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NPF-49

ATTACHMENT 1

2006 RADIOACTIVE EFFLUENT RELEASE REPORT
VOLUME I

MILLSTONE POWER STATION UNITS 1, 2, AND 3
DOMINION NUCLEAR CONNECTICUT, INC. (DNC)

Millstone Power Station
2006 Radioactive Effluent Report
Release Report
Volume 1

Dominion Nuclear Connecticut, Inc.

MILLSTONE UNIT	LICENSE	DOCKET
1	DPR-21	50-245
2	DPR-65	50-336
3	NPF-49	50-423

Dominion

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2006 REMODCM Revision 25-02

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References

1. NUREG-0597 User Guide to GASPAR Code, KF Eckerman, FJ Congel, AK Roecklien, WJ Pasciak, Division of Site Safety and Environmental Analysis, Office of Nuclear Reactor Regulation, US Nuclear Regulatory Commission, Washington, DC 20555, manuscript completed January 1980, published June 1980.

2. Intentionally left blank

3. NRC Regulatory Guide 1.109 Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I, Revision 1, October 1977.

4. Intentionally left blank

5. NRC Regulatory Guide 1.111 Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors, Revision 1, July 1977.

6. NUREG/CR-1276, ORNL/NUREG/TDMC-1 User's Manual for LADTAP II - A Computer Program for Calculating Radiation Exposure to Man from Routine Release of Nuclear Reactor Liquid Effluents, DB Simpson, BL McGill, prepared by Oak Ridge National Laboratory, Oak Ridge, TN 37830, for Office of Administration, US Nuclear Regulatory Commission, manuscript completed 17 March 1980.

7. 10 CFR Energy, Part 50 Domestic Licensing of Production and Utilization Facilities, Appendix I Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion "As Low As Reasonably Achievable" for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents.

8. 40 CFR Environmental Protection Agency, Part 190 Environmental Radiation Protection Standard for Nuclear Power Operation.

9. DOSLIQ-Dose Excel Code for Liquid Effluents, Software Document File, Rev 1, February 2002.

10. DOSAIR-Dose Excel Code for Airborne Effluents, Software Document File, Rev 0, February 2002.

11. GASPAR II - Technical Reference and User Guide (NUREG/CR-4653), March 1987.

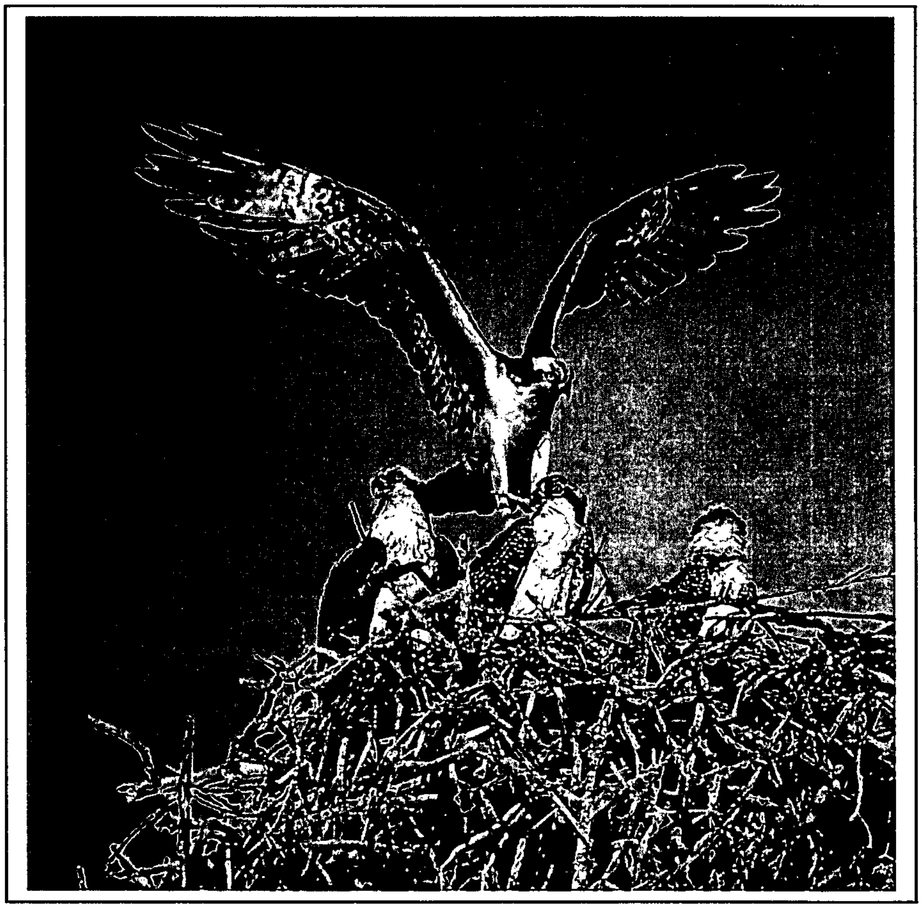
12. Memo No. MP-HPO-07024, 2006 Report on Solid Waste and Irradiated Component Shipments, April 9, 2007.

13. Memo No. NAF-07-035, 40CFR190 Offsite Dose Estimate for 2006, April 9, 2007.

Introduction

This report, for the period of January through December of 2006, is being submitted by Dominion Nuclear Connecticut, Inc. for Millstone Power Station's Units 1, 2, and 3, in accordance with 10CFR50.36a, the REMODCM, and the Station's Technical Specifications. A combined report, written in the US NRC Regulatory Guide 1.21 format, is submitted for all three units.

Volume 1 contains radiological and volumetric information on airborne and liquid effluents, shipments of solid waste & irradiated components, calculated offsite radiological doses, all changes to the REMODCM, information on effluent monitors inoperable for more than 30 consecutive days, and corrections to previous reports. Volume 2 contains a full copy of each of the complete revisions to the REMODCM effective during the calendar year.



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1.0 Off-Site Doses

This report provides a summary of the 2006 off-site radiation doses from releases of radioactive materials in airborne and liquid effluents from Millstone Units 1, 2, and 3. This includes the annual maximum dose (mrem) to any real member of the public as well the maximum gamma and beta air doses.

To provide perspective, these doses are compared to the regulatory limits and to the annual average dose that a member of the public could receive from natural background and other sources.

1.1 Dose Calculations

The off-site dose to humans from radioactive airborne and liquid effluents have been calculated using measured radioactive effluent data, measured meteorological data, and the dose computer models DOSAIR and DOSLIQ, which were developed by Millstone. The methodology and input parameters for DOSAIR are those used in GASPAR II (Reference 12) and NRC Regulatory Guide 1.109 (Reference 3). The methodology and input parameters for DOSLIQ are those used in LADTAP II (Reference 6) and NRC Regulatory Guide 1.109 (Reference 3). The calculated doses generally tend to be conservative due to the conservative model assumptions. More realistic estimates of the off-site dose can be obtained by analysis of environmental monitoring data. A comparison of doses estimated by each of the above methods is presented in the Annual Radiological Environmental Operating Report.

Doses are based upon exposure to the airborne and liquid effluents over a one-year period and an associated dose commitment over a 50-year period from initial exposure. The portion of the doses due to inhalation and ingestion take into account radioactive decay and biological elimination of the radioactive materials.

Maximum individual dose is defined as the dose to the individual who would receive the maximum dose from releases of airborne and liquid effluents. Although the location of the maximum individual may vary each quarterly period, the annual dose is the sum of these quarterly doses. This conservatively assumes that the individual is at the location of maximum dose each quarter.

The dose calculations are based upon three types of input: radioactive source term, site-specific data, and generic factors. The radioactive source terms (Curies) are characterized in Section 2, Effluent Radioactivity, of this report. The site-specific data includes: meteorological data (e.g. wind speed, wind direction, atmospheric stability, etc.) to calculate the transport and dispersion of airborne effluents, and dilution factors for liquid effluents. The generic factors include the average annual consumption rates (for inhalation of air and ingestion of fruits, vegetables, leafy vegetables, grains, milk, poultry, meat, fish, and shellfish) and occupancy factors (for air submersion and ground irradiation, shoreline activity, swimming, boating, etc.). All these inputs are used in the appropriate dose models to calculate the maximum individual dose from radioactive airborne and liquid effluents.

1.1.1 Airborne Effluents

Maximum individual doses due to the release of noble gases, radioiodines, and particulates were calculated using the computer code DOSAIR (Reference 11). This is equivalent to the NRC code, GASPAR II, which uses a semi-infinite cloud model to implement the NRC Regulatory Guide 1.109 (Reference 3) dose models.

The values of average relative effluent concentration (χ/Q) and average relative deposition (D/Q) used in the DOSAIR code were generated using EDAN 3, a meteorological computer code which implements the assumptions cited in NRC Regulatory Guide 1.111 (Reference 5), Section C. The annual summary of hourly meteorological data (in 15-minute increments), which includes wind speed, direction, atmospheric stability, and joint frequency distribution, is not provided in the report but can be retrieved from computer storage.

Millstone Stack (375 ft) releases are normally considered elevated with Pasquill stability classes determined based upon the temperature gradient between the 33 ft and 374 ft meteorological tower levels. The doses were conservatively calculated using mixed mode 142 ft meteorology since DOSAIR may underestimate the plume exposure (prior to plume touchdown) for elevated releases from the Millstone Stack. All three units previously had the ability to discharge effluents to the Millstone Stack. However, in March 2001, Unit 1 was separated from releasing to the stack and modifications were made to add two new release points, the Spent Fuel Pool Island Vent (SFPI) and the Balance of Plant Vent (BOP).

Unit 1 Spent Fuel Pool Island Vent (73 ft) and the Balance of Plant Vent (80 ft) releases are considered ground level, therefore these doses were calculated using the 33 ft meteorology. Continuous ventilation of the spent fuel pool island and evaporation from the spent fuel pool water (H-3) release to the Spent Fuel Pool Island Vent. Continuous ventilation from other Unit 1 buildings and airborne releases from the reactor building evaporator are discharged to the BOP Vent. Doses from these release points were summed to determine the total Unit 1 airborne effluent dose.

Unit 2 Auxiliary Building Ventilation, Steam Generator Blowdown Tank Vent, and Containment Purge (through the Unit 2 Vent)(159 ft) releases are considered mixed mode (partially elevated and partially ground) continuous releases. The first two of these are continuous releases while the Containment Purge is typically a batch release. Some Containment Purges are released via the Millstone Stack. Because doses for releases from the Unit 2 Vent and from the Millstone Stack are calculated using the same meteorology, the Containment Purge releases are not divided between Unit 2 Vent and Millstone Stack. Batch releases from the Waste Gas Decay Tanks and Containment Vents are typically discharged via the Millstone Stack. The doses for these elevated releases were conservatively calculated using mixed mode 142 ft meteorology for which the Pasquill stability classes are determined based upon the temperature gradient between the 33 ft and 142 ft meteorological tower levels. The Containment Equipment Hatch and the RWST Tank Vent releases are considered ground level where the 33 ft meteorology was used for the dose calculations. Each of the doses for the various release points were summed to determine the total Unit 2 airborne effluent dose.

The Unit 3 Vent (142.5 ft) is considered a mixed mode (partially elevated and partially ground) release point. The Pasquill stability classes are determined based upon the temperature gradient between the 33 ft and 142 ft meteorological tower levels. Auxiliary Building Ventilation is a mixed mode continuous release while Containment Purge and "initial" Containment Drawdown (through the roof of the Auxiliary Building) are considered mixed mode batch releases. Gaseous waste and operational containment drawdowns (also called containment vents) are released through the Unit 3 SLCRS system to the Millstone Stack (375 ft). The doses for these elevated releases were conservatively calculated using mixed mode 142 ft meteorology. The Engineered Safety Features Building (ESF) Ventilation, the Containment Equipment Hatch, and RWST Vent releases are considered ground level where the doses were calculated using 33 ft meteorology. Similar to Unit 2, each of the doses for the various release points were summed to determine the total Unit 3 airborne effluent dose.

1.1.2 Liquid Effluents

Maximum individual doses from the release of radioactive liquid effluents were calculated using the DOSLIQ program (Reference 10). This program uses the dose models and parameters cited in NRC Regulatory Guide 1.109 with site-specific inputs to produce results similar to the LADTAP II code, (Reference 6).

1.2 Dose Results

The calculated maximum off-site doses are presented in Table 1-1 for airborne effluents and Table 1-2 for liquid effluents.

1.2.1 Airborne Effluents

For the dose to the maximum individual, DOSAIR calculates the dose to the whole body, GI-tract, bone, liver, kidney, thyroid, lung, and skin from each of the following pathways: direct exposure from noble gases in the plume and from ground deposition, inhalation, and ingestion of vegetation, cow or goat milk, and meat. The values presented are a total from all pathways. However, only the whole body, skin, thyroid and maximum organ (other than thyroid) doses are presented.

For the plume and inhalation pathways, the maximum individual dose is calculated at the off-site location of the highest decayed χ/Q where a potential for dose exists.

For ground deposition, the maximum individual dose is calculated at both the off-site maximum land location of the highest χ/Q and highest D/Q where a potential for dose exists.

For the vegetation pathway, the maximum individual dose is calculated at the vegetable garden of the highest D/Q (or highest χ/Q when only tritium is released). For the vegetation pathway, the calculated dose is included in the maximum individual's dose only at locations and times where these pathways actually exist. Similarly, for meat, cow's milk, and goat's milk pathways, the calculated dose is included in the maximum individual's dose only at locations and times where these pathways actually exist.

To determine compliance with 10CFR50, Appendix I (Reference 7), the maximum individual whole body and organ doses include all applicable external pathways (i.e. plume and ground exposure) as well as the internal pathways (inhalation and ingestion).

1.2.2 Liquid Effluents

The DOSLIQ code performs calculations for the following pathways: fish, shellfish, shoreline activity, swimming, and boating. Doses are calculated for the whole body, skin, thyroid, and maximum organ (GI-LLI, bone, liver, kidney, and lung).

1.2.3 Analysis of Results

Table 1-3 provides a quantitative dose comparison with the limits specified in the REMODCM. The data indicates that the total whole body and organ doses to the maximum offsite individual from Millstone Station including all sources of the fuel cycle are well within the limits of 40CFR190 (Reference 8). On-site radioactive waste storage during this year was within storage criteria and the maximum dose to a member of the public was approximately 0.22 mrem/yr. The doses from airborne and liquid effluents were added to the estimated dose from on-site radioactive waste storage to show compliance with 40CFR190.

The Offsite Dose Comparison, Table 1-4, provides a perspective on the maximum offsite individual dose received from Millstone Station with the natural background radiation dose received by the average Connecticut resident. The total dose to the maximum individual received from Millstone Station is small in comparison to the dose received from natural background radiation.

Table 1-1
2006 Off-Site Dose Commitments from Airborne Effluents
Millstone Units 1, 2, 3

Unit 1	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual Total
Max Air	(mrad)	(mrad)	(mrad)	(mrad)	(mrad)
Beta	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Gamma	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Max Individual	(mrem)	(mrem)	(mrem)	(mrem)	(mrem)
Whole Body	3.09E-04	2.60E-04	2.60E-04	1.49E-04	9.78E-04
Skin	3.46E-04	2.64E-04	2.62E-04	1.49E-04	1.02E-03
Thyroid	3.08E-04	2.46E-04	2.51E-04	1.49E-04	9.54E-04
Max organ+	3.10E-04	3.41E-04	3.11E-04	1.49E-04	1.11E-03

Unit 2	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual Total
Max Air	(mrad)	(mrad)	(mrad)	(mrad)	(mrad)
Beta	1.66E-03	4.02E-03	1.32E-03	8.03E-03	1.50E-02
Gamma	2.30E-03	2.51E-04	2.41E-04	9.92E-04	3.79E-03
Max Individual	(mrem)	(mrem)	(mrem)	(mrem)	(mrem)
Whole Body	2.59E-03	5.20E-03	8.12E-04	1.51E-03	1.01E-02
Skin	4.05E-03	7.41E-03	1.47E-03	2.83E-03	1.58E-02
Thyroid	3.71E-03	1.20E-02	2.06E-02	2.18E-02	5.81E-02
Max organ+	2.60E-03	5.25E-03	8.84E-04	2.48E-03	1.12E-02

Unit 3	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual Total
Max Air	(mrad)	(mrad)	(mrad)	(mrad)	(mrad)
Beta	5.49E-06	6.20E-06	8.89E-06	3.10E-06	2.37E-05
Gamma	1.07E-05	1.54E-04	2.21E-05	8.09E-06	1.95E-04
Max Individual	(mrem)	(mrem)	(mrem)	(mrem)	(mrem)
Whole Body	1.87E-03	2.51E-03	7.23E-03	6.79E-04	1.23E-02
Skin	1.87E-03	2.51E-03	7.23E-03	6.84E-04	1.23E-02
Thyroid	1.87E-03	2.51E-03	7.22E-03	6.79E-04	1.23E-02
Max organ+	1.87E-03	2.51E-03	7.23E-03	6.79E-04	1.23E-02

+ Maximum of the following organs (not including thyroid): Bone, GI-LLI, Kidney, Liver, Lung

Table 1-2
2006 Off-Site Dose Commitments from Liquid Effluents
Millstone Units 1, 2, 3

Unit 1	*1st Quarter*	*2nd Quarter*	*3rd Quarter*	*4th Quarter*	*Annual Total*
Max Individual	(mrem)	(mrem)	(mrem)	(mrem)	(mrem)
Whole Body	0.00E+00	2.66E-07	0.00E+00	0.00E+00	2.66E-07
Thyroid	0.00E+00	7.63E-08	0.00E+00	0.00E+00	7.63E-08
Max Organ	0.00E+00	3.78E-07	0.00E+00	0.00E+00	3.78E-07

Unit 2	*1st Quarter*	*2nd Quarter*	*3rd Quarter*	*4th Quarter*	*Annual Total*
Max Individual	(mrem)	(mrem)	(mrem)	(mrem)	(mrem)
Whole Body	9.93E-05	7.63E-05	8.78E-05	1.30E-04	3.93E-04
Thyroid	6.83E-05	6.43E-05	7.10E-05	4.20E-05	2.46E-04
Max Organ	2.73E-04	3.16E-04	5.22E-04	1.75E-03	2.86E-03

Unit 3	*1st Quarter*	*2nd Quarter*	*3rd Quarter*	*4th Quarter*	*Annual Total*
Max Individual	(mrem)	(mrem)	(mrem)	(mrem)	(mrem)
Whole Body	4.96E-05	1.13E-04	6.90E-05	1.21E-04	3.53E-04
Thyroid	2.87E-05	4.23E-05	2.94E-05	1.03E-04	2.03E-04
Max Organ	1.93E-04	7.15E-04	2.88E-04	1.76E-04	1.37E-03

Table 1-3
2006 Off-Site Dose Comparison to Limits
Millstone Units 1, 2, 3

Airborne Effluents

Max Individual Dose vs REMODCM Limits

	Whole Body (mrem)	Thyroid (mrem)	Max Organ** (mrem)	Skin (mrem)	Beta Air (mrad)	Gamma Air (mrad)
Unit 1	9.78E-04	9.54E-04	1.11E-03	1.02E-03	0.00E+00	0.00E+00
Unit 2	1.01E-02	5.81E-02	1.12E-02	1.58E-02	1.50E-02	3.79E-03
Unit 3	1.23E-02	1.23E-02	1.23E-02	1.23E-02	2.37E-05	1.95E-04
Millstone Station	**2.34E-02**	**7.14E-02**	**2.46E-02**	**2.91E-02**	**1.51E-02**	**3.98E-03**
REMODCM Limits	5 *	15	15	15 *	20	10

Liquid Effluents

Max Individual Dose vs REMODCM Limits

	Whole Body (mrem)	Thyroid (mrem)	Max Organ** (mrem)
Unit 1	2.66E-07	7.63E-08	3.78E-07
Unit 2	3.93E-04	2.46E-04	2.86E-03
Unit 3	3.53E-04	2.03E-04	1.37E-03
Millstone Station	**7.46E-04**	**4.49E-04**	**4.23E-03**
REMODCM Limits	3 *	10 *	10 *

Max Individual Dose vs 40CFR190 Limits

	Whole Body (mrem)	Thyroid (mrem)	Max Organ ** (mrem)
Airborne Effluents	2.34E-02	7.14E-02	2.46E-02
Liquid Effluents	7.46E-04	4.49E-04	4.23E-03
Radwaste Storage	2.20E-01	2.20E-01	2.20E-01
Millstone Station	**2.44E-01**	**2.92E-01**	**2.49E-01**
40CFR190 Limit	25	75	25

* 10CFR50, Appendix I Guidelines

** Maximum of the following organs (not including Thyroid): Bone, GI-LLI, Kidney, Liver, Lung

Table 1-4
2006 Offsite Dose Comparison
Natural Background vs. Millstone Station

Average Resident	**Natural Background Radiation Dose (NCRP 94)**
Cosmic	27 mrem
Cosmogenic	1 mrem
Terrestial (Atlantic and Gulf Coastal Plain)	16 mrem
Inhaled	200 mrem
In the Body	40 mrem
	~284 mrem

Maximum Off-Site Individual	**Millstone Station Whole Body Dose**
Airborne Effluents	0.023 mrem
Liquid Effluents	0.001 mrem
On site RadWaste Storage	0.220 mrem
	0.244 mrem

2.0 Effluent Radioactivity

2.1 Airborne Effluents

2.1.1 Measurement of Airborne Radioactivity

2.1.1.1 Continuous Releases

The following pathways have continuous radiation monitors that include particulate filters and, except for Unit 1, charcoal cartridges for monitoring the activity being released:

Unit 1 Spent Fuel Pool (SFPI) Island (no charcoal cartridge)
Unit 1 Balance of Plant (BOP) Vent (no charcoal cartridge)
Unit 2 Ventilation Vent
Unit 2 Wide Range Gas Monitor (WRGM)
Unit 3 Ventilation Vent
Unit 3 Supplementary Leak Collection and Recovery System (SLCRS)
Unit 3 Emergency Safeguards Facility (ESF) Building Vent

Charcoal cartridges and particulate filters are used to collect iodines and particulates, respectively. These filters are periodically replaced (typically weekly, except every two weeks for Unit 1) and then analyzed for isotopic content using a gamma spectrometer. Particulate filters are also analyzed for Sr-89 (for all but Unit 1), Sr-90 and gross alpha. At least monthly, gaseous grab samples are taken and analyzed for noble gasses and tritium. The gas washing bottle (bubbler) method is utilized for tritium collection. This sample is counted on a liquid scintillation detector. Isotopic concentrations at the release point are multiplied by the total flow to obtain the total activity released for each isotope.

Since a major source of tritium is evaporation of water from the spent fuel pools, tritium releases were also estimated based upon amount of water lost and measured concentrations of the pool water. Grab samples from the Unit 1 SFPI Vent and the Unit 2 and 3 Vents are compared to the measured evaporation technique and the higher amount from either the vent or the measured evaporation technique is used to determine the amount of tritium released.

Another continuous airborne pathway is the Unit 2 Steam Generator Blowdown Tank Vent. A decontamination factor (DF) across the SGBD Tank vent was determined for iodines by comparing the results of gamma spectrometry, HPGe, analysis of the Steam Generator Blowdown water and grab samples of the condensed steam exiting the vent. This DF was applied to the total iodine releases via the Steam Generator Blowdown water to calculate the iodine release out the vent. An additional factor of 0.33 was utilized to account for the fraction of blowdown water actually flashing to steam in the Steam Generator Blowdown Tank.

2.1.1.2 Batch Releases

The following pathways periodically have releases that are considered batches:

Unit 1 Reactor Building Evaporator (via BOP Vent)
Unit 2 Waste Gas Decay Tanks (via Unit 2 WRGM to Millstone Stack)
Unit 2 and 3 Containment Purges (via Unit Ventilation Vents, except for Unit 2 if using Enclosure Building Filtration System (EBFS) via WRGM to Millstone Stack)
Unit 2 and 3 Containment Equipment Hatch Openings
Unit 2 and 3 Refueling Water Storage Tank (RWST) Vents
Unit 3 Containment Drawdown

Prior to processing each batch from the Reactor Building Evaporator a sample is collected and counted on a liquid scintillation detector. Concentration is multiplied by volume to determine the total activity released.

Waste Gases from the Unit 2 Gaseous Waste Processing System are held for decay in waste gas decay tanks (6) prior to discharge through the Millstone Site Stack. Each gas decay tank is analyzed prior to discharge for noble gas and tritium. Calculated volume discharged is multiplied by the isotopic concentrations (noble gas and tritium) from the analysis of grab samples to determine the total activity released.

Containment air is sampled periodically for gamma and tritium to determine the activity released from containment venting. The measured concentrations are multiplied by the containment vent volume to obtain the total activity released. Unit 2 typically performs this process of discharging air from containment to maintain pressure approximately once per week while at Unit 3 it is more often (typically at least daily).

Containment air is sampled prior to each purge for gamma and tritium to determine the activity released from containment purging. Similar to containment venting, the measured concentrations are multiplied by the containment vent volume to obtain the total activity released.

Samples of air near the Containment Equipment Hatch openings are analyzed for particulates and iodines, during refueling outages for the period that the equipment hatch is open. An estimated flow out of the hatch and sample results are used to determine the radioactivity released.

When water is transferred to Refueling Water Storage Tank (RWST) there is a potential for a release of radioactivity through the tank vent. In previous years a decontamination factor (DF) was applied to the total iodine transferred from the water that is transferred to the RWST water to estimate the iodine released. Starting with the 2R17 outage, actual measurements were performed by suction on the tank. Iodines and particulates were reduced prior to release by HEPA and charcoal filtration. All noble gases are assumed to be released through the tank vent.

Unit 3 containment is initially drawn down prior to startup. This is accomplished by using the containment vacuum steam jet ejector which releases through an unmonitored vent on the roof of the Auxiliary Building. Grab samples are performed prior to drawdown to document the amount of radioactivity released during these evolutions.

2.1.2 Estimate of Errors

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

Sampling/Data Collection	10%	Variation in data collection
Sample Line Loss	20%	Deposition of some nuclides
Calibration	10%	Calibration to NBS standards
Sample Counting	10%	Error for counting statistics
Flow & Level Measurements	10%	Error for release volumes

2.1.3 Airborne Batch Release Statistics

Unit 1 – None

Unit 2	Ctmt Purges	Ctmt Vents	WGDT
Number of Batches	1	36	16
Total Time (min)	492	5569	8688
Maximum Time (min)	492	320	717
Average Time (min)	492	155	543
Minimum Time (min)	492	65	306

Unit 3	Ctmt Purges	Ctmt Vents	Drawdowns
Number of Batches	0	278	0
Total Time (min)	-	*	-
Maximum Time (min)	-	*	-
Average Time (min)	-	*	-
Minimum Time (min)	-	*	-

* ~ 2-3 hrs per Vent

2.1.4 Abnormal Airborne Releases

An abnormal airborne release of radioactivity is defined as an increase in airborne radioactive material released to the environment that was unplanned or uncontrolled due to an unanticipated event. These do not include normal routine effluent releases from anticipated operational and maintenance occurrences such as power level changes, reactor trip, opening primary system loops, degassing, letdown of reactor coolant or transferring spent resin and do not include non-routine events such as minor leakages from piping, valves, pump seals, tank vents, etc.

2.1.4.1 Unit 1 - None

2.1.4.2 Unit 2 – None

2.1.4.3 Unit 3 – None

2.1.5 Airborne Release Tables

The following tables provide the details of the airborne radioactivity released from each of the Millstone units. They are categorized by type of release, source(s), and by release point of discharge to the environment.

Table 2.1-A1
Millstone Unit 1 Airborne Effluents
Release Summary

	Units	2006 1st Qtr	2006 2nd Qtr	2006 3rd Qtr	2006 4th Qtr	2006 Total
A. Fission & Activation Gases						
1. Total Activity Released	Ci	-	-	-	-	-
2. Average Period Release Rate	uCi/sec	-	-	-	-	-
B. Iodine-131						
1. Total Activity Released	Ci	-	-	-	-	-
2. Average Period Release Rate	uCi/sec	-	-	-	-	-
C. Particulates						
1. Total Activity Released	Ci	6.37E-06	2.07E-06	8.44E-07	-	9.29E-06
2. Average Period Release Rate	uCi/sec	8.20E-07	2.63E-07	1.06E-07	-	2.95E-07
D. Gross Alpha						
1. Total Activity Released	Ci	-	-	-	-	-
E. Tritium						
1. Total Activity Released	Ci	2.86E-01	1.28E-01	1.25E-01	6.10E-01	1.15E+00
2. Average Period Release Rate	uCi/sec	3.67E-02	1.63E-02	1.58E-02	7.68E-02	3.64E-02

dash "-" denotes less than Minimum Detectable Activity (MDA)

Table 2.1-A2

Millstone Unit 1 Airborne Effluents

Ground Continuous - Balance of Plant Vent & Spent Fuel Pool Island Vent

Nuclides Released	Units	2006				
		1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
A. Fission & Activation Gases						
Kr-85	Ci	-	-	-	-	-
Total Activity	Ci	-	-	-	-	-
B. Iodines						
I-131	Ci	-	-	-	-	-
Total Activity	Ci	-	-	-	-	-
C. Particulates						
Cs-137	Ci	6.37E-06	2.07E-06	8.44E-07	-	9.29E-06
Total Activity	Ci	6.37E-06	2.07E-06	8.44E-07	-	9.29E-06
D. Gross Alpha						
Gross Alpha	Ci	-	-	-	-	-
E. Tritium						
H-3	Ci	2.86E-01	1.28E-01	1.25E-01	6.10E-01	1.15E+00

dash "-" denotes less than Minimum Detectable Activity (MDA)

Table 2.2-A1
Millstone Unit No. 2

Airborne Effluents - Release Summary

	Units	2006 1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
A. Fission & Activation Gases						
1. Total Activity Released	Ci	3.62E+00	3.24E+00	1.92E+00	1.95E+01	2.83E+01
2. Average Period Release Rate	uCi/sec	4.66E-01	4.12E-01	2.42E-01	2.46E+00	8.98E-01
B. Iodine-131						
1. Total Activity Released	Ci	2.12E-04	1.30E-04	2.23E-04	6.99E-04	1.26E-03
2. Average Period Release Rate	uCi/sec	2.73E-05	1.66E-05	2.81E-05	8.79E-05	4.01E-05
C. Particulates						
1. Total Activity Released	Ci	-	-	-	8.55E-06	8.55E-06
2. Average Period Release Rate	uCi/sec	-	-	-	1.08E-06	2.71E-07
D. Gross Alpha						
1. Total Activity Released	Ci	-	-	-	-	-
E. Tritium						
1. Total Activity Released	Ci	7.73E+00	1.37E+01	1.09E+00	7.64E+00	3.02E+01
2. Average Period Release Rate	uCi/sec	9.95E-01	1.74E+00	1.37E-01	9.61E-01	9.56E-01

dash "-" denotes less than Minimum Detectable Activity (MDA)

Table 2.2-A2

Millstone Unit No. 2
Airborne Effluents - Mixed Continuous - Aux Bldg Vent & SGBD Tank Vent & Spent Fuel Pool Evaporation

Nuclides Released	Units	2006 1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
A. Fission & Activation Gases						
Ar-41	Ci	1.17E+00		2.07E-02	2.56E-01	1.45E+00
Xe-133	Ci	5.23E-01	6.94E-01	2.34E-02	2.53E+00	3.77E+00
Xe-135	Ci	5.10E-01	-	1.54E-02	1.30E-01	6.55E-01
Total Activity	Ci	2.20E+00	6.94E-01	5.96E-02	2.92E+00	5.87E+00
B. Iodines						
I-131	Ci	2.12E-04	1.30E-04	2.23E-04	6.65E-04	1.23E-03
I-132	Ci	1.27E-04	8.24E-05	3.31E-04	7.25E-04	1.27E-03
I-133	Ci	7.46E-04	4.66E-04	7.56E-04	2.15E-04	2.18E-03
I-134	Ci	-	-	-	-	-
I-135	Ci	4.42E-04	2.08E-04	5.02E-04	1.45E-04	1.30E-03
Total Activity	Ci	1.53E-03	8.87E-04	1.81E-03	1.75E-03	5.98E-03
C. Particulates						
I-131	Ci	-	-	-	-	-
Br-82	Ci	-	-	-	-	-
Co-58	Ci	-	-	-	2.90E-07	2.90E-07
Co-60	Ci	-	-	-	-	-
Ru-103	Ci	-	-	-	-	-
Ru-106	Ci	-	-	-	4.35E-06	4.35E-06
Cs-137	Ci	-	-	-	-	-
Sr-89	Ci	-	-	-	-	-
Sr-90	Ci	-	-	-	-	-
Total Activity	Ci	-	-	-	4.64E-06	4.64E-06
D. Gross Alpha						
Gross Alpha	Ci	-	-	-	-	-
E. Tritium *						
H-3	Ci	7.43E+00	1.33E+01	1.03E+00	7.53E+00	2.93E+01

* includes estimated spent fuel pool evaporation
dash "-" denotes less than Minimum Detectable Activity (MDA)

Table 2.2-A3

Millstone Unit No. 2

Airborne Effluents - Mixed Batch - Containment Purges

Nuclides Released	Units	2006 1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
A. Fission & Activation Gases						
Kr-85	Ci	N/A	N/A	N/A	2.19E+00	2.19E+00
Xe-133	Ci	N/A	N/A	N/A	1.08E+01	1.08E+01
Xe-135	Ci	N/A	N/A	N/A	2.12E-03	2.12E-03
Total Activity	Ci	N/A	N/A	N/A	1.30E+01	1.30E+01
B. Iodines *						
I-131	Ci	N/A	N/A	N/A	-	-
Total Activity	Ci	N/A	N/A	N/A	-	-
C. Particulates *						
I-131	Ci	N/A	N/A	N/A	-	-
Cs-137	Ci	N/A	N/A	N/A	-	-
Total Activity	Ci	N/A	N/A	N/A	-	-
D. Gross Alpha *						
Gross Alpha	Ci	N/A	N/A	N/A	-	-
E. Tritium						
H-3	Ci	N/A	N/A	N/A	6.99E-03	6.99E-03

* Iodines, Particulates and Gross α included in Table 2.2-A2 or 2.2-A5
dash "-" denotes less than Minimum Detectable Activity (MDA)

Table 2.2-A4

Millstone Unit No. 2

Airborne Effluents - Elevated Batch - WGDT

Nuclides Released	Units	2006 1st Qtr	2006 2nd Qtr	2006 3rd Qtr	2006 4th Qtr	2006 Total
A. Fission & Activation Gases						
Kr-85	Ci	5.35E-01	1.39E+00	4.00E-01	1.26E+00	3.59E+00
Xe-131m	Ci	5.03E-03	6.80E-03	5.03E-03	8.07E-03	2.49E-02
Xe-133	Ci	1.10E-01	1.05E-01	1.82E-01	1.00E-01	4.97E-01
Xe-133m	Ci	3.22E-05	-	7.01E-05	-	1.02E-04
Xe-135	Ci	5.05E-05	2.00E-05	-	-	7.05E-05
Total Activity	Ci	6.50E-01	1.50E+00	5.87E-01	1.37E+00	4.11E+00
B. Iodines *						
I-131	Ci	-	-	-	-	-
Total Activity	Ci	-	-	-	-	-
C. Particulates *						
I-131	Ci	-	-	-	-	-
Cs-137	Ci	-	-	-	-	-
Total Activity	Ci	-	-	-	-	-
D. Gross Alpha *						
Gross Alpha	Ci	-	-	-	-	-
E. Tritium						
H-3	Ci	6.79E-04	2.75E-03	3.51E-04	4.33E-04	4.21E-03

* Iodines, Particulates and Gross α included in Table 2.2-A2 or 2.2-A5

dash "-" denotes less than Minimum Detectable Activity (MDA)

Table 2.2-A5

Millstone Unit No. 2

Airborne Effluents - Elevated - Containment Vents/Site Stack

Nuclides Released	Units	2006 1st Qtr	2006 2nd Qtr	2006 3rd Qtr	2006 4th Qtr	2006 Total
A. Fission & Activation Gases						
Ar-41	Ci	2.07E-02	2.10E-02	2.60E-02	1.20E-02	7.96E-02
Kr-85	Ci	6.06E-01	9.40E-01	1.20E+00	7.36E-02	2.82E+00
Kr-87	Ci	7.45E-04	-	-	-	7.45E-04
Kr-88	Ci	-	-	-	1.40E-03	1.40E-03
Xe-133	Ci	1.37E-01	8.01E-02	4.92E-02	1.41E-02	2.80E-01
Xe-133m	Ci	4.83E-04	-	-	-	4.83E-04
Xe-135	Ci	6.80E-03	7.68E-04	2.40E-04	2.77E-04	8.08E-03
Total Activity	Ci	7.71E-01	1.04E+00	1.28E+00	1.01E-01	3.19E+00
B. Iodines						
I-131	Ci	-	-	-	7.19E-08	7.19E-08
I-133		-	-	-	2.52E-07	2.52E-07
Total Activity	Ci	-	-	-	3.24E-07	3.24E-07
C. Particulates						
I-131	Ci	-	-	-	-	-
Br-82	Ci	-	-	-	1.47E-07	1.47E-07
Co-58	Ci	-	-	-	1.81E-07	1.81E-07
Co-60	Ci	-	-	-	-	-
Ru-103	Ci	-	-	-	-	-
Ru-106	Ci	-	-	-	-	-
Cs-137	Ci	-	-	-	-	-
Sr-89	Ci	-	-	-	-	-
Sr-90	Ci	-	-	-	-	-
Total Activity	Ci	-	-	-	3.28E-07	3.28E-07
D. Gross Alpha						
Gross Alpha	Ci	-	-	-	-	-
E. Tritium						
H-3	Ci	3.01E-01	4.15E-01	5.91E-02	1.05E-01	8.79E-01

dash "-" denotes less than Minimum Detectable Activity (MDA)

Table 2.2-A6

Millstone Unit No. 2

Airborne Effluents - Ground Batch - Containment Equipment Hatch

Nuclides Released	Units	2006 1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
A. Fission & Activation Gases						
Kr-85	Ci	N/A	N/A	N/A	-	-
Xe-133	Ci	N/A	N/A	N/A	-	-
Total Activity	Ci	N/A	N/A	N/A	-	-
B. Iodines						
I-131	Ci	N/A	N/A	N/A	2.75E-05	2.75E-05
I-132	Ci	N/A	N/A	N/A	7.49E-06	7.49E-06
Total Activity	Ci	N/A	N/A	N/A	3.50E-05	3.50E-05
C. Particulates						
I-131	Ci	N/A	N/A	N/A	-	-
Co-58	Ci	N/A	N/A	N/A	1.86E-06	1.86E-06
Co-60	Ci	N/A	N/A	N/A	2.12E-07	2.12E-07
Zr-95	Ci	N/A	N/A	N/A	5.16E-07	5.16E-07
Nb-95	Ci	N/A	N/A	N/A	6.51E-07	6.51E-07
Cs-137	Ci	N/A	N/A	N/A	1.01E-07	1.01E-07
Ru-105	Ci	N/A	N/A	N/A	2.41E-07	2.41E-07
Total Activity	Ci	N/A	N/A	N/A	3.58E-06	3.58E-06
D. Gross Alpha						
Gross Alpha	Ci	N/A	N/A	N/A	-	-
E. Tritium						
H-3	Ci	N/A	N/A	N/A	-	-

dash "-" denotes less than Minimum Detectable Activity (MDA)

Table 2.2-A7

Millstone Unit No. 2

Airborne Effluents - Ground Batch - RWST Vent

Nuclides Released	Units	2006 1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
A. Fission & Activation Gases						
Kr-85	Ci	-	-	-	1.38E-01	1.38E-01
Kr-85m	Ci	-	-	-	5.04E-06	5.04E-06
Xe-131m	Ci	-	-	-	1.42E-02	1.42E-02
Xe-133	Ci	-	-	-	1.97E+00	1.97E+00
Xe-133m	Ci	-	-	-	2.88E-02	2.88E-02
Xe-135	Ci	-	-	-	1.59E-02	1.59E-02
Total Activity	Ci	-	-	-	2.17E+00	2.17E+00
B. Iodines						
I-131	Ci	N/A	N/A	N/A	5.81E-06	5.81E-06
I-133	Ci	N/A	N/A	N/A	4.00E-07	4.00E-07
Total Activity	Ci	N/A	N/A	N/A	6.21E-06	6.21E-06
C. Particulates						
I-131	Ci	N/A	N/A	N/A	-	-
Total Activity	Ci	N/A	N/A	N/A	-	-
D. Gross Alpha						
Gross Alpha	Ci	N/A	N/A	N/A	-	-
E. Tritium						
H-3	Ci	N/A	N/A	N/A	-	-

dash "-" denotes less than Minimum Detectable Activity (MDA)

Table 2.3-A1

Millstone Unit No. 3

Airborne Effluents - Release Summary

	Units	2006				
		1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
A. Fission & Activation Gases						
1. Total Activity Released	Ci	1.99E-02	1.03E-02	1.11E-02	1.05E-02	5.18E-02
2. Average Period Release Rate	uCi/sec	2.56E-03	1.31E-03	1.40E-03	1.33E-03	1.64E-03
B. Iodine-131						
1. Total Activity Released	Ci	-	-	-	-	-
		No Activity Detected				
2. Average Period Release Rate	uCi/sec	-	-	-	-	-
C. Particulates						
1. Total Activity Released	Ci	4.82E-06	3.70E-06	1.70E-05	3.80E-06	2.93E-05
2. Average Period Release Rate	uCi/sec	6.20E-07	4.71E-07	2.14E-06	4.78E-07	9.29E-07
D. Gross Alpha						
1. Total Activity Released	Ci	-	-	-	-	-
E. Tritium						
1. Total Activity Released	Ci	1.77E+01	1.07E+01	1.60E+01	8.51E+00	5.28E+01
2. Average Period Release Rate	uCi/sec	2.27E+00	1.36E+00	2.01E+00	1.07E+00	1.67E+00

dash "-" denotes less than Minimum Detectable Activity (MDA)

Table 2.3-A2

Millstone Unit No. 3

Airborne Effluents - Mixed Continuous - Normal Ventilation & Spent Fuel Pool Evaporation

Nuclides Released	Units	2006 1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
A. Fission & Activation Gases						
Xe-133	Ci	-	-	-	-	-
Total Activity	Ci	-	-	-	-	-
B. Iodines						
I-131	Ci	-	-	-	-	-
I-133	Ci	-	-	-	-	-
Total Activity	Ci	-	-	-	-	-
C. Particulates						
I-131	Ci	-	-	-	-	-
Be-7	Ci	-	-	1.27E-05	-	1.27E-05
Co-58	Ci	-	-	-	-	-
Co-60	Ci	-	-	-	-	-
Cr-51	Ci	-	-	-	-	-
Mn-54	Ci	-	-	-	-	-
Nb-95	Ci	-	-	-	-	-
Ba-140	Ci	-	-	-	-	-
Ce-141	Ci	-	-	-	-	-
Ce144	Ci	-	-	-	-	-
Sr-89	Ci	-	-	-	-	-
Sr-90	Ci	-	-	-	-	-
Total Activity	Ci	-	-	1.27E-05	-	1.27E-05
D. Gross Alpha						
Gross Alpha	Ci	-	-	-	-	-
E. Tritium						
H-3	Ci	1.74E+01	1.03E+01	1.54E+01	7.76E+00	5.09E+01

dash "-" denotes less than Minimum Detectable Activity (MDA)

Table 2.3-A3

Millstone Unit No. 3

Airborne Effluents - Ground Continuous - ESF Building Ventilation

Nuclides Released	Units	2006 1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
A. Fission & Activation Gases						
Xe-133	Ci	-	-	-	-	-
Total Activity	Ci	-	-	-	-	-
B. Iodines						
I-131	Ci	-	-	-	-	-
I-133	Ci	-	-	-	-	-
Total Activity	Ci	-	-	-	-	-
C. Particulates						
I-131	Ci	-	-	-	-	-
Be-7	Ci	3.96E-07	-	-	3.15E-07	7.11E-07
Co-58	Ci	-	-	-	-	-
Cr-51	Ci	-	-	-	-	-
Sr-89	Ci	-	-	-	-	-
Sr-90	Ci	-	-	-	-	-
Total Activity	Ci	3.96E-07	-	-	3.15E-07	7.11E-07
D. Gross Alpha						
Gross Alpha	Ci	-	-	-	-	-
E. Tritium						
H-3	Ci	-	-	2.32E-01	1.62E-01	3.94E-01

dash "-" denotes less than Minimum Detectable Activity (MDA)

Table 2.3-A4

Millstone Unit No. 3

Airborne Effluents - Mixed Batch - Containment Drawdowns

<< No Release >>

Nuclides Released	Units	2006 1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
A. Fission & Activation Gases						
Xe-133	Ci	N/A	N/A	N/A	N/A	N/A
Total Activity	Ci	N/A	N/A	N/A	N/A	N/A
B. Iodines						
I-131	Ci	N/A	N/A	N/A	N/A	N/A
I-133	Ci	N/A	N/A	N/A	N/A	N/A
Total Activity	Ci	N/A	N/A	N/A	N/A	N/A
C. Particulates						
I-131	Ci	N/A	N/A	N/A	N/A	N/A
Total Activity	Ci	N/A	N/A	N/A	N/A	N/A
D. Gross Alpha						
Gross Alpha	Ci	N/A	N/A	N/A	N/A	N/A
E. Tritium						
H-3	Ci	N/A	N/A	N/A	N/A	N/A

dash "-" denotes less than Minimum Detectable Activity (MDA)

Table 2.3-A5

Millstone Unit No. 3

Airborne Effluents - Mixed Batch - Containment Purges

<< No Release >>

Nuclides Released	Units	2006 1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
A. Fission & Activation Gases						
Xe-133	Ci	N/A	N/A	N/A	N/A	N/A
Xe-135	Ci	N/A	N/A	N/A	N/A	N/A
Total Activity	Ci	N/A	N/A	N/A	N/A	N/A
B. Iodines *						
I-131	Ci	N/A	N/A	N/A	N/A	N/A
I-133	Ci	N/A	N/A	N/A	N/A	N/A
Total Activity	Ci	N/A	N/A	N/A	N/A	N/A
C. Particulates *						
I-131	Ci	N/A	N/A	N/A	N/A	N/A
Br-82	Ci	N/A	N/A	N/A	N/A	N/A
Total Activity	Ci	N/A	N/A	N/A	N/A	N/A
D. Gross Alpha *						
Gross Alpha	Ci	N/A	N/A	N/A	N/A	N/A
E. Tritium						
H-3	Ci	N/A	N/A	N/A	N/A	N/A

* Iodines, Particulates and Gross α included in Table 2.3-A2 or 2.3-A6
dash "-" denotes less than Minimum Detectable Activity (MDA)

Table 2.3-A6

Millstone Unit No. 3

Airborne Effluents - Elevated Continuous - Gaseous Waste System & Containment Vents

Nuclides Released	Units	2006				
		1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total

A. Fission & Activation Gases

Ar-41	Ci	7.45E-03	6.85E-03	7.59E-03	8.23E-03	3.01E-02
Xe-133	Ci	1.22E-02	3.38E-03	3.22E-03	2.02E-03	2.08E-02
Xe-135	Ci	2.21E-04	6.51E-05	3.17E-04	2.87E-04	8.90E-04
Kr-85m	Ci	-	-	-	-	-
Xe-135m	Ci	-	-	-	-	-
Total Activity	Ci	1.99E-02	1.03E-02	1.11E-02	1.05E-02	5.18E-02

B. Iodines

I-131	Ci	-	-	-	-	-
Total Activity	Ci	-	-	-	-	-

C. Particulates

I-131	Ci	-	-	-	-	-
Ce-141	Ci	-	-	2.56E-08	-	2.56E-08
Ce-144	Ci	-	-	1.28E-07	-	1.28E-07
Sn-117m	Ci	1.50E-08	-	1.98E-08	-	3.48E-08
Br-82	Ci	4.41E-06	3.30E-06	3.93E-06	3.43E-06	1.51E-05
Co-60	Ci	-	4.01E-07	1.73E-07	5.24E-08	6.26E-07
Sr-89	Ci	-	-	-	-	-
Sr-90	Ci	-	-	-	-	-
Total Activity	Ci	4.43E-06	3.70E-06	4.28E-06	3.48E-06	1.59E-05

D. Gross Alpha

Gross Alpha	Ci	-	-	-	-	-

E. Tritium

H-3	Ci	2.67E-01	3.57E-01	3.26E-01	5.91E-01	1.54E+00

dash "-" denotes less than Minimum Detectable Activity (MDA)

Table 2.3-A7

Millstone Unit No. 3

Airborne Effluents - Ground Batch - Containment Equipment Hatch

<< No Release >>

Nuclides Released	Units	2006 1st Qtr	2006 2nd Qtr	2006 3rd Qtr	2006 4th Qtr	2006 Total
A. Fission & Activation Gases						
Xe-133	Ci	N/A	N/A	N/A	N/A	N/A
Total Activity	Ci	N/A	N/A	N/A	N/A	N/A
B. Iodines						
I-131	Ci	N/A	N/A	N/A	N/A	N/A
I-133	Ci	N/A	N/A	N/A	N/A	N/A
Total Activity	Ci	N/A	N/A	N/A	N/A	N/A
C. Particulates						
I-131	Ci	N/A	N/A	N/A	N/A	N/A
Cr-51	Ci	N/A	N/A	N/A	N/A	N/A
Co-58	Ci	N/A	N/A	N/A	N/A	N/A
Co-60	Ci	N/A	N/A	N/A	N/A	N/A
Mn-54	Ci	N/A	N/A	N/A	N/A	N/A
Nb-95	Ci	N/A	N/A	N/A	N/A	N/A
Zr-95	Ci	N/A	N/A	N/A	N/A	N/A
Ru-105	Ci	N/A	N/A	N/A	N/A	N/A
Sn-117m	Ci	N/A	N/A	N/A	N/A	N/A
Cs-137	Ci	N/A	N/A	N/A	N/A	N/A
Total Activity	Ci	N/A	N/A	N/A	N/A	N/A
D. Gross Alpha						
Gross Alpha	Ci	N/A	N/A	N/A	N/A	N/A
E. Tritium						
H-3	Ci	N/A	N/A	N/A	N/A	N/A

dash "-" denotes less than Minimum Detectable Activity (MDA)

Table 2.3-A8

Millstone Unit No. 3

Airborne Effluents - Ground Batch - RWST Vent

<< No Release >>

Nuclides Released	Units	2006 1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
A. Fission & Activation Gases						
Xe-133	Ci	N/A	N/A	N/A	N/A	N/A
Total Activity	Ci	N/A	N/A	N/A	N/A	N/A
B. Iodines						
I-131	Ci	N/A	N/A	N/A	N/A	N/A
I-133	Ci	N/A	N/A	N/A	N/A	N/A
Total Activity	Ci	N/A	N/A	N/A	N/A	N/A
C. Particulates						
I-131	Ci	N/A	N/A	N/A	N/A	N/A
Total Activity	Ci	N/A	N/A	N/A	N/A	N/A
D. Gross Alpha						
Gross Alpha	Ci	N/A	N/A	N/A	N/A	N/A
E. Tritium						
H-3	Ci	N/A	N/A	N/A	N/A	N/A

dash "-" denotes less than Minimum Detectable Activity (MDA)

2.2 Liquid Effluents

2.2.1 Measurement of Liquid Radioactivity

2.2.1.1 Continuous Liquid Releases

Grab samples are taken for continuous liquid release pathways and analyzed on the HPGe gamma spectrometer and liquid scintillation detector (for tritium) if required by the conditional action requirements of the REMODCM. Total estimated volume is multiplied by the isotopic concentrations (if any) to determine the total activity released. A proportional aliquot of each discharge is retained for composite analysis for Sr-89, Sr-90, Fe-55 and gross alpha if required by the conditional action requirements of the REMODCM. Pathways for continuous liquid effluent releases include, Steam Generator Blowdown, Service Water Effluent, and Turbine Building Sump discharge from Units 2 & 3.

2.2.1.2 Liquid Tanks/Sumps

There are numerous tanks & sumps that are used to discharge liquids containing radioactivity to the environs; they are:

Unit 1	Reactor Cavity Water
Unit 2	Clean Waste Monitor Tanks (2) Aerated Waste Monitor Tanks (2) CPF Waste Neutralization Sump & Turbine Building Sump Steam Generator Bulk
Unit 3	High Level Waste Test Tanks (2) Low Level Waste Drain Tanks (2) Boron Test Tanks CPF Waste Neutralization Sump & Turbine Building Sump Steam Generator Bulk

Prior to release, a tank is re-circulated for two equivalent tank volumes, a sample is drawn and then analyzed on the HPGe gamma spectrometer and liquid scintillation detector (H-3) for individual radionuclide composition. Isotopic concentrations are multiplied by the volume released to obtain the total activity released. For bulk releases, several samples are taken during the discharge to verify the amount of radioactivity released. A proportional aliquot of each discharge is retained for composite analysis for Sr-89, Sr-90, Fe-55, Ni-63, and gross alpha.

2.2.2 Estimate of Errors

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

Sampling/Data Collection	10%	Variation in data collection
Calibration	10%	Calibration to NBS standards
Sample Counting	10%	Error for counting statistics
Flow & Level Measurements	10%	Error for release volumes

2.2.3 Liquid Batch Release Statistics

	Unit 1	Unit 2	Unit 3
Number of Batches	0	55	297
Total Time (min)	0	6140	35,026
Maximum Time (min)	0	287	370
Average Time (min)	0	112	118
Minimum Time (min)	0	11	7
Average Stream Flow	Not Applicable - Ocean Site		

2.2.4 Abnormal Liquid Releases

An abnormal release of radioactivity is the discharge of a volume of liquid radioactive material to the environment that was unplanned or uncontrolled.

In 2006, the following abnormal liquid releases occurred:

2.2.4.1 Unit 1 - None

2.2.4.2 Unit 2 - None

2.2.4.3 Unit 3 - None

2.2.5 Liquid Release Tables

The following tables provide the details of the liquid radioactivity released from each of the Millstone units. They are categorized by type of release, source(s), and by release point of discharge to the environment.

Table 2.1-L1

Millstone Unit No. 1
Liquid Effluents - Release Summary
(Release Point - Quarry)

	Units	2006				
		1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
A. Fission and Activation Products						
1. Total Activity Released	Ci	N/A	2.31E-05	N/A	N/A	2.31E-05
2. Average Period Diluted Activity(1)	uCi/ml	N/A	6.23E-14	N/A	N/A	6.23E-14
B. Tritium						
1. Total Activity Released	Ci	N/A	-	N/A	N/A	-
2. Average Period Diluted Activity	uCi/ml	N/A	-	N/A	N/A	-
C. Dissolved and Entrained Gases						
1. Total Activity Released	Ci	N/A	N/A	N/A	N/A	N/A
2. Average Period Diluted Activity	uCi/ml	N/A	N/A	N/A	N/A	N/A
D. Gross Alpha						
1. Total Activity Released	Ci	N/A	-	N/A	N/A	N/A
E. Volume						
1. Released Waste Volume	Liters	0.00E+00	8.32E+04	0.00E+00	0.00E+00	8.32E+04
2. Dilution Volume During Releases	Liters	N/A	9.09E+08	N/A	N/A	9.09E+08
3. Dilution Volume During Period(1)	Liters	N/A	3.70E+11	N/A	N/A	3.70E+11

dash "-" denotes less than Minimum Detectable Activity (MDA)

Table 2.2-L1
Millstone Unit No. 2
Liquid Effluents - Release Summary
(Release Point - Quarry)

	Units	2006 1st Qtr	2006 2nd Qtr	2006 3rd Qtr	2006 4th Qtr	2006 Total
A. Fission and Activation Products						
1. Total Activity Released	Ci	6.72E-03	3.19E-03	5.08E-03	1.56E-02	3.06E-02
2. Average Period Diluted Activity	uCi/ml	2.50E-11	1.17E-11	1.77E-11	8.39E-11	3.01E-11
B. Tritium						
1. Total Activity Released	Ci	1.79E+02	1.84E+02	1.97E+02	4.23E+01	6.02E+02
2. Average Period Diluted Activity	uCi/ml	6.65E-07	6.73E-07	6.87E-07	2.28E-07	5.93E-07
C. Dissolved and Entrained Gases						
1. Total Activity Released	Ci	3.30E-02	5.08E-02	3.08E-01	1.33E-01	5.24E-01
2. Average Period Diluted Activity	uCi/ml	1.23E-10	1.86E-10	1.07E-09	7.13E-10	5.16E-10
D. Gross Alpha						
1. Total Activity Released	Ci	-	-	-	-	-
E. Volume						
1. Released Waste Volume	Liters	7.95E+06	4.08E+05	7.25E+05	4.58E+05	9.54E+06
2. Dilution Volume During Releases	Liters	2.40E+09	1.82E+09	3.56E+09	1.56E+09	9.34E+09
3. Dilution Volume During Period	Liters	2.69E+11	2.73E+11	2.87E+11	1.86E+11	1.02E+12

dash "-" denotes less than Minimum Detectable Activity (MDA)

Table 2.2-L2

Millstone Unit No. 2
Liquid Effluents - Continuous - SGBD, SW, RBCCW
(Quarry Release Point)

Nuclides Released	Units	2006				
		1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
A. Fission & Activation Products						
Total Activity	Ci	-	-	-	-	-
B. Tritium						
H-3	Ci	1.13E-02	7.85E-05	-	5.80E-04	1.20E-02
C. Dissolved & Entrained Gases						
Total Activity	Ci	-	-	-	-	-
D. Gross Alpha						
Gross Alpha	Ci	N/A	N/A	N/A	N/A	N/A

dash "-" denotes less than Minimum Detectable Activity (MDA),
or that an MDA is not specified.

Table 2.2-L3

Millstone Unit No. 2
Liquid Effluents - Batch - LWS

Nuclides Released	Units	2006 1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
A. Fission & Activation Products						
Ag-110m	Ci	4.85E-05	5.36E-05	1.29E-04	1.42E-04	3.73E-04
Ce-141	Ci	-	-	-	-	-
Ce-144	Ci	-	-	-	-	-
Co-57	Ci	3.57E-06	7.68E-07	2.91E-06	3.76E-05	4.48E-05
Co-58	Ci	2.15E-04	1.65E-04	1.35E-04	1.85E-03	2.37E-03
Co-60	Ci	6.02E-04	1.14E-03	1.84E-03	1.90E-03	5.48E-03
Cr-51	Ci	1.05E-05	-	-	1.34E-03	1.35E-03
Ni-63	Ci	2.40E-03	3.51E-04	7.63E-04	1.39E-03	4.90E-03
Cs-134	Ci	5.12E-04	1.89E-06	7.30E-06	2.05E-04	7.26E-04
Cs-137	Ci	9.25E-04	2.01E-05	4.82E-05	3.02E-04	1.30E-03
Fe-55	Ci	9.33E-04	7.08E-04	7.93E-04	4.32E-03	6.76E-03
Fe-59	Ci	-	-	-	2.46E-04	2.46E-04
La-140	Ci	4.70E-08	-	-	-	4.70E-08
Mn-54	Ci	2.05E-05	6.69E-05	1.20E-04	1.95E-04	4.02E-04
M0-99	Ci	-	-	-	-	-
Nb-95	Ci	5.85E-06	2.48E-05	-	4.70E-04	5.01E-04
Ru-103	Ci	-	-	-	3.60E-05	3.60E-05
Sb-124	Ci	-	-	-	4.35E-05	4.35E-05
Sb-125	Ci	1.02E-03	6.65E-04	1.24E-03	2.53E-03	5.46E-03
Sn-113	Ci	9.04E-06	1.95E-07	-	3.06E-04	3.15E-04
Sn-117m	Ci	-	-	-	3.79E-05	3.79E-05
Sr-89	Ci	1.05E-05	-	-	-	1.05E-05
Sr-90	Ci	-	-	4.16E-06	-	4.16E-06
Zn-65	Ci	-	-	-	-	-
Zr-95	Ci	4.10E-06	-	-	2.39E-04	2.43E-04
Zr-97	Ci	-	-	-	6.05E-06	6.05E-06
Total Activity	Ci	6.72E-03	3.19E-03	5.08E-03	1.56E-02	3.06E-02
B. Tritium						
H-3	Ci	1.79E+02	1.84E+02	1.97E+02	4.23E+01	6.02E+02
C. Dissolved & Entrained Gases						
Kr-85	Ci	2.83E-02	5.04E-02	1.88E-01	1.13E-01	3.80E-01
Xe-131m	Ci	-	-	2.29E-03	3.85E-04	2.67E-03
Xe-133	Ci	4.72E-03	4.54E-04	1.17E-01	1.94E-02	1.41E-01
Xe-133m	Ci	-	-	2.59E-04	-	2.59E-04
Xe-135	Ci	-	-	9.88E-05	1.35E-05	1.12E-04
Total Activity	Ci	3.30E-02	5.08E-02	3.08E-01	1.33E-01	5.24E-01
D. Gross Alpha						
Gross Alpha	Ci	-	-	-	-	-

dash "-" denotes less than Minimum Detectable Activity (MDA), or that an MDA is not specified.

Table 2.2-L4

Millstone Unit No. 2

Liquid Effluents -Continuous-Turbine Building Sump

(Release Point - Yard Drain - DSN 006)

Nuclides Released	Units	2006 1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
A. Fission & Activation Products						
Total Activity	Ci	-	-	-	-	-
B. Tritium						
H-3	Ci	1.75E-02	8.08E-03	2.23E-04	2.75E-02	5.33E-02
Average Period Diluted Activity	uCi/ml	6.91E-07	2.31E-07	4.66E-09	1.34E-06	4.14E-07
C. Dissolved & Entrained Gases						
Total Activity	Ci	-	-	-	-	-
D. Gross Alpha						
Gross Alpha	Ci	N/A	N/A	N/A	N/A	N/A
E. Volume						
Released Waste Volume	Liters	1.95E+06	8.29E+05	6.59E+07	1.76E+06	7.04E+07
Dilution Volume During Period*	Liters	2.53E+07	3.49E+07	4.79E+07	2.06E+07	1.29E+08

dash "-" denotes less than Minimum Detectable Activity (MDA),
or that an MDA is not specified.

*Dilution Volume During Period is an approximation of actual dilution flow to DSN006.

Table 2.3-L1

Millstone Unit No. 3
Liquid Effluents - Release Summary
(Release Point - Quarry)

	Units	2006 1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
A. Fission and Activation Products						
1. Total Activity Released	Ci	4.23E-03	1.94E-02	1.45E-02	4.11E-03	4.23E-02
2. Average Period Diluted Activity	uCi/ml	9.65E-12	4.17E-11	3.07E-11	8.76E-12	2.29E-11
B. Tritium						
1. Total Activity Released	Ci	4.54E+01	2.40E+01	2.55E+01	2.32E+02	3.27E+02
2. Average Period Diluted Activity	uCi/ml	1.04E-07	5.15E-08	5.40E-08	4.95E-07	1.77E-07
C. Dissolved and Entrained Gases						
1. Total Activity Released	Ci	-	5.16E-03	-	-	5.16E-03
2. Average Period Diluted Activity	uCi/ml	-	1.11E-11	-	-	2.80E-12
D. Gross Alpha						
1. Total Activity Released	Ci	-	-	-	-	-
E. Volume						
1. Released Waste Volume	Liters	4.66E+06	4.82E+06	7.91E+06	4.32E+06	2.17E+07
2. Dilution Volume During Releases	Liters	5.23E+09	7.79E+09	8.68E+09	6.67E+09	2.84E+10
3. Dilution Volume During Period	Liters	4.38E+11	4.66E+11	4.72E+11	4.69E+11	1.85E+12

dash "-" denotes less than Minimum Detectable Activity (MDA),
or that an MDA is not specified.

Table 2.3-L2

Millstone Unit No. 3
Liquid Effluents - Continuous - SGBD & SW
(Quarry Release Point)

Nuclides Released	Units	2006				
		1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
A. Fission & Activation Products						
Total Activity	Ci	-	-	-	-	-
B. Tritium						
H-3	Ci	1.86E-02	6.87E-02	1.46E-01	4.95E-02	2.83E-01
C. Dissolved & Entrained Gases						
Xe-133	Ci	-	-	-	-	-
Total Activity	Ci	-	-	-	-	-
D. Gross Alpha						
Gross Alpha	Ci	N/A	N/A	N/A	N/A	N/A

dash "-" denotes less than Minimum Detectable Activity (MDA),
or that an MDA is not specified.

Table 2.3-L3

Millstone Unit No. 3
Liquid Effluents - Batch - LWS
(Quarry Release Point)

Nuclides Released	Units	2006 1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total

A. Fission & Activation Products

Nuclides Released	Units	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
Ag-110m	Ci	-	1.19E-04	2.42E-05	-	1.43E-04
Ce-141	Ci	-	-	-	-	-
Ce-144	Ci	-	-	-	-	-
Co-58	Ci	2.93E-04	3.68E-05	1.24E-05	-	3.42E-04
Co-60	Ci	6.56E-04	2.07E-03	2.19E-03	1.05E-03	5.97E-03
Cs-134	Ci	-	-	-	-	-
Cs-137	Ci	4.61E-05	4.55E-05	8.50E-05	1.25E-04	3.02E-04
Fe-55	Ci	1.82E-03	5.40E-03	3.34E-03	1.15E-03	1.17E-02
Fe-59	Ci	-	-	-	-	-
Mn-54	Ci	7.48E-05	2.63E-04	1.93E-04	1.94E-05	5.50E-04
Mo-99	Ci	-	-	-	-	-
Nb-95	Ci	1.50E-05	1.09E-05	-	-	2.59E-05
Ni-63	Ci	6.26E-04	4.11E-03	3.73E-04	4.13E-04	5.52E-03
Sb-124	Ci	-	3.95E-05	-	-	3.95E-05
Sb-125	Ci	6.92E-04	7.29E-03	8.25E-03	1.35E-03	1.76E-02
Sn-113	Ci	-	1.14E-05	-	-	1.14E-05
Sn-117m	Ci	-	4.15E-05	8.17E-06	-	4.97E-05
Te-132	Ci	5.92E-06	-	-	-	5.92E-06
Sr-89	Ci	-	-	-	-	-
Sr-90	Ci	-	-	-	-	-
Sr-92	Ci	-	-	1.35E-05	-	-
Zn-65	Ci	-	-	-	-	-
Total Activity	Ci	4.23E-03	1.94E-02	1.45E-02	4.11E-03	4.22E-02

B. Tritium

H-3	Ci	4.54E+01	2.39E+01	2.53E+01	2.32E+02	3.27E+02

C. Dissolved & Entrained Gases

Kr-85	Ci	-	5.16E-03	-	-	5.16E-03

D. Gross Alpha

Gross Alpha	Ci	-	-	-	-	-

dash "-" denotes less than Minimum Detectable Activity (MDA), or that an MDA is not specified.

Table 2.3-L4

Millstone Unit No. 3
Liquid Effluents - Batch - CPF Waste Neutralization Sumps, Hotwell, S/G Bulk
(Quarry Release Point)

Nuclides Released	Units	2006 1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
A. Fission & Activation Products						
Total Activity	Ci	-	-	-	-	-
B. Tritium						
H-3	Ci	1.74E-02	2.83E-02	3.42E-02	2.46E-02	1.05E-01
C. Dissolved & Entrained Gases						
Total Activity	Ci	-	-	-	-	-
D. Gross Alpha						
Gross Alpha	Ci	N/A	N/A	N/A	N/A	N/A

dash "-" denotes less than Minimum Detectable Activity (MDA),
or that an MDA is not specified.

Table 2.3-L5

Millstone Unit No. 3

Liquid Effluents - Release Summary

(Release Point - Yard Drain - DSN 006)

	Units	2006				
		1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
A. Fission and Activation Products						
1. Total Activity Released	Ci	-	-	-	-	-
2. Average Period Diluted Activity	uCi/ml	-	-	-	-	-
B. Tritium						
1. Total Activity Released	Ci	3.68E-02	8.51E-02	4.61E-03	4.95E-02	1.76E-01
2. Average Period Diluted Activity	uCi/ml	1.34E-06	2.28E-06	9.22E-08	2.35E-06	1.30E-06
C. Dissolved and Entrained Gases						
1. Total Activity Released	Ci	-	-	-	-	-
2. Average Period Diluted Activity	uCi/ml	-	-	-	-	-
D. Gross Alpha						
1. Total Activity Released	Ci	N/A	N/A	N/A	N/A	N/A
E. Volume						
1. Released Waste Volume	Liters	2.23E+06	2.36E+06	2.10E+06	4.23E+05	7.11E+06
3. Dilution Volume During Period*	Liters	2.53E+07	3.49E+07	4.79E+07	2.06E+07	1.29E+08

*Dilution Volume During Period is an approximation of actual dilution flow to DSN006.
dash "-" denotes less than Minimum Detectable Activity (MDA),
or that an MDA is not specified.

Table 2.3-L6

Millstone Unit No. 3

Liquid Effluents - Continuous - Turbine Building Sump

(Release Point - Yard Drain - DSN 006)

Nuclides Released	Units	2006 1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
A. Fission & Activation Products						
Total Activity	Ci	-	-	-	-	-
B. Tritium						
H-3	Ci	3.66E-02	8.51E-02	4.61E-03	4.95E-02	1.76E-01
C. Dissolved & Entrained Gases						
Total Activity	Ci	-	-	-	-	-
D. Gross Alpha						
Gross Alpha	Ci	N/A	N/A	N/A	N/A	N/A

dash "-" denotes less than Minimum Detectable Activity (MDA), or that an MDA is not specified.

Table 2.3-L7

Millstone Unit No. 3

Liquid Effluents - Continuous - WTT Berm Water

(Release Point - Yard Drain - DSN 006)

Nuclides Released	Units	2006 1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
A. Fission & Activation Products						
Total Activity	Ci	-	N/A	N/A	N/A	-
B. Tritium						
H-3	Ci	2.00E-04	N/A	N/A	N/A	2.00E-04
C. Dissolved & Entrained Gases						
Total Activity	Ci	-	N/A	N/A	N/S	-
D. Gross Alpha						
Gross Alpha	Ci	N/A	N/A	N/A	N/A	N/A

dash "-" denotes less than Minimum Detectable Activity (MDA), or that an MDA is not specified.

2.3 Solid Waste

Solid waste shipment summaries for each unit are given in the following tables:

Table 2.1-S Unit 1 Solid Waste and Irradiated Component Shipments
Table 2.2-S Unit 2 Solid Waste and Irradiated Component Shipments
Table 2.3-S Unit 3 Solid Waste and Irradiated Component Shipments

The principal radionuclides in these tables were from shipping manifests.

Solidification Agent(s): No solidification on site

Containers routinely used for radioactive waste shipment include:

55-gal Steel Drum DOT 17-H container	7.5 ft^3
Steel Boxes	45 ft^3
	87 ft^3
	95 ft^3
	122 ft^3
Steel Container	202.1 ft^3
Steel "Sea Van"	1280 ft^3
Polyethylene High Integrity Containers	120.3 ft^3
	132.4 ft^3
	173.4 ft^3
	202.1 ft^3

Table 2.1-S
Solid Waste and Irradiated Component Shipments
Millstone Unit 1

January 1, 2006 through December 31, 2006

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (Not irradiated fuel)

1. Type of Waste

a. Spent resins, Filter sludges, Evaporator bottoms, etc.

Disposition	Units	Annual Totals	Est. Total Error
None			

b. Dry compressible waste, Contaminated equipment, etc.

Disposition	Units	Annual Totals	Est. Total Error
From Millstone Nuclear Power Station to Duratek, Inc., Oak Ridge, TN for Super-Compaction, Incineration, etc..	m^3	1.7105E+01	25%
	Ci	3.7522E-03	

c. Irradiated components, Control rods, etc.

Disposition	Units	Annual Totals	Est. Total Error
None			

d. Other - (Grease, Oil, Oily waste)

Disposition	Units	Annual Totals	Est. Total Error
None			

d. Other - (Mixed Waste)

Disposition	Units	Annual Totals	Est. Total Error
From Millstone Nuclear Power Station to Perma-Fix of Florida, Inc., Gainesville, FL for Stabilization, Fuel Blending, etc..	m^3	1.0809E-01	25%
	Ci	4.3471E-04	

d. Other - (Water)

Disposition	Units	Annual Totals	Est. Total Error
From Millstone Nuclear Power Station to Duratek, Inc., Oak Ridge, TN for Incineration.	m^3	9.4627E-01	25%
	Ci	1.1778E-03	

2. Estimate of major nuclide composition (by type of waste)

b. Dry compressible waste, Contaminated equipment, etc.

From Millstone Nuclear Power Station to Duratek, Inc., Oak Ridge, TN for Super-Compaction, Incineration, etc..

Radionuclide	% of Total	Curies
H-3	0.74	2.7898E-05
C-14		
Cr-51	0.03	1.3115E-06
Mn-54		
Fe-55	54.13	2.0311E-03
Fe-59		
Co-57		
Co-58	1.19	4.4730E-05
Co-60	11.38	4.2705E-04
Ni-59		
Ni-63	6.56	2.4612E-04
Zn-65		
Sr-89		
Sr-90		
Nb-94		
Zr-95		
Nb-95		
Tc-99		
Ru-103		
Ru-106		
Ag-110m		
Sn-113		
Sn-117m		
Sb-124		
Sb-125		
I-129		
I-131		
Cs-134	2.08	7.8112E-05
Cs-136		
Cs-137	23.82	8.9363E-04
Ba-140		
La-140		
Ce-141		
Ce-144		
Eu-154		
Hf-181		
Pu-238	0.01	4.3842E-07
Pu-239	<0.01	3.0189E-07
Pu-241		
Am-241	0.03	1.0894E-06
Pu-242		
Cm-242		
Cm-243		
Cm-244	0.01	4.6107E-07
CURIES (TOTAL)		3.7522E-03

2. Estimate of major nuclide composition (by type of waste)

d. Other - (Mixed Waste)

From Millstone Nuclear Power Station to Perma-Fix of Florida, Inc., Gainesville, FL for Stabilization, Fuel Blending, etc..

Radionuclide	% of Total	Curies
H-3	1.40	6.0896E-06
C-14		
Cr-51	0.75	3.2793E-06
Mn-54		
Fe-55	49.47	2.1503E-04
Fe-59		
Co-57		
Co-58	5.71	2.4835E-05
Co-60	10.40	4.5201E-05
Ni-59		
Ni-63	9.55	4.1532E-05
Zn-65		
Sr-89		
Sr-90		
Nb-94		
Zr-95		
Nb-95		
Tc-99		
Ru-103		
Ru-106		
Ag-110m		
Sn-113		
Sn-117m		
Sb-124		
Sb-125		
I-129		
I-131		
Cs-134	4.22	1.8353E-05
Cs-136		
Cs-137	18.45	8.0188E-05
Ba-140		
La-140		
Ce-141		
Ce-144		
Eu-154		
Hf-181		
Pu-238	0.01	4.9965E-08
Pu-239	<0.01	3.9932E-08
Pu-241		
Am-241	0.02	8.7060E-08
Pu-242		
Cm-242		
Cm-243		
Cm-244	<0.01	2.3622E-08
CURIES (TOTAL)		4.3471E-04

2. Estimate of major nuclide composition (by type of waste)

d. Other - (Water)

From Millstone Nuclear Power Station to Duratek, Inc., Oak Ridge, TN for Incineration.

Radionuclide	% of Total	Curies
H-3	95.56	1.1256E-03
C-14	<0.01	8.9895E-09
Cr-51		
Mn-54	0.02	2.2579E-07
Fe-55	0.93	1.1007E-05
Fe-59		
Co-57		
Co-58	0.17	1.9939E-06
Co-60	0.32	3.7564E-06
Ni-59		
Ni-63	0.65	7.6305E-06
Zn-65		
Sr-89	<0.01	7.7641E-08
Sr-90	<0.01	1.0378E-07
Nb-94	<0.01	2.6436E-09
Zr-95		
Nb-95	<0.01	8.2036E-08
Tc-99	<0.01	8.0282E-09
Ru-103		
Ru-106		
Ag-110m		
Sn-113		
Sn-117m		
Sb-124		
Sb-125	0.04	5.2261E-07
I-129		
I-131		
Cs-134	0.04	4.3330E-07
Cs-136		
Cs-137	2.03	2.3963E-05
Ba-140		
La-140		
Ce-141		
Ce-144	<0.01	9.5663E-09
Eu-154	<0.01	1.8934E-09
Hf-181		
Pu-238	<0.01	8.8690E-08
Pu-239	<0.01	3.7440E-08
Pu-241	0.18	2.1576E-06
Am-241	<0.01	1.0881E-07
Pu-242	<0.01	6.7301E-10
Cm-242	<0.01	6.3870E-10
Cm-243	<0.01	2.0520E-08
Cm-244		
CURIES (TOTAL)		1.1778E-03

3. Solid Waste Disposition (Shipments from Millstone)

Number of Shipments*	Mode of Transportation	Destination
3	Truck (Sole Use Vehicle)	Duratek, Inc., Oak Ridge, TN
2	Truck (Sole Use Vehicle)	Perma-Fix of Florida, Inc., Gainesville, FL

* Indicates the number of shipments in this category which contained *any* unit-1 waste. (Example: A shipment containing wastes from units 1, 2 *and* 3 will be counted once on *each* of the three unit-specific sections of this report.) 31 physical shipments were made from this station in 2006.

B. IRRADIATED FUEL SHIPMENTS (Disposition)

Number of Shipments	Mode of Transportation	Destination
No Shipments in 2006	N/A	N/A

Table 2.2-S
Solid Waste and Irradiated Component Shipments
Millstone Unit 2

January 1, 2006 through December 31, 2006

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (Not irradiated fuel)

1. Type of Waste

a. Spent resins, Filter sludges, Evaporator bottoms, etc.

Disposition	Units	Annual Totals	Est. Total Error
From Millstone Nuclear Power Station to Chem-Nuclear Systems, LLC, Barnwell, SC for Burial.	m^3	3.4069E+00	25%
	Ci	2.0047E+02	
From Millstone Nuclear Power Station to Duratek, Inc., Kingston, TN for Super-Compaction, Incineration, etc..	m^3	5.0976E+00	25%
	Ci	2.3207E-03	
From Millstone Nuclear Power Station to Duratek, Inc., Oak Ridge, TN for Super-Compaction, Incineration, etc..	m^3	9.7524E+00	25%
	Ci	4.0877E-01	
From Millstone Nuclear Power Station to Studsvik Processing Facility, Erwin, TN for Thermal Destruction, Incineration, etc..	m^3	5.3569E+00	25%
	Ci	1.0516E+02	

b. Dry compressible waste, Contaminated equipment, etc.

Disposition	Units	Annual Totals	Est. Total Error
From Millstone Nuclear Power Station to Duratek, Inc., Kingston, TN for Super-Compaction, Incineration, etc..	m^3	1.3359E+02	25%
	Ci	4.4353E-02	
From Millstone Nuclear Power Station to Duratek, Inc., Oak Ridge, TN for Super-Compaction, Incineration, etc..	m^3	2.8574E+02	25%
	Ci	2.7485E-01	
From Millstone Nuclear Power Station to Energy Solutions, LLC, Clive, UT for Burial.	m^3	1.8428E+02	25%
	Ci	1.9502E+01	

c. Irradiated components, Control rods, etc.

Disposition	Units	Annual Totals	Est. Total Error
From Millstone Nuclear Power Station to Energy Solutions, LLC, Clive, UT for Burial.	m^3	1.0082E+02	25%
	Ci	6.6065E+01	

d. Other - (Grease, Oil, Oily waste)

Disposition	Units	Annual Totals	Est. Total Error
From Millstone Nuclear Power Station to Duratek, Inc., Oak Ridge, TN for Super-Compaction, Incineration, etc..	m^3	6.2446E-01	25%
	Ci	6.1083E-05	

d. Other - (Mixed Waste)

Disposition	Units	Annual Totals	Est. Total Error
From Millstone Nuclear Power Station to Perma-Fix of Florida, Inc., Gainesville, FL for Stabilization, Fuel Blending, etc..	m^3	1.0809E-01	25%
	Ci	4.3471E-04	

d. Other - (Water)

Disposition	Units	Annual Totals	Est. Total Error
From Millstone Nuclear Power Station to Duratek, Inc., Oak Ridge, TN for Incineration.	m^3	4.0170E+01	25%
	Ci	2.7558E-02	

2. Estimate of major nuclide composition (by type of waste)

a. Spent resins, Filter sludges, Evaporator bottoms, etc.

From Millstone Nuclear Power Station to Chem-Nuclear Systems, LLC, Barnwell, SC for Burial.

Radionuclide	% of Total	Curies
H-3		
C-14		
Cr-51		
Mn-54	0.30	5.9172E-01
Fe-55	5.03	1.0077E+01
Fe-59		
Co-57		
Co-58	<0.01	1.6420E-03
Co-60	1.63	3.2701E+00
Ni-59		
Ni-63	15.28	3.0635E+01
Zn-65		
Sr-89		
Sr-90	0.12	2.4595E-01
Nb-94		
Zr-95		
Nb-95		
Tc-99		
Ru-103		
Ru-106		
Ag-110m		
Sn-113		
Sn-117m		
Sb-124		
Sb-125		
I-129		
I-131		
Cs-134	27.53	5.5193E+01
Cs-136		
Cs-137	50.10	1.0043E+02
Ba-140		
La-140		
Ce-141		
Ce-144		
Eu-154		
Hf-181		
Pu-238	<0.01	8.5083E-04
Pu-239	<0.01	2.1471E-04
Pu-241	<0.01	1.5475E-02
Am-241	<0.01	7.7075E-05
Pu-242		
Cm-242	<0.01	1.2676E-04
Cm-243		
Cm-244	<0.01	6.5148E-04
CURIES (TOTAL)		2.0047E+02

2. Estimate of major nuclide composition (by type of waste)

a. Spent resins, Filter sludges, Evaporator bottoms, etc.

From Millstone Nuclear Power Station to Duratek, Inc., Kingston, TN for Super-Compaction, Incineration, etc..

Radionuclide	% of Total	Curies
H-3		
C-14		
Cr-51		
Mn-54		
Fe-55	27.49	6.3799E-04
Fe-59		
Co-57		
Co-58	5.94	1.3788E-04
Co-60	7.90	1.8325E-04
Ni-59		
Ni-63	12.84	2.9788E-04
Zn-65		
Sr-89		
Sr-90		
Nb-94		
Zr-95		
Nb-95		
Tc-99		
Ru-103		
Ru-106		
Ag-110m		
Sn-113		
Sn-117m		
Sb-124		
Sb-125		
I-129		
I-131		
Cs-134	17.41	4.0403E-04
Cs-136		
Cs-137	28.37	6.5838E-04
Ba-140		
La-140		
Ce-141		
Ce-144		
Eu-154		
Hf-181		
Pu-238	0.02	4.3699E-07
Pu-239	0.02	3.8887E-07
Pu-241		
Am-241	0.02	4.9796E-07
Pu-242		
Cm-242		
Cm-243		
Cm-244		
CURIES (TOTAL)		2.3207E-03

2. Estimate of major nuclide composition (by type of waste)

a. Spent resins, Filter sludges, Evaporator bottoms, etc.

From Millstone Nuclear Power Station to Duratek, Inc., Oak Ridge, TN for Super-Compaction, Incineration, etc..

Radionuclide	% of Total	Curies
H-3	1.27	5.1740E-03
C-14	0.07	2.9248E-04
Cr-51	1.07	4.3728E-03
Mn-54	0.65	2.6443E-03
Fe-55	43.62	1.7829E-01
Fe-59	0.04	1.5556E-04
Co-57	0.16	6.5833E-04
Co-58	12.51	5.1140E-02
Co-60	12.65	5.1708E-02
Ni-59		
Ni-63	20.48	8.3708E-02
Zn-65	<0.01	9.9811E-06
Sr-89	<0.01	1.0219E-05
Sr-90	0.02	7.5739E-05
Nb-94	<0.01	1.0800E-05
Zr-95	2.85	1.1644E-02
Nb-95	1.76	7.2080E-03
Tc-99	<0.01	2.4710E-07
Ru-103	<0.01	2.1727E-05
Ru-106		
Ag-110m	0.08	3.3548E-04
Sn-113	0.17	6.8227E-04
Sn-117m		
Sb-124	0.02	1.0081E-04
Sb-125	0.57	2.3266E-03
I-129		
I-131		
Cs-134	0.66	2.7113E-03
Cs-136		
Cs-137	0.97	3.9583E-03
Ba-140	<0.01	3.2926E-06
La-140		
Ce-141	<0.01	4.7541E-06
Ce-144	0.15	6.0688E-04
Eu-154		
Hf-181	0.01	4.7923E-05
Pu-238	<0.01	2.1128E-05
Pu-239	<0.01	9.6661E-06
Pu-241	0.19	7.8853E-04
Am-241	<0.01	1.1569E-05
Pu-242		
Cm-242	<0.01	1.3274E-05
Cm-243		
Cm-244	<0.01	2.5143E-05
CURIES (TOTAL)		4.0877E-01

2. Estimate of major nuclide composition (by type of waste)

a. Spent resins, Filter sludges, Evaporator bottoms, etc.

From Millstone Nuclear Power Station to Studsvik Processing Facility, Erwin, TN for Thermal Destruction, Incineration, etc..

Radionuclide	% of Total	Curies
H-3	0.56	5.8797E-01
C-14	0.02	2.1019E-02
Cr-51	0.03	3.4000E-02
Mn-54	1.06	1.1154E+00
Fe-55	23.18	2.4376E+01
Fe-59	<0.01	3.5607E-03
Co-57	0.05	4.8872E-02
Co-58	0.40	4.2454E-01
Co-60	4.69	4.9282E+00
Ni-59		
Ni-63	28.29	2.9750E+01
Zn-65	<0.01	1.1300E-03
Sr-89	<0.01	3.2828E-03
Sr-90	0.18	1.8853E-01
Nb-94		
Zr-95	0.05	5.5333E-02
Nb-95	0.04	4.5701E-02
Tc-99		
Ru-103	<0.01	8.7500E-04
Ru-106	<0.01	4.0900E-03
Ag-110m	<0.01	3.9850E-03
Sn-113	0.03	3.5579E-02
Sn-117m		
Sb-124	<0.01	4.4400E-04
Sb-125	0.23	2.3921E-01
I-129		
I-131		
Cs-134	16.06	1.6884E+01
Cs-136		
Cs-137	24.98	2.6270E+01
Ba-140	<0.01	2.4339E-20
La-140		
Ce-141	<0.01	1.3600E-04
Ce-144	0.06	6.5932E-02
Eu-154		
Hf-181	<0.01	2.6493E-07
Pu-238	<0.01	1.5083E-03
Pu-239	<0.01	6.9768E-04
Pu-241	0.06	6.2845E-02
Am-241	<0.01	8.2932E-04
Pu-242		
Cm-242	<0.01	3.6848E-04
Cm-243		
Cm-244	<0.01	1.7305E-03
CURIES (TOTAL)		1.0516E+02

2. Estimate of major nuclide composition (by type of waste)

b. Dry compressible waste, Contaminated equipment, etc.

From Millstone Nuclear Power Station to Duratek, Inc., Kingston, TN for Super-Compaction, Incineration, etc..

Radionuclide	% of Total	Curies
H-3	0.64	2.8456E-04
C-14		
Cr-51	0.75	3.3326E-04
Mn-54	0.63	2.7863E-04
Fe-55	35.08	1.5557E-02
Fe-59		
Co-57		
Co-58	8.41	3.7302E-03
Co-60	8.55	3.7908E-03
Ni-59		
Ni-63	12.13	5.3812E-03
Zn-65		
Sr-89		
Sr-90		
Nb-94		
Zr-95		
Nb-95		
Tc-99		
Ru-103		
Ru-106		
Ag-110m		
Sn-113		
Sn-117m		
Sb-124		
Sb-125		
I-129		
I-131		
Cs-134	12.54	5.5632E-03
Cs-136		
Cs-137	21.22	9.4134E-03
Ba-140		
La-140		
Ce-141		
Ce-144		
Eu-154		
Hf-181		
Pu-238	0.02	6.7487E-06
Pu-239	0.01	5.9860E-06
Pu-241		
Am-241	0.02	7.8058E-06
Pu-242		
Cm-242		
Cm-243		
Cm-244	<0.01	9.1732E-08
CURIES (TOTAL)		4.4353E-02

2. Estimate of major nuclide composition (by type of waste)

b. Dry compressible waste, Contaminated equipment, etc.

From Millstone Nuclear Power Station to Duratek, Inc., Oak Ridge, TN for Super-Compaction, Incineration, etc..

Radionuclide	% of Total	Curies
H-3	0.04	9.7843E-05
C-14		
Cr-51	0.02	4.1905E-05
Mn-54	0.02	4.4007E-05
Fe-55	28.25	7.7642E-02
Fe-59		
Co-57		
Co-58	5.71	1.5692E-02
Co-60	8.06	2.2151E-02
Ni-59		
Ni-63	12.93	3.5542E-02
Zn-65		
Sr-89		
Sr-90		
Nb-94		
Zr-95		
Nb-95		
Tc-99		
Ru-103		
Ru-106		
Ag-110m		
Sn-113		
Sn-117m		
Sb-124		
Sb-125		
I-129		
I-131		
Cs-134	17.05	4.6873E-02
Cs-136		
Cs-137	27.87	7.6608E-02
Ba-140		
La-140		
Ce-141		
Ce-144		
Eu-154		
Hf-181		
Pu-238	0.02	5.1127E-05
Pu-239	0.02	4.5342E-05
Pu-241	<0.01	1.7385E-05
Am-241	0.02	4.6581E-05
Pu-242		
Cm-242		
Cm-243		
Cm-244	<0.01	2.1747E-07
CURIES (TOTAL)		2.7485E-01

2. Estimate of major nuclide composition (by type of waste)

b. Dry compressible waste, Contaminated equipment, etc.

From Millstone Nuclear Power Station to Energy Solutions, LLC, Clive, UT for Burial.

Radionuclide	% of Total	Curies
H-3	0.58	1.1400E-01
C-14	1.24	2.4200E-01
Cr-51	<0.01	3.4100E-07
Mn-54	1.16	2.2700E-01
Fe-55	53.33	1.0400E+01
Fe-59	<0.01	2.3500E-07
Co-57	0.15	2.8800E-02
Co-58	1.05	2.0500E-01
Co-60	15.13	2.9500E+00
Ni-59		
Ni-63	24.36	4.7500E+00
Zn-65		
Sr-89		
Sr-90		
Nb-94		
Zr-95	0.09	1.7800E-02
Nb-95	0.17	3.3700E-02
Tc-99	0.93	1.8100E-01
Ru-103	<0.01	6.3300E-09
Ru-106	0.78	1.5300E-01
Ag-110m	<0.01	2.7100E-08
Sn-113	0.09	1.7100E-02
Sn-117m	<0.01	2.8800E-09
Sb-124	<0.01	5.0700E-09
Sb-125	0.67	1.3100E-01
I-129	0.03	5.7800E-03
I-131	<0.01	8.2200E-08
Cs-134	<0.01	2.3550E-05
Cs-136	<0.01	2.2400E-08
Cs-137	<0.01	2.8965E-05
Ba-140	<0.01	1.8800E-07
La-140	<0.01	1.8800E-07
Ce-141	<0.01	2.5500E-09
Ce-144	0.13	2.4600E-02
Eu-154		
Hf-181	<0.01	5.7800E-09
Pu-238	0.04	6.9800E-03
Pu-239	0.03	6.2000E-03
Pu-241		
Am-241	0.04	7.9500E-03
Pu-242		
Cm-242		
Cm-243		
Cm-244		
CURIES (TOTAL)		1.9502E+01

2. Estimate of major nuclide composition (by type of waste)

c. Irradiated components, Control rods, etc.

From Millstone Nuclear Power Station to Energy Solutions, LLC, Clive, UT for Burial.

Radionuclide	% of Total	Curies
H-3	<0.01	2.6600E-04
C-14	0.11	7.3700E-02
Cr-51	<0.01	1.3500E-05
Mn-54	2.13	1.4100E+00
Fe-55	81.89	5.4100E+01
Fe-59	<0.01	4.6600E-04
Co-57	<0.01	3.9200E-03
Co-58	0.03	2.2000E-02
Co-60	12.47	8.2400E+00
Ni-59	0.01	6.6900E-03
Ni-63	3.24	2.1400E+00
Zn-65	<0.01	2.2400E-03
Sr-89		
Sr-90		
Nb-94	<0.01	2.2900E-05
Zr-95	<0.01	4.2700E-03
Nb-95	<0.01	3.2200E-05
Tc-99	<0.01	6.0500E-06
Ru-103	<0.01	9.6500E-06
Ru-106		
Ag-110m		
Sn-113	<0.01	2.3000E-03
Sn-117m		
Sb-124		
Sb-125	0.07	4.7000E-02
I-129		
I-131		
Cs-134		
Cs-136		
Cs-137	<0.01	2.9100E-03
Ba-140		
La-140		
Ce-141	<0.01	4.0600E-07
Ce-144		
Eu-154		
Hf-181	<0.01	2.5300E-06
Pu-238	<0.01	2.0500E-03
Pu-239	<0.01	1.8400E-03
Pu-241		
Am-241	<0.01	2.3639E-03
Pu-242		
Cm-242		
Cm-243	<0.01	3.2600E-03
Cm-244		
CURIES (TOTAL)		6.6065E+01

2. Estimate of major nuclide composition (by type of waste)

d. Other - (Grease, Oil, Oily waste)

From Millstone Nuclear Power Station to Duratek, Inc., Oak Ridge, TN for Super-Compaction, Incineration, etc..

Radionuclide	% of Total	Curies
H-3	0.46	2.8391E-07
C-14		
Cr-51		
Mn-54	4.23	2.5847E-06
Fe-55	52.77	3.2235E-05
Fe-59		
Co-57		
Co-58	11.77	7.1865E-06
Co-60	11.54	7.0518E-06
Ni-59		
Ni-63	14.95	9.1301E-06
Zn-65		
Sr-89		
Sr-90		
Nb-94		
Zr-95		
Nb-95	0.12	7.3124E-08
Tc-99		
Ru-103		
Ru-106		
Ag-110m		
Sn-113		
Sn-117m		
Sb-124		
Sb-125		
I-129		
I-131		
Cs-134		
Cs-136		
Cs-137	4.11	2.5118E-06
Ba-140		
La-140		
Ce-141		
Ce-144		
Eu-154		
Hf-181		
Pu-238	0.01	8.6784E-09
Pu-239	0.01	7.7499E-09
Pu-241		
Am-241	0.02	9.9450E-09
Pu-242		
Cm-242		
Cm-243		
Cm-244		
CURIES (TOTAL)		6.1083E-05

2. Estimate of major nuclide composition (by type of waste)

d. Other - (Mixed Waste)

From Millstone Nuclear Power Station to Perma-Fix of Florida, Inc., Gainesville, FL for Stabilization, Fuel Blending, etc..

Radionuclide	% of Total	Curies
H-3	1.40	6.0896E-06
C-14		
Cr-51	0.75	3.2793E-06
Mn-54		
Fe-55	49.47	2.1503E-04
Fe-59		
Co-57		
Co-58	5.71	2.4835E-05
Co-60	10.40	4.5201E-05
Ni-59		
Ni-63	9.55	4.1532E-05
Zn-65		
Sr-89		
Sr-90		
Nb-94		
Zr-95		
Nb-95		
Tc-99		
Ru-103		
Ru-106		
Ag-110m		
Sn-113		
Sn-117m		
Sb-124		
Sb-125		
I-129		
I-131		
Cs-134	4.22	1.8353E-05
Cs-136		
Cs-137	18.45	8.0188E-05
Ba-140		
La-140		
Ce-141		
Ce-144		
Eu-154		
Hf-181		
Pu-238	0.01	4.9965E-08
Pu-239	<0.01	3.9932E-08
Pu-241		
Am-241	0.02	8.7060E-08
Pu-242		
Cm-242		
Cm-243		
Cm-244	<0.01	2.3622E-08
CURIES (TOTAL)		4.3471E-04

2. Estimate of major nuclide composition (by type of waste)

d. Other - (Water)

From Millstone Nuclear Power Station to Duratek, Inc., Oak Ridge, TN for Incineration.

Radionuclide	% of Total	Curies
H-3	91.34	2.5173E-02
C-14	<0.01	9.8165E-08
Cr-51		
Mn-54	0.07	1.8396E-05
Fe-55	2.62	7.2190E-04
Fe-59		
Co-57	<0.01	1.2696E-06
Co-58	0.57	1.5730E-04
Co-60	2.03	5.5979E-04
Ni-59		
Ni-63	1.30	3.5798E-04
Zn-65		
Sr-89	<0.01	8.4784E-07
Sr-90	<0.01	1.1333E-06
Nb-94	<0.01	2.8868E-08
Zr-95		
Nb-95	0.02	5.8562E-06
Tc-99	<0.01	8.7668E-08
Ru-103		
Ru-106		
Ag-110m		
Sn-113	<0.01	2.3582E-06
Sn-117m		
Sb-124		
Sb-125	0.07	2.0517E-05
I-129		
I-131		
Cs-134	0.11	3.1662E-05
Cs-136		
Cs-137	1.74	4.7826E-04
Ba-140		
La-140		
Ce-141		
Ce-144	<0.01	1.0446E-07
Eu-154	<0.01	2.0676E-08
Hf-181		
Pu-238	<0.01	1.3708E-06
Pu-239	<0.01	7.6651E-07
Pu-241	0.09	2.3561E-05
Am-241	<0.01	1.6464E-06
Pu-242	<0.01	7.3492E-09
Cm-242	<0.01	6.9746E-09
Cm-243	<0.01	2.2407E-07
Cm-244		
CURIES (TOTAL)		2.7558E-02

3. Solid Waste Disposition (Shipments from Millstone)

Number of Shipments*	Mode of Transportation	Destination
1	Truck (Sole Use Vehicle)	Chem-Nuclear Systems, LLC, Barnwell, SC
8	Truck (Sole Use Vehicle)	Duratek, Inc., Kingston, TN
13	Truck (Sole Use Vehicle)	Duratek, Inc., Oak Ridge, TN
1	Rail-Car (Sole Use Vehicle)	Energy Solutions, LLC, Clive, UT
1**	Barge (Sole Use Vehicle)	Energy Solutions, LLC, Clive, UT
2	Truck (Sole Use Vehicle)	Perma-Fix of Florida, Inc., Gainesville, FL
4	Truck (Sole Use Vehicle)	Studsvik Processing Facility, Erwin, TN

* Indicates the number of shipments in this category which contained *any* unit-2 waste. (Example: A shipment containing wastes from units 1, 2 *and* 3 will be counted once on *each* of the three unit-specific sections of this report.) 31 physical shipments were made from this station in 2006.

** One physical Barge shipment was made, holding three separately manifested components.

B. IRRADIATED FUEL SHIPMENTS (Disposition)

Number of Shipments	Mode of Transportation	Destination
No Shipments in 2006	N/A	N/A

Table 2.3-S
Solid Waste and Irradiated Component Shipments
Millstone Unit 3

January 1, 2006 through December 31, 2006

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (Not irradiated fuel)

1. Type of Waste

a. Spent resins, Filter sludges, Evaporator bottoms, etc.

Disposition	Units	Annual Totals	Est. Total Error
From Millstone Nuclear Power Station to Duratek, Inc., Kingston, TN for Super-Compaction, Incineration, etc..	m^3	1.2744E+01	25%
	Ci	1.1532E-02	
From Millstone Nuclear Power Station to Duratek, Inc., Oak Ridge, TN for Super-Compaction, Incineration, etc..	m^3	7.1887E+00	25%
	Ci	2.0762E+00	
From Millstone Nuclear Power Station to Studsvik Processing Facility, Erwin, TN for Thermal Destruction, Incineration, etc..	m^3	2.7557E+00	25%
	Ci	7.3485E+01	

b. Dry compressible waste, Contaminated equipment, etc.

Disposition	Units	Annual Totals	Est. Total Error
From Millstone Nuclear Power Station to Duratek, Inc., Kingston, TN for Super-Compaction, Incineration, etc..	m^3	8.0429E+01	25%
	Ci	3.1317E-02	
From Millstone Nuclear Power Station to Duratek, Inc., Oak Ridge, TN for Super-Compaction, Incineration, etc..	m^3	1.3590E+02	25%
	Ci	1.1307E+00	

c. Irradiated components, Control rods, etc.

Disposition	Units	Annual Totals	Est. Total Error
None			

d. Other - (Grease, Oil, Oily waste)

Disposition	Units	Annual Totals	Est. Total Error
From Millstone Nuclear Power Station to Duratek, Inc., Oak Ridge, TN for Super-Compaction, Incineration, etc..	m^3	6.2446E-01	25%
	Ci	6.1083E-05	

d. Other - (Mixed Waste)

Disposition	Units	Annual Totals	Est. Total Error
From Millstone Nuclear Power Station to Perma-Fix of Florida, Inc., Gainesville, FL for Stabilization, Fuel Blending, etc..	m^3	1.0809E-01	25%
	Ci	4.3471E-04	

d. Other - (Water)

Disposition	Units	Annual Totals	Est. Total Error
From Millstone Nuclear Power Station to Duratek, Inc., Oak Ridge, TN for Incineration.	m^3	1.6708E+01	25%
	Ci	1.6969E-02	

2. Estimate of major nuclide composition (by type of waste)

a. Spent resins, Filter sludges, Evaporator bottoms, etc.

From Millstone Nuclear Power Station to Duratek, Inc., Kingston, TN for Super-Compaction, Incineration, etc..

Radionuclide	% of Total	Curies
H-3	0.50	5.8103E-05
C-14		
Cr-51	3.59	4.1438E-04
Mn-54	2.40	2.7715E-04
Fe-55	57.05	6.5793E-03
Fe-59		
Co-57		
Co-58	14.38	1.6580E-03
Co-60	9.57	1.1041E-03
Ni-59		
Ni-63	8.39	9.6742E-04
Zn-65		
Sr-89		
Sr-90		
Nb-94		
Zr-95	0.94	1.0783E-04
Nb-95	0.97	1.1161E-04
Tc-99		
Ru-103		
Ru-106		
Ag-110m		
Sn-113		
Sn-117m		
Sb-124		
Sb-125		
I-129		
I-131		
Cs-134		
Cs-136		
Cs-137	2.20	2.5423E-04
Ba-140		
La-140		
Ce-141		
Ce-144		
Eu-154		
Hf-181		
Pu-238		
Pu-239		
Pu-241		
Am-241		
Pu-242		
Cm-242		
Cm-243		
Cm-244		
CURIES (TOTAL)		1.1532E-02

2. Estimate of major nuclide composition (by type of waste)

a. Spent resins, Filter sludges, Evaporator bottoms, etc.

From Millstone Nuclear Power Station to Duratek, Inc., Oak Ridge, TN for Super-Compaction, Incineration, etc..

Radionuclide	% of Total	Curies
H-3	0.42	8.6712E-03
C-14	<0.01	1.5500E-05
Cr-51	<0.01	1.6334E-05
Mn-54	1.90	3.9471E-02
Fe-55	65.66	1.3632E+00
Fe-59		
Co-57	0.04	7.8103E-04
Co-58	0.17	3.5560E-03
Co-60	18.03	3.7438E-01
Ni-59		
Ni-63	13.28	2.7573E-01
Zn-65		
Sr-89		
Sr-90	<0.01	4.0000E-06
Nb-94		
Zr-95	<0.01	5.6231E-05
Nb-95	0.01	2.7481E-04
Tc-99		
Ru-103		
Ru-106		
Ag-110m	<0.01	2.2500E-05
Sn-113		
Sn-117m		
Sb-124		
Sb-125	0.38	7.8546E-03
I-129		
I-131		
Cs-134	<0.01	1.1700E-04
Cs-136		
Cs-137	0.07	1.5065E-03
Ba-140		
La-140		
Ce-141		
Ce-144	<0.01	1.3609E-04
Eu-154		
Hf-181		
Pu-238	<0.01	9.7344E-06
Pu-239	<0.01	2.9559E-06
Pu-241	0.02	3.5250E-04
Am-241	<0.01	5.2061E-06
Pu-242		
Cm-242	<0.01	3.1021E-06
Cm-243		
Cm-244	<0.01	1.9121E-05
CURIES (TOTAL)		2.0762E+00

2. Estimate of major nuclide composition (by type of waste)

a. Spent resins, Filter sludges, Evaporator bottoms, etc.

From Millstone Nuclear Power Station to Studsvik Processing Facility, Erwin, TN for Thermal Destruction, Incineration, etc..

Radionuclide	% of Total	Curies
H-3	0.05	3.4297E-02
C-14	0.01	7.3570E-03
Cr-51	0.80	5.8600E-01
Mn-54	4.33	3.1806E+00
Fe-55	51.88	3.8125E+01
Fe-59	0.06	4.5300E-02
Co-57	0.12	8.9427E-02
Co-58	4.05	2.9732E+00
Co-60	13.95	1.0253E+01
Ni-59		
Ni-63	22.92	1.6841E+01
Zn-65	0.03	2.0488E-02
Sr-89	<0.01	4.3715E-04
Sr-90	<0.01	1.9569E-03
Nb-94		
Zr-95	0.44	3.2302E-01
Nb-95	0.59	4.3500E-01
Tc-99		
Ru-103	<0.01	3.3400E-03
Ru-106	<0.01	3.1400E-03
Ag-110m	0.05	3.4810E-02
Sn-113	0.04	3.2687E-02
Sn-117m		
Sb-124	<0.01	3.1401E-03
Sb-125	0.53	3.8689E-01
I-129	<0.01	1.6429E-05
I-131		
Cs-134	<0.01	3.0500E-03
Cs-136		
Cs-137	0.06	4.0443E-02
Ba-140		
La-140		
Ce-141	<0.01	1.0400E-04
Ce-144	0.05	3.6621E-02
Eu-154		
Hf-181		
Pu-238	<0.01	5.5000E-04
Pu-239	<0.01	2.0839E-04
Pu-241	0.03	2.2476E-02
Am-241	<0.01	3.5685E-04
Pu-242		
Cm-242	<0.01	1.0622E-03
Cm-243		
Cm-244	<0.01	9.1509E-04
CURIES (TOTAL)		7.3485E+01

2. Estimate of major nuclide composition (by type of waste)

b. Dry compressible waste, Contaminated equipment, etc.

From Millstone Nuclear Power Station to Duratek, Inc., Kingston, TN for Super-Compaction, Incineration, etc..

Radionuclide	% of Total	Curies
H-3	1.10	3.4368E-04
C-14		
Cr-51	2.16	6.7736E-04
Mn-54	1.77	5.5366E-04
Fe-55	49.56	1.5522E-02
Fe-59		
Co-57		
Co-58	11.37	3.5600E-03
Co-60	9.59	3.0038E-03
Ni-59		
Ni-63	10.49	3.2863E-03
Zn-65		
Sr-89		
Sr-90		
Nb-94		
Zr-95	0.31	9.8223E-05
Nb-95	0.30	9.5400E-05
Tc-99		
Ru-103		
Ru-106		
Ag-110m		
Sn-113		
Sn-117m		
Sb-124		
Sb-125		
I-129		
I-131		
Cs-134	4.19	1.3129E-03
Cs-136		
Cs-137	9.12	2.8569E-03
Ba-140		
La-140		
Ce-141		
Ce-144		
Eu-154		
Hf-181		
Pu-238	<0.01	2.2285E-06
Pu-239	<0.01	1.9652E-06
Pu-241		
Am-241	<0.01	2.6566E-06
Pu-242		
Cm-242		
Cm-243		
Cm-244	<0.01	9.1732E-08
CURIES (TOTAL)		3.1317E-02

2. Estimate of major nuclide composition (by type of waste)

b. Dry compressible waste, Contaminated equipment, etc.

From Millstone Nuclear Power Station to Duratek, Inc., Oak Ridge, TN for Super-Compaction, Incineration, etc..

Radionuclide	% of Total	Curies
H-3	0.62	6.9945E-03
C-14		
Cr-51	0.60	6.7636E-03
Mn-54	2.28	2.5808E-02
Fe-55	64.81	7.3281E-01
Fe-59		
Co-57		
Co-58	6.54	7.3912E-02
Co-60	11.34	1.2824E-01
Ni-59		
Ni-63	10.38	1.1738E-01
Zn-65		
Sr-89		
Sr-90		
Nb-94		
Zr-95	0.38	4.3431E-03
Nb-95	0.22	2.4610E-03
Tc-99		
Ru-103		
Ru-106		
Ag-110m		
Sn-113		
Sn-117m		
Sb-124		
Sb-125		
I-129		
I-131		
Cs-134	0.03	3.5466E-04
Cs-136		
Cs-137	2.80	3.1607E-02
Ba-140		
La-140		
Ce-141		
Ce-144		
Eu-154		
Hf-181		
Pu-238	<0.01	7.9206E-07
Pu-239	<0.01	6.6357E-07
Pu-241		
Am-241	<0.01	1.1836E-06
Pu-242		
Cm-242		
Cm-243		
Cm-244	<0.01	2.1747E-07
CURIES (TOTAL)		1.1307E+00

2. Estimate of major nuclide composition (by type of waste)

d. Other - (Grease, Oil, Oily waste)

From Millstone Nuclear Power Station to Duratek, Inc., Oak Ridge, TN for Super-Compaction, Incineration, etc..

Radionuclide	% of Total	Curies
H-3	0.46	2.8391E-07
C-14		
Cr-51		
Mn-54	4.23	2.5847E-06
Fe-55	52.77	3.2235E-05
Fe-59		
Co-57		
Co-58	11.77	7.1865E-06
Co-60	11.54	7.0518E-06
Ni-59		
Ni-63	14.95	9.1301E-06
Zn-65		
Sr-89		
Sr-90		
Nb-94		
Zr-95		
Nb-95	0.12	7.3124E-08
Tc-99		
Ru-103		
Ru-106		
Ag-110m		
Sn-113		
Sn-117m		
Sb-124		
Sb-125		
I-129		
I-131		
Cs-134		
Cs-136		
Cs-137	4.11	2.5118E-06
Ba-140		
La-140		
Ce-141		
Ce-144		
Eu-154		
Hf-181		
Pu-238	0.01	8.6784E-09
Pu-239	0.01	7.7499E-09
Pu-241		
Am-241	0.02	9.9450E-09
Pu-242		
Cm-242		
Cm-243		
Cm-244		
CURIES (TOTAL)		6.1083E-05

2. Estimate of major nuclide composition (by type of waste)

d. Other - (Grease, Oil, Oily waste)

From Millstone Nuclear Power Station to Duratek, Inc., Oak Ridge, TN for Super-Compaction, Incineration, etc..

Radionuclide	% of Total	Curies
H-3	0.46	2.8391E-07
C-14		
Cr-51		
Mn-54	4.23	2.5847E-06
Fe-55	52.77	3.2235E-05
Fe-59		
Co-57		
Co-58	11.77	7.1865E-06
Co-60	11.54	7.0518E-06
Ni-59		
Ni-63	14.95	9.1301E-06
Zn-65		
Sr-89		
Sr-90		
Nb-94		
Zr-95		
Nb-95	0.12	7.3124E-08
Tc-99		
Ru-103		
Ru-106		
Ag-110m		
Sn-113		
Sn-117m		
Sb-124		
Sb-125		
I-129		
I-131		
Cs-134		
Cs-136		
Cs-137	4.11	2.5118E-06
Ba-140		
La-140		
Ce-141		
Ce-144		
Eu-154		
Hf-181		
Pu-238	0.01	8.6784E-09
Pu-239	0.01	7.7499E-09
Pu-241		
Am-241	0.02	9.9450E-09
Pu-242		
Cm-242		
Cm-243		
Cm-244		
CURIES (TOTAL)		6.1083E-05

2. Estimate of major nuclide composition (by type of waste)

d. Other - (Water)

From Millstone Nuclear Power Station to Duratek, Inc., Oak Ridge, TN for Incineration.

Radionuclide	% of Total	Curies
H-3	96.95	1.6451E-02
C-14	<0.01	7.9827E-08
Cr-51		
Mn-54	0.02	3.1079E-06
Fe-55	0.61	1.0286E-04
Fe-59		
Co-57		
Co-58	0.11	1.7979E-05
Co-60	0.21	3.5210E-05
Ni-59		
Ni-63	0.41	6.9101E-05
Zn-65		
Sr-89	<0.01	6.8945E-07
Sr-90	<0.01	9.2157E-07
Nb-94	<0.01	2.3475E-08
Zr-95		
Nb-95	<0.01	7.2848E-07
Tc-99	<0.01	7.1290E-08
Ru-103		
Ru-106		
Ag-110m		
Sn-113		
Sn-117m		
Sb-124		
Sb-125	0.03	4.6407E-06
I-129		
I-131		
Cs-134	0.07	1.1300E-05
Cs-136		
Cs-137	1.47	2.4987E-04
Ba-140		
La-140		
Ce-141		
Ce-144	<0.01	8.4949E-08
Eu-154	<0.01	1.6813E-08
Hf-181		
Pu-238	<0.01	7.8884E-07
Pu-239	<0.01	3.3360E-07
Pu-241	0.11	1.9160E-05
Am-241	<0.01	9.6767E-07
Pu-242	<0.01	5.9763E-09
Cm-242	<0.01	5.6717E-09
Cm-243	<0.01	1.8221E-07
Cm-244		
CURIES (TOTAL)		1.6969E-02

3. Solid Waste Disposition (Shipments from Millstone)

Number of Shipments*	Mode of Transportation	Destination
5	Truck (Sole Use Vehicle)	Duratek, Inc., Kingston, TN
9	Truck (Sole Use Vehicle)	Duratek, Inc., Oak Ridge, TN
2	Truck (Sole Use Vehicle)	Perma-Fix of Florida, Inc., Gainesville, FL
3	Truck (Sole Use Vehicle)	Studsvik Processing Facility, Erwin, TN

* Indicates the number of shipments in this category which contained *any* unit-3 waste. (Example: A shipment containing wastes from units 1, 2 *and* 3 will be counted once on *each* of the three unit-specific sections of this report.) 31 physical shipments were made from this station in 2006.

B. IRRADIATED FUEL SHIPMENTS (Disposition)

Number of Shipments	Mode of Transportation	Destination
No Shipments in 2006	N/A	N/A

2.4 Groundwater Monitoring

Per the voluntary requirements of the NEI Groundwater Monitoring Initiative:

Table 2.4-GW Groundwater Monitoring Results

Type	Location	Identification	Frequency	Results
Well	Unit 1 Tank Farm	MW-9A	Semiannually	Gamma and H-3 < LLD
	Unit 1 Tank Farm	MW-9B	Semiannually	Gamma and H-3 < LLD
	Unit 1 Tank Farm	MW-9D	Semiannually	Gamma and H-3 < LLD
	Unit 1 Tank Farm	T1-MW-1	Semiannually	Gamma and H-3 < LLD
	Former Waste Oil UST	T3-MW-1	Quarterly	Gamma and H-3 < LLD
	Former ROB UST	ME-5	Quarterly	Gamma and H-3 < LLD
	Former S&W USTs	T7MW-1	Semiannually	Gamma and H-3 < LLD
	Former S&W USTs	T7-MW-2	Semiannually	Gamma and H-3 < LLD
	Former S&W USTs	T7-MW-3	Semiannually	Gamma and H-3 < LLD
	Fab Shop Area	T10-MW-1	Semiannually	Gamma and H-3 < LLD
	Fab Shop Area	T10-MW-2	Semiannually	Gamma and H-3 < LLD
	Fab Shop Area	T10-MW-3	Semiannually	Gamma and H-3 < LLD
	Fab Shop Area	MW-4A	Semiannually	Gamma and H-3 < LLD
	Fab Shop Area	MW-4B	Semiannually	Gamma and H-3 < LLD
	Fab Shop Area	MW-4D	Semiannually	Gamma and H-3 < LLD
	Fab Shop Area	T10-MW-5A	Semiannually	Gamma and H-3 < LLD
	Fab Shop Area	T10-MW-5C	Semiannually	Gamma and H-3 < LLD
	Fab Shop Area	T10-MW-5D	Semiannually	Gamma and H-3 < LLD
	Unit 1 Transformer Switchyard	1MW-XMFR-03	Semiannually	Gamma and H-3 < LLD
	Unit 1 Transformer Switchyard	S1-MW-2	Semiannually	Gamma and H-3 < LLD
	Unit 2 Transformer Switchyard	MW-7B	Semiannually	Gamma and H-3 < LLD
	Unit 2 Transformer Switchyard	MW-7C	Semiannually	Gamma and H-3 < LLD
	Unit 2 Transformer Switchyard	MW-7D	Semiannually	Gamma and H-3 < LLD
	Unit 2 Transformer Switchyard	S2-MW-1	Semiannually	Gamma and H-3 < LLD
	Unit 3 Service Trans. Switchyard	S3-MW-2	Quarterly	Gamma and H-3 < LLD
	Fueling Station	S11-MW-1	Semiannually	Gamma and H-3 < LLD
	Fueling Station	S11-MW-2	Semiannually	Gamma and H-3 < LLD
	Unit 2 Fuel Oil AST	S12-MW-1	Semiannually	Gamma and H-3 < LLD
	Unit 2 Fuel Oil AST	S12-MW-3	Semiannually	Gamma and H-3 < LLD
	Recycling Area Waste Oil AST	S13-MW-1	Semiannually	Gamma and H-3 < LLD
	Recycling Area Waste Oil AST	S13-MW-2	Semiannually	Gamma and H-3 < LLD
	Recycling Area Waste Oil AST	MW-6A	Annual	Gamma and H-3 < LLD
	Recycling Area Waste Oil AST	MW-6B	Annual	Gamma and H-3 < LLD
Yard Drains	Catch Basin 1-3	CB 1-3	Monthly	Gamma and H-3 < LLD
	Catch Basin 1-5	CB 1-5	Monthly	Gamma and H-3 < LLD
	Catch Basin 1-7	CB 1-7	Monthly	Gamma and H-3 < LLD
	Catch Basin 1-13	CB 1-13	Monthly	Gamma and H-3 < LLD
	Catch Basin 1-14	CB 1-14	Monthly	Gamma and H-3 < LLD
	Catch Basin 1-22	CB 1-22	Monthly	Gamma and H-3 < LLD
	Catch Basin 2-9	CB 2-9	Monthly	Gamma and H-3 < LLD
	NPDES Discharge DSN 006		Monthly	Gamma < LLD and, occasionally*, H-3 at ~2000 pCi/liter
	ROB Yard Drain		Monthly	Gamma and H-3 < LLD
	ISFSI Yard Drain	DMH#11	Monthly	Gamma and H-3 < LLD
Sump	Unit 3 Containment Underdrains		Weekly	Gamma and H-3 < LLD

* Note: Turbine building sumps normally have detectable H-3, which is monitored and reported in the effluent section of this report

3.0 Inoperable Effluent Monitors

During the period January 1 through December 31, 2006, the following effluent monitors were inoperable for more than 30 consecutive days:

3.1 Unit 1 – None

3.2 Unit 2 – None

3.3 Unit 3 - None

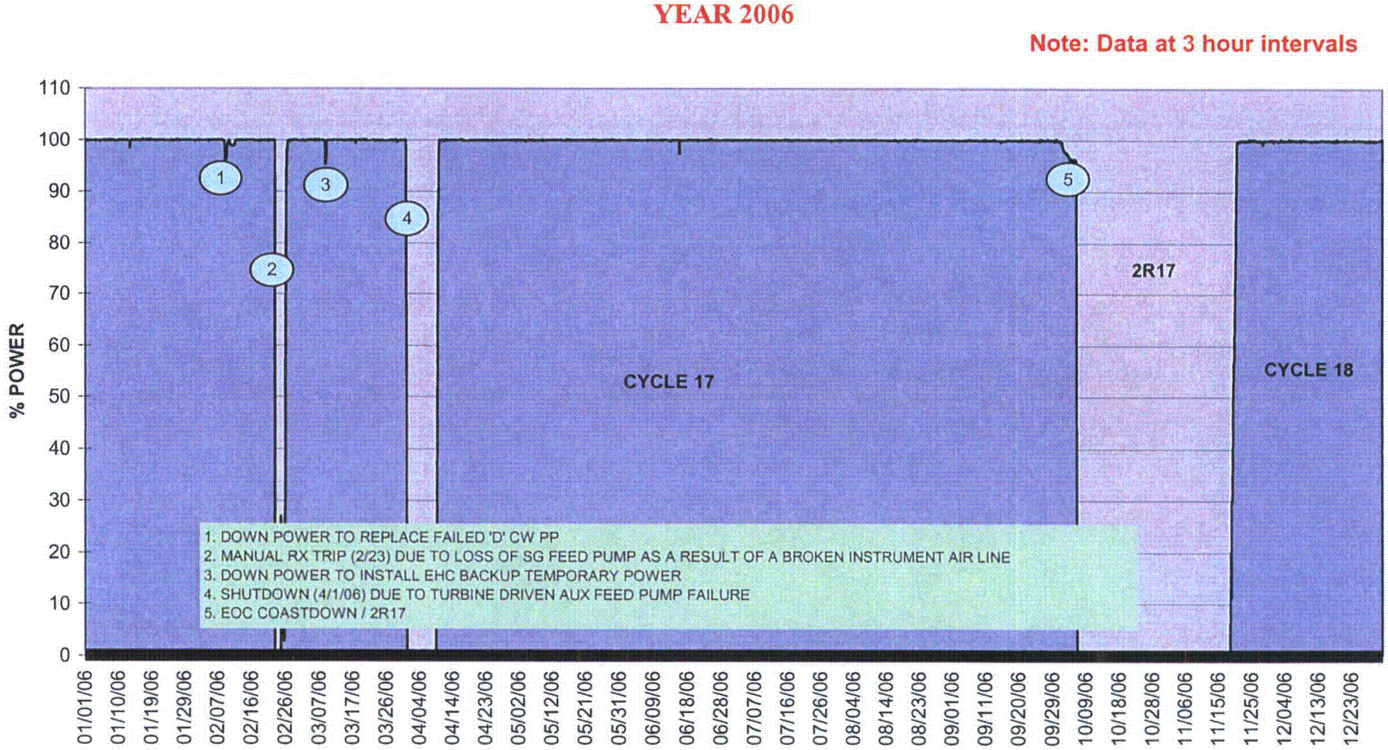
4.0 Operating History

The operating history of the Millstone Units during this reporting period was as follows:

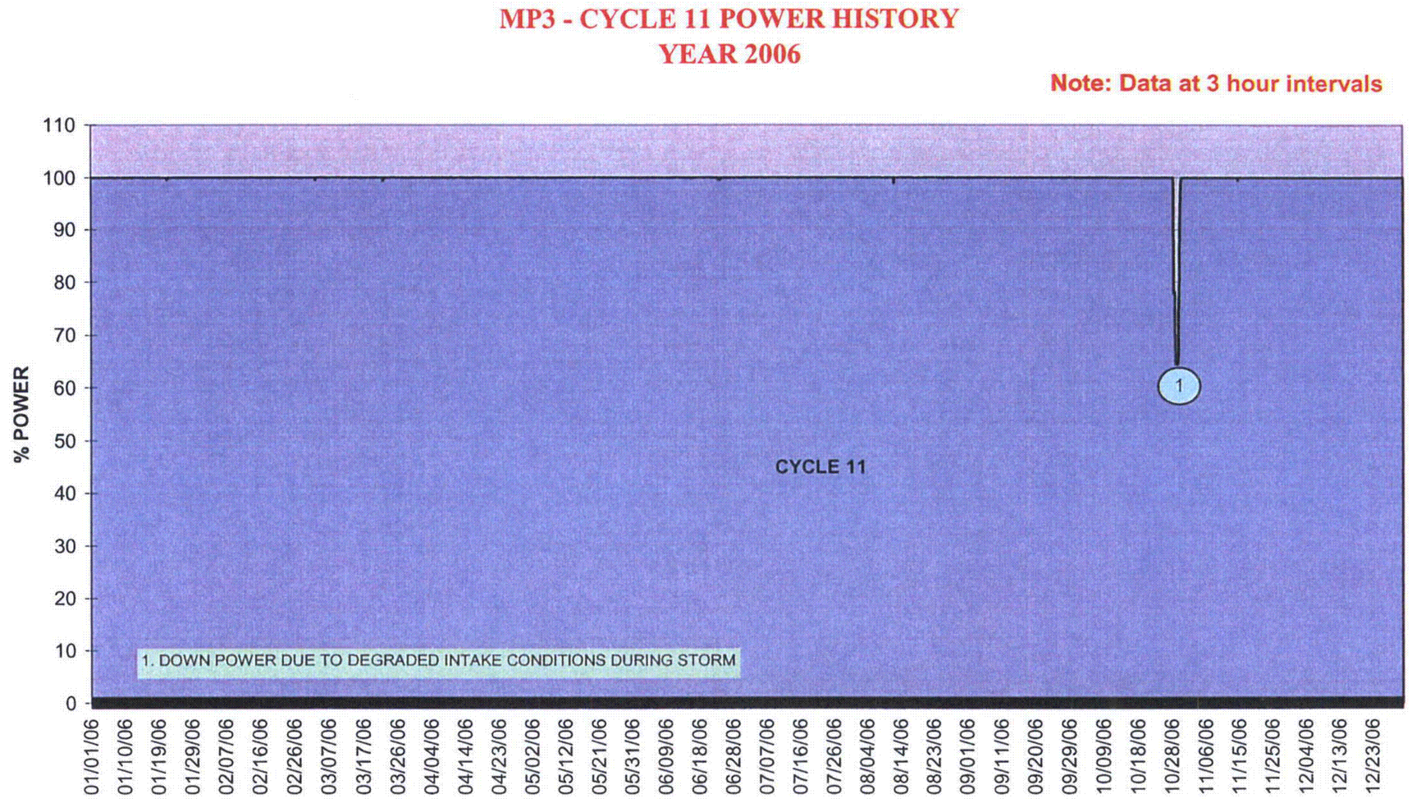
Unit 1 was shut down November 11, 1995 with a cessation of operation declared in July 1998.

Unit 2 operated with a DER capacity factor of 84.0% and the power history for 2006 is shown below.

MP2 - CYCLE 17 & 18 POWER HISTORY
YEAR 2006



Unit 3 operated with a DER capacity factor of 99.6% and the power history for 2006 is shown below.



5.0 Errata

5.1 The 2005 Radioactive Effluent Release Report had incorrect information for Reference 9. The corrected Reference 9:

Memo No. MP-HPO-06023, 2005 Report on Solid Waste and Irradiated Component Shipments, April 11, 2006.

6.0 REMODCM Changes

In 2006, the following changes were made to the Millstone REMODCM:

<u>Rev</u>	<u>Effective Date</u>
25 - 02	December 4, 2006

The description and the bases of the change(s) for each REMODCM revision are included here in Volume 1 of the Radioactive Effluent Release Report. In addition, a complete copy of the REMODCM revision(s) for the calendar year 2006 is provided to the Nuclear Regulatory Commission as Volume 2 of the Radioactive Effluent Release Report.

6.1 REMODCM Rev 25–02 - Description of Changes

Approval 02/21/06 Effective 02/28/06

REMODCM Change Request - Routing and Cover Sheet

Change Request #: 06-02 **Page 1 of 2.**

I. Description of changes (include markup pages) and affected documents

Originator name (Print): **Claude Flory**

Section/Page	Section Title and Description of Change with Basis
Table I.D-3 Page 28	Millstone Unit 2 Radioactive Gaseous Waste Sampling and Analysis Program Correct title of table by changing "Unit 2" to "Unit 3."
Table I.E-1 Page 39	1) Change sample type for #6 from "Well Water" to "Sea Water." This will correct an error made during processing of a previous REMODCM change. 2) Change sample type for #6a from "Water" to "Well Water." This will correct an error made during processing of a previous REMODCM change. 3) Change numbering of samples #6a to #7, #7 to #8, #7a to #9, and #8-#12 to #10-#14. This is an administrative change.
V.B.1/P. 140	REMODCM Unit Three Controls – Definitions The definition for DOSE EQUIVALENT I-131 is changed for Unit 3. This change supports the licensing change associated with the Alternate Source Term (AST). (See attached markup page for change.)

If more space is needed, Go To page 3 **Yes** ☐ **No** ☒

Originator signature: Claude Flory **Date:** 10/20/06

Table I.D-3
Millstone Unit ~~2~~3 Radioactive Gaseous Waste Sampling and Analysis Program

Gaseous Release Source or Point	Sample Type and Frequency	Minimum Analysis Frequency	Type of Activity Analysis	Lower Limit of Detection (LLD)[A] (μCi/cc)
A. Containment and Fuel Building Release				
1. Containment Hogger Drawdown 2. Containment Purge 3. Containment Vent 4. Open Equipment Hatch during Outages 5. Fuel Building	Gaseous, Particulate and Charcoal Grab Prior to Each Drawdown Gaseous Grab prior to each purge[H] Gaseous Grab every two weeks for venting[I]	Prior to Each Purge or Drawdown; Weekly for venting and prior to venting for Footnote I sample	Principal Gamma Emitters[B]	1×10^{-4}
		Prior to Each Drawdown	I-131 I-133	1×10^{-12} 1×10^{-10}
			Principal Particulate Gamma Emitters[B] - (I-131, others with half lives greater than 8 days)	1×10^{-11}
		Monthly for all release sources except Equipment Hatch	H-3	1×10^{-6}
	Continuous Particulate at Open Equipment Hatch	Weekly	Particulate Gamma emitters for ½ hour count (I-131, others with half-life greater than 8 days)	NA
	Continuous Charcoal at Equipment Hatch and Fuel Building Rollup Doors[K]	Weekly	I-131 and I-133 for one hour count	NA
	Gaseous Grab at Equipment Hatch and Fuel Building Rollup Doors[K]	Daily	Noble Gases – Gross Activity	1×10^{-4}
B. Continuous Release				
1. Unit 3 Ventilation Vent (HVR-RE10B) 2. Engineered Safeguards Building (HVQ-RE49) 3. Millstone Stack via SLCRS (HVR-RE19B)	Monthly - Gaseous Grab[C,J]	Monthly[C, J]	Principal Gamma Emitters[B]	1×10^{-4}
			H-3[G]	1×10^{-6}
	Continuous Charcoal Sample[D,F]	Weekly	I-131 I-133	1×10^{-12} 1×10^{-10}
	Continuous Particulate Sample[D,F]	Weekly	Principal Particulate Gamma Emitters[B] - (I-131, others with half lives greater than 8 days)	1×10^{-11}
	Continuous Particulate Sample[D]	Quarterly Composite	Sr-89, Sr-90 Gross alpha	1×10^{-11} 1×10^{-11}
	Continuous Noble Gas[D]	Continuous Monitor	Noble Gases - Gross Activity	1×10^{-6}

TABLE I.E-1

Millstone Radiological Environmental Monitoring Program

Exposure Pathway and/or Sample	No. of Locations	Sampling and Collection Frequency	Type and Frequency of Analysis
1. Gamma Dose - Environmental TLD	40[a]	Quarterly	Gamma Dose - Quarterly
2. Airborne Particulate	8	Continuous sampler - weekly filter change	Gross Beta - Weekly Gamma Spectrum - Quarterly on composite (by location), and on individual sample if gross beta is greater than 10 times the mean of the weekly control station's gross beta results
3. Airborne Iodine	8	Continuous sampler - weekly canister change	I-131 - Weekly
4. Vegetation	5	One sample near middle and one near end of growing season	Gamma Isotopic on each sample
5. Milk	3	Semimonthly when animals are on pasture; monthly at other times.	Gamma Isotopic and I-131 on each sample; Sr-89 and Sr-90 on Quarterly Composite
5a.Pasture Grass	3	Sample as necessary to substitute for unavailable milk	Gamma Isotopic and I-131
6. ~~Well~~Sea Water	2	Continuous sampler with a monthly collection at indicator location. Quarterly at control location - Composite of 6 weekly grab samples	Gamma Isotopic and Tritium on each sample.
~~6a~~7. Well Water	~~3~~2	Semiannually	Gamma Isotopic and Tritium on each sample.
~~7~~8. Bottom Sediment	5	Semiannual	Gamma Isotopic on each sample
~~7a~~9. Soil	3	Annually	Gamma Isotopic on each sample
~~8~~10. Fin Fish-Flounder and one other type of edible fin fish (edible portion)	2	Quarterly	Gamma Isotopic on each sample
~~9~~11. Mussels (edible portion)	2	Quarterly	Gamma Isotopic on each sample
~~10~~12.Oysters (edible portion)	4	Quarterly	Gamma Isotopic on each sample
~~11~~13.Clams (edible portion)	2	Quarterly	Gamma Isotopic on each sample
~~12~~14.Lobsters (edible portion)	2	Quarterly	Gamma Isotopic on each sample

(a) Two or more TLDs or TLD with two or more elements per location.

3. CHANNEL CALIBRATION - A CHANNEL CALIBRATION shall be the adjustment, as necessary, of the channel such that it responds within the required range and accuracy to known values of input. The CHANNEL CALIBRATION shall encompass the entire channel including the sensors and alarm, interlock and/or trip functions and may be performed by any series of sequential, overlapping, or total channel steps such that the entire channel is calibrated.

4. CHANNEL CHECK - A CHANNEL CHECK shall be the qualitative assessment of channel behavior during operation by observation. This determination shall include, where possible, comparison of the channel indication and/or status with other indications and/or status derived from independent instrument channels measuring the same parameter.

5 DOSE EQUIVALENT I-131 - DOSE EQUIVALENT I-131 shall be that concentration of I-131 (microCurie/gram) which alone would produce the same CDE-thyroid dose as the quantity and isotopic mixture of I-131, I-132, I-133, I-134, and I-135 actually present. The thyroid dose conversion factors used for this calculation shall be those listed ~~in Regulatory Guide 1.109 Rev. 1, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluent for the Purpose of Evaluating Compliance with 10 CFR Part 50 Appendix I~~ under Inhalation in Federal Guidance Report No. 11 (FGR 11), "Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion and Ingestion.

6. MEMBER(S) OF THE PUBLIC - MEMBER(S) OF THE PUBLIC shall include all persons who are not occupationally associated with the plant. This category does not include employees of the licensee, its contractors or its vendors. Also excluded from this category are persons who enter the site to service equipment or to make deliveries. This category does include persons who use portions of the site for recreational, occupational, or other purposes not associated with the plant.

   The term "REAL MEMBER OF THE PUBLIC" means an individual who is exposed to existing dose pathways at one particular location.

7. MODE - Refers to Mode of Operation as defined in Safety Technical Specifications.

8. OPERABLE – OPERABILITY - An instrument shall be OPERABLE or have OPERABILITY when it is capable of performing its specified functions(s) and when all necessary attendant instrumentation, controls, electrical power, or other auxiliary equipment that are required for the instrument to perform its functions(s) are also capable of performing their related support function(s).

9. SITE BOUNDARY - The SITE BOUNDARY shall be that line beyond which the land is not owned, leased, or otherwise controlled by the licensee.

REMODCM Change Request - Routing and Cover Sheet

Change Request Number #: 06-02	Page 2 of 2 .
II. Technical Reviews:	
Manager, - Radiological Protection and Chemistry Date	Approve ☑ Disapprove ☐
Supervisor - Radiological Engineering Date	Approve ☑ Disapprove ☐
III. SORC Review:	**Meeting No.**
Unreviewed Radiological Environmental Impact (Bases Attached) Yes ☐ No ☒	
SORC Chairman Date 10/26/06	Approve ☒ Disapprove ☐ MP 06-078
IV. Management Approval:	
Site Vice President Date 10-23-06	Approve ☑ Disapprove ☐
V. Implementation: Verify that the affected document changes have been Effective date of REMODCM revision: 12/4/06	
Supervisor - Radiological Engineering Section (NFE)	Date 12/12/06
VI. Distribution: Change sent to Document Control for distribution	
Supervisor - Radiological Engineering Section (NFE)	Date 12/12/06
VII. Documentation: In Annual Effluent Report (or separate submittal to NRC)	
Supervisor - Radiological Engineering Section (NFE)	Date 4/18/07