

	3rd Qtr	4th Qtr
1. Gamma-Whole Body		
Specification (mRads)	5.00 E+0	5.00 E+0
Actual Dose (mRads)	6.72 E-6	-0-
% of Specification	1.34 E-4	-0
2. Beta-Skin		
Specification (mRads)	1.00 E+1	1.00 E+1
Actual Dose (mRads)	4.31 E-5	-0-
% of Specification	4.31 E-4	-0-
3. Ingestion Pathways-Organ		
Specification (mRem)	7.50 E+0	7.50 E+0
Actual Dose (mRem)	7.15 E-5	3.57 E-4
% of Specification	9.53 E-4	4.76 E-3

TABLE 2.4 (cont.)
Semiannual Radioactive Effluent Report 1989
Dose From Gaseous Effluents

In addition, the cumulative annual offsite doses through the end of December versus the annual Technical Specification limits were:

	Annual
1. Gamma-Whole Body	
Specification (mRads)	1.DO E+1
Actual Dose (mRads)	2.13 E-3
% of Specification	2.13 E-2
2. Beta-Skin	
Specification (mRads)	2.DO E+1
Actual Dose (mRads)	1.01 E-2
% of Specification	5.05 E-2
3. Ingestion Pathways-Organ	
Specification (mRem)	1.5D E+1
Actual Dose (mRem)	2.17 E+D
% of Specification	1.44 E+1

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 December 1989 proportional composites for Gross Alpha, Strontium 89, Strontium 90 and Iron 55 were not available at the time that this report was written. When these values are available, applicable revisions shall be submitted.

The LLD's for liquid batch release radioanalyses, as listed in Table 8.3 of the Kewaunee Technical Specifications, are:

Analysis	LLD (uCi/ml)
Principal Gamma Emitters	1.00 E-06
Iodine 131	1.DO E-06
Tritium	1.00 E-D5
Gross Alpha	5.DO E-07
Strontium 89, 90	5.DO E-D8
Iron 55	1.00 E-06

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 8.3 of the Kewaunee Technical Specifications, are:

Analysis	LLD (uCi/ml)
Principal Gamma Emitters	5.00 E-07
Iodine 131	1.DD E-06
Tritium	1.00 E-05
Gross Alpha	5.DO E-07
Strontium 89, 90	5.OD E-D8
Iron 55	1.00 E-06

3.2 Liquid Batch Release Statistics

The following is a summation of all liquid batch releases made during the second half of 1989.

Number of batch releases and gallonage:

Laundry	80	82,814.5 Gal.
Boron Recycle	15	84,000.0 Gal.
Miscellaneous Sources	17	158,889.0 Gal.

Total time for all batch releases . . . . 15,020 Min.

Maximum time for one batch release . . . . 800 Min.

Minimum time for one batch release . . . . . 19 Min.

Average time for a batch release . . . . 134.1 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 the 3rd and 4th quarter and the calculated doses this year from liquid effluents.

TABLE 3.1
Semiannual Radioactive Effluent Report 1989
Liquid Effluents - Summation of all Releases

	3rd Qtr	4th Qtr	Total
Fission and Activation Products			
Total Release (Excluding H_3 and Oissolved Gases) (Ci)	2.33 E-2	4.05 E-2	6.38 E-2
Average Concentration (uCi/ml)	1.92 E-9	1.50 E-9	
Tritium			
Total Release (Ci)	6.95 E+1	9.46 E+1	1.6 E+2
Average Concentration (uCi/ml)	7.18 E-6	1.25 E-5	
Percent of Tech Spec Limit (3.0 E-3 uCi/ml) (%)	2.39 E-1	4.17 E-1	
Dissolved Gases			
Total Release (Ci)	-0-	-0-	-0-
Average Concentration (uCi/ml)	-0-	-0-	
Percent of Tech Spec Limit (2.0 E-4 uCi/ml) (%)	-0-	-0-	
Gross Alpha Activity			
Total Release (Ci)	$\leq$5.44 E-5	$\leq$2.89 E-5	$\leq$8.33 E-5
Volume of Waste Released (Batch Releases)			
(Liters)	5.59 E+5	6.75 E+5	1.23 E+6
Volume of Dilution Water (Batch Releases)			
(Liters)	9.66 E+9	7.58 E+9	1.72 E+10

TABLE 3.2A
Semiannual Radioactive Effluent Report 1989
Liquid Effluents - Batch Releases

Liquid Releases	July	August	September	Total
Gross Radioactivity				
Total Release (Excluding Tritium and Dissolved Gases) (Ci)	1.32 E-2	1.79 E-3	3.29 E-3	1.83 E-2
Average Concentration (uCi/ml)	3.51 E-9	1.39 E-9	7.14 E-10	
Tritium				
Total Release (Ci)	1.51 E+1	5.37 E+0	4.89 E+1	6.94 E+1
Average Concentration (uCi/ml)	4.02 E-6	4.16 E-6	1.06 E-5	
Dissolved Noble Gases				
Total Release (Ci)	-0-	-0-	-0-	-0-
Average Concentration (uCi/ml)	-0-	-0-	-0-	
Gross Alpha Activity				
Total Release (Ci)	$\leq$1.30 E-6	$\leq$5.51 E-7	3.12 E-6	$\leq$4.97 E-6
Average Concentration (uCi/ml)	$\leq$3.46 E-13	$\leq$4.27 E-13	6.77 E-13	
Volume of Waste Released				
(Liters)	2.17 E+5	9.18 E+4	2.50 E+5	5.59 E+5
Volume of Dilution Water				
(Liters)	3.76 E+9	1.29 E+9	4.61 E+9	9.66 E+9

TABLE 3.2A (con't)
Semiannual Radioactive Effluent Report 1989
Liquid Effluents - Batch Releases

Isotopes Released (Curies)	July	August	September	Total
Sr-89	-0-	-0-	-0-	-0-
Sr-90	-0-	-0-	-0-	-0-
Fe-55	-0-	1.00 E-3	1.35 E-3	2.35 E-3
Fe-59	5.35 E-5	-0-	-0-	5.35 E-5
Co-58	5.00 E-3	4.70 E-4	1.02 E-3	6.49 E-3
Co-60	4.35 E-3	1.74 E-4	4.99 E-4	5.02 E-3
Mn-54	2.07 E-4	-0-	1.49 E-5	2.22 E-4
Cs-134	-0-	-0-	3.25 E-5	3.25 E-5
Cs-137	-0-	-0-	3.59 E-5	3.59 E-5
Ag-110m	9.20 E-4	8.44 E-5	2.46 E-4	1.25 E-3
Sb-124	6.00 E-4	6.19 E-5	2.16 E-5	6.84 E-4
Sb-125	3.30 E-4	-0-	4.38 E-5	3.74 E-4
Nb-95	2.96 E-4	-0-	-0-	2.96 E-4
Cr-51	9.59 E-4	-0-	-0-	9.59 E-4
Sn-113	2.24 E-4	-0-	2.51 E-5	2.49 E-4
Zr-95	2.29 E-4	-0-	-0-	2.29 E-4
Ni-56	2.77 E-5	-0-	-0-	2.77 E-5

TABLE 3.2B
Semiannual Radioactive Effluent Report 1989
Liquid Effluents - Batch Releases

Liquid Releases	October	November	December	Total
Gross Radioactivity				
Total Release (Excluding Tritium and Dissolved Gases) (Ci)	2.96 E-3	5.22 E-3	1.48 E-3	9.66 E-3
Average Concentration (uCi/ml)	2.45 E-9	1.65 E-9	4.63 E-10	
Tritium				
Total Release (Ci)	3.57 E+0	4.49 E+1	4.61 E+1	9.46 E+1
Average Concentration (uCi/ml)	2.95 E-6	1.42 E-5	1.44 E-5	
Dissolved Noble Gases				
Total Release (Ci)	-0-	-0-	-0-	-0-
Average Concentration (uCi/ml)	-0-	-0-	-0-	
Gross Alpha Activity				
Total Release (Ci)	$\leq$7.86 E-8	$\leq$2.24 E-6	***	$\leq$2.32 E-6
Average Concentration (uCi/ml)	$\leq$6.50 E-14	$\leq$7.07 E-13	***	
Volume of Waste Released				
(Liters)	7.86 E+4	2.24 E+5	3.72 E+5	6.75 E+5
Volume of Dilution Water				
(Liters)	1.21 E+9	3.17 E+9	3.20 E+9	7.58 E+9

TABLE 3.2B (con't)
Semiannual Radioactive Effluent Report 1989
Liquid Effluents - Batch Releases

Isotopes Released (Curies)	October	November	December	Total
Sr-89	-0-	-0-	***	-0-
Sr-90	-0-	-0-	***	-0-
Fe-55	1.38 E-3	1.09 E-3	***	2.47 E-3
Co-58	8.50 E-4	2.35 E-3	5.45 E-4	3.75 E-3
Co-60	5.30 E-4	1.10 E-3	5.59 E-4	2.19 E-3
Mn-54	-0-	5.94 E-5	-0-	5.94 E-5
Cs-134	-0-	1.62 E-4	1.37 E-4	2.99 E-4
Cs-137	-0-	2.24 E-4	1.72 E-4	3.96 E-4
Ag-110m	6.92 E-5	1.20 E-4	3.79 E-5	2.27 E-4
Sb-124	4.02 E-5	-0-	-0-	4.02 E-5
Sb-125	5.58 E-5	1.13 E-4	2.55 E-5	1.94 E-4
Sn-113	2.98 E-5	-0-	-0-	2.98 E-5
Ru-103	-0-	-0-	6.95 E-6	6.95 E-6

TABLE 3.3A
Semiannual Radioactive Effluent Report 1989
Liquid Effluents - Continuous Releases

Liquid Releases	July	August	September	Total
Gross Radioactivity				
Total Release (Excluding Tritium and Dissolved Gases) (Ci)	3.19 E-3	1.25 E-3	5.77 E-4	5.02 E-3
Average Concentration (uCi/ml)	4.73 E-11	1.85 E-11	8.84 E-12	
Tritium				
Total Release (Ci)	6.66 E-2	2.43 E-2	4.16 E-2	1.33 E-1
Gross Alpha Activity				
Total Release (Ci)	≤1.94 E-5	≤1.D7 E-5	≤1.93 E-5	≤4.94 E-5
Volume of Continuous Release				
(Liters)	9.73 E+6	1.D7 E+7	9.67 E+6	3.01 E+7
Volume of Dilution Flow				
(Liters)	6.75 E+10	6.75 E+10	6.53 E+10	2.00 E+11
Isotopes Released				
(Curies)				
Sr-89	-0-	-0-	-0-	-0-
Sr-90	-D-	-0-	-D-	-0-
Fe-55	-0-	2.07 E-4	9.55 E-5	3.03 E-4
Co-58	3.30 E-3	9.76 E-4	4.81 E-4	4.49 E-3
Co-60	1.44 E-4	6.37 E-5	-D-	2.08 E-4
Mn-54	1.23 E-5	-0-	-0-	1.23 E-5

TABLE 3.3B
Semiannual Radioactive Effluent Report 19B9
Liquid Effluents - Continuous Releases

Liquid Releases	October	November	December	Total
Gross Radioactivity				
Total Release (Excluding Tritium and Dissolved Gases) (Ci)	7.16 E-4	1.76 E-2	1.25 E-2	3.08 E-2
Average Concentration (uCi/ml)	1.D8 E-11	4.62 E-10	3.71 E-10	
Tritium				
Total Release (Ci)	-0-	-D-	-D-	-0-
Gross Alpha Activity				
Total Release (Ci)	≤1.66 E-5	≤1.00 E-5	***	≤2.66 E-5
Volume of Continuous Release				
(Liters)	9.8D E+6	1.00 E+7	1.06 E+7	3.04 E+7
Volume of Dilution Flow				
(Liters)	6.64 E+10	3.81 E+10	3.37 E+10	1.38 E+11
Isotopes Released				
(Curies)				
Sr-89	-D-	-D-	***	-0-
Sr-90	-0-	-0-	***	-0-
Fe-55	2.45 E-4	-D-	***	2.45 E-4
Co-58	3.77 E-4	1.79 E-3	4.43 E-4	2.61 E-3
Co-60	5.46 E-5	2.35 E-4	-0-	2.90 E-4
Cs-137	1.46 E-5	-D-	-D-	1.46 E-5
Na-24	-0-	1.56 E-2	1.21 E-2	2.77 E-2
Ce-141	2.48 E-4	-0-	-0-	2.48 E-5

TABLE 3.4
Semiannual Radioactive Effluent Report 1989
Dose From Liquid Effluents

The dose to a member of the public from total liquid radioactive release for each quarter was well below the Technical Specification limits of 1.5 mRems to the body and less than or equal to 5 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 exceeded the concentrations specified in Appendix B. The following offsite doses were calculated using equation 1.5 from the Kewaunee ODCM.

3rd Quarter Dose

	Total Body	Bone	Liver	Thyroid	Kidney	Lung	GI LLI
Dose Total (mRem)	6.58 E-4	2.61 E-4	7.54 E-4	2.52 E-4	4.09 E-4	3.04 E-4	5.76 E-3
Quarterly Dose Limit (mRem)	1.5	5.0	5.D	5.0	5.0	5.0	5.0
Percent of Quarterly Limit (%)	0.044	0.005	0.015	0.005	0.008	0.006	0.115

4th Quarter Dose

	Total Body	Bone	Liver	Thyroid	Kidney	Lung	GI LLI
Dose Total (mRem)	7.44 E-3	5.33 E-3	9.74 E-3	9.06 E-4	3.82 E-3	1.88 E-3	1.51 E-3
Quarterly Dose Limit (mRem)	1.5	5.0	5.0	5.0	5.D	5.0	5.0
Percent of Quarterly Limit (%)	0.496	0.107	0.195	0.018	0.076	0.038	0.030

TABLE 3.4 (con't)
Semiannual Radioactive Effluent Report 1989
Dose From Liquid Effluents

Calculated Doses This Year

	Total Body	Bone	Liver	Thyroid	Kidney	Lung	GI LLI
Dose Total (mRem)	1.68 E-1	1.15 E-1	2.19 E-1	1.16 E-2	7.33 E-2	2.60 E-2	5.73 E-1
Yearly Dose Limit (mRem)	3	10	10	10	10	10	10
Percent of Yearly Limit (%)	5.60	1.15	2.19	0.116	0.733	0.26	5.73

4.0 UNPLANNED RELEASES

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

5.0 METEOROLOGICAL DATA

Meteorological data for the second six months of 1989 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 Technical Specification 6.9.3.b (1)(b).

6.0 SOLID WASTE DISPOSAL

Table 6.1 is a summation of solid wastes shipped for the second half of 1989. Presented are the types of wastes, major nuclide composition, disposition of the wastes and shipping containers used.

The containers utilized have the following volumes:

High Integrity Container (HIC) ..... 158 ft^3

LSA 8ox (B-25) ..... 98 ft^3

DOT-17H Drum ..... 7.5 ft^3

No irradiated fuel shipments were made during the report period.

A composite sample from the 1989 dewatered resin shipments was analyzed by a contractor for transuranic nuclides. The results showed an average transuranic concentration of 1.1 E-2 nanocuries/gram, well within the disposal site limit of 10 nanocuries/gram.

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

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

TABLE 6.1
Semiannual Radioactive Effluent Report 1989
Solid Waste and Irradiated Fuel Shipments

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

1. Type of Waste	Unit	July - December
a. Dewatered resin Container: HIC	Cu.M Ci	4.48 E+0 5.65 E+1
b. Dry compressible contaminated waste Container: DOT 17H Drums	Cu.M Ci	2.74 E+1 1.85 E+0
c. Non-compressible contaminated scrap Container: LSA Boxes	Cu.M Ci	2.78 E+0 2.00 E-1
d. Contaminated filter elements Container: HIC	Cu.M Ci	4.48 E+0 5.14 E+1
e. Contaminated sludge	Cu.M Ci	None None

TABLE 6.1 (con't)
Semiannual Radioactive Effluent Report 1989
Solid Waste and Irradiated Fuel Shipments

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

		%	Ci
a.	Mn-54	1.05 E+0	5.93 E-1
	Co-57	1.59 E-1	9.00 E-2
	Co-58	8.81 E-1	4.98 E-1
	Co-60	4.18 E+1	2.36 E+1
	Ag-110m	4.05 E-1	2.29 E-1
	Cs-137	3.93 E-1	2.22 E-1
	Sb-125	5.08 E+0	2.87 E+0
*	Fe-55	1.42 E+1	8.03 E+0
*	C-14	5.02 E-2	2.84 E-2
	Ni-59	4.09 E-1	2.31 E-1
*	Tc-99	4.71 E-4	2.66 E-4
	Nb-94	4.21 E-2	2.38 E-2
*	TRU	4.32 E-5	2.44 E-5
*	Pu-241	1.34 E-3	7.55 E-4
*	Cm-242	5.11 E-6	2.89 E-6
*	Sr-90	7.70 E-3	4.35 E-3
*	Ni-63	3.56 E+1	2.01 E+1

		%	Ci
b.	Mn-54	1.23 E+0	2.27 E-2
	Co-57	1.27 E-1	2.35 E-3
	Co-58	1.98 E+1	3.66 E-1
	Co-60	2.83 E+1	5.23 E-1
	Zr-95	1.69 E-1	3.12 E-3
	Nb-95	4.11 E-1	7.59 E-3
	Cs-134	2.12 E-1	3.92 E-3
	Cs-137	2.27 E-1	4.19 E-3
	Sb-125	3.83 E-1	7.07 E-3
	Sn-113	2.27 E-1	4.19 E-3
*	Fe-55	3.97 E+1	7.33 E-1
*	TRU	1.29 E-3	2.39 E-5
*	Pu-241	7.64 E-2	1.41 E-3
*	Cm-242	1.54 E-3	2.85 E-5
*	Ni-63	9.05 E+0	1.67 E-1

TABLE 6.1 (con't)
Semiannual Radioactive Effluent Report 1989
Solid Waste and Irradiated Fuel Shipments

c.	Mn-54	1.23 E+0	2.46 E-3
	Co-57	1.28 E-1	2.55 E-4
	Co-58	1.99 E+1	3.97 E-2
	Co-60	2.84 E+1	5.68 E-2
	Zr-95	1.69 E-1	3.38 E-4
	Nb-95	4.12 E-1	8.23 E-4
	Cs-134	2.13 E-1	4.25 E-4
	Cs-137	2.27 E-1	4.54 E-4
	Sb-125	3.83 E-1	7.66 E-4
	Sn-113	2.27 E-1	4.54 E-4
	* Fe-55	3.97 E+1	7.94 E-2
	* TRU	1.30 E-3	2.59 E-6
	* Pu-241	7.65 E-2	1.53 E-4
	* Cm-242	1.55 E-3	3.09 E-6
	* Ni-63	9.10 E+0	1.82 E-2
d.	Mn-54	1.48 E-1	7.60 E-2
	Co-57	9.93 E-2	5.10 E-2
	Co-58	1.85 E+1	9.50 E+0
	Co-60	2.88 E+1	1.48 E+1
	Zr-95	2.30 E+0	1.18 E+0
	Nb-95	4.52 E+0	2.32 E+0
	Cs-137	3.78 E-1	1.94 E-1
	Sb-125	1.64 E+0	8.44 E-1
	Sn-113	5.33 E-1	2.74 E-1
	* Fe-55	2.71 E+1	1.39 E+1
	Nb-94	2.32 E-2	1.19 E-2
	* TRU	1.71 E-5	8.77 E-6
	* Ni-63	1.60 E+1	8.23 E+0
e.	None	N/A	N/A

3. Solid Waste Disposition

a.

Date of Shipment	Mode of Transportation	Destination
07/25/89	CNSI 14-190H Cask	Barnwell, SC
08/21/89	CNSI Conventional Van	Barnwell, SC
08/23/89	CNSI 14-190H Cask	Barnwell, SC

b. Irradiated Fuel Shipments

No irradiated fuel shipments were made from the Kewaunee Nuclear Power Plant during the second six months of 1989.

7.0 PROGRAM REVISIONS

In accordance with Technical Specifications 6.9.3.b (1)(e), 6.17.2.a, 6.18.2.a and 6.19.1.a, the revisions to the Process Control Program, Offsite Dose Calculation Manual and radioactive waste systems are listed below.

7.1 Process Control Program

The Kewaunee Nuclear Power Plant Process Control Program has not been revised during this report period.

7.2 Offsite Dose Calculation Manual

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

7.3 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.