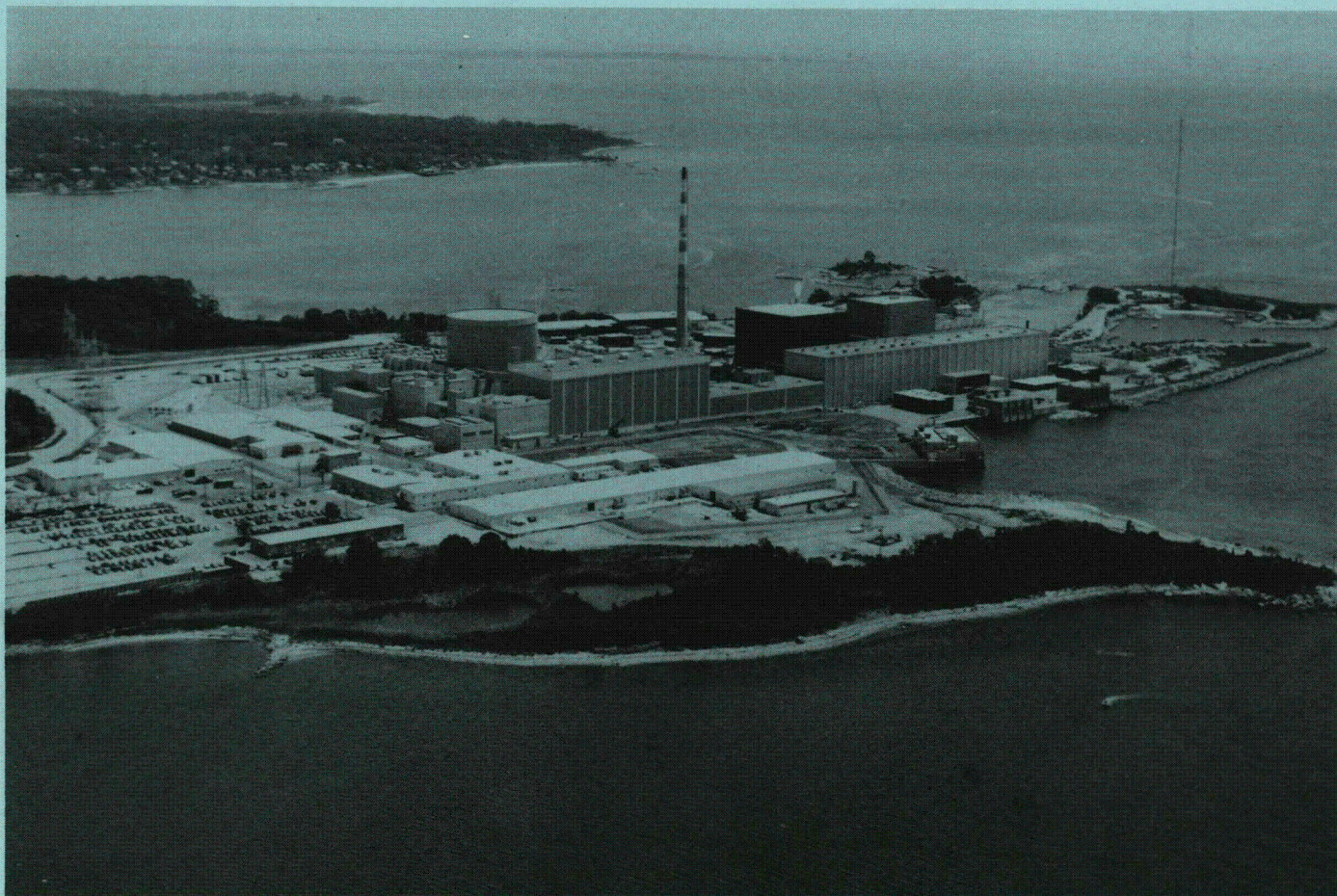


NORTHEAST NUCLEAR ENERGY COMPANY

MILLSTONE NUCLEAR POWER STATION

UNITS NO. 1, 2 & 3



SEMIANNUAL RADIOACTIVE EFFLUENTS

RELEASE REPORT

JULY-DECEMBER 1988

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

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

NORTHEAST UTILITIES



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

General Offices • Selden Street, Berlin, Connecticut

P.O. BOX 270
HARTFORD, CONNECTICUT 06141-0270
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February 28, 1989

Docket Nos. 50-245
50-336
50-423
B13140

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 1988. An annual Radioactive Effluents Dose Report (to be submitted in March 1989) will include an assessment of the radiation doses due to the radioactive liquid and gaseous effluents released during the calendar year (January through December 1988).

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

E. J. Mroczka
Senior Vice President

By: C. F. Sears
Vice President

cc: W. T. Russell, Region I Administrator
M. L. Boyle, NRC Project Manager, Millstone Unit No. 1
G. S. Vissing, NRC Project Manager, Millstone Unit No. 2
D. H. Jaffe, NRC Project Manager, Millstone Unit No. 3
W. J. Raymond, Senior Resident Inspector, Millstone Unit Nos. 1, 2, and 3

NORTHEAST NUCLEAR ENERGY COMPANY

MILLSTONE NUCLEAR POWER STATION

UNITS NO. 1, 2 & 3

SEMIANNUAL RADIOACTIVE EFFLUENTS

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2.0	Radioactive Effluent Releases
3.0	Radioactive Solid Waste
4.0	Supplemental Information
5.0	Changes to the REMM/ODCM/PCP
6.0	Effluent Monitor Inoperability

Appendix A - Updated Tables

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, Unit No. 1 operated with a unit capacity factor of 94%, Unit No. 2 with a unit capacity factor of 98%, and Unit 3 with a unit capacity factor of 85%.

Unit 3 was shutdown for main steam isolation valve repairs in October 1988.

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 shortly in the Annual Radioactive Effluents Dose Report for 1988.

RADIOACTIVE EFFLUENT RELEASES

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

Table 2.1-1	Unit 1 Liquid Effluents - Summation
Table 2.1-2	Unit 1 Liquid Effluents - Batch Mode
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Table 2.3-7	Unit 3 Gaseous Effluents - Mixed Continuous (ESF Building Vent)
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RADIOACTIVE EFFLUENT RELEASES - Continued

- Table 2.3-9 Unit 3 Gaseous Effluents - Mixed Batch
(Containment Purge)
- Table 2.3-10 Unit 3 Gaseous Effluents - Mixed Continuous
(Turbine Gland Sealing System Exhaust)
- Table 2.3-11 Unit 3 Gaseous Effluents - Mixed Batch
(Main Condenser Mechanical Vacuum Pump Exhaust)

MILLSTONE NUCLEAR POWER STATION

UNIT #1

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

YEAR 1988

UNITS	JULY	AUGUST	SEPTEMBER	QUARTERLY TOTALS
-------	------	--------	-----------	---------------------

A. Fission and Activation Products

1. TOTAL ACTIVITY RELEASED	Ci	3.38E-02	1.36E-02	9.78E-02	1.45E-01
2. AVERAGE DILUTED ACTIVITY DURING PERIOD	UCi/ml	4.52E-10	1.83E-10	1.32E-09	6.54E-10

B. Tritium

1. TOTAL ACTIVITY RELEASED	Ci	3.91E+00	3.64E+00	4.25E+00	1.18E+01
2. AVERAGE DILUTED ACTIVITY DURING PERIOD	UCi/ml	5.23E-08	4.89E-08	5.74E-08	5.32E-08

C. Dissolved and Entrained Gases

1. TOTAL ACTIVITY RELEASED	Ci	6.42E-05	1.75E-05	7.81E-05	1.60E-04
2. AVERAGE DILUTED ACTIVITY DURING PERIOD	UCi/ml	8.58E-13	2.35E-13	1.06E-12	7.22E-13

D. Gross Alpha

1. TOTAL ACTIVITY RELEASED	Ci	-----	-----	-----	-----
-------------------------------	----	-------	-------	-------	-------

E. Volume

1. VOLUME OF WASTE RELEASED	LITERS	1.54E+06	1.16E+06	1.16E+06	3.86E+06
2. VOLUME OF DILUTION DURING RELEASES	LITERS	7.67E+09	5.83E+09	6.40E+09	1.99E+10
3. VOLUME OF DILUTION DURING TIME PERIOD	LITERS	7.48E+10	7.44E+10	7.24E+10	2.22E+11

TABLE 2.1-1

MILLSTONE NUCLEAR POWER STATION

UNIT #1

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

YEAR 1988

UNITS	OCT	NOV	DEC	QUARTERLY TOTALS
-------	-----	-----	-----	---------------------

A. Fission and Activation Products

1. TOTAL ACTIVITY RELEASED	Ci	2.11 E-02	2.00 E-02	1.79 E-02	5.90 E-02
2. AVERAGE DILUTED ACTIVITY DURING PERIOD	UCi/ml	2.82 E-10	3.29 E-10	2.63 E-10	2.89 E-10

B. Tritium

1. TOTAL ACTIVITY RELEASED	Ci	4.17 E+00	5.66 E+00	4.89 E+00	1.47 E+01
2. AVERAGE DILUTED ACTIVITY DURING PERIOD	UCi/ml	5.57 E-08	9.32 E-08	7.18 E-08	7.21 E-08

C. Dissolved and Entrained Gases

1. TOTAL ACTIVITY RELEASED	Ci	3.76 E-04	8.10 E-04	2.77 E-04	1.46 E-03
2. AVERAGE DILUTED ACTIVITY DURING PERIOD	UCi/ml	5.02 E-12	1.33 E-11	4.07 E-12	7.16 E-12

D. Gross Alpha

1. TOTAL ACTIVITY RELEASED	Ci	-----	-----	-----	-----
-------------------------------	----	-------	-------	-------	-------

E. Volume

1. VOLUME OF WASTE RELEASED	LITERS	1.13 E+06	1.27 E+06	1.12 E+06	3.52 E+06
2. VOLUME OF DILUTION DURING RELEASES	LITERS	6.05 E+09	5.09 E+09	5.74 E+09	1.69 E+10
3. VOLUME OF DILUTION DURING TIME PERIOD	LITERS	7.49 E+10	6.07 E+10	6.81 E+10	2.04 E+11

TABLE 2.1-2

MILLSTONE NUCLEAR POWER STATION - UNIT #1

LIQUID EFFLUENTS - BATCH MODE

Year 1988

Nuclides Released	Unit	JULY	AUGUST	SEPTEMBER	Quarterly Total
Cr-51	C1			1.88E-04	1.88E-04
Mn-54	C1	1.28E-03	4.00E-04	5.48E-03	7.16E-03
Tc-99M	C1				
Co-58	C1				
Co-60	C1	2.99E-02	7.57E-03	1.90E-02	5.65E-02
I-131	C1	9.92E-06		1.21E-05	2.20E-05
I-133	C1		1.95E-05	3.85E-05	5.80E-05
I-135	C1				
Cs-134	C1		1.11E-05	5.60E-04	5.71E-04
Cs-137	C1	1.94E-03	5.51E-03	2.53E-02	3.28E-02
Mo-99	C1				
Ce-141	C1				
Ce-144	C1				
Zn-65	C1	4.05E-04	4.72E-05	1.67E-03	2.12E-03
Fe-59	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
Fe-55	C1	-----	-----	4.52E-02	4.52E-02
Sr-89	C1	2.39E-04	-----	-----	2.39E-04
Sr-90	C1	3.16E-05	1.74E-05	3.36E-04	3.85E-04
Total Activity	C1	3.38E-02	1.36E-02	9.78E-02	1.45E-01

Xe-133	C1			1.09E-05	1.09E-05
Xe-135	C1	6.42E-05	1.75E-05	6.72E-05	1.49E-04
Xe-135M	C1				
	C1				
	C1				
	C1				

TABLE 2.1-2

MILLSTONE NUCLEAR POWER STATION - UNIT #1

LIQUID EFFLUENTS - BATCH MODE

Year 1988

Nuclides Released	Unit	OCT	NOV	DEC	Quarterly Total
Cr-51	C1	1.54 E-04	6.73 E-05	3.30 E-04	5.51 E-04
Mn-54	C1	1.05 E-03	9.33 E-04	2.61 E-04	2.24 E-03
Tc-99M	C1	2.33 E-05	8.75 E-05	6.35 E-05	1.74 E-04
Co-58	C1				
Co-60	C1	1.17 E-02	8.52 E-03	1.05 E-02	3.07 E-02
I-131	C1	6.76 E-04	2.38 E-04	1.29 E-04	1.04 E-03
I-133	C1	3.39 E-04	3.09 E-04	3.20 E-04	9.68 E-04
I-135	C1				
Cs-134	C1		1.62 E-04	1.63 E-05	1.78 E-04
Cs-137	C1	4.70 E-03	8.69 E-03	5.34 E-03	1.87 E-02
Mo-99	C1				
Ce-141	C1				
Ce-144	C1			6.85 E-06	6.85 E-06
Zn-65	C1	1.40 E-03	7.88 E-04	9.37 E-04	3.13 E-03
Fe-59	C1		3.68 E-05		3.68 E-05
Ru-103	C1	4.70 E-06			4.70 E-06
Y-93	C1	2.09 E-05			2.09 E-05
	C1				
	C1				
	C1				
Fe-55	C1	9.61 E-04	----	----	9.61 E-04
Sr-89	C1	3.84 E-05	2.10 E-04		2.48 E-04
Sr-90	C1	1.81 E-05	----	----	1.81 E-05
Total Activity	C1	2.11 E-02	2.00 E-02	1.79 E-02	5.90 E-02

Xe-133	C1	2.30 E-04	5.51 E-04	1.18 E-04	8.99 E-04
Xe-135	C1	1.46 E-04	2.59 E-04	1.59 E-04	5.64 E-04
Xe-135M	C1				
	C1				
	C1				
	C1				

TABLE 2.1-3

MILLSTONE NUCLEAR POWER STATION

UNIT #1

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

YEAR 1988

UNITS	JULY	AUGUST	SEPTEMBER	QUARTERLY TOTALS
-------	------	--------	-----------	------------------

A. Fission and Activation Gases

1. TOTAL ACTIVITY RELEASED	Ci	9.52E+01	1.91E+00	5.19E+01	1.49E+02
2. AVERAGE RELEASE RATE FOR THE PERIOD	UCi/sec	3.93E+01	7.83E-01	1.71E+01	1.89E+01

B. Iodines

1. TOTAL I-131 ACTIVITY RELEASED	Ci	2.86E-04	1.27E-04	2.11E-04	6.24E-04
2. AVERAGE RELEASE RATE FOR THE PERIOD	UCi/sec	1.18E-04	5.20E-05	6.96E-05	7.91E-05

C. Particulates

1. TOTAL PARTICULATE ACTIVITY RELEASED	Ci	4.25E-04	3.43E-04	3.18E-04	1.09E-03
2. AVERAGE RELEASE RATE FOR THE PERIOD	UCi/sec	1.76E-04	1.41E-04	1.05E-04	1.38E-04
3. TOTAL GROSS ALPHA ACTIVITY RELEASED	Ci	-----	-----	-----	-----

D. Tritium

1. TOTAL ACTIVITY RELEASED	Ci	1.12E+01	2.32E+00	1.38E+00	1.49E+01
2. AVERAGE RELEASE RATE FOR THE PERIOD	UCi/sec	4.63E+00	9.51E-01	4.55E-01	1.89E+00

TABLE 2.1-3

MILLSTONE NUCLEAR POWER STATION

UNIT #1

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

YEAR 1988

UNITS	OCT	NOV	DEC	QUARTERLY TOTALS
-------	-----	-----	-----	---------------------

A. Fission and Activation Gases

1. TOTAL ACTIVITY RELEASED	Ci	1.21 E+00	3.27 E+00	6.47 E+00	1.10 E+01
2. AVERAGE RELEASE RATE FOR THE PERIOD	UCi/sec	5.01 E-01	1.09 E+00	2.27 E+00	1.40 E+00

B. Iodines

1. TOTAL I-131 ACTIVITY RELEASED	Ci	4.67 E-04	2.66 E-04	1.32 E-04	8.65 E-04
2. AVERAGE RELEASE RATE FOR THE PERIOD	UCi/sec	1.93 E-04	8.84 E-05	5.44 E-05	1.10 E-04

C. Particulates

1. TOTAL PARTICULATE ACTIVITY RELEASED	Ci	3.14 E-04	7.63 E-04	5.84 E-04	1.66 E-03
2. AVERAGE RELEASE RATE FOR THE PERIOD	UCi/sec	1.30 E-04	2.53 E-04	2.41 E-04	2.12 E-04
3. TOTAL GROSS ALPHA ACTIVITY RELEASED	Ci	2.09 E-07	2.61 E-07	2.62 E-07	7.32 E-07

D. Tritium

1. TOTAL ACTIVITY RELEASED	Ci	3.61 E-01	5.08 E+00	6.23 E+00	1.17 E+01
2. AVERAGE RELEASE RATE FOR THE PERIOD	UCi/sec	1.49 E-01	1.69 E+00	2.57 E+00	1.49 E+00

TABLE 2.1-4

MILLSTONE NUCLEAR POWER STATION - UNIT #1

GASEOUS EFFLUENTS - ELEVATED RELEASE - CONTINUOUS MODE

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

1. Fission gases

Xe-138	Cf	4.69E+01		2.31E+01	7.00E+01
Kr-87	Cf	1.06E+01		5.85E+00	1.65E+01
Kr-88	Cf			2.51E+00	2.51E+00
Kr-85m	Cf	2.73E+00		2.09E+00	4.82E+00
Xe-135	Cf	1.54E+01		7.95E+00	2.34E+01
Xe-133	Cf	8.49E+00	1.91E+00	4.88E+00	1.53E+01
Kr-89	Cf				
Xe-137	Cf				
Xe-135m	Cf	1.11E+01		5.52E+00	1.66E+01
Kr-83m	Cf				
Xe-133m	Cf				
Xe-131m	Cf				
Kr-85	Cf				
Ar-37	Cf				
Total For Period	Cf	9.52E+01	1.91E+00	5.19E+01	1.49E+02

2. Iodines

Iodine-131	Cf	2.61E-04	1.27E-04	2.10E-04	5.98E-04
Iodine-133	Cf	1.62E-03	8.97E-04	1.22E-03	3.74E-03

3. Particulates

Cr-51	Cf	3.47E-05	1.50E-04	6.25E-05	2.47E-04
Mn-54	Cf			2.62E-06	2.62E-06
Fe-59	Cf				
Co-58	Cf		7.96E-07		7.96E-07
Co-60	Cf	3.09E-05	2.77E-05	3.86E-05	9.72E-05
Zn-65	Cf	4.98E-05	1.01E-04	4.65E-05	1.97E-04
I-131	Cf	2.47E-05		1.16E-06	2.59E-05
Cs-134	Cf				
Cs-137	Cf	1.67E-05	2.00E-05	2.11E-05	5.78E-05
Ba-140	Cf	1.61E-04	1.97E-05	8.91E-05	2.70E-04
Ce-141	Cf				
Ce-144	Cf				
	Cf				
La-140	Cf				
	Cf				
Sr-89	Cf	1.07E-04	2.32E-05	5.58E-05	1.86E-04
Sr-90	Cf	5.81E-07	1.84E-07	9.46E-07	1.71E-06
	Cf				
TOTAL	Cf	4.25E-04	3.43E-04	3.18E-04	1.09E-03

TABLE 2.1-4

MILLSTONE NUCLEAR POWER STATION - UNIT #1

GASEOUS EFFLUENTS - ELEVATED RELEASE - CONTINUOUS MODE

Nuclides Released	Unit	OCT	NOV	DEC	Quarterly Total
-------------------	------	-----	-----	-----	-----------------

1. Fission gases

Xe-130	Cf				
Kr-87	Cf				
Kr-88	Cf				
Kr-85m	Cf				
Xe-135	Cf	1.21 E+00	8.39 E-01	9.37 E-01	2.99 E+00
Xe-133	Cf		2.43 E+00	5.53 E+00	7.96 E+00
Kr-89	Cf				
Xe-137	Cf				
Xe-135m	Cf				
Kr-83m	Cf				
Xe-133m	Cf				
Xe-131m	Cf				
Kr-85	Cf				
Ar-37	Cf				
Total For Period	Cf	1.21 E+00	3.27 E+00	6.47 E+00	1.10 E+01

2. Iodines

Iodine-131	Cf	4.63 E-04	2.66 E-04	1.19 E-04	8.48 E-04
Iodine-133	Cf	2.74 E-03	1.35 E-03	5.59 E-04	4.65 E-03

3. Particulates

Cr-51	Cf	4.87 E-05	1.42 E-04	1.41 E-04	3.32 E-04
Mn-54	Cf	4.44 E-06			4.44 E-06
Fe-59	Cf				
Co-58	Cf		9.82 E-06	2.88 E-06	1.27 E-05
Co-60	Cf	1.09 E-04	8.61 E-05	4.58 E-05	2.41 E-04
Zn-65	Cf	1.30 E-04	4.91 E-04	3.45 E-04	9.66 E-04
I-131	Cf	4.32 E-06		1.26 E-05	1.69 E-05
Cs-134	Cf				
Cs-137	Cf				
Ba-140	Cf			1.09 E-05	1.09 E-05
Ce-141	Cf				
Ce-144	Cf				
	Cf				
La-140	Cf				
	Cf				
Sr-89	Cf	7.73 E-05	3.39 E-05	2.53 E-05	7.65 E-05
Sr-90	Cf	3.30 E-07	1.84 E-07	2.14 E-07	7.28 E-07
	Cf				
TOTAL	Cf	3.14 E-04	7.63 E-04	5.84 E-04	1.66 E-03

Table 2.1-5
MILLSTONE NUCLEAR POWER STATION - UNIT #1

CASEOUS EFFLUENTS -

WATCH NONE

Year 88

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

1. Fission gases

NONE

Xe-138	CI				
Kr-87	CI				
Kr-88	CI				
Kr-85m	CI				
Xe-135	CI				
Xe-133	CI				
Kr-89	CI				
Xe-137	CI				
Xe-137m	CI				
Kr-83m	CI				
Xe-133m	CI				
Xe-131m	CI				
Kr-85	CI				
Ar-37	CI				
Total For Period	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				
Ce-134	CI				
Ce-137	CI				
Ba-140	CI				
Ce-141	CI				
Ce-144	CI				
	CI				
	CI				
	CI				
Br-89	CI				
Sr-90	CI				
	CI				
TOTAL	CI				

Table 2.1-5

MILLSTONE NUCLEAR POWER STATION - UNIT #1

GASEOUS EFFLUENTS -

RATCH MODE

Year 88

Nuclides Released	Unit	October	November	December	Quarterly Total
1. Fission gases		NONE			
Xe-138	CI				
Kr-87	CI				
Kr-88	CI				
Kr-89m	CI				
Xe-135	CI				
Xe-133	CI				
Kr-89	CI				
Xe-137	CI				
Xe-137m	CI				
Kr-83m	CI				
Xe-137m	CI				
Xe-131m	CI				
Kr-85	CI				
Ar-37	CI				
Total For Period	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				
	CI				
	CI				
Br-89	CI				
Sr-90	CI				
	CI				
TOTAL	CI				

TABLE 2.2-1

MILLSTONE NUCLEAR POWER STATION

UNIT 2

LIQUID EFFLUENT - SUMMATION OF ALL RELEASES

YEAR <u>1988</u>	UNITS	JULY	AUGUST	SEPTEMBER	QUARTERLY TOTALS
A. Fission and Activation Products					
1. TOTAL ACTIVITY RELEASED	C1	1.88-02	9.39-02	1.28-01	2.41-01
2. AVERAGE DILUTED ACTIVITY DURING PERIOD	UC1/m1	1.94-10	9.70-10	1.34-09	8.34-10
B. Tritium					
1. TOTAL ACTIVITY RELEASED	C1	3.44+00	1.38+01	2.51+01	4.23+01
2. AVERAGE DILUTED ACTIVITY DURING PERIOD	UC1/m1	3.56-08	1.43-07	2.63-07	1.46-07
C. Dissolved and Entrained Gases					
1. TOTAL ACTIVITY RELEASED	C1	1.54-02	3.55-02	1.85-02	6.94-02
2. AVERAGE DILUTED ACTIVITY DURING PERIOD	UC1/m1	1.59-10	3.67-10	1.94-10	2.40-10
D. Gross Alpha					
1. TOTAL ACTIVITY RELEASED	C1	N/D	N/D	N/D	N/D
E. Volume					
1. VOLUME OF WASTE RELEASED	LITERS	1.52+07	1.89+07	2.27+07	5.68+07
2. VOLUME OF DILUTION DURING RELEASES	LITERS	1.29+10	1.57+10	1.10+10	3.96+10
3. VOLUME OF DILUTION DURING TIME PERIOD	LITERS	9.67+10	9.68+10	9.53+10	2.89+11

TABLE 2.2-1

MILLSTONE NUCLEAR POWER STATION
UNIT 2
LIQUID EFFLUENT - SUMMATION OF ALL RELEASES

YEAR	UNITS	OCTOBER	NOVEMBER	DECEMBER	QUARTERLY TOTALS
1988					
A. Fission and Activation Products					
1. TOTAL ACTIVITY RELEASED	C1	5.97-01	4.04-01	2.44-01	1.25+00
2. AVERAGE DILUTED ACTIVITY DURING PERIOD	UC1/ml	7.17-09	4.32-09	2.52-09	4.56-09
B. Tritium					
1. TOTAL ACTIVITY RELEASED	C1	4.01+01	3.73+01	2.25+01	9.99+01
2. AVERAGE DILUTED ACTIVITY DURING PERIOD	UC1/ml	4.81-07	3.99-07	2.33-07	3.65-07
C. Dissolved and Entrained Gases					
1. TOTAL ACTIVITY RELEASED	C1	2.58-01	5.43-01	2.19-02	8.21-01
2. AVERAGE DILUTED ACTIVITY DURING PERIOD	UC1/ml	3.10-09	5.80-09	2.26-10	3.00-09
D. Gross Alpha					
1. TOTAL ACTIVITY RELEASED	C1	LLD	LLD	LLD	LLD
E. Volume					
1. VOLUME OF WASTE RELEASED	LITERS	1.76+07	1.28+07	1.17+07	4.21+07
2. VOLUME OF DILUTION DURING RELEASES	LITERS	9.02+09	1.19+10	1.49+10	3.58+10
3. VOLUME OF DILUTION DURING TIME PERIOD	LITERS	8.33+10	9.36+10	9.67+10	2.74+11

TABLE 2.2-2

MILLSTONE NUCLEAR POWER STATION

UNIT 2

LIQUID EFFLUENTS - CONTINUOUS - S/G

Year 1988

NUCLIDES RELEASED	UNIT	JULY	AUGUST	SEPTEMBER	QUARTERLY TOTAL
Cr-51	C1				
Mn-54	C1				
	C1				
Co-58	C1				
Co-60	C1				
I-131	C1				
I-133	C1				
I-135	C1				
Cs-134	C1				
Cs-137	C1				
	C1				
Ce-141	C1				
Ce-144	C1				
Zn-65	C1				
Fe-59	C1				
SR 89	C1				
SR 90	C1				
Total Act (F/A)	C1				
H-3	C1	1.35-01	2.06-01	3.00-01	6.41-01
Gross a	C1				
	C1				
	C1				
	C1				
Xe-133	C1				
Xe-131	C1				
Xe-135	C1				
Xe-135M	C1				
	C1				
	C1				
Total Dis Gas	C1				

TABLE 2.2-2

MILLSTONE NUCLEAR POWER STATION

UNIT 2

LIQUID EFFLUENTS - CONTINUOUS - S/G

Year 1988

NUCLIDES RELEASED	UNIT	OCTOBER	NOVEMBER	DECEMBER	QUARTERLY TOTAL
Cr-51	C1				
Mn-54	C1				
Ag-110M	C1	1.62-02			1.62-02
Co-58	C1	8.78-04			8.78-04
Co-60	C1	3.46-04			3.46-04
I-131	C1	1.25-02			1.25-02
I-133	C1	7.35-03			7.35-03
Rn 106	C1	1.01-02			1.01-02
Cs-134	C1	1.95-02	5.14-04		2.00-02
Cs-137	C1	2.30-02			2.30-02
I-132	C1	9.07-04			9.07-04
Sr 92	C1	5.79-02			5.79-03
Ce-144	C1				
Nb-97	C1	2.27-02			2.27-02
Fe-59	C1				
SR 89	C1				
SR 90	C1				
Total Act (F/A)	C1	1.19-01	5.14-04		1.20-01
H-3	C1	4.18-01	1.48-01	1.44-01	7.10-01
Gross a	C1				
Xe-133	C1	2.26-03			2.26-03
Xe-131	C1				
Xe-135	C1	1.31-03			1.31-03
Xe-135M	C1				
	C1				
Total Dis Gas	C1	3.57-03			3.57-03

TABLE 2.2-3

MILLSTONE NUCLEAR POWER STATION

UNIT 2

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

Year 1988

NUCLIDES RELEASED	UNIT	JULY	AUGUST	SEPTEMBER	QUARTERLY TOTAL
Cr-51	C1	9.49-05	2.84-03	2.67-04	3.20-03
Mn-54	C1	2.29-05	3.97-04	2.03-04	6.23-04
La-141	C1	6.61-04	1.43-03	1.01-03	3.10-03
Co-58	C1	2.57-03	6.79-03	3.75-03	1.31-02
Co-60	C1	4.04-03	3.52-02	1.92-02	5.84-02
I-131	C1	5.23-04	5.48-04	3.15-05	1.10-03
I-133	C1	3.67-04	1.66-04		3.84-03
I-135	C1				
Cs-134	C1	1.11-05	3.64-04	2.27-02	2.31-02
Cs-137	C1	8.83-04	3.58-03	5.50-02	5.50-02
NA-24	C1	6.34-05	2.50-04	1.18-04	4.31.04
Ce-141	C1				
Ce-144	C1				
Zn-65	C1				
Fe-59	C1				
NB-95	C1	7.38-05	9.20-04	2.89-04	1.28-04
BA-139	C1				
BA-140	C1				
SB-124	C1	4.27-03	1.19-02	5.29-03	2.15-02
SB-125	C1	4.12-03	1.76-02	1.30-02	3.47-02
Co-57	C1				
AG-110M	C1	2.43-04	1.31-03	1.12-03	2.67-03
NB-97	C1	7.04-04	2.07-03	1.85-03	4.62-03
SR-92	C1	1.13-04	4.74-04	3.68-04	9.55-04
LA-140	C1				
SR-89					
SR-90					
Fe-55			8.14-03	8.06-03	1.62-02
Total F/A Prod.		1.88-02	9.39-02	1.28-01	2.41-01

TABLE 2.2-3

MILLSTONE NUCLEAR POWER STATION

UNIT 2

LIQUID EFFLUENTS - BATCH - AWMT/CWMT/TK10/11

Year 1988

NUCLIDES RELEASED	UNIT				QUARTERLY
		JULY	AUGUST	SEPTEMBER	TOTAL
Xe 131	C1				
Xe 131M	C1				
Xe 133	C1	1.17-02	2.67-02	1.83-02	5.67-02
Xe 135	C1	3.67-03	3.24-03	1.73-04	7.08-03
Xe 135M	C1				
Xe 133M	C1		5.23-04		5.23-04
Kr 85	C1		5.00-03		5.00-03
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
Total Dissolved Gas	C1	1.54-02	3.55-02	1.85-02	6.94-02
H-3	C1	3.33+00	1.36+01	2.48+01	4.17+01
Gross a	C1				
	C1				

TABLE 2.2-3

MILLSTONE NUCLEAR POWER STATION

UNIT 2

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

Year 1988

NUCLIDES RELEASED	UNIT	OCTOBER	NOVEMBER	DECEMBER	QUARTERLY TOTAL
Cr-51	C1				
Mn-54	C1	9.43-05	1.81-03	1.31-03	3.21-03
Na-24	C1		1.49-04		1.49-04
Co-58	C1	2.67-03	1.35-02	7.01-03	2.32-02
Co-60	C1	1.36-02	2.96-02	5.32-02	9.64-02
I-131	C1	6.84-03	3.71-03	3.01-04	1.09-02
I-133	C1	1.88-03	3.98-03	3.09-05	5.89-03
I-135	C1		1.11-03		1.11-03
Cs-134	C1	1.26-01	1.54-04	5.41-02	1.80-01
Cs-137	C1	2.99-01	3.46-01	1.05-01	7.50-01
	C1	3.47-04	6.51-04		9.98-04
Ce-141	C1				
Ce-144	C1				
Tc 99M	C1		3.31-05		3.31-05
Fe-59	C1				
NB-95	C1	2.81-04		2.64-04	5.45-04
BA-139	C1				
BA-140	C1				
SB-124	C1	6.47-04			6.47-04
SB-125	C1	1.56-02	1.56-03	1.15-03	1.83-02
Co-57	C1			4.51-05	4.51-05
AG-110M	C1	1.44-03		5.66-04	2.01-03
NB-97	C1	2.48-03	1.59-04	1.29-03	3.93-03
SR-92	C1	3.96-04	1.72-05	2.38-04	6.51-04
LA-140	C1				
I-132	C1		7.30-05		7.30-05
SR-89	C1			1.21-04	
SR-90	C1				
Fe-55	C1	6.97-03			
Total F/A Prod.		4.78-01	4.03-01	2.24-01	1.11+00

TABLE 2.2-3

MILLSTONE NUCLEAR POWER STATION

UNIT 2

LIQUID EFFLUENTS - BATCH - AWMT/CWMT/TK10/11

Year 1988

NUCLIDES RELEASED	UNIT	OCTOBER	NOVEMBER	DECEMBER	QUARTERLY TOTAL
Xe 131	C1				
Xe 131M	C1	1.13-02		1.42-03	2.55-03
Xe 133	C1	2.02-01	5.22-01	1.96-02	7.44-01
Xe 135	C1	3.73-03	1.23-02	8.56-04	1.69-02
Xe 135M	C1		1.59-03		1.59-03
Xe 133M	C1	2.58-03	5.10-03		7.68-03
Kr 85	C1	4.44-02			4.44-02
Kr 85M	C1		6.54-05		6.54-05
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
Total Dissolved Gas	C1	2.54-01	5.41-01	2.19-02	8.17-01
H-3	C1	3.97+01	3.72+01	2.24+01	9.93+01
Gross a	C1				

TABLE 2.2-4

MILLSTONE NUCLEAR POWER STATION

UNIT 2

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

YEAR	1988	UNITS	JULY	AUGUST	SEPTEMBER	QUARTERLY TOTALS
A. Fission and Activation Gases						
1. TOTAL ACTIVITY RELEASED	C1	1.60+01	7.23+01	3.08+01	1.19E+02	
2. AVERAGE RELEASE RATE FOR THE PERIOD	UC1/sec	6.61	2.99+01	1.02+01	1.51+01	
B. Iodines						
1. TOTAL I-131 ACTIVITY RELEASED	C1	9.82-04	6.43-04	7.75-04	2.40-03	
2. AVERAGE RELEASE RATE FOR THE PERIOD	UC1/sec	4.06-04	2.66-04	2.57-04	3.05-04	
C. Particulates						
1. TOTAL PARTICULATE ACTIVITY RELEASED	C1	N/D	N/D	N/D	N/D	
2. AVERAGE RELEASE RATE FOR THE PERIOD	UC1/sec	N/D	N/D	N/D	N/D	
3. TOTAL GROSS ALPHA ACTIVITY RELEASED	C1	N/D	N/D	N/D	N/D	
D. Tritium						
1. TOTAL ACTIVITY RELEASED	C1	8.50	6.63	1.95+01	3.46+01	
2. AVERAGE RELEASE RATE FOR THE PERIOD	UC1/sec	3.51	2.74	6.46	4.40	

TABLE 2.2-4

MILLSTONE NUCLEAR POWER STATION

UNIT 2

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

YEAR <u>1988</u>	UNITS	OCTOBER	NOVEMBER	DECEMBER	QUARTERLY TOTALS
A. Fission and Activation Gases					
1. TOTAL ACTIVITY RELEASED	C1	6.87-01	5.31+01	3.98+01	1.02+02
2. AVERAGE RELEASE RATE FOR THE PERIOD	UC1/sec	1.14+01	2.19+01	1.64+01	2.06+01
B. Iodines					
1. TOTAL I-131 ACTIVITY RELEASED	C1	1.44-03	5.07-04	3.22-04	2.27-03
2. AVERAGE RELEASE RATE FOR THE PERIOD	UC1/sec	4.77-04	2.10-04	1.33-04	2.89-04
C. Particulates					
1. TOTAL PARTICULATE ACTIVITY RELEASED	C1	1.26-06	4.50-07	LLD	1.71-06
2. AVERAGE RELEASE RATE FOR THE PERIOD	UC1/sec	4.17-07	1.86-07	LLD	2.18-07
3. TOTAL GROSS ALPHA ACTIVITY RELEASED	C1	LLD	LLD	LLD	LLD
D. Tritium					
1. TOTAL ACTIVITY RELEASED	C1	3.18	3.64	3.79	1.06+01
2. AVERAGE RELEASE RATE FOR THE PERIOD	UC1/sec	1.05	1.50	1.57	1.35

TABLE 2.2-5

MILLSTONE NUCLEAR POWER STATION - UNIT 2

GASEOUS EFFLUENTS - MIXED RELEASE - CONTINUOUS MODE

Year 1988

Fission Gas	Unit	JULY	AUGUST	SEPTEMBER	Quarterly Total
Xe 133	Cf	1.56+01	6.82+01	3.01+01	1.14+06
Xe 135	Cf	4.05-01	4.11+00	6.11-01	5.13+00
Xe 131M	Cf				
Xe 135M	Cf				
Kr 85	Cf				
	Cf				
	Cf				
	Cf				
	Cf				
	Cf				
	Cf				
	Cf				
	Cf				
	Cf				
	Cf				
Total for Period	Cf	1.60+01	7.23+01	3.08+01	1.19+02
2. Iodines					
Iodine-131	Cf	3.32-04	2.70-04	3.20-04	9.22-04
Iodine-133	Cf	6.50-04	3.73-04	4.55-04	1.48-03
	Cf				
Total Iodine	Cf	9.82-04	6.43-04	7.75-04	2.40-03
3. Particulates					
Mn-54	Cf				
Fe-59	Cf				
Co-58	Cf				
Co-60	Cf				
I-131	Cf				
Cs-134	Cf				
Cs-137	Cf				
Sr 89	Cf				
Sr 90	Cf				
Total	Cf				
H-3	Cf	8.50-00	6.63	1.95+01	3.46+01
Gross a.	Cf				
	Cf				
	Cf				

TABLE 2.2-5

MILLSTONE NUCLEAR POWER STATION - UNIT 2

GASEOUS EFFLUENTS - Mixed RELEASE - CONTINUOUS MODE

Year 1988

Fission Gas	Unit	OCTOBER	NOVEMBER	DECEMBER	Quarterly Total
Xe 133	C1	6.54+01	4.81+01	3.70+01	1.51+02
Xe 135	C1	3.30+00	5.02+00	2.72+00	1.10+01
Xe 131M	C1				
Xe 135M	C1				
Kr 85	C1			1.24-01	1.24-01
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
Total for Period	C1	6.87+01	5.31+01	3.98+01	1.62+02

2. Iodines

Iodine-131	C1	5.34-04	3.90-04	1.36-04	1.06-03
Iodine-133	C1	9.02-04	1.17-04	1.86-04	1.21-03
Iodine Via SG Vent	C1	3.09-07	-0-	-0-	3.09-07
Total Iodine	C1	1.44-03	5.07-04	3.22-04	2.27-03

3. Particulates

Mn-54	C1				
Fe-59	C1				
Co-58	C1				
Co-60	C1				
I-131	C1	1.26-06			1.26-06
Cs-134	C1				
Cs-137	C1		4.50-07		4.50-07
Sr 89	C1				
Sr 90	C1				
Total	C1	1.26-06	4.50-07		1.71-06
H-3	C1	3.18+00	3.64+00	3.79+00	1.06+01
Gross a.	C1				
Total Vol.	cc	1.10+14	7.28+13	6.71+13	2.50+14
Time (sec)		3.02+06	2.42+06	2.42+06	7.86+06
	C1				
	C1				

TABLE 2.2-6

MILLSTONE NUCLEAR POWER STATION - UNIT 2

GASEOUS EFFLUENTS - MIXED RELEASE - BATCH MODE - CONTAINMENT PURGE

Year 1988

Nuclides Released	Unit	JULY	AUGUST	SEPTEMBER	Quarterly Total
1. Fission gases		NONE			
Xe 133	Cf				
Xe 135	Cf				
Xe 131M	Cf				
Xe 133M	Cf				
Kr-85	Cf				
	Cf				
	Cf				
	Cf				
	Cf				
	Cf				
	Cf				
	Cf				
	Cf				
	Cf				
	Cf				
Total Gas	Cf				
2. Iodines					
Iodine-131	Cf				
Iodine-133	Cf				
Total Iodine	Cf				
3. Particulates					
Cr-51	Cf				
Mn-54	Cf				
Fe-59	Cf				
Co-58	Cf				
Co-60	Cf				
Zn-65	Cf				
I-131	Cf				
Cs-134	Cf				
Cs-137	Cf				
	Cf				
	Cf				
	Cf				
Total Part	Cf				
Total H3	Cf				
	Cf				
	Cf				

TABLE 2.2-6

MILLSTONE NUCLEAR POWER STATION - UNIT 2

GASEOUS EFFLUENTS - Mixed RELEASE - BATCH MODE - CONTAINMENT PURGE

Year 1988

Nuclides Released	Unit	OCTOBER	NOVEMBER	DECEMBER	Quarterly Total
1. Fission gases		NONE			
Xe 133	C1				
Xe 135	C1				
Xe 131M	C1				
Xe 133M	C1				
Kr-85	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
Total Gas	C1				
2. Iodines					
Iodine-131	C1				
Iodine-133	C1				
Total Iodine	C1				
3. Particulates					
Cr-51	C1				
Mn-54	C1				
Fe-59	C1				
Co-58	C1				
Co-60	C1				
Zn-65	C1				
I-131	C1				
Cs-134	C1				
Cs-137	C1				
	C1				
	C1				
	C1				
Total Part	C1				
Total H3	C1				
	C1				
	C1				

TABLE 2.2-7

MILLSTONE NUCLEAR POWER STATION - UNIT 2

GASEOUS EFFLUENTS -ELEVATED RELEASE - BATCH MODE - WGD

Year 1988

Nuclides Released		JULY	AUGUST	SEPTEMBER	Quarterly Total
1. Fission Gases					
Xe-131M	Ci	5.46-02	1.05-02		6.51-02
Xe 133	Ci	1.38+00	1.06+00		2.44+00
Xe 133M	Ci				
Xe 135	Ci				
Xe 135M	Ci				
Kr 85	Ci	6.33-01	1.79-01		8.12-01
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
Total for Period	Ci	2.07+00	1.25+00		3.32+00
H-3	Ci	1.93-04	1.30-03		1.49-03

TABLE 2.2-7

MILLSTONE NUCLEAR POWER STATION - UNIT 2

GASEOUS EFFLUENTS -Elevated RELEASE - BATCH MODE - WGD

Year 1988

Nuclides Released		OCTOBER	NOVEMBER	DECEMBER	Quarterly Total
1. Fission Gases					
Xe-131M	C1	4.66-03		8.24-03	1.29-02
Xe 133	C1	2.23-02		4.05-02	6.28-02
Xe 133M	C1			3.27-04	3.27-04
Xe 135	C1			6.35-04	6.35-04
Xe 135M	C1				
Kr 85	C1	7.37-02		1.25-01	1.99-01
Kr 85M	C1			1.56-05	1.56-05
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
Total for Period	C1	1.01-01		1.75-01	2.76-01
H-3	C1	5.38-05		1.49-03	1.54-03

TABLE 2.3-1

MILLSTONE UNIT No. 3

SUMMATION OF LIQUID EFFLUENT RELEASES

YEAR 1988

UNITS	JULY	AUGUST	SEPTEMBER	QUARTERLY TOTALS
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A. Fission and Activation Products

1. TOTAL ACTIVITY RELEASED	Ci	1.56E-01	3.52E-02	1.14E-01	3.05E-01
2. AVERAGE DILUTED ACTIVITY DURING PERIOD	UCi/ml	9.56E-10	2.21E-10	7.40E-10	6.46E-10

B. Tritium

1. TOTAL ACTIVITY RELEASED	Ci	16.14	43.5	35.5	95.1
2. AVERAGE DILUTED ACTIVITY DURING PERIOD	UCi/ml	1.02E-07	2.74E-07	2.31E-07	2.01E-07

C. Dissolved and Entrained Gases

1. TOTAL ACTIVITY RELEASED	Ci	3.77E-03	2.19E-03	1.48E-03	7.44E-03
2. AVERAGE DILUTED ACTIVITY DURING PERIOD	UCi/ml	2.37E-11	1.38E-11	9.61E-12	1.58E-11

D. Gross Alpha

1. TOTAL ACTIVITY RELEASED	Ci	<MDA	<MDA	<MDA	<MDA
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E. Volume

1. VOLUME OF WASTE RELEASED	LITERS	1.88E+06	1.59E+06	1.49E+06	4.96E+06
2. VOLUME OF DILUTION DURING RELEASES	LITERS	1.29E+10	1.09E+10	8.84E+09	3.26E+10
3. VOLUME OF DILUTION DURING TIME PERIOD	LITERS	1.59E+11	1.59E+11	1.54E+11	4.72E+11

TABLE 2.3-1

MILLSTONE UNIT No. 3
SUMMATION OF LIQUID EFFLUENT RELEASES

YEAR 1988

UNITS	OCTOBER	NOVEMBER	DECEMBER	QUARTERLY TOTALS
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A. Fission and Activation Products

1. TOTAL ACTIVITY RELEASED	Ci	3.52E-01	2.37E-01	7.54E-02	6.64E-01
2. AVERAGE DILUTED ACTIVITY DURING PERIOD	UCi/ml	2.51E-09	1.98E-09	5.76E-10	1.70E-09

B. Tritium

1. TOTAL ACTIVITY RELEASED	Ci	1.18E+02	87.4	70.2	275.6
2. AVERAGE DILUTED ACTIVITY DURING PERIOD	UCi/ml	8.43E-07	7.28E-07	5.36E-07	7.05E-07

C. Dissolved and Entrained Gases

1. TOTAL ACTIVITY RELEASED	Ci	3.03E-02	3.09E-03	4.61E-03	1.07E-02
2. AVERAGE DILUTED ACTIVITY DURING PERIOD	UCi/ml	2.16E-10	2.58E-11	3.52E-11	2.74E-11

D. Gross Alpha

1. TOTAL ACTIVITY RELEASED	Ci	< MDA	< MDA	< MDA	< MDA
----------------------------	----	-------	-------	-------	-------

E. Volume

1. VOLUME OF WASTE RELEASED	LITERS	1.75E+06	1.599E+06	1.498E+06	4.85E+06
2. VOLUME OF DILUTION DURING RELEASES	LITERS	1.37E+10	1.069E+10	1.074E+10	3.51E+10
3. VOLUME OF DILUTION DURING TIME PERIOD	LITERS	1.40E-11	1.20E-11	1.31E-11	3.91E-11

TABLE 2.3-2

MILLSTONE UNIT No. 3
 LIQUID EFFLUENTS - CONTINUOUS
 STEAM GENERATOR BLOWDOWN

Year 1988

Nuclides Released	Unit	July	August	September	Quarterly Total
NONE					
Cr-51	Ci				
Mn-54	Ci				
Tc-99M	Ci				
Co-58	Ci				
Co-60	Ci				
I-131	Ci				
I-133	Ci				
I-135	Ci				
Cs-134	Ci				
Cs-137	Ci				
Mo-99	Ci				
Ce-141	Ci				
Ce-144	Ci				
Zn-65	Ci				
Fe-59	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
Fe-55	Ci				
Sr-89	Ci				
Sr-90	Ci				
Total Activity	Ci				

Xe-133	Ci				
Xe-135	Ci				
Xe-135M	Ci				
	Ci				
	Ci				
H-3	Ci				

TABLE 2.3-2

MILLSTONE UNIT No. 3

LIQUID EFFLUENTS - CONTINUOUS

Year 1988

STEAM GENERATOR BLOWDOWN

Nuclides Released	Unit	OCTOBER	NOVEMBER	DECEMBER	Quarterly Total
NONE					
Cr-51	C1				
Mn-54	C1				
Tc-99M	C1				
Co-58	C1				
Co-60	C1				
I-131	C1				
I-133	C1				
I-135	C1				
Cs-134	C1				
Cs-137	C1				
Mo-99	C1				
Ce-141	C1				
Ce-144	C1				
Zn-65	C1				
Fe-59	C1				
	C1				
	C1				
	C1				
	C1				
	C1				
Fe-55	C1				
Sr-89	C1				
Sr-90	C1				
Total Activity	C1				
Xe-133	C1				
Xe-135	C1				
Xe-135M	C1				
	C1				
	C1				
H-3	C1				

TABLE 2.3-3

MILLSTONE UNIT No. 3

Year 1988 LIQUID RAD WASTE EFFLUENTS - BATCH - LWS

Nuclides Released	Unit	JULY	AUGUST	SEPTEMBER	Quarterly Total
Cr-51	Ci				
Mn-54	Ci	2.5E-02	2.86E-03	1.780E-02	4.566E-02
Tc-99M	Ci	2.24E-05		4.710E-05	6.95E-05
Co-58	Ci	3.76E-02	5.13E-03	1.44E-02	5.713E-02
Co-60	Ci	3.64E-02	1.06E-02	1.80E-02	6.500E-02
I-131	Ci	3.73E-03	1.48E-03	2.272E-03	7.482E-03
I-133	Ci	3.8E-04		5.286E-04	9.086E-04
I-135	Ci	3.8E-04		3.197E-04	6.997E-04
Cs-134	Ci	9.54E-03	2.78E-03	1.269E-02	2.501E-02
Cs-137	Ci	1.49E-02	4.45E-03	2.137E-02	4.072E-02
Mo-99	Ci				
Ce-141	Ci				
Ce-144	Ci				
Zn-65	Ci				
Fe-59	Ci	1.69E-05			1.690E-05
Na-24	Ci	4.07E-03		3.676E-03	7.746E-03
Nb-97	Ci	2.53E-03	4.16E-04	1.708E-03	4.654E-03
Co-57	Ci	4.8E-04	3.4E-05	1.393E-04	6.533E-04
Nb-95	Ci	1.17E-03	1.04E-04	2.493E-04	1.523E-03
Rb-88	Ci	1.65E-03			1.650E-03
Fe-55	Ci	1.11E-02	3.99E-03	1.79E-02	3.3E-02
Sr-89	Ci	≤ 5.66E-05	≤ 4.78E-05	≤ 5.96E-05	<MDA
Sr-90	Ci	≤ 1.89E-05	≤ 9.56E-06	≤ 1.49E-05	<MDA
See Page 2	Ci				
Xe-133	Ci	2.09E-03	1.45E-03	5.628E-04	4.103E-03
Xe-135	Ci	1.37E-03	7.28E-04	8.039E-04	2.902E-03
Xe-135M	Ci	1.61E-04		1.059E-04	2.669E-04
Kr-85M	Ci	1.02E-04	1.2E-05	2.842E-06	1.168E-04
Kr-87	Ci	5.15E-05			5.15E-05
Total	Ci	3.77E-03	2.19E-03	1.48E-03	7.44E-03

TABLE 2.3-3

MILLSTONE UNIT No. 3

Year 1988 LIQUID RAD WASTE EFFLUENTS - BATCH - LWS

Nuclides Released	Unit	JULY	AUGUST	SEPTEMBER	Quarterly Total
Y-88	Ci	1.29E-04			1.29E-04
Sb-125	Ci	1.85E-03	1.12E-03	6.149E-06	2.976E-03
Sr-92	Ci	3.59E-04		3.19E-04	6.78E-04
I-132	Ci	1.07E-04		3.599E-05	1.43E-04
Zr-95	Ci	3.79E-04			3.79E-04
Ag-110M	Ci			7.355E-04	7.355E-04
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
Total Activity	Ci	1.56E-01	3.52E-02	1.14E-01	3.05E-01
Gross Alpha	Ci	<MDA	<MDA	<MDA	<MDA
Xe-133	Ci				
Xe-135	Ci				
Xe-135M	Ci				
	Ci				
	Ci				
H-3	Ci	16.14	43.5	35.47	95.11

TABLE 2.3-3

MILLSTONE UNIT No. 3

Year 1988 LIQUID RAD WASTE EFFLUENTS - BATCH - LWS

Nuclides Released	Unit	OCTOBER	NOVEMBER	DECEMBER	Quarterly Total
Cr-51	C1				
Mn-54	C1	2.108E-02	3.153E-02	8.466E-03	6.11E-02
Tc-99M	C1	9.707E-03	2.166E-04	4.08E-05	2.96E-03
Co-58	C1	1.968E-02	4.870E-02	8.84E-03	7.72E-02
Co-60	C1	4.896E-02	7.376E-02	2.28E-02	1.45E-01
I-131	C1	1.086E-01	2.856E-02	1.323E-03	1.38E-01
I-133	C1	2.521E-03	6.636E-05	-----	2.59E-03
I-135	C1			-----	-----
Cs-134	C1	2.427E-02	8.165E-03	1.72E-03	3.42E-02
Cs-137	C1	4.469E-02	1.464E-02	3.28E-03	6.26E-02
Mo-99	C1			-----	-----
Ce-141	C1			-----	-----
Ce-144	C1			-----	-----
Zn-65	C1	2.120E-04		-----	2.12E-04
Fe-59	C1			-----	-----
Nb-95	C1	1.385E-03	1.262E-03	1.38E-04	2.78E-03
Nb-97	C1	5.342E-03	5.734E-03	3.142E-03	1.42E-02
Sb-125	C1	1.805E-04	4.932E-04	4.56E-04	1.13E-03
Co-57	C1	3.727E-04	5.683E-04	1.60E-06	9.43E-04
Ag-110M	C1	3.452E-03	2.577E-03	1.82E-03	7.85E-03
Fe-55	C1	1.58E-02	1.47E-02	2.25E-02	5.30E-02
Sr-89	C1	1.17E-04	4.64E-05	≤7.49E-05	2.38E-04
Sr-90	C1	≤1.75E-05	≤1.44E-05	≤3.00E-05	≤6.19E-05
See Page 2	C1				
Xe-133	C1	2.288E-02	2.828E-03	1.02E-03	2.67E-02
Xe-135	C1	4.787E-03	2.592E-04	5.06E-04	5.55E-03
Xe-135M	C1	-----	-----	-----	-----
Xe-131M	C1	2.670E-03	-----	-----	2.67E-03
Total	C1	3.03E-02	3.09E-03	4.61E-03	1.07E-02
H-3	C1	117.9	87.37	70.2	275.5

TABLE 2.3-3

MILLSTONE UNIT No. 3

Year 1988 LIQUID RAD WASTE EFFLUENTS - BATCH - LWS

Nuclides Released	Unit	OCTOBER	NOVEMBER	DECEMBER	Quarterly Total
Sr-92	Ci	1.339E-03	1.070E-03	7.56E-04	3.16E-03
Mo-99	Ci	8.848E-03		-----	8.85E-03
Cs-136	Ci	4.882E-03	1.740E-04	-----	5.06E-03
Na-24	Ci	1.827E-04	1.617E-03	1.06E-04	1.91E-03
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
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	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
Total Activity	Ci	3.52E-01	2.37E-01	7.54E-02	6.64E-01

Gross Alpha	Ci	≤1.75E-04	≤1.6E-04	≤7.49E-05	≤4.10E-04
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				

TABLE 2.3-4

MILLSTONE UNIT No. 3

Year 1988

LIQUID RAD WASTE EFFLUENTS - BATCH

CPF WASTE NEUTRALIZING SUMPS

Nuclides Released	Unit	JULY	AUGUST	SEPTEMBER	Quarterly Total
NONE					
Cr-51	Ci				
Mn-54	Ci				
Tc-99M	Ci				
Co-58	Ci				
Co-60	Ci				
I-131	Ci				
I-133	Ci				
I-135	Ci				
Cs-134	Ci				
Cs-137	Ci				
Mo-99	Ci				
Ce-141	Ci				
Ce-144	Ci				
Zn-65	Ci				
Fe-59	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
Fe-55	Ci				
Sr-89	Ci				
Sr-90	Ci				
Total Activity	Ci				
Xe-133	Ci				
Xe-135	Ci				
Xe-135M	Ci				
	Ci				
	Ci				
H-3	Ci				

TABLE 2.3-4

MILLSTONE UNIT No. 3

Year 1988

LIQUID RAD WASTE EFFLUENTS - BATCH

CPF WASTE NEUTRALIZING SUMPS

Nuclides Released	Unit	OCTOBER	NOVEMBER	DECEMBER	Quarterly Total
NONE					
Cr-51	Ci				
Mn-54	Ci				
Tc-99M	Ci				
Co-58	Ci				
Co-60	Ci				
I-131	Ci				
I-133	Ci				
I-135	Ci				
Cs-134	Ci				
Cs-137	Ci				
Mo-99	Ci				
Ce-141	Ci				
Ce-144	Ci				
Zn-65	Ci				
Fe-59	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
Fe-55	Ci				
Sr-89	Ci				
Sr-90	Ci				
Total Activity	Ci				
Xe-133	Ci				
Xe-135	Ci				
Xe-135M	Ci				
	Ci				
	Ci				
H-3	Ci				

TABLE 2.3-5

MILLSTONE UNIT No. 3
SUMMATION OF GASEOUS EFFLUENT RELEASES

YEAR	UNITS	JULY	AUGUST	SEPTEMBER	QUARTERLY TOTALS
1988					

A. Fission and Activation Gases

1. TOTAL ACTIVITY RELEASED	Ci	<MDA	< MDA	7.49	7.49
2. AVERAGE RELEASE RATE FOR THE PERIOD	UCi/sec	-----	-----	2.99	1.01

B. Iodines

1. TOTAL I-131 ACTIVITY RELEASED	Ci	6.04E-04	1.44E-04	5.45E-05	8.03E-04
2. AVERAGE RELEASE RATE FOR THE PERIOD	UCi/sec	2.41E-04	5.95E-05	2.17E-05	1.08E-04

C. Particulates

1. TOTAL PARTICULATE ACTIVITY RELEASED	Ci	<MDA	6.8E-05	<MDA	6.8E-05
2. AVERAGE RELEASE RATE FOR THE PERIOD	UCi/sec	-----	2.81E-05	-----	9.14E-06
3. TOTAL GROSS ALPHA ACTIVITY RELEASED	Ci	<MDA	< MDA	<MDA	-----

D. Tritium

1. TOTAL ACTIVITY RELEASED	Ci	13.1	8.06	9.04	30.2
2. AVERAGE RELEASE RATE FOR THE PERIOD	UCi/sec	5.21	3.33	3.60	4.06

MILLSTONE UNIT No. 3
SUMMATION OF GASEOUS EFFLUENT RELEASES

YEAR	1988	UNITS	OCTOBER	NOVEMBER	DECEMBER	QUARTERLY TOTALS
------	------	-------	---------	----------	----------	---------------------

A. Fission and Activation Gases

1. TOTAL ACTIVITY RELEASED	Ci	41.8	4.82	<MDA	46.6
2. AVERAGE RELEASE RATE FOR THE PERIOD	UCi/sec	13.8	1.99	<MDA	5.51

B. Iodines

1. TOTAL I-131 ACTIVITY RELEASED	Ci	1.29E-03	4.46E-04	3.78E-04	2.11E-03
2. AVERAGE RELEASE RATE FOR THE PERIOD	UCi/sec	4.27E-04	1.84E-04	1.25E-04	2.50E-04

C. Particulates

1. TOTAL PARTICULATE ACTIVITY RELEASED	Ci	6.48E-05	1.09E-05	<MDA	7.57E-05
2. AVERAGE RELEASE RATE FOR THE PERIOD	UCi/sec	2.15E-05	4.50E-06	<MDA	8.95E-06
3. TOTAL GROSS ALPHA ACTIVITY RELEASED	Ci	2.14E-07	<MDA	7.73E-10	2.14E-07

D. Tritium

1. TOTAL ACTIVITY RELEASED	Ci	25.4	1.53	<MDA	26.9
2. AVERAGE RELEASE RATE FOR THE PERIOD	UCi/sec	8.4	0.63	<MDA	3.18

TABLE 2.3-6

MILLSTONE UNIT No. 3 - GASEOUS EFFLUENT - CONTINUOUS
NORMAL VENTILATION

Year 1988

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

1. Fusion gases

Xe-138	Cf				
Kr-87	Cf				
Kr-88	Cf				
Kr-85m	Cf				
Xe-135	Cf			3.22	3.22
Xe-133	Cf			4.27	4.27
Kr-89	Cf				
Xe-137	Cf				
Xe-135m	Cf				
Kr-83m	Cf				
Xe-133m	Cf				
Xe-131m	Cf				
Kr-85	Cf				
Ar-37	Cf				
Total For Period	Cf	N/D	N/D	7.49	7.49

2. Iodines

Iodine-131	Cf	6.04E-04	1.44E-04	5.45E-05	8.03E-04
Iodine-133	Cf	$\leq 7.97E-05$	$\leq 1.43E-04$	6.62E-05	6.62E-05

3. Particulates

Cr-51	Cf				
Mn-54	Cf				
Fe-59	Cf				
Co-58	Cf				
Co-60	Cf				
Zn-65	Cf				
I-131	Cf				
Cs-134	Cf				
Cs-137	Cf				
Ba-140	Cf				
Ce-141	Cf				
Ce-144	Cf				
ND-147	Cf		6.8E-05		6.8E-05
Gross Alpha	Cf	$\leq 3.6E-06$	$\leq 2.2E-06$	$\leq 3.2E-06$	$\leq 3.0E-06$
	Cf				
Sr-89	Cf	$\leq 1.2E-06$	$\leq 1.92E-06$	$\leq 1.61E-06$	$\leq 1.58E-06$
Sr-90	Cf	$\leq 3.2E-07$	$\leq 3.2E-07$	$\leq 3.2E-07$	$\leq 3.2E-07$
Total	Cf		6.8E-05		6.8E-05
H-3	Cf	13.1	8.04	8.85	29.99

TABLE 2.3-6

MILLSTONE UNIT No. 3 - GASEOUS EFFLUENT - CONTINUOUS
NORMAL VENTILATION

Year 1988

Nuclides Released	Unit	OCTOBER	NOVEMBER	DECEMBER	Quarterly Total
1. Fission gases					
Xe-138	CI			<MDA	
Kr-87	CI				
Kr-88	CI				
Kr-89m	CI				
Xe-135	CI		1.2		1.2
Xe-133	CI	19.95	3.61		23.56
Kr-89	CI				
Xe-137	CI				
Xe-135m	CI				
Kr-83m	CI				
Xe-133m	CI				
Xe-131m	CI				
Kr-85	CI				
Ar-37	CI				
Total For Period	CI	19.95	4.81	MDA	24.76
2. Iodines					
Iodine-131	CI	1.06E-03	4.38E-04	3.78E-04	1.88E-03
Iodine-133	CI	3.37E-04	7.10E-06	6.12E-05	4.05E-04
3. Particulates					
Cr-51	CI			<MDA	
Mn-54	CI				
Fe-59	CI				
Co-58	CI				
Co-60	CI				
Zn-65	CI				
I-131	CI	4.85E-05	1.02E-05		5.86E-05
Cs-134	CI				
Cs-137	CI	1.633E-05			1.63E-05
Ba-140	CI				
Ce-141	CI				
Ce-144	CI				
	CI				
Gross Alpha	CI	2.09E-07	<MDA		1.09E-07
	CI				
Sr-89	CI	<MDA	<MDA	<MDA	<MDA
Sr-90	CI	<MDA	<MDA	<MDA	<MDA
Total	CI	6.48E-05	1.02E-05	<MDA	7.50E-05
H3	CI	12.82	<MDA	<MDA	12.82

TABLE 2.3-7

MILLSTONE UNIT No. 3 - GASEOUS EFFLUENT - CONTINUOUS
ESF BUILDING VENTILATION

Year 1988

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

1. Fission gases

Xe-138	Cf				
Kr-87	Cf				
Kr-88	Cf				
Kr-85m	Cf				
Xe-135	Cf				
Xe-133	Cf				
Kr-89	Cf				
Xe-137	Cf				
Xe-135m	Cf				
Kr-83m	Cf				
Xe-133m	Cf				
Xe-131m	Cf				
Kr-85	Cf				
Ar-37	Cf				
Total For Period	Cf	< MDA	< MDA	< MDA	< MDA

2. Iodines

Iodine-131	Cf	< MDA	< MDA	< MDA	< MDA
Iodine-133	Cf	< MDA	< MDA	< MDA	< MDA

3. Particulates

Cr-51	Cf				
Mn-54	Cf				
Fe-59	Cf				
Co-58	Cf				
Co-60	Cf				
Zn-65	Cf				
I-131	Cf				
Cs-134	Cf				
Cs-137	Cf				
Ba-140	Cf				
Ce-141	Cf				
Ce-144	Cf				
	Cf				
Gross Alpha	Cf	$\leq 4.6E-08$	$\leq 2.2E-08$	$\leq 5.21E-08$	\leq MDA
	Cf				
Sr-89	Cf	$\leq 1.86E-08$	$\leq 1.48E-08$	$\leq 2.23E-08$	\leq MDA
Sr-90	Cf	$\leq 3.7E-09$	$\leq 3.71E-09$	$\leq 5.2E-09$	\leq MDA
Total	Cf	< MDA	< MDA	< MDA	< MDA
H3	Cf	< MDA	2.5E-02	1.9E-01	2.1E-01

TABLE 2.3-7

MILLSTONE UNIT No. 3 - GASEOUS EFFLUENT - CONTINUOUS
ESP BUILDING VENTILATION

Year 1988

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

1. Fission gases

	Unit	MDA	MDA	MDA	MDA
Xe-138	CI				
Kr-87	CI				
Kr-88	CI				
Kr-85m	CI				
Xe-135	CI				
Xe-133	CI				
Kr-89	CI				
Xe-137	CI				
Xe-132m	CI				
Kr-83m	CI				
Xe-133m	CI				
Xe-131m	CI				
Kr-85	CI				
Ar-37	CI				
Total For Period	CI	↓	↓	↓	MDA

2. Iodines

Iodine-131	CI	1.18E-05	3.22E-06	<MDA	1.50E-05
Iodine-133	CI	3.59E-06	<MDA	<MDA	3.59E-06

3. Particulates

	Unit	<MDA		<MDA	
Cr-51	CI	<MDA		<MDA	
Mn-54	CI		2.21E-07		2.21E-07
Fe-59	CI				
Co-58	CI		4.41E-07		4.41E-07
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				
Gross Alpha	CI	5.18E-09	<MDA	7.73E-10	5.59E-09
	CI				
Sr-89	CI	<MDA	<MDA	<MDA	
Sr-90	CI	<MDA	<MDA	<MDA	
Total	CI	<MDA	6.62E-07	<MDA	6.62E-07
H-3	CI	1.4E-01	1.53	<MDA	1.67

TABLE 2.3-8

MILLSTONE UNIT No. 3 - BATCH

CONTAINMENT DRAWDOWN

Year 1988

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

1. Fission gases

NONE

Xe-138	Cf				
Kr-87	Cf				
Kr-88	Cf				
Kr-85m	Cf				
Xe-135	Cf				
Xe-133	Cf				
Kr-89	Cf				
Xe-137	Cf				
Xe-135m	Cf				
Kr-83m	Cf				
Xe-133m	Cf				
Xe-131m	Cf				
Kr-85	Cf				
Ar-37	Cf				
Total For Period	Cf				

2. Iodines

Iodine-131	Cf				
Iodine-133	Cf				

3. Particulates

Cr-51	Cf				
Mn-54	Cf				
Fe-59	Cf				
Co-58	Cf				
Co-60	Cf				
Zn-65	Cf				
I-131	Cf				
Cs-134	Cf				
Cs-137	Cf				
Ba-140	Cf				
Ce-141	Cf				
Ce-144	Cf				
	Cf				
	Cf				
TOTAL	Cf				
	Cf				
	Cf				
H-3	Cf				
	Cf				

MILLSTONE UNIT No. 3 - BATCH
CONTAINMENT DRAWDOWN

Year 1988

Nuclides Released	Unit	OCTOBER	NOVEMBER	DECEMBER	Quarterly Total
1. Fission gases					
Xe-138	CI			N/A	
Kr-87	CI				
Kr-88	CI				
Kr-85m	CI				
Xe-135	CI				
Xe-133	CI	4.44E-01	9.59E-03		4.53E-01
Kr-89	CI				
Xe-137	CI				
Xe-132m	CI				
Kr-83m	CI				
Xe-132m	CI	4.51E-03			4.51E-03
Xe-131m	CI				
Kr-85	CI				
Ar-37	CI				
Total For Period	CI	4.48E-01	9.59E-03		4.58E-01
2. Iodines					
Iodine-131	CI	5.11E-06	5.20E-06		1.03E-05
Iodine-133	CI	<MDA	<MDA		<MDA
3. Particulates					
Cr-51	CI			N/A	
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				
	CI				
TOTAL	CI	<MDA	<MDA		<MDA
	CI				
	CI				
H-3	CI	2.42E-03	1.94E-03		4.36E-03
	CI				

TABLE 2.3-9

MILLSTONE UNIT No. 3 - BATCH
CONTAINMENT PURGES

Year 1988

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

1. Fission gases

NONE

Xe-138	Cf				
Kr-87	Cf				
Kr-88	Cf				
Kr-85m	Cf				
Xe-135	Cf				
Xe-133	Cf				
Kr-89	Cf				
Xe-137	Cf				
Xe-135m	Cf				
Kr-83m	Cf				
Xe-133m	Cf				
Xe-131m	Cf				
Kr-85	Cf				
Ar-37	Cf				
Total For Period	Cf				

2. Iodines

Iodine-131	Cf				
Iodine-133	Cf				

3. Particulates

Cr-51	Cf				
Mn-54	Cf				
Fe-59	Cf				
Co-58	Cf				
Co-60	Cf				
Zn-65	Cf				
I-131	Cf				
Cs-134	Cf				
Cs-137	Cf				
Ba-140	Cf				
Ce-141	Cf				
Ce-144	Cf				
	Cf				
	Cf				
TOTAL	Cf				
	Cf				
	Cf				
H-3	Cf				
	Cf				

TABLE 2.3-9

MILLSTONE UNIT No. 3 - BATCH
CONTAINMENT PURGES

Year 1988

Nuclides Released	Unit	OCTOBER	NOVEMBER	DECEMBER	Quarterly Total
1. Fission gases					
Xe-138	CF		N/A	N/A	
Kr-87	CF				
Kr-88	CF				
Kr-89m	CF	2.14E-03			2.14E-03
Xe-135	CF	5.94E-01			5.94E-01
Xe-133	CF	2.04E+01			2.04E+01
Kr-89	CF				
Xe-137	CF				
Xe-135m	CF				
Kr-83m	CF				
Xe-133m	CF	3.0E-01			3.0E-01
Xe-133m	CF	1.14E-01			1.14E-01
Kr-85	CF				
Ar-37	CF				
Total For Period	CF	21.4			21.4
2. Iodines					
Iodine-131	CF	2.10E-04	N/A	N/A	2.10E-04
Iodine-133	CF	3.37E-05	N/A	N/A	3.37E-05
3. Particulates					
Cr-51	CF		N/A	N/A	
Mn-54	CF				
Fe-59	CF				
Co-58	CF				
Co-60	CF				
Zn-65	CF				
I-131	CF				
Cs-134	CF				
Cs-137	CF				
Ba-140	CF				
Ce-141	CF				
Ce-144	CF				
	CF				
	CF				
TOTAL	CF	< MDA	< MDA		< MDA
	CF				
	CF				
H-3	CF	1.24E+01			1.24E+01
	CF				

TABLE 2.3-10

MILLSTONE UNIT No. 3 - CONTINUOUS
TURBINE GLAND SEALING SYSTEM EXHAUST

Year 1988

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

1. Fission gases

NONE

Xe-138	Cf				
Kr-87	Cf				
Kr-88	Cf				
Kr-85m	Cf				
Xe-135	Cf				
Xe-133	Cf				
Kr-89	Cf				
Xe-137	Cf				
Xe-135m	Cf				
Kr-83m	Cf				
Xe-133m	Cf				
Xe-131m	Cf				
Kr-85	Cf				
Ar-37	Cf				
Total For Period	Cf				

2. Iodines

Iodine-131	Cf				
Iodine-133	Cf				

3. Particulates

Cr-51	Cf				
Mn-54	Cf				
Fe-59	Cf				
Co-58	Cf				
Co-60	Cf				
Zn-65	Cf				
I-131	Cf				
Cs-134	Cf				
Cs-137	Cf				
Ba-140	Cf				
Ce-141	Cf				
Ce-144	Cf				
	Cf				
	Cf				
TOTAL	Cf				
	Cf				
	Cf				
	Cf				
	Cf				

TABLE 2.3-10

MILLSTONE UNIT No. 3 - CONTINUOUS
TURBINE GLAND SEALING SYSTEM EXHAUST

Year 1988

Nuclides Released	Unit	OCTOBER	NOVEMBER	DECEMBER	Quarterly Total
1. Fission gases		NONE			
Xe-138	CI				
Kr-87	CI				
Kr-88	CI				
Kr-85m	CI				
Xe-135	CI				
Xe-133	CI				
Kr-89	CI				
Xe-137	CI				
Xe-135m	CI				
Kr-83m	CI				
Xe-133m	CI				
Xe-131m	CI				
Kr-85	CI				
Ar-37	CI				
Total For Period	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				
	CI				
TOTAL	CI				
	CI				
	CI				
	CI				
	CI				

TABLE 2.3-11

MILLSTONE UNIT No. 3 - BATCH

MAIN CONDENSER MECHANICAL VACUUM PUMP EXHAUST

Year 1988

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

1. Fission gases

NONE

Xe-138	Cf				
Kr-87	Cf				
Kr-88	Cf				
Kr-85m	Cf				
Xe-135	Cf				
Xe-133	Cf				
Kr-89	Cf				
Xe-137	Cf				
Xe-135m	Cf				
Kr-83m	Cf				
Xe-133m	Cf				
Xe-131m	Cf				
Kr-85	Cf				
Ar-37	Cf				
Total For Period	Cf				

2. Iodines

Iodine-131	Cf				
Iodine-133	Cf				

3. Particulates

Cr-51	Cf				
Mn-54	Cf				
Fe-59	Cf				
Co-58	Cf				
Co-60	Cf				
Zn-65	Cf				
I-131	Cf				
Cs-134	Cf				
Cs-137	Cf				
Ba-140	Cf				
Ce-141	Cf				
Ce-144	Cf				
	Cf				
	Cf				
TOTAL	Cf				
	Cf				
	Cf				
	Cf				
	Cf				

MILLSTONE UNIT No. 3 - BATCH
 MAIN CONDENSER MECHANICAL VACUUM PUMP EXHAUST

Year 1988

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

1. Fission gases

Xe-138	Cf	<MDA	N/A	<MDA	<MDA
Kr-87	Cf				
Kr-88	Cf				
Kr-85m	Cf				
Xe-135	Cf				
Xe-133	Cf				
Kr-89	Cf				
Xe-137	Cf				
Xe-135m	Cf				
Kr-83m	Cf				
Xe-133m	Cf				
Xe-131m	Cf				
Kr-85	Cf				
Ar-37	Cf				
Total For Period	Cf	↓	↓	↓	<MDA

2. Iodines

Iodine-131	Cf	8.49E-08	N/A		8.49E-08
Iodine-133	Cf	<MDA	↓		<MDA

3. Particulates

Cr-51	Cf	<MDA	N/A	<MDA	<MDA
Mn-54	Cf				
Fe-59	Cf				
Co-58	Cf				
Co-60	Cf				
Zn-65	Cf				
I-131	Cf				
Cs-134	Cf				
Cs-137	Cf				
Ba-140	Cf				
Ce-141	Cf				
Ce-144	Cf				
	Cf				
	Cf	↓			
TOTAL	Cf	<MDA			<MDA
	Cf				
	Cf				
	Cf				
	Cf				
	Cf		↓	↓	

3.0

Radioactive Solid Waste

Summaries of solid waste shipments 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 I 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, 1988 - DECEMBER 31, 1988

1. Type of Waste	Units	6-Month Period	Est. Total Error, %	
a) Spent Resin, Filter Sludge, Evaporator Bottoms, Etc.	(CNSI) Burial	M ³ Ci	94.9 7.02E+02	2.5E1
	(SEG) Super Compaction	M ³ Ci	N/A N/A	2.5E1
b) Dry Compressible Waste, Contaminated Equipment, Etc.	(CNSI) Burial	M ³ Ci	30.1 1.11E+00	2.5E1
	(SEG) Super Compaction	M ³ Ci	32.3 2.02E-01	2.5E1
	(B&W) Burial	M ³ Ci	15.3 2.10E-01	2.5E1
c) Irradiated Components, Control Rods, Etc.		M ³ Ci	1.1 4.43E+02	2.5E1
d) Others (Describe)		M ³ Ci	N/A N/A	2.5E1

2. Estimates of Major Nuclides Composition (By Type of Waste)

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

<u>Nuclide</u>	<u>(%)</u>
H-3	<0.01
C-14	0.01

Cr-51	3.38
Mn-54	9.09
Fe-55	13.62
Co-58	0.54
Fe-59	0.64
Co-60	16.57
Ni-63	0.60
Zn-65	53.71
Sr-89	0.02
Sr-90	0.03
Tc-99	<0.01
I-129	<0.01
I-131	0.02
Cs-134	0.04
Cs-137	1.65
Ba-140	0.02
La-140	0.01
Ce-141	0.01
Ce-144	<0.01
Pu-238	<0.01
Pu-239	<0.01
Pu-241	0.03
Am-241	<0.01
Cm-242	<0.01
Cm-244	<0.01

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

<u>Nuclide</u>	<u>(%)</u>
C-14	<0.01
Mn-54	12.72
Fe-55	10.42
Co-60	60.66
Ni-63	9.18
Zn-65	4.93
Sr-90	<0.01
Cs-137	2.05
Pu-238	<0.01
Pu-239	<0.01
Pu-241	0.02
Am-241	<0.01
Cm-242	<0.01
Cm-244	0.01

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

<u>Nuclide</u>	<u>(%)</u>
Mn-54	14.59
Fe-55	16.72
Co-60	59.72
Ni-63	4.41
Zn-65	1.78
Cs-137	2.78

b) Dry Compressible Waste,
Contaminated Equipment, Etc. (Burial from Babcock & Wilcox)

<u>Nuclide</u>	<u>(%)</u>
H-3	0.08
C-14	0.92
Mn-54	1.00
Fe-55	6.21
Co-58	<0.01
Co-60	83.94
Ni-63	2.82
Zn-65	0.07
Sr-90	<0.01
Tc-99	<0.01
Ag-110m	0.01
Sb-125	4.46
I-129	<0.01
Cs-137	0.14
Pu-241	0.26
Cm-242	0.02
Other Tru	0.06

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

<u>Nuclide</u>	<u>(%)</u>
H-3	0.49
C-14	<0.01
Cr-51	<0.01

Mn-54	12.83
Fe-55	60.44
Ni-59	0.01
Co-60	24.36
Ni-63	1.87
Nb-95	<0.01
Tc-99	<0.01
Pu-238	<0.01
Pu-239	<0.01
Pu-241	<0.01
Am-241	<0.01
Cm-242	<0.01
Cm-242	<0.01

3. Solid Waste Disposition (From Millstone)

Number of Shipments	Mode of Transportation	Destination
20	Truck (Sole Use Vehicle)	Chem-Nuclear Barnwell S.C.
1	Truck (Sole Use Vehicle)	Scientific Ecology Group Oakridge Tenn.

Solid Waste Disposition (From Babcock & Wilcox) (See Note)

Number of Shipments	Mode of Transportation	Destination
6	Truck (Sole Use Vehicle)	Chem-Nuclear Barnwell S.C.
3	Truck (Sole Use Vehicle)	U.S. Ecology Richland Wash.

NOTE: No unit assignment, shipments charged to Station

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

MILLSTONE UNIT 2

JULY 1, 1988 - DECEMBER 31, 1988

1. Type of Waste	Units	6-Month Period	Est. Total Error, %	
a) Spent Resin, Filter Sludge, Evaporator Bottoms, Etc.	(CNSI) Burial	M ³ Ci	2.1 9.88E+00	2.5E1
	(SEG) Super Compaction	M ³ Ci	8.1 1.22E-01	2.5E1
b) Dry Compressible Waste, Contaminated Equipment, Etc.	(CNSI) Burial	M ³ Ci	14.8 3.60E+00	2.5E1
	(SEG) Super Compaction	M ³ Ci	9.9 5.40E-02	2.5E1
	(B&W) Burial	M ³ Ci	6.2 8.55E-02	2.5E1
c) Irradiated Components, Control Rods, Etc.		M ³ Ci	N/A N/A	2.5E1
d) Others (Describe)		M ³ Ci	N/A N/A	2.5E1

2. Estimates of Major Nuclides Composition (By Type of Waste)

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

<u>Nuclide</u>	<u>(%)</u>
H-3	0.02
C-14	<0.01

Mn-54	0.09
Fe-55	64.06
Co-58	5.36
Co-60	19.70
Ni-63	9.07
Sr-90	0.02
Tc-99	0.01
Ag-110m	0.80
Sb-125	0.43
Cs-137	0.31
Pu-238	<0.01
Pu-239	<0.01
Pu-241	0.10
Am-241	<0.01
Cm-242	0.02
Cm-244	<0.01

a) Spent Resin, Filter Sludges,
Evaporator Bottoms, Etc. (Super Compaction - Filters only)

<u>Nuclide</u>	<u>(%)</u>
H-3	93.50
C-14	0.14
Mn-54	0.03
Fe-55	3.68
Co-60	2.17
Ni-63	0.03
Cs-137	0.03

Am-241	0.04
Cm-242	0.09
Cm-244	0.01

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

<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,
Contaminated Equipment, Etc. (Super Compaction)

<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,
Contaminated Equipment, Etc. (Burial from Babcock & Wilcox)

<u>Nuclide</u>	<u>(%)</u>
H-3	0.08
C-14	0.92

Mn-54	0.99
Fe-55	6.21
Co-58	<0.01
Co-60	83.94
Ni-63	2.82
Zn-65	0.07
Sr-90	<0.01
Tc-99	<0.01
Ag-110m	0.01
Sb-125	4.46
I-129	<0.01
Cs-137	0.14
Pu-241	0.26
Cm-242	0.02
Other Tru	0.06

3. Solid Waste Disposition (From Millstone)

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
2	Truck (Sole Use Vehicle)	Chem-Nuclear Barnwell S.C.
1	Truck (Sole Use Vehicle)	Scientific Ecology Group Oakridge Tenn.

Solid Waste Disposition (From Babcock & Wilcox)

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
See Page 5	Truck (Sole Use Vehicle)	Chem-Nuclear Barnwell S.C.
	Truck (Sole Use Vehicle)	U.S. Ecology Richland Wash.

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

MILLSTONE UNIT 3

JULY 1, 1988 - DECEMBER 31, 1988

1. Type of Waste	Units	6-Month Period	Est. Total Error, %	
a) Spent Resin, Filter Sludge, Evaporator Bottoms, Ect.	(CNSI) Burial	M ³ Ci	10.7 6.65E+00	2.5E1
	(SEG) Super Compaction	M ³ Ci	0.2 6.26E-04	2.5E1
b) Dry Compressible Waste, Contaminated Equipment, Ect.	(CNSI) Burial	M ³ Ci	11.4 1.69E+00	2.5E1
	(SEG) Super Compaction	M ³ Ci	14.8 3.82E-02	2.5E1
	(B&W) Burial	M ³ Ci	4.5 6.19E-02	2.5E1
c) Irradiated Components, Control Rods, Ect.		M ³ Ci	N/A N/A	2.5E1
d) Others (Describe)		M ³ Ci	N/A N/A	2.5E1

2. Estimates of Major Nuclides Composition (By Type of Waste)

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

<u>Nuclide</u>	<u>(%)</u>
H-3	0.11
C-14	<0.01

Mn-54	11.15
Fe-55	27.56
Co-57	0.08
Co-58	12.81
Co-60	24.23
Ni-63	21.55
Sr-89	0.02
Sr-90	0.02
Nb-95	0.29
Tc-99	0.05
Ag-110m	0.75
I-129	0.05
I-131	0.15
Cs-134	0.40
Cs-137	0.68
Pu-238	<0.01
Pu-239	<0.01
Pu-241	0.09
Am-241	<0.01
Cm-242	<0.01
Cm-244	<0.01

a) Spent Resin, Filter Sludges,
Evaporator Bottoms, Etc. (Super Compaction - Filters only)

<u>Nuclide</u>	<u>(%)</u>
H-3	0.14
C-14	0.02

Mn-54	12.31
Fe-55	50.18
Co-57	0.18
Co-58	1.58
Co-60	23.81
Ni-63	11.14
Tc-99	0.21
I-129	0.19
Pu-238	0.02
Pu-239	0.02
Pu-241	0.18
Am-241	0.02
Cm-242	0.02

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

<u>Nuclide</u>	<u>(%)</u>
Cr-51	0.85
Mn-54	4.16
Fe-55	27.49
Co-58	54.43
Fe-59	0.33
Co-60	4.48
Ni-63	7.93
Nb-95	0.21
Zr-95	0.12

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

<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,
Contaminated Equipment, Etc. (Burial from Babcock & Wilcox)

<u>Nuclide</u>	<u>(%)</u>
H-3	0.08
C-14	0.92
Mn-54	1.00
Fe-55	6.21
Co-58	<0.01
Co-60	83.94
Ni-63	2.82
Zn-65	0.07
Sr-90	<0.01
Tc-99	<0.01
Ag-110m	0.01
Sb-125	4.46
I-129	<0.01
Cs-137	0.14
Pu-241	0.26

Cm-242	0.02
<hr/>	
Other Tru	0.06

3. Solid Waste Disposition (From Millstone)

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
3	Truck (Sole Use Vehicle)	Chem-Nuclear Barnwell S.C.
0	Truck (Sole Use Vehicle)	Scientific Ecology Group Oakridge Tenn.

Solid Waste Disposition (From Babcock & Wilcox)

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
See Page 5	Truck (Sole Use Vehicle)	Chem-Nuclear Barnwell S.C.
	Truck (Sole Use Vehicle)	U.S. Ecology Richland Wash.

January 1 - June 30 1988
Corrected Update

Unit 1 reporting of Irradiated Components incorrectly listed the Curie Content.

Correction:	Reported	7.44E+04 Ci
	Change	9.36E+04 Ci

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 jet air ejectors and subsequent isotopic analysis. The isotopic activity at the SJAE 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 sub-atmospheric 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 startup and maintains vacuum during startup. The Main Condenser mechanical vacuum pumps exhaust through the vent on the condensate polishing building roof. Steam Jet Air Ejectors maintains 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 startup 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 of 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 Estimates 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.

4.4 BATCH RELEASES

Liquid

	<u>UNIT 1</u>	<u>UNIT 2</u>	<u>UNIT 3</u>
a. Number of Batches	264	299	306
b. Total Time: (Min.)	24,540	50,753	29,432
c. Maximum Time: (Min.)	237	480	508
d. Average Time: (Min.)	93	170	96
e. Minimum Time: (Min.)	30	31	15

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	0	7	2	2
b. Total Time: (Min.)	-	-	2,463	540	240
c. Maximum Time: (Min.)	-	-	440	270	120
d. Average Time: (Min.)	-	-	352	270	120
e. Minimum Time: (Min.)	-	-	151	270	120

4.5 ABNORMAL RELEASES

None

5.0

CHANGES TO THE REMM/ODCM/PCP

There were no changes to the REMM/ODCM/PCP during the period.

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.

APPENDIX A - UPDATED TABLES

TABLE 3

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

MILLSTONE UNIT 1

JANUARY 1, 1988 - JUNE 30, 1988

1. Type of Waste	Unit	6-Month Period	Est. Total Error, %	
Spent Resins, Filter Sludges, a) Evaporator Bottoms, Etc.	(CNSI) Burial	M ³ Ci	9.25E1 6.76E2	2.5E1
	(SEG) Filters Only	Super Compaction	M ³ Ci	8.00E-1 1.29E-2
Dry Compressible Waste b) Contaminated Equipment, Etc.	(CNSI) Burial	M ³ Ci	1.22E1 8.68E-1	2.5E1
	(SEG) Super Compaction	M ³ Ci	3.56E1 5.83E-1	2.5E1
See Page 13 (SEG) Burial Data				
Irradiated Components, c) Control Rods, Etc.		M ³ Ci	2.80E0 9.36E4	2.5E1
d) Other (Describe)		M ³ Ci	N/A	N/A

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

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

Nuclide	(%)
H ³	2.00E-2
C ¹⁴	1.54E0
Cr ⁵¹	4.89E0
Mn ⁵⁴	2.56E1
Fe ⁵⁵	8.42E0