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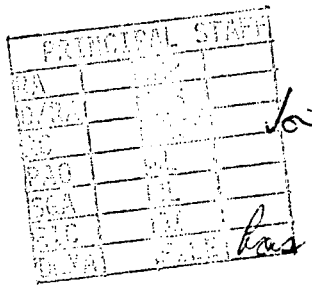

August 31, 1984

Mr. J. G. Keppler, Regional Administrator
Region III
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, IL 60137

Dear Mr. Keppler:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant
Semi-Annual Effluent Report-January to June 1984

Enclosed please find a copy of the Kewaunee Semi-Annual Effluent Report for January through June 1984, submitted per Technical Specification 6.9.3.b.

Included at the end of the report are errata sheets which contain corrections to the January through June 1982 and July through December 1983 Semi-Annual Effluent Reports.

Very truly yours,

D. C. Hintz
Manager - Nuclear Power

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KEWAUNEE NUCLEAR POWER PLANT

SEMI - ANNUAL
EFFLUENT RELEASE REPORT
JANUARY - JUNE 1984

WISCONSIN PUBLIC SERVICE CORPORATION

WISCONSIN POWER & LIGHT COMPANY

MADISON GAS & ELECTRIC COMPANY

Docket 50-305

KEWAUNEE NUCLEAR POWER PLANT

SEMIANNUAL

EFFLUENT RELEASE REPORT

JANUARY - JUNE 1984

Wisconsin Public Service Corporation
Green Bay, Wisconsin
JULY 1984

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. The data reported covers the releases made from January through June 1984. The report contains a summary of the gaseous and liquid releases made to the environment including the quantity, characterization, time duration and percent of technical specification limits of the releases. A summation of solid waste disposal is also included.

1.I Technical Specification Limits and Objectives

Specifications and objectives are set to insure that as low as practical releases are made to unrestricted areas and still allow for practical and dependable operation of the Kewaunee Plant. The annual objectives for release of gaseous wastes are: noble gases and particulates with half lives less than eight days should not exceed 1.7 E+03 uCi/sec; and halogens and other particulates with half lives greater than eight days should not exceed 9.2 E-04 uCi/sec. Technical Specifications limit gaseous releases to 4.45 E+03 uCi/sec for gross gaseous activity (based on Xe-135): and 6.12 E-02 uCi/sec for halogens and particulates (half lives greater than eight days) when averaged over any calendar quarter. The noble gas activity limit is based on Xe-135 as the most restrictive isotope.

The following are the Kewaunee Plant objectives for the release of liquid effluents to unrestricted areas.

a. The annual total quantity of radioactive materials in liquid waste, excluding tritium and dissolved gases, should not exceed 5 curies.

b. The annual average concentration of radioactive material in liquid waste, prior to dilution in Lake Michigan, excluding tritium and dissolved gases, should not exceed 2.0 E-8 uCi/ml.

c. The annual average concentration of tritium in liquid waste, prior to dilution in Lake Michigan should not exceed 5.0 E-6 uCi/ml.

Technical specification limits for the release of liquid effluents are:

a. The instantaneous gross radioactivity release concentration in liquid effluents shall not exceed the values specified in 10 CFR Part 20 Appendix B, for unrestricted areas.

b. The release rate of radioactive liquid effluents, excluding tritium and dissolved gases, shall not exceed 10 curies during any calendar quarter.

c. The annual average concentration of tritium prior to dilution in a natural body of water shall not exceed 3.0 E-3 uCi/cc.

1.2 Batch Release Data

Gaseous

The following is a summation of the total gaseous batch releases made during the first half of 1984.

Number of batch releases 24

Total time for all batch releases (sec). . .3.44 E+6

Maximum time for one batch release (sec) . .1.82 E+6

Average time for a batch release (sec) . . .1.43 E+5

Minimum time for a batch release (sec) . . .1.44 E+3

Liquid

The following is a summary of the batch liquid radioactive discharges made in the first half of 1984.

Number of Releases and Gallonage

Laundry	281	235,767 gal.
Boron Recycle	203	1,322,472 gal.
Miscellaneous Sources	28	246,910 gal.
Total time for all releases		69,192 min.
Maximum time for one release		1772 min.
Minimum time for one release		14 min.
Average time for a release		135.1 min.

1.3 Abnormal Releases

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

1.4 Lower Limits of Detection (LLD)

All routine releases of radioactive liquid wastes are made in the batch mode. Each batch is quantitatively analyzed for gamma emitters and tritium and an allowable release rate specified to maintain the concentration of radionuclides prior to dilution in Lake Michigan less than the limits stated in Section 1.1. A fraction of each sample is retained for a monthly proportional composite analysis for alpha emitters, Strontium 89, and Strontium 90. The lower limits of detection (LLD) for the various radio-analyses are:

Analysis	LLD (uCi/ml)
Gross beta-gamma	1.2 E-7
Dissolved Noble Gases	3 E-8 to 2 E-7
I-131, Ba-La-140	1 E-7
Gamma emitters	7 E-8 to 1 E-7
Tritium	1.5 E-6
Gross Alpha	2.3 E-8
Sr-89, 90	1 E-8

Gaseous radioactive effluents are released in both the continuous mode (Auxiliary Building Stack) and the batch mode (Containment Vent, Annulus or Gas Decay Tanks). The Auxiliary Building Stack is sampled continuously for particulates, halogens and strontium by "off-line" sample trains. The stack is also grab-sampled daily for gaseous gamma emitters. The LLDs for these radio analyses are:

Analysis	LLD (uCi/cc)
Gross Gamma (Gas)	5 E-08
Gamma Emitters (Gas)	5 E-08 to 5 E-09 (Kr-85,5 E-07)
Iodines	5 E-14
Gross beta-gamma (Particulate)	5 E-15
Gamma Emitters (Particulate)	5 E-13
Sr-89, 90 (Particulate)	8 E-14
Gross alpha (Particulate)	1 E-14

The batch releases are sampled for particulates, halogens, tritium and fission gases prior to release to determine allowable release rates. The actual amounts released are quantified by samplers downstream of any filters in the release path. The LLDs for these releases are dependent on the duration of the release and, in the case of particulates and iodines, are typically a factor of 6 to 10 higher than those given above for the continuous release mode. The gas LLDs are the same as those given above.

In 1983, a new gamma spectroscopy system was installed. Revised LLD'S have been determined and are included in the above table.

2.0 GASEOUS EFFLUENTS

The release rates for gaseous activity, excluding halogens and particulates with half-lives greater than eight days, were well below applicable Technical Specification limits and annual objectives for the first six months of 1984. The average release rates versus Technical Specifications are shown below.

	1st Qtr	2nd Qtr
Specification (uCi/sec)	4.45 E+3	4.45 E+3
Average (uCi/sec)	3.20 E+0	5.51 E-1
% of specification	7.19 E-2	1.24 E-2

The average release rate for the period was 1.87 E+0 uCi/sec which is 0.11% of Kewaunee's annual release rate objective.

The release rates for halogens and particulates with half-lives greater than eight days were also below Technical Specification limits and Kewaunee annual objectives. Those average quarterly release rates are:

	1st Qtr	2nd Qtr
Specification (uCi/sec)	6.12 E-2	6.12 E-2
Average (uCi/sec)	6.17 E-5	9.17 E-5
% of specification	1.01 E-1	1.50 E-1

The average release rate for the period was 7.70 E-5 uCi/sec which is 8.37% of Kewaunee's annual release rate objective.

Table 2.1 presents a quarterly summation of the total release, average release rates, and percent of Technical Specifications for 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 presented in a monthly summation as required by Technical Specifications.

Table 2.1
SEMIANNUAL EFFLUENT REPORT 1984
Gaseous Effluents - Summation of All Releases

	1st Quarter	2nd Quarter
Fission and Activation Gases		
Total Release (Ci)	2.49 E+1	4.32 E+0
Ave. Release Rate (uCi/sec)	3.19 E+0	5.50 E-1
% of Tech Spec (based on Xe-135)	7.17 E-2	1.24 E-2
Iodine - 131		
Total Release (Ci)	3.06 E-4	3.11 E-3
Ave. Release Rate (uCi/sec)	3.93 E-5	3.96 E-4
% of Tech Spec	6.43 E-2	6.47 E-1
Particulate (half-lives ≥ 8d)		
Total Release (Ci)	1.11 E-4	3.99 E-4
Ave. Release Rate (uCi/sec)	1.43 E-5	5.08 E-5
% of Tech Spec	2.33 E-2	8.30 E-2
Gross Alpha Released (Ci)	1.37 E-4	5.49 E-4
Tritium		
Total Release (Ci)	2.68 E-1	3.39 E-1
Ave. Release Rate (uCi/sec)	3.44 E-2	4.31 E-2
There is no applicable Tech Spec limiting tritium release rates		

Table 2.2
SEMIANNUAL EFFLUENT REPORT 1984
Gaseous Effluents - Elevated Release

Nuclides Released (Ci)	Continuous Mode 1st Qtr	Continuous Mode 2nd Qtr	Batch Mode 1st Qtr	Batch Mode 2nd Qtr
Fission Gases				
Ar-41	-	-	9.74 E-2	3.26 E-2
Kr-85	-	-	2.75 E-2	6.98 E-2
Kr-85m	1.10 E-2	-	-	-
Xe-131m	-	-	-	9.69 E-3
Xe-133	1.07 E+1	8.50 E-2	1.22 E+1	8.55 E-1
Xe-133m	-	-	-	2.98 E-4
Xe-135	1.69 E-1	-	5.14 E-2	8.98 E-4
Xe-135m	3.66 E-5	-	-	-
Unidentified	<1.62 E+0	<3.15 E+0	<4.55 E-3	<1.10 E-1
Total for Period	<1.25 E+1	<3.24 E+0	<1.24 E+1	<1.08 E+0
Iodines				
I-131	5.25 E-5	9.09 E-5	2.54 E-4	3.01 E-3
I-132	-	-	5.27 E-5	1.04 E-4
I-133	8.82 E-6	3.48 E-6	1.58 E-6	1.60 E-6
Total for Period	6.13 E-5	9.44 E-5	3.08 E-4	3.12 E-3
Particulates				
Co-58	-	1.91 E-5	-	1.04 E-5
Co-60	-	-	-	6.43 E-6
Te-132	-	-	2.45 E-6	1.28 E-5
Sr-85	-	-	3.02 E-9	3.12 E-9
Sr-89	<3.74 E-7	2.23 E-4	-	-
Sr 90	<3.74 E-7	1.66 E-4	-	-
Mn-54	-	-	-	8.74 E-7
Cr-51	-	-	-	2.63 E-6
Cd-109	-	-	1.10 E-4	-
Rn-222	2.37 E-5	-	7.40 E-4	1.45 E-2
Unidentified	<5.57 E-6	<2.32 E-6	<4.08 E-5	<2.09 E-4
Total for Period	<3.00 E-5	<4.11 E-4	<8.93 E-4	<1.47 E-2

Semiannual Effluent Report for 1984
1st Quarter Gaseous Release
Total
Table 2.3A

Noble Gases (Curies)

Isotope	January	February	March	Total
Ar-41	-	-	9.74 E-2	9.74 E-2
Kr-85	-	-	2.75 E-2	2.75 E-2
Kr-85m	-	1.10 E-2	-	1.10 E-2
Xe-133	4.92 E+0	3.44 E+0	1.45 E+1	2.29 E+1
Xe-135	2.82 E-4	1.20 E-1	1.00 E-1	2.20 E-1
Xe-135m	-	3.66 E-5	-	3.66 E-5
Unident.	<4.32 E-1	<4.70 E-1	<7.22 E-1	<1.62 E+0
TOTAL	<5.35 E+0	<4.04 E+0	<1.54 E+1	<2.49 E+1

Particulates (Curies)

Isotope	January	February	March	Total
Te-132	-	-	2.45 E-6	2.45 E-6
Cd-109	5.79 E-5	5.25 E-5	-	1.10 E-4
Sr-89	<1.24 E-7	<1.00 E-7	<1.50 E-7	<3.74 E-7
Sr-90	<1.24 E-7	<1.00 E-7	<1.50 E-7	<3.74 E-7
Sr-85	-	-	3.02 E-9	3.02 E-9
Rn-222	2.61 E-4	5.03 E-4	-	7.64 E-4
Unident.	<1.78 E-6	<1.90 E-6	<4.26 E-5	<4.63 E-5
TOTAL	<3.21 E-4	<5.57 E-4	<4.54 E-5	<9.23 E-4

Semiannual Effluent Report for 1984
1st Quarter Gaseous Release
Total
Table 2.3A (con't)

Halogens (Curies)

Isotope	January	February	March	Total
I-131	1.55 E-6	1.93 E-6	3.03 E-4	3.06 E-4
I-132	-	-	5.27 E-5	5.27 E-5
I-133	7.94 E-7	1.94 E-6	7.67 E-6	1.04 E-5
Total	2.34 E-6	3.87 E-6	3.63 E-4	3.69 E-4

Summary

	January	February	March	Total
Total Noble Gases (Ci)	<5.35 E+0	<4.04 E+0	<1.54 E+1	<2.48 E+1
Total Halogens (Ci)	2.34 E-6	3.87 E-6	3.63 E-4	3.69 E-4
Total Particulate Gross Beta-Gamma (Ci)	<3.21 E-4	<5.57 E-4	<4.54 E-5	<9.23 E-4
Total Particulate Gross Beta-Gamma Half-Lives >8 Days(Ci)	<5.81 E-5	<5.27 E-5	<3.03 E-7	<1.11 E-4
Total Tritium(Ci)	<1.79 E-1	<1.41 E-2	<7.50 E-2	<2.68 E-1
Total Particulate Gross Alpha (Ci)	<4.39 E-5	<8.22 E-5	<1.08 E-5	<1.37 E-4
Maximum Noble Gas Release Rate uCi/sec	4.69 E+0	4.00 E+0	1.82 E+2	

Semiannual Effluent Report for 1984
1st Quarter Gaseous Release
Continuous
Table 2.3B (con't)

Halogens (Curies)

Isotope	January	February	March	Total
I-131	1.55 E-6	1.93 E-6	4.90 E-5	5.25 E-5
I-133	7.94 E-7	1.94 E-6	6.09 E-6	8.82 E-6
TOTAL	2.34 E-6	3.87 E-6	5.51 E-5	6.13 E-5

Summary

	January	February	March	Total
Total Noble Gases (Ci)	<5.35 E+0	<4.04 E+0	<3.08 E+0	<1.25 E+1
Total Halogens (Ci)	2.34 E-6	3.87 E-6	5.51 E-5	6.13 E-5
Total Particulate Gross Beta-Gamma (Ci)	<2.03 E-6	<2.58 E-5	<2.19 E-6	<3.00 E-5
Total Particulate Gross Beta-Gamma Half-Lives >8 Days(Ci)	<2.48 E-7	<2.00 E-7	<3.00 E-7	<7.48 E-7
Total Tritium(Ci)	<1.76 E-1	3.00 E-3	2.10 E-2	<2.00 E-1
Total Particulate Gross Alpha (Ci)	<6.16 E-7	<6.84 E-7	<6.88 E-7	<1.99 E-6
Maximum Noble Gas Release Rate uCi/sec	4.50 E+0	3.74 E+0	4.88 E+0	

Semiannual Effluent Report for 1984
1st Quarter Gaseous Release
Continuous
Table 2.3B

Noble Gases (Curies)

Isotope	January	February	March	Total
Kr-85m	-	1.10 E-2	-	1.10 E-2
Xe-133	4.92 E+0	3.44 E+0	2.31 E+0	1.07 E+1
Xe-135	-	1.20 E-1	4.90 E-2	1.69 E-1
Unident.	<4.30 E-1	<4.69 E-1	<7.21 E-1	<1.62 E+0
Total	<5.35 E+0	<4.04 E+0	<3.08 E+0	<1.25 E+1

Particulates (Curies)

Isotope	January	February	March	Total
Sr-89	<1.24 E-7	<1.00 E-7	<1.50 E-7	<3.74 E-7
Sr-90	<1.24 E-7	<1.00 E-7	<1.50 E-7	<3.74 E-7
Rn-222	-	2.37 E-5	-	2.37 E-5
Unident.	<1.78 E-6	<1.90 E-6	<1.89 E-6	<5.57 E-6
TOTAL	<2.03 E-6	<2.58 E-5	<2.19 E-6	<3.00 E-5

Semiannual Effluent Report for 1984
2nd Quarter Gaseous Release
Total
Table 2.3A (con't)

Halogens (Curies)

Isotope	April	May	June	Total
I-131	3.10 E-3	5.81 E-6	-	3.11 E-3
I-132	1.04 E-4	-	-	1.04 E-4
I-133	1.59 E-6	2.41 E-6	1.08 E-6	5.08 E-6
TOTAL	3.21 E-3	8.22 E-6	1.08 E-6	3.22 E-3

Summary

	April	May	June	Total
Total Noble Gases (Ci)	<2.02 E+0	<1.11 E+0	<1.18 E+0	<4.32 E+0
Total Halogens (Ci)	3.21 E-3	8.22 E-6	1.08 E-6	3.22 E-3
Total Particulate Gross Beta-Gamma (Ci)	<1.19 E-2	<1.00 E-3	<2.26 E-3	<1.51 E-2
Total Particulate Gross Beta-Gamma Half-Lives >8 Days(Ci)	<1.02 E-5	<2.52 E-7	3.89 E-4	<3.99 E-4
Total Tritium(Ci)	1.01 E-1	2.13 E-2	2.17 E-1	3.39 E-1
Total Particulate Gross Alpha (Ci)	<1.22 E-5	<1.83 E-4	<3.54 E-4	<5.49 E-4
Maximum Noble Gas Release Rate uCi/sec	2.17 E+2	3.47 E+0	2.31 E+0	

Semiannual Effluent Report for 1984
2nd Quarter Gaseous Release
Total
Table 2.3A (con't)

Noble Gases (Curies)

Isotope	April	May	June	Total
Ar-41	-	2.41 E-2	8.51 E-3	3.26 E-2
Kr-85	6.98 E-2	-	-	6.98 E-2
Xe-131m	9.69 E-3	-	-	9.69 E-3
Xe-133	9.30 E-1	5.52 E-3	4.07 E-3	9.40 E-1
Xe-133m	2.98 E-4	-	-	2.98 E-4
Xe-135	-	6.36 E-4	2.62 E-4	8.98 E-4
Unident.	<1.01 E+0	<1.08 E+0	<1.17 E+0	<3.26 E+0
TOTAL	<2.02 E+0	<1.11 E+0	<1.18 E+0	<4.32 E+0

Particulates (Curies)

Isotope	April	May	June	Total
Co-58	2.72 E-5	2.25 E-6	-	2.95 E-5
Co-60	6.43 E-6	-	-	6.43 E-6
Te-132	1.28 E-5	-	-	1.28 E-5
Sr-85	3.12 E-9	-	-	3.12 E-9
Sr-89	<1.42 E-7	<1.26 E-7	2.23 E-4	<2.23 E-4
Sr-90	<1.42 E-7	<1.26 E-7	1.66 E-4	<1.66 E-4
Mn-54	8.74 E-7	-	-	8.74 E-7
Cr-51	2.63 E-6	-	-	2.63 E-6
Rn-222	1.18 E-2	8.15 E-4	1.87 E-3	1.45 E-2
Unident.	<2.54 E-5	<1.85 E-4	<1.51 E-6	<2.11 E-4
TOTAL	<1.19 E-2	<1.00 E-3	<2.26 E-3	<1.51 E-2

Semiannual Effluent Report for 1984
2nd Quarter Gaseous Release
Continuous
Table 2.3B (con't)

Noble Gases (Curies)

Isotope	April	May	June	Total
Xe-133	8.50 E-2	-	-	8.50 E-2
Unident.	<1.01 E+0	<9.84 E-1	<1.16 E+0	<3.15 E+0
TOTAL	<1.10 E+0	<9.84 E-1	<1.16 E+0	<3.24 E+0

Particulates (Curies)

Isotope	April	May	June	Total
Co-58	1.79 E-5	1.18 E-6	-	1.91 E-5
Sr-89	<1.42 E-7	<1.26 E-7	2.23 E-4	2.23 E-4
Sr-90	<1.42 E-7	<1.26 E-7	1.66 E-4	1.66 E-4
Unident.	-	<8.08 E-7	<1.51 E-6	<2.32 E-6
TOTAL	<1.82 E-5	<2.24 E-6	<3.91 E-4	<4.11 E-4

Semiannual Effluent Report for 1984
2nd Quarter Gaseous Release
Continuous
Table 2.3B (con't)

Halogens (Curies)

Isotope	April	May	June	Total
I-131	8.95 E-5	1.38 E-6	-	9.09 E-5
I-133	-	2.41 E-6	1.07 E-6	3.48 E-6
Total	8.95 E-5	3.79 E-6	1.07 E-6	9.44 E-5

Summary

	April	May	June	Total
Total Noble Gases (Ci)	<1.10 E+0	<9.84 E-1	<1.16 E+0	<3.24 E+0
Total Halogens (Ci)	8.95 E-5	3.79 E-6	1.07 E-6	9.44 E-5
Total Particulate Gross Beta-Gamma (Ci)	<1.82 E-5	<2.24 E-6	<3.91 E-4	<4.11 E-4
Total Particulate Gross Beta-Gamma Half-Lives >8 Days(Ci)	<2.84 E-7	<2.52 E-7	3.89 E-4	<3.90 E-4
Total Tritium(Ci)	5.00 E-3	6.00 E-3	2.00 E-1	2.11 E-1
Total Particulate Gross Alpha (Ci)	<1.24 E-6	<7.32 E-7	<5.49 E-7	<2.52 E-6
Maximum Noble Gas Release Rate uCi/sec	9.84 E-1	1.79 E-2	7.29 E-1	

Semiannual Effluent Report for 1984
1st Quarter Gaseous Release
Batch
Table 2.3C

Noble Gases (Curies)

Isotope	January	February	March	Total
Ar-41	-	-	9.74 E-2	9.74 E-2
Kr-85	-	-	2.75 E-2	2.75 E-2
Xe-133	-	5.37 E-4	1.22 E+1	1.22 E+1
Xe-135	-	-	5.14 E-2	5.14 E-2
Unident.	<1.79 E-3	<1.46 E-3	<1.30 E-3	<4.55 E-3
TOTAL	<1.79 E-3	<2.00 E-3	<1.24 E+1	<1.24 E+1

Particulates (Curies)

Isotope	January	February	March	Total
Te-132	-	-	2.45 E-6	2.45 E-6
Cd-109	5.79 E-5	5.25 E-5	-	1.10 E-4
Sr-85	-	-	3.02 E-9	3.02 E-9
Rn-222	2.61 E-4	4.79 E-4	-	7.40 E-4
Unident.	-	-	4.08 E-5	4.08 E-5
TOTAL	3.19 E-4	5.32 E-4	4.32 E-5	8.93 E-4

Semiannual Effluent Report for 1984
1st Quarter Release
Batch
Table 2.3C (con't)

Halogens (Curies)

Isotope	January	February	March	Total
I-131	-	-	2.54 E-4	2.54 E-4
I-132	-	-	5.27 E-5	5.27 E-5
I-133	-	-	1.58 E-6	1.58 E-6
Total	-	-	3.08 E-4	3.08 E-4

Summary

	January	February	March	Total
Total Noble Gases (Ci)	<1.79 E-3	<2.00 E-3	<1.24 E+1	<1.24 E+1
Total Halogens (Ci)	-	-	3.08 E-4	3.08 E-4
Total Particulate Gross Beta-Gamma (Ci)	3.19 E-4	5.32 E-4	4.32 E-5	8.93 E-4
Total Particulate Gross Beta-Gamma Half-Lives >8 Days(Ci)	5.79 E-5	5.25 E-5	-	1.10 E-4
Total Tritium(Ci)	<3.39 E-3	<1.11 E-2	<5.40 E-2	<6.85 E-2
Total Particulate Gross Alpha (Ci)	4.33 E-5	8.15 E-5	<1.01 E-5	<1.35 E-4
Maximum Noble Gas Release Rate uCi/sec	1.94 E-1	2.61 E-1	1.77 E+2	

Semiannual Effluent Report for 1984
2nd Quarter Gaseous Release
Batch
Table 2.3C (con't)

Noble Gases (Curies)

Isotope	April	May	June	Total
Ar-41	-	2.41 E-2	8.51 E-3	3.26 E-2
Kr-85	6.98 E-2	-	-	6.98 E-2
Xe-131m	9.69 E-3	-	-	9.69 E-3
Xe-133	8.45 E-1	5.52 E-3	4.07 E-3	8.55 E-1
Xe 133m	2.98 E-4	-	-	2.98 E-4
Xe-135	-	6.36 E-4	2.62 E-4	8.98 E-4
Unident.	<3.21 E-3	<9.77 E-2	<9.20 E-3	<1.10 E-1
TOTAL	<9.28 E-1	<1.28 E-1	<2.20 E-2	<1.08 E+0

Particulates (Curies)

Isotope	April	May	June	Total
Co-58	9.28 E-6	1.07 E-6	-	1.04 E-5
Co-60	6.43 E-6	-	-	6.43 E-6
Te-132	1.28 E-5	-	-	1.28 E-5
Sr-85	3.12 E-9	-	-	3.12 E-9
Mn-54	8.74 E-7	-	-	8.74 E-7
Cr-51	2.63 E-6	-	-	2.63 E-6
Rn-222	1.18 E-2	8.15 E-4	1.87 E-3	1.45 E-2
Unident.	<2.54 E-5	<1.84 E-4	-	<2.09 E-4
Total	<1.19 E-2	<1.00 E-3	1.87 E-3	<1.47 E-2

Semiannual Effluent Report for 1984
2nd Quarter Gaseous Release
Batch
Table 2.3C (con't)

Halogens (Curies)

Isotope	April	May	June	Total
I-131	3.01 E-3	4.43 E-6	-	3.01 E-3
I-132	1.04 E-4	-	-	1.04 E-4
I-133	1.59 E-6	-	9.80 E-9	1.60 E-6
Total	3.12 E-3	4.43 E-6	9.80 E-9	3.12 E-3

Summary

	April	May	June	Total
Total Noble Gases (Ci)	<9.28 E-1	<1.28 E-1	<2.20 E-2	<1.08 E+0
Total Halogens (Ci)	3.12 E-3	4.43 E-6	9.80 E-9	3.12 E-3
Total Particulate Gross Beta-Gamma (Ci)	<1.19 E-2	<1.00 E-3	1.87 E-3	<1.47 E-2
Total Particulate Gross Beta-Gamma Half-Lives >8 Days(Ci)	9.94 E-6	-	-	9.94 E-6
Total Tritium(Ci)	9.61 E-2	1.53 E-2	1.68 E-2	1.28 E-1
Total Particulate Gross Alpha (Ci)	1.10 E-5	1.82 E-4	3.53 E-4	5.46 E-4
Maximum Noble Gas Release Rate uCi/sec	2.16 E+2	3.45 E+0	1.58 E+0	

3.0 LIQUID EFFLUENTS

The total liquid radioactive release for each quarter was well below the Technical Specification limits of 10 curies per quarter. The 1st quarter releases were 9.4% of the yearly objective applied by quarter of 1.25 curies. The 2nd quarter releases were 62.8% of the objective.

Instantaneous release concentrations are limited by the individual radionuclide concentrations established in 10CFR20, Appendix B, for unrestricted areas. During the report period, none of the isotopes released exceeded the concentrations specified in Appendix B.

The 1st and 2nd quarter release concentrations for liquids, excluding Tritium and dissolved gases, were 4.35 E-09 uCi/ml and 3.76 E-08 uCi/ml respectively, averaging 1.88 E-08 uCi/ml for the report period, the 2nd quarter total reflecting the effects of the annual outage. The average concentration of tritium released was well below both Technical Specification limits and annual objectives.

Table 3.1 presents a quarterly summation of the total release, average concentration and percent of applicable Technical Specification limit for three categories of liquid effluents. It also presents the gross alpha release, volume of waste released and volume of dilution water used. Table 3.2 is a monthly summation of the same information in Table 3.1, plus the quantity of the individual isotopes released to unrestricted areas.

Table 3.1
Semiannual Effluent Report 1984
Liquid Effluents - Summation of All Releases

	1st Qtr	2nd Qtr	Total
Fission and Activation Products			
Total Release (excluding H3 and dissolved gases) (Ci)	1.18 E-01	7.85 E-01	9.03 E-01
Average Concentration (uCi/ml)	4.35 E-09	3.76 E-08	
Percent of Tech Spec (10 Ci/Qtr) (%)	1.18 E+0	7.85 E+0	
Tritium			
Total Release (Ci)	7.54 E+01	6.30 E+01	1.38 E+02
Average Concentration (uCi/ml)	2.78 E-06	3.01 E-06	
Percent of Tech Spec (3.0 E-3 uCi/ml) (%)	9.27 E-02	1.00 E-01	
Dissolved Gases			
Total Release (Ci)	2.25 e-02	3.52 E-04	2.29 E-02
Average Concentration (uCi/ml)	8.30 E-10	1.68 E-11	
No applicable Tech Spec			
Gross Alpha Activity			
Total Release (Ci)	<3.07 E-04	<2.11 E-04	<5.18 E-04
Volume of Waste Released			
(liters)	4.30 E+06	2.54 E+06	6.84 E+06
Volume of Dilution Water			
(liters)	2.71 E+10	2.09 E+10	4.80 E+10

Table 3.2A
Semiannual Effluent Report
Liquid Effluents

LIQUID RELEASES	UNITS	JAN	FEB	MARCH
1. GROSS RADIOACTIVITY				
A. Total Released	CURIES	1.28 E-2	4.42 E-2	8.34 E-2
B. Ave. Conc. Released	UCI/ML	1.24 E-9	4.50 E-9	1.20 E-8
C. Max. Conc. Released	UCI/ML	2.24 E-8	4.59 E-8	9.69 E-7
2. TRITIUM				
A. Total Released	CURIES	3.77 E+1	2.34 E+1	1.43 E+1
B. Ave. Conc. Released	UCI/ML	3.66 E-6	2.38 E-6	2.05 E-6
3. DISSOLVED NOBLE GASES				
A. Total Released	CURIES	3.68 E-3	3.33 E-3	1.55 E-2
B. Ave. Conc. Released	UCI/ML	3.57 E-10	3.39 E-10	2.22 E-9
4. GROSS ALPHA ACTIVITY				
A. Total Released	CURIES	≤1.11 E-4	≤1.02 E-4	≤9.41 E-5
B. Ave. Conc. Released	UCI/ML	≤7.30 E-8	≤6.80 E-8	≤7.30 E-8
5. VOLUME OF LIQUID WASTE RELEASED	LITERS	1.51 E+6	1.50 E+6	1.29 E+6
6. VOLUME OF DILUTION WATER	LITERS	1.03 E+10	9.82 E+9	6.97 E+9
7. ISOTOPES RELEASED				
Sr 89	CURIES	6.87 E-4	6.81 E-4	5.85 E-4
Sr 90	CURIES	7.47 E-5	7.40 E-5	6.36 E-5
Xe 133	CURIES	3.68 E-3	3.31 E-3	1.55 E-2
Co 58	CURIES	3.42 E-4	2.75 E-3	2.77 E-2
Co 60	CURIES	2.83 E-3	2.22 E-2	8.42 E-3
Cs 137	CURIES	3.27 E-3	5.39 E-4	1.96 E-3
Ag 110m	CURIES	1.77 E-3	1.37 E-2	5.44 E-3
Xe 135	CURIES	3.55 E-6	7.82 E-6	2.09 E-5
Mn 54	CURIES	9.73 E-5	9.96 E-4	3.48 E-4
Cs 134	CURIES	5.33 E-4	-0-	6.15 E-4
Xe 133m	CURIES	-0-	1.52 E-5	-0-
Sb 125	CURIES	-0-	1.46 E-4	5.67 E-3
Co 57	CURIES	-0-	3.91 E-5	-0-
Sn 113	CURIES	-0-	2.20 E-4	-0-
Sb 124	CURIES	-0-	-0-	1.25 E-2
Fe 59	CURIES	-0-	-0-	8.09 E-5
Na 24	CURIES	-0-	-0-	3.94 E-4
Cs 138	CURIES	-0-	-0-	3.12 E-4
K 40	CURIES	-0-	-0-	6.92 E-5
Cr 51	CURIES	-0-	-0-	-0-
Nb 95	CURIES	-0-	-0-	-0-
Zr 95	CURIES	-0-	-0-	-0-
I 131	CURIES	-0-	-0-	-0-
Ce 139	CURIES	-0-	-0-	-0-

Table 3.2A
Semiannual Effluent Report
Liquid Effluents (con't)

Nb 97	CURIES	-0-	-0-	-0-
Zr 97	CURIES	-0-	-0-	-0-
Hg 203	CURIES	-0-	-0-	-0-

Table 3.2B
Semiannual Effluent Report
Liquid Effluents

LIQUID RELEASES	UNITS	APRIL	MAY	JUNE	SEMIANNUAL TOTAL
1. GROSS RADIOACTIVITY					
A. Total Released	CURIES	2.86 E-1	4.02 E-1	9.69 E-2	9.25 E-1
B. Ave. Conc. Released	UCI/ML	3.76 E-7	1.11 E-7	5.87 E-9	
C. Max. Conc. Released	UCI/ML	1.71 E-6	7.73 E-7	1.48 E-7	
2. TRITIUM					
A. Total Released	CURIES	8.40 E+0	4.50 E+0	5.01 E+1	1.38 E+2
B. Ave. Conc. Released	UCI/ML	1.10 E-5	1.24 E-6	3.04 E-6	
3. DISSOLVED NOBLE GASES					
A. Total Released	CURIES	2.95 E-4	-0-	5.72 E-5	2.29 E-2
B. Ave. Conc. Released	UCI/ML	3.88 E-10	-0-	3.47 E-12	
4. GROSS ALPHA ACTIVITY					
A. Total Released	CURIES	≤6.53 E-5	≤3.80 E-5	≤1.08 E-4	≤5.18 E-4
B. Ave. Conc. Released	UCI/ML	≤7.90 E-8	≤8.20 E-8	≤8.70 E-8	
5. VOLUME OF LIQUID WASTE RELEASED	LITERS	8.26 E+5	4.64 E+5	1.25 E+6	6.84 E+6
6. VOLUME OF DILUTION WATER	LITERS	7.60 E+8	3.63 E+9	1.65 E+10	4.80 E+10
7. ISOTOPES RELEASED					
Sr 89	CURIES	5.45 E-5	6.77 E-6	<1.62 E-6	2.02 E-3
Sr 90	CURIES	2.45 E-5	<5.10 E-7	3.36 E-6	2.41 E-4
Xe 133	CURIES	2.95 E-4	-0-	5.68 E-5	2.28 E-2
Co 58	CURIES	1.84 E-1	3.19 E-1	2.32 E-2	5.57 E-1
Co 60	CURIES	2.10 E-2	2.25 E-2	6.30 E-3	8.33 E-2
Cs 137	CURIES	5.21 E-3	4.87 E-3	2.07 E-4	1.61 E-2
Ag 110m	CURIES	1.73 E-3	1.21 E-3	1.26 E-2	3.65 E-2
Xe 135	CURIES	-0-	-0-	4.18 E-7	3.27 E-5
Mn 54	CURIES	4.40 E-4	2.36 E-3	4.67 E-4	4.71 E-3
Cs 134	CURIES	4.39 E-3	5.11 E-3	-0-	1.06 E-2
Xe 133m	CURIES	-0-	-0-	-0-	1.52 E-5
Sb 125	CURIES	2.04 E-2	1.47 E-2	5.09 E-3	4.60 E-2
CO 57	CURIES	2.44 E-4	6.64 E-4	-0-	9.47 E-4
Sn 113	CURIES	-0-	-0-	7.01 E-4	9.21 E-4
Sb 124	CURIES	4.85 E-2	3.07 E-2	2.90 E-3	9.46 E-2
Fe 59	CURIES	-0-	-0-	2.81 E-4	3.62 E-4
Na 24	CURIES	5.83 E-4	3.75 E-4	6.59 E-5	1.42 E-3
Cs 138	CURIES	2.50 E-4	2.39 E-4	-0-	8.01 E-4
K 40	CURIES	-0-	-0-	-0-	6.92 E-5
Cr 51	CURIES	3.62 E-5	2.15 E-5	2.51 E-3	2.57 E-3
Nb 95	CURIES	7.86 E-6	1.77 E-5	1.20 E-3	1.23 E-3
Zr 95	CURIES	2.66 E-6	1.26 E-5	5.69 E-4	5.84 E-4

Table 3.2B
Semiannual Effluent Report
Liquid Effluents (con't)

I 131	CURIES	1.91 E-6	-0-	-0-	1.91 E-6
Ce 139	CURIES	3.28 E-7	-0-	-0-	3.28 E-7
Nb 97	CURIES	-0-	-0-	3.91 E-2	3.91 E-2
Zr 97	CURIES	-0-	-0-	3.55 E-4	3.55 E-4
Hg 203	CURIES	-0-	-0-	6.46 E-7	6.46 E-7
Fe 55	curies	-0-	1.37 E-3	6.08 E-3	7.45 E-3

4.0 SOLID WASTE DISPOSAL

Table 4.1 is a summation of solid wastes shipped for the first half of 1984. Presented are the types of waste, major nuclide composition and disposition of wastes. No irradiated fuel shipments were made during the report period.

A composite sample from the 1983 solidified resin shipments was analyzed by a contractor for transuranic nuclides. The results showed an average transuranic concentration of 1.53 E-1 nanocuries/ gram, well within the disposal site limit of 10 nanocuries/gram.

Table 4.1 contains the radionuclide content (curies) and percent abundance for each rad waste type. The following radionuclides are included in Table 4.1 as a reporting requirement of 10 CFR 20.311, 10 CFR 61, and Barnwell burial site criteria on radioactive shipment manifests:

C-14

Nb-94

TRU

Cm-242

Ni-63

Ni-59

Sr-90

Tc-99 LLD value 3.0 E-5 uCi/g

I-129 LLD value 1.7 E-5 uCi/g

H-3 LLD value 3.2 E-5 uCi/g

Isotopes noted "*" are correlated values.

Table 4.1
January thru June 1984 Solid Waste and Irradiated Fuel Shipments

A. Solid Waste Shipped Off-Site for Burial or Disposal (Not Irradiated Fuel)

1. Type of Waste	Unit	Jan - Jun 1984
a. Spent resins solidified in a concrete matrix	Cu.M	1.21 E+1
	Ci	1.17 E+3
b. Dry compressable contaminated waste	Cu.M	2.57 E+1
	Ci	1.07 E+1
c. Non-compressable contaminated scrap	Cu.M	2.78 E+0
	Ci	2.21 E+0
d. Contaminated Filter elements solidified in concrete	Cu.M	5.10 E+0
	Ci	2.15 E+1
e. Contaminated sludge solidified in concrete	Cu.M	-0-
	Ci	-0-

2. Estimate of Major Nuclide by Composition (By Type of Waste)	%	Ci
a. Manganese-54	1.71 E+0	2.01 E+1
Cobalt-57	5.67 E-1	6.65 E+0
Cobalt-58	6.56 E+0	7.69 E+1
Cobalt-60	5.13 E+1	6.01 E+2
Cesium-137	5.24 E+0	6.14 E+1
Niobium-95	2.90 E-2	3.38 E-1
Silver-110m	5.98 E-3	7.01 E-2
Tin-113	2.05 E-3	2.40 E-2
Carbon-14	2.81 E-3	3.30 E-2
Niobium-94	6.31 E-5	7.40 E-4
Transuranics	1.61 E-3	1.89 E-2
Plutonium-241	7.30 E-2	8.60 E-1
Curium-242	1.32 E-3	1.55 E-2
Nickel-63	3.40 E+1	3.98 E+2 *
Nickel-59	5.16 E-1	6.05 E+0 *
Strontium-90	2.70 E-2	3.19 E-1 *
b. Manganese-54	1.10 E+0	1.18 E-1
Cobalt-57	3.19 E-1	3.42 E-2
Cobalt-58	1.03 E+1	1.11 E+0
Cobalt-60	3.93 E+1	4.21 E+0
Cesium-137	1.80 E-1	1.93 E-2
Carbon-14	7.01 E-1	7.51 E-2
Niobium-94	4.22 E-3	4.52 E-4
Transuranics	6.23 E-2	6.67 E-3

Table 4.1
January thru June 1984 Solid Waste and Irradiated
Fuel Shipments (con't)

	Plutonium-241	4.32 E+0	4.63 E-1
	Curium-242	7.86 E-2	8.42 E-3
	Nickel-63	3.44 E+1	3.69 E+0
	Nickel-59	3.96 E-1	4.24 E-2
	Strontium-90	9.34 E-4	1.00 E-4
	Niobium-95	4.75 E+0	5.08 E-1
	Zirconium-95	3.85 E+0	4.12 E-1
	Tin-113	1.71 E-1	1.83 E-2
c.	Manganese-54	1.66 E+0	3.67 E-2
	Cobalt-57	1.74 E-1	3.84 E-3
	Cobalt-58	3.62 E+0	8.01 E-2
	Cobalt-60	5.38 E+1	1.19 E+0
	Cesium-137	4.00 E-1	8.85 E-3
	Carbon-14	3.74 E-1	8.28 E-3
	Niobium-94	8.62 E-3	8.00 E-5
	Transuranics	2.08 E-1	4.61 E-3
	Plutonium-241	9.40 E+0	2.08 E-1
	Curium-242	1.71 E-1	3.79 E-3
	Nickel-63	2.96 E+1	6.56 E-1 *
	Nickel-59	5.38 E-1	1.19 E-2 *
	Strontium-90	2.08 E-3	4.60 E-5 *
d.	Manganese-54	2.59 E+0	5.56 E-1
	Cobalt-57	1.11 E-1	2.38 E-2
	Cobalt-58	1.18 E+1	2.53 E+0
	Cobalt-60	3.94 E+1	8.46 E+0
	Cesium-137	1.12 E+0	2.40 E-1
	Niobium-95	7.37 E-1	1.58 E-1
	Silver-110m	2.41 E+0	5.17 E-1
	Tin-113	2.55 E-2	5.47 E-3
	Zirconium-95	3.31 E-1	7.12 E-2
	Iron-59	2.46 E+0	5.29 E-1
	Antimony-124	1.03 E-2	2.22 E-3
	Carbon-14	6.70 E-2	1.44 E-2
	Niobium-94	3.99 E-3	8.58 E-4
	Transuranics	3.95 E-2	8.49 E-3
	Plutonium-241	1.82 E+0	3.91 E-1
	Curium-242	3.39 E-2	7.27 E-3
	Nickel-63	3.45 E+1	7.40 E+0 *
	Nickel-59	3.96 E-1	8.51 E-2 *
	Strontium-90	5.81 E-3	1.25 E-3 *
	Chromium-51	2.26 E+0	4.85 E-1

e. None

Table 4.1
January thru June 1984 Solid Waste and Irradiated
Fuel Shipments (con't)

3. Solid Waste Disposition

Date of Shipment	Mode of Transportation	Destination
03/26/84	Chem-Nuclear 14-195H Cask	Barnwell South Carolina
04/17/84	Chem-Nuclear 14-195H Cask	Barnwell South Carolina
04/24/84	Chem-Nuclear 14-195H Cask	Barnwell South Carolina
04/26/84	Chem-Nuclear Shielded Van	Barnwell South Carolina
05/15/84	Chem-Nuclear 14-170 Cask	Barnwell South Carolina
05/25/84	Chem-Nuclear Shielded Van	Barnwell South Carolina
06/11/84	Chem-Nuclear 14-170 Cask	Barnwell South Carolina
06/21/84	Chem-Nuclear 14-195H Cask	Barnwell South Carolina

B. Irradiated Fuel Shipments

No irradiated fuel shipments were made from the Kewaunee Nuclear Power Plant during the first six months of 1984.

ERRATA SHEET FOR KEWAUNEE NUCLEAR POWER PLANT

SEMI-ANNUAL EFFLUENT REPORT - JANUARY-JUNE 1982

- Page 23, Table 3.2b, Liquid Effluents:

  Item 7. Isotopes Released, Isotope Na 95 should read Nb 95.

- Page 25, Table 4.1, Solid Waste and Irradiated Fuel Shipments:

A.1.b.	Dry compressable contaminated waste	Cu.M Ci	1.28 E+1 1.71 E 0

ERRATA SHEET FOR KEWAUNEE NUCLEAR POWER PLANT

SEMI-ANNUAL EFFLUENT REPORT - JULY-DECEMBER 1983

- Page 23, Table 3.2b, Liquid Effluents:

Item 7. Isotopes Released

	UNITS	OCT	NOV	DEC	TOTAL
Sr 90	CURIES	1.78 E-6	3.08 E-6	4.25 E-6	6.78 E-5