ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

(ARERR)

YANKEE ROWE STATION

JANUARY 1, 2003 - DECEMBER 31, 2003

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YANKEE ATOMIC ELECTRIC COMPANY
Rowe, Massachusetts

AREVA DOC. # 47-5043455-00

NOTES:

1. Yankee Nuclear Power Station's last day at any power level was October 1, 1991. The facility is permanently shut down and in the process of decommissioning. Due to ceased operations, short-lived nuclides have been deleted from the gaseous and liquid effluent tables. Their activity concentrations in the fuel inventory have decayed to zero values.

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1.0 INTRODUCTION

The Yankee Decommissioning Quality Assurance Program (YDQAP), Appendix D, Section B.d.3, requires that an Annual Radioactive Effluent Release Report covering the operation of the unit during the previous calendar year shall be submitted (to the NRC) before May 1 of each year. This report includes a summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from the unit. The material provided is (1) consistent with the objectives outlined in the Offsite Dose Calculation Manual (ODCM) and Process Control Program (PCP) for solid waste, and (2) is in conformance with 10CFR50.36a and Section IV.B.1 of Appendix I to 10CFR50. ODCM Control 7.2 details the specific information to be included in the annual report.

In July 2002, the first dry spent fuel storage canister was placed on the Independent Spent Fuel Storage Installation (ISFSI) pad located within the plant's protected area. By design, there are no liquid or gaseous effluent release pathways from storage canisters once placed on the ISFSI pad. In June 2003, all transfers of spent fuel and greater than Class C materials requiring storage in the ISFSI were completed. Following the completion of these transfers to dry storage, the Spent Fuel Pool (SFP) water inventory was processed by filtration and demineralization and released to the environment as a controlled liquid waste discharge in accordance with our NPDES permit and the ODCM. The discharge of the SFP water represented the last major source of plant process water requiring processing as part of plant decommissioning. Potential sources of waste water remaining which could require treatment include items such as equipment decontamination, laboratory drains and building sumps that handle ground water and potential surface runoff (construction dewatering).

Tables 1A through 3 lists the recorded radioactive gaseous and liquid effluents and solid waste, respectively, with data summarized on a quarterly basis for the year. Table 4 summarizes the estimated radiological dose commitments from all radioactive liquid and gaseous effluents released during the year 2003 along with the direct dose from station related activities, including the ISFSI. Table 5 summarizes the total dose to the maximum off-site individual from all station related sources for 2003.

As required by ODCM Control 7.2.b, dose commitments resulting from the release of radioactive materials in liquids and gases were estimated in accordance with the models and parameters identified in the ODCM (Reference 1). These dose estimates were made using a Method II analysis as described in the ODCM. A Method II analysis incorporates the methodology of Regulatory Guide 1.109 (Reference 2) using historic meteorological data. For gaseous releases, five years of historic (1992-1996) quarterly meteorological data were used for determining the gaseous pathway doses. As required by Control 7.2.b, this report also shall include an assessment of the radiation doses from radioactive effluents to member(s) of the public due to allowed recreational activities inside the site boundary during the year. However, for this reporting period, there were no recreational facilities open to the public inside the site boundary (on land), nor was permission granted for recreational use of plant property. Shoreline activities associated with Sherman Pond and the Deerfield River were included in the dose assessments to the maximum individual. The dose impact for over-water activities, such as boating, are not significant due to the self shielding of water and the transient nature of the activity leading to low occupancy times.

The limited use of the Information Center on-site is associated with educational activities as they pertain to the operation/decommissioning of the plant and as such, is not included under Control 7.2.b. Assessment of radiation doses (including direct radiation) to the most likely exposed real member(s) of the public for the calendar year for the purposes of demonstrating conformance with 40CFR Part 190, "Environmental Radiation Protection Standards for Nuclear Power Operations," also are included.

All calculated dose estimates for this reporting period are well below the regulatory dose criteria of 10CFR Part 50, Appendix I and 40CFR Part 190.

Appendices A through J indicate the status of reportable items per the requirements of the following documents:

Appendix	Title	Requirement Reference
A	Radioactive Liquid Effluent Monitoring Instrumentation	ODCM (Rev.16) Control 5.1
B	Radioactive Gaseous Effluent Monitoring Instrumentation	ODCM (Rev.16) Control 5.2
C	Liquid Holdup Tanks	YDQAP; Appendix D, Section H
D	Radiological Environmental Monitoring Program	ODCM (Rev.16) Control 4.1
E	Land Use Census	ODCM (Rev.16) Control 4.2
F	Process Control Program (PCP)	PCP Control 2.0
G	Offsite Dose Calculation Manual (ODCM)	ODCM (Rev.16) Control 7.2
H	Radioactive Liquid, Gaseous, and Solid Waste Treatment System	ODCM (Rev.16) Control 7.3, PCP Control 3.0
I	Supplemental Information	Regulatory Guide 1.21
J	Sewage Sludge Disposal	ODCM (Rev.16) Appendix A

2.0 METEOROLOGICAL DATA

Five years of historic meteorological data (1992-1996) collected from the site's 200-foot meteorological tower, located approximately 180 meters north of the vapor container, were used to model the atmospheric dispersion of airborne effluents. The tower instrumentation was designed to meet the requirements of Regulatory Guide 1.23 (Reference 3) for meteorological monitoring. A summary of the 1992-1996 meteorological data is provided in Table 6 of this report.

The main release point for gases discharged from the plant is via the 150-foot primary vent stack, located between the vapor container and the primary auxiliary building. The primary vent stack is treated as a mixed mode elevated release point dependent upon wind speed, as described in Regulatory Guide 1.111 (Reference 4).

Atmospheric diffusion was calculated using quarterly historical data along with the recorded quarterly effluent information. CHI/Q and D/Q values were derived for all receptor points using a straight-line airflow model. All dispersion and deposition factors have been calculated employing appropriate source configuration considerations and removal mechanism (e.g., dry deposition) described in Regulatory Guide 1.111 (Reference 4). Terrain elevations, including downwind valley flow corrections for the surrounding area, were factored into the calculation of CHI/Q and D/Q values at each receptor location.

3.0 DOSE ASSESSMENT

3.1 Doses From Liquid Effluents

Control 3.1 limits total body (1.5 mrem per quarter and 3 mrem per year) and organ (5 mrem per quarter and 10 mrem per year) doses from liquid effluents to a member of the public to those specified in 10CFR Part 50, Appendix I. By implementing the requirements of 10CFR Part 50, Appendix I, Control 3.1 assures that the release of radioactive material in liquid effluents will be kept "as low as is reasonably achievable."

Exposure pathways that could exist as a result of liquid effluents are fish, direct exposure from river shoreline sedimentation, milk and meat via animal ingestion of the Deerfield River water, and meat, milk, and vegetable pathways via crop irrigation with water withdrawn from the Deerfield River. Drinking water and aquatic invertebrate pathways do not exist downriver of the Yankee plant at Rowe. The dose analysis for the liquid pathways assumes a dilution based on the monthly average flow at the Sherman Dam.

The whole body and organ doses due to liquid effluents were determined by summing the contributions from all pathways. The whole body and organ doses to a member of the public from liquid effluents are given in Table 4. The estimated quarterly and annual doses due to liquid effluents are well below the 10CFR Part 50, Appendix I dose criteria of Control 3.1.

For 2003, there were no liquid effluent releases from the plant during the first and second quarter and, therefore, no corresponding projected dose impact to the public. Liquid effluents releases were recorded during the third and fourth quarters of the year, associated primarily with the SFP drain-down operation following the transfer of all spent fuel and Greater Than Class C materials inventory to the ISFSI.

3.2 Doses From Noble Gases

In 2003, ODCM Control 3.4 limited the gamma air doses (5 mrad per quarter and 10 mrad per year) and beta air doses (10 mrad per quarter and 20 mrad per year) from noble gases released in gaseous effluents from the site to areas at and beyond the site boundary to those specified in 10CFR Part 50, Appendix I. By implementing the requirements of 10CFR Part 50, Appendix I, Control 3.4 assures that the release of radioactive noble gases in gaseous effluents will be kept "as low as is reasonably achievable."

When noble gases are determined to be present in effluent discharge, the dose estimates are calculated at the site boundary, nearest resident, nearest vegetable garden, and nearest milk animal in each of the sixteen principle compass directions, as well as the point of highest off-site ground level air concentrations of radioactive materials. Gamma and beta air doses, as well as whole body and skin doses, are calculated at each of the above locations.

To determine the beta contribution to the skin dose, a semi-infinite cloud model is utilized. The whole body gamma dose is calculated using a finite cloud sector average model with a Gaussian distribution of activity in the vertical plane. The gamma radiation received from the cloud at a point of interest is determined by integrating the contribution from a differential volume over the entire cloud, taking into account the geometry of the cloud, variation in concentration, attenuation by the interaction of photons with matter in the path between the source and receptor point, and scattering of radiation from material outside the direct path to the point of interest. No additional credit is taken for decay of radionuclides in transit to the receptor point.

In 2003, the last of the potential plant sources (spent fuel stored in the SFP) of noble gases was eliminated with the transfer of the spent fuel to dry storage in the ISFSI during the first and second quarters of the year, and the processing and release of the SFP water inventory during the third and fourth quarters of the year. As indicated on Tables 1A and 1B, small quantities of Kr-85 were recorded as being discharged during the fuel transfer operations.

The estimated quarterly and annual gamma and beta air doses at the point of highest off-site exposure are listed in Table 4. The estimated gamma and beta air doses due to noble gases released in gaseous effluents are well below the 10CFR Part 50, Appendix I dose criteria of Control 3.4.

3.3 Doses From Tritium and Radionuclides in Particulate Form With Half-Lives Greater Than 8 Days

ODCM Control 3.5 limits the organ doses to a member of the public from tritium and radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents released from the site to areas at and beyond the site boundary to those specified in 10CFR Part 50, Appendix I (7.5 mrem per quarter and 15 mrem per year). By implementing the requirements of 10CFR Part 50, Appendix I, Control 3.5 assures that the releases of tritium and particulates in gaseous effluents will be kept "as low as is reasonably achievable." It should be noted that due to the permanent shutdown of the plant (last power operation was in October 1991); the Iodine-131 source term has decayed away and no longer has the potential to affect dose assessment.

Exposure pathways that could exist as a result of the release of particulates and tritium to the atmosphere include external irradiation from activity deposited onto the ground surface, inhalation, and ingestion of vegetables, meat, and milk. Dose estimates for 2003 were made at the site boundary, nearest resident, nearest vegetable garden, and nearest meat animal in each of the sixteen principle compass directions. The nearest resident, vegetable garden and milk animal in each sector were searched for by the most recent Land Use Census, as required by Control 4.2. Doses were calculated for pathways that were determined by the field survey to actually exist. Conservatively, a vegetable garden is assumed to exist at each milk animal location when the milk pathway is included. Furthermore, the meat pathway is assumed to exist at locations where identified in the past (a meat animal inventory is not required by the annual Land Use Census). Meat and milk animals are assumed to receive their entire intake from pasture during the second and third quarters. This assumption is conservative since most dairy operations utilize supplemental feeding of animals when on pasture or actually restrict animals to full time silage feeding throughout the entire year.

The organ doses were determined after adding the contributions from all pathways at each location. Doses were calculated for the whole body, GI-tract, bones, liver, kidneys, thyroid, lungs, and skin for adults, teenagers, children, and infants. The maximum estimated quarterly and annual organ doses due to tritium and particulates at any of the off-site receptor locations are reported in Table 4. The doses to all other organs at all other locations for all other age groups are less than the doses reported in Table 4. The estimated organ doses from tritium and particulates in gaseous effluents are well below the 10CFR Part 50, Appendix I dose criteria of Control 3.5.

3.4 Total Dose from Direct External Radiation, Plus Liquid and Gaseous Effluents

The annual total dose or dose commitment to any member of the public due to releases of radioactivity and direct radiation from fixed sources are limited to the EPA's radiation protection standards for the uranium fuel cycle (40CFR190). The dose limits are set to less than or equal to 25 mrem per year to the total body or any organ, except the thyroid, which is limited to less than or equal to 75 mrem per year.

Direct external dose from fixed sources of radioactive materials, such as the on-site ISFSI, and from within other plant structures, was evaluated by comparing Yankee Rowe's 2003 TLD data for offsite indicator stations versus the control locations. Since there was no distinguishable difference between the indicator measurements at the site boundary or beyond and the control measurements, it was concluded that there is no measurable station-related direct radiation dose for 2003.

Table 5 shows that the total dose to the maximum off-site individual for 2003 is well below the EPA dose limit criteria.

4.0 REFERENCES

1. YNPS Offsite Dose Calculation Manual (ODCM), Revision No. 16, effective date, August 14, 2003 (ODCM Revision in effect as of the end of 2003).

2. Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Release of Reactor Effluents for the Purpose of Evaluating Compliance With 10CFR Part 50, Appendix I," U.S. Nuclear Regulatory Commission, Office of Standards Development, Revision 1, October 1977.

3. Regulatory Guide 1.23, "On-Site Meteorological Programs (Safety Guide 23)," U.S. Nuclear Regulatory Commission, Office of Standards Development, February 1972.

4. Regulatory Guide 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light - Water - Cooled Reactors," U.S. Nuclear Regulatory Commission, Office of Standards Development, Revision 1, October 1977.

TABLE 1A
(Sheet 1 of 2)

Yankee Atomic Electric Company, Rowe, Massachusetts
2003 Annual Radioactive Effluent Release Report
Gaseous Effluents – Summation of All Releases

	Unit	Quarter 1	Quarter 2	Est. Total Error, %
A. Fission and Activation Gases				
1. Total Release	Ci	4.45E-02	2.00E-01	±2.50E+01
2. Average Release Rate for Period	µCi/sec	5.72E-03	2.54E-02	
3. Percent of Control Limit[(a)]	%	5.76E-04	2.93E-03	
B. Iodines[(b)]				
C. Particulates				
1. Particulates with Half-lives > 8 days	Ci	ND	ND	±3.00E+01
2. Average Release Rate for Period	µCi/sec	ND	ND	
3. Percent of Control Limit[(c)]	%	3.64E-04	1.51E-03	
4. Gross Alpha Radioactivity	Ci	1.26E-09	ND	
D. Tritium				
1. Total Release	Ci	1.30E-02	4.52E-02	±3.00E+01
2. Average Release Rate for Period	µCi/sec	1.67E-03	5.75E-03	
3. Percent of Control Limit	%	(d)	(d)	

ND Not detected in gaseous effluents.
(a) ODCM Control 3.4.b for beta-air dose. Percent of limits are calculated using ODCM Method II dose equations.
(b) Iodine-131 (and I-133, I-135) data have been deleted. These nuclides have decayed below any practicable level for detection in effluents due to permanent plant shutdown.
(c) Per ODCM Control 3.5, the percentage of the limit is based on the combined dose contribution from iodines, tritium, and particulates with half-lives greater than 8 days. Percent of limits are calculated using ODCM Method II dose equations.
(d) Per ODCM Control 3.5, percentage dose contribution from tritium is included in Part C.3.

TABLE 1A
(Sheet 2 of 2)

Yankee Atomic Electric Company, Rowe, Massachusetts
2003 Annual Radioactive Effluent Release Report
Gaseous Effluents – Summation of All Releases

	Unit	Quarter 3	Quarter 4	Est. Total Error, %
A. Fission and Activation Gases				
1. Total Release	Ci	ND	ND	±2.50E+01
2. Average Release Rate for Period	µCi/sec	ND	ND	
3. Percent of Control Limit[a]	%	0.00E+00	0.00E+00	
B. Iodines[b]				
C. Particulates				
1. Particulates with Half-lives > 8 days	Ci	ND	ND	±3.00E+01
2. Average Release Rate for Period	µCi/sec	ND	ND	
3. Percent of Control Limit[c]	%	1.29E-03	5.56E-04	
4. Gross Alpha Radioactivity	Ci	ND	ND	
D. Tritium				
1. Total Release	Ci	3.69E-02	1.96E-02	±3.00E+01
2. Average Release Rate for Period	µCi/sec	4.64E-03	2.47E-03	
3. Percent of Control Limit	%	(d)	(d)	

ND Not detected in gaseous effluents.
(a) ODCM Control 3.4.b for beta-air dose. Percent of limits are calculated using ODCM Method II dose equations.
(b) Iodine-131 (and I-133, I-135) data have been deleted. These nuclides have decayed below any practicable level for detection in effluents due to permanent plant shutdown.
(c) Per ODCM Control 3.5, the percentage of the limit is based on the combined dose contribution from iodines, tritium, and particulates with half-lives greater than 8 days. Percent of limits are calculated using ODCM Method II dose equations.
(d) Per ODCM Control 3.5, percentage dose contribution from tritium is included in Part C.3.

TABLE 1B
(Sheet 1 of 2)

Yankee Atomic Electric Company, Rowe, Massachusetts
2003 Annual Radioactive Effluent Release Report
Gaseous Effluents – Elevated Releases

		Continuous Mode		Batch Mode[a]	
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 1	Quarter 2
1. Fission Gases					
Krypton-85	Ci	4.45E-02	2.00E-01	-	-
Total for Period	Ci	4.45E-02	2.00E-01	-	-
2. Iodines[b]					
3. Particulates					
Strontium-89	Ci	ND	ND	-	-
Strontium-90	Ci	ND	ND	-	-
Cesium-134	Ci	ND	ND	-	-
Cesium-137	Ci	ND	ND	-	-
Zinc-65	Ci	ND	ND	-	-
Cobalt-58	Ci	ND	ND	-	-
Cobalt-60	Ci	ND	ND	-	-
Cerium-144	Ci	ND	ND	-	-
Manganese-54	Ci	ND	ND	-	-
Total for Period	Ci	0.00E+00	0.00E+00	-	-

ND Not detected in gaseous effluents.
(a) There are no longer any batch mode gaseous releases.
(b) Iodine-131, I-133 and I-135 data have been deleted. These nuclides have decayed below any practicable level for detection in effluents due to perm anent plant shutdown.
- Dash indicates no release of this type.

TABLE 1B
(Sheet 2 of 2)

Yankee Atomic Electric Company, Rowe, Massachusetts
2003 Annual Radioactive Effluent Release Report
Gaseous Effluents – Elevated Releases

		Continuous Mode		Batch Mode[a]	
Nuclides Released	Unit	Quarter 3	Quarter 4	Quarter 3	Quarter 4
1. Fission Gases					
Krypton-85	Ci	ND	ND	-	-
Total for Period	Ci	0.00E+00	0.00E+00	-	-
2. Iodines[b]					
3. Particulates					
Strontium-89	Ci	ND	ND	-	-
Strontium-90	Ci	ND	ND	-	-
Cesium-134	Ci	ND	ND	-	-
Cesium-137	Ci	ND	ND	-	-
Zinc-65	Ci	ND	ND	-	-
Cobalt-58	Ci	ND	ND	-	-
Cobalt-60	Ci	ND	ND	-	-
Cerium-144	Ci	ND	ND	-	-
Manganese-54	Ci	ND	ND	-	-
Total for Period	Ci	0.00E+00	0.00E+00	-	-

ND Not detected in gaseous effluents.
(a) There are no longer any batch mode gaseous releases.
(b) Iodine-131, I-133 and I-135 data have been deleted. These nuclides have decayed below any practicable level for detection in effluents due to permanent plant shutdown.
- Dash indicates no release of this type.

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(Sheet 1 of 2)

Yankee Atomic Electric Company, Rowe, Massachusetts
2003 Annual Radioactive Effluent Release Report
Gaseous Effluents – Ground Level Releases

There were no gaseous ground level releases during the reporting period.

TABLE 2A
(Sheet 1 of 2)

Yankee Atomic Electric Company, Rowe, Massachusetts
2003 Annual Radioactive Effluent Release Report
Liquid Effluents – Summation of All Releases

	Unit	Quarter 1	Quarter 2	Est. Total Error, %
A. Fission and Activation Products				
1. Total Release (not including tritium, gases, alpha)	Ci	-	-	±2.00E+01
2. Average Diluted Concentration During Period	µCi/ml	-	-	
3. Percent of Applicable Limit[a]	%	-	-	
B. Tritium				
1. Total Release	Ci	-	-	±1.00E+01
2. Average Diluted Concentration During Period	µCi/ml	-	-	
3. Percent of Applicable Limit[a]	%	-	-	
C. Dissolved and Entrained Gases				
1. Total Release	Ci	-	-	±2.00E+01
2. Average Diluted Concentration During Period	µCi/ml	-	-	
3. Percent of Applicable Limit[b]	%	-	-	
D. Gross Alpha Radioactivity				
1. Total Release	Ci	-	-	±3.50E+01
E. Volume of Waste Release (prior to dilution)	Liters	0.00E+00	0.00E+00	±1.00E+01
F. Volume of Dilution Water Used During Period	Liters	4.43E+07	9.07E+06	±1.50E+01

ND Not detected in liquid effluents.
(a) Concentration limits specified in Appendix B to 10CFR20.1-20.602, Table II, Column 2 (ODCM Control 2.1). The percent of applicable limit reported is based on the average diluted concentration during the period. At no time did any release exceed the concentration limit.
(b) Concentration limits for dissolved and entrained noble gases is 2.00E-04 µCi/ml (ODCM Control 2.1). The percent of applicable limit reported is based on the average diluted concentration during the period. At no time did any release exceed the concentration limit.
- Dash indicates no release of this type.

TABLE 2A
(Sheet 2 of 2)

Yankee Atomic Electric Company, Rowe, Massachusetts
2003 Annual Radioactive Effluent Release Report
Liquid Effluents – Summation of All Releases

	Unit	Quarter 3	Quarter 4	Est. Total Error, %
A. Fission and Activation Products				
1. Total Release (not including tritium, gases, alpha)	Ci	3.33E-05	3.87E-06	±2.00E+01
2. Average Diluted Concentration During Period	µCi/ml	9.82E-10	3.72E-10	
3. Percent of Applicable Limit[(a)]	%	1.02E-02	3.57E-03	
B. Tritium				
1. Total Release	Ci	8.70E-02	1.58E-02	±1.00E+01
2. Average Diluted Concentration During Period	µCi/ml	2.57E-06	1.52E-06	
3. Percent of Applicable Limit[(a)]	%	8.56E-02	5.07E-02	
C. Dissolved and Entrained Gases				
1. Total Release	Ci	ND	ND	±2.00E+01
2. Average Diluted Concentration During Period	µCi/ml	ND	ND	
3. Percent of Applicable Limit[(b)]	%	ND	ND	
D. Gross Alpha Radioactivity				
1. Total Release	Ci	ND	ND	±3.50E+01
E. Volume of Waste Release (prior to dilution)	Liters	5.26E+05	1.16E+05	±1.00E+01
F. Volume of Dilution Water Used During Period	Liters	3.39E+07	1.04E+07	±1.50E+01

ND Not detected in liquid effluents.
(a) Concentration limits specified in Appendix B to 10CFR20.1-20.602, Table II, Column 2 (ODCM Control 2.1). The percent of applicable limit reported is based on the average diluted concentration during the period. At no time did any release exceed the concentration limit.
(b) Concentration limits for dissolved and entrained noble gases is 2.00E-04 µCi/ml (ODCM Control 2.1). The percent of applicable limit reported is based on the average diluted concentration during the period. At no time did any release exceed the concentration limit.
- Dash indicates no release of this type.

TABLE 2B
(Sheet 1 of 2)

Yankee Atomic Electric Company, Rowe, Massachusetts
2003 Annual Radioactive Effluent Release Report
Liquid Effluents – Routine Releases

		Continuous Mode		Batch Mode	
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 1	Quarter 2
Strontium-89	Ci	-	-	-	-
Strontium-90	Ci	-	-	-	-
Cesium-134	Ci	-	-	-	-
Cesium-137	Ci	-	-	-	-
Cobalt-58	Ci	-	-	-	
Cobalt-60	Ci	-	-	-	-
Zinc-65	Ci	-	-	-	-
Manganese-54	Ci	-	-	-	-
Cerium-144	Ci	-	-	-	-
Carbon-14	Ci	-	-	-	-
Iron-55	Ci	-	-	-	-
Unidentified	Ci	-	-	-	-
Total for Period (above)	Ci	-	-	-	-
Krypton-85	Ci	-	-	-	-

ND Not detected in liquid effluents.
- Dash indicates no release of this type.

TABLE 2B
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Yankee Atomic Electric Company, Rowe, Massachusetts
2003 Annual Radioactive Effluent Release Report
Liquid Effluents – Routine Releases

		Continuous Mode		Batch Mode	
Nuclides Released	Unit	Quarter 3	Quarter 4	Quarter 3	Quarter 4
Strontium-89	Ci	-	-	ND	ND
Strontium-90	Ci	-	-	ND	ND
Cesium-134	Ci	-	-	ND	ND
Cesium-137	Ci	-	-	2.04E-06	ND
Cobalt-58	Ci	-	-	ND	ND
Cobalt-60	Ci	-	-	2.35E-05	3.06E-06
Zinc-65	Ci	-	-	ND	ND
Manganese-54	Ci	-	-	ND	ND
Cerium-144	Ci	-	-	ND	ND
Carbon-14	Ci	-	-	ND	ND
Iron-55	Ci	-	-	ND	ND
Silver-108M	Ci	-	-	7.76E-06	8.07E-07
Unidentified	Ci	-	-	ND	ND
Total for Period (above)	Ci	-	-	3.33E-05	3.87E-06
Krypton-85	Ci	-	-	ND	ND

ND Not detected in liquid effluents.
- Dash indicates no release of this type.

TABLE 3
(Sheet 1 of 4)

Yankee Atomic Electric Company, Rowe, Massachusetts
2003 Annual Radioactive Effluent Release Report
Solid Waste and Irradiated Fuel Shipments

I. First and Second Quarters

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

1. Type of Waste	Unit	6-month Period	Est. Total Error, %
a. Filters & Irradiated Hardware: Class C	m^3	1.5	30
Container: 8-120 Poly HIC	Ci (est.)	4.7E2	
b. Resin & Debris: Class C	m^3	1.4	30
Container: 8-120 Poly HIC	Ci (est.)	1.3E2	
c. Dry Active Waste: Class A	m^3	184.8	50
Container: (a)	Ci (est.)	7.0E-1	
d. Fuel Pool Equipment: Class A	m^3	8.5	30
Container: (a)	Ci (est.)	1.7E0	

2. Estimate of Nuclide Composition > 1% (by type of waste)

a.	Iron-55	%	24.7
	Cobalt-60	%	52.7
	Nickel-63	%	22.2
b.	Iron-55	%	49.4
	Cobalt-60	%	31.5
	Nickel-63	%	15.8
	Cerium-144	%	2.2
c.	Iron-55	%	42.2
	Cobalt-60	%	33.9
	Nickel-63	%	19.7
	Cesium-137	%	2.5
	Cerium-144	%	1.2
d.	Iron-55	%	81.3
	Cobalt-60	%	14.9
	Nickel-63	%	2.2

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
2	Truck	Barnwell, SC
7(b)	Truck	Oak Ridge, TN

(a) Partial shipments by the processor to disposal.
(b) Waste shipments to processor.

TABLE 3
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Yankee Atomic Electric Company, Rowe, Massachusetts
2003 Annual Radioactive Effluent Release Report
Solid Waste and Irradiated Fuel Shipments

I. First and Second Quarters (continued)

B. IRRADIATED FUEL SHIPMENTS (Disposition): None

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(Sheet 3 of 4)

Yankee Atomic Electric Company, Rowe, Massachusetts
2003 Annual Radioactive Effluent Release Report
Solid Waste and Irradiated Fuel Shipments

II. Third and Fourth Quarters

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

1. Type of Waste	Unit	6-month Period	Est. Total Error, %
a. Resin & Debris: Class C	m^3	2.4	30
Container: 8-120 Poly HIC	Ci (est.)	6.2E1	
b. Dry Active Waste: Class A	m^3	126.8	50
Container: (a)	Ci (est.)	3.1E0	
c. Dry Active Waste: Class A	m^3	36.3	50
Container: (a)	Ci (est.)	7.2E-4	
d. Radioactive Waste Containing PCB & Asbestos: Class A	m^3	1157.4	30
Container: Intermodal (6ft x 8ft x 20ft)	Ci (est.)	7.3E-2	

2. Estimate of Nuclide Composition > 1% (by type of waste)

a.	Iron-55	%	45.9
	Cobalt-60	%	29.1
	Nickel-63	%	16.4
	Cesium-137	%	1.2
	Cerium-144	%	7.1
b.	Iron-55	%	42.3
	Cobalt-60	%	33.9
	Nickel-63	%	19.7
	Cesium-137	%	2.5
	Cerium-144	%	1.3
c.	Iron-55	%	36.9
	Cobalt-60	%	20.4
	Nickel-63	%	37.3
	Cesium-137	%	3.5
d.	Hydrogen-3 (Tritium)	%	1.3
	Iron-55	%	37.6
	Cobalt-60	%	18.5
	Nickel-63	%	30.1
	Cesium-137	%	8.1
	Cerium-144	%	4.1

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
1	Truck	Barnwell, SC
8(b)	Truck	Oak Ridge, TN
1(b)	Truck	Kingston, TN
10	Truck/Railroad	Clive, UT

(a) Partial shipments by the processor to disposal.
(b) Waste shipments to processor.

TABLE 3
(Sheet 4 of 4)

Yankee Atomic Electric Company, Rowe, Massachusetts
2003 Annual Radioactive Effluent Release Report
Solid Waste and Irradiated Fuel Shipments

II. Third and Fourth Quarters (continued)

B. IRRADIATED FUEL SHIPMENTS (Disposition): None

TABLE 4
(Sheet 1 of 1)

Yankee Atomic Electric Company, Rowe, Massachusetts
2003 Annual Radioactive Effluent Release Report
Maximum[a] Off-Site Doses and Dose Commitments to Members of the Public[b]

Source	Unit	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Year[c]
1. Liquid Effluents						
Whole Body	mrem	0.00E+00[d]	0.00E+00[d]	4.43E-05[e]	4.03E-06[e]	4.83E-05
Critical Organ	mrem	0.00E+00[d]	0.00E+00[d]	5.94E-05[f]	4.10E-06[g]	6.35E-05
2. Airborne Effluents						
Tritium and Particulates (Max Organ)	mrem	2.73E-05[h]	1.13E-04[i]	9.68E-05[i]	4.17E-05[i]	2.79E-04
Noble Gases (Beta Air)	mrad	5.76E-05[j]	2.93E-04[j]	0.00E+00[k]	0.00E+00[k]	3.51E-04
Noble Gases (Gamma Air)	mrad	1.64E-07[j]	7.79E-07[j]	0.00E+00[k]	0.00E+00[k]	9.43E-07
3. Direct Dose						
Direct External Dose	mrem	0.00E+00[l]	0.00E+00[l]	0.00E+00[l]	0.00E+00[l]	0.00E+00

(a) "Maximum" means the largest fraction of corresponding 10 CFR Part 50, Appendix I, dose design objective.

(b) The numbered footnotes indicate the location of the dose receptor, age group, and organ, where appropriate.

(c) "Maximum" dose for the year is the sum of the maximum doses for each quarter. This results in a conservative yearly dose estimate, but still within the limits of 10 CFR Part 50.

(d) There were no liquid releases during the first and second and third quarters of 2003.

(e) Child.

(f) Liver of child.

(g) GI-LLI of child.

(h) SW and WSW, 1300 meters; Liver of child

(i) SW and WSW, 1300 meters; Liver, Kidney, Thyroid, lung, GI-LLI and whole body of child.

(j) SSE and W, 800 meters; site boundary.

(k) There were no noble gases released during the third and fourth quarters of 2003.

(l) 2003 TLD data for off-site (site boundary) indicator stations and control stations were compared. No statistical difference which could be attributed to station sources was identified

TABLE 5
(Sheet 1 of 1)

Yankee Atomic Electric Company, Rowe, Massachusetts
2003 Annual Radioactive Effluent Release Report
Total Dose to Maximum Off-Site Individual (40CFR190)

Pathway	Total Body (mrem)	Maximum Organ[(a)] (mrem)
Direct External	0.0	0.0
Liquids	4.83E-05	6.35E-05
Gases	2.79E-04	2.79E-04
Annual Total	3.27E-04	3.43E-04

(a) Maximum organ includes consideration of the thyroid.

TABLE 6
(Sheet 1 of 8)

Yankee Atomic Electric Company, Rowe, Massachusetts
2003 Annual Radioactive Effluent Release Report
1992-1996 Meteorological Data Joint Frequency Distribution

1. 199.0 FT WIND DATA STABILITY CLASS A CLASS FREQUENCY (PERCENT) = .09

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	1	0	4
(1)	.00	.00	2.56	5.13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	2.56	.00	10.26
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
4-7	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	3
(1)	.00	.00	.00	.00	.00	.00	.00	2.56	.00	5.13	.00	.00	.00	.00	.00	.00	.00	7.69
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
8-12	0	1	0	0	0	0	0	0	2	3	13	6	1	0	0	0	0	26
(1)	.00	2.56	.00	.00	.00	.00	.00	.00	5.13	7.69	33.33	15.38	2.56	.00	.00	.00	.00	66.67
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.03	.01	.00	.00	.00	.00	.00	.06
13-18	0	0	0	0	0	0	0	0	0	0	5	1	0	0	0	0	0	6
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	12.82	2.56	.00	.00	.00	.00	.00	15.38
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00	.00	.00	.00	.01
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	0	1	1	2	0	0	0	1	2	5	18	7	1	0	0	1	0	39
(1)	.00	2.56	2.56	5.13	.00	.00	.00	2.56	5.13	12.82	46.15	17.95	2.56	.00	.00	2.56	.00	100.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.04	.02	.00	.00	.00	.00	.00	.09

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C=CALM (WIND SPEED LESS THAN OR EQUAL TO .95 MPH)

TABLE 6
(Sheet 2 of 8)

Yankee Atomic Electric Company, Rowe, Massachusetts
2003 Annual Radioactive Effluent Release Report
1992-1996 Meteorological Data Joint Frequency Distribution

2. 199.0 FT WIND DATA STABILITY CLASS B CLASS FREQ UENCY (PERCENT) = .36

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	5
(1)	.68	.68	.68	.68	.68	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	3.42
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
4-7	1	0	0	0	0	0	0	2	11	5	6	3	1	0	0	0	0	29
(1)	.68	.00	.00	.00	.00	.00	.00	1.37	7.53	3.42	4.11	2.05	.68	.00	.00	.00	.00	19.86
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.03	.01	.01	.01	.00	.00	.00	.00	.00	.07
8-12	0	1	0	0	0	0	0	3	6	14	49	20	0	0	0	0	0	93
(1)	.00	.68	.00	.00	.00	.00	.00	2.05	4.11	9.59	33.56	13.70	.00	.00	.00	.00	.00	63.70
(2)	.00	.00	.00	.00	.00	.00	.00	.01	.01	.03	.12	.05	.00	.00	.00	.00	.00	.23
13-18	0	1	0	0	0	0	0	0	0	0	12	6	0	0	0	0	0	19
(1)	.00	.68	.00	.00	.00	.00	.00	.00	.00	.00	8.22	4.11	.00	.00	.00	.00	.00	13.01
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.03	.01	.00	.00	.00	.00	.00	.05
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	2	3	1	1	1	0	0	5	17	19	67	29	1	0	0	0	0	146
(1)	1.37	2.05	.68	.68	.68	.00	.00	3.42	11.64	13.01	45.89	19.86	.68	.00	.00	.00	.00	100.00
(2)	.00	.01	.00	.00	.00	.00	.00	.01	.04	.05	.16	.07	.00	.00	.00	.00	.00	.36

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C=CALM (WIND SPEED LESS THAN OR EQUAL TO .95 MPH)

TABLE 6
(Sheet 3 of 8)

Yankee Atomic Electric Company, Rowe, Massachusetts
2003 Annual Radioactive Effluent Release Report
1992-1996 Meteorological Data Joint Frequency Distribution

3. 199.0 FT WIND DATA STABILITY CLASS C CLASS FREQUENCY (PERCENT) = 1.24

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	1	1	5	3	0	0	0	1	1	0	0	0	0	0	1	0	0	13
(1)	.20	.20	.98	.59	.00	.00	.00	.20	.20	.00	.00	.00	.00	.00	.20	.00	.00	2.55
(2)	.00	.00	.01	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.03
4-7	0	3	2	0	1	3	2	17	24	21	22	16	6	3	1	0	0	121
(1)	.00	.59	.39	.00	.20	.59	.39	3.33	4.71	4.12	4.31	3.14	1.18	.59	.20	.00	.00	23.73
(2)	.00	.01	.00	.00	.00	.01	.00	.04	.06	.05	.05	.04	.01	.01	.00	.00	.00	.29
8-12	1	4	1	0	0	0	2	7	17	42	122	107	10	2	1	2	0	318
(1)	.20	.78	.20	.00	.00	.00	.39	1.37	3.33	8.24	23.92	20.98	1.96	.39	.20	.39	.00	62.35
(2)	.00	.01	.00	.00	.00	.00	.00	.02	.04	.10	.30	.26	.02	.00	.00	.00	.00	.77
13-18	2	2	0	0	0	0	0	0	1	4	20	27	2	0	0	0	0	58
(1)	.39	.39	.00	.00	.00	.00	.00	.00	.20	.78	3.92	5.29	.39	.00	.00	.00	.00	11.37
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.05	.07	.00	.00	.00	.00	.00	.14
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	4	10	8	3	1	3	4	25	43	67	164	150	18	5	3	2	0	510
(1)	.78	1.96	1.57	.59	.20	.59	.78	4.90	8.43	13.14	32.16	29.41	3.53	.98	.59	.39	.00	100.00
(2)	.01	.02	.02	.01	.00	.01	.01	.06	.10	.16	.40	.36	.04	.01	.01	.00	.00	1.24

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C=CALM (WIND SPEED LESS THAN OR EQUAL TO .95 MPH)

TABLE 6
(Sheet 4 of 8)

Yankee Atomic Electric Company, Rowe, Massachusetts
2003 Annual Radioactive Effluent Release Report
1992-1996 Meteorological Data Joint Frequency Distribution

4. 199.0 FT WIND DATA STABILITY CLASS D CLASS FREQUENCY (PERCENT) = 46.68

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00	.01
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	299	588	303	121	89	87	85	80	81	132	224	161	97	79	99	124	0	2649
(1)	1.56	3.07	1.58	.63	.46	.45	.44	.42	.42	.69	1.17	.84	.51	.41	.52	.65	.00	13.81
(2)	.73	1.43	.74	.29	.22	.21	.21	.19	.20	.32	.55	.39	.24	.19	.24	.30	.00	6.45
4-7	786	1407	437	174	174	183	237	322	561	795	1107	761	509	358	376	454	0	8641
(1)	4.10	7.33	2.28	.91	.91	.95	1.24	1.68	2.92	4.14	5.77	3.97	2.65	1.87	1.96	2.37	.00	45.05
(2)	1.91	3.42	1.06	.42	.42	.45	.58	.78	1.36	1.93	2.69	1.85	1.24	.87	.91	1.10	.00	21.02
8-12	935	1264	163	35	37	32	39	82	162	525	792	942	569	258	241	441	0	6517
(1)	4.87	6.59	.85	.18	.19	.17	.20	.43	.84	2.74	4.13	4.91	2.97	1.34	1.26	2.30	.00	33.97
(2)	2.27	3.08	.40	.09	.09	.08	.09	.20	.39	1.28	1.93	2.29	1.38	.63	.59	1.07	.00	15.86
13-18	216	446	19	3	0	2	1	1	11	39	172	265	68	13	11	47	0	1314
(1)	1.13	2.32	.10	.02	.00	.01	.01	.01	.06	.20	.90	1.38	.35	.07	.06	.25	.00	6.85
(2)	.53	1.09	.05	.01	.00	.00	.00	.00	.03	.09	.42	.64	.17	.03	.03	.11	.00	3.20
19-24	12	28	1	0	0	0	0	0	0	2	5	10	2	0	0	1	0	61
(1)	.06	.15	.01	.00	.00	.00	.00	.00	.00	.01	.03	.05	.01	.00	.00	.01	.00	.32
(2)	.03	.07	.00	.00	.00	.00	.00	.00	.00	.00	.01	.02	.00	.00	.00	.00	.00	.15
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	2248	3733	923	333	300	304	362	485	815	1493	2300	2139	1245	709	727	1067	0	19183
(1)	11.72	19.46	4.81	1.74	1.56	1.58	1.89	2.53	4.25	7.78	11.99	11.15	6.49	3.70	3.79	5.56	.00	100.00
(2)	5.47	9.08	2.25	.81	.73	.74	.88	1.18	1.98	3.63	5.60	5.20	3.03	1.73	1.77	2.60	.00	46.68

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C=CALM (WIND SPEED LESS THAN OR EQUAL TO .95 MPH)

TABLE 6
(Sheet 5 of 8)

Yankee Atomic Electric Company, Rowe, Massachusetts
2003 Annual Radioactive Effluent Release Report
1992-1996 Meteorological Data Joint Frequency Distribution

5. 199.0 FT WIND DATA STABILITY CLASS E CLASS FREQUENCY (PERCENT) = 40.08

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	999	2950	1363	527	310	271	231	250	295	401	523	315	191	171	204	309	0	9310
(1)	6.06	17.91	8.27	3.20	1.88	1.65	1.40	1.52	1.79	2.43	3.17	1.91	1.16	1.04	1.24	1.88	.00	56.51
(2)	2.43	7.18	3.32	1.28	.75	.66	.56	.61	.72	.98	1.27	.77	.46	.42	.50	.75	.00	22.65
4-7	455	2014	392	83	66	59	74	168	242	501	730	340	172	92	151	164	0	5703
(1)	2.76	12.23	2.38	.50	.40	.36	.45	1.02	1.47	3.04	4.43	2.06	1.04	.56	.92	1.00	.00	34.62
(2)	1.11	4.90	.95	.20	.16	.14	.18	.41	.59	1.22	1.78	.83	.42	.22	.37	.40	.00	13.88
8-12	121	331	52	2	1	4	2	17	38	238	176	122	55	22	22	33	0	1236
(1)	.73	2.01	.32	.01	.01	.02	.01	.10	.23	1.44	1.07	.74	.33	.13	.13	.20	.00	7.50
(2)	.29	.81	.13	.00	.00	.01	.00	.04	.09	.58	.43	.30	.13	.05	.05	.08	.00	3.01
13-18	16	64	7	2	0	0	0	0	4	40	37	26	6	0	1	4	0	207
(1)	.10	.39	.04	.01	.00	.00	.00	.00	.02	.24	.22	.16	.04	.00	.01	.02	.00	1.26
(2)	.04	.16	.02	.00	.00	.00	.00	.00	.01	.10	.09	.06	.01	.00	.00	.01	.00	.50
19-24	0	7	0	0	0	0	0	0	0	0	9	2	0	0	0	0	0	18
(1)	.00	.04	.00	.00	.00	.00	.00	.00	.00	.00	.05	.01	.00	.00	.00	.00	.00	.11
(2)	.00	.02	.00	.00	.00	.00	.00	.00	.00	.00	.02	.00	.00	.00	.00	.00	.00	.04
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	1591	5366	1814	614	377	334	307	435	579	1180	1475	805	424	285	378	510	0	16474
(1)	9.66	32.57	11.01	3.73	2.29	2.03	1.86	2.64	3.51	7.16	8.95	4.89	2.57	1.73	2.29	3.10	.00	100.00
(2)	3.87	13.06	4.41	1.49	.92	.81	.75	1.06	1.41	2.87	3.59	1.96	1.03	.69	.92	1.24	.00	40.08

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C=CALM (WIND SPEED LESS THAN OR EQUAL TO .95 MPH)

TABLE 6
(Sheet 6 of 8)

Yankee Atomic Electric Company, Rowe, Massachusetts
2003 Annual Radioactive Effluent Release Report
1992-1996 Meteorological Data Joint Frequency Distribution

6. 199.0 FT WIND DATA STABILITY CLASS F CLASS FREQUENCY (PERCENT) = 8.76

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	156	433	448	220	148	132	112	86	105	133	152	99	92	50	71	83	0	2520
(1)	4.33	12.02	12.44	6.11	4.11	3.67	3.11	2.39	2.92	3.69	4.22	2.75	2.55	1.39	1.97	2.30	.00	69.98
(2)	.38	1.05	1.09	.54	.36	.32	.27	.21	.26	.32	.37	.24	.22	.12	.17	.20	.00	6.13
4-7	69	257	83	27	17	10	25	39	54	100	144	68	38	32	34	26	0	1023
(1)	1.92	7.14	2.30	.75	.47	.28	.69	1.08	1.50	2.78	4.00	1.89	1.06	.89	.94	.72	.00	28.41
(2)	.17	.63	.20	.07	.04	.02	.06	.09	.13	.24	.35	.17	.09	.08	.08	.06	.00	2.49
8-12	4	13	0	0	0	0	0	0	2	6	14	7	4	1	0	0	0	51
(1)	.11	.36	.00	.00	.00	.00	.00	.00	.06	.17	.39	.19	.11	.03	.00	.00	.00	1.42
(2)	.01	.03	.00	.00	.00	.00	.00	.00	.00	.01	.03	.02	.01	.00	.00	.00	.00	.12
13-18	1	5	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	7
(1)	.03	.14	.00	.00	.00	.00	.00	.00	.00	.00	.03	.00	.00	.00	.00	.00	.00	.19
(2)	.00	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.02
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	230	708	531	247	165	142	137	125	161	239	311	174	134	83	105	109	0	3601
(1)	6.39	19.66	14.75	6.86	4.58	3.94	3.80	3.47	4.47	6.64	8.64	4.83	3.72	2.30	2.92	3.03	.00	100.00
(2)	.56	1.72	1.29	.60	.40	.35	.33	.30	.39	.58	.76	.42	.33	.20	.26	.27	.00	8.76

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD
C=CALM (WIND SPEED LESS THAN OR EQUAL TO .95 MPH)

TABLE 6
(Sheet 7 of 8)

Yankee Atomic Electric Company, Rowe, Massachusetts
2003 Annual Radioactive Effluent Release Report
1992-1996 Meteorological Data Joint Frequency Distribution

7. 199.0 FT WIND DATA STABILITY CLASS G CLASS FREQUENCY (PERCENT) = 2.79

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	30	88	83	54	60	41	47	46	44	41	52	31	15	13	16	16	0	677
(1)	2.62	7.68	7.24	4.71	5.24	3.58	4.10	4.01	3.84	3.58	4.54	2.71	1.31	1.13	1.40	1.40	.00	59.08
(2)	.07	.21	.20	.13	.15	.10	.11	.11	.11	.10	.13	.08	.04	.03	.04	.04	.00	1.65
4-7	14	54	27	16	12	9	18	38	26	73	86	29	14	10	10	4	0	440
(1)	1.22	4.71	2.36	1.40	1.05	.79	1.57	3.32	2.27	6.37	7.50	2.53	1.22	.87	.87	.35	.00	38.39
(2)	.03	.13	.07	.04	.03	.02	.04	.09	.06	.18	.21	.07	.03	.02	.02	.01	.00	1.07
8-12	0	3	0	0	0	0	0	0	3	8	8	4	2	0	0	0	0	28
(1)	.00	.26	.00	.00	.00	.00	.00	.00	.26	.70	.70	.35	.17	.00	.00	.00	.00	2.44
(2)	.00	.01	.00	.00	.00	.00	.00	.00	.01	.02	.02	.01	.00	.00	.00	.00	.00	.07
13-18	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.09	.00	.00	.00	.00	.00	.00	.09
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	44	145	110	70	72	50	65	84	73	122	147	64	31	23	26	20	0	1146
(1)	3.84	12.65	9.60	6.11	6.28	4.36	5.67	7.33	6.37	10.65	12.83	5.58	2.71	2.01	2.27	1.75	.00	100.00
(2)	.11	.35	.27	.17	.18	.12	.16	.20	.18	.30	.36	.16	.08	.06	.06	.05	.00	2.79

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
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C=CALM (WIND SPEED LESS THAN OR EQUAL TO .95 MPH)

TABLE 6
(Sheet 8 of 8)

Yankee Atomic Electric Company, Rowe, Massachusetts
2003 Annual Radioactive Effluent Release Report
1992-1996 Meteorological Data Joint Frequency Distribution

8. 199.0 FT WIND DATA STABILITY CLASS ALL CLASS FREQUENCY (PERCENT) = 100.00

WIND DIRECTION FROM

SPEED(MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL
CALM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
C-3	1486	4061	2204	928	608	531	475	463	526	707	951	606	395	313	391	533	0	15178
(1)	3.62	9.88	5.36	2.26	1.48	1.29	1.16	1.13	1.28	1.72	2.31	1.47	.96	.76	.95	1.30	.00	36.93
(2)	3.62	9.88	5.36	2.26	1.48	1.29	1.16	1.13	1.28	1.72	2.31	1.47	.96	.76	.95	1.30	.00	36.93
4-7	1325	3735	941	300	270	264	356	587	918	1497	2095	1217	740	495	572	648	0	15960
(1)	3.22	9.09	2.29	.73	.66	.64	.87	1.43	2.23	3.64	5.10	2.96	1.80	1.20	1.39	1.58	.00	38.83
(2)	3.22	9.09	2.29	.73	.66	.64	.87	1.43	2.23	3.64	5.10	2.96	1.80	1.20	1.39	1.58	.00	38.83
8-12	1061	1617	216	37	38	36	43	109	230	836	1174	1208	641	283	264	476	0	8269
(1)	2.58	3.93	.53	.09	.09	.09	.10	.27	.56	2.03	2.86	2.94	1.56	.69	.64	1.16	.00	20.12
(2)	2.58	3.93	.53	.09	.09	.09	.10	.27	.56	2.03	2.86	2.94	1.56	.69	.64	1.16	.00	20.12
13-18	235	518	26	5	0	2	1	1	16	83	248	325	76	13	12	51	0	1612
(1)	.57	1.26	.06	.01	.00	.00	.00	.00	.04	.20	.60	.79	.18	.03	.03	.12	.00	3.92
(2)	.57	1.26	.06	.01	.00	.00	.00	.00	.04	.20	.60	.79	.18	.03	.03	.12	.00	3.92
19-24	12	35	1	0	0	0	0	0	0	2	14	12	2	0	0	1	0	79
(1)	.03	.09	.00	.00	.00	.00	.00	.00	.00	.00	.03	.03	.00	.00	.00	.00	.00	.19
(2)	.03	.09	.00	.00	.00	.00	.00	.00	.00	.00	.03	.03	.00	.00	.00	.00	.00	.19
GT 24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALL SPEEDS	4119	9966	3388	1270	916	833	875	1160	1690	3125	4482	3368	1854	1105	1239	1709	0	41099
(1)	10.02	24.25	8.24	3.09	2.23	2.03	2.13	2.82	4.11	7.60	10.91	8.19	4.51	2.69	3.01	4.16	.00	100.00
(2)	10.02	24.25	8.24	3.09	2.23	2.03	2.13	2.82	4.11	7.60	10.91	8.19	4.51	2.69	3.01	4.16	.00	100.00

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
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C=CALM (WIND SPEED LESS THAN OR EQUAL TO .95 MPH)

APPENDIX A

Radioactive Liquid Effluent Monitoring Instrumentation

Requirement: Radioactive liquid effluent monitoring instrumentation channels are required to be operable in accordance with ODCM Control 5.1. With less than the minimum number of channels operable and reasonable efforts to return the instrument(s) to operable status within 30 days being unsuccessful, ODCM Control 5.1 requires an explanation for the delay in correcting the inoperability in the next Annual Radioactive Effluent Release Report.

Response: *The requirements of ODCM (Rev. 16) Control 5.1 governing the operability of radioactive liquid effluent monitoring instrumentation were met for this reporting period.*

APPENDIX B

Radioactive Gaseous Effluent Monitoring Instrumentation

Requirement: Radioactive gaseous effluent monitoring instrumentation channels are required to be operable in accordance with ODCM Control 5.2. With less than the minimum number of channels operable and reasonable efforts to return the instrument(s) to operable status within 30 days being unsuccessful, ODCM Control 5.2 requires an explanation for the delay in correcting the inoperability in the next Annual Radioactive Effluent Release Report.

Response: *The requirements of ODCM (Rev. 16) Control 5.2 governing the operability of radioactive gaseous effluent monitoring instrumentation were met for this reporting period.*

APPENDIX C

Liquid Holdup Tanks

Requirement: The Yankee Decommissioning Quality Assurance Program (YDQAP), Appendix D, Section H, limits the quantity of radioactive material contained in any outside temporary tank. With the quantity of radioactive material in any outside temporary tank exceeding the limits of the YDQAP, a description of the events leading to this condition is required in the next Annual Radioactive Effluent Release Report.

Response: *The limits of the Yankee Decommissioning Quality Assurance Program were not exceeded during this reporting period.*

APPENDIX D

Radiological Environmental Monitoring Program

Requirement: The Radiological Environmental Monitoring Program is conducted in accordance with ODCM Control 4.1. With the Radiological Environmental Monitoring Program not being conducted as specified in Table 4.1, ODCM Control 4.1 requires a description of the reasons for not conducting the program as required and that plans for preventing a recurrence be included in the next Annual Radioactive Effluent Report.

Response: *The requirements of ODCM (Rev. 16) Control 4.1 governing the conduction of the REMP were met for this reporting period.*

Requirement: With milk samples no longer available from one or more of the required sample locations, ODCM Control 4.1 requires the identification of the new location(s) if available, for obtaining replacement sample(s) in the next Annual Radioactive Effluent Release Report and inclusion of revised Off-Site Dose Calculation Manual figure(s) and table(s) reflecting the new location(s).

Response: *A total of two milk sampling locations are called for in the REMP; one indicator location and one control. The 2003 land use census did identify, as in the recent past years, two locations with a limited number of goats within 5 miles of the Yankee site in the South sector, one at 2.0 miles and the other at 2.8 miles. Both owners have stated that milk would not be available on a regular basis due to the small number of goats and need for the milk for other purposes. As a consequence of the non-routine availability of milk from these locations, they could not be added to the Radiological Environmental Monitoring Program. There are no other milk animal locations identified within 5 miles. As discussed in Appendix G, Revision 16 to the ODCM removed the requirement for milk sampling based on the unavailability of milk in the local area, the loss of the control sample site due to the dairy going out of business, the lack of a potential source term due to radioactive decay since plant shutdown and the elimination of the remaining primary gaseous waste effluent pathway (SFP water evaporation) with the completion of the spent fuel transfer to the ISFSI.*

APPENDIX E

Land Use Census

Requirement: A land use census is conducted in accordance with ODCM Control 4.2. With a land use census identifying a location(s) which yields at least a 20 percent greater dose or dose commitment than the values currently being calculated in ODCM Control 3.5, ODCM Control 4.2 requires the identification of the new location(s) in the next Annual Radioactive Effluent Release Report.

Response: *The land use census for this reporting period did not identify any locations yielding at least 20 percent greater dose or dose commitment than the values currently being calculated in ODCM Control 3.5.*

Requirement: With a land use census identifying a location(s) which yields a calculated dose or dose commitment (via the same exposure pathway) at least 20 percent greater than at a location from which samples are currently being obtained in accordance with ODCM Control 4.1, ODCM Control 4.2 requires that the new location(s) be added to the Radiological Environmental Monitoring Program if permission from the owner to collect samples can be obtained and sufficient sample volume is available. If a new location is found, then it must be identified in the next Annual Radioactive Effluent Release Report.

Response: *No new locations were added to the Radiological Environmental Monitoring Program as a result of the 2003 land use census.*

APPENDIX F

Process Control Program (PCP)

Requirement: PCP Control 2.0 requires that licensee-initiated changes to the PCP be submitted to the Commission in the Annual Radioactive Effluent Release Report for the period in which the change(s) was made.

Response: *On July 15, 2003, Revision 7 to the PCP was approved. The PCP provides for vendor supplied service option for the off site treatment of special waste streams. The following changes were incorporated in the PCP:*

- *The vendor service option facility named was changed from Chem Nuclear to Duratek to reflect the change in the facility ownership.*
- *Additional liquid waste processing methods for evaporator bottoms such as Gruenburg Gas-Fired or Electrical Industrial Oven, or other approved and applicable Duratek liquid waste stream processes currently approved at the vendor's waste processing facility were incorporated by reference.*

APPENDIX G

Off-Site Dose Calculation Manual (ODCM)

Requirement: ODCM Control 7.2 requires that licensee-initiated changes to the ODCM be submitted to the Commission in the Annual Radioactive Effluent Release Report for the period in which the change(s) was made effective.

Response: *Revision 16 to the ODCM was approved for implementation in August 2003. These licensee-initiated changes that make-up Revision 16 include:*

A. Eliminates the need to meet certain detection sensitivities for fission generated radionuclides that have undergone significant natural decay (greater than 11 half lives) since the time of permanent plant shutdown in 1992. A review of plant effluent release analyses for the last several years illustrates that certain of these shorter lived (< 1 year half-life) radionuclides are no longer detected in plant effluents. Based on this reduced release potential due to natural decay, decontamination of systems and structures, and the relocation of spent fuel into dry storage, the need to drive radioactivity lab analysis to see certain detection sensitivities is no longer necessary to ensure that any significant source of these short lived is measured. The following radionuclides fall into this category and have had their analysis detection limits removed from the ODCM:

Sb-124	*60.2*	*days T1/2*
Ce-144	*284.6*	*days T1/2*
Zn-65	*243.8*	*days T1/2*
Co-58	*70.9*	*days T1/2*
Mn-54	*312.2*	*days T1/2*
Sr-89	*50.5*	*days T1/2*

Note: The removal of detection limits does not mean that these nuclides will not be searched for and reported if they are detected during effluent and environmental media radiological analysis that is driven by lower limits of detection for those radionuclides which continue to have a potential for being present in effluents of environmental media based on their longer half-lives.

B. Eliminates all milk sampling and analysis requirements from the REMP based on the lack of identified sampling locations in the site area. During the 1998 Land Use Census, it was found that there are no longer any milk animals within 5 miles of the plant that could provide reliable sources of milk. The 1998 and subsequent land use census through 2003 found only one or two milk animal location within 5 miles. However, none of these locations were able to provide a reliable source of milk on a monthly basis, and as such could not be added to the REMP, leaving only the control milk station (TM-21) in Williamstown as being sampled as a base line in case future indicator locations within five miles were later identified. At the end of 2002, the Williamstown control milk location (TM-21) informed YNPS that they were no longer going to be in the milking business and, therefore, no longer could supply milk samples

for the REMP. Since milk sampling is unavailable at the control location, and no suitable indicator milk sites within five miles having been found over the last 5 years, the ODCM dropped the requirement to collect milk. These changes are supported by the continued lack of available milk animals in the site area, the reduction in dose potential (reduced source term due to decay of short lived radionuclides over the last eleven years since plant shutdown), and the elimination of liquid and gaseous release pathways with the transfer of spent fuel to dry storage on the ISFSI pad and subsequent cleanup of the spent fuel pool. The land use census required by the ODCM will continue to look each year for milking activity within five miles of the site. This will provide information on any future changes in the nature of the milk supply and an assessment of its dose significance.

C. The change adds new liquid waste treatment capability for the processing of Spent Fuel Pool (SFP) water following the removal of all fuel and other radioactive materials from the pool. After all spent fuel and other contaminated materials (i.e., GTCC) are transferred to the Independent Spent Fuel Storage Installation (ISFSI), the Spent Fuel Pool (SFP) must be drained before dismantlement of this facility. Discharge of the SFP water is treated by a new temporary skid mounted demineralization and filtration system before release to Outfall 001. This new process treatment capability ensures that the release of radioactivity to the environment is kept ALARA and within all regulatory release limits. Representative sample collection is obtained by a composite sampler on the outlet line of the treatment skid coupled with grab sample of SFP water collected and analyzed prior to initiation of continuous release to Sherman Pond. Additional liquid waste sampling and analysis requirements are added to the liquid surveillance requirement to cover both batch and continuous modes of discharge in order to provide assurance that proper effluent controls are taken to quantify all releases to the environment, as well as determining the effectiveness of the waste treatment (demineralization and filtration) process.

D. The dismantling of buildings and related structures, including foundation excavations, can potentially result in areas that fill with either ground water or storm water. Construction dewatering may also include water generated during the process of digging new ground water monitoring wells, or other dismantlement / demolition related water and waste water sources. The water-filled excavations, in many cases, must be dewatered to complete the dismantling activity. Dewatering will be intermittent and only performed when needed. This discharge will be directed to either the existing northeast or northwest storm drain systems with final release to Outfalls 003 (Sherman Pond) or 004 (Deerfield River just below the Sherman Dam). Neither yard drain networks are directly connected to any plant operations. Since dewatering effluent potentially could contain low levels of radionuclides, compliance with effluent dose requirements set forth in 10 CFR Part 50 (Appendix I) and EPA in 40 CFR Part 190, and as defined in the YNPS Decommissioning Quality Assurance Program, will be met. With respect to ODCM effluent control, dewatering will be treated as batch releases with prerequisite sampling and analysis to determine the radionuclide content. Since it may not be possible to recirculate or mix foundation water, an aliquot for every 1000 gallons of water pumped for temporary storage or release are to be collected and composited for radionuclide analysis. If temporary storage of construction dewatering in

temporary tanks or basins is not practical, three separate grab samples from different parts of the foundation water source will be collected and analyzed for gamma emitters and tritium in order to determine the apparent variability of radioactivity in the source water. If the variability is found to be less than a factor of two, then it will be assumed that the waste water is homogeneous enough to be discharged as a continuous source where the final radioactivity content of the discharged stream will be determined by a composite sample (representative sampling) taken during the discharge. Releases to the storm drain system and Outfalls 003 or 004 will occur only if the total batch waste impact, in terms of dose, is less than ODCM Control 6.1 limits, which if exceeded would indicate that waste treatment prior to release should be applied to keep the waste impact ALARA. If higher activity water is found, it will be treated as appropriate to reduce the radionuclide inventory (other than tritium) prior to discharge. Changes in the ODCM, Revision 16 recognizes the potential for contaminated ground water dewatering from plant structures during the dismantlement of these structures, and the need to provide surveillance and possible effluent treatment on such water.

E. Several informational additions have been incorporated into the ODCM site area maps used to identify environmental sampling locations. These include the addition of the ISFSI pad location on the southeast side of the plant's protected area. Associated with the pad is a series of new TLD measurement locations, which are intended to provide additional information concerning environmental dose impact from any direct radiation coming from the ISFSI pad which might not be covered by the site's REMP and existing Restricted Area Fence TLD locations. As such, the expansion of the site's monitor capabilities constitutes an improvement to the existing surveillance program and will provide data useful in demonstrating compliance with 40 CFR Part 190 dose limits to a member of the public from all site sources, including direct radiation, of 25 mrem/year.

F. This revision to the ODCM updates liquid instrument and monitor surveillance requirements in Section 5 to reflect changes in wastewater processing of SFP drain-down through Auxiliary Service Water (ASW) discharge. With the changes in the liquid waste processing system (as discussed above) to treat SFP drain-down wastewater and the elimination of the need to provide SFP cooling due to the removal of all spent fuel to dry storage, the radioactive liquid effluent instrumentation requirements are updated to reflect the new processing configuration. The new requirements are designed to provide equivalent surveillance and instrument operability requirements as was previously included for liquid waste processing needs. These changes reflect that the need for ASW to provide cooling to the SFP heat exchanger has been eliminated due to the removal of all spent fuel from the pool. The ASW now only serves as dilution flow for radioactive effluent releases. The requirements to operate the ASW composite sampler and gross radiation monitor to look for potential leaks from the SFP heat exchanger are removed. The composite sampler is retained in the ASW line, but is now tied to sampling requirements outlined in the new NPDES discharge permit. The radiation monitor now serves to alarm and isolate on detection of unexpected high activity associate with planned liquid waste releases. The ACTION Statement requirements have been expanded to insure that additional checks on the expected radioactivity to be released are made if the radiation monitoring channel is out of service. In

addition to the new composite sampler in the SFP drain down line, a new flow measuring devise is added to the SFP dewatering skid in order to quantify the flow rate from the SFP during wastewater processing.

G. Method I dose conversion factors (maximum organ and whole body) for Ag-108m/Ag-108 pair released in liquid and gaseous effluents have been added to the ODCM since theses nuclides were not included in the original development of the site specific dose conversions. Silver-108m has been found in plant waste materials during the recent site decommissioning activities and is associated with past station operations. The new dose conversion factors for the parent/daughter pair of Ag-108m /Ag-108 have been developed using the same environmental exposure pathway parameters and models as used for all other listed dose conversion factors in the YNPS ODCM. Since the NRC Regulatory Guide 1.109 dose calculation data tables, which are used for other nuclides listed in the ODCM, does not provide dose coefficients for these nuclides of Silver, the inhalation and ingestion dose coefficients for Ag-108m and Ag-108 were obtained from Federal Guidance Report 11, and the external dose coefficient for standing on contaminated ground was obtained from Federal Guidance Report No. 12.

H. This revision to the ODCM eliminated the need to measure dissolved and entrained noble gas in liquid effluents due to removal of spent fuel from the SFP to dry storage. Table 2.1 contains a sampling and analysis requirement to determine if any dissolved and entrained gases (noble gases) are present in batch liquid waste being prepared for discharge to the off-site environment. This requirement is tied to ODCM Control 2.1 which places a limit on dissolved and entrained noble gases of 2E-04 uCi/ml in liquid waste concentrations being released to the environment. Since the source of any potential noble gas (Kr-85 only remaining noble gas in the fuel due to decay from last criticality) in water was tied to the spent fuel, this potential has been removed with the final removal of all spent fuel assemblies from the spent fuel pool and placement in dry storage casks independent from any plant liquid (or gaseous) system. As such, the continued requirement to measure for its potential in the remaining plant water carries no meaningful significance.

It has been determined that these changes to the ODCM in Revision 16 will maintain the level of radioactive effluent control required by 10CFR20.106 (10CFR20.1301), 40CFR190, 10CFR50.36a, and Appendix I to 10CFR50 and not adversely impact the accuracy or reliability of effluent, dose, or setpoint calculations.

APPENDIX H

Radioactive Liquid, Gaseous, and Solid Waste Treatment Systems

Requirement: ODCM Control 7.3 and PCP Control 3.0 require that licensee-initiated major changes to the radioactive waste systems (liquid, gaseous, and solid) be reported to the Commission in the Annual Radioactive Effluent Release Report for the period in which the evaluation was reviewed by the Plant Operation Review Committee.

Response: *On August 14, 2003, a change was made to the ODCM (Revision 16) to allow the discharge of the Spent Fuel Pool (SFP) water by the use of filtration and demineralization media for activity removal during final drain-down of the pool. The new process capability was provided by a temporary (skid mounted) system. The waste water processing components used were removed from the SFP area at project completion. See Appendix G, item C for additional details on this process change.*

APPENDIX I

Supplemental Information

1. Control Limits – Dose and Dose Rate

Control and Category	Limit
a. Noble Gases	
Control 3.3, Total Body Dose Rate	500 mrem/year
Control 3.3, Skin Dose Rate	3000 mrem/year
Control 3.4, Gamma Air Dose	5 mrad/quarter
Control 3.4, Gamma Air Dose	10 mrad/year
Control 3.4, Beta Air Dose	10 mrad/quarter
Control 3.4, Beta Air Dose	20 mrad/year
b. Iodine-131, Tritium, and Radionuclides in Particulate Form With Half-Lives Greater Than 8 Days	
Control 3.3, Organ Dose Rate	1500 mrem/year
Control 3.5, Organ Dose	7.5 mrem/quarter
Control 3.5, Organ Dose	15 mrem/year
c. Liquids	
Control 3.1, Total Body Dose	1.5 mrem/quarter
Control 3.1, Total Body Dose	3 mrem/year
Control 3.1, Organ Dose	5 mrem/quarter
Control 3.1, Organ Dose	10 mrem/year

2. Control Limits – Concentration

Control and Category	Limit
a. Liquids	
Control 2.1, Total Sum of the Fraction of MPC (10CFR20, Appendix B, Table II, Column 2), excluding Noble Gases less than:	1.0
Control 2.1, Total Noble Gas Concentration	2.00E-4 uCi/cc

3. Measurements and Approximations of Total Radioactivity

a. Noble Gases, Krypton-85

Continuous discharges are determined by direct measurements. A primary vent stack gas sample is taken monthly and analyzed for Krypton-85. A review of the weekly primary vent stack noble gas integrator readings for any increase in values above the background level also is used as a reference. There are no longer any batch discharges. Errors associated with the above measurements are estimated to be ± 25 percent.

b. Iodines, Particulates

There are no longer any iodine isotopes available for discharge. The sampling system design requires the use of a charcoal cartridge as a support for the particulate filter during particulate collection. The sampling system continuously draws a sample from the primary vent stack through a filter and charcoal cartridge. The particulate filter is removed and analyzed weekly. The errors associated with the determination of particulate effluents are estimated to be ±30 percent.

c. Liquid Effluents

A gamma isotopic analysis is performed on a representative sample using a Marinelli Beaker geometry for both a batch or continuous discharge. Composite samples for batch and continuous discharges are analyzed for strontium-89, strontium-90, iron-55 and gross alpha activity.

Tritium analysis is performed on composite samples for continuous discharges and on each batch discharge. The errors associated with these measurements are as follows: fission and activation products, ±20 percent; tritium, ±10 percent; dissolved fission gases, ±20 percent; and alpha activity, ±35 percent.

4. Batch Releases

a. Liquids

First Quarter	Routine Releases
Number of batch releases	0
Total time period for batch releases (minutes)	-
Maximum time period for a batch release (minutes)	-
Average time period for batch releases (minutes)	-
Minimum time period for a batch release (minutes)	-
Average stream flow (Sherman Dam) during period (cfs)	729
Average discharge rate (gpm)	-

Second Quarter	Routine Releases
Number of batch releases	0
Total time period for batch releases (minutes)	-
Maximum time period for a batch release (minutes)	-
Average time period for batch releases (minutes)	-
Minimum time period for a batch release (minutes)	-
Average stream flow (Sherman Dam) during period (cfs)	676
Average discharge rate (gpm)	-

Third Quarter	Routine Releases
Number of batch releases	22
Total time period for batch releases (minutes)	19,617
Maximum time period for a batch release (minutes)	1,901
Average time period for batch releases (minutes)	892
Minimum time period for a batch release (minutes)	275
Average stream flow (Sherman Dam) during period (cfs)	543
Average discharge rate (gpm)	7.1

Fourth Quarter	Routine Releases
Number of batch releases	6
Total time period for batch releases (minutes)	5,076
Maximum time period for a batch release (minutes)	2,228
Average time period for batch releases (minutes)	846
Minimum time period for a batch release (minutes)	210
Average stream flow (Sherman Dam) during period (cfs)	863
Average discharge rate (gpm)	6.1

b. Gases

There are no longer any batch-mode gaseous releases associated with plant systems.

5. Abnormal Releases

ODCM Control 7.2 requires the reporting of any unplanned releases from the site to the site boundary of radioactive material in gaseous and liquid effluents made during the reporting period.

a. Liquid

There were no non-routine liquid releases during the reporting period.

b. Gases

There were no non-routine gaseous releases during the reporting period.

APPENDIX J

Sewage Sludge Disposal

Requirement: ODCM< Appendix A requires that for periods in which disposal of septage occurs, the licensee shall report in the Annual Radioactive Effluent Release Report, the volume discharged, liquid and solid fractions, and total activity discharged.

Response: *There were no septage disposals for the year 2003.*