

NORTHEAST UTILITIES



THE CONNECTICUT LIGHT AND POWER COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY

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February 28, 1990

Docket Nos. 50-245

50-336

50-423

B13457

Re: 10CFR50.36a

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

Gentlemen:

Millstone Nuclear Power Station
Unit Nos. 1, 2, and 3
Semiannual Radioactive Effluents Release Report

In accordance with the requirements of 10CFR50.36a, the Technical Specifications and the Radiological Effluents Monitoring Manual, a copy of the Semi-annual Radioactive Effluents Release Report is herewith submitted.


This report includes a summary of the quantities of solid radioactive waste and liquid and gaseous effluents for the period of July through December 1989. An annual Radioactive Effluents Dose Report (to be submitted in March 1990) will include an assessment of the radiation doses due to the radioactive liquid and gaseous effluents released during the calendar year (January through December 1989).

The report has been prepared in accordance with the format of Regulatory Guide 1.21, and copies of the report are being forwarded in accordance with the provisions of 10CFR50.4(b)(1).

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

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PDR ADOCK 05000245
R PNU


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Senior Vice President

cc: W. T. Russell, Region I Administrator
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NORTHEAST NUCLEAR ENERGY COMPANY

MILLSTONE NUCLEAR POWER STATION
UNITS NO. 1, 2 & 3

SEMIANNUAL RADIOACTIVE
EFFLUENTS REPORT
JULY-DECEMBER 1989

OPERATING LICENSE NO's. DPR-21, DPR-65, & NPF-49

DOCKET NO's. 50-245, 50-336, & 50-423

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INTRODUCTION

1.0 This report is being submitted for Northeast Nuclear Energy Company's Millstone Power Station, Units No. 1, 2, and 3 in accordance with the requirements of 10CFR50.36a, and the Radiological Effluent Technical Specifications and in the format outlined by U. S. NRC Regulatory Guide 1.21.

During the period covered by this report, July 1 through December 31, 1989, Unit No. 1 operated with a unit capacity factor of 93.9%, Unit No. 2 with a unit capacity factor of 78.3%, and Unit No. 3 with a unit capacity factor of 81.8%.

Unit No. 1 ran for almost the entire period. The unit was shut down for four days in October to repair a feedwater regulating valve. Unit 2 was shut down from October 21 to November 22 for a steam generator inspection. The unit ran continuously for the rest of the period.

Unit No. 3 commenced postrefueling start-up on July 12 and ran continuously until November 29, when the unit was shut down for seven days to repair a pressurizer safety valve.

A single report is being submitted for all units as the three units share a number of items related to this report. However, effluent release data are presented separately for each unit.

This report does not consider the dose consequences of the radioactive effluents tabulated here. However, the data in the report is comparable to prior experience and the results of dose calculations are anticipated to be well within regulatory limits. These will be published in the Annual Radioactive Effluents Dose Report for 1989.

RADIOACTIVE EFFLUENT RELEASES

2.0 The plants were operated in accordance with the Technical Specifications. The liquid and airborne effluents are given in the attached tables as follows:

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Table 2.1-1
Millstone Unit No. 1
Liquid Effluents - Sum Of All Releases

Year 1989

Units	JULY	AUGUST	SEPTEMBER	Quarterly Totals
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A. Fission and Activation Products

1. Total Activity Released	Ci	9.74E-02	1.05E-01	1.51E-01	3.53E-01
2. Average Diluted Activity During Period	μCi/ml	1.31E-09	1.39E-09	2.14E-09	1.58E-09

B. Tritium

1. Total Activity Released	Ci	1.26E+00	1.63E+00	9.66E-01	3.86E+00
2. Average Diluted Activity During Period	μCi/ml	1.70E-08	2.16E-08	1.37E-08	1.73E-08

C. Dissolved and Entrained Gases

1. Total Activity Released	Ci	1.38E-05	9.79E-05	1.91E-05	1.31E-04
2. Average Diluted Activity During Period	μCi/ml	1.86E-13	1.29E-12	2.70E-13	5.87E-13

D. Gross Alpha

1. Total Activity Released	Ci	-----	-----	-----	-----
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E. Volume

1. Volume of Waste Released	Liters	1.19E+06	1.55E+06	1.41E+06	4.15E+06
2. Volume of Dilution During Releases	Liters	6.64E+09	1.10E+10	1.18E+10	2.94E+10
3. Volume of Dilution During Time Period	Liters	7.43E+10	7.56E+10	7.07E+10	2.23E+11

Table 2.1-1
Millstone Unit No. 1
Liquid Effluents - Sum Of All Releases

Year 1989

Units	OCTOBER	NOVEMBER	DECEMBER	Quarterly Totals
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A. Fission and Activation Products

1. Total Activity Released	Ci	7.01E-02	1.30E-02	2.66E-02	1.10E-01
2. Average Diluted Activity During Period	µCi/ml	1.07E-09	1.80E-10	3.54E-10	5.16E-10

B. Tritium

1. Total Activity Released	Ci	5.95E+00	1.16E+00	1.19E+01	1.90E+01
2. Average Diluted Activity During Period	µCi/ml	9.04E-08	1.61E-08	1.58E-07	8.92E-08

C. Dissolved and Entrained Gases

1. Total Activity Released	Ci	1.84E-06	----	2.13E-05	2.31E-05
2. Average Diluted Activity During Period	µCi/ml	2.80E-14	----	2.84E-13	1.08E-13

D. Gross Alpha

1. Total Activity Released	Ci	----	----	----	----
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E. Volume

1. Volume of Waste Released	Liters	1.60E+06	1.25E+06	1.43E+06	4.28E+06
2. Volume of Dilution During Releases	Liters	8.27E+09	7.27E+09	7.55E+09	2.31E+10
3. Volume of Dilution During Time Period	Liters	6.58E+10	7.21E+10	7.51E+10	2.13E+11

Table 2.1-2
Millstone Unit No. 1
Liquid Effluents - Batch

Year 1989

Nuclides Released	Unit	JULY	AUGUST	SEPTEMBER	Quarterly Total
Na-24	Ci				
Cr-51	Ci	4.90E-04	2.68E-06		4.93E-04
Mn-54	Ci	4.61E-03	3.01E-03	4.70E-03	1.23E-02
	Ci				
Fe-59	Ci				
Co-58	Ci	1.04E-03	6.33E-04	1.14E-04	8.51E-03
Co-60	Ci	4.93E-02	3.41E-02	4.90E-02	1.32E-01
Zn-65	Ci	9.84E-03	3.03E-02	4.67E-02	8.68E-02
	Ci				
	Ci				
Tc-99M	Ci				
I-131	Ci		2.71E-06	3.61E-06	6.32E-06
I-133	Ci		8.34E-05	1.70E-05	1.00E-04
I-135	Ci				
I-132	Ci			4.72E-06	4.72E-06
Ba-139	Ci			7.89E-06	7.89E-06
	Ci				
Cs-134	Ci	1.12E-04	2.20E-04	3.47E-04	6.79E-04
Cs-137	Ci	2.02E-02	2.88E-02	3.87E-02	8.77E-02
	Ci				
Fe-55	Ci	1.17E-02	7.44E-03	1.04E-02	2.95E-02
Sr-89	Ci			2.12E-04	2.12E-04
Sr-90	Ci	6.89E-05	2.17E-04	1.02E-03	1.30E-03
	Ci				
	Ci				
Xe-133	Ci			1.21E-05	1.21E-05
Xe-135	Ci	1.38E-05	9.79E-05	7.02E-06	1.19E-04
Xe-135M	Ci				
	Ci				
	Ci				
	Ci				

Table 2.1-3
Millstone Unit No. 1
Airborne Effluents - Sum Of All Releases

Year 1989

Units	JULY	AUGUST	SEPTEMBER	Quarterly Totals
-------	------	--------	-----------	------------------

A. Fission and Activation Products

1. Total Activity Released	Ci	5.05E+00	7.66E+00	6.42E+00	1.91E+01
2. Average Release Rate for the Period	μCi/sec	2.09E+00	2.53E+00	2.65E+00	2.43E+00

B. Iodines

1. Total I-131 Activity Released	Ci	1.66E-05	4.22E-05	1.15E-05	7.03E-05
2. Average Release Rate for the Period	μCi/sec	6.89E-06	1.40E-05	4.75E-06	8.96E-06

C. Particulates

1. Total Particulate Activity Released	Ci	5.55E-05	4.64E-04	8.16E-05	6.01E-04
2. Average Release Rate for the Period	μCi/sec	2.30E-05	1.54E-04	3.37E-05	7.66E-05
3. Total Gross Alpha Activity Released	Ci	-----	4.57E-07	1.02E-07	5.59E-07

D. Tritium

1. Total Activity Releases	Ci	2.26E+01	5.25E+01	6.21E+00	8.13E+01
2. Average Release Rate for the Period	μCi/sec	9.38E+00	1.74E+01	2.57E+00	1.04E+01

Table 2.1-3
Millstone Unit No. 1
Airborne Effluents - Sum Of All Releases

Year 1989

Units	OCTOBER	NOVEMBER	DECEMBER	Quarterly Totals
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A. Fission and Activation Products

1. Total Activity Released	Ci	2.83E+01	2.54E+01	4.59E+00	5.83E+01
2. Average Release Rate for the Period	μCi/sec	1.17E+01	8.41E+00	1.90E+00	7.43E+00

B. Iodines

1. Total I-131 Activity Released	Ci	3.54E-05	4.23E-05	9.65E-05	1.74E-04
2. Average Release Rate for the Period	μCi/sec	1.47E-05	1.40E-05	3.99E-05	2.22E-05

C. Particulates

1. Total Particulate Activity Released	Ci	2.74E-04	1.04E-04	2.90E-04	6.68E-04
2. Average Release Rate for the Period	μCi/sec	1.14E-04	3.44E-05	1.20E-04	8.51E-05
3. Total Gross Alpha Activity Released	Ci	1.99E-07	7.12E-07	5.83E-07	1.49E-06

D. Tritium

1. Total Activity Released	Ci	1.51E+00	3.82E+00	1.11E+01	1.49E+01
2. Average Release Rate for the Period	μCi/sec	6.27E-01	1.26E+00	4.59E+00	1.90E+00

Table 2.1-4
Millstone Unit No. 1
Airborne Effluents - Elevated - Continuous

Year 1989

Nuclides	Unit	JULY	AUGUST	SEPTEMBER	Quarterly Total
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1. Fission Gases

Kr-85	Ci				
Kr-85m	Ci				
Kr-87	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
Xe-131m	Ci				
Xe-133	Ci	4.95E+00	7.05E+00	6.32E+00	1.83E+01
Xe-133m	Ci				
	Ci				
Xe-135	Ci	9.88E-02	6.05E-01	9.77E-02	8.02E-01
Xe-135m	Ci				
Xe-138	Ci				
	Ci				

2. Iodines

Iodine-131	Ci	1.66E-05	4.22E-05	1.15E-05	7.03E-05
Iodine-133	Ci	1.77E-05	3.33E-05	1.87E-05	6.97E-05

3. Particulates

Cr-51	Ci		1.81E-04	3.08E-05	2.12E-04
Mn-54	Ci		1.53E-05		1.53E-05
Fe-59	Ci				
Co-58	Ci	6.45E-06	2.21E-05		2.86E-05
Co-60	Ci	2.33E-05	4.67E-05	1.96E-05	8.96E-05
Zn-65	Ci	1.09E-05	1.81E-04	1.74E-05	2.09E-04
I-131	Ci				
Cs-134	Ci				
Cs-137	Ci	3.04E-06	5.48E-06	6.63E-06	1.52E-05
Ba-140	Ci				
Ce-141	Ci				
Ce-144	Ci				
	Ci				
La-140	Ci				
	Ci				
Sr-89	Ci	1.18E-05	1.19E-05	7.17E-06	3.08E-05
Sr-90	Ci		2.31E-07		2.31E-07
	Ci				
	Ci				

Table 2.1-4
Millstone Unit No. 1
Airborne Effluents - Elevated - Continuous

Year 1989

Nuclides	Unit	OCTOBER	NOVEMBER	DECEMBER	Quarterly Total
----------	------	---------	----------	----------	-----------------

1. Fission Gases

Xe-135	Ci	3.79E+00	3.16E+00	1.68E-01	7.12E+00
Xe-133	Ci	2.33E+01	2.22E+01	3.40E+00	4.89E+01
Xe-133m	Ci			6.21E-01	6.21E-01
Ar-41	Ci	1.17E+00	7.46E-02	4.02E-01	1.65E+00
Total For Period	Ci	2.83E+01	2.54E+01	4.95E+00	5.83E+01
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				

2. Iodines

iodine-131	Ci	3.54E-05	4.23E-05	9.65E-05	1.74E-04
iodine-133	Ci	----	8.97E-05	2.13E-04	3.03E-04

3. Particulates

Cr-51	Ci	9.83E-05		6.42E-05	1.63E-04
Mn-54	Ci	1.11E-05		1.07E-05	2.18E-05
Co-58	Ci	5.74E-06		1.28E-05	1.85E-05
Co-60	Ci	3.66E-05	5.48E-05	8.20E-05	1.73E-04
Zn-65	Ci	1.13E-04	2.20E-05	9.93E-05	2.34E-04
Cs-137	Ci	3.57E-06	7.98E-06	2.10E-05	3.26E-05
Sr-89	Ci	5.23E-06	1.97E-05	**	**
Sr-90	Ci	1.74E-07	----	**	**
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				

** Data not available as of 2/27/90. Will be submitted in subsequent report.

Table 2.1-5
Millstone Unit No. 1
Airborne Effluents - Batch

Year 1989

Nuclides	Unit	July	August	September	Quarterly Total
----------	------	------	--------	-----------	-----------------

1. Fission Gases

NO BATCH RELEASES

Kr-85	Ci				
Kr-85m	Ci				
Kr-87	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
Xe-131m	Ci				
Xe-133	Ci				
Xe-133m	Ci				
	Ci				
Xe-135	Ci				
Xe-135m	Ci				
Xe-138	Ci				
	Ci				

2. Iodines

Iodine-131	Ci				
Iodine-133	Ci				

3. Particulates

Cr-51	Ci				
Mn-54	Ci				
Fe-59	Ci				
Co-58	Ci				
Co-60	Ci				
Zn-65	Ci				
I-131	Ci				
Cs-134	Ci				
Cs-137	Ci				
Ba-140	Ci				
Ce-141	Ci				
Ce-144	Ci				
	Ci				
La-140	Ci				
	Ci				
Sr-89	Ci				
Sr-90	Ci				
	Ci				
	Ci				

Table 2.2-1
Millstone Unit No. 2
Liquid Effluents - Sum Of All Releases

Year 1989

Units	JULY	AUGUST	SEPTEMBER	Quarterly Totals
-------	------	--------	-----------	------------------

A. Fission and Activation Products

1. Total Activity Released	Ci	1.28-01	9.84-03	9.10-04	1.39-01
2. Average Diluted Activity During Period	µCi/ml	1.32-09	1.02-10	9.73-12	4.84-10

B. Tritium

1. Total Activity Released	Ci	1.76+01	4.34+01	1.57+01	7.67+01
2. Average Diluted Activity During Period	µCi/ml	1.82-07	4.48-07	1.68-07	2.67-07

C. Dissolved and Entrained Gases

1. Total Activity Released	Ci	1.59-01	3.92-02	2.58-03	2.01-01
2. Average Diluted Activity During Period	µCi/ml	1.64-09	4.05-10	2.76-11	7.00-10

D. Gross Alpha

1. Total Activity Released	Ci	-0-	-0-	-0-	-0-
----------------------------	----	-----	-----	-----	-----

E. Volume

1. Volume of Waste Released	Liters	7.43+06	9.98+06	1.44+07	3.18+07
2. Volume of Dilution During Releases	Liters	1.10+10	1.13+10	1.13+10	3.36+10
3. Volume of Dilution During Time Period	Liters	9.68+10	9.68+10	9.35+10	2.87+11

Table 2.2-1
Millstone Unit No. 2
Liquid Effluents - Sum Of All Releases

Year 1989

Units	OCTOBER	NOVEMBER	DECEMBER	Quarterly Totals
-------	---------	----------	----------	------------------

A. Fission and Activation Products

1. Total Activity Released	Ci	4.56-02	6.65-02	3.36E-01	4.48E-01
2. Average Diluted Activity During Period	µCi/ml	5.62-10	1.23-09	3.48-09	1.95-09

B. Tritium

1. Total Activity Released	Ci	4.36+01	1.20+02	1.50+01	1.79+02
2. Average Diluted Activity During Period	µCi/ml	5.38-07	2.22-06	1.55-07	7.78-07

C. Dissolved and Entrained Gases

1. Total Activity Released	Ci	2.25-02	9.36-02	9.39-03	1.26-01
2. Average Diluted Activity During Period	µCi/ml	2.77-10	1.73-09	9.73-11	5.48-10

D. Gross Alpha

1. Total Activity Released	Ci	-0-	-0-	-0-	-0-
----------------------------	----	-----	-----	-----	-----

E. Volume

1. Volume of Waste Released	Liters	2.19+07	9.98+06	1.75+07	4.94+07
2. Volume of Dilution During Releases	Liters	1.17+10	6.62+09	8.59+09	2.69+10
3. Volume of Dilution During Time Period	Liters	8.11+10	5.40+10	9.65+10	2.30+11

Table 2.2-2
Millstone Unit No. 1
Liquid Effluents - Continuous - S.G.

Year 1989

Nuclides Released	Unit	JULY	AUGUST	SEPTEMBER	Quarterly Total
Na-24	Ci				
Cr-51	Ci				
Mn-54	Ci				
	Ci				
Fe-59	Ci				
Co-58	Ci				
Co-60	Ci				
Zn-65	Ci				
	Ci				
	Ci				
Tc-99M	Ci				
I-131	Ci				
I-133	Ci				
I-135	Ci				
	Ci				
	Ci				
	Ci				
Cs-134	Ci				
Cs-137	Ci				
	Ci				
Fe-55	Ci				
Sr-89	Ci				
Sr-90	Ci				
H-3	Ci	2.04-01	3.20-01	4.11-01	9.35-01
	Ci				
Xe-133	Ci				
Xe-135	Ci				
Xe-135M	Ci				
	Ci				

Table 2.2-4
Millstone Unit No. 2
Airborne Effluents - Sum Of All Releases

Year 1989

Units	JULY	AUGUST	SEPTEMBER	Quarterly Totals
-------	------	--------	-----------	------------------

A. Fission and Activation Products

1. Total Activity Released	Ci	2.08+01	1.71+01	5.94+00	4.38+01
2. Average Release Rate for the Period	μCi/sec	6.89+00	7.07+00	2.45+00	5.57+00

B. Iodines

1. Total I-131 Activity Released	Ci	2.28-04	1.82-04	1.94-04	6.04-04
2. Average Release Rate for the Period	μCi/sec	7.54-05	7.53-05	7.99-05	7.70-05

C. Particulates

1. Total Particulate Activity Released	Ci	-0-	-0-	-0-	-0-
2. Average Release Rate for the Period	μCi/sec	N/A	N/A	N/A	N/A
3. Total Gross Alpha Activity Released	Ci	-0-	-0-	-0-	-0-

D. Tritium

1. Total Activity Releases	Ci	2.19+01	5.84+00	3.95+00	3.17+01
2. Average Release Rate for the Period	μCi/sec	7.25+00	2.41+00	1.63+00	4.03+00

Table 2.2-4
Millstone Unit No. 2
Airborne Effluents - Sum Of All Releases

Year 1989

Units	OCTOBER	NOVEMBER	DECEMBER	Quarterly Totals
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A. Fission and Activation Products

1. Total Activity Released	Ci	5.29+01	6.22+00	2.05+01	7.96+01
2. Average Release Rate for the Period	µCi/sec	2.19+01	2.58+00	6.78+00	1.01+01

B. Iodines

1. Total I-131 Activity Released	Ci	3.33-03	1.94-04	7.51-05	3.60-03
2. Average Release Rate for the Period	µCi/sec	1.37-03	8.02-05	2.49-05	4.58-04

C. Particulates

1. Total Particulate Activity Released	Ci	-0-	-0-	1.20-05	1.20-05
2. Average Release Rate for the Period	µCi/sec	-0-	-0-	3.97-06	1.53-06
3. Total Gross Alpha Activity Released	Ci	-0-	-0-	-0-	-0-

D. Tritium

1. Total Activity Releases	Ci	2.37+00	1.51+00	2.91+00	6.79+00
2. Average Release Rate for the Period	µCi/sec	9.79-01	6.24-01	9.64-01	8.64-01

Table 2.2-5
Millstone Unit No. 2

Airborne Effluents - Mixed - Continuous Vent & BD Tank Vent

Year 1989

Nuclides	Unit	JULY	AUGUST	SEPTEMBER	Quarterly Total
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1. Fission Gases

Kr-85	Ci				
Kr-85m	Ci				
Kr-87	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
Xe-131m	Ci				
Xe-133	Ci	1.88+01	1.37+01	5.66+00	3.82+01
Xe-133m	Ci				
	Ci				
Xe-135	Ci	1.30+00	2.89+00	2.77-01	4.47+00
Xe-135m	Ci				
Xe-138	Ci				
	Ci				

2. Iodines

Iodine-131	Ci	2.28-04	1.82-04	1.94-04	6.04-04
Iodine-133	Ci	4.80-04	3.62-04	1.33-04	9.95-04

3. Particulates

Cr-51	Ci				
Mn-54	Ci				
Fe-59	Ci				
Co-58	Ci				
Co-60	Ci				
Zn-65	Ci				
I-131	Ci				
Cs-134	Ci				
Cs-137	Ci				
Ba-140	Ci				
Ce-141	Ci				
Ce-144	Ci				
H-3	Ci	2.19+01	5.84+00	3.95+00	3.17+01
La-140	Ci				
	Ci				
Sr-89	Ci	-0-	-0-	-0-	-0-
Sr-90	Ci	-0-	-0-	-0-	-0-
	Ci				
	Ci				

**Table 2.2-5
Millstone Unit No. 2**

Airborne Effluents - Mixed - Continuous Vent & BD Tank Vent

Year 1989

Nuclides	Unit	OCTOBER	NOVEMBER	DECEMBER	Quarterly Total
----------	------	---------	----------	----------	-----------------

1. Fission Gases

Xe 133	Ci	2.86+01	2.80+00	1.55+01	4.69+01
Xe 135	Ci	1.02+00		3.92+00	4.94+00
Xe 135M	Ci			2.71-01	2.71-01
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
Total for Period	Ci	2.96+01	2.80+00	1.97+01	5.21+01
	Ci				

2. Iodines

Iodine-131	Ci	1.42-03	1.94-04	7.51-05	1.69-03
Iodine-133	Ci	2.82-03	5.04-06	1.76-04	3.00-03

3. Particulates

Co-60	Ci			3.60-06	3.60-06
Cs-134	Ci			2.24-06	2.24-06
Cs-137	Ci			6.14-06	6.14-06
Total	Ci	-0-	-0-	1.20-05	1.20-05
H-3	Ci	2.37+00	1.51+00	2.91+00	6.79+00
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
Iodine Via SG Vent	Ci	4.15-06	1.25-05	-0-	1.67E-05
	Ci				
	Ci				
	Ci				
	Ci				

Table 2.2-6
Millstone Unit No. 2
Airborne Effluents - Mixed - Batch - Containment Purge

Year 1989

Nuclides	Unit	JULY	AUGUST	SEPTEMBER	Quarterly Total
----------	------	------	--------	-----------	-----------------

1. Fission Gases

Kr-85	Ci				
Kr-85m	Ci		NONE THIS QUARTER		
Kr-87	Ci				
	Ci				
	Ci				
	Ci				
Xe-131m	Ci				
Xe-133	Ci				
Xe-133m	Ci				
	Ci				
Xe-135	Ci				
Xe-135m	Ci				
Xe-138	Ci				
	Ci				

2. Iodines

Iodine-131	Ci				
Iodine-133	Ci				

3. Particulates

Cr-51	Ci				
Mn-54	Ci				
Fe-59	Ci				
Co-58	Ci				
Co-60	Ci				
Zn-65	Ci				
I-131	Ci				
Cs-134	Ci				
Cs-137	Ci				
Ba-140	Ci				
Ce-141	Ci				
Ce-144	Ci				
	Ci				
La-140	Ci				
	Ci				
Sr-89	Ci				
Sr-90	Ci				
	Ci				
	Ci				

Table 2.2-7
Millstone Unit No. 2
Airborne Effluents - Elevated - Batch - WGDT

Year 1989

Nuclides	Unit	July	August	September	Quarterly Total
----------	------	------	--------	-----------	-----------------

1. Fission Gases

Kr-85	Ci	2.41-01			2.41-01
Kr-85m	Ci				
Kr-87	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
Xe-131m	Ci	8.55-03			8.55-03
Xe-133	Ci	5.05-01	5.26-01		1.03+00
Xe-133m	Ci	2.01-03			2.01-03
	Ci				
Xe-135	Ci	9.28-05			9.28-05
Xe-135m	Ci				
Xe-138	Ci				
	Ci				

2. Iodines

Iodine-131	Ci				
Iodine-133	Ci				

3. Particulates

Cr-51	Ci				
Mn-54	Ci				
Fe-59	Ci				
Co-58	Ci				
Co-60	Ci				
Zn-65	Ci				
I-131	Ci				
Cs-134	Ci				
Cs-137	Ci				
Ba-140	Ci				
Ce-141	Ci				
Ce-144	Ci				
	Ci				
La-140	Ci				
	Ci				
Sr-89	Ci				
Sr-90	Ci				
H-3	Ci	6.35-04	2.87-04		9.22-04
	Ci				

Table 2.3-1
Millstone Unit No. 3
Liquid Effluents - Sum Of All Releases

Year 1989

Units	July	August	September	Quarterly Totals
-------	------	--------	-----------	------------------

A. Fission and Activation Products

1. Total Activity Released	Ci	1.75E+00	4.885E-01	2.355E-01	2.475E+00
2. Average Diluted Activity During Period	μCi/ml	1.39E-08	3.88E-09	1.59E-09	5.81E-09

B. Tritium

1. Total Activity Released	Ci	1.079E+01	3.212E+01	2.961E+01	7.252E+01
2. Average Diluted Activity During Period	μCi/ml	8.56E-08	2.55E-07	2.00E-07	1.70E-07

C. Dissolved and Entrained Gases

1. Total Activity Released	Ci	2.42E-03	1.57E-03	1.85E-03	5.84E-03
2. Average Diluted Activity During Period	μCi/ml	1.92E-11	1.25E-11	1.25E-11	1.37E-11

D. Gross Alpha

1. Total Activity Released	Ci	≤1.76E-04	≤1.56E-04	≤9.45E-05	≤4.27E-04
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E. Volume

1. Volume of Waste Released	Liters	1.961E+06	1.562E+06	1.050E+06	4.573E+06
2. Volume of Dilution During Releases	Liters	1.196E+10	1.096E+10	6.462E+09	2.938E+10
3. Volume of Dilution During Time Period	Liters	1.26E+11	1.26E+11	1.48E+11	4.26E+11

Table 2.3-1
Millstone Unit No. 3
Liquid Effluents - Sum Of All Releases

Year 1989

Units	OCTOBER	NOVEMBER	DECEMBER	Quarterly Totals
-------	---------	----------	----------	------------------

A. Fission and Activation Products

1. Total Activity Released	Ci	3.959E-01	2.848E-01	3.709E-01	1.052E+00
2. Average Diluted Activity During Period	μCi/ml	2.81E-09	2.01E-09	2.59E-09	2.44E-09

B. Tritium

1. Total Activity Released	Ci	5.546E+01	4.760E+01	1.405E+02	2.436E+02
2. Average Diluted Activity During Period	μCi/ml	3.93E-07	3.35E-07	9.83E-07	5.65E-07

C. Dissolved and Entrained Gases

1. Total Activity Released	Ci	2.365E-03	3.594E-03	1.572E-02	2.167E-02
2. Average Diluted Activity During Period	μCi/ml	1.68E-11	2.53E-11	1.10E-10	5.03E-11

D. Gross Alpha

1. Total Activity Released	Ci	≤ 9.216E-05	≤ 1.415E-04	≤ 1.29E-04	≤ 3.627E-04
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E. Volume

1. Volume of Waste Released	Liters	1.152E+06	1.415E+06	1.431E+06	3.998E+06
2. Volume of Dilution During Releases	Liters	7.563E+09	8.179E+09	8.572E+09	2.431E+10
3. Volume of Dilution During Time Period	Liters	1.41E+11	1.42E+11	1.43E+11	4.31E+11

Table 2.3-2
Millstone Unit No. 3
Liquid Effluents - Continuous - S.G.

Year 1989

Nuclides Released	Unit	July	August	September	Quarterly Total
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NO DETECTABLE ACTIVITY

Na-24	Ci				
Cr-51	Ci				
Mn-54	Ci				
	Ci				
Fe-59	Ci				
Co-58	Ci				
Co-60	Ci				
Zn-65	Ci				
	Ci				
	Ci				
Tc-99M	Ci				
I-131	Ci				
I-133	Ci				
I-135	Ci				
	Ci				
	Ci				
	Ci				
Cs-134	Ci				
Cs-137	Ci				
	Ci				
Fe-55	Ci				
Sr-89	Ci				
Sr-90	Ci				
	Ci				
	Ci				
Xe-133	Ci				
Xe-135	Ci				
Xe-135M	Ci				
	Ci				
	Ci				
	Ci				

Table 2.3-3
Millstone Unit No. 3
Liquid Effluents - Batch - LWS

Year 1989

Nuclides Released	Unit	JULY	AUGUST	SEPTEMBER	Quarterly Total
Cr-51	Ci	1.624E-01	9.667E-03	3.723E-03	1.768E-01
Mn-54	Ci	7.957E-02	1.275E-02	6.615E-03	9.893E-02
Tc-99M	Ci	< MDA	< MDA	< MDA	< MDA
Co-58	Ci	4.753E-01	8.092E-02	2.119E-02	5.774E-01
Co-60	Ci	1.875E-01	2.691E-02	1.721E-02	2.316E-01
I-131	Ci	9.717E-05	1.607E-03	1.974E-04	1.902E-03
I-133	Ci	6.067E-05	4.952E-05	< MDA	1.102E-04
I-135	Ci	< MDA	< MDA	< MDA	< MDA
Cs-134	Ci	1.641E-02	1.958E-02	4.674E-04	3.646E-02
Cs-137	Ci	3.315E-02	3.370E-02	1.300E-03	6.815E-02
Mo-99	Ci	< MDA	< MDA	< MDA	< MDA
Ce-141	Ci	< MDA	< MDA	< MDA	< MDA
Ce-144	Ci	3.076E-02	1.503E-03	3.322E-04	3.259E-02
Zn-65	Ci	4.638E-03	5.618E-04	< MDA	5.20E-03
Fe-59	Ci	1.590E-02	2.015E-03	9.977E-04	1.891E-02
Co-57	Ci	2.711E-03	1.695E-04	1.689E-04	3.049E-03
Ag-110M	Ci	3.039E-02	2.008E-02	1.228E-02	6.275E-02
Zr-95	Ci	3.152E-02	2.860E-03	1.408E-03	3.579E-02
Nb-95	Ci	6.594E-02	1.077E-02	5.129E-03	8.184E-02
Nb-97	Ci	4.216E-02	2.907E-02	2.058E-02	9.181E-02
Fe-55	Ci	5.29E-01	2.19E-01	1.36E-01	8.84E-01
Sr-89	Ci	1.10E-04	≤ 6.25E-05	≤ 3.15E-05	≤ 2.04E-04
Sr-90	Ci	≤ 1.18E-05	≤ 1.562E-05	≤ 6.30E-06	≤ 3.37E-05
Ar-41	Ci	1.192E-03	2.028E-04	1.118E-04	1.507E-03
Xe-133	Ci	6.037E-04	9.752E-04	2.669E-04	1.846E-03
Xe-135	Ci	6.262E-04	3.887E-04	2.272E-04	1.242E-03
Xe-135M	Ci	< MDA	< MDA	< MDA	< MDA
Kr-85M	Ci	< MDA	< MDA	8.562E-06	8.562E-06
Kr-87	Ci	< MDA	< MDA	1.065E-05	1.065E-05
Rb-88	Ci	< MDA	< MDA	1.226E-03	1.226E-03
Total Gases	Ci	2.42E-03	1.57E-03	1.85E-03	5.84E-03

Table 2.3-3
Millstone Unit No. 3
Liquid Effluents - Batch - LWS

Year 1989

Nuclides Released	Unit	OCTOBER	NOVEMBER	DECEMBER	Quarterly Total
Cr-51	Ci	2.143E-03	<MDA	2.128E-02	2.342E-02
Mn-54	Ci	1.207E-02	1.385E-02	2.139E-02	4.731E-02
Tc-99M	Ci	3.078E-05	5.236E-06	<MDA	3.602E-05
Co-58	Ci	2.471E-02	2.153E-02	7.525E-02	1.215E-01
Co-60	Ci	3.440E-02	5.580E-02	6.574E-02	1.559E-01
I-131	Ci	8.503E-04	5.316E-04	1.889E-03	3.271E-03
I-133	Ci	1.735E-04	2.988E-04	<MDA	4.723E-04
I-135	Ci	1.023E-04	1.160E-04	<MDA	2.183E-04
Cs-134	Ci	8.282E-03	2.299E-03	1.615E-02	2.673E-02
Cs-137	Ci	1.248E-02	3.703E-03	2.164E-02	3.782E-02
Ce-144	Ci	6.623E-04	<MDA	2.208E-03	2.870E-03
Zn-65	Ci	3.640E-04	7.142E-04	9.374E-04	2.016E-03
Fe-59	Ci	3.707E-04	<MDA	1.416E-03	1.787E-03
Nb-95	Ci	7.843E-03	6.634E-03	1.166E-02	2.614E-02
Zr-95	Ci	2.453E-03	1.579E-03	4.919E-03	8.951E-03
Ag-110M	Ci	1.253E-02	1.339E-02	1.288E-02	3.880E-02
Nb-97	Ci	1.821E-02	4.921E-02	1.913E-02	8.655E-02
Sr-92	Ci	4.467E-03	6.005E-03	4.449E-03	1.492E-02
Fe-55	Ci	2.50E-01	1.05E-01	8.30E-02	4.380E-01
Sr-89	Ci	≤ 3.46E-05	≤ 7.07E-05	≤ 5.15E-05	≤ 1.57E-04
Sr-90	Ci	≤ 1.152E-05	≤ 4.24E-05	≤ 1.00E-05	≤ 6.39E-05
Ar-41	Ci	1.572E-04	<MDA	<MDA	1.572E-04
Xe-133	Ci	1.356E-03	2.548E-03	1.279E-02	1.669E-02
Xe-135	Ci	8.514E-04	6.138E-04	2.084E-04	1.674E-03
Xe-135M	Ci	<MDA	4.322E-04	<MDA	4.322E-04
Xe-133M	Ci	<MDA	<MDA	1.721E-04	1.721E-04
Xe-131M	Ci	<MDA	<MDA	2.545E-03	2.545E-03
	Ci				
	Ci				
	Ci				
	Ci				

Table 2.3-4
Millstone Unit No. 3
Liquid Effluents - Batch - CPF Sumps

Year 1989

Nuclides Released	Unit	July	August	September	Quarterly Total
-------------------	------	------	--------	-----------	-----------------

NO DETECTABLE ACTIVITY

Na-24	Ci				
Cr-51	Ci				
Mn-54	Ci				
	Ci				
Fe-59	Ci				
Co-58	Ci				
Co-60	Ci				
Zn-65	Ci				
	Ci				
	Ci				
Tc-99M	Ci				
I-131	Ci				
I-133	Ci				
I-135	Ci				
	Ci				
	Ci				
	Ci				
Cs-134	Ci				
Cs-137	Ci				
	Ci				
Fe-55	Ci				
Sr-89	Ci				
Sr-90	Ci				
	Ci				
	Ci				
Xe-133	Ci				
Xe-135	Ci				
Xe-135M	Ci				
	Ci				
	Ci				
	Ci				

Table 2.3-5
Millstone Unit No. 3
Airborne Effluents - Sum Of All Releases

Year 1989

Units	July	August	September	Quarterly Totals
-------	------	--------	-----------	------------------

A. Fission and Activation Products

1. Total Activity Released	Ci	26.8	27.9	23.1	77.8
2. Average Release Rate for the Period	μCi/sec	11.1	9.2	9.6	9.9

B. Iodines

1. Total I-131 Activity Released	Ci	5.98E-05	1.50E-04	1.52E-04	3.62E-04
2. Average Release Rate for the Period	μCi/sec	2.47E-05	4.97E-05	6.31E-05	4.61E-05

C. Particulates

1. Total Particulate Activity Released	Ci	5.0E-04	<MDA	<MDA	5.0E-04
2. Average Release Rate for the Period	μCi/sec	2.07E-04	<MDA	<MDA	6.37E-05
3. Total Gross Alpha Activity Released	Ci	<MDA	1.41E-08	<MDA	1.41E-08

D. Tritium

1. Total Activity Releases	Ci	<MDA	<MDA	<MDA	<MDA
2. Average Release Rate for the Period	μCi/sec	<MDA	<MDA	<MDA	<MDA

Table 2.3-5
Millstone Unit No. 3
Airborne Effluents - Sum Of All Releases

Year 1989

Units	OCTOBER	NOVEMBER	DECEMBER	Quarterly Totals
-------	---------	----------	----------	------------------

A. Fission and Activation Products

1. Total Activity Released	Ci	1.25E+01	6.183E+01	5.86E+01	1.33E+02
2. Average Release Rate for the Period	μCi/sec	4.96E00	2.654E+01	2.53E+01	1.67E+01

B. Iodines

1. Total I-131 Activity Released	Ci	1.00E-04	5.06E-04	1.18E-04	7.24E-04
2. Average Release Rate for the Period	μCi/sec	3.97E-05	2.17E-04	5.09E-05	9.11E-05

C. Particulates

1. Total Particulate Activity Released	Ci	2.66E-06	2.05E-07	1.55E-06	4.41E-06
2. Average Release Rate for the Period	μCi/sec	1.06E-06	8.80E-08	6.70E-07	5.50E-07
3. Total Gross Alpha Activity Released	Ci	1.19E-07	1.51E-07	3.08E-06	3.35E-06

D. Tritium

1. Total Activity Releases	Ci	<MDA	MDA	5.66	5.66
2. Average Release Rate for the Period	μCi/sec	<MDA	MDA	2.44E00	7.12E-01

Table 2.3-6
Millstone Unit No. 3

Airborne Effluents - Mixed Continuous - Normal Ventilation

Year 1989

Nuclides	Unit	July	August	September	Quarterly Total
----------	------	------	--------	-----------	-----------------

1. Fission Gases

Kr-85	Ci				
Kr-85m	Ci				
Kr-87	Ci				
	Ci				
	Ci				
	Ci				
Xe-131m	Ci				
Xe-133	Ci	26.8	27.9	22.9	77.6
Xe-133m	Ci				
	Ci				
Xe-135	Ci				
Xe-135m	Ci				
Xe-138	Ci				
	Ci				

2. Iodines

Iodine-131	Ci	5.98E-05	1.05E-04	1.52E-04	3.62E-04
Iodine-133	Ci	4.97E-05	1.62E-04	1.64E-04	3.76E-04

3. Particulates

Cr-51	Ci				
Mn-54	Ci				
Fe-59	Ci				
Co-58	Ci	2.38E-05			2.38E-05
Co-60	Ci				
Zn-65	Ci				
I-131	Ci				
Cs-134	Ci	1.95E-05			1.95E-05
Cs-137	Ci	5.33E-05			5.33E-05
Ba-140	Ci				
Ce-141	Ci				
Ce-144	Ci				
Cd-109	Ci	2.54E-04			2.54E-04
La-140	Ci				
	Ci				
Sr-89	Ci				
Sr-90	Ci				
Gross Alpha	Ci		1.05E-08		1.05E-08
	Ci				

Table 2.3-7
Millstone Unit No. 3

Airborne Effluents - Mixed Continuous - ESF Building Ventilation

Year 1989

Nuclides	Unit	July	August	September	Quarterly Total
----------	------	------	--------	-----------	-----------------

1. Fission Gases

Kr-85	Ci				
Kr-85m	Ci				
Kr-87	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
Xe-131m	Ci				
Xe-133	Ci			2.31E-01	2.31E-01
Xe-133m	Ci				
	Ci				
Xe-135	Ci				
Xe-135m	Ci				
Xe-138	Ci				
	Ci				

2. Iodines

Iodine-131	Ci		1.01E-07		1.10E-07
Iodine-133	Ci		9.12E-08		9.12E-08

3. Particulates

Cr-51	Ci				
Mn-54	Ci				
Fe-59	Ci				
Co-58	Ci				
Co-60	Ci				
Zn-65	Ci				
I-131	Ci				
Cs-134	Ci				
Cs-137	Ci				
Ba-140	Ci				
Ce-141	Ci				
Ce-144	Ci				
Cd-109	Ci	1.49E-04			1.49E-04
La-140	Ci				
	Ci				
Sr-89	Ci				
Sr-90	Ci				
	Ci				
Gross Alpha	Ci		3.60E-09		3.60E-09

Table 2.3-8
Millstone Unit No. 3

Airborne Effluents - Mixed Batch - Containment Drawdown

Year 1989

Nuclides	Unit	July	August	September	Quarterly Total
----------	------	------	--------	-----------	-----------------

1. Fission Gases NO DETECTABLE ACTIVITY

Kr-85	Ci				
Kr-85m	Ci				
Kr-87	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
Xe-131m	Ci				
Xe-133	Ci				
Xe-133m	Ci				
	Ci				
Xe-135	Ci				
Xe-135m	Ci				
Xe-138	Ci				
	Ci				

2. Iodines

Iodine-131	Ci				
Iodine-133	Ci				

3. Particulates

Cr-51	Ci				
Mn-54	Ci				
Fe-59	Ci				
Co-58	Ci				
Co-60	Ci				
Zn-65	Ci				
I-131	Ci				
Cs-134	Ci				
Cs-137	Ci				
Ba-140	Ci				
Ce-141	Ci				
Ce-144	Ci				
	Ci				
La-140	Ci				
	Ci				
Sr-89	Ci				
Sr-90	Ci				
	Ci				
	Ci				

Table 2.3-9
Millstone Unit No. 3
Airborne Effluents - Mixed Batch - Containment Purges

Year 1989

Nuclides	Unit	July	August	September	Quarterly Total
----------	------	------	--------	-----------	-----------------

1. Fission Gases NO DETECTABLE ACTIVITY

Kr-85	Ci				
Kr-85m	Ci				
Kr-87	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
Xe-131m	Ci				
Xe-133	Ci				
Xe-133m	Ci				
	Ci				
Xe-135	Ci				
Xe-135m	Ci				
Xe-138	Ci				
	Ci				

2. Iodines

Iodine-131	Ci				
Iodine-133	Ci				

3. Particulates

Cr-51	Ci				
Mn-54	Ci				
Fe-59	Ci				
Co-58	Ci				
Co-60	Ci				
Zn-65	Ci				
I-131	Ci				
Cs-134	Ci				
Cs-137	Ci				
Ba-140	Ci				
Ce-141	Ci				
Ce-144	Ci				
	Ci				
La-140	Ci				
	Ci				
Sr-89	Ci				
Sr-90	Ci				
	Ci				
	Ci				

Table 2.3-10
Millstone Unit No. 3

Airborne Effluents - Mixed Continuous - Turbine Gland Seal

Year 1989

Nuclides	Unit	July	August	September	Quarterly Total
----------	------	------	--------	-----------	-----------------

1. Fission Gases

NO DETECTABLE ACTIVITY

Kr-85	Ci				
Kr-85m	Ci				
Kr-87	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
Xe-131m	Ci				
Xe-133	Ci				
Xe-133m	Ci				
	Ci				
Xe-135	Ci				
Xe-135m	Ci				
Xe-138	Ci				
	Ci				

2. Iodines

Iodine-131	Ci				
Iodine-133	Ci				

3. Particulates

Cr-51	Ci				
Mn-54	Ci				
Fe-59	Ci				
Co-58	Ci				
Co-60	Ci				
Zn-65	Ci				
I-131	Ci				
Cs-134	Ci				
Cs-137	Ci				
Ba-140	Ci				
Ce-141	Ci				
Ce-144	Ci				
	Ci				
La-140	Ci				
	Ci				
Sr-89	Ci				
Sr-90	Ci				
	Ci				
	Ci				

**Table 2.3-11
Millstone Unit No. 3**

Airborne Effluents - Mixed - Batch - Condenser Mech. Vacuum Pump

Year 1989

Nuclides	Unit	July	August	September	Quarterly Total
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1. Fission Gases

NO DETECTABLE ACTIVITY

Kr-85	Ci				
Kr-85m	Ci				
Kr-87	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
Xe-131m	Ci				
Xe-133	Ci				
Xe-133m	Ci				
	Ci				
Xe-135	Ci				
Xe-135m	Ci				
Xe-138	Ci				
	Ci				

2. Iodines

Iodine-131	Ci				
Iodine-133	Ci				

3. Particulates

Cr-51	Ci				
Mn-54	Ci				
Fe-59	Ci				
Co-58	Ci				
Co-60	Ci				
Zn-65	Ci				
I-131	Ci				
Cs-134	Ci				
Cs-137	Ci				
Ba-140	Ci				
Ce-141	Ci				
Ce-144	Ci				
	Ci				
La-140	Ci				
	Ci				
Sr-89	Ci				
Sr-90	Ci				
	Ci				
	Ci				

3.0 Radioactive Solid Waste

Summaries of solid waste shipment for each unit are given in the attached Tables. The principal radionuclides were considered to be those included on the shipping manifest.

Solidification Agent(s):

Portland 1 Cement

Types and Typical Volumes of Containers:

55 gallon steel drum DOT 17-H container

202 ft³ steel container

87 ft³ LSA steel box

132 ft³ Polyurethane high integrity container

202 ft³ Polyurethane high integrity container

92.7 ft³ steel box

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMI ANNUAL REPORT -
SOLID WASTE AND IRRADIATED COMPONENT SHIPMENTS

MILLSTONE UNIT 1

JULY 1, 1989 - DECEMBER 31, 1989

1. Type of Waste		Units	6-Month Period	Est. Total Error, %
a) Spent Resin, Filter Sludge, Evaporator Bottoms, Etc.	(CNSI)	M ³	7.11E+01	2.5E1
	Burial	Ci	7.38E+02	
	(SEG)	M ³	0.00E+00	2.5E1
	Super Compaction	Ci	0.00E+00	
	(CNSI)	M ³	3.21E+01	2.5E1
	Burial	Ci	1.86E+01	
	(SEG)	M ³	7.00E+01	2.5E1
	Super Compaction	Ci	7.05E-02	
b) Dry Compressible Waste Contaminated Equipment, Etc.	(SEG)	M ³	9.04E+01	2.5E1
	Burial	Ci	3.80E-01	
	(B&W)	M ³	0.00E+00	2.5E1
	Decon	Ci	0.00E+00	
	(B&W)	M ³	8.42E+00	2.5E1
	Burial	Ci	1.24E-01	
	(QUAD)	M ³	2.52E+01	2.5E1
	Decon	Ci	4.87E-02	
	(QUAD)	M ³	1.25E+01	2.5E1
	Burial	Ci	2.46E-01	
c) Irradiated Components, Control Rods, Etc.	(CNSI)	M ³	1.60E+00	2.5E1
	Burial	Ci	1.81E+04	

Estimates of Major Nuclides Composition (By Type of Waste)a) Spent Resin, Filter Sludges, (Burial)
Evaporator Bottoms, Etc.

<u>Nuclide</u>	<u>(%)</u>
H-3	0.11
C-14	0.01
Cr-51	<0.01
Mn-54	0.71
Fe-55	0.62
Co-58	0.07
Fe-59	<0.01
Co-60	2.23
Ni-63	0.54
Zn-65	89.98
Sr-89	<0.01
Sr-90	0.01
Tc-99	<0.01
I-131	0.03
Cs-134	0.04
Cs-137	5.40
Ba-140	0.09
La-140	0.06
Ce-141	0.01
Pu-238	<0.01
Pu-239	<0.01
Pu-241	0.07
Am-241	<0.01
Cm-242	<0.01
Cm-244	<0.01

a) Spent Resin, Filter Sludges, (SEG Super Compaction)
Evaporator Bottoms, Etc.

<u>Nuclide</u>	<u>(%)</u>
None	

b) Dry Compressible Waste (Burial)
Contaminated Equipment, Etc.

<u>Nuclide</u>	<u>(%)</u>
Mn-54	3.14
Fe-55	42.43
Co-58	16.74
Co-60	15.68
Ni-63	20.88
Zn-65	0.02
Cs-137	1.11

b) Dry Compressible Waste (SEG Super Compaction)
Contaminated Equipment, Etc.

<u>Nuclide</u>	<u>(%)</u>
Mn-54	8.04
Fe-55	31.20
Co-58	9.28
Co-60	34.35
Ni-63	13.61
Zn-65	0.78
Cs-137	2.74

b) Dry Compressible Waste (SEG Burial)
Contaminated Equipment, Etc.

<u>Nuclide</u>	<u>(%)</u>
Mn-54	12.52
Fe-55	21.40
Co-58	3.01
Co-60	51.44
Ni-63	7.38
Zn-65	1.46
Cs-137	2.78

b) Dry Compressible Waste (BABCOCK & WILCOX Decon)
Contaminated Equipment, Etc.

<u>Nuclide</u>	<u>(%)</u>
None	

b) Dry Compressible Waste (BABCOCK & WILCOX Burial)
Contaminated Equipment, Etc.

<u>Nuclide</u>	<u>(%)</u>
H-3	0.09
C-14	<0.01
Fe-55	4.39
Co-60	88.10
Ni-63	2.85
Tc-99	<0.01
Sb-125	4.58
Cs-137	<0.01

b) Dry Compressible Waste (QUADREX Decon)
Contaminated Equipment, Etc.

<u>Nuclide</u>	<u>(%)</u>
Mn-54	3.02
Fe-55	42.70
Co-58	16.89
Co-60	15.25
Ni-63	21.05
Cs-137	1.09

b) Dry Compressible Waste (QUADREX Burial)
Contaminated Equipment, Etc.

<u>Nuclide</u>	<u>(%)</u>
Mn-54	5.40
Fe-55	25.09
Co-58	4.54
Co-60	54.74
Ni-63	8.91
Cs-137	1.32

c) Irradiated Components, (Burial)
Control Rods, Etc.

<u>Nuclide</u>	<u>(%)</u>
H-3	<0.01
C-14	<0.01
Cr-51	0.33
Mn-54	3.58
Fe-55	54.77
Fe-59	0.07

<u>Nuclide</u>	<u>(%)</u>
Co-58	1.18
Ni-59	0.01
Co-60	31.95
Ni-63	2.01
Zn-65	<0.01
Sr-89	<0.01
Sr-90	<0.01
Nb-94	<0.01
Tc-99	<0.01
Cs-134	<0.01
Cs-137	<0.01
Hf-175	1.87
Hf-181	4.23
Ta-182	<0.01
Np-237	<0.01
Pu-238	<0.01
Pu-239	<0.01
Pu-240	<0.01
Pu-241	<0.01
Am-241	<0.01
Am-242m	<0.01
Cm-242	<0.01
Pu-242	<0.01
Am-243	<0.01
Cm-243	<0.01
Cm-244	<0.01

Solid Waste Disposition (From Millstone)

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
15	Truck (Sole Use Vehicle)	Chem-Nuclear Barnwell, S.C.
5	Truck (Sole Use Vehicle)	Scientific Ecology Group Oak Ridge, Tn.
0	Truck (Sole Use Vehicle)	Babcock & Wilcox Apollo Pa.
1	Truck (Sole Use Vehicle)	Quadrex Oak Ridge, Tn.

EFFLUENT AND WASTE DISPOSAL SEMI ANNUAL REPORT -
SOLID WASTE AND IRRADIATED COMPONENT SHIPMENTS

MILLSTONE UNIT 2

JULY 1, 1989 - DECEMBER 31, 1989

1. Type of Waste	Units	6-Month Period	Est. Total Error, %	
a) Spent Resin, Filter Sludge, Evaporator Bottoms, Etc.	(CNSI) Burial	M ³ Ci	6.80E+00 5.31E+02	2.5E1
	(SEG) Super Compaction	M ³ Ci	2.50E+00 7.89E-04	2.5E1
	(CNSI) Burial	M ³ Ci	5.51E+01 1.14E+00	2.5E1
	(SEG) Super Compaction	M ³ Ci	1.72E+01 3.47E-02	2.5E1
b) Dry Compressible Waste Contaminated Equipment, Etc.	(SEG) Burial	M ³ Ci	4.76E+01 6.31E-01	2.5E1
	(B&W) Decon	M ³ Ci	0.00E+00 0.00E+00	2.5E1
	(B&W) Burial	M ³ Ci	1.55E+01 2.29E-01	2.5E1
	(QUAD) Decon	M ³ Ci	4.65E+01 8.98E-02	2.5E1
	(QUAD) Burial	M ³ Ci	5.90E+00 9.67E-02	2.5E1
	c) Irradiated Components, Control Rods, Etc.	(CNSI) Burial	M ³ Ci	0.00E+00 0.00E+00

Estimates of Major Nuclides Composition (By Type of Waste)**a) Spent Resin, Filter Sludges, (Burial)
Evaporator Bottoms, Etc.**

<u>Nuclide</u>	<u>(%)</u>
H-3	<0.01
C-14	0.38
Cr-51	<0.01
Mn-54	1.11
Fe-55	24.83
Co-57	0.17
Co-58	12.27
Fe-59	<0.01
Co-60	23.90
Ni-63	18.20
Sr-89	<0.01
Sr-90	0.01
Nb-95	<0.01
Tc-99	0.01
Ag-110m	<0.01
Sb-124	<0.01
Sb-125	0.18
I-129	<0.01
Cs-134	7.38
Cs-137	11.47
Np-237	<0.01
Pu-238	<0.01
Pu-239	<0.01
Pu-241	0.09
Pu-242	<0.01

<u>Nuclide</u>	<u>(%)</u>
Am-241	<0.01
Cm-242	<0.01
Cm-244	<0.01

a) Spent Resin, Filter Sludges, (SEG Super Compaction)
Evaporator Bottoms, Etc.

<u>Nuclide</u>	<u>(%)</u>
H-3	5.20
C-14	2.15
Fe-55	54.25
Co-60	31.94
Ni-63	4.44
Am-241	0.63
Cm-242	1.27
Cm-244	0.13

b) Dry Compressible Waste (Burial)
Contaminated Equipment, Etc.

<u>Nuclide</u>	<u>(%)</u>
Fe-55	10.35
Co-58	36.55
Co-60	17.61
Ni-63	32.21
Cs-134	1.17
Cs-137	2.11

b) Dry Compressible Waste (SEG Super Compaction)
Contaminated Equipment, Etc.

<u>Nuclide</u>	<u>(%)</u>
Fe-55	10.35
Co-58	36.55
Co-60	17.61
Ni-63	32.21
Cs-134	1.17
Cs-137	2.11

b) Dry Compressible Waste (SEG Burial)
Contaminated Equipment, Etc.

<u>Nuclide</u>	<u>(%)</u>
H-3	0.03
C-14	0.01
Fe-55	10.94
Co-58	36.20
Co-60	17.79
Ni-63	31.80
Cs-134	1.15
Cs-137	2.08
Am-241	<0.01
Cm-242	0.01
Cm-244	<0.01

b) Dry Compressible Waste (BABCOCK & WILCOX Decon)
Contaminated Equipment, Etc.

<u>Nuclide</u>	<u>(%)</u>
None	

b) Dry Compressible Waste (BABCOCK & WILCOX Burial)
Contaminated Equipment, Etc.

<u>Nuclide</u>	<u>(%)</u>
H-3	0.09
C-14	<0.01
Fe-55	4.39
Co-60	88.10
Ni-63	2.85
Tc-99	<0.01
Sb-125	4.58
Cs-137	<0.01

b) Dry Compressible Waste (QUADREX Decon)
Contaminated Equipment, Etc.

<u>Nuclide</u>	<u>(%)</u>
Mn-54	3.02
Fe-55	42.70
Co-58	16.89
Co-60	15.25
Ni-63	21.05
Cs-137	1.09

b) Dry Compressible Waste (QUADREX Burial)
Contaminated Equipment, Etc.

<u>Nuclide</u>	<u>(%)</u>
Mn-54	3.65
Fe-55	34.73
Co-58	11.13
Co-60	33.76
Ni-63	15.55
Cs-137	1.18

c) Irradiated Components, (Burial)
Control Rods, Etc.

<u>Nuclide</u>	<u>(%)</u>
None	

3. Solid Waste Disposition (From Millstone)

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
5	Truck (Sole Use Vehicle)	Chem-Nuclear Barnwell, S.C.
0	Truck (Sole Use Vehicle)	Scientific Ecology Group Oak Ridge, Tn.
0	Truck (Sole Use Vehicle)	Babcock & Wilcox Apollo Pa.
3	Truck (Sole Use Vehicle)	Quadrex Oak Ridge, Tn.

EFFLUENT AND WASTE DISPOSAL SEMI ANNUAL REPORT -
SOLID WASTE AND IRRADIATED COMPONENT SHIPMENTS

MILLSTONE UNIT 3

JULY 1, 1989 - DECEMBER 31, 1989

1. Type of Waste	Units	6-Month Period	Est. Total Error, %	
a) Spent Resin, Filter Sludge, Evaporator Bottoms, Etc.	(CNSI) Burial	M ³ Ci	2.32E+01 7.26E+02	2.5E1
	(SEG) Super Compaction	M ³ Ci	2.50E+00 3.46E-01	2.5E1
	(CNSI) Burial	M ³ Ci	4.46E+01 5.94E-01	2.5E1
	(SEG) Super Compaction	M ³ Ci	1.23E+01 1.10E-02	2.5E1
b) Dry Compressible Waste Contaminated Equipment, Etc.	(SEG) Burial	M ³ Ci	1.36E+01 2.02E+00	2.5E1
	(B&W) Decon	M ³ Ci	0.00E+00 0.00E+00	2.5E1
	(B&W) Burial	M ³ Ci	6.99E+00 1.03E-01	2.5E1
	(QUAD) Decon	M ³ Ci	2.09E+01 4.04E-02	2.5E1
	(QUAD) Burial	M ³ Ci	2.66E+00 4.35E-02	2.5E1
c) Irradiated Components, Control Rods, Etc.	(CNSI) Burial	M ³ Ci	0.00E+00 0.00E+00	2.5E1

Estimates of Major Nuclides Composition (By Type of Waste)

a) Spent Resin, Filter Sludges, (Burial)
Evaporator Bottoms, Etc.

<u>Nuclide</u>	<u>(%)</u>
H-3	<0.01
C-14	0.01
Cr-51	1.13
Mn-54	8.09
Fe-55	29.48
Co-57	0.20
Co-58	32.18
Fe-59	0.08
Co-60	8.47
Ni-63	9.47
Zn-65	0.12
Sr-89	0.09
Sr-90	0.01
Nb-95	0.44
Zr-95	0.01
Tc-99	0.01
Ag-110m	0.01
Sb-125	<0.01
Cs-134	3.36
Cs-136	<0.01
Cs-137	6.84
Ce-144	<0.01
Pu-238	<0.01
Pu-239	<0.01
Pu-241	0.01

<u>Nuclide</u>	<u>(%)</u>
Am-241	<0.01
Cm-242	<0.01
Cm-244	<0.01

a) Spent Resin, Filter Sludges, (SEG Super Compaction)
Evaporator Bottoms, Etc.

<u>Nuclide</u>	<u>(%)</u>
H-3	0.95
Cr-51	0.59
Mn-54	3.14
Fe-55	45.60
Co-57	0.17
Co-58	11.11
Fe-59	0.15
Co-60	14.76
Ni-63	19.92
Zn-65	0.13
Nb-95	0.47
Zr-95	0.24
Tc-99	0.06
Ag-110m	0.70
Sb-125	0.40
Cs-134	0.19
Cs-137	0.42
Ce-144	0.50
Pu-238	<0.01
Pu-239	<0.01
Pu-241	0.50

<u>Nuclide</u>	<u>(%)</u>
Am-241	<0.01
Cm-242	<0.01

b) Dry Compressible Waste (Burial)
Contaminated Equipment, Etc.

<u>Nuclide</u>	<u>(%)</u>
Mn-54	4.14
Fe-55	35.20
Co-58	45.49
Co-60	4.69
Ni-63	10.48

b) Dry Compressible Waste (SEG Super Compaction)
Contaminated Equipment, Etc.

<u>Nuclide</u>	<u>(%)</u>
Mn-54	4.14
Fe-55	35.20
Co-58	45.49
Co-60	4.69
Ni-63	10.48

b) Dry Compressible Waste (SEG Burial)
Contaminated Equipment, Etc.

<u>Nuclide</u>	<u>(%)</u>
H-3	0.53
Cr-51	0.11
Mn-54	1.01
Fe-55	83.62

<u>Nuclide</u>	<u>(%)</u>
Co-57	0.05
Co-58	2.39
Co-60	4.89
Fe-59	0.03
Ni-63	6.63
Zn-65	0.02
Tc-99	0.03
Nb-95	0.09
Zr-95	0.04
Ag-110m	0.13
Sb-125	0.07
Cs-134	0.04
Cs-137	0.07
Ce-144	0.09
Pu-238	<0.01
Pu-239	<0.01
Pu-241	0.16
Am-241	<0.01
Cm-242	<0.01

b) Dry Compressible Waste
Contaminated Equipment, Etc.

(BABCOCK & WILCOX Decon)

<u>Nuclide</u>	<u>(%)</u>
None	

b) Dry Compressible Waste (BABCOCK & WILCOX Burial)
Contaminated Equipment, Etc.

<u>Nuclide</u>	<u>(%)</u>
H-3	0.09
C-14	<0.01
Fe-55	4.39
Co-60	88.10
Ni-63	2.85
Tc-99	<0.01
Sb-125	4.58
Cs-137	<0.01

b) Dry Compressible Waste (QUADREX Decon)
Contaminated Equipment, Etc.

<u>Nuclide</u>	<u>(%)</u>
Mn-54	3.02
Fe-55	42.70
Co-58	16.89
Co-60	15.25
Ni-63	21.05
Cs-137	1.09

b) Dry Compressible Waste (QUADREX Burial)
Contaminated Equipment, Etc.

<u>Nuclide</u>	<u>(%)</u>
Mn-54	3.65
Fe-55	34.73
Co-58	11.13
Co-60	33.76
Ni-63	15.55
Cs-137	1.18

c) Irradiated Components, (Burial)
Control Rods, Etc.

<u>Nuclide</u>	<u>(%)</u>
None	

3. Solid Waste Disposition (From Millstone)

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
8	Truck (Sole Use Vehicle)	Chem-Nuclear Barnwell, S.C.
0	Truck (Sole Use Vehicle)	Scientific Ecology Group Oak Ridge, Tn.
0	Truck (Sole Use Vehicle)	Babcock & Wilcox Apollo Pa.
0	Truck (Sole Use Vehicle)	Quadrex Oak Ridge, Tn.

4.0 SUPPLEMENTAL INFORMATION

A. MEASUREMENTS AND APPROXIMATIONS OF TOTAL RADIOACTIVITY

4.1 Gaseous Releases

a. Unit 1 Stack - Gaseous Releases

(1) Fission and Activation Gases

Stack monitors continuously record the effluent activity and flow rate. During periods when the augmented off-gas system is not operable, the radiation monitor reading is related to μCi by off-gas sampling at the steam air ejectors and subsequent isotopic analysis. The isotopic activity at the SJAЕ is mathematically decayed to establish the activity in the stack using the known holdup time. During periods of augmented off-gas system operation, samples are taken directly from the stack with a subsequent isotopic analysis. In both cases, the calculated activity in the stack is then correlated to the monitor reading. The isotopic concentrations at the release point are multiplied by the total stack flow to obtain total μCi release for each isotope.

(2) Iodines and Particulates

Charcoal cartridges and particulate filters are used to collect iodines and particulates, respectively. The filters are then analyzed for isotopic content using a gamma spectrometer;

particulate filters are also analyzed for strontium. Isotopic concentrations are multiplied by the release flow rate to determine the total amount of activity released.

b. Unit 2 Vent

Total effluent volume from the Unit 2 Vent per month is multiplied by the isotopic concentrations as measured by gamma spectrometer Ge(Li) analysis of grab samples of gases, iodine and particulates to obtain total μCi released from the Vent.

c. Unit 2 Containment Purges

Grab samples are taken for gaseous, particulate, and iodine. These are analyzed on Ge(Li) gamma spectrometer and concentrations computed. Computed concentrations are then multiplied by the purge volume for total μCi released.

Tritium collection is accomplished by the gas washing bottle method. The sample is counted on a liquid scintillation counter. Concentration is computed using worst possible case, 100% humidity. Concentration is multiplied by volume purged to give total μCi released.

d. Unit 2 Steam Generator Blowdown Tank Vent

A decontamination factor (DF) across the steam generator blowdown tank vent has been determined for iodines by

comparison of the results of gamma spectrometry, Ge(Li), analysis of steam generator blowdown water and grab samples of condensed steam exiting the blowdown tank vent. This DF was then applied to the total iodine releases via the steam generator blowdown water to determine the iodine releases out of the blowdown tank vent. An additional factor of 0.33 was utilized to account for the fraction of blowdown volume actually flashing to steam in the blowdown tank.

e. Unit 3 Vent and ESF Building Vent

The Unit 3 Ventilation Vent collects gas streams from the Auxiliary, Fuel, Waste Disposal, and Service Building exhausts, containment purge and gaseous waste process vent. The Unit 3 Vent is located on the roof of the turbine building and discharges 133 feet above grade. The Unit 3 ESF Building Vent collects gas streams from the Engineered Safety Features Building Ventilation System. This vent is located on the south wall and discharges 23 feet above grade. Total Effluent Volume per month is multiplied by isotopic concentrations from the analysis of grab samples to obtain the total activity released. These grab samples are obtained monthly for fission gas and tritium, weekly filters for iodines and particulates, monthly composites of particulate filters for gross alpha and Strontium.

f. Unit 3 Containment Drawdown and Purge

Unit 3 Containment is drawn down and purged intermittently. The drawdown is accomplished by using the containment vacuum steam jet ejector and releases through an unmonitored vent on the roof of the Auxiliary Building. The containment vacuum pump discharge, which maintains subatmospheric pressure following the initial drawdown, is released through the Unit 1 Stack. The purge is the process of discharging air from containment to maintain temperature humidity, pressure, concentration, etc., where air is replaced. Purges are filtered and normally released through the Unit 3 Vent but may use the Unit 1 Stack. Purges and Drawdowns are intermittent and are therefore considered batch releases. Calculated volume discharged is multiplied by isotopic concentrations from the analysis of grab samples to obtain activity released.

g. Unit 3 Turbine Gland Sealing System Exhaust

The turbine gland sealing system prevents air leakage into the turbine and valve stems and collects steam leakage. A mixture of air and steam drawn from the turbine shaft packing is condensed and the noncondensable gases are vented to the atmosphere at a point above the condensate polishing building. This vent is at an elevation of 48 feet above grade. Noble Gas Activity released is calculated using the air ejector monitor activity concentration and the percentage of steam to the gland sealing condenser.

Iodine and particulate activity is calculated using the steam generator blowdown activity concentration and appropriate carry over fraction. (See Appendix H, ODCM).

h. Unit 3 Main Condenser Mechanical Vacuum Pump Exhaust

The Main Condenser Evacuation System draws the initial vacuum in the condenser during start-up and maintains vacuum during start-up. The main condenser mechanical vacuum pumps exhaust through the vent on the condensate polishing building roof. The Steam Jet Air Ejectors maintain condenser vacuum during normal operation. Air and noncondensable gases removed from the condenser by the steam jet air ejectors are discharged to the Unit 1 Stack.

Noble Gas Activity released during start-up by the main condenser vacuum pumps is obtained by multiplying the condenser volume by a grab sample of the air ejector decay corrected for time of shutdown. Iodine and particulate activity is obtained from a grab sample of the mechanical vacuum pump exhaust and volume discharged. (See Appendix H, ODCM).

4.2 Liquid Effluents

a. Liquid Tanks

There are numerous tanks which are used to discharge liquids containing radioactivity to the environs; they are:

Unit 1 - Decontamination Solution Tank

Unit 1 - Floor Drain Sample Tanks (2)

Unit 1 - Waste Sample Tanks (2)

Unit 2 - Clean Waste Monitor Tanks (2)

Unit 2 - Aerated Waste Monitor Tank

Unit 3 - High Level Waste Test Tanks (2)

Unit 3 - Low Level Waste Tanks (2)

Prior to release, a tank is recirculated for two equivalent tank volumes, a sample is drawn and analyzed on the Ge(Li) gamma spectrometer for individual radionuclide composition. An aliquot of the sample is composited and analyzed for H-3, Fe-55, Sr-89/90. Isotopic concentrations are multiplied by the volume released to obtain the total activity released. A proportional aliquot of each discharge is retained for composite analysis for strontium and gross alpha.

b. Unit 2 and Unit 3 Steam Generator Blowdown

Grab samples are taken to steam generator blowdown water, and are analyzed by gamma spectrometry, Ge(Li). Total volume of blowdown is multiplied by the isotopic concentrations to determine the total activity released via blowdown. The calculated activity released out of the blowdown tank vent is accounted for pending the point of blowdown sampling.

Tritium is determined through liquid scintillation counting and strontiums are analyzed by radiochemical separations and appropriate counting techniques.

4.3 Estimate of Errors

Estimates of errors associated with radioactivity measurements were made using the following guidelines:

- 1) Sampling and Data Collection - 10% accounts for variation in personnel obtaining required data.
- 2) Calibration - 5% instrument calibration to NBS standards.
- 3) Counting of Samples - 10% maximum error due to counting statistics.
- 4) Flow and Level Measurements - 10% maximum errors on volumes released.

BATCH RELEASES

Liquid

	<u>UNIT 1</u>	<u>UNIT 2</u>	<u>UNIT 3</u>
a. Number of Batches	327	286	331
b. Total Time: (Min.)	33,711	41,557	27,115
c. Maximum Time: (Min.)	321	755	290
d. Average Time: (Min.)	103	145	82
e. Minimum Time: (Min.)	20	6	23

Average Stream Flow - Not Applicable-Ocean Site

Gaseous

	<u>UNIT 1 PURGE</u>	<u>UNIT 2 PURGE</u>	<u>UNIT 2 WGDT</u>	<u>UNIT 3 PURGE</u>	<u>UNIT 3 DRAWDOWN</u>
a. Number of Batches	0	1	7	1	2
b. Total Time: (Min.)	-	233	3,003	270	564
c. Maximum Time: (Min.)	-	233	571	270	339
d. Average Time: (Min.)	-	233	429	270	282
e. Minimum Time: (Min.)	-	233	318	270	225

4.5 ABNORMAL RELEASES

None

5.0 CHANGES TO THE REMM/ODCM/PCP

The REMM/ODCM/PCP was revised effective September 30, 1989. The revision deleted the requirement to have the NRC approve REMM changes prior to implementation. The revised page B-1 is attached.

The NRC approved this change when it approved a PTSCR to delete the requirement for NRC review of REMM changes. This change was recommended by the NRC in their Generic Letter 89-01.

B. RESPONSIBILITIES

All changes to this manual shall be reviewed and approved by the Station Operations Review Committee prior to implementation.

All changes and their rationale shall be documented in the *Semiannual Radioactive Effluent Release Report*.

It shall be the responsibility of the Station Superintendent to ensure that this manual is used in performance of the surveillance requirements and administrative controls of the *Technical Specifications*.

6.0 EFFLUENT MONITOR INOPERABILITY

During the period covered by this report, the following monitors were inoperable for greater than 30 days:

1. Unit 3 Steam Generator Blowdown Monitor

This monitor has not been placed in initial service yet. Until this monitor is in service, steam generator blowdown is being recovered without discharge to the environment except during plant startups and other periods when steam generator water chemistry is out of specification. During these periods, blowdown is sampled and analyzed daily for radioactive isotopic content per the Technical Specifications. Since the MP3 start-up in 1986, there has yet to be detectable activity in the steam generator blowdown due to the absence of any primary-to-secondary leakage.

This monitor's long-term inoperability status received regulatory attention during the reporting period (NRC Inspection Report 50-423). The report states: "Licensee corrective actions taken to restore the monitor to service, and to accurately report its status to the NRC constitute an unresolved item (UNR50-447/89-14-01)." This monitor is inoperable because the current design does not provide sufficient blowdown sample flow to the monitor. The current status of the efforts being made to make the monitor operable include:

- Completion and approval of new design to ensure adequate sample flow.

- In-house fabrication of certain components.
- Material expedition for the balance of the components.

Installation is anticipated during March 1990. The next Semiannual Radioactive Effluents report will describe the results of this modification.

2. Unit 3 Waste Neutralization Sump Monitor

On August 2, 1989, shift personnel declared the Condensate Demineralizer Waste Neutralization Sump effluent radiation monitor, 3CND-07, inoperable due to inadequate testing of the automatic release termination feature on high effluent radiation. The testing deficiency has existed since plant start-up in 1986 and was discovered by Radiological Assessment Engineering personnel reviewing the radiation monitoring surveillance program to verify adequate testing procedures were in place.

Although the monitor was declared inoperable due to the technicality of insufficient testing, it was in fact always in service and able to perform its intended function; i.e., terminate releases within 10CFR20 radionuclide concentration limits. It should also be noted that since initial plant start-up in 1986, no detectable activity has been observed in MP3 CPF waste neutralization sump water due to the absence of primary-to-secondary leaks.

The root cause of the event was a failure to incorporate all the automatic release termination capability of 3CND-07 into the applicable surveillance procedure. Since this was not realized until August 1989, an explanation of this technical inoperability was never provided in the Semiannual Effluent Release Report until this writing.

No immediate action was required as the monitor was functioning. The surveillance procedure was changed to incorporate the interlocks for all release paths and were satisfactorily tested. The monitor was declared operable on September 1, 1989. In the interim, the required action statements of the Technical Specifications were implemented. A Licensee Event Report, 89-018-00, was submitted to the NRC on September 1, 1989 on this subject.

3. Unit 3 Liquid Waste Discharge Monitor 3LWS-70

This monitor was declared inoperable on November 11, 1989 because the monitor failed its source check surveillance.

The surveillance failure occurred because the sample piping (detector well) has been contaminated by the waste stream being monitored to such an extent that the check source strength is now insufficient to cause a detectable increase in the monitor reading.

Although the monitor failed this surveillance, it has always been in service and able to perform its intended function; i.e., terminate releases within 10CFR20 radionuclide concentration limits.

Since the monitor is technically inoperable, Technical Specification Action statements are being performed and an engineering effort is underway to restore the monitor to operable status.

This effort includes:

- Obtaining another detector well to replace the currently contaminated one.
- Changing procedures to ensure the detector well is purged before and after each discharge.
- Revising source check acceptance criteria.

In the interim, the monitor remains in service and capable of performing its intended function.

APPENDIX A - UPDATED TABLES

The attached table includes the Sr-89 and Sr-90 results which were unavailable at the time of the last report. Note that no Sr activity was detected.

Table 2.2-3

MILLSTONE NUCLEAR POWER STATION

UNIT 2

LIQUID EFFLUENTS - BATCH - AMMT/CWMT/TK10 AND TK11

Year 1989

NUCLIDES RELEASED	UNIT	APRIL	MAY	JUNE	QUARTERLY TOTAL
Cr-51	C1	5.32-03	1.51-01		1.56-01
Mn-54	C1	4.26-03	1.59-02	1.68-03	2.18-02
Na-24	C1	6.39-05	1.11-05		7.50-05
Co-58	C1	7.71-01	3.63-01	6.81-02	1.20+00
Co-60	C1	6.79-02	6.45-01	3.34-02	7.46-01
I-131	C1		1.23-03	2.46-04	1.48-03
I-133	C1		2.21-03	7.82-05	2.29-03
I-135	C1				
Cs-134	C1	5.51-03	2.22-02	1.44-02	4.21-02
Cs-137	C1	1.02-02	2.93-02	3.44-02	7.39-02
RU-103	C1	5.57-05	3.16-03		3.22-03
Ce-141	C1				
Ce-144	C1		7.12-04		7.12-04
ZR-95	C1		2.37-02		2.37-02
Fe-59	C1		3.69-03		3.69-03
NB-95	C1	1.91-04	4.87-02	2.85-04	4.92-03
BA-139	C1				
BA-140	C1				
SB-124	C1	3.67-03	9.44-03	2.20-04	1.33-02
SB-125	C1	1.19-02	2.07-02	1.60-03	3.42-02
Co-57	C1	1.56-03	2.04-03	3.75-04	3.98-03
AG-110M	C1	8.05-03	8.20-02	1.65-03	9.17-02
NB-97	C1	1.11-02	1.13-01	2.63-03	1.27-01
SR-92	C1	2.47-03	2.69-02	6.21-04	3.00-02
LA-140	C1				
LA-141	C1	3.65-04			3.65-04
SR-89		-----	-----	-----	<MDA
SR-90		-----	-----	-----	<MDA
Fe-55		3.52-02	5.90-02	3.33-03	9.75-02
Total F/A Prod.		9.38-01	1.63+00	1.63-01	2.73+00