

# Maine Yankee

RELIABLE ELECTRICITY FOR MAINE SINCE 1972

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August 29, 1989  
MN-89-111

GDW-89-284

Region I  
UNITED STATES NUCLEAR REGULATORY COMMISSION  
475 Allendale Road  
King of Prussia, Pennsylvania 19406

Attention: Mr. William T. Russell, Regional Administrator

References: (a) License No. DPR-36 (Docket No. 50-309)

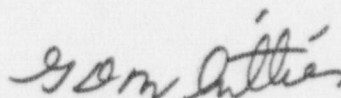
Gentlemen:

Subject: Semiannual Effluent Release Report

Enclosed is the Maine Yankee Semiannual Effluent Release Report for the period January 1, 1989 to June 30, 1989. There were no changes to the Off-Site Dose Calculation Manual. These reports are submitted in accordance with Technical Specifications 5.9.1.6, 4.13, 3.28, 3.16 and 3.17.

Very truly yours,

MAINE YANKEE



G. D. Whittier, Manager  
Nuclear Engineering and Licensing

GDW:WSD

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MAINE YANKEE ATOMIC POWER COMPANY

SEMIANNUAL EFFLUENT RELEASE REPORT

January - June, 1989

1.0 INTRODUCTION

Tables 1 through 4 list the recorded radioactive liquid and gaseous effluents and solid waste for the first six months of the year, with data summarized on a quarterly basis.

Appendices A through D indicate the status of reportable items per the requirements of Technical Specifications 3.16.C, 3.17.D, 3.28.A, 3.28.B, 4.8.A, 4.13 and 5.9.1.6.

Maine Yankee Atomic Power Station  
Effluent and Waste Disposal Semiannual Report  
First and Second Quarters, 1989  
Gaseous Effluents - Summation of All Releases

Unit	Quarter 1st	Quarter 2nd	Est. Total Error, %
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A. Fission and Activation Gases

1. Total release	Ci	4.29 E-01	2.18 E-01	2.50 E+01
2. Average release rate for period	uCi/sec	5.45 E-02	2.78 E-02	
3. Percent of regulatory limit	%	1.64 E-04	9.04 E-05	

B. Iodines

1. Total Iodine-131	Ci	9.38 E-06	5.39 E-06	2.50 E+01
2. Average release rate for period	uCi/sec	1.19 E-06	6.84 E-07	
3. Percent of regulatory limit	%	1.05 E-05	6.00 E-06	

C. Particulates

1. Particulates with T-1/2 > 8 days	Ci	1.46 E-06	1.57 E-07	2.50 E+01
2. Average release rate for period	uCi/sec	1.85 E-07	1.99 E-08	
3. Percent of regulatory limit	%	4.57 E-07	5.81 E-08	
4. Gross alpha radioactivity	Ci	1.84 E-07	8.18 E-08	

D. Tritium

1. Total release	Ci	1.20 E+00	2.12 E+00	2.50 E+01
2. Average release rate for period	uCi/sec	1.53 E-01	2.70 E-01	
3. Percent of regulatory limit	%	6.69 E-04	1.18 E-03	

Maine Yankee Atomic Power Station  
Effluent and Waste Disposal Semiannual Report  
First and Second Quarters, 1989  
Gaseous Effluents - Elevated Release

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		Quarter 1st	Quarter 2nd	Quarter 1st	Quarter 2nd
1. Fission Gases					
Krypton-85	Ci	N/D*	N/D*	N/D*	N/D*
Krypton-85m	Ci	N/D*	N/D*	N/D*	3.59 E-04
Krypton-87	Ci	N/D*	N/D*	N/D*	N/D*
Krypton-88	Ci	N/D*	N/D*	N/D*	N/D*
Xenon-133	Ci	N/D*	N/D*	4.26 E-01	2.09 E-01
Xenon-135	Ci	N/D*	N/D*	1.45 E-04	8.72 E-03
Xenon-135m	Ci	N/D*	N/D*	N/D*	N/D*
Xenon-138	Ci	N/D*	N/D*	N/D*	N/D*
Xenon-133m	Ci	N/D*	N/D*	2.38 E-03	7.13 E-06
Xenon-131m	Ci	N/D*	N/D*	N/D*	N/D*
Argon-41	Ci	N/D*	N/D*	N/D*	N/D*
Unidentified	Ci	N/D*	N/D*	N/D*	N/D*
Total for period	Ci	N/D*	N/D*	4.29 E-01	2.18 E-01
2. Iodines					
Iodine-131	Ci	9.34 E-06	3.85 E-06	3.93 E-08	1.54 E-06
Iodine-133	Ci	1.04 E-05	1.47 E-05	5.21 E-08	3.39 E-06
Iodine-135	Ci	N/D*	N/D*	2.02 E-08	1.60 E-06
Total for period	Ci	1.97 E-05	1.86 E-05	1.12 E-07	6.53 E-06
3. Particulates					
Strontium-89	Ci	N/D*	N/D*	N/D*	N/D*
Strontium-90	Ci	N/D*	N/D*	N/D*	N/D*
Cesium-134	Ci	N/D*	N/D*	N/D*	N/D*
Cesium-137	Ci	5.73 E-07	N/D*	N/D*	1.32 E-09
Barium-Lanthanum-140	Ci	N/D*	N/D*	N/D*	N/D*
Zinc-65	Ci	N/D*	N/D*	N/D*	N/D*
Cobalt-58	Ci	N/D*	N/D*	N/D*	N/D*
Cobalt-60	Ci	8.83 E-07	1.55 E-07	N/D*	8.80 E-10
Others	Ci	N/D*	N/D*	N/D*	N/D*

\*N/D - Not Detected

Maine Yankee Atomic Power Station  
Effluent and Waste Disposal Semiannual Report  
First and Second Quarters 1989  
Gaseous Effluents - Ground Level Releases

There were no routine measured ground level continuous or batch mode gaseous releases during the first and second quarters of 1989.

TABLE 2A

Maine Yankee Atomic Power Station  
Effluent and Waste Disposal Semiannual Report  
First and Second Quarters, 1989  
Liquid Effluents - Summation of All Releases

	Unit	Quarter 1st	Quarter 2nd	Est. Total Error, %
A. Fission and Activation Products				
1. Total release (not including tritium, gases, alpha)	Ci	1.01 E-01	1.49 E-02	1.50 E+01
2. Average diluted concentration during period	uCi/ml	5.05 E-10	7.16 E-11	
3. Percent of applicable limit	%	7.65 E-03	1.61 E-03	
B. Tritium				
1. Total release	Ci	3.52 E+01	9.59 E+01	1.50 E+01
2. Average diluted concentration during period	uCi/ml	1.76 E-07	4.61 E-07	
3. Percent of applicable limit	%	5.87 E-03	1.54 E-02	
C. Dissolved and Entrained Gases				
1. Total release	Ci	6.74 E-03	8.38 E-02	1.50 E+01
2. Average diluted concentration during period	uCi/ml	3.37 E-11	4.03 E-10	
3. Percent of applicable limit	%	1.69 E-05	2.01 E-04	
D. Gross Alpha Radioactivity				
1. Total release	Ci	2.89 E-05	N/D*	1.50 E+01
2. Average diluted concentration during period	uCi/ml	1.45 E-13	N/D*	
E. Volume of waste released (prior to dilution)				
	liters	1.54 E+07	7.76 E+06	1.00 E+01
F. Volume of dilution water used during period				
	liters	2.00 E+11	2.08 E+11	1.00 E+01

TABLE 2B

Maine Yankee Atomic Power Station  
Effluent and Waste Disposal Semiannual Report  
First and Second Quarters, 1989

Liquid Effluents

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		Quarter 1st	Quarter 2nd	Quarter 1st	Quarter 2nd
Strontium-89	Ci	N/D*	N/D*	2.50 E-04	N/D*
Strontium-90	Ci	N/D*	N/D*	N/D*	N/D*
Cesium-134	Ci	N/D*	N/D*	2.65 E-03	9.01 E-05
Cesium-137	Ci	1.23 E-05	4.81 E-05	8.52 E-03	5.78 E-04
Iodine-131	Ci	N/D*	N/D*	3.37 E-03	8.94 E-04
Cobalt-58	Ci	N/D*	N/D*	1.42 E-02	2.04 E-03
Cobalt-60	Ci	1.40 E-04	1.51 E-04	1.52 E-02	4.20 E-03
Iron-59	Ci	N/D*	N/D*	N/D*	N/D*
Zinc-65	Ci	N/D*	9.39 E-08	N/D*	N/D*
Manganese-54	Ci	N/D*	1.23 E-08	1.22 E-03	3.79 E-04
Chromium-51	Ci	N/D*	N/D*	4.27 E-04	N/D*
Zirconium-Niobium-95	Ci	N/D*	5.08 E-07	1.05 E-05	N/D*
Molybdenum-99	Ci	N/D*	N/D*	1.57 E-04	1.15 E-05
Technetium-99m	Ci	N/D*	N/D*	3.73 E-04	9.35 E-06
Barium-Lanthanum-140	Ci	N/D*	9.31 E-07	1.30 E-04	1.21 E-04
Cerium-141	Ci	N/D*	N/D*	N/D*	N/D*
Others Iron-55	Ci	N/D*	N/D*	6.85 E-03	2.55 E-03
Silver-110m	Ci	N/D*	N/D*	1.94 E-03	1.22 E-04
Iodine-133	Ci	N/D*	4.74 E-07	9.62 E-04	N/D*
Antimony-124	Ci	N/D*	N/D*	2.79 E-02	1.85 E-03
Antimony-125	Ci	N/D*	1.36 E-05	1.67 E-02	1.82 E-03
Ruthenium-103	Ci	N/D*	2.28 E-08	N/D*	N/D*
Cobalt-57	Ci	N/D*	N/D*	4.51 E-06	N/D*
Tin-113	Ci	N/D*	3.85 E-07	2.63 E-05	2.49 E-05
Unidentified	Ci	N/D*	N/D*	N/D*	N/D*
Total for period (above)(1)	Ci	1.52 E-04	2.15 E-04	1.01 E-01	1.47 E-02
Xenon-133	Ci	1.05 E-04	1.96 E-05	6.53 E-03	8.24 E-02
Xenon-135	Ci	N/D*	2.30 E-06	1.02 E-04	3.36 E-04
Xenon-131m	Ci	N/D*	N/D*	N/D*	2.76 E-04
Xenon-133m	Ci	N/D*	N/D*	N/D*	7.49 E-04
Krypton-85m	Ci	N/D*	2.11 E-06	N/D*	N/D*
Krypton-88	Ci	N/D*	1.33 E-06	N/D*	N/D*

N/D\* - Not Detected

(1) - Total for period does not include unidentified in this summation but is included in Table 2A, Item A1.

TABLE 3

Maine Yankee Atomic Power Station  
Effluent and Waste Disposal Semiannual Report  
First and Second Quarters, 1989  
Solid Waste and Irradiated Fuel Shipments

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

	Unit	6-Month Period	Est. Total Error, %
1. Type of Waste			
a. Spent resins, filter sludges, evaporator bottoms, etc. - LSA container**+++	m <sup>3</sup> C1	3.4 55.72	± 10
b. Dry compressible waste, contaminated equipment, etc. - LSA container+++	m <sup>3</sup> C1	84.1 1.5	± 10
c. Irradiated components, control rods, etc.	m <sup>3</sup> C1	0 0	
d.	m <sup>3</sup> C1		
e.	m <sup>3</sup> C1		

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

a. Fe-55	35%	plus or minus 10%
Ni-63	31%	plus or minus 10%
Co-60	22%	plus or minus 10%
Cs-137	2%	plus or minus 10%
Ba-137M	2%	plus or minus 10%
Sb-125	1%	plus or minus 10%
b. Cs-137	10%	plus or minus 10%
Co-60	22%	plus or minus 10%
Ce-58	11%	plus or minus 10%
Cs-134	3%	plus or minus 10%
Ni-63	14%	plus or minus 10%
Fe-55	26%	plus or minus 10%
Zr-95	5%	plus or minus 10%
Sb-125	2%	plus or minus 10%

## 3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
From Maine Yankee 5	Trucking over Highway	Chem-Nuclear, Barnwell, S.C.
From SEG # 31	Trucking over Highway	Chem-Nuclear, Barnwell, S.C.

## B. Irradiated Fuel Shipments (Disposition)

- + Container volume equal to 55 gallons (drums).
- ++ Container volume equal to 110 ft<sup>3</sup> (boxes).
- +++ Container volume equal to 170 ft<sup>3</sup> (liners) (HIC)
- \* Solid waste is Class A, as defined in 10CFR61.55. 84.1 m<sup>3</sup>, 1.5 C1
- \* Solid waste is Class B, as defined in 10CFR61.55. 0.8 m<sup>3</sup>, 6.76 C1
- \* Solid waste is Class C, as defined in 10CFR61.55. 2.6 m<sup>3</sup>, 48.96 C1
- \*\* Solidification agent is cement.
- \*\*\* Excluding nuclides with half-lives less than 12.8 days.
- # SEG performs super compacting of DAW.

Supplemental Information

1. Regulatory Limits

Maximum Permissible Concentration

- |  |  |
|--|--|
| a. Fission and activation gases:                       | 10CFR20; Appendix B, Table 2, Column 1 |
| b. Iodines:  | 10CFR20; Appendix B, Table 2, Column 1 |
| c. Particulates, (with half lives greater than 8 days) | 10CFR20; Appendix B, Table 2, Column 1 |
| d. Liquid effluents:                                   | 10CFR20; Appendix B, Table 2, Column 1 |
| e. Total noble gas concentration                       | 2E-04 uCi/ml                           |

2. Average Energy - Not Applicable

3. Measurements and Approximations of Radioactivity

a. Fission and Activation Cases

Continuous Discharge - Vent stack samples are analyzed monthly. Activity levels determined are assumed constant for the surveillance interval. The continuous vent stack monitor reading is used as a basis for increasing periodic sample frequency.

Batch Discharges - Direct measurements of the waste gas hold-up drums are taken prior to discharge. Containment vents and purges are analyzed by direct measurement of the containment atmosphere at periodic intervals during discharge.

b. Iodines

Primary vent stack iodine totals are taken from a minimum of weekly measurements of an in-line charcoal filter.

c. Particulates

Primary vent stack particulate totals are taken from a minimum of weekly measurements of an in-line particulate filter.

d. Liquid Effluents

Samples of secondary systems' liquid effluents are analyzed weekly for gross beta-gamma, alpha, tritium, dissolved gases, and gamma emitting isotopes.

Each batch release is analyzed for gross beta-gamma, alpha, tritium, dissolved gases, and gamma emitting isotopes prior to discharge.

Composite samples are made of secondary and primary system liquid effluents for a quarterly analysis of Strontium-90 and Strontium-89. Primary system liquid effluents are also analyzed quarterly for Iron-55.

TABLE 4  
(Continued)

4. Batch Releases

a. Liquids

1. Number of batch releases: 57
2. Total time period for batch releases: 187 hours, 50 minutes
3. Maximum time period for a batch release: 31 hours, 5 minutes
4. Average time period for batch releases: 3 hours, 18 minutes
5. Minimum time period for a batch release: 15 minutes
6. Average stream flow during periods of release of effluents into a flowing stream: N/A
7. Maximum gross release concentration (uCi/ml):  $1.71 \times 10^{-7}$

b. Gaseous

1. Number of batch releases: 12
2. Total time period for batch releases: 104 hours, 53 minutes
3. Maximum time period for a batch release: 90 hours, 22 minutes
4. Average time period for batch releases: 8 hours, 44 minutes
5. Minimum time period for a batch release: 15 minutes
6. Maximum gross release rate (uCi/sec):  $1.13 \times 10^3$

5. Abnormal Releases

a. Liquid

There were no abnormal liquid releases during the reporting period.

b. Gaseous

There were no abnormal gaseous releases during the reporting period.

6. On-Line Containment Purge

On-line containment purge was not employed during the reporting period.

## APPENDIX A

### Radioactive Effluent Monitoring Instrumentation

Requirement: Radioactive effluent monitoring instrumentation channels are required to be operable in accordance with Technical Specifications 3.28.A & B. With less than the minimum number of channels operable and reasonable efforts to return the instrument(s) to operable status within 30 days being unsuccessful, Technical Specifications 3.28.A & B requires an explanation for the delay in correcting the inoperability in the next Semiannual Effluent Release Report.

Response: The requirements of Technical Specifications 3.28.A and 3.28.B, governing operability of radioactive effluent monitoring instrumentation, were met for this reporting period, and no report is required.

## APPENDIX B

### Liquid Radwaste Treatment System

Requirement: With radioactive liquid waste being discharged without treatment with estimated doses in excess of the limits in Technical Specification 3.17.C.1, a report must be submitted to the Commission in the Semiannual Effluent Release Report for the period.

Response: The requirements of Technical Specification 3.17.C.1 were met during this period and, therefore, no report is required.

## APPENDIX C

### Gaseous Radwaste Treatment System

Requirement: With radioactive gaseous waste being discharged without treatment with doses in excess of the limits in Technical Specifications 3.18.D.1, a report must be submitted to the Commission in the Semiannual Effluent Release Report for the period.

Response: The requirements of Technical Specification 3.18.D.1 were met during this period and, therefore, no report is required.

## APPENDIX D

### Lower Limit of Detection for Radiological Analyses

Requirement: Technical Specification 4.13 requires that when unusual circumstances result in LLDs higher than required, the reasons shall be documented in the Semiannual Radioactive Effluent Release Report.

Response: Analyses were performed in such a manner that the stated LLD's were achievable under routine conditions. On occasion, with liquid samples, however, the presence of detected higher energy isotopes caused a compton background elevation. This interference was sufficient to make some of the specified LLD's in those liquid samples unattainable. This occurred in four (4) of the samples for Zinc-65, and one (1) for Iron-59. All other isotope LLD's were met. On all occasions, the specified LLD's were attained on the gaseous samples.