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**Constellation Energy**
Nuclear Generation Group

May 12, 2008

U. S. Nuclear Regulatory Commission
Washington, DC 20555

**ATTENTION:** Document Control Desk

**SUBJECT:** **R.E. Ginna Nuclear Power Plant**
Docket No. 50-244
**Annual Radioactive Effluent Release and Radiological Environmental Operating Reports**

Ladies and Gentlemen:

R. E. Ginna Nuclear Power Plant, LLC is pleased to submit the enclosed Annual Radioactive Effluent Release and Annual Radiological Environmental Operating Reports, prepared in accordance with Technical Specification Section 5.6.3 and Technical Specification 5.6.2, respectively.

Should you have questions regarding the enclosed documents, please contact Tom Harding at (585) 771-3384.

Very truly yours,

John Carlin

Enclosures: Annual Radioactive Effluent Release Report
Annual Radiological Environmental Operating Report

cc: S. J. Collins, NRC
D. V. Pickett, NRC
Resident Inspector, NRC

1001963

IE48
IE25
NRR

State Emergency Management Office
Building #2, First Sublevel
State Campus
Albany, NY 12226-5000
Attn: Jay Dunkleberger

NYS Department of Public Service
3 Empire State Plaza, 10th Floor
Albany, NY 12223
Attn: Paul Eddy

American Nuclear Insurers
95 Glastonbury, Blvd.
Glastonbury, CT 06033
Attn: Thomas Wolff

INPO
700 Galleria Parkway
Atlanta, GA 30339-5957

**2007**

# ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

R. E. GINNA NUCLEAR POWER PLANT

DOCKET NO. 50-244

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## 1.0 INTRODUCTION

This Annual Radioactive Effluent Release Report is for the R. E. Ginna Nuclear Power Plant and is submitted in accordance with the requirements of Technical Specification Section 5.6.3. The report covers the period from January 1, 2007 through December 31, 2007.

This report includes a summary of the quantities of radioactive gaseous and liquid effluents and solid waste released from the plant presented in the format outlined in Appendix B of Regulatory Guide 1.21, Revision 1, June 1974.

All gaseous and liquid effluents discharged during this reporting period were in compliance with the limits of the R. E. Ginna Technical Specifications as defined in the Offsite Dose Calculation Manual (ODCM).

## 2.0 SUPPLEMENTAL INFORMATION

### 2.1 Regulatory Limits

The ODCM limits applicable to the release of radioactive material in liquid and gaseous effluents are:

#### 2.1.1 Fission and Activation Gases

The instantaneous dose rate, as calculated in the ODCM, due to noble gases released in gaseous effluents from the site shall be limited to a release rate which would yield $\leq$ 500 mrem/yr to the total body and $\leq$ 3000 mrem/yr to the skin if allowed to continue for a full year.

The air dose, as calculated in the ODCM, due to noble gases released in gaseous effluents from the site shall be limited to the flowing:

(i) During any calendar quarter to $\leq$ 5 mrad for gamma radiation and to $\leq$ 10 mrad for beta radiation.

(ii) During any calendar year to $\leq$ 10 mrad for gamma radiation and to $\leq$ 20 mrad for beta radiation.

2.1.2 Radioiodine, Tritium, and Particulates

The instantaneous dose rate, as calculated in the ODCM, due to radioactive materials released in gaseous effluents from the site as radioiodines, radioactive materials in particulate form, and radionuclides other than noble gases with half-lives greater than 8 days shall be limited to a release rate which would yield $\leq$ 1500 mrem/yr to any organ if allowed to continue for a full year.

The dose to an individual, as calculated in the ODCM, from radioiodine, radioactive materials in particulate form, and radionuclides other than noble gases with half-lives greater than 8 days released with gaseous effluents from the site shall be limited to the following:

(i) During any calendar quarter to $\leq$ 7.5 mrem to any organ.

(ii) During any calendar year to $\leq$ 15 mrem to any organ.

2.1.3 Liquid Effluents

The release of radioactive liquid effluents shall be such that the concentration in the circulating water discharge does not exceed the limits specified in accordance with Appendix B, Table II, Column 2 and notes thereto of 10 CFR 20, as explained in Section 1 of the ODCM. For dissolved or entrained noble gases the total activity due to dissolved or entrained noble gases shall not exceed 2E-04 uCi/ml.

The dose or dose committed to an individual as calculated in the ODCM from radioactive materials in liquid effluents released to unrestricted areas shall be limited:

(i) During any calendar quarter to < 1.5 mrem to the total body and to < 5 mrem to any organ, and

(ii) During any calendar year to < 3 mrem to the total body and to < 10 mrem to and organ.

## 2.2 Effluent Air and Water Concentrations

2.2.1 For gaseous effluents, effluent concentration limits are not directly used in release rate calculations since the applicable limits are stated in terms of dose rate at the unrestricted area boundary, in accordance with Technical Specification 5.5.4.g.

2.2.2 For liquid effluents, ten times the effluent concentration values specified in 10 CFR 20, Appendix B, Table II, Column 2, are used to calculate release rates and permissible concentrations at the unrestricted area boundary as permitted by Technical Specification 5.5.4.b. A value of 2E-04 uCi/ml is used as the ECL for dissolved and entrained noble gases in liquid effluents.

## 2.3 Release Rate Limits

The release rate limits for fission and activation gases from the R. E. Ginna Nuclear Power Plant are not based on the average energy of the radionuclide mixture in gaseous effluents; therefore, this value is not applicable. However the 2007 average beta/gamma energy of the radionuclide mixture in fission and activation gases released from Ginna is available for review upon request.

## 2.4 Measurements and Approximations of Total Radioactivity

Gamma spectroscopy was the primary analysis method used to determine the radionuclide composition and concentration of gaseous and liquid effluents. Composite samples were analyzed for Sr-89, Sr-90, and Fe-55 by a contract laboratory. Tritium and alpha were performed using liquid scintillation and gas flow proportional counting respectively.

The total radioactivity in effluent releases was determined from the measured concentration of each radionuclide present and the total volume of effluents released.

## 2.5 Batch Releases

### 2.5.1 Liquid

| | |
|---|---|
| 1. Number of batch releases: | 1.17 E+02 |
| 2. Total time period for batch releases: | 1.06 E+06 min |
| 3. Maximum time period for a batch release: | 4.47 E+04 min |
| 4. Average time period for batch releases: | 9.06 E+03 min |
| 5. Minimum time period for a batch release: | 8.00 E+00 min |
| 6. Average blowdown (LPM) during periods of effluent release into the discharge canal: | 4.34 E+02 lpm |

### 2.5.2 Gaseous

| | |
|---|---|
| 1. Number of batch releases: | 4.50 E+01 |
| 2. Total time period for batch releases: | 5.30 E+05 min |
| 3. Maximum time period for a batch release: | 4.46 E+04 min |
| 4. Average time period for batch releases: | 1.18 E+04 min |
| 5. Minimum time period for a batch release: | 2.60 E+01 min |

## 2.6 Abnormal Releases

There were no abnormal or unplanned releases in 2007. Examples of ventilation system deficiencies that could result in small quantities of air exiting controlled areas by pathways other than monitored vent exhaust have been documented by the corrective action process. Sampling did not result in any measured radioactivity. Gaseous release permit methodology is conservative against small deviations in flow direction, if activity were present.

## 3.0 SUMMARY OF GASEOUS RADIOACTIVE EFFLUENTS

The quantities of radioactive material released in gaseous effluents are summarized in Tables 1A and 1B. Plant Vent and Containment Vent releases are modeled as mixed mode and Air Ejector is modeled as ground level release. In 2005, Ginna revised gaseous release procedures to remove the unrealistically conservative step of including sample activity that was less than the Minimum Detectable Activity, MDA, (which is the calculated *a posteriori* LLD for each sample counted), as if it were actually a measured value. This conservatism had been included in procedures years ago to account for sample purges and valve leakage which have since been demonstrated to be dramatically lower than the conservative estimate. Any leaks or purges with measurable activity are now included in release permits by integration of Radiation Monitoring System (RMS) data. This change has resulted in lower total reported activity in gaseous effluents for 2007 as compared to years prior to 2005.

## 4.0 SUMMARY OF LIQUID RADIOACTIVE EFFLUENTS

The quantities of radioactive material released in liquid effluents are summarized in Tables 2A and 2B.

## 5.0 SOLID WASTE

The quantities of radioactive material released in shipments of solid waste transported from the site during the reporting period are summarized in Table 3. Principal nuclides were determined by gamma spectroscopy and non-gamma emitters were calculated from scaling factors determined by an independent laboratory from representative samples of that waste type. The majority of Dry Active Waste is processed utilizing an off-site processor who reduces the volume and then sends the waste for burial.

## 6.0 LOWER LIMIT OF DETECTION

The required Lower Limit of Detection, (LLD), as defined in the ODCM, was met for all samples used in reporting effluent releases for 2007.

All samples also met the *a posteriori* Minimum Detectable Activity (MDA).

## 7.0 RADIOLOGICAL IMPACT

An assessment of doses to the maximally exposed individual from gaseous and liquid effluents was performed for locations representing the maximum calculated dose in occupied sectors. Meteorological sectors from WNW through ENE are entirely over Lake Ontario. In all cases, doses were well below Technical Specification limits as defined in the ODCM. Doses were assessed based upon historical meteorological conditions considering the noble gas exposure, inhalation, ground plane exposure, and ingestion pathways. The ingestion pathways considered were the fruit, vegetable, fish, drinking water, goat's milk, cow's milk, and cow meat pathways. Results of this assessment are presented in Tables 4A and 4B. Since September 11, 2001, Ginna Security has been augmented by full-time presence of the New York State Police and the New York National Guard. These personnel have posts within the site boundary. For this reason, the exposure and uptake pathways for 2007 are calculated using meteorological dispersion and deposition parameters at onsite posts, as well as at the site boundary.

### 7.1 Total Dose

40 CFR 190 limits the total dose to members of the public due to radiation and radioactivity from uranium fuel cycle sources to:

<25 mrem total body or any organ and;
<75 mrem thyroid for a calendar year.

Using the maximum exposure and uptake pathways, the maximum liquid pathways, and the direct radiation measurements onsite in the vicinity of the National Guard outpost, yield the following dose summaries to the maximally exposed individual member of the public onsite.

2.60E+00 mrem total body (2.60E+00 mrem direct radiation plus 4.81E-03 mrem all other pathways).
4.86E-03 mrem GI-LLI (maximum organ dose).

Using the maximum exposure and uptake pathways, the maximum liquid pathways, and the direct radiation measurements at the site boundary, yield the following dose summaries to the hypothetical maximally exposed individual member of the public offsite. This dose conservatively bounds any real member of the public.

6.00E+00 mrem total body (6.00E+00 mrem direct radiation plus 4.81E-03 mrem all other pathways).
4.86E-03 mrem GI-LLI (maximum organ dose).

## 8.0 METEOROLOGICAL DATA

The annual summary of hourly meteorological data collected during 2007 is not included with this report, but can be made available at the R. E. Ginna Nuclear Power Plant.

## 9.0 LAND USE CENSUS CHANGES

There were no changes in critical receptor location for dose calculations during the reporting period. There were no large changes in land use within 5 miles of the plant. Additional new homes are being built at consistent rate compared to past years.

## 10.0 CHANGES TO THE OFFSITE DOSE CALCULATION MANUAL

There were no changes to the ODCM during the reporting period.

## 11.0 CHANGES TO THE PROCESS CONTROL PROGRAM

There were no changes to the Process Control Program during the reporting period.

## 12.0 MAJOR CHANGES TO THE RADWASTE TREATMENT SYSTEMS

There were no major changes to the Radwaste Treatment Systems during the reporting period.

## 13.0 INOPERABLE MONITORS

No gaseous effluent monitors were inoperable for greater than 7 days in 2007.

## 14.0 GROUNDWATER SAMPLING RESULTS

No inadvertent releases to groundwater occurred during 2007. Sample results are included in Table 5.

## 15.0 CHANGES TO PREVIOUS ANNUAL EFFLUENT OPERATING REPORTS

None

## R. E. Ginna Nuclear Power Plant

Table 1A

**EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT**

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES
January – June 2007

| **A. Fission & Activation Gases** | Unit | Quarter 1st | Quarter 2nd | Est. Total Error, % |
|---|---|---|---|---|
| 1. Total release | Ci | 1.82E-01 | 4.32E-01 | 1.50E+01 |
| 2. Average release rate for period | uCi/sec | 2.34E-02 | 5.50E-02 | |
| 3. Percent of Technical Specification limit | % | 3.71E-05 | 8.73E-05 | |
| **B. Iodines** | | | | |
| 1. Total iodine-131 | Ci | | | |
| 2. Average release rate for period | uCi/sec | | | |
| 3. Percent of Technical Specification limit | % | | | |
| **C. Particulates** | | | | |
| 1. Particulates with half-lives > 8 days | Ci | | | |
| 2. Average release rate for period | uCi/sec | | | |
| 3. Percent of Technical Specification limit | % | | | |
| 4. Gross alpha radioactivity | Ci | | | |
| **D. Tritium** | | | | |
| 1. Total release | Ci | 7.39E+00 | 7.47E+00 | 9.20E+00 |
| 2. Average release rate for period | uCi/sec | 9.50E-01 | 9.49E-01 | |
| 3. Percent of Technical Specification limit | % | 1.12E-04 | 1.12E-04 | |

Note: Isotopes for which no value is given were not identified in applicable releases.

## R. E. Ginna Nuclear Power Plant

Table 1A

**EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT**

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES
July – December 2007

| **A. Fission & Activation Gases** | Unit | Quarter 3rd | Quarter 4th | Est. Total Error, % |
|---|---|---|---|---|
| 1. Total release | Ci | 2.89E-01 | 3.03E-01 | 1.50E+01 |
| 2. Average release rate for period | uCi/sec | 3.63E-02 | 3.81E-02 | |
| 3. Percent of Technical Specification limit | % | 5.76E-05 | 6.05E-05 | |
| **B. Iodines** | | | | |
| 1. Total iodine-131 | Ci | | | |
| 2. Average release rate for period | uCi/sec | | | |
| 3. Percent of Technical Specification limit | % | | | |
| **C. Particulates** | | | | |
| 1. Particulates with half-lives > 8 days | Ci | | | |
| 2. Average release rate for period | uCi/sec | | | |
| 3. Percent of Technical Specification limit | % | | | |
| 4. Gross alpha radioactivity | Ci | | | |
| **D. Tritium** | | | | |
| 1. Total release | Ci | 7.29E+00 | 5.80E+00 | 9.20E+00 |
| 2. Average release rate for period | uCi/sec | 9.17E-01 | 7.30E-01 | |
| 3. Percent of Technical Specification limit | % | 1.08E-04 | 8.59E-05 | |

Note: Isotopes for which no value is given were not identified in applicable releases.

## R. E. Ginna Nuclear Power Plant

Table 2A

**EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT**

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES
January – June 2007

| **A. Fission & Activation Products** | Unit | Quarter 1st | Quarter 2nd | Est. Total Error, % |
|---|---|---|---|---|
| 1. Total release (not including tritium, gases, alpha) | Ci | 5.65E-03 | 9.24E-03 | 9.90E+00 |
| 2. Average diluted concentration during period | uCi/ml | 1.30E-11 | 1.82E-11 | |
| 3. Percent of applicable limit | % | 4.45E-12 | 3.80E-12 | |
| **B. Tritium** | | | | |
| 1. Total release | Ci | 2.73E+01 | 1.85E+02 | 9.20E+00 |
| 2. Average diluted concentration during period | uCi/ml | 6.31E-08 | 3.64E-07 | |
| 3. Percent of applicable limit | % | 3.16E-01 | 1.82E+00 | |
| **C. Dissolved and entrained gases** | | | | |
| 1. Total release | Ci | | 1.37E-04 | 9.90E+00 |
| 2. Average diluted concentration during period | uCi/ml | | 2.70E-13 | |
| 3. Percent of applicable limit | % | | 1.35E-07 | |
| **D. Gross alpha radioactivity** | | | | |
| 1. Total release | Ci | | | |
| | | | | |
| **E. Volume of waste released (prior to dilution)** | Liters | 9.04E+07 | 9.55E+07 | |
| | | | | |
| **F. Volume of dilution water used during period** | Liters | 4.34E+11 | 5.07E+11 | |

Note: Isotopes for which no value is given were not identified in applicable releases.

## R. E. Ginna Nuclear Power Plant

Table 2A

**EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT**

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES
July – December 2007

| **A. Fission & Activation Products** | Unit | Quarter 3rd | Quarter 4th | Est. Total Error, % |
|---|---|---|---|---|
| 1. Total release (not including tritium, gases, alpha) | Ci | 7.02E-03 | 8.72E-05 | 9.90E+00 |
| 2. Average diluted concentration during period | uCi/ml | 1.37E-11 | 1.78E-13 | |
| 3. Percent of applicable limit | % | 3.74E-12 | 9.38E-13 | |
| **B. Tritium** | | | | |
| 1. Total release | Ci | 1.63E+02 | 3.89E+01 | 9.20E+00 |
| 2. Average diluted concentration during period | uCi/ml | 3.19E-07 | 7.93E-08 | |
| 3. Percent of applicable limit | % | 1.60E+00 | 3.97E-01 | |
| **C. Dissolved and entrained gases** | | | | |
| 1. Total release | Ci | 3.36E-05 | | 9.90E+00 |
| 2. Average diluted concentration during period | uCi/ml | 6.55E-14 | | |
| 3. Percent of applicable limit | % | 3.27E-08 | | |
| **D. Gross alpha radioactivity** | | | | |
| 1. Total release | Ci | | | |
| | | | | |
| **E. Volume of waste released (prior to dilution)** | Liters | 9.66E+07 | 1.01E+08 | |
| | | | | |
| **F. Volume of dilution water used during period** | Liters | 5.12E+11 | 4.91E+11 | |

Note: Isotopes for which no value is given were not identified in applicable releases.

## R. E. Ginna Nuclear Power Plant

Table 1B

### EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

GASEOUS EFFLUENTS – CONTINUOUS AND BATCH RELEASES
January – June 2007

| Nuclides released | Unit | Continuous Mode | | Batch Mode | |
|---|---|---|---|---|---|
| | | Quarter | Quarter | Quarter | Quarter |
| | | 1st | 2nd | 1st | 2nd |
| **1. Fission Gases** | | | | | |
| Argon-41 | Ci | | | 7.10E-02 | 6.93E-02 |
| Krypton-85 | Ci | | | | |
| Krypton-85m | Ci | | | | |
| Krypton-87 | Ci | | | | |
| Krypton-88 | Ci | | | | |
| Xenon-131m | Ci | | | | 9.84E-04 |
| Xenon-133 | Ci | | | 1.10E-01 | 3.59E-01 |
| Xenon-133m | Ci | | | | 4.33E-04 |
| Xenon-135 | Ci | | | 8.23E-04 | 2.07E-03 |
| Xenon-135m | Ci | | | | |
| Xenon-138 | Ci | | | | |
| Others (specify) | Ci | | | | |
| Xenon-135 | Ci | | | | |
| | Ci | | | | |
| | Ci | | | | |
| **Total for period** | Ci | 0.00E+00 | 0.00E+00 | 1.82E-01 | 4.30E-01 |
| | | | | | |
| **2. Iodines** | | | | | |
| Iodine-131 | Ci | | | | |
| Iodine-132 | Ci | | | | |
| Iodine-133 | Ci | | | | |
| **Total for period** | Ci | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | | | | | |
| **3. Particulates** | | | | | |
| Strontium-89 | Ci | | | | |
| Strontium-90 | Ci | | | | |
| Cesium-134 | Ci | | | | |
| Cesium-137 | Ci | | | | |
| Niobium-95 | Ci | | | | |
| Cobalt-58 | Ci | | | | |
| Cobalt-60 | Ci | | | | |
| Others (specify) | Ci | | | | |
| **Total for period** | Ci | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

Note: Isotopes for which no value is given were not identified in applicable releases.

## R. E. Ginna Nuclear Power Plant

Table 1B

### EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

GASEOUS EFFLUENTS – CONTINUOUS AND BATCH RELEASES
July – December 2007

| Nuclides released | Unit | Continuous Mode | | Batch Mode | |
|---|---|---|---|---|---|
| | | Quarter | Quarter | Quarter | Quarter |
| | | 3rd | 4th | 3rd | 4th |
| **1. Fission Gases** | | | | | |
| Argon-41 | Ci | | | 7.20E-02 | 7.36E-02 |
| Krypton-85 | Ci | | | | |
| Krypton-85m | Ci | | | | |
| Krypton-87 | Ci | | | | |
| Krypton-88 | Ci | | | | |
| Xenon-131m | Ci | | | | |
| Xenon-133 | Ci | | | 2.15E-01 | 2.28E-01 |
| Xenon-133m | Ci | | | | |
| Xenon-135 | Ci | | | 1.71E-03 | 1.77E-03 |
| Xenon-135m | Ci | | | | |
| Xenon-138 | Ci | | | | |
| Others (specify) | Ci | | | | |
| | Ci | | | | |
| | Ci | | | | |
| | Ci | | | | |
| **Total for period** | Ci | 0.00E+00 | 0.00E+00 | 2.89E-01 | 3.03E-01 |
| | | | | | |
| **2. Iodines** | | | | | |
| Iodine-131 | Ci | | | | |
| Iodine-132 | Ci | | | | |
| Iodine-133 | Ci | | | | |
| **Total for period** | Ci | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| | | | | | |
| **3. Particulates** | | | | | |
| Strontium-89 | Ci | | | | |
| Strontium-90 | Ci | | | | |
| Cesium-134 | Ci | | | | |
| Cesium-137 | Ci | | | | |
| Niobium-95 | Ci | | | | |
| Cobalt-58 | Ci | | | | |
| Cobalt-60 | Ci | | | | |
| Zirconium-95 | Ci | | | | |
| **Total for period** | Ci | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

Note: Isotopes for which no value is given were not identified in applicable releases.

## R. E. Ginna Nuclear Power Plant

Table 2B

### EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

LIQUID EFFLUENTS – CONTINUOUS AND BATCH RELEASES
January – June 2007

| Nuclides released | Unit | Continuous Mode | | Batch Mode | |
|---|---|---|---|---|---|
| | | Quarter | Quarter | Quarter | Quarter |
| | | 1st | 2nd | 1st | 2nd |
| **Nuclide** | | | | | |
| Chromium-51 | Ci | | | | |
| Manganese-54 | Ci | | | | |
| Iron-55 | Ci | | | | |
| Cobalt-57 | Ci | | | | |
| Cobalt-58 | Ci | | | 3.96E-04 | 3.09E-04 |
| Iron-59 | Ci | | | | |
| Cobalt-60 | Ci | | | 2.64E-05 | 5.01E-05 |
| Zinc-65 | Ci | | | | |
| Stronium-89 | Ci | | | | |
| Stronium-90 | Ci | | | | |
| Niobium-95 | Ci | | | 6.13E-06 | |
| Zirconium-95 | Ci | | | | |
| Molybdenum-99 | Ci | | | | |
| Silver-110m | Ci | | | | |
| Antimony-122 | Ci | | | | |
| Antimony-124 | Ci | | | | |
| Antimony-125 | Ci | | | | 1.98E-05 |
| Iodine-131 | Ci | | | | |
| Iodine-132 | Ci | | | | |
| Tellerium-132 | Ci | | | | |
| Cesium-134 | Ci | | | | |
| Iodine-135 | Ci | | | | |
| Cesium-136 | Ci | | | | |
| Cesium-137 | Ci | | | | |
| Barium/Lanthanum-140 | Ci | | | | |
| Cerium-141 | Ci | | | | |
| Tellerium-123m | Ci | | | 4.07E-05 | 5.74E-05 |
| Tellerium-125m | Ci | | | 5.18E-03 | 8.80E-03 |
| **Total for period** | Ci | 0.00E+00 | 0.00E+00 | 5.65E-03 | 9.24E-03 |
| | | | | | |
| Xenon-133 | Ci | | | | 1.37E-04 |
| Xenon-135 | Ci | | | | |

Note: Isotopes for which no value is given were not identified in applicable releases.

## R. E. Ginna Nuclear Power Plant

Table 2B

### EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

LIQUID EFFLUENTS – CONTINUOUS AND BATCH RELEASES
July – December 2007

| Nuclides released | Unit | Continuous Mode | | Batch Mode | |
|---|---|---|---|---|---|
| | | Quarter 3rd | Quarter 4th | Quarter 3rd | Quarter 4th |
| **Nuclide** | | | | | |
| Chromium-51 | Ci | | | | |
| Manganese-54 | Ci | | | | |
| Iron-55 | Ci | | | | |
| Cobalt-57 | Ci | | | | |
| Cobalt-58 | Ci | | | 9.78E-05 | 3.57E-05 |
| Iron-59 | Ci | | | | |
| Cobalt-60 | Ci | | | 4.88E-05 | 5.15E-05 |
| Zinc-65 | Ci | | | | |
| Stronium-89 | Ci | | | | |
| Stronium-90 | Ci | | | | |
| Niobium-95 | Ci | | | | |
| Zirconium-95 | Ci | | | | |
| Molybdenum-99 | Ci | | | | |
| Silver-110m | Ci | | | | |
| Antimony-122 | Ci | | | | |
| Antimony-124 | Ci | | | | |
| Antimony-125 | Ci | | | | |
| Iodine-131 | Ci | | | | |
| Iodine-132 | Ci | | | | 1.42E-04 |
| Tellerium-132 | Ci | | | | 1.64E-04 |
| Cesium-134 | Ci | | | | |
| Iodine-135 | Ci | | | | |
| Cesium-136 | Ci | | | | |
| Cesium-137 | Ci | | | | |
| Barium/Lanthanum-140 | Ci | | | | |
| Cerium-141 | Ci | | | | |
| Tellerium-123m | Ci | | | 3.22E-05 | |
| Tellerium-125m | Ci | | | 6.85E-03 | |
| **Total for period** | Ci | 0.00E+00 | 0.00E+00 | 7.03E-03 | 8.72E-05 |
| | | | | | |
| Xenon-133 | Ci | | | 3.36E-05 | |
| Xenon-135 | Ci | | | | |

Note: Isotopes for which no value is given were not identified in applicable releases.

Table 3
**EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT**
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS
January 1, 2007 - December 31, 2007

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

| 1. Type of waste | Unit | 12 month period | Est. total Error % |
|---|---|---|---|
| a. Spent resins, filter sludges, evaporator bottoms, etc. | $m^3$<br>Ci | 8.42E+01<br>8.21E+01 | 7.00E+00<br>1.40E+01 |
| b. Dry compressible waste, contaminated equip, etc. | $m^3$<br>Ci | 2.19E+02<br>2.39E-02 | 7.00E+00<br>1.40E+01 |
| c. Irradiated components, control rods, etc. | $m^3$<br>Ci | None | N/A |
| d. Other: Condensate Cooler | $m^3$<br>Ci | 8.72E+00<br>1.42E-03 | 7.00E+00<br>1.40E+01 |

| **2.Estimate of major nuclide composition** (by type of waste) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| a. | | | b. | | | d. (None) | | |
| Co-58 | % | 1.30E-01 | Fe-55 | % | 2.54E+01 | Co-60 | % | 3.66E+01 |
| Ni-63 | % | 7.12E+01 | Co-58 | % | 1.49E+01 | Ni-63 | % | 5.84E+01 |
| Co-60 | % | 1.19E+01 | Ni-63 | % | 2.54E+01 | Ag-110m | % | 5.00E-01 |
| Cs-137 | % | 3.85E+00 | Cr-51 | % | 2.07E+00 | Cs-137 | % | 2.50E+00 |
| Fe-55 | % | 1.10E+01 | Co-60 | % | 2.35E+01 | Ce-144 | % | 2.00E+00 |
| Sb-125 | % | 3.90E-01 | Zr-95 | % | 7.90E-01 | | % | |
| Ce-144 | % | 3.00E-02 | Ag-110m | % | 1.71E+00 | | % | |
| Mn-54 | % | 3.50E-01 | Cs-137 | % | 2.02E+00 | | % | |
| Ag-110m | % | 3.00E-03 | Sb-125 | % | 8.30E-01 | | % | |
| H-3 | % | 1.50E-01 | H-3 | % | 7.90E-01 | | % | |
| Total | | 9.90E+01 | Total | | 9.74E+01 | Total | | 1.00E+02 |

| 3. Solid Waste Disposition | | |
|---|---|---|
| **Number of Shipments** | **Mode of Transportation** | **Destination** |
| 1.00E+00 | Sole Use Truck | Barnwell, SC |
| 4.00E+00 | Sole Use Truck | Duratek, TN |
| 2.00E+00 | Sole Use Truck | Studsvik, TN |
| 1.00E+00 | Sole Use Truck | Toxco, TN |

**B. IRRADIATED FUEL SHIPMENTS** (Disposition)

| Number of Shipments | Mode of Transportation | Destination |
|---|---|---|
| None | N/A | N/A |

Table 4A
Radiation Dose to Maximum Individual Receptor
First Quarter 2007
(Units in rem)

| | All | All | Adult | Teen | Child | Infant |
|---|---|---|---|---|---|---|
| | Noble Gas | Noble Gas | Thyroid | Thyroid | Thyroid | Thyroid |
| | Air Gamma | Air Beta | | | | |
| N | 1.90E-09 | 9.51E-10 | | | | |
| NNE | 1.59E-09 | 7.97E-10 | | | | |
| NE | 1.84E-09 | 9.19E-10 | | | | |
| ENE | 2.33E-09 | 1.17E-09 | | | | |
| E | 4.24E-09 | 2.12E-09 | 2.06E-07 | 2.26E-07 | 3.10E-07 | 1.35E-07 |
| ESE | 5.40E-09 | 2.70E-09 | 2.63E-07 | 2.87E-07 | 3.94E-07 | 1.72E-07 |
| SE | 3.27E-09 | 1.63E-09 | 1.59E-07 | 1.74E-07 | 2.39E-07 | 1.04E-07 |
| SSE | 1.35E-09 | 6.73E-10 | 6.55E-08 | 7.16E-08 | 9.84E-08 | 4.28E-08 |
| S | 2.36E-09 | 1.18E-09 | 1.15E-07 | 1.25E-07 | 1.72E-07 | 7.49E-08 |
| SSW | 2.36E-09 | 1.18E-09 | 1.15E-07 | 1.25E-07 | 1.72E-07 | 7.49E-08 |
| SW | 2.36E-09 | 1.18E-09 | 1.15E-07 | 1.25E-07 | 1.72E-07 | 7.49E-08 |
| WSW | 2.51E-09 | 1.26E-09 | 1.22E-07 | 1.33E-07 | 1.83E-07 | 7.99E-08 |
| W | 1.60E-09 | 7.99E-10 | 7.77E-08 | 8.49E-08 | 1.17E-07 | 5.08E-08 |
| WNW | 1.35E-10 | 6.75E-11 | | | | |
| NW | 4.42E-10 | 2.21E-10 | | | | |
| NNW | 1.38E-09 | 6.92E-10 | | | | |
| | | | | | | |
| Maximum | 5.40E-09 | 2.70E-09 | 2.626E-07 | 2.869E-07 | 3.944E-07 | 1.718E-07 |

## R. E. Ginna Nuclear Power Plant

Table 4A
Radiation Dose to Maximum Individual Receptor
Second Quarter 2007
(Units in rem)

| | All | All | Adult | Teen | Child | Infant |
|---|---|---|---|---|---|---|
| | Noble Gas | Noble Gas | Thyroid | Thyroid | Thyroid | Thyroid |
| | Air Gamma | Air Beta | | | | |
| N | 2.11E-09 | 1.66E-09 | | | | |
| NNE | 1.76E-09 | 1.39E-09 | | | | |
| NE | 2.03E-09 | 1.60E-09 | | | | |
| ENE | 2.58E-09 | 2.04E-09 | | | | |
| E | 4.70E-09 | 3.70E-09 | 2.08E-07 | 2.28E-07 | 3.14E-07 | 1.37E-07 |
| ESE | 5.98E-09 | 4.71E-09 | 2.65E-07 | 2.90E-07 | 3.99E-07 | 1.74E-07 |
| SE | 3.62E-09 | 2.85E-09 | 1.60E-07 | 1.76E-07 | 2.41E-07 | 1.05E-07 |
| SSE | 1.49E-09 | 1.17E-09 | 6.61E-08 | 7.24E-08 | 9.96E-08 | 4.34E-08 |
| S | 2.61E-09 | 2.05E-09 | 1.16E-07 | 1.27E-07 | 1.74E-07 | 7.60E-08 |
| SSW | 2.61E-09 | 2.05E-09 | 1.16E-07 | 1.27E-07 | 1.74E-07 | 7.60E-08 |
| SW | 2.61E-09 | 2.05E-09 | 1.16E-07 | 1.27E-07 | 1.74E-07 | 7.60E-08 |
| WSW | 2.78E-09 | 2.19E-09 | 1.23E-07 | 1.35E-07 | 1.86E-07 | 8.10E-08 |
| W | 1.77E-09 | 1.39E-09 | 7.84E-08 | 8.59E-08 | 1.18E-07 | 5.15E-08 |
| WNW | 1.50E-10 | 1.18E-10 | | | | |
| NW | 4.90E-10 | 3.86E-10 | | | | |
| NNW | 1.53E-09 | 1.21E-09 | | | | |
| | | | | | | |
| Maximum | 5.98E-09 | 4.71E-09 | 2.65E-07 | 2.90E-07 | 3.99E-07 | 1.74E-07 |

Table 4A
Radiation Dose to Maximum Individual Receptor
Third Quarter 2007
(Units in rem)

| | All Noble Gas Air Gamma | All Noble Gas Air Beta | Adult Thyroid | Teen Thyroid | Child Thyroid | Infant Thyroid |
|---|---|---|---|---|---|---|
| N | 2.03E-09 | 1.26E-09 | | | | |
| NNE | 1.70E-09 | 1.06E-09 | | | | |
| NE | 1.96E-09 | 1.22E-09 | | | | |
| ENE | 2.49E-09 | 1.55E-09 | | | | |
| E | 4.54E-09 | 2.82E-09 | 2.03E-07 | 2.22E-07 | 3.06E-07 | 1.34E-07 |
| ESE | 5.77E-09 | 3.59E-09 | 2.59E-07 | 2.83E-07 | 3.89E-07 | 1.70E-07 |
| SE | 3.49E-09 | 2.17E-09 | 1.57E-07 | 1.71E-07 | 2.35E-07 | 1.03E-07 |
| SSE | 1.44E-09 | 8.95E-10 | 6.46E-08 | 7.06E-08 | 9.71E-08 | 4.25E-08 |
| S | 2.52E-09 | 1.57E-09 | 1.13E-07 | 1.23E-07 | 1.70E-07 | 7.43E-08 |
| SSW | 2.52E-09 | 1.57E-09 | 1.13E-07 | 1.23E-07 | 1.70E-07 | 7.43E-08 |
| SW | 2.52E-09 | 1.57E-09 | 1.13E-07 | 1.23E-07 | 1.70E-07 | 7.43E-08 |
| WSW | 2.68E-09 | 1.67E-09 | 1.20E-07 | 1.32E-07 | 1.81E-07 | 7.92E-08 |
| W | 1.71E-09 | 1.06E-09 | 7.66E-08 | 8.37E-08 | 1.15E-07 | 5.04E-08 |
| WNW | 1.44E-10 | 8.98E-11 | | | | |
| NW | 4.73E-10 | 2.94E-10 | | | | |
| NNW | 1.48E-09 | 9.20E-10 | | | | |
| | | | | | | |
| Maximum | 5.77E-09 | 3.59E-09 | 2.59E-07 | 2.83E-07 | 3.89E-07 | 1.70E-07 |

# R. E. Ginna Nuclear Power Plant

Table 4A
Radiation Dose to Maximum Individual Receptor
Fourth Quarter 2007
(Units in rem)

| | All | All | Adult | Teen | Child | Infant |
|---|---|---|---|---|---|---|
| | Noble Gas | Noble Gas | Thyroid | Thyroid | Thyroid | Thyroid |
| | Air Gamma | Air Beta | | | | |
| N | 2.09E-09 | 1.31E-09 | | | | |
| NNE | 1.75E-09 | 1.10E-09 | | | | |
| NE | 2.01E-09 | 1.27E-09 | | | | |
| ENE | 2.56E-09 | 1.61E-09 | | | | |
| E | 4.65E-09 | 2.93E-09 | 1.62E-07 | 1.77E-07 | 2.43E-07 | 1.06E-07 |
| ESE | 5.92E-09 | 3.73E-09 | 2.06E-07 | 2.26E-07 | 3.10E-07 | 1.35E-07 |
| SE | 3.58E-09 | 2.26E-09 | 1.25E-07 | 1.37E-07 | 1.87E-07 | 8.16E-08 |
| SSE | 1.48E-09 | 9.30E-10 | 5.14E-08 | 5.63E-08 | 7.72E-08 | 3.36E-08 |
| S | 2.58E-09 | 1.63E-09 | 8.98E-08 | 9.85E-08 | 1.35E-07 | 5.88E-08 |
| SSW | 2.58E-09 | 1.63E-09 | 8.98E-08 | 9.85E-08 | 1.35E-07 | 5.88E-08 |
| SW | 2.58E-09 | 1.63E-09 | 8.98E-08 | 9.85E-08 | 1.35E-07 | 5.88E-08 |
| WSW | 2.75E-09 | 1.73E-09 | 9.57E-08 | 1.05E-07 | 1.44E-07 | 6.27E-08 |
| W | 1.75E-09 | 1.10E-09 | 6.09E-08 | 6.68E-08 | 9.16E-08 | 3.99E-08 |
| WNW | 1.48E-10 | 9.33E-11 | | | | |
| NW | 4.85E-10 | 3.05E-10 | | | | |
| NNW | 1.52E-09 | 9.56E-10 | | | | |
| | | | | | | |
| Maximum | 5.92E-09 | 3.73E-09 | 2.06E-07 | 2.26E-07 | 3.10E-07 | 1.35E-07 |

Table 4B
Radiation Dose to Maximum Individual Receptor
From Liquid Release
2007
(Units in rem)

| | Adult | Teen | Child | Infant |
|---|---|---|---|---|
| **First Quarter** | | | | |
| **Total Body** | 1.86E-07 | 1.32E-07 | 2.48E-07 | 2.40E-07 |
| **GI-LLI** | 2.35E-07 | 1.70E-07 | 2.64E-07 | 2.41E-07 |
| **Thyroid** | 1.88E-07 | 1.34E-07 | 2.51E-07 | 2.40E-07 |
| **Second Quarter** | | | | |
| **Total Body** | 1.08E-06 | 7.65E-07 | 1.44E-06 | 1.40E-06 |
| **GI-LLI** | 1.14E-06 | 8.10E-07 | 1.46E-06 | 1.40E-06 |
| **Thyroid** | 1.08E-06 | 7.65E-07 | 1.44E-06 | 1.40E-06 |
| **Third Quarter** | | | | |
| **Total Body** | 9.55E-07 | 6.75E-07 | 1.27E-06 | 1.23E-06 |
| **GI-LLI** | 1.00E-06 | 7.10E-07 | 1.29E-06 | 1.24E-06 |
| **Thyroid** | 9.55E-07 | 6.75E-07 | 1.28E-06 | 1.23E-06 |
| **Fourth Quarter** | | | | |
| **Total Body** | 2.37E-07 | 1.67E-07 | 3.15E-07 | 3.06E-07 |
| **GI-LLI** | 2.37E-07 | 1.67E-07 | 3.15E-07 | 3.06E-07 |
| **Thyroid** | 2.37E-07 | 1.67E-07 | 3.15E-07 | 3.06E-07 |

## R. E. Ginna Nuclear Power Plant

Groundwater Sampling Results

Table 5

| LOCATION | DATE SAMPLED | Tritium pCi/L |
|---|---|---|
| Groundwater by Butler Bldg. | 01/16/07 | * |
| Groundwater by Butler Bldg. | 02/07/07 | * |
| Groundwater by Butler Bldg. | 03/29/07 | * |
| Groundwater by Butler Bldg. | 04/26/07 | * |
| Groundwater by Butler Bldg. | 05/31/07 | * |
| Groundwater by Butler Bldg. | 06/26/07 | * |
| Groundwater by Butler Bldg. | 07/31/07 | * |
| Groundwater by Butler Bldg. | 08/15/07 | * |
| Groundwater by Butler Bldg. | 09/25/07 | * |
| Groundwater by Butler Bldg. | 10/28/07 | * |
| Groundwater by Butler Bldg. | 11/29/07 | * |
| Groundwater by Butler Bldg. | 12/20/07 | * |
| | | |
| Groundwater IFFSI work | 08/15/07 | * |
| | | |
| Groundwater SE of CSB | 01/16/07 | * |
| Groundwater SE of CSB | 02/02/07 | * |
| Groundwater SE of CSB | 03/29/07 | * |
| Groundwater SE of CSB | 04/26/07 | * |
| Groundwater SE of CSB | 05/31/07 | * |
| Groundwater SE of CSB | 06/26/07 | * |
| Groundwater SE of CSB | 07/31/07 | * |
| Groundwater SE of CSB | 08/15/07 | * |
| Groundwater SE of CSB | 09/26/07 | * |
| Groundwater SE of CSB | 10/28/07 | * |
| Groundwater SE of CSB | 11/29/07 | * |
| Groundwater SE of CSB | 12/20/07 | * |
| | | |
| Pond | 01/16/07 | * |
| Pond | 03/29/07 | * |
| Pond | 04/26/07 | * |
| Pond | 05/08/07 | * |
| Pond | 05/31/07 | * |
| Pond | 08/15/07 | * |
| Pond | 10/28/07 | * |
| | | |
| Screen House West | 01/16/07 | * |
| Screen House West | 03/29/07 | * |
| Screen House West | 04/26/07 | * |
| Screen House West | 05/31/07 | * |
| Screen House West | 06/26/07 | * |
| Screen House West | 07/31/07 | * |
| Screen House West | 08/15/07 | * |
| Screen House West | 09/25/07 | * |
| Screen House West | 10/28/07 | * |
| Screen House West | 11/29/07 | * |

* All results are <500 pCi/L unless otherwise shown

## R. E. Ginna Nuclear Power Plant

Groundwater Sampling Results

Table 5 continued

| LOCATION | DATE SAMPLED | Tritium pCi/L |
|---|---|---|
| Storm Drain F | 01/16/07 | * |
| Storm Drain F | 02/02/07 | * |
| Storm Drain F | 03/29/07 | * |
| Storm Drain F | 04/26/07 | * |
| Storm Drain F | 05/31/07 | * |
| Storm Drain F | 06/26/07 | * |
| Storm Drain F | 07/31/07 | * |
| Storm Drain F | 08/15/07 | * |
| Storm Drain F | 09/25/07 | * |
| Storm Drain F | 10/28/07 | * |
| Storm Drain F | 11/29/07 | * |
| Storm Drain F | 12/20/07 | * |
| | | |
| Storm Drain G | 01/16/07 | * |
| Storm Drain G | 03/29/07 | * |
| Storm Drain G | 04/26/07 | * |
| Storm Drain G | 05/31/07 | * |
| Storm Drain G | 06/26/07 | * |
| Storm Drain G | 07/31/07 | * |
| Storm Drain G | 08/15/07 | * |
| Storm Drain G | 09/25/07 | * |
| Storm Drain G | 10/28/07 | * |
| Storm Drain G | 11/29/07 | * |
| Storm Drain G | 12/20/07 | * |
| | | |
| Storm Drain H | 01/16/07 | * |
| Storm Drain H | 02/02/07 | * |
| Storm Drain H | 03/29/07 | * |
| Storm Drain H | 04/26/07 | * |
| Storm Drain H | 09/26/07 | * |
| Storm Drain H | 11/29/07 | * |
| Storm Drain H | 12/20/07 | * |
| | | |
| Storm Drain I | 01/16/07 | * |
| Storm Drain I | 03/29/07 | * |
| Storm Drain I | 04/26/07 | * |
| Storm Drain I | 05/31/07 | * |
| Storm Drain I | 06/26/07 | * |
| Storm Drain I | 07/31/07 | * |
| Storm Drain I | 08/15/07 | * |
| Storm Drain I | 09/25/07 | * |
| Storm Drain I | 10/28/07 | * |
| Storm Drain I | 11/29/07 | * |
| Storm Drain I | 12/20/07 | * |

* All results are <500 pCi/L unless otherwise shown

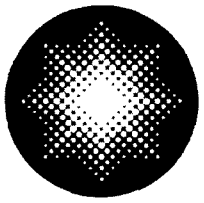
## R. E. Ginna Nuclear Power Plant

Groundwater Sampling Results

Table 5 continued

| LOCATION | DATE SAMPLED | Tritium pCi/L |
|---|---|---|
| Groundwater AVT M. 17' | 01/16/07 | * |
| Groundwater AVT M. 17' | 02/02/07 | * |
| Groundwater AVT M. 17' | 03/29/07 | * |
| Groundwater AVT M. 17' | 04/26/07 | * |
| Groundwater AVT M. 17' | 05/31/07 | * |
| Groundwater AVT M. 17' | 06/26/07 | * |
| Groundwater AVT M. 17' | 07/31/07 | * |
| Groundwater AVT M. 17' | 08/15/07 | * |
| Groundwater AVT M. 17' | 09/25/07 | * |
| Groundwater AVT M. 17' | 10/28/07 | * |
| Groundwater AVT M. 17' | 11/29/07 | * |
| Groundwater AVT M. 17' | 12/20/07 | * |
| | | |
| Groundwater AVT N. 6' | 01/16/07 | * |
| Groundwater AVT N. 6' | 02/02/07 | * |
| Groundwater AVT N. 6' | 03/29/07 | * |
| Groundwater AVT N. 6' | 04/26/07 | * |
| Groundwater AVT N. 6' | 05/31/07 | * |
| Groundwater AVT N. 6' | 06/26/07 | * |
| Groundwater AVT N. 6' | 07/31/07 | * |
| Groundwater AVT N. 6' | 08/15/07 | * |
| Groundwater AVT N. 6' | 09/25/07 | * |
| Groundwater AVT N. 6' | 10/28/07 | * |
| Groundwater AVT N. 6' | 11/29/07 | * |
| Groundwater AVT N. 6' | 12/20/07 | * |
| | | |
| Groundwater AVT S. 13' | 01/16/07 | * |
| Groundwater AVT S. 13' | 02/02/07 | * |
| Groundwater AVT S. 13' | 03/29/07 | * |
| Groundwater AVT S. 13' | 04/26/07 | * |
| Groundwater AVT S. 13' | 05/31/07 | * |
| Groundwater AVT S. 13' | 06/26/07 | * |
| Groundwater AVT S. 13' | 07/31/07 | * |
| Groundwater AVT S. 13' | 08/15/07 | * |
| Groundwater AVT S. 13' | 09/25/07 | * |
| Groundwater AVT S. 13' | 10/28/07 | * |
| Groundwater AVT S. 13' | 11/29/07 | * |

* All results are <500 pCi/L unless otherwise shown



**Constellation Energy®**
Nuclear Generation Group

# ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT: JANUARY 1, 2007 – DECEMBER 31, 2007

## MAY 2008

Prepared For:

**R.E. Ginna Nuclear Power Plant**

1503 Lake Road
Ontario, New York 14519

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# LIST OF TABLES

# I. SUMMARY

The Annual Radiological Environmental Operating Report is published in accordance with Section 5.0 of the Offsite Dose Calculation Manual, (ODCM). This report describes the Radiological Environmental Monitoring Program, (REMP), and its implementation as required by the ODCM.

The REMP is implemented to measure radioactivity in the aquatic and terrestrial pathways. The aquatic pathways include Lake Ontario fish, Lake Ontario water, and Deer Creek water. Measurement results of the samples representing these pathways contained only natural background radiation or low concentrations of Cesium-137 resulting from past atmospheric nuclear weapons testing. Terrestrial pathways monitored included airborne particulate and radioiodine, milk, food products, and direct radiation. Analysis of terrestrial pathways demonstrated no detectable increase in radiation levels as a result of plant operation. The 2007 results were consistent with data for the past five years and exhibited no adverse trends.

The analytical results from the 2007 Radiological Environmental Monitoring program demonstrate that the operation of the R.E. Ginna Nuclear Power Plant had no measurable radiological impact on the environment. The results also demonstrate that operation of the plant did not result in a measurable radiation dose to the general population above natural background levels.

During 2007, 1289 samples were collected for analysis by gross beta counting and/or gamma spectroscopy. These included 60 water samples, 17 fish samples, 6 sediment samples, 4 cladophera samples, 312 air iodine samples, 672 air particulates samples, 36 milk samples, 26 food products samples, and 156 thermoluminescent dosimeter measurements. During 2007 there were three deviations from the sampling schedule for air samples, one deviation from the sampling schedule for milk samples, and one deviation from the sampling schedule for surface water samples. In addition a set of samples were delayed in delivery to the laboratory due to a mistake by the shipping vendor. All deviations were documented in the Corrective Action Program. The minimum number of samples required in the ODCM (Ref. 2) was collected for all pathways.

Samples were collected by R. E. Ginna Nuclear Power Plant's Chemistry personnel and analyzed by the Constellation Energy Ft. Smallwood Environmental Laboratory. A summary of the content of the REMP and the results of all the data collected for indicator and control locations are provided in Tables 1 and 2.

# II. R. E. GINNA NUCLEAR POWER PLANT RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

## II.A. INTRODUCTION

The R. E. Ginna Nuclear Power Plant (Ginna) is an operating nuclear generating facility consisting of one pressurized water reactor. Unit 1 achieved criticality on September 1969 and commenced commercial operation in July 1970. The location of the plant in relation to local metropolitan areas is depicted in Appendix A, Figure A-1.

Results of the monitoring program for the pre-operational and previous operational periods through 2006 have been reported in a series of documents.

Results of the monitoring program for the current operational period are included in this report. The report presents the content of the REMP (Table 1), the sampling locations (Appendix A), the summary of the analytical results (Table 2), a compilation of the analytical data (Appendix B), the results of the Quality Assurance Program (Appendix C), and the results of the Land Use Survey (Appendix D). Interpretation of the data and conclusions are presented in the body of the report.

The environmental surveillance data collected during this reporting period were compared with that generated in previous periods whenever possible to evaluate the environmental radiological impact of the R. E. Ginna Nuclear Power Plant.

## II.B. PROGRAM

### II.B.1 Objectives

The objectives of the REMP for the R.E. Ginna Nuclear Power Plant are:

a. Measure and evaluate the effects of plant operation on the environment.
b. Monitor background radiation levels in the environs of the Ginna site.
c. Demonstrate compliance with the environmental conditions and requirements of applicable state and federal regulations, including the ODCM and 40 CFR 190.
d. Provide information by which the general public can evaluate environmental aspects of the operation of the R.E. Ginna Nuclear Power Plant.

### II.B.2 Sample Collection

The locations of the individual sampling stations are listed in Table A-1 and shown in Figures A-2 and A-3. All samples were collected by contractors to, or personnel of Constellation Energy according to Ginna procedures.

### II.B.3 Data Interpretation

Many results in environmental monitoring occur at or below the minimum detectable activity (MDA). In this report, all results below the relevant MDA are reported as being "less than" the MDA value. Typical MDA values are listed in Table B-10.

### II.B.4 Program Exceptions

Six items reportable in the Annual Environmental Radiological Operating Report under procedure CHA-RETS-VARIATION were reported as follows:

1. Possible damage to environmental air sample #8 from striking filter housing with paintbrush during painting of sample shed on 5/1/07. Analysis showed no deviation from expected result.
2. Circulating Water Outlet water sampler was found out of service on 5/15/07. Compensatory grab samples were taken in accordance with the instructions of the ODCM.
3. Particulate filter on environmental air sampler #12 was damaged during annual pump changeout on 6/4/07 and was replaced.
4. Milk samples taken on 7/10/07 degraded during shipment due to ineffective preservation. Samples were retaken 7/16/07.
5. Environmental air sampler #11 found off 8/13/07. Reset with no subsequent indications of problem. Sample period was 60.1 hours.
6. Milk samples and air samples taken the week of 8/6/07 were lost in shipment by the vendor. Compensatory milk samples were collected and sent 8/14/07. Missing air samples were found by the vendor and resent to the environmental laboratory.

## II.C. RESULTS AND DISCUSSIONS

All the environmental samples collected during the year were analyzed using Constellation Energy laboratory procedures (Ref. 3). The analytical results for this reporting period are presented in Appendix B and are also summarized in Table 2. For discussion, the analytical results are divided into four categories. The categories are the Aquatic Environment, the Atmospheric Environment, the Terrestrial Environment, and Direct Radiation. These categories are further divided into subcategories according to sample type (e.g., Circulating Water, Aquatic Organisms, etc., for the Aquatic Environment).

## II.C.1 Aquatic Environment

The aquatic environment surrounding the plant was monitored by analyzing samples of surface and drinking water, aquatic organisms, and shoreline sediment. These samples were obtained from various sampling locations on Lake Ontario and Deer Creek near the plant.

### *II.C.1.a Surface and Drinking Water*

Samples are collected weekly from Lake Ontario, upstream (Monroe County Water Authority - Shoremont) and downstream (Ontario Water District Plant - OWD), composited monthly, and analyzed for gross beta activity (Table B-1). There was no statistically significant difference between the upstream and downstream sample concentrations. The 2007 averages were 2.00 pCi/liter and 2.28 pCi/liter for the upstream and downstream samples respectively. Gamma isotopic analysis of the monthly composite samples showed no statistically significant difference in activity between the upstream and downstream samples.

Gross beta peaks of up to10 pCi/liter can occur when the lake is stirred up by wind and the weekly sample includes large quantities of suspended silt.

Weekly samples are taken from the plant circulating water intake (Circ In) and discharge canal (Circ Out), and composited monthly. The 2007 averages were 2.14 pCi/liter and 2.11 pCi/liter for the intake and discharge canal respectively. These are essentially the same as the upstream and downstream values as they fall within the $\pm$ 1 sigma error band and range of the measurement.

Results for all water beta analyses are listed in Table B-1.

Samples of the creek which crosses the site are collected and analyzed monthly. Deer Creek gross beta values are typically higher than other surface water samples due to Radon progeny in the soils from which the creek recharges and over which the creek flows.

Gamma isotopic analysis including I-131 is performed on each monthly composite sample. These are listed in Table B-1 and are separated by source of sample. No anomalous results were noted. The analysis allows the determination of Iodine-131 activity of <1 pCi/liter. Any positive counts and the 1 sigma error are reported. During 2007, no sample results indicated I-131 activity.

Tritium analysis was performed on all water samples on a monthly basis. Composites are made from the weekly samples and a portion filtered to remove interferences for analysis by beta scintillation. During 2007, no sample results indicated tritium activity. Tritium data is provided in Table B-1.

### *II.C.1.b Aquatic Organisms*

Indicator fish are caught in the vicinity of the R.E. Ginna Nuclear Power Plant and analyzed for radioactivity from liquid effluent releases from the plant. The fish are filleted to represent that portion which would normally be eaten. Additional fish are caught more than 15 miles away to be used as control samples and are prepared in the same manner.

Four different species of fish are analyzed during each half-year from the indicator and background locations if they are available. There was no statistically significant difference in the traces of radioactivity of the fish caught between the indicator and control locations.

Fish are caught by R. E. Ginna Nuclear Power Plant environmental staff and are analyzed by gamma spectroscopy after being held for periods of less than one week to keep the LLD value for the shorter half-life isotopes realistic. Detection limits could also be affected by small mass samples, (< 2000 grams), in some species. Gamma isotopic concentrations (pCi/kilogram wet) are provided in Table B-2.

### *II.C.1.c Shoreline Sediment*

Samples of shoreline sediment are taken upstream (Monroe County Water Authority - Shoremont) and downstream (Ontario Water District) of R. E. Ginna Nuclear Power Plant.

Results of the gamma isotopic analysis for sediment are included in Table B-3, along with benthic sediment and cladophera from Lake Ontario. Positive indication of Iodine-131 was found in cladophera samples taken at Ginna. The corrective action process was used to verify that positive indication of Iodine-131 was also found in cladophera samples taken upstream, outside of the influence of Ginna, and results were verified by the New York State Department of Environmental Conservation. The apparent cause of this radioactivity in the cladophora is the common nuclear medicine Iodine-131 treatments and subsequent pathway to Lake Ontario via sanitary sewage releases in nearby communities. Cladophera had been included in the Ginna REMP as a supplemental sample due to its extremely high bioaccumulation factor for iodine.

## II.C.2 Atmospheric Environment

Radioactive particles in air are collected by drawing approximately one SCFM through a two inch diameter particulate filter. The volume of air sampled is measured by a dry gas meter and corrected for the pressure drop across the filter. The filters are changed weekly and allowed to decay for three days prior to counting to eliminate most of the natural radioactivity such as the short half-life decay products of radon. The decay period is used to give a more sensitive measurement of long-lived man-made radioactivity.

A ring of 6 sampling stations is located on the plant site from 160 to 420 meters from the reactor centerline near the point of the maximum annual average ground level concentration, 1 more is located on-site at 690 meters, and 2 others offsite at approximately 7 miles. In addition, there are 3 sampling stations located approximately 7 to 16 miles from the site that serve as control stations. See Figure A-2 and Figure A-4.

### *II.C.2.a Air Particulate Filters*

Based on weekly comparisons, there was no statistical difference between the Control and Indicator radioactive particulate concentrations. The averages for the control samples were 0.020 $pCi/m^3$, and the averages for the indicators were 0.020 $pCi/m^3$ for the period of January to December 2007. Maximum weekly concentrations for each station were less than 0.034 $pCi/m^3$.

The major airborne species released from the plant are noble gases and tritium. Most of this activity is released in a gaseous form, however, some of the particulate activity is due to short lived noble gas decay products.

Tables B-5 is a list of gross beta analysis values for the on-site sample stations. Table B-6 is a list of gross beta analysis values for the off-site sampler stations.

The particulate filters from each sampling location were saved and a 13 week composite was made. A gamma isotopic analysis was performed for each sampling location and corrected for decay. One sample indicated a positive result for Cs-137 a factor of 35 times lower than the required limit of detection. This result is consistent with background levels of this long-lived radionuclide released in historical atmospheric weapons tests. The results of these analyses are listed in Table B-7.

### *II.C.2.b Air Iodine*

Radioiodine cartridges are placed at six locations. These cartridges are changed and analyzed each week. No positive analytical results were found on any sample. A list of values for these cartridges is given in Table B-4.

## II.C.3 Terrestrial Environment

Crops are grown on the plant property in a location with a highest off-site meteorological deposition parameter, and samples of the produce are collected at harvest time for analysis. Control samples are purchased from farms greater than ten miles from the plant, (e.g. Gro-Moore Farm Market in Henrietta, New York).

### *II.C.3.a Vegetation*

There was no indication in the samples of any activity other than naturally occurring radionuclides and trace levels of Cesium-137 consistent with background levels.

Gamma isotopic data is given in Table B-8.

### *II.C.3.b Milk*

There was one indicator dairy herd located within five miles from the plant on 1/1/07. Milk samples are collected monthly during November through May from the indicator farm and biweekly during June through October. A control farm sample is taken for each monthly sample and once during each biweekly period. The milk is analyzed for Iodine-131 and also analyzed by gamma spectroscopy for major fission products.

All positive counts and the ±1 sigma error are reported. During 2007, no samples indicated Iodine-131 activity that exceeded the LLD for the analysis. One sample from the control farm indicated trace Cesium-137 activity consistent with background levels.

Table B-9 is a listing of all samples collected during 2007 with analytical results.

## II.C.4 Direct Radiation

Thermoluminescent dosimeters (TLDs) or Optically Stimulated Luminescent Dosimeters (OSLs) with a sensitivity of 5 millirem/quarter are placed as part of the environmental monitoring program. Thirty-nine TLD/OSL badges are currently placed in four rings around the plant. These rings range from less than 1000 feet to 15 miles and have been dispersed to give indications in each of the nine land based sectors around the plant should an excessive release occur from the plant. Badges are changed and read after approximately 3 months exposure.

TLD/OSL locations #7 and #13 are influenced by close proximity to radioactive equipment storage areas and will normally read slightly higher than other locations. For the year of 2007 on-site exposure ranged between 9.9 – 14.3 mrem/quarter, with an average exposure of 12.5 mrem/quarter and off-site exposure ranged between 9.8 – 15.4 mrem/quarter with an average exposure of 11.4 mrem/quarter.

40 CFR 190 requires that the annual dose equivalent not exceed 25 millirem to the whole body of any member of the public. Using the annual average of control TLD/OSL stations as background at 43.7 millirem, and the highest site boundary TLD/OSL annual reading, leads to 6.0 millirem direct radiation dose to the hypothetical maximally exposed member of the public, off-site.

Table B-12 gives TLD/OSL readings for each quarter.

### II.C.5 Monitoring Wells

In accordance with R. E. Ginna Nuclear Power Plant's Chemistry procedures, environmental groundwater monitoring wells are sampled monthly. There are 3 indicator wells, one of which is screened at 3 depths to include groundwater from top of the water table down to bedrock. One well is located upgradient from the reactor containment building and serves as a local control sample point. Additionally, surface water samples from storm drains and the transformer retention pond are sampled monthly when water is present. These samples are analyzed for tritium to a detection limit of 500 pCi/L. In 2007, no radioactivity was detected in any groundwater sample or storm drain sample. Results of the groundwater monitoring well sampling are presented in Table B-13.

## II.D. CONCLUSION

It is concluded that operation of the R. E. Ginna Nuclear Power Plant produced radioactivity and ambient radiation levels significantly below the limits of the ODCM and 40 CFR 190. Additionally, there was no significant buildup of plant-related radionuclides in the environment due to the operations of R. E. Ginna Nuclear Power Plant.

## Table 1

Synopsis of R.E. Ginna Nuclear Power Plant Radiological Environmental Monitoring Program

| Sample Type | Sampling Frequency[1] | Number of Locations | Number Collected | Analysis | Analysis Frequency[1] | Number Analyzed |
|---|---|---|---|---|---|---|
| Aquatic Environment | | | | | | |
| Drinking Water | MC | 2 | 24 | Gamma | M | 24 |
| | | | | Gross Beta | M | 24 |
| | | | | Tritium | M | 24 |
| Surface Water | MC | 3 | 36 | Gamma | M | 36 |
| | | | | Gross Beta | M | 36 |
| | | | | Tritium | M | 36 |
| Fish[2] | SA | 4 | 17 | Gamma | SA | 17 |
| Sediment | SA | 4 | 6 | Gamma | SA | 6 |
| Cladophera | A | 3 | 4 | Gamma | A | 4 |
| Atmospheric Environment | | | | | | |
| Air Iodine[3] | W | 6 | 312 | Gamma | W | 312 |
| Air Particulates[4] | W | 12 | 624 | Gross Beta | W | 624 |
| | Q | 12 | 48 | Gamma | Q | 48 |
| Direct Radiation | | | | | | |
| Ambient Radiation | Q | 39 | 156 | TLD | Q | 156 |
| Terrestrial Environment | | | | | | |
| Food Products[5] | A | 11 | 26 | Gamma | A | 26 |
| Milk | BW (June thru October) | 2 | 22 | Gamma | BW | 22 |
| | M (November thru May) | 2 | 14 | Gamma | M | 14 |

[1] W=Weekly, BW=biweekly (15 days), M=Monthly (31 days), Q=Quarterly (92 days), SA=Semiannual, A=Annual, C= Composite
[2] Twice during fishing season including at least four species
[3] The collection device contains activated charcoal
[4] Beta counting is performed ≥ 24 hours following filter change. Gamma spectroscopy performed on quarterly composite of weekly samples.
[5] Annually during growing season. Samples include grapes, apples, cabbage, tomatoes, green leafy vegeatables, cucumbers, raspberries, and squash.

**Table 2**

Annual Summary of Radioactivity in the Environs of the Ginna Nuclear Power Plant

| Medium or Pathway Sampled (Unit of Measurement) | Type and Total Number of Analyses Performed | Lower Limit of Detection (LLD) | Indicator Locations Mean (F)/Range[1] | Location with Highest Annual Mean Name/Distance & Direction[2] | Highest Annual Mean (F)/Range[1] | Control Locations Mean (F)/Range[1] |
|---|---|---|---|---|---|---|
| ***Aquatic Environment*** | | | | | | |
| Drinking Water (pCi/L) | Gross Beta<br>24 | 0.60 | 2.28(12/12)<br>(1.32 – 2.73) | Ontario Water District<br>2.2 km ENE | 2.28(12/12)<br>(1.32 – 2.73) | 2.06(12/12)<br>(1.15 – 2.48) |
| | Cs-137<br>24 | 2.30 | 2.82(1/12) | Ontario Water District Station 15<br>2.2 km ENE | 2.82(1/12) | [3] |
| Surface Water (pCi/L) | Gross Beta<br>36 | 0.60 | 2.92(36/36)<br>(0.88 – 8.41) | Deer Creek | 4.51(12/12)<br>(1.90 –8.41) | 2.06(12/12)<br>(1.15 – 2.48) |
| | Cs-137<br>36 | 2.80 | 4.23 (1/36) | Circulating Water Out<br>0.1 km NNE | 4.23(1/12) | [3] |
| Fish | Cs-137<br>17 | 17 | 43(1/10) | North Indicator | 43(1/10) | [3] |
| Sediment | | | | | | |
| Shoreline Sediment | Cs-137<br>5 | 58 | 0(4/4) | [3] | 0(4/4) | [3] |
| Benthic Sediment | Cs-137<br>1 | 58 | 0(4/4) | [3] | 0(4/4) | [3] |

**Table 2 (Continued)**

Annual Summary of Radioactivity in the Environs of the Ginna Nuclear Power Plant

| Medium or Pathway Sampled (Unit of Measurement) | Type and Total Number of Analyses Performed | Lower Limit of Detection (LLD) | Indicator Locations Mean (F)/Range[1] | Location with Highest Annual Mean Name/Distance & Direction[2] | Highest Annual Mean (F)/Range[1] | Control Locations Mean (F)/Range[1] |
|---|---|---|---|---|---|---|
| Cladophera (pCi/kg) | I-131<br>4 | 19 | 41(3/3)<br>(22-53) | Lake Ontario<br>Discharge | 53(1/3) | 22(1/1) |
| | Cs-137<br>4 | 26 | 21(1/1) | Slater Creek | 21(1/1) | 21(1/1) |
| ***Atmospheric Environment*** | | | | | | |
| Air Iodine | I-131 | 1.9 | 0 (312/312) | [3] | 0 (312/312) | [3] |
| Air Particulates ($10^{-2}$ pCi/$m^3$) | Gross Beta<br>624 | 0.5 | 1.94(468/468)<br>(0.72 – 3.55) | Substation 13<br>Station 13<br>1.4 km SSW | 2.04(52/52)<br>(0.81 – 3.55) | 2.02(156/156)<br>(0.80 – 3.55) |
| | Cs-137<br>28 | 0.03 | 0.0249(2/28)<br>(0.0205-0.0292) | Creek Bridge<br>Station 5<br>0.1 km SSE | 0.0292(1/4) | 0.0288(1/20) |
| ***Direct Radiation*** | | | | | | |
| Ambient Radiation (mR/91 days) | Dosimeters<br>156 | -- | 11.6 (360/360)<br>(9.9 – 15.4) | West Fence Line<br>Station 7<br>0.22 km WSW | 13.6(12/12)<br>(12.9 – 14.3) | 10.9(108/108)<br>(9.8 – 12.3) |
| ***Terrestrial Environmental*** | | | | | | |
| Food Products (pCi/kg) | Cs-137<br>26 | 10.3 | 22(1/2) | ESE Garden | 22(1/2) | [3] |
| Milk | Cs-137<br>36 | 2.9 | 3.5 (1/18) | Farm C | 3.5 (1/18) | 3.5 (1/18) |

**Table 2 (Continued)**

Annual Summary of Radioactivity in the Environs of the Ginna Nuclear Power Plant

Notes:

[1] Mean and range based upon detectable measurements only. Fraction (F) of detectable measurements at specified location is indicated in parentheses

[2] From the center point of the containment building

[3] There was no detectable activity at the control or indicator location

## III. REFERENCES

(1) R. E. Ginna Nuclear Power Plant, Nos. DPR-18, Technical Specification 5.6.2; Annual Radiological Environmental Operating Report.

(2) Offsite Dose Calculation Manual for the R. E. Ginna Nuclear Power Plant, Revision 20, Effective Date: March 29, 2005.

(3) Constellation Energy Laboratory Procedures Manual, General Services Department.

(4) Constellation Energy, "Land Use Survey Around R. E. Ginna Nuclear Power Plant, September 2007."

# APPENDIX A

## REMP Sample Locations

**Summary of Appendix A Content**

Appendix A contains information concerning the environmental samples which were collected during this operating period. Sample locations and specific information about individual locations for the Ginna are given in Table A-1. Figure A-1 shows the location of the R. E. Ginna Nuclear Power Plant in relation to New York State and Lake Ontario. Figures A-2, A-3, and A-4 show the locations of the power plant sampling sites in relation to the plant site at different degrees of detail.

# APPENDIX A – REMP SAMPLE LOCATIONS
# TABLE OF CONTENTS

**TABLE A-1**
**Locations of Environmental Sampling Stations**
**for the R. E. Ginna Nuclear Plant**

| Station | Description | Distance | | Direction |
|---|---|---|---|---|
| | | Meters | Miles | Sector |
| | Air Samplers | | | |
| 2 | Manor House Yard | 320 | 0.2 | E |
| 3 | East Field | 420 | 0.3 | ESE |
| 4 | Training Center Parking Lot | 250 | 0.2 | SE |
| 5 | Creek Bridge | 160 | 0.1 | SSE |
| 6 | Main Parking Lot | 225 | 0.1 | SW |
| 7 | West Fence Line | 220 | 0.1 | WSW |
| 8 | Seabreeze | 19200 | 11.9 | WSW |
| 9 | Webster | 11400 | 7.1 | SW |
| 10 | Walworth | 13100 | 8.1 | S |
| 11 | Williamson | 11500 | 7.1 | ESE |
| 12 | Sodus Point | 25100 | 15.6 | E |
| 13 | Substation 13 | 690 | 0.4 | SSW |
| | Direct Radiation | | | |
| 2 | Onsite-Manor House Yard | 320 | 0.2 | E |
| 3 | Onsite-In field approximately 200 ft SE of station #2 | 420 | 0.3 | ESE |
| 4 | Onsite-Training Center yard driveway circle | 250 | 0.2 | SE |
| 5 | Onsite-Between creek and plant entry road | 160 | 0.1 | SSE |
| 6 | Onsite-SW side of plant parking lot | 225 | 0.1 | SW |
| 7 | Onsite-utility pole along West plant fence | 220 | 0.1 | WSW |
| 8 | Topper Drive-Irondequoit, Seabreeze Substation #51 | 19200 | 11.9 | WSW |
| 9 | Phillips Road-Webster, intersection with Highway #104, Substation #74 | 11400 | 7.1 | SW |
| 10 | Atlantic Avenue-Walworth, Substation #230 | 13100 | 8.1 | S |
| 11 | W. Main Street-Williamson, Substation #207 | 11500 | 7.1 | ESE |
| 12 | 12 Seaman Avenue-Sodus Point-Off Lake Road by Sewer district, Substation #209 | 25100 | 15.6 | E |
| 13 | At corner of plant-controlled area fence and dogleg to West | 230 | 0.1 | WNW |
| 14 | NW corner of field along lake shore | 770 | 0.5 | WNW |
| 15 | Field access road, west of orchard, approximately 3000' West of plant | 850 | 0.5 | W |
| 16 | SW Corner of orchard, approximately 3000' West of plant, approximately 200' North of Lake Road | 900 | 0.6 | WSW |
| 17 | Utility pole in orchard, approximately 75" North of Lake Road | 500 | 0.3 | SSW |
| 18 | Substation 13A fence, North Side | 650 | 0.4 | SSW |
| 19 | On NW corner of house 100' East of plant access road | 400 | 0.2 | S |
| 20 | Approximately 150' West of Ontario Center Road and approximately 170' South of Lake Road | 680 | 0.4 | SSE |

| Station | Description | Distance | | Direction |
|---|---|---|---|---|
| | | Meters | Miles | Sector |
| 21 | North side of Lake Road, approximately 200' East of Ontario Center Road | 600 | 0.4 | SE |
| 22 | North side of Lake Road, SE, property corner | 810 | 0.5 | SE |
| 23 | East property line, midway between Lake Road and Lake shore | 680 | 0.4 | ESE |
| 24 | Lake shore near NE corner of property | 630 | 0.4 | E |
| 25 | Substation #73, Klem Road, adjacent to 897 Klem Road | 14350 | 8.9 | WSW |
| 26 | Service Center, Plank Road, West of 250 | 14800 | 9.2 | SW |
| 27 | Atlantic Avenue at Knollwood Drive utility pole, North side of road | 14700 | 9.1 | SSW |
| 28 | Substation #193, Marion, behind Stanton Ag. Service, North Main Street | 17700 | 11.0 | SE |
| 29 | Substation #208, Town Line Road (CR-118), 1000 ' North of Route 104 | 13800 | 8.6 | ESE |
| 30 | District Office, Sodus, on pole, West side of bldg | 20500 | 12.7 | ESE |
| 31 | Lake Road, pole 20' North of road, 500' East of Salt Road | 7280 | 4.5 | W |
| 32 | Woodard Road at County Line Road, pole @ Northwest corner. | 6850 | 4.2 | WSW |
| 33 | County Line Road at RR tracks, pole approximately 100' East along tracks | 7950 | 4.9 | SW |
| 34 | Pole at Route 104, Lincoln Road, SW Corner. | 6850 | 4.2 | SSW |
| 35 | Transmission Right of Way, North of Clevenger Road on pole. | 7600 | 4.7 | SSW |
| 36 | Substation #205, Route 104, East of Ontario Center Road, North side of fence. | 5650 | 3.5 | S |
| 37 | Rail Road Avenue, pole at 2048 | 6000 | 3.7 | SSE |
| 38 | Fisher Road at RR Tracks, pole East of road | 7070 | 4.4 | SE |
| 39 | Seeley Road, Pole South side 100' West of intersection with Stony Lonesome Road | 6630 | 4.1 | ESE |
| 40 | Lake Road at Stoney Lonesome Road, pole at SE corner | 6630 | 4.1 | E |
| | Fish | | | |
| | Lake Ontario Discharge Plume | 2200 | 1.4 | ENE |
| | Russell Station | 25600 | 15.9 | W |
| | Produce (Vegetation) | | | |
| Indicator and background samples of lettuce, apples, tomatoes, and cabbage are collected from gardens grown on company property and purchased from farms >10 miles from the plant. | | | | |
| | Water | | | |
| | Shoremont/MCWA | 27160 | 16.9 | W |
| | Ontario Water District | 2200 | 1.4 | ENE |
| | Circ Water Intake | 420 | 0.3 | N |
| | Circ Water Discharge | 130 | 0.1 | NNE |
| | Deer Creek | 260 | 0.2 | ESE |

| Station | Description | Distance | | Direction |
|---|---|---|---|---|
| | | Meters | Miles | Sector |
| Sediment | | | | |
| | Lake Ontario Discharge Plume | 2200 | 1.4 | ENE |
| | Russell Station | 25600 | 15.9 | W |
| Milk | | | | |
| | Farm A | 8270 | 5.1 | ESE |
| | Farm C (Control) | 21000 | 13.0 | SE |

## FIGURE A-1

## Map of New York State and Lake Ontario Showing Location of R. E. Ginna Nuclear Power Plant

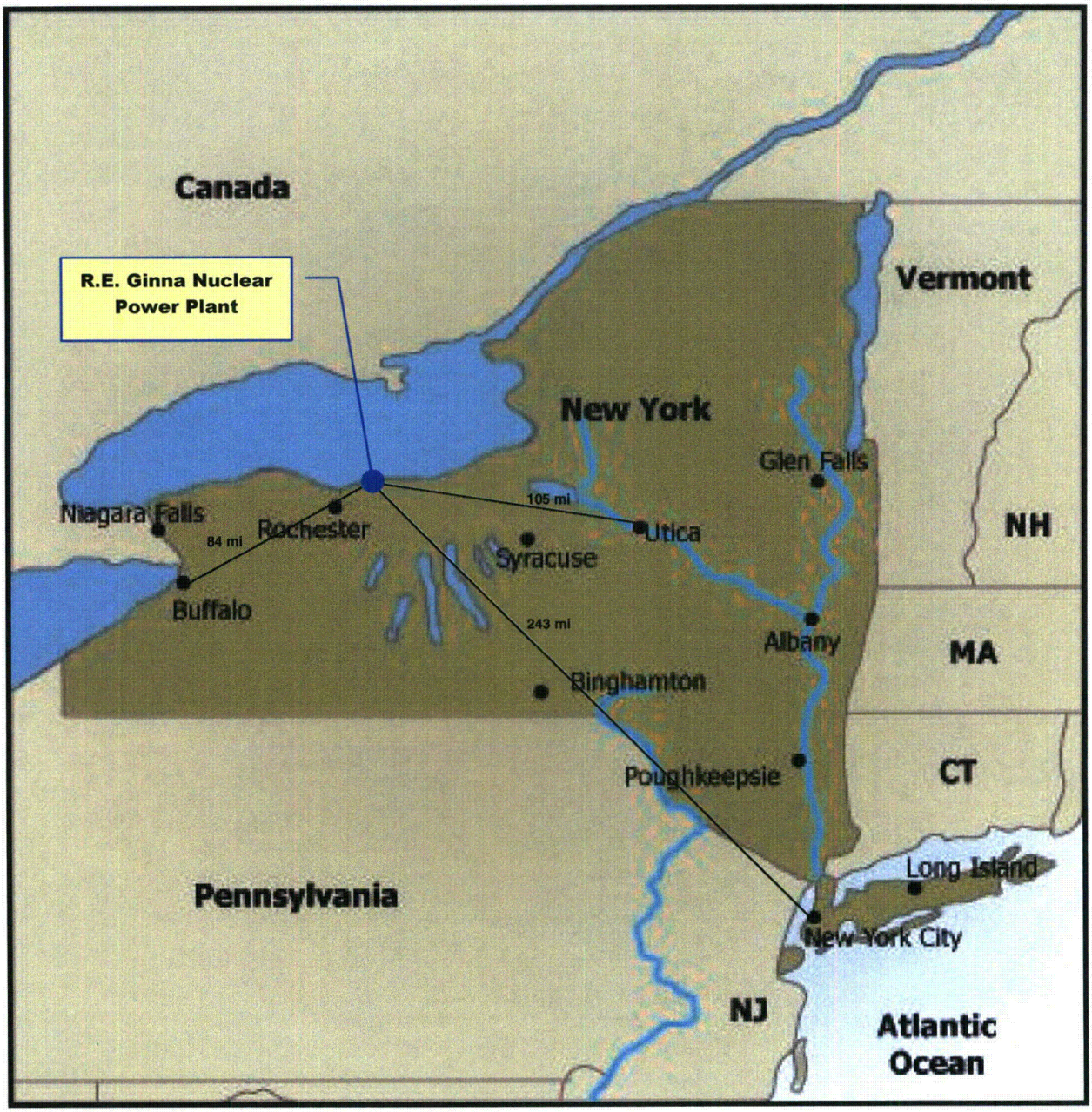
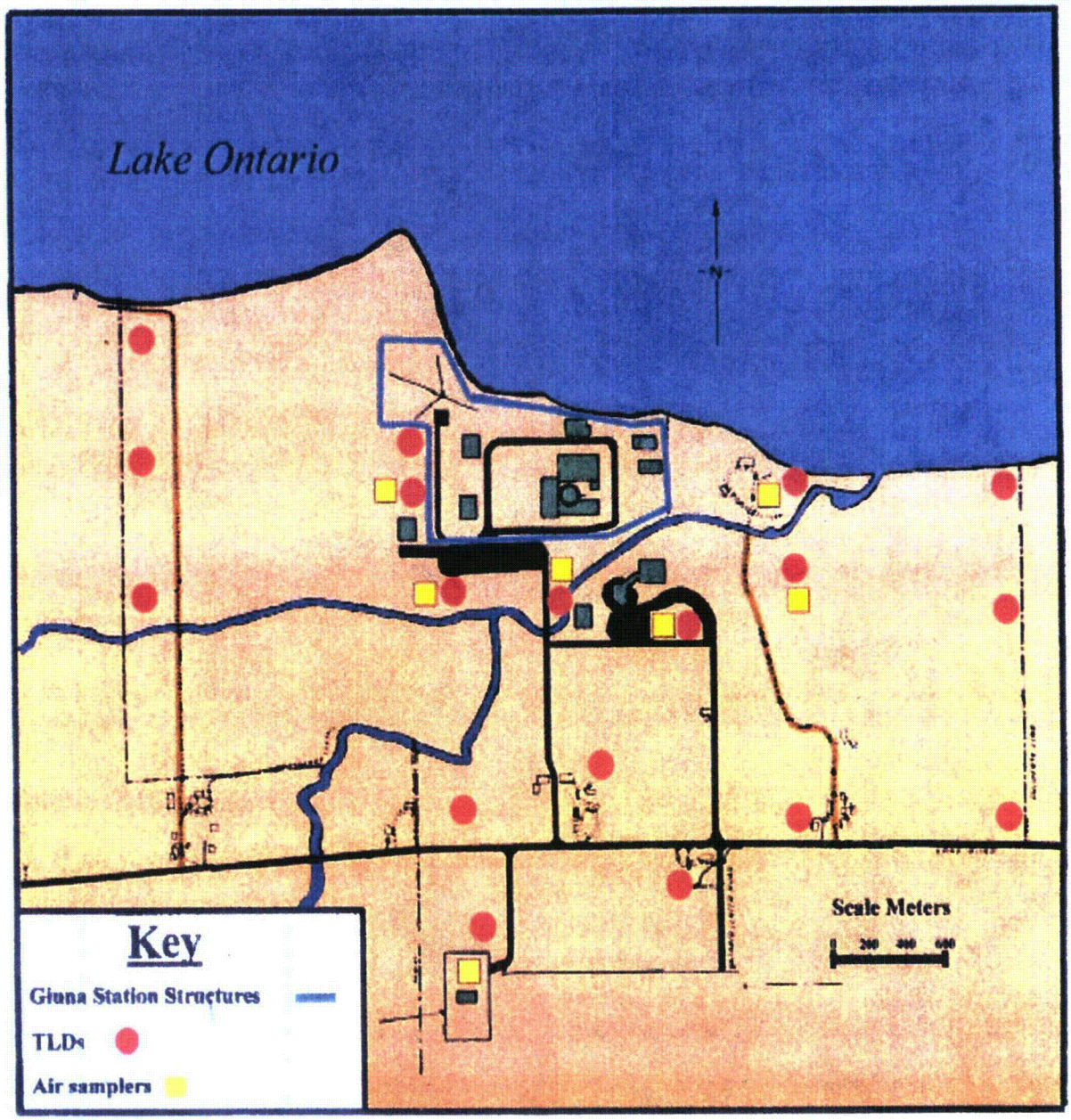


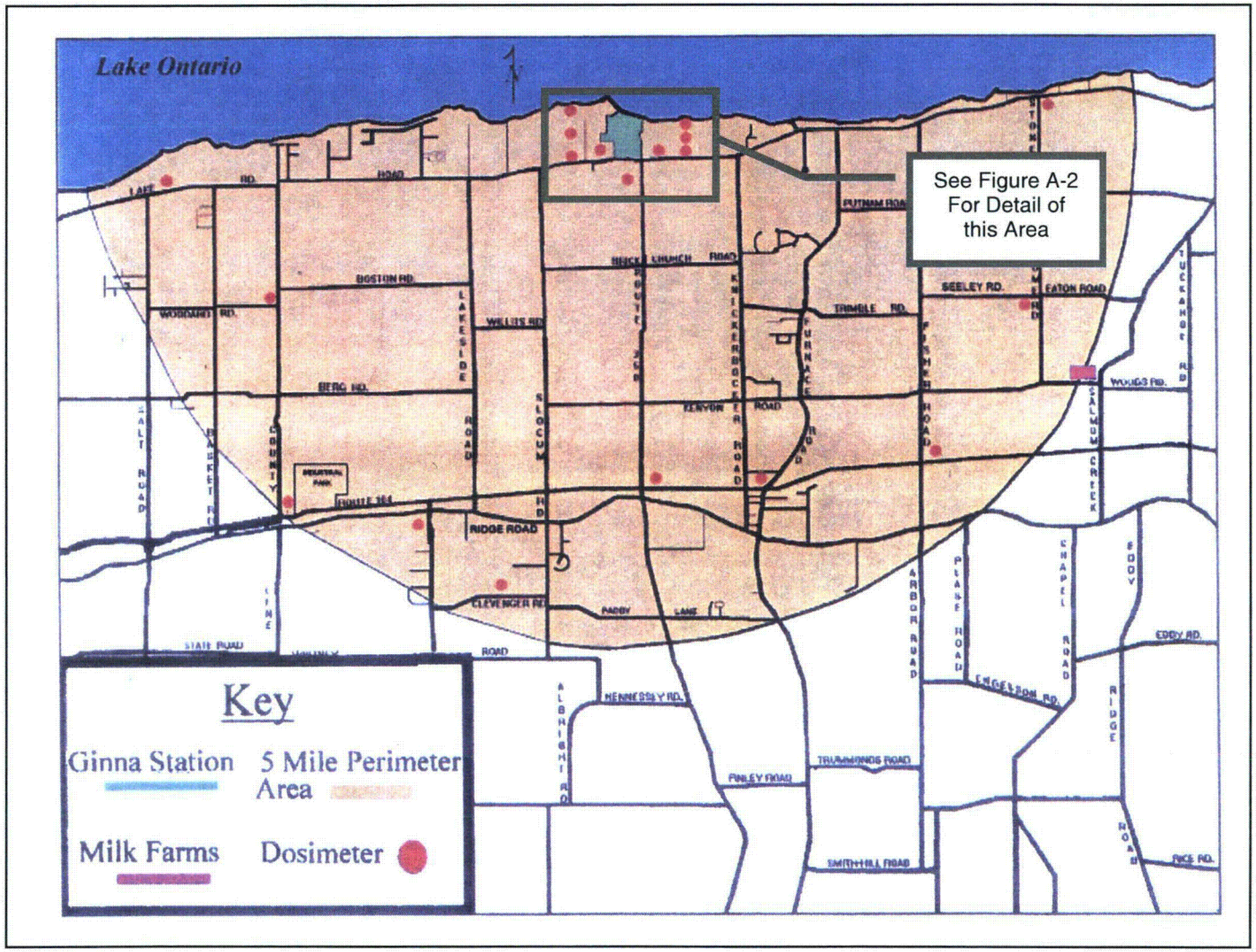
**FIGURE A-2**

**Onsite Sample Locations**



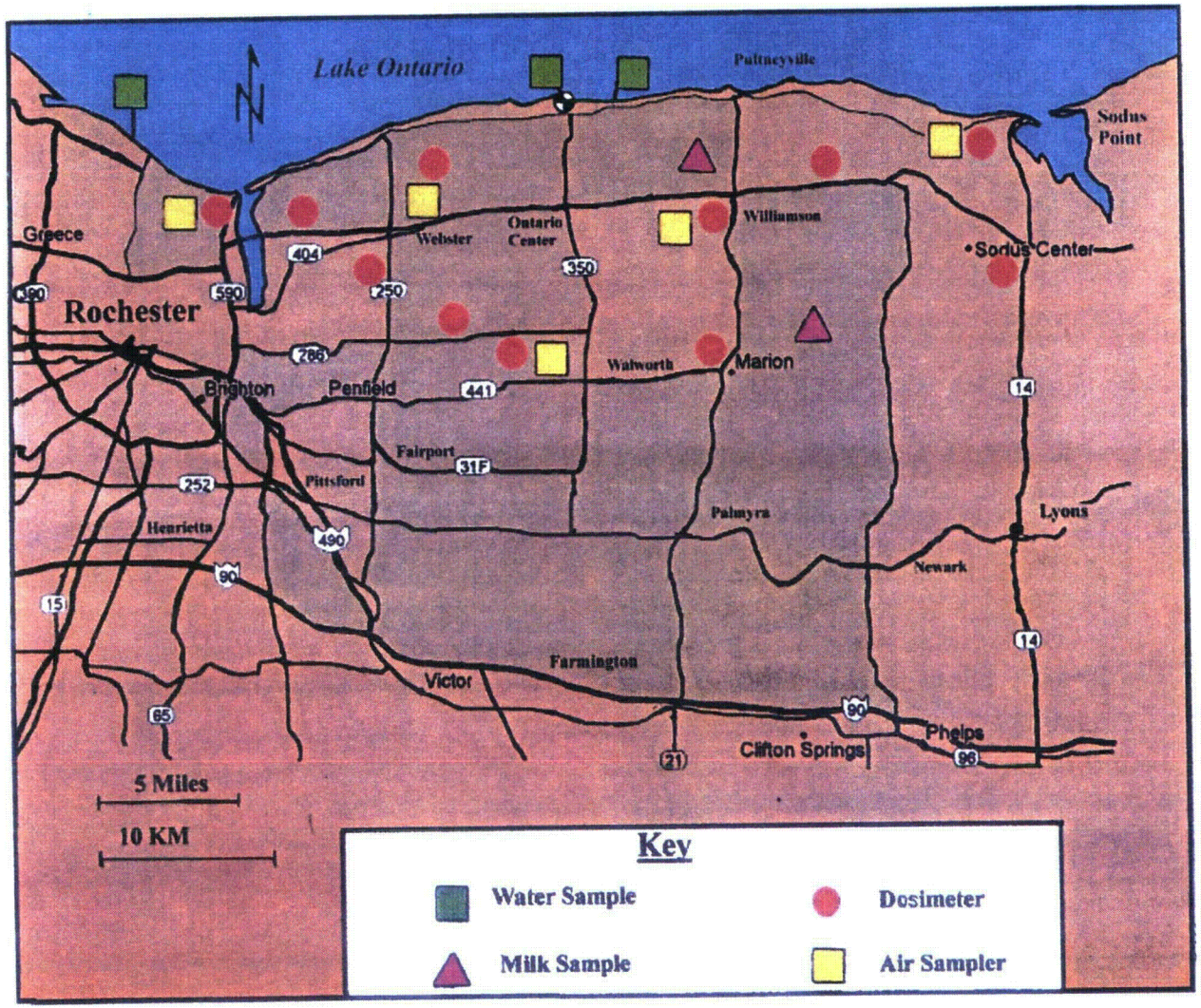
## FIGURE A-3

**Offsite Sample Locations (TLDs and milk farms within 5 miles)**



## FIGURE A-4

### Water Sample, Milk Farms and TLD Locations



# APPENDIX B

## REMP Analytical Results

**Summary of Appendix B Content**

Appendix B is a presentation of the analytical results for the R. E. Ginna Nuclear Power Plant radiological environmental monitoring programs.

## APPENDIX B
## TABLE OF CONTENTS - REMP ANALYTICAL RESULTS

**Table B-1**

Concentration of Tritium, Gamma Emitters and Gross Beta in Surface and Drinking Water
(Results in units of pCi/L ± 2σ)

| Location | Sample Date | H-3 | Gamma Emitters | Gross Beta |
|---|---|---|---|---|
| Monroe County Water | 01/30/2007 | * | * | 1.15 ± 0.28 |
| Shoremont (MCWA) | 02/26/2007 | * | * | 2.39 ± 0.55 |
| | 04/02/2007 | * | * | 2.14 ± 0.55 |
| | 04/30/2007 | * | * | 2.31 ± 0.50 |
| | 06/04/2007 | * | * | 2.15 ± 0.52 |
| | 07/02/2007 | * | * | 2.02 ± 0.50 |
| | 07/30/2007 | * | * | 1.94 ± 0.53 |
| | 08/28/2007 | * | * | 1.70 ± 0.50 |
| | 10/02/2007 | * | * | 1.98 ± 0.53 |
| | 10/30/2007 | * | * | 2.44 ± 0.52 |
| | 11/27/2007 | * | * | 2.48 ± 0.54 |
| | 12/26/2007 | * | * | 1.27 ± 0.50 |
| Ontario Water District (OWD) | 01/30/2007 | * | * | 1.32 ± 0.29 |
| | 02/26/2007 | * | * | 2.13 ± 0.54 |
| | 04/02/2007 | * | * | 2.23 ± 0.55 |
| | 04/30/2007 | * | * | 2.60 ± 0.52 |
| | 06/04/2007 | * | * | 2.54 ± 0.54 |
| | 07/02/2007 | * | 2.82±1.68 (Cs-137) | 2.52 ± 0.53 |
| | 07/30/2007 | * | * | 2.24 ± 0.55 |
| | 08/28/2007 | * | * | 2.13 ± 0.53 |
| | 10/02/2007 | * | * | 1.79 ± 0.52 |
| | 10/30/2007 | * | * | 2.73 ± 0.55 |
| | 11/27/2007 | * | * | 2.47 ± 0.53 |
| | 12/26/2007 | * | * | 2.65 ± 0.57 |
| Circulating Water Inlet (Circ In) | 01/30/2007 | * | * | 0.88 ± 0.27 |
| | 02/26/2007 | * | * | 2.65 ± 0.57 |
| | 04/02/2007 | * | * | 2.06 ± 0.55 |
| | 04/30/2007 | * | * | 2.63 ± 0.53 |
| | 06/04/2007 | * | * | 1.86 ± 0.49 |
| | 07/02/2007 | * | * | 1.99 ± 0.50 |
| | 07/30/2007 | * | * | 1.18 ± 0.53 |
| | 08/28/2007 | * | * | 2.16 ± 0.53 |
| | 10/02/2007 | * | * | 1.91 ± 0.52 |
| | 10/30/2007 | * | * | 2.50 ± 0.54 |
| | 11/27/2007 | * | * | 2.77 ± 0.56 |
| | 12/26/2007 | * | * | 3.03 ± 0.59 |

*All Non-Natural Gamma Emitters, including I-131, and tritium <MDA.

**Table B-1 (Continued)**

Concentration of Tritium, Gamma Emitters and Gross Beta in Surface and Drinking Water
(Results in units of pCi/L ± 2σ)

| Location | Sample Date | H-3 | Gamma Emitters | Gross Beta |
|---|---|---|---|---|
| Circulating Water Outlet (Circ Out) | 01/30/2007 | * | * | 1.26 ± 0.29 |
| | 02/26/2007 | * | * | 2.80 ± 0.58 |
| | 04/02/2007 | * | * | 2.17 ± 0.55 |
| | 04/30/2007 | * | * | 3.03 ± 0.52 |
| | 06/04/2007 | * | * | 1.95 ± 0.50 |
| | 07/02/2007 | * | * | 2.38 ± 0.52 |
| | 07/30/2007 | * | * | 1.63 ± 0.51 |
| | 08/28/2007 | * | * | 2.03 ± 0.52 |
| | 10/02/2007 | * | * | 1.30 ± 0.50 |
| | 10/30/2007 | * | * | 2.54 ± 0.54 |
| | 11/27/2007 | * | 4.23±2.42 (Cs-137) | 2.43 ± 0.53 |
| | 12/26/2007 | * | * | 1.82 ± 0.53 |
| Deer Creek | 01/16/2007 | * | * | 1.90 ± 0.34 |
| | 02/27/2007 | * | * | 3.61 ± 0.75 |
| | 03/19/2007 | * | * | 3.22 ± 0.67 |
| | 04/23/2007 | * | * | 3.65 ± 0.62 |
| | 05/14/2007 | * | * | 2.88 ± 0.63 |
| | 06/18/2007 | * | * | 4.12 ± 0.66 |
| | 07/16/2007 | * | * | 8.03 ± 0.83 |
| | 08/13/2007 | * | * | 4.81 ± 0.79 |
| | 09/10/2007 | * | * | 2.64 ± 0.65 |
| | 10/16/2007 | * | * | 6.55 ± 0.94 |
| | 11/05/2007 | * | * | 8.41 ± 1.26 |
| | 12/11/2007 | * | * | 4.35 ± 0.75 |

* All Non-Natural Gamma Emitters, including I-131, and tritium < MDA.

**Table B-2**

Concentration of Gamma Emitters in the Flesh of Edible Fish
(Results in units of pCi/kg (wet) ± 2σ)

| Location | Sample Date | Fish Type | Gamma Emitters |
|---|---|---|---|
| North Indicator | 1/11/2007 | Burbot | 43±19 (Cs-137) |
| | 1/17/2007 | Lake Trout | * |
| | 1/17/2007 | Smallmouth Bass | * |
| | 1/24/2007 | White Sucker | * |
| | 3/07/2007 | Smallmouth Bass | * |
| | 11/21/2007 | Lake Trout | * |
| | 11/21/2007 | White Sucker | * |
| | 11/28/2007 | Brown Trout | * |
| | 11/29/2007 | Smallmouth Bass | * |
| Russel Station (Control) | 5/02/2007 | Smallmouth Bass | * |
| Sandy Creek – Hamlin (Control) | 4/25/2007 | Rainbow Trout | * |
| | 6/7/2007 | Bowfin | * |
| | 6/7/2007 | Northern Pike | * |
| | 9/25/2007 | Largemouth Bass | * |
| | 9/25/2007 | Chinook Salmon | * |
| | 9/25/2007 | Northern Pike | * |
| Greece (Control) | 12/13/2006 | Lake Trout | * |

*All Non-Natural Gamma Emitters <MDA

**Table B-3**

Concentration of Gamma Emitters in Sediment
(Results in units of pCi/kg (wet) ± 2σ)

| Description | Sample Date | Gamma Emitters |
|---|---|---|
| Shoreline Sediment | | |
| - East (Manor House) | 6/7/2007 | * |
| - East (Bear Creek) | 6/14/2007 | * |
| | 9/04/2007 | * |
| - Greece (Control) | 6/7/2007 | * |
| | 9/04/2007 | * |
| Benthic Sediment | | |
| - North | 5/30/2007 | * |
| Cladophera | | |
| - East (Manor House) | 8/20/2007 | 53±15 ( I-131 ) |
| | 9/5/2007 | 48±24 ( I-131 ) |
| - Slater Creek (Control) | 9/5/2007 | 22±9 ( I-131 ) |
| | 9/5/2007 | 21±10 (Cs-137) |
| - Webster Park | 9/5/2007 | * |

* All Non-Natural Gamma Emitters <MDA

**Table B-4**

Concentration of Iodine-131 in Filtered Air (Charcoal Cartridges)
(Results in units of $10^{-2}$ pCi/$m^3$ ± 2σ)

| Start Date | Stop Date | Station #2 (I) Manor House Yard | Station #4 (I) Training Center Parking Lot | Station #7 (I) West Fence Line | Station #8 (C) Seabreeze [1] | Station #9 (I) Webster | Station #11 (I) Williamson |
|---|---|---|---|---|---|---|---|
| 1/01/2007 | 1/08/2007 | * | * | * | * | * | * |
| 1/08/2007 | 1/15/2007 | * | * | * | * | * | * |
| 1/15/2007 | 1/23/2007 | * | * | * | * | * | * |
| 1/23/2007 | 1/29/2007 | * | * | * | * | * | * |
| 1/29/2007 | 2/05/2007 | * | * | * | * | * | * |
| 2/05/2007 | 2/12/2007 | * | * | * | * | * | * |
| 2/12/2007 | 2/19/2007 | * | * | * | * | * | * |
| 2/19/2007 | 2/26/2007 | * | * | * | * | * | * |
| 2/26/2007 | 3/05/2007 | * | * | * | * | * | * |
| 3/05/2007 | 3/12/2007 | * | * | * | * | * | * |
| 3/12/2007 | 3/19/2007 | * | * | * | * | * | * |
| 3/19/2007 | 3/26/2007 | * | * | * | * | * | * |
| 3/26/2007 | 4/02/2007 | * | * | * | * | * | * |
| 4/02/2007 | 4/09/2007 | * | * | * | * | * | * |
| 4/09/2007 | 4/16/2007 | * | * | * | * | * | * |
| 4/16/2007 | 4/23/2007 | * | * | * | * | * | * |
| 4/23/2007 | 4/30/2007 | * | * | * | * | * | * |
| 4/30/2007 | 5/07/2007 | * | * | * | * | * | * |
| 5/07/2007 | 5/14/2007 | * | * | * | * | * | * |
| 5/14/2007 | 5/21/2007 | * | * | * | * | * | * |
| 5/21/2007 | 5/28/2007 | * | * | * | * | * | * |
| 5/28/2007 | 6/04/2007 | * | * | * | * | * | * |
| 6/04/2007 | 6/11/2007 | * | * | * | * | * | * |
| 6/11/2007 | 6/18/2007 | * | * | * | * | * | * |
| 6/18/2007 | 6/25/2007 | * | * | * | * | * | * |
| 6/25/2007 | 7/02/2007 | * | * | * | * | * | * |

[1] Control Location

*<MDA (I-131)

**Table B-4 (Continued)**

Concentration of Iodine-131 in Filtered Air (Charcoal Cartridges)
(Results in units of $10^{-2}$ pCi/$m^3$ ± 2σ)

| Start Date | Stop Date | Station #2 (I) Manor House Yard | Station #4 (I) Training Center Parking Lot | Station #7 (I) West Fence Line | Station #8 (C) Seabreeze [1] | Station #9 (I) Webster | Station #11 (I) Williamson |
|---|---|---|---|---|---|---|---|
| 7/02/2007 | 7/09/2007 | * | * | * | * | * | * |
| 7/09/2007 | 7/16/2007 | * | * | * | * | * | * |
| 7/16/2007 | 7/23/2007 | * | * | * | * | * | * |
| 7/23/2007 | 7/30/2007 | * | * | * | * | * | * |
| 7/30/2007 | 8/06/2007 | * | * | * | * | * | * |
| 8/7/2007 | 8/13/2007 | * | * | * | * | * | * |
| 8/13/2007 | 8/20/2007 | * | * | * | * | * | * |
| 8/20/2007 | 8/27/2007 | * | * | * | * | * | * |
| 8/27/2007 | 9/03/2007 | * | * | * | * | * | * |
| 9/03/2007 | 9/10/2007 | * | * | * | * | * | * |
| 9/10/2007 | 9/17/2007 | * | * | * | * | * | * |
| 9/17/2007 | 9/24/2007 | * | * | * | * | * | * |
| 9/24/2007 | 10/01/2007 | * | * | * | * | * | * |
| 10/01/2007 | 10/08/2007 | * | * | * | * | * | * |
| 10/08/2007 | 10/15/2007 | * | * | * | * | * | * |
| 10/15/2007 | 10/22/2007 | * | * | * | * | * | * |
| 10/23/2007 | 10/29/2007 | * | * | * | * | * | * |
| 10/29/2007 | 11/05/2007 | * | * | * | * | * | * |
| 11/05/2007 | 11/12/2007 | * | * | * | * | * | * |
| 11/12/2007 | 11/19/2007 | * | * | * | * | * | * |
| 11/19/2007 | 11/26/2007 | * | * | * | * | * | * |
| 11/26/2007 | 12/03/2007 | * | * | * | * | * | * |
| 12/03/2007 | 12/10/2007 | * | * | * | * | * | * |
| 12/10/2007 | 12/17/2007 | * | * | * | * | * | * |
| 12/17/2007 | 12/24/2007 | * | * | * | * | * | * |
| 12/24/2007 | 12/31/2007 | * | * | * | * | * | * |

[1] Control Location

*<MDA (I-131)

**Table B-5**

Concentration of Beta Emitters in Air Particulates – Onsite Samples
(Results in pCi/m$^3$ ± 2σ Uncertainty)

| START DATE | STOP DATE | Station #2 (I) Manor House Yard | Station #3 (I) East Field | Station #4 (I) Training Center Parking Lot | Station #5 (I) Creek Bridge | Station #6 (I) Main Parking Lot | Station #7 (I) West Fence Line | Station #13 (I) Substation 13 |
|---|---|---|---|---|---|---|---|---|
| 01/01/07 | 01/08/07 | 0.0135 ± 0.0011 | 0.0144 ± 0.0012 | 0.0144 ± 0.0012 | 0.0153 ± 0.0014 | 0.0137 ± 0.0011 | 0.0157 ± 0.0012 | 0.0145 ± 0.0014 |
| 01/08/07 | 01/15/07 | 0.0140 ± 0.0010 | 0.0152 ± 0.0011 | 0.0145 ± 0.0011 | 0.0158 ± 0.0013 | 0.0148 ± 0.0011 | 0.0155 ± 0.0011 | 0.0138 ± 0.0013 |
| 01/15/07 | 01/23/07 | 0.0183 ± 0.0010 | 0.0135 ± 0.0009 | 0.0178 ± 0.0011 | 0.0209 ± 0.0013 | 0.0193 ± 0.0011 | 0.0195 ± 0.0012 | 0.0193 ± 0.0014 |
| 01/23/07 | 01/29/07 | 0.0194 ± 0.0012 | 0.0195 ± 0.0013 | 0.0199 ± 0.0013 | 0.0217 ± 0.0015 | 0.0208 ± 0.0012 | 0.0233 ± 0.0013 | 0.0186 ± 0.0013 |
| 01/29/07 | 02/05/07 | 0.0197 ± 0.0012 | 0.0207 ± 0.0012 | 0.0206 ± 0.0013 | 0.0233 ± 0.0015 | 0.0194 ± 0.0012 | 0.0207 ± 0.0013 | 0.0211 ± 0.0015 |
| 02/05/07 | 02/12/07 | 0.0161 ± 0.0011 | 0.0160 ± 0.0011 | 0.0151 ± 0.0011 | 0.0181 ± 0.0013 | 0.0138 ± 0.0010 | 0.0152 ± 0.0011 | 0.0167 ± 0.0013 |
| 02/12/07 | 02/19/07 | 0.0193 ± 0.0011 | 0.0188 ± 0.0012 | 0.0194 ± 0.0012 | 0.0209 ± 0.0014 | 0.0171 ± 0.0011 | 0.0195 ± 0.0012 | 0.0198 ± 0.0014 |
| 02/19/07 | 02/26/07 | 0.0166 ± 0.0011 | 0.0150 ± 0.0011 | 0.0144 ± 0.0011 | 0.0177 ± 0.0013 | 0.0166 ± 0.0011 | 0.0177 ± 0.0012 | 0.0153 ± 0.0013 |
| 02/26/07 | 03/05/07 | 0.0130 ± 0.0010 | 0.0131 ± 0.0010 | 0.0127 ± 0.0010 | 0.0128 ± 0.0012 | 0.0134 ± 0.0010 | 0.0131 ± 0.0011 | 0.0130 ± 0.0012 |
| 03/05/07 | 03/12/07 | 0.0211 ± 0.0012 | 0.0220 ± 0.0012 | 0.0195 ± 0.0012 | 0.0242 ± 0.0015 | 0.0211 ± 0.0011 | 0.0207 ± 0.0013 | 0.0216 ± 0.0013 |
| 03/12/07 | 03/19/07 | 0.0196 ± 0.0012 | 0.0199 ± 0.0012 | 0.0203 ± 0.0012 | 0.0212 ± 0.0014 | 0.0199 ± 0.0013 | 0.0217 ± 0.0013 | 0.0211 ± 0.0016 |
| 03/19/07 | 03/26/07 | 0.0180 ± 0.0010 | 0.0179 ± 0.0011 | 0.0184 ± 0.0011 | 0.0192 ± 0.0012 | 0.0189 ± 0.0011 | 0.0201 ± 0.0012 | 0.0157 ± 0.0012 |
| 03/27/07 | 04/02/07 | 0.0161 ± 0.0012 | 0.0162 ± 0.0012 | 0.0164 ± 0.0012 | 0.0187 ± 0.0015 | 0.0155 ± 0.0011 | 0.0178 ± 0.0012 | 0.0153 ± 0.0014 |
| 04/02/07 | 04/09/07 | 0.0075 ± 0.0008 | 0.0072 ± 0.0008 | 0.0076 ± 0.0009 | 0.0090 ± 0.0011 | 0.0082 ± 0.0008 | 0.0078 ± 0.0009 | 0.0081 ± 0.0011 |
| 04/09/07 | 04/16/07 | 0.0103 ± 0.0009 | 0.0108 ± 0.0010 | 0.0111 ± 0.0010 | 0.0126 ± 0.0012 | 0.0098 ± 0.0009 | 0.0120 ± 0.0011 | 0.0108 ± 0.0011 |
| 04/16/07 | 04/23/07 | 0.0169 ± 0.0011 | 0.0166 ± 0.0011 | 0.0158 ± 0.0011 | 0.0169 ± 0.0013 | 0.0163 ± 0.0011 | 0.0180 ± 0.0012 | 0.0173 ± 0.0014 |
| 04/23/07 | 04/30/07 | 0.0120 ± 0.0010 | 0.0116 ± 0.0010 | 0.0114 ± 0.0010 | 0.0127 ± 0.0012 | 0.0108 ± 0.0010 | 0.0124 ± 0.0011 | 0.0101 ± 0.0012 |
| 04/30/07 | 05/07/07 | 0.0127 ± 0.0010 | 0.0123 ± 0.0010 | 0.0124 ± 0.0011 | 0.0125 ± 0.0012 | 0.0122 ± 0.0010 | 0.0139 ± 0.0012 | 0.0116 ± 0.0012 |
| 05/07/07 | 05/14/07 | 0.0198 ± 0.0012 | 0.0191 ± 0.0012 | 0.0198 ± 0.0013 | 0.0157 ± 0.0011 | 0.0193 ± 0.0012 | 0.0197 ± 0.0013 | 0.0188 ± 0.0014 |
| 05/14/07 | 05/21/07 | 0.0160 ± 0.0011 | 0.0177 ± 0.0012 | 0.0165 ± 0.0012 | 0.0164 ± 0.0011 | 0.0174 ± 0.0012 | 0.0182 ± 0.0013 | 0.0171 ± 0.0014 |
| 05/21/07 | 05/28/07 | 0.0206 ± 0.0011 | 0.0219 ± 0.0012 | 0.0207 ± 0.0012 | 0.0195 ± 0.0011 | 0.0202 ± 0.0011 | 0.0230 ± 0.0012 | 0.0227 ± 0.0014 |
| 05/28/07 | 06/04/07 | 0.0255 ± 0.0014 | 0.0260 ± 0.0015 | 0.0234 ± 0.0014 | 0.0246 ± 0.0014 | 0.0264 ± 0.0015 | 0.0298 ± 0.0017 | 0.0273 ± 0.0018 |
| 06/04/07 | 06/11/07 | 0.0123 ± 0.0010 | 0.0115 ± 0.0010 | 0.0118 ± 0.0011 | 0.0120 ± 0.0010 | 0.0118 ± 0.0010 | 0.0142 ± 0.0012 | 0.0130 ± 0.0012 |
| 06/11/07 | 06/18/07 | 0.0181 ± 0.0012 | 0.0188 ± 0.0012 | 0.0180 ± 0.0013 | 0.0183 ± 0.0012 | 0.0168 ± 0.0012 | 0.0196 ± 0.0014 | 0.0207 ± 0.0014 |
| 06/18/07 | 06/25/07 | 0.0146 ± 0.0011 | 0.0151 ± 0.0011 | 0.0142 ± 0.0011 | 0.0153 ± 0.0010 | 0.0144 ± 0.0010 | 0.0159 ± 0.0012 | 0.0158 ± 0.0013 |
| 06/25/07 | 07/02/07 | 0.0192 ± 0.0012 | 0.0191 ± 0.0012 | 0.0207 ± 0.0013 | 0.0193 ± 0.0013 | 0.0189 ± 0.0012 | 0.0219 ± 0.0014 | 0.0227 ± 0.0015 |
| 1st 6-Month Summary | | | | | | | | |
| Maximum | | 0.0255 ± 0.0014 | 0.0260 ± 0.0015 | 0.0234 ± 0.0014 | 0.0246 ± 0.0015 | 0.0264 ± 0.0015 | 0.0298 ± 0.0017 | 0.0273 ± 0.0018 |
| Average | | 0.0165 | 0.0165 | 0.0164 | 0.0175 | 0.0164 | 0.0180 | 0.0170 |
| Minimum | | 0.0075 ± 0.0008 | 0.0072 ± 0.0008 | 0.0076 ± 0.0009 | 0.0090 ± 0.0010 | 0.0082 ± 0.0008 | 0.0078 ± 0.0009 | 0.0081 ± 0.0011 |

**Table B-5 (Continued)**

(Results in pCi/m$^3$ ± 2σ Uncertainty)

| START DATE | STOP DATE | Station #2 (I) Manor House Yard | Station #3 (I) East Field | Station #4 (I) Training Center Parking Lot | Station #5 (I) Creek Bridge | Station #6 (I) Main Parking Lot | Station #7 (I) West Fence Line | Station #13 (I) Substation 13 |
|---|---|---|---|---|---|---|---|---|
| 7/2/2007 | 7/9/2007 | 0.0223 ± 0.0013 | 0.0227 ± 0.0013 | 0.0223 ± 0.0014 | 0.0227 ± 0.0013 | 0.0225 ± 0.0013 | 0.0230 ± 0.0014 | 0.0234 ± 0.0015 |
| 7/9/2007 | 7/16/2007 | 0.0203 ± 0.0013 | 0.0193 ± 0.0012 | 0.0200 ± 0.0013 | 0.0194 ± 0.0012 | 0.0214 ± 0.0014 | 0.0213 ± 0.0014 | 0.0213 ± 0.0013 |
| 7/16/2007 | 7/23/2007 | 0.0230 ± 0.0013 | 0.0231 ± 0.0013 | 0.0210 ± 0.0013 | 0.0206 ± 0.0012 | 0.0252 ± 0.0014 | 0.0218 ± 0.0013 | 0.0236 ± 0.0015 |
| 7/23/2007 | 7/30/2007 | 0.0218 ± 0.0014 | 0.0223 ± 0.0013 | 0.0232 ± 0.0014 | 0.0230 ± 0.0013 | 0.0244 ± 0.0017 | 0.0236 ± 0.0016 | 0.0245 ± 0.0017 |
| 8/6/2007 | 8/13/2007 | 0.0240 ± 0.0014 | 0.0189 ± 0.0012 | 0.0227 ± 0.0013 | 0.0229 ± 0.0013 | 0.0259 ± 0.0015 | 0.0233 ± 0.0014 | 0.0248 ± 0.0014 |
| 7/30/2007 | 8/6/2007 | 0.0263 ± 0.0014 | 0.0284 ± 0.0015 | 0.0264 ± 0.0015 | 0.0265 ± 0.0014 | 0.0273 ± 0.0016 | 0.0280 ± 0.0015 | 0.0295 ± 0.0017 |
| 8/13/2007 | 8/20/2007 | 0.0116 ± 0.0010 | 0.0110 ± 0.0010 | 0.0132 ± 0.0011 | 0.0128 ± 0.0010 | 0.0155 ± 0.0012 | 0.0128 ± 0.0011 | 0.0159 ± 0.0014 |
| 8/20/2007 | 8/27/2007 | 0.0145 ± 0.0011 | 0.0110 ± 0.0010 | 0.0144 ± 0.0011 | 0.0144 ± 0.0011 | 0.0156 ± 0.0012 | 0.0150 ± 0.0012 | 0.0161 ± 0.0013 |
| 8/27/2007 | 9/3/2007 | 0.0232 ± 0.0012 | 0.0169 ± 0.0011 | 0.0216 ± 0.0012 | 0.0219 ± 0.0012 | 0.0225 ± 0.0013 | 0.0228 ± 0.0013 | 0.0236 ± 0.0014 |
| 9/3/2007 | 9/10/2007 | 0.0228 ± 0.0014 | 0.0191 ± 0.0014 | 0.0242 ± 0.0015 | 0.0231 ± 0.0014 | 0.0266 ± 0.0017 | 0.0264 ± 0.0016 | 0.0270 ± 0.0017 |
| 9/10/2007 | 9/17/2007 | 0.0152 ± 0.0012 | 0.0119 ± 0.0011 | 0.0141 ± 0.0012 | 0.0144 ± 0.0011 | 0.0136 ± 0.0012 | 0.0138 ± 0.0012 | 0.0138 ± 0.0012 |
| 9/17/2007 | 9/24/2007 | 0.0277 ± 0.0014 | 0.0226 ± 0.0013 | 0.0263 ± 0.0014 | 0.0284 ± 0.0014 | 0.0298 ± 0.0016 | 0.0306 ± 0.0016 | 0.0317 ± 0.0017 |
| 9/24/2007 | 10/1/2007 | 0.0195 ± 0.0013 | 0.0167 ± 0.0012 | 0.0214 ± 0.0014 | 0.0198 ± 0.0012 | 0.0202 ± 0.0014 | 0.0195 ± 0.0014 | 0.0229 ± 0.0015 |
| 10/1/2007 | 10/8/2007 | 0.0286 ± 0.0015 | 0.0231 ± 0.0014 | 0.0317 ± 0.0016 | 0.0304 ± 0.0015 | 0.0328 ± 0.0017 | 0.0308 ± 0.0016 | 0.0355 ± 0.0018 |
| 10/8/2007 | 10/15/2007 | 0.0121 ± 0.0011 | 0.0095 ± 0.0011 | 0.0111 ± 0.0011 | 0.0126 ± 0.0010 | 0.0118 ± 0.0012 | 0.0110 ± 0.0011 | 0.0124 ± 0.0012 |
| 10/15/2007 | 10/22/2007 | 0.0296 ± 0.0015 | 0.0243 ± 0.0014 | 0.0283 ± 0.0015 | 0.0315 ± 0.0015 | 0.0337 ± 0.0017 | 0.0316 ± 0.0016 | 0.0352 ± 0.0018 |
| 10/22/2007 | 10/29/2007 | 0.0155 ± 0.0012 | 0.0145 ± 0.0012 | 0.0169 ± 0.0012 | 0.0184 ± 0.0012 | 0.0179 ± 0.0013 | 0.0172 ± 0.0013 | 0.0183 ± 0.0014 |
| 10/29/2007 | 11/5/2007 | 0.0223 ± 0.0014 | 0.0183 ± 0.0013 | 0.0244 ± 0.0014 | 0.0249 ± 0.0013 | 0.0236 ± 0.0015 | 0.0243 ± 0.0015 | 0.0265 ± 0.0016 |
| 11/5/2007 | 11/12/2007 | 0.0187 ± 0.0012 | 0.0159 ± 0.0012 | 0.0201 ± 0.0013 | 0.0200 ± 0.0012 | 0.0201 ± 0.0013 | 0.0204 ± 0.0013 | 0.0208 ± 0.0014 |
| 11/12/2007 | 11/19/2007 | 0.0207 ± 0.0013 | 0.0164 ± 0.0011 | 0.0218 ± 0.0013 | 0.0220 ± 0.0012 | 0.0222 ± 0.0014 | 0.0219 ± 0.0013 | 0.0220 ± 0.0014 |
| 11/19/2007 | 11/26/2007 | 0.0159 ± 0.0012 | 0.0129 ± 0.0011 | 0.0167 ± 0.0012 | 0.0172 ± 0.0011 | 0.0165 ± 0.0027 | 0.0176 ± 0.0013 | 0.0179 ± 0.0014 |
| 11/26/2007 | 12/3/2007 | 0.0245 ± 0.0013 | 0.0198 ± 0.0012 | 0.0246 ± 0.0013 | 0.0242 ± 0.0012 | 0.0253 ± 0.0014 | 0.0256 ± 0.0014 | 0.0273 ± 0.0015 |
| 12/3/2007 | 12/10/2007 | 0.0187 ± 0.0011 | 0.0157 ± 0.0010 | 0.0180 ± 0.0011 | 0.0186 ± 0.0010 | 0.0205 ± 0.0012 | 0.0185 ± 0.0011 | 0.0210 ± 0.0013 |
| 12/10/2007 | 12/17/2007 | 0.0249 ± 0.0013 | 0.0210 ± 0.0013 | 0.0254 ± 0.0014 | 0.0251 ± 0.0013 | 0.0264 ± 0.0015 | 0.0263 ± 0.0014 | 0.0276 ± 0.0015 |
| 12/17/2007 | 12/24/2007 | 0.0278 ± 0.0014 | 0.0232 ± 0.0013 | 0.0279 ± 0.0014 | 0.0269 ± 0.0013 | 0.0282 ± 0.0014 | 0.0295 ± 0.0014 | 0.0329 ± 0.0016 |
| 12/24/2007 | 12/31/2007 | 0.0264 ± 0.0013 | 0.0228 ± 0.0013 | 0.0271 ± 0.0014 | 0.0272 ± 0.0013 | 0.0296 ± 0.0015 | 0.0285 ± 0.0014 | 0.0305 ± 0.0016 |
| 2nd 6-Month Summary | | | | | | | | |
| Maximum | | 0.0296 ± 0.0015 | 0.0284 ± 0.0015 | 0.0317 ± 0.0016 | 0.0315 ± 0.0015 | 0.0337 ± 0.0027 | 0.0316 ± 0.0016 | 0.0355 ± 0.0018 |
| Average | | 0.0215 | 0.0185 | 0.0217 | 0.0219 | 0.0230 | 0.0225 | 0.0241 |
| Minimum | | 0.0116 ± 0.0010 | 0.0095 ± 0.0010 | 0.0111 ± 0.0011 | 0.0126 ± 0.0010 | 0.0118 ± 0.0012 | 0.0110 ± 0.0011 | 0.0124 ± 0.0012 |
| 12-Month Summary | | | | | | | | |
| Maximum | | 0.0296 ± 0.0015 | 0.0284 ± 0.0015 | 0.0317 ± 0.0016 | 0.0315 ± 0.0015 | 0.0337 ± 0.0027 | 0.0316 ± 0.0017 | 0.0355 ± 0.0018 |
| Average | | 0.0190 | 0.0175 | 0.0191 | 0.0197 | 0.0197 | 0.0202 | 0.0205 |
| Minimum | | 0.0075 ± 0.0008 | 0.0072 ± 0.0008 | 0.0076 ± 0.0009 | 0.0090 ± 0.0010 | 0.0082 ± 0.0008 | 0.0078 ± 0.0009 | 0.0081 ± 0.0011 |

## Table B-6

Concentration of Beta Emitters in Air Particulates – Offsite Samples
Results in pCi/$m^3$ ± 2sigma Uncertainty

| START DATE | STOP DATE | Station #8 ( C ) Seabreeze | Station #9 (I) Webster | Station #10 ( C ) Walworth | Station #11 (I) Williamson | Station #12 ( C ) Sodus Point |
|---|---|---|---|---|---|---|
| 01/01/07 | 01/08/07 | 0.0162 ± 0.0018 | 0.0144 ± 0.0012 | 0.0162 ± 0.0012 | 0.0154 ± 0.0020 | 0.0154 ± 0.0013 |
| 01/08/07 | 01/15/07 | 0.0155 ± 0.0017 | 0.0139 ± 0.0011 | 0.0139 ± 0.0011 | 0.0139 ± 0.0019 | 0.0167 ± 0.0011 |
| 01/15/07 | 01/23/07 | 0.0183 ± 0.0017 | 0.0167 ± 0.0012 | 0.0177 ± 0.0012 | 0.0202 ± 0.0019 | 0.0251 ± 0.0014 |
| 01/23/07 | 01/29/07 | 0.0174 ± 0.0017 | 0.0147 ± 0.0011 | 0.0187 ± 0.0012 | 0.0212 ± 0.0023 | 0.0225 ± 0.0014 |
| 01/29/07 | 02/05/07 | 0.0201 ± 0.0018 | 0.0196 ± 0.0013 | 0.0206 ± 0.0012 | 0.0191 ± 0.0020 | 0.0228 ± 0.0013 |
| 02/05/07 | 02/12/07 | 0.0172 ± 0.0018 | 0.0153 ± 0.0012 | 0.0166 ± 0.0011 | 0.0166 ± 0.0020 | 0.0172 ± 0.0012 |
| 02/12/07 | 02/19/07 | 0.0181 ± 0.0016 | 0.0173 ± 0.0011 | 0.0184 ± 0.0011 | 0.0208 ± 0.0020 | 0.0208 ± 0.0012 |
| 02/19/07 | 02/26/07 | 0.0170 ± 0.0018 | 0.0143 ± 0.0012 | 0.0163 ± 0.0012 | 0.0177 ± 0.0020 | 0.0175 ± 0.0012 |
| 02/26/07 | 03/05/07 | 0.0160 ± 0.0017 | 0.0124 ± 0.0011 | 0.0125 ± 0.0010 | 0.0135 ± 0.0019 | 0.0133 ± 0.0011 |
| 03/05/07 | 03/12/07 | 0.0230 ± 0.0019 | 0.0190 ± 0.0013 | 0.0219 ± 0.0013 | 0.0217 ± 0.0020 | 0.0235 ± 0.0013 |
| 03/12/07 | 03/19/07 | 0.0214 ± 0.0018 | 0.0191 ± 0.0013 | 0.0212 ± 0.0013 | 0.0213 ± 0.0023 | 0.0238 ± 0.0015 |
| 03/19/07 | 03/26/07 | 0.0199 ± 0.0016 | 0.0143 ± 0.0010 | 0.0186 ± 0.0011 | 0.0172 ± 0.0018 | 0.0180 ± 0.0011 |
| 03/27/07 | 04/02/07 | 0.0183 ± 0.0020 | 0.0163 ± 0.0013 | 0.0186 ± 0.0013 | 0.0160 ± 0.0022 | 0.0164 ± 0.0013 |
| 04/02/07 | 04/09/07 | 0.0080 ± 0.0014 | 0.0081 ± 0.0010 | 0.0081 ± 0.0009 | 0.0080 ± 0.0017 | 0.0092 ± 0.0010 |
| 04/09/07 | 04/16/07 | 0.0128 ± 0.0016 | 0.0112 ± 0.0010 | 0.0106 ± 0.0009 | 0.0102 ± 0.0017 | 0.0103 ± 0.0010 |
| 04/16/07 | 04/23/07 | 0.0176 ± 0.0017 | 0.0163 ± 0.0012 | 0.0165 ± 0.0011 | 0.0172 ± 0.0020 | 0.0171 ± 0.0012 |
| 04/23/07 | 04/30/07 | 0.0120 ± 0.0016 | 0.0116 ± 0.0011 | 0.0117 ± 0.0010 | 0.0110 ± 0.0018 | 0.0121 ± 0.0011 |
| 04/30/07 | 05/07/07 | 0.0145 ± 0.0016 | 0.0119 ± 0.0011 | 0.0134 ± 0.0011 | 0.0130 ± 0.0019 | 0.0145 ± 0.0012 |
| 05/07/07 | 05/14/07 | 0.0239 ± 0.0020 | 0.0213 ± 0.0014 | 0.0221 ± 0.0013 | 0.0219 ± 0.0014 | 0.0203 ± 0.0013 |
| 05/14/07 | 05/21/07 | 0.0209 ± 0.0017 | 0.0231 ± 0.0014 | 0.0231 ± 0.0013 | 0.0179 ± 0.0012 | 0.0167 ± 0.0012 |
| 05/21/07 | 05/28/07 | 0.0238 ± 0.0020 | 0.0237 ± 0.0015 | 0.0228 ± 0.0013 | 0.0228 ± 0.0012 | 0.0204 ± 0.0012 |
| 05/28/07 | 06/04/07 | 0.0316 ± 0.0024 | 0.0289 ± 0.0017 | 0.0300 ± 0.0016 | 0.0302 ± 0.0016 | 0.0281 ± 0.0016 |
| 06/04/07 | 06/11/07 | 0.0162 ± 0.0018 | 0.0126 ± 0.0012 | 0.0139 ± 0.0011 | 0.0132 ± 0.0011 | 0.0118 ± 0.0018 |
| 06/11/07 | 06/18/07 | 0.0198 ± 0.0018 | 0.0189 ± 0.0014 | 0.0207 ± 0.0013 | 0.0187 ± 0.0013 | 0.0202 ± 0.0022 |
| 06/18/07 | 06/25/07 | 0.0157 ± 0.0017 | 0.0153 ± 0.0013 | 0.0161 ± 0.0012 | 0.0150 ± 0.0012 | 0.0160 ± 0.0020 |
| 06/25/07 | 07/02/07 | 0.0236 ± 0.0019 | 0.0219 ± 0.0014 | 0.0214 ± 0.0013 | 0.0222 ± 0.0013 | 0.0212 ± 0.0021 |
| 1st 6-Month Summary | | | | | | |
| Maximum | | 0.0316 ± 0.0024 | 0.0289 ± 0.0017 | 0.0300 ± 0.0016 | 0.0302 ± 0.0023 | 0.0281 ± 0.0022 |
| Average | | 0.0184 | 0.0166 | 0.0178 | 0.0175 | 0.0181 |
| Minimum | | 0.0080 ± 0.0014 | 0.0081 ± 0.0010 | 0.0081 ± 0.0009 | 0.0080 ± 0.0011 | 0.0092 ± 0.0010 |

**Table B-6 (Continued)**

Concentration of Beta Emitters in Air Particulates – Offsite Samples
(Results in pCi/$m^3$ ± 2σ Uncertainty)

| START DATE | STOP DATE | Station #8 ( C ) Seabreeze | Station #9 (I) Webster | Station #10 ( C ) Walworth | Station #11 (I) Williamson | Station #12 ( C ) Sodus Point |
|---|---|---|---|---|---|---|
| 7/2/2007 | 7/9/2007 | 0.0247 ± 0.0020 | 0.0230 ± 0.0015 | 0.0233 ± 0.0014 | 0.0232 ± 0.0014 | 0.0229 ± 0.0022 |
| 7/9/2007 | 7/16/2007 | 0.0197 ± 0.0017 | 0.0204 ± 0.0013 | 0.0226 ± 0.0013 | 0.0195 ± 0.0013 | 0.0210 ± 0.0022 |
| 7/16/2007 | 7/23/2007 | 0.0223 ± 0.0021 | 0.0222 ± 0.0016 | 0.0229 ± 0.0013 | 0.0219 ± 0.0012 | 0.0215 ± 0.0020 |
| 7/23/2007 | 7/30/2007 | 0.0262 ± 0.0021 | 0.0231 ± 0.0015 | 0.0239 ± 0.0015 | 0.0228 ± 0.0015 | 0.0237 ± 0.0025 |
| 8/6/2007 | 8/13/2007 | 0.0241 ± 0.0014 | 0.0238 ± 0.0015 | 0.0227 ± 0.0013 | 0.0355 ± 0.0030 | 0.0227 ± 0.0020 |
| 7/30/2007 | 8/6/2007 | 0.0305 ± 0.0022 | 0.0272 ± 0.0016 | 0.0287 ± 0.0015 | 0.0297 ± 0.0015 | 0.0293 ± 0.0024 |
| 8/13/2007 | 8/20/2007 | 0.0146 ± 0.0011 | 0.0144 ± 0.0012 | 0.0133 ± 0.0011 | 0.0133 ± 0.0011 | 0.0164 ± 0.0022 |
| 8/20/2007 | 8/27/2007 | 0.0150 ± 0.0011 | 0.0156 ± 0.0013 | 0.0153 ± 0.0011 | 0.0157 ± 0.0011 | 0.0166 ± 0.0018 |
| 8/27/2007 | 9/3/2007 | 0.0231 ± 0.0012 | 0.0231 ± 0.0014 | 0.0232 ± 0.0013 | 0.0248 ± 0.0014 | 0.0244 ± 0.0022 |
| 9/3/2007 | 9/10/2007 | 0.0237 ± 0.0014 | 0.0274 ± 0.0017 | 0.0263 ± 0.0016 | 0.0269 ± 0.0016 | 0.0262 ± 0.0026 |
| 9/10/2007 | 9/17/2007 | 0.0141 ± 0.0011 | 0.0150 ± 0.0013 | 0.0146 ± 0.0011 | 0.0145 ± 0.0011 | 0.0147 ± 0.0020 |
| 9/17/2007 | 9/24/2007 | 0.0281 ± 0.0014 | 0.0303 ± 0.0017 | 0.0291 ± 0.0015 | 0.0312 ± 0.0015 | 0.0304 ± 0.0025 |
| 9/24/2007 | 10/1/2007 | 0.0205 ± 0.0013 | 0.0208 ± 0.0015 | 0.0216 ± 0.0014 | 0.0230 ± 0.0013 | 0.0213 ± 0.0021 |
| 10/1/2007 | 10/8/2007 | 0.0321 ± 0.0015 | 0.0324 ± 0.0017 | 0.0302 ± 0.0015 | 0.0326 ± 0.0017 | 0.0352 ± 0.0028 |
| 10/8/2007 | 10/15/2007 | 0.0153 ± 0.0011 | 0.0176 ± 0.0013 | 0.0165 ± 0.0011 | 0.0114 ± 0.0011 | 0.0097 ± 0.0020 |
| 10/15/2007 | 10/22/2007 | 0.0336 ± 0.0015 | 0.0349 ± 0.0018 | 0.0320 ± 0.0016 | 0.0331 ± 0.0015 | 0.0306 ± 0.0023 |
| 10/22/2007 | 10/29/2007 | 0.0131 ± 0.0012 | 0.0148 ± 0.0014 | 0.0144 ± 0.0013 | 0.0141 ± 0.0012 | 0.0139 ± 0.0022 |
| 10/29/2007 | 11/5/2007 | 0.0233 ± 0.0013 | 0.0239 ± 0.0015 | 0.0250 ± 0.0014 | 0.0258 ± 0.0014 | 0.0262 ± 0.0024 |
| 11/5/2007 | 11/12/2007 | 0.0190 ± 0.0012 | 0.0195 ± 0.0014 | 0.0185 ± 0.0012 | 0.0198 ± 0.0013 | 0.0185 ± 0.0021 |
| 11/12/2007 | 11/19/2007 | 0.0218 ± 0.0012 | 0.0207 ± 0.0014 | 0.0225 ± 0.0013 | 0.0228 ± 0.0013 | 0.0216 ± 0.0021 |
| 11/19/2007 | 11/26/2007 | 0.0175 ± 0.0012 | 0.0161 ± 0.0013 | 0.0151 ± 0.0012 | 0.0150 ± 0.0012 | 0.0154 ± 0.0021 |
| 11/26/2007 | 12/3/2007 | 0.0232 ± 0.0013 | 0.0221 ± 0.0014 | 0.0208 ± 0.0012 | 0.0243 ± 0.0013 | 0.0244 ± 0.0022 |
| 12/3/2007 | 12/10/2007 | 0.0185 ± 0.0011 | 0.0177 ± 0.0012 | 0.0215 ± 0.0012 | 0.0189 ± 0.0011 | 0.0203 ± 0.0019 |
| 12/10/2007 | 12/17/2007 | 0.0194 ± 0.0011 | 0.0227 ± 0.0015 | 0.0277 ± 0.0015 | 0.0248 ± 0.0014 | 0.0254 ± 0.0023 |
| 12/17/2007 | 12/24/2007 | 0.0237 ± 0.0012 | 0.0264 ± 0.0014 | 0.0278 ± 0.0013 | 0.0292 ± 0.0013 | 0.0270 ± 0.0022 |
| 12/24/2007 | 12/31/2007 | 0.0289 ± 0.0014 | 0.0246 ± 0.0014 | 0.0292 ± 0.0014 | 0.0290 ± 0.0014 | 0.0290 ± 0.0023 |
| 2nd 6-Month Summary | | | | | | |
| Maximum | | 0.0336 ± 0.0022 | 0.0349 ± 0.0018 | 0.0320 ± 0.0016 | 0.0355 ± 0.0030 | 0.0352 ± 0.0028 |
| Average | | 0.0221 | 0.0223 | 0.0226 | 0.0232 | 0.0226 |
| Minimum | | 0.0131 ± 0.0011 | 0.0144 ± 0.0012 | 0.0133 ± 0.0011 | 0.0114 ± 0.0011 | 0.0097 ± 0.0018 |
| 12-Month Summary | | | | | | |
| Maximum | | 0.0336 ± 0.0024 | 0.0349 ± 0.0018 | 0.0320 ± 0.0016 | 0.0355 ± 0.0030 | 0.0352 ± 0.0028 |
| Average | | 0.0203 | 0.0195 | 0.0202 | 0.0204 | 0.0204 |
| Minimum | | 0.0080 ± 0.0011 | 0.0081 ± 0.0010 | 0.0081 ± 0.0009 | 0.0080 ± 0.0011 | 0.0092 ± 0.0010 |

**Table B-7**

Concentration of Gamma Emitters in Air Particulates
(Results in units of $10^{-3}$pCi/$m^3$ ± 2σ)

| Location | First Quarter | Second Quarter | Third Quarter | Fourth Quarter |
|---|---|---|---|---|
| Station #2<br>Manor House Yard | * | * | * | * |
| Station #3<br>East Field | * | * | * | * |
| Station #4<br>Training Center Parking Lot | * | * | * | * |
| Station #5<br>Creek Bridge | Cs-137<br>0.292±0.187 | * | * | * |
| Station #6<br>Main Parking Lot | * | * | * | * |
| Station #7<br>West Fence Line | * | * | * | * |
| Station #8<br>Seabreeze | * | * | * | * |
| Station #9<br>Webster | * | * | * | * |
| Station #10<br>Walworth | * | * | * | * |
| Station #11<br>Williamson | * | * | * | * |
| Station #12<br>Sodus Point | * | * | * | * |
| Station #13<br>Substation 13 | * | * | * | * |

* All Non-Natural Gamma Emitters <MDA

**Table B-8**

Concentration of Gamma Emitters in Vegetation Samples
(Results in units of pCi/kg (wet) ± 2σ)

| Location | Sample Date | Sample Type | Gamma Emitters |
|---|---|---|---|
| South East Garden | 09/19/2007 | Grapes | * |
| | 09/19/2007 | Apples | * |
| East South East Garden | 07/16/2007 | Raspberries | * |
| | 07/16/2007 | Squash | * |
| | 07/30/2007 | Cucumbers | * |
| | 07/30/2007 | Green Leafy Vegetables | * |
| | 09/04/2007 | Cabbage | * |
| | 09/04/2007 | Tomatoes | 22±8 (Cs-137) |
| Brockport (Control) | 08/11/2007 | Green Leafy Vegetables | * |
| | 09/26/2007 | Cabbage | * |
| Lyndonville (Control) | 08/11/2007 | Raspberries | * |
| South Southeast Garden | 07/24/2007 | Green Leafy Vegetables | * |
| | 08/14/2007 | Cucumbers | * |
| | 09/04/2007 | Cabbage | * |
| | 09/04/2007 | Tomatoes | * |
| | 09/19/2007 | Apples | * |
| South | 09/19/2007 | Apples | * |
| South West | 09/19/2007 | Apples | * |
| West | 09/19/2007 | Apples | * |
| South South West | 09/19/2007 | Apples | * |
| West South West | 09/19/2007 | Apples | * |
| Hilton (Control) | 08/07/2007 | Tomatoes | * |
| | 08/07/2007 | Squash | * |
| | 08/07/2007 | Cucumbers | * |
| | 09/20/2007 | Grapes | * |
| | 09/20/2007 | Apples | * |

* All Non-Natural Gamma Emitters <MDA

## Table B-9

Concentration of Gamma Emitters (including I-131) in Milk
(Results in units of pCi/Liter ± 2σ)

| Location | Sample Date | Gamma Emitters |
|---|---|---|
| FARM A | 01/08/07 | * |
| | 02/19/07 | * |
| | 03/12/07 | * |
| | 04/17/07 | * |
| | 05/08/07 | * |
| | 06/13/07 | * |
| | 06/26/07 | * |
| | 07/16/07 | * |
| | 07/24/07 | * |
| | 08/13/07 | * |
| | 08/21/07 | * |
| | 09/04/07 | * |
| | 09/17/07 | * |
| | 10/01/07 | * |
| | 10/15/07 | * |
| | 10/29/07 | * |
| | 11/12/07 | * |
| | 12/10/07 | * |
| FARM C | 01/08/07 | * |
| | 02/19/07 | * |
| | 03/12/07 | * |
| | 04/17/07 | * |
| | 05/08/07 | * |
| | 06/13/07 | * |
| | 06/26/07 | * |
| | 07/16/07 | * |
| | 07/24/07 | * |
| | 08/13/07 | * |
| | 08/21/07 | * |
| | 09/04/07 | * |
| | 09/17/07 | * |
| | 10/01/07 | 3.6±1.89 (Cs-137) |
| | 10/15/07 | * |
| | 10/29/07 | * |
| | 11/12/07 | * |
| | 12/10/07 | * |

* All Non-Natural Gamma Emitters <MDA

**Table B-10**

Typical MDA Ranges for Gamma Spectrometry

| Selected Nuclides | Water pCi/l | Fish pCi/Kg | Sediment pCi/Kg | Particulate $10^{-3}$ pCi/$m^3$ | Vegetation pCi/Kg | Milk pCi/l |
|---|---|---|---|---|---|---|
| H-3 | 223 -- 779 | -- | -- | -- | -- | -- |
| Na-22 | 4 – 10 | 27 – 51 | 47 – 160 | 0.4 – 1.0 | 21 – 68 | 6 – 13 |
| Cr-51 | 28 – 77 | 237 – 777 | 353 – 1380 | 14 – 27 | 143 – 380 | 31 – 61 |
| Mn-54 | 4 – 8 | 20-39 | 39 – 118 | 0.5 – 0.9 | 15 – 56 | 5 – 10 |
| Co-58 | 4 – 9 | 33 – 50 | 47 – 156 | 0.8 – 1.6 | 20 – 54 | 5 – 10 |
| Fe-59 | 8 – 11 | 69 – 191 | 118-436 | 3 – 6 | 45 – 144 | 11 – 24 |
| Co-60 | 4 – 9 | 24 – 47 | 49 – 144 | 0.5 – 1.0 | 21 – 70 | 5 – 12 |
| Zn-65 | 8 – 21 | 53 – 95 | 102 – 365 | 3 – 3 | 45 – 166 | 12 – 25 |
| Nb-95 | 4 – 11 | 39 – 100 | 53 – 222 | 2 – 3 | 23 – 61 | 5 – 9 |
| Zr-95 | 6 – 16 | 47 – 94 | 75 – 259 | 1 – 3 | 34 – 102 | 8 – 16 |
| Ru-106 | 34 – 71 | 185 – 267 | 319 – 922 | 4 – 6 | 149 – 440 | 37 – 75 |
| Ag-110m | 3 – 8 | 20 – 31 | 37 – 142 | 0.4 – 0.8 | 16 – 52 | 4 – 8 |
| Te-129m | 42 – 119 | 364 – 1170 | 538 – 2280 | 19 – 33 | 246 – 674 | 50 – 98 |
| I-131 | 4 – 29** | 100 – 12200 | 122 – 1300 | 161 – 827* | 21 – 479 | 4 – 9*** |
| Cs-134 | 3 – 7 | 18 – 27 | 33 – 117 | 0.4 – 0.7 | 14 – 51 | 4 – 8 |
| Cs-137 | 4 – 8 | 21 – 32 | 39 – 125 | 0.3 – 0.7 | 18 – 57 | 5 – 10 |
| Ba-140 | 6 – 29 | 59 – 2250 | 103 – 916 | 33 – 87 | 29 – 137 | 6 – 14 |
| La-140 | 6 – 29 | 59 – 2250 | 103 – 916 | 33 – 87 | 29 – 137 | 6 – 14 |
| Ce-144 | 18 – 39 | 61 – 80 | 140 – 413 | 1 – 2 | 64 – 195 | 20 - 43 |

* The MDA range for I-131 measured on a charcoal cartridge is typically 6.3 x $10^{-3}$ to 2.3 x $10^{-2}$ pCi/$m^3$

** The MDA range for I-131 measured in drinking water is typically 0.5 to 1.1 pCi/L

***The MDA range for I-131 measured in milk is typically 0.6 to 0.9 pCi/L

**Table B-11**

Typical LLDs for Gamma Spectrometry

| Selected Nuclides | Water pCi/l | Fish pCi/Kg | Sediment pCi/Kg | Particulate* $10^{-3}$ pCi/$m^3$ | Vegetation pCi/Kg | Milk pCi/l |
|---|---|---|---|---|---|---|
| Na-22 | 4.1 | 24 | 59 | 3.7 | 29 | 6 |
| Cr-51 | 26 | 120 | 327 | 16 | 144 | 30 |
| Mn-54 | 3.8 | 20 | 49 | 2.8 | 24 | 5 |
| Co-58 | 3.9 | 20 | 36 | 2.8 | 19 | 5 |
| Fs-59 | 7.8 | 45 | 103 | 2.8 | 50 | 11 |
| Co-60 | 4.4 | 24 | 60 | 2.7 | 26 | 6 |
| Zn-65 | 7.9 | 54 | 141 | 7.0 | 57 | 12 |
| Nb-95 | 4.2 | 18 | 60 | 2.4 | 24 | 4 |
| Zr-95 | 6.5 | 35 | 79 | 5.0 | 43 | 8 |
| Ru-106 | 35 | 172 | 458 | 25 | 196 | 39 |
| Ag-110m | 3.6 | 15 | 42 | 2.2 | 21 | 4 |
| Te-129m | 41 | 170 | 551 | 27 | 248 | 50 |
| I-131 | 3.2* | 13 | 41 | 1.9 ** | 19 | 4* |
| Cs-134 | 3.3 | 17 | 44 | 2.4 | 20 | 4 |
| Cs-137 | 3.9 | 17 | 58 | 2.8 | 26 | 5 |
| Ba-140 | 4.8 | 19 | 67 | 3.9 | 33 | 5 |
| La-140 | 4.8 | 19 | 67 | 3.9 | 33 | 5 |
| Ce-144 | 17 | 58 | 191 | 8.9 | 81 | 20 |

* The LLD for I-131 measured in drinking water and milk is 0.5 pCi/L

**The LLD for I-131 measured on charcoal filter is 9.4 x $10^{-3}$ pCi/$m^3$

**Table B-12**

Direct Radiation
(Results in Units of mR/90 days ± 2σ)

| Station | Location | First Quarter | Second Quarter | Third Quarter | Fourth Quarter |
|---|---|---|---|---|---|
| 2 | Onsite-Manor House Yard | 12.1 ± 3.0 | 11.8 ± 3.0 | 13.2 ± 3.3 | 13.0 ± 3.3 |
| 3 | Onsite-In field approximately 200 ft SE of station #2 | 11.9 ± 3.0 | 11.9 ± 3.0 | 13.8 ± 3.5 | 13.4 ± 3.4 |
| 4 | Onsite-Training Center yard driveway circle | 12.4 ± 3.1 | 12.4 ± 3.1 | 13.4 ± 3.4 | 13.4 ± 3.4 |
| 5 | Onsite-Between creek and plant entry road | 12.9 ± 3.2 | 12.7 ± 3.2 | 13.9 ± 3.5 | 13.7 ± 3.5 |
| 6 | Onsite-SW side of plant parking lot | 10.1 ± 2.6 | 10.1± 2.5 | 9.9 ± 2.5 | 10.2 ± 2.6 |
| 7 | Onsite-utility pole along West plant fence | 12.9 ± 3.3 | 14.3 ± 3.6 | 14.0 ± 3.5 | 13.0 ± 3.3 |
| 8 [1] | Topper Drive-Irondequoit, Seabreeze Substation #51 | 11.1 ± 2.8 | 10.8 ± 2.7 | 11.5 ± 2.9 | 11.2 ± 2.8 |
| 9 | Phillips Road-Webster, intersection with Highway #104, Substation #74 | 10.5 ± 2.6 | 10.8 ± 2.7 | 11.4 ± 2.9 | 11.4 ± 2.9 |
| 10 [1] | Atlantic Avenue-Walworth, Substation #230 | 10.1 ± 2.5 | 9.8 ± 2.5 | 10.6 ± 2.7 | 10.3 ± 2.6 |
| 11 | W. Main Street-Williamson, Substation #207 | 10.5 ± 2.6 | 10.6 ± 2.7 | 10.3 ± 2.6 | 11.0 ± 2.8 |
| 12 [1] | 12 Seaman Avenue-Sodus Point-Off Lake Road by Sewer district, Substation #209 | 10.5 ± 2.7 | 11.5 ± 2.9 | 11.6 ± 2.9 | 12.1 ± 3.0 |
| 13 | At corner of plant-controlled area fence and dogleg to West | 11.9 ± 3.0 | 12.2 ± 3.1 | 13.3 ± 3.3 | 12.6 ± 3.2 |
| 14 | NW corner of field along lake shore | 11.1 ± 2.8 | 11.9 ± 3.0 | 12.9 ± 3.2 | 12.5 ± 3.1 |
| 15 | Field access road, west of orchard, approximately 3000' West of plant | 11.8 ± 3.0 | 12.7 ± 3.2 | 13.4 ± 3.4 | 13.1 ± 3.3 |

**Table B-12 (Continued)**

Direct Radiation
(Results in Units of mR/90 days ± 2σ)

| Station | Location | First Quarter | Second Quarter | Third Quarter | Fourth Quarter |
|---|---|---|---|---|---|
| 16 | SW Corner of orchard, approximately 3000' West of plant, approximately 200' North of Lake Road | 11.4 ± 2.9 | 12.1 ± 3.0 | 13.3 ± 3.3 | 12.9 ± 3.3 |
| 17 | Utility pole in orchard, approximately 75" North of Lake Road | 11.1 ± 2.8 | 11.7 ± 2.9 | 12.4 ± 3.1 | 12.4 ± 3.1 |
| 18 | Approximately 30' North of NE corner of Substation 13A fence | 10.0 ± 2.5 | 10.0 ± 2.5 | 10.3 ± 2.6 | 10.4 ± 2.6 |
| 19 | On NW corner of house 100' East of plant access road | 10.7 ± 2.7 | 10.3 ± 2.6 | 10.5 ± 2.6 | 10.7 ± 2.7 |
| 20 | Approximately 150' West of Ontario Center Road and approximately 170' South of Lake Road | 11.6 ± 2.9 | 11.8 ± 3.0 | 12.5 ± 3.2 | 12.6 ± 3.2 |
| 21 | North side of Lake Road, approximately 200' East of Ontario Center Road | 10.9 ± 2.8 | 11.2 ± 2.8 | 12.0 ± 3.0 | 12.2 ± 3.1 |
| 22 | North side of Lake Road, SE, property owner | 10.9 ± 2.7 | 11.1 ± 2.8 | 11.4 ± 2.9 | 10.9 ± 2.8 |
| 23 | East property line, midway between Lake Road and Lake shore | 10.8 ± 2.7 | 12.2 ± 3.1 | 13.1 ± 3.3 | 12.9 ± 3.2 |
| 24 | Lake shore near NE corner of property | 11.8 ± 3.0 | 12.4 ± 3.1 | 12.8 ± 3.2 | 12.9 ± 3.3 |
| 25 [1] | Substation #73, Klem Road, adjacent to 897 Klem Road | 10.3± 2.6 | 10.4 ± 2.6 | 10.7 ± 2.7 | 10.7 ± 2.0 |
| 26 [1] | Service Center, Plank Road, West of 250 | 10.6 ± 2.7 | 11.0 ± 2.8 | 11.4 ± 2.9 | 11.1 ± 2.7 |
| 27 [1] | Atlantic Avenue at Knollwood Drive utility pole, North side of road | 10.5 ± 2.6 | 11.5 ± 2.9 | 12.3 ± 3.1 | 11.7 ± 3.0 |

**Table B-12 (Continued)**

Direct Radiation
(Results in Units of mR/90 days ± 2σ)

| | | | | | |
|---|---|---|---|---|---|
| 28 [1] | Substation #193, Marion, behind Stanton Ag. Service, North Main Street | 10.0 ± 2.5 | 11.1 ± 2.8 | 11.2 ± 2.8 | 10.8 ± 2.7 |
| 29 [1] | Substation #208, Town Line Road (CR-118), 1000 ' North of Route 104 | 10.4 ± 2.6 | 10.6 ± 2.7 | 11.2 ± 2.8 | 11.0 ± 2.8 |
| 30 [1] | District Office, Sodus, on pole, West side of bldg | 11.3 ± 2.9 | 10.7 ± 2.7 | 11.2 ± 2.8 | 10.7 ± 2.7 |
| 31 | Lake Road, pole 20' North of road, 500' East of Salt Road | 11.2 ± 2.8 | 12.5 ± 3.2 | 13.2 ± 3.3 | 12.0 ± 3.0 |
| 32 | Woodard Road at County Line Road, pole @ BW corner | 10.4 ± 2.6 | 10.2 ± 2.6 | 10.8 ± 2.7 | 10.8 ± 2.7 |
| 33 | County Line Road at RR tracks, pole approximately 100' East along tracks | 10.5 ± 2.6 | 10.8 ± 2.7 | 10.5 ± 2.6 | 10.8 ± 2.7 |
| 34 | Lincoln Road, pole midway between Ridge Road and Route 104 | 12.2 ± 3.1 | 12.8 ± 3.2 | 13.2 ± 3.3 | 13.2 ± 3.3 |
| 35 | Transmission Right of Way, North of Clevenger Road on pole | 11.3 ± 2.8 | 12.7 ± 3.2 | 13.8 ± 3.5 | 15.4 ± 3.9 |
| 36 | Substation #205, Route 104, East of Ontario Center Road, North side of fence | 10.7 ± 2.7 | 10.7 ± 2.7 | 11.4 ± 2.9 | 11.3 ± 2.8 |
| 37 | Rail Road Avenue, pole at 2048 | 10.1 ± 2.6 | 10.4 ± 2.6 | 10.5 ± 2.7 | 10.1 ± 2.5 |
| 38 | Fisher Road at RR Tracks, pole East of road | 11.5 ± 2.9 | 12.1 ± 3.1 | 12.5 ± 3.1 | 11.5 ± 2.9 |
| 39 | Seeley Road, Pole South side 100' West of intersection with Stony Lonesome Road | 11.0 ± 2.8 | 12.5 ± 3.2 | 12.9 ± 3.3 | 11.8 ± 3.0 |
| 40 | Lake Road at Stoney Lonesome Road, pole at SE corner | 10.6 ± 2.7 | 11.4 ± 2.9 | 10.5 ± 2.7 | 11.0 ± 2.8 |

[1] Control Location

**Table B-13**

Groundwater Monitoring Wells

| Location | Depth to Water (ft) | Sample Date | Tritium |
|---|---|---|---|
| Groundwater AVT M. 17' | 3.5 | 1/16/07 | * |
| | 3.6 | 2/2/07 | * |
| | 1.8 | 3/29/07 | * |
| | 3.3 | 4/26/07 | * |
| | 4.4 | 5/31/07 | * |
| | 4.4 | 6/26/07 | * |
| | 4.9 | 7/31/07 | * |
| | 4.9 | 8/15/07 | * |
| | 4.9 | 9/25/07 | * |
| | (1) | 10/28/07 | * |
| | 2.0 | 11/29/07 | * |
| | 4.9 | 12/20/07 | * |
| Groundwater AVT N. 6' | 3.2' | 1/16/07 | * |
| | 3.3' | 2/2/07 | * |
| | 1.6' | 3/29/07 | * |
| | 3.2' | 4/26/07 | * |
| | 4.3' | 5/31/07 | * |
| | 4.7' (recount) | 6/26/07 | * |
| | 4.7' | 7/31/07 | * |
| | 5.0' | 8/15/07 | * |
| | 4.6' | 9/25/07 | * |
| | (1) | 10/28/07 | * |
| | 1.6' | 11/29/07 | * |
| | 3.9' | 12/20/07 | * |
| Groundwater AVT S. 13' | 3.2' | 1/16/07 | * |
| | 3.0' | 2/2/07 | * |
| | 1.0' | 3/29/07 | * |
| | 3.0' | 4/26/07 | * |
| | 4.0' | 5/31/07 | * |
| | 4.3' | 6/26/07 | * |
| | 4.4' | 7/31/07 | * |
| | 4.9' | 8/15/07 | * |
| | 4.6' | 9/25/07 | * |
| | (1) | 10/28/07 | * |
| | 1.3' | 11/29/07 | * |
| | 5.2' | 12/20/07 | * |

**Table B-13 (Continued)**

Groundwater Monitoring Wells

| Location | Depth to Water (ft) | Sample Date | Tritium |
|---|---|---|---|
| Groundwater by Butler Bldg. | 7.4' | 1/16/07 | * |
| | 7.7' | 2/7/07 | * |
| | 6.4' | 3/29/07 | * |
| | 7.0' | 4/26/07 | * |
| | 7.6' | 5/31/07 | * |
| | 8.6' | 6/26/07 | * |
| | 10.5' | 7/31/07 | * |
| | 12.6' | 8/15/07 | * |
| | 15.6' | 9/25/07 | * |
| | (1) | 10/28/07 | * |
| | 13.6' | 11/29/07 | * |
| | 12.8' | 12/20/07 | * |
| Groundwater SE of CSB | 17.1' | 1/16/07 | * |
| | 17.4' | 2/2/07 | * |
| | 14.2' | 3/29/07 | * |
| | 15.8' | 4/26/07 | * |
| | 17.6' | 5/31/07 | * |
| | 17.9' | 6/26/07 | * |
| | 17.4' | 7/31/07 | * |
| | 18.4' | 8/15/07 | * |
| | 18.3' | 9/26/07 | * |
| | (1) | 10/28/07 | * |
| | 16.3' | 11/29/07 | * |
| | 16.6' | 12/20/07 | * |
| Pond | | 1/16/07 | * |
| | | 3/29/07 | * |
| | | 4/26/07 | * |
| | Prior to drain | 5/8/07 | * |
| | | 5/31/07 | * |
| | | 8/15/07 | * |
| | | 10/28/07 | * |
| Screen House West | 6.0' | 1/16/07 | * |
| | 6.0' | 3/29/07 | * |
| | 6.2' | 4/26/07 | * |
| | 6.4' | 5/31/07 | * |
| | 6.2' | 6/26/07 | * |
| | 12.3' | 7/31/07 | * |
| | 12.7' | 8/15/07 | * |
| | 9.7' | 9/25/07 | * |
| | (1) | 10/28/07 | * |
| | 12.0' | 11/29/07 | * |

**Table B-13 (Continued)**

Groundwater Monitoring Wells

| Location | Depth to Water (ft) | Sample Date | Tritium |
|---|---|---|---|
| Storm Drain F | | 1/16/07 | * |
| | | 2/2/07 | * |
| | | 3/29/07 | * |
| | | 4/26/07 | * |
| | | 5/31/07 | * |
| | | 6/26/07 | * |
| | | 7/31/07 | * |
| | | 8/15/07 | * |
| | | 9/25/07 | * |
| | | 10/28/07 | * |
| | | 11/29/07 | * |
| | | 12/20/07 | * |
| Storm Drain G | | 1/16/07 | * |
| | | 3/29/07 | * |
| | | 4/26/07 | * |
| | | 5/31/07 | * |
| | | 6/26/07 | * |
| | | 7/31/07 | * |
| | | 8/15/07 | * |
| | | 9/25/07 | * |
| | | 10/28/07 | * |
| | | 11/29/07 | * |
| | | 12/20/07 | * |
| Storm Drain H | | 1/16/07 | * |
| | | 2/2/07 | * |
| | | 3/29/07 | * |
| | | 4/26/07 | * |
| | | 9/26/07 | * |
| | | 11/29/07 | * |
| | | 12/20/07 | * |
| Storm Drain I | | 1/16/07 | * |
| | | 3/29/07 | * |
| | | 4/26/07 | * |
| | | 5/31/07 | * |
| | | 6/26/07 | * |
| | | 7/31/07 | * |
| | | 8/15/07 | * |
| | | 9/25/07 | * |
| | | 10/28/07 | * |
| | | 11/29/07 | * |
| | | 12/20/07 | * |

* – Analytical results less than MDA
(1) – Depth to water information not collected.

# APPENDIX C

## Quality Assurance Program

**Summary of Appendix C Content:**

Appendix C presents a summary of Constellation Energy laboratory's quality assurance program, including the following:

- Table C-1 compiles the results of the Constellation Energy Laboratory's participation in an intercomparison program with Environmental Resource Associates (ERA), located in Arvada, Colorado and Analytics, Inc. located in Atlanta, Georgia.
- Table C-2 compiles the results of the Constellation Energy Laboratory's participation in a split sample program with Teledyne Brown Engineering located in Knoxville, Tennessee.
- Table C-3 lists typical MDAs achieved by Teledyne Brown for Gamma Spectroscopy.

All the Constellation Energy Laboratory's results contained in Table C-1 generally agree with the intercomparison laboratory's results within the range of ±2 σ of each other. In addition, all the sets of intercomparison results in the table are in full agreement when they were further evaluated using the NRC Resolution Test Criteria[1]. The uncertainties for the Constellation Energy Laboratory's results and Analytics' results are ±2σ while the ERA laboratory's uncertainty is based on USEPA guidelines[2].

All the results contained in Table C-2 agree within the range of ±2 σ of each other with their respective Constellation Energy Laboratory original, replicate and/or Teledyne Brown Engineering's split laboratory samples, except for the comparisons of five samples involving Cs-137 results: an air filter composite sample from A3 collected 5/15/2007; a soil sample from SFA4 collected 5/31/2007; a shoreline sample from Wb1 collected 5/31/2007; a vegetation sample form Ib1 collected 7/23/2007; and a vegetation sample from SFb3 collected 12/18/2007. In all five cases low levels of Cs-137 were observed in only one of the results of the comparison set and not observed in the other two. These minor discrepancies, occurring very close to or below the analyses MDA's, are most probably due to counting statistical fluctuations and/or the non-homogeneous nature of the sample-splitting process. Other samples whose nature generally precludes sample splitting are marked "**" in the Split Analysis column.

[1] NRC Inspection Manual, Inspection Procedure 84750, March 15, 1994
[2] National Standards for Water Proficiency Testing Studies Criteria Document, December 1998

# TABLE OF CONTENTS - ANALYTICAL RESULTS

## TABLE C-1

### Results of Participation in Cross Check Programs

| Sample Date | Sample Type and Units | Isotope Observed | Reported Laboratory' Results[1] | Cross Check Lab Results[1] |
|---|---|---|---|---|
| 1/08/07 | Water-pCi/L | Ba-133 | 90±10 | 91±15 |
| | | Co-60 | 104±9 | 101±9 |
| | | Cs-134 | 83±7 | 89±9 |
| | | Cs-137 | 233±15 | 231±20 |
| | | Zn-65 | 381±33 | 350±60 |
| 3/22/07 | Milk-pCi/L | I-131 | 85±29 | 85±3 |
| | | Cs-134 | 99±13 | 112±4 |
| | | Cs-137 | 249±28 | 234±8 |
| | | Ce-141 | 309±28 | 297±10 |
| | | Cr-51 | 227±109 | 245±8 |
| | | Mn-54 | 197±27 | 182±6 |
| | | Co-58 | 106±22 | 100±3 |
| | | Fe-59 | 111±30 | 106±4 |
| | | Co-60 | 162±17 | 152±5 |
| | | Zn-65 | 1075±80 | 1000±33 |
| 3/22/07 | Charcoal Cartridge-pCi | I-131 | 80±5 | 70±2 |
| 3/22/07 | Water-pCi/L | Gross β | 99±5 | 100±3 |
| 4/09/07 | Water-pCi/L | I-131 | 19±7 | 19±5 |
| 6/14/07 | Water-pCi | Gross β | 147±2 | 148±5 |
| 6/14/07 | Water-pCi/L | Cs-134 | 172±7 | 194±6 |
| | | Cs-137 | 138±11 | 135±5 |
| | | Ce-141 | 145±36 | 160±5 |
| | | Co-58 | 171±15 | 159±5 |
| | | Fe-59 | 145±26 | 134±4 |
| | | Cr-51 | 489±191 | 411±14 |
| | | Co-60 | 202±8 | 191±6 |
| | | Mn-54 | 144±10 | 133±4 |
| | | Zn-65 | 283±23 | 268±9 |
| | | Cs-137 | 112±11 | 110±6 |
| | | Zn-65 | 194±24 | 200±19 |

[1] See discussion at the beginning of the Appendix.

**Table C-1 (Continued)**

| Sample Date | Sample Type and Units | Isotope Observed | Reported Laboratory' Results[1] | Cross Check Lab Results[1] |
|---|---|---|---|---|
| 6/14/07 | Filter-pCi/filter | Ce-141 | 121±24 | 114±4 |
| | | Cr-51 | 286±130 | 293±10 |
| | | Cs-134 | 118±6 | 138±5 |
| | | Cs-137 | 100±8 | 97±3 |
| | | Mn-54 | 108±9 | 95±3 |
| | | Fe-59 | 103±29 | 95±3 |
| | | Zn-65 | 230±22 | 191±6 |
| | | Co-60 | 143±8 | 136±5 |
| | | Co-58 | 122±14 | 113±4 |
| 7/06/07 | Water-pCi/L | Ba-133 | 19±7 | 19±9 |
| | | Cs-134 | 67±6 | 69±9 |
| | | Cs-137 | 64±9 | 61±9 |
| | | Zn-65 | 113±15 | 55±9 |
| | | Co-60 | 34±5 | 34±8 |
| 7/06/07 | Water-pCi/L | Gross β | 7.6±0.4 | 11.5±9.0 |
| 9/13/07 | Filter-pCi/filter | Gross β | 82±2 | 87±1 |
| 9/18/07 | Filter-pCi/filter | Am-241 | 31±22 | 21±8 |
| | | Cs-134 | 859±22 | 922±208 |
| | | Cs-137 | 916±23 | 831±269 |
| | | Co-60 | 562±14 | 505±126 |
| | | Zn-65 | 1554±51 | 1290±500 |
| 10/06/07 | Water-pCi/L | I-131 | 29±2 | 29±5 |
| 12/06/07 | Charcoal | I-131 | 79±5 | 74±2 |

[1] See discussion at the beginning of the Appendix

## Table C-1 (Continued)

## Results of Participation in Cross Check Programs

| Sample Date | Sample Type and Units | Isotope Observed | Reported Laboratory' Results[1] | Cross Check Lab Results[1] |
|---|---|---|---|---|
| 12/06/07 | Milk-pCi/L | Cs-137 | 181±17 | 166±6 |
| | | Co-58 | 190±16 | 174±6 |
| | | Mn-54 | 208±16 | 190±6 |
| | | Fe-59 | 172±19 | 148±5 |
| | | Zn-65 | 264±30 | 234±8 |
| | | Co-60 | 224±13 | 211±8 |
| 12/06/07 | Filter-pCi/filter | Ce-141 | 143±7 | 117±4 |
| | | Cr-51 | 535±60 | 425±14 |
| | | Cs-134 | 96±6 | 114±4 |
| | | Cs-137 | 148±10 | 138±5 |
| | | Co-58 | 152±12 | 144±5 |
| | | Mn-54 | 180±12 | 157±6 |
| | | Fe-59 | 148±14 | 123±4 |
| | | Zn-65 | 238±30 | 194±6 |
| | | Co-60 | 190±10 | 175±6 |

[1] See discussion at the beginning of the Appendix

## TABLE C-2

Results of Quality Assurance Program

| Sample Type And Location | Sample Date | Type of Analysis | Original Analysis | Replicate Analysis ($10^{-2}$ pCi/$m^3$) | Split Analysis |
|---|---|---|---|---|---|
| Air Iodine-A1 | 2/05/07 | I-131 | <MDA | <MDA | ** |
| Air Iodine-A2 | 2/05/07 | I-131 | <MDA | <MDA | ** |
| Air Iodine-A3 | 1/08/07 | I-131 | <MDA | <MDA | ** |
| Air Iodine-A4 | 1/08/07 | I-131 | <MDA | <MDA | ** |
| Air Filter -A1 | 1/08/07 | Beta | 0.7±0.1 | 0.8±0.1 | ** |
| Air Filter -A2 | 1/08/07 | Beta | 1.0±0.2 | 1.0±0.2 | ** |
| Air Filter -A3 | 1/08/07 | Beta | 0.7±0.1 | 0.7±0.1 | ** |
| Air Filter -A4 | 1/08/07 | Beta | 1.0±0.2 | 1.0±0.2 | ** |
| Air Filter -A5 | 1/08/07 | Beta | 0.9±0.1 | 0.9±0.1 | ** |
| Air Filter –SFA1 | 1/08/07 | Beta | 0.8±0.1 | 0.9±0.1 | ** |
| Air Filter –SFA2 | 1/08/07 | Beta | 1.0±0.1 | 0.9±0.1 | ** |
| Air Filter –SFA3 | 1/08/07 | Beta | 1.1±0.1 | 1.1±0.1 | ** |
| Air Filter –SFA4 | 1/08/07 | Beta | 1.0±0.2 | 0.9±0.1 | ** |
| Air Filter-A1 | 2/05/07 | Beta | 2.5±0.2 | 2.5±0.2 | ** |
| Air Filter-A2 | 2/05/07 | Beta | 2.5±0.2 | 2.4±0.2 | ** |
| Air Filter-A3 | 2/05/07 | Beta | 2.4±0.2 | 2.3±0.2 | ** |
| Air Filter-A4 | 2/05/07 | Beta | 2.7±0.3 | 2.9±0.2 | ** |
| Air Filter-A5 | 2/05/07 | Beta | 2.3±0.2 | 2.6±0.2 | ** |
| Air Filter-SFA1 | 2/05/07 | Beta | 2.6±0.2 | 2.7±0.2 | ** |
| Air Filter-SFA2 | 2/05/07 | Beta | 2.6±0.2 | 2.5±0.2 | ** |
| Air Filter-SFA3 | 2/05/07 | Beta | 2.4±0.2 | 2.6±0.2 | ** |
| Air Filter-SFA4 | 2/05/07 | Beta | 2.7±0.2 | 2.5±0.2 | ** |
| | | | | **(pCi/L)** | |
| Bay Water-Wa2 | 2/28/07 | Gamma | <MDA | <MDA | |
| | | | | **($10^{-2}$ pCi/$m^3$)** | |
| Air Filter-A1 | 3/05/07 | Beta | 1.1±0.2 | 1.2±0.2 | |

**The nature of these samples precluded splitting them with an independent laboratory.

## TABLE C-2 (Continued)

Results of Quality Assurance Program

| Sample Type And Location | Sample Date | Type of Analysis | Original Analysis | Replicate Analysis ($10^{-2}$ pCi/$m^3$) | Split Analysis |
|---|---|---|---|---|---|
| Air Filter-A2 | 3/05/07 | Beta | 1.4±0.2 | 1.4±0.2 | ** |
| Air Filter-A3 | 3/05/07 | Beta | 1.2±0.2 | 1.1±0.2 | ** |
| Air Filter-A4 | 3/05/07 | Beta | 1.5±0.2 | 1.5±0.2 | ** |
| Air Filter-A5 | 3/05/07 | Beta | 1.0±0.1 | 1.0±0.1 | ** |
| Air Filter-SFA1 | 3/05/07 | Beta | 1.1±0.1 | 1.1±0.1 | ** |
| Air Filter-SFA2 | 3/05/07 | Beta | 1.0±0.1 | 1.2±0.2 | ** |
| Air Filter-SFA3 | 3/05/07 | Beta | 1.1±0.1 | 1.1±0.2 | ** |
| Air Filter-SFA4 | 3/05/07 | Beta | 1.5±0.2 | 1.4±0.2 | ** |
| | | | | ($10^{-2}$ pCi/$m^3$) | |
| Air Iodine-A3 | 3/05/07 | I-131 | <MDA | < MDA | ** |
| Air Iodine-A4 | 3/05/07 | I-131 | < MDA | < MDA | ** |
| | | | | (pCi/Kg) | |
| Oysters-Ia3 | 3/28/07 | Gamma | <MDA | <MDA | <MDA |
| | | | | (pCi/L) | |
| Bay Water-Wa2 | 4/27/07 | Cs-137 | 2±2 | 2±2 | MDA |
| | | | | ($10^{-2}$ pCi/$m^3$) | |
| Air Filter-A1 | 4/09/07 | Beta | 1.2±0.2 | 1.3±0.2 | ** |
| Air Filter-A2 | 4/09/07 | Beta | 1.3±0.2 | 1.2±0.2 | ** |
| Air Filter-A3 | 4/09/07 | Beta | 1.5±0.2 | 1.6±0.2 | ** |
| Air Filter-A4 | 4/09/07 | Beta | 2.2±0.3 | 2.4±0.3 | ** |
| Air Filter-A5 | 4/09/07 | Beta | 1.4±0.2 | 1.2±0.2 | ** |
| Air Filter-SFA1 | 4/09/07 | Beta | 1.6±0.2 | 1.6±0.2 | ** |
| Air Filter-SFA2 | 4/09/07 | Beta | 1.3±0.2 | 1.5±0.2 | ** |
| Air Filter-SFA3 | 4/09/07 | Beta | 1.4±0.2 | 1.2±0.2 | ** |
| Air Filter-SFA4 | 4/09/07 | Beta | 1.3±0.2 | 1.4±0.2 | ** |
| | | | | ($10^{-2}$ pCi/$m^3$) | |
| Air Iodine-A1 | 4/09/07 | I-131 | <MDA | <MDA | ** |
| Air Iodine-A2 | 4/09/07 | I-131 | <MDA | <MDA | ** |

**The nature of these samples precluded splitting them with an independent laboratory.

## TABLE C-2 (Continued)

Results of Quality Assurance Program

| Sample Type And Location | Sample Date | Type of Analysis | Original Analysis | Replicate Analysis ($10^{-2}$ pCi/$m^3$) | Split Analysis |
|---|---|---|---|---|---|
| Air Filters-A1 | 5/15/07 | Gamma | <MDA | <MDA | <MDA |
| Air Filters-A2 | 5/15/07 | Be-7 | <MDA | <MDA | <MDA |
| Air Filters-A3 | 5/15/07 | Cs-137 | <MDA | 2±1 | <MDA |
| Air Filters-A4 | 5/15/07 | Gamma | <MDA | <MDA | <MDA |
| Air Filters-A5 | 5/15/07 | Gamma | <MDA | <MDA | <MDA |
| Air Filters-SFA1 | 5/15/07 | Gamma | <MDA | <MDA | <MDA |
| Air Filters-SFA2 | 5/15/07 | Gamma | <MDA | <MDA | <MDA |
| Air Filters-SFA3 | 5/15/07 | Gamma | <MDA | <MDA | <MDA |
| Air Filters-SFA4 | 5/15/07 | Gamma | <MDA | <MDA | <MDA |
| | | | | ($10^{-2}$ pCi/$m^3$) | |
| Air Iodine-A3 | 5/07/07 | I-131 | <MDA | <MDA | ** |
| Air Iodine-A4 | 5/07/07 | I-131 | <MDA | <MDA | ** |
| | | | | ($10^{-2}$ pCi/$m^3$) | |
| Air Filter-A1 | 5/07/07 | Beta | 1.5±0.2 | 1.3±0.2 | ** |
| Air Filter-A2 | 5/07/07 | Beta | 1.2±0.1 | 1.1±0.1 | ** |
| Air Filter-A3 | 5/07/07 | Beta | 1.4±0.2 | 1.1±0.2 | ** |
| Air Filter-A4 | 5/07/07 | Beta | 0.9±0.2 | 1.0±0.2 | ** |
| Air Filter-A5 | 5/07/07 | Beta | 3.1±0.3 | 2.6±0.3 | ** |
| Air Filter-SFA1 | 5/07/07 | Beta | 1.3±0.2 | 1.0±0.1 | ** |
| Air Filter-SFA2 | 5/07/07 | Beta | 1.2±0.1 | 1.1±0.1 | ** |
| Air Filter-SFA3 | 5/07/07 | Beta | 1.0±0.1 | 1.0±0.1 | ** |
| Air Filter-SFA4 | 5/07/07 | Beta | 1.1±0.1 | 1.0±0.1 | ** |
| | | | | (pCi/Kg) | |
| Soil-SFS3 | 5/31/07 | Cs-137 | 563±103 | 672±1013 | 708±99 |
| Soil-SFS4 | 5/31/07 | Cs-137 | <MDA | <MDA | 101±32 |
| | | | | (pCi/Kg) | |
| Vegetation-SFb3 | 5/31/07 | Gamma | <MDA | <MDA | <MDA |
| Vegetation-SFb4 | 5/31/07 | Gamma | <MDA | <MDA | <MDA |

**The nature of these samples precluded splitting them with an independent laboratory.

## TABLE C-2 (Continued)

## Results of Quality Assurance Program

| Sample Type And Location | Sample Date | Type of Analysis | Original Analysis | Replicate Analysis | Split Analysis |
|---|---|---|---|---|---|
| Shoreline Wb1 | 5/31/07 | Gamma | <MDA | <MDA | 336±344 |
| | | | | ($10^{-2}$ pCi/$m^3$) | |
| Air Iodine-SFA2 | 6/04/07 | I-131 | <MDA | <MDA | ** |
| Air Iodine-SFA3 | 6/04/07 | I-131 | <MDA | <MDA | ** |
| | | | | ($10^{-2}$ pCi/$m^3$) | |
| Air Filter-A1 | 6/04/07 | Beta | 2.0±0.2 | 2.1±0.2 | ** |
| Air Filter-A2 | 6/04/07 | Beta | 1.8±0.2 | 1.7±0.2 | ** |
| Air Filter-A3 | 6/04/07 | Beta | 1.8±0.2 | 1.9±0.2 | ** |
| Air Filter-A4 | 6/04/07 | Beta | 2.0±0.2 | 2.2±0.2 | ** |
| Air Filter-A5 | 6/04/07 | Beta | 2.0±0.2 | 2.2±0.2 | ** |
| Air Filter-SFA1 | 6/04/07 | Beta | 1.7±0.2 | 1.7±0.2 | ** |
| Air Filter-SFA2 | 6/04/07 | Beta | 1.8±0.2 | 1.9±0.2 | ** |
| Air Filter-SFA3 | 6/04/07 | Beta | 1.7±0.2 | 2.0±0.2 | ** |
| Air Filter-SFA4 | 6/04/07 | Beta | 1.9±0.2 | 1.8±0.2 | ** |
| | | | | (mR/90 Days) | |
| DR05 | 6/29/07 | TLD | 11.15±0.97 | 11.94±1.49 | ** |
| DR06 | 6/29/07 | TLD | 9.58±0.58 | 10.06±1.32 | ** |
| DR07 | 6/29/07 | TLD | 11.13±0.56 | 11.72±1.17 | ** |
| DR08 | 6/29/07 | TLD | 14.01±1.23 | 14.60±0.71 | ** |
| DR09 | 6/29/07 | TLD | 10.62±0.79 | 10.94±1.58 | ** |
| DR10 | 6/29/07 | TLD | 9.91±0.70 | 10.56±0.65 | ** |
| DR11 | 6/29/07 | TLD | 10.68±0.45 | 10.96±1.42 | ** |
| SFDR14 | 6/29/07 | TLD | 21.47±2.54 | 24.08±1.47 | ** |
| SFDR15 | 6/29/07 | TLD | 20.42±3.30 | 23.38±5.16 | ** |
| DR29 | 6/29/07 | TLD | 21.49±1.87 | 14.11±1.99 | |
| DR31 | 6/29/07 | TLD | 14.88±2.17 | 15.26±1.32 | ** |

**The nature of these samples precluded splitting them with an independent laboratory.

## TABLE C-2 (Continued)

Results of Quality Assurance Program

| Sample Type And Location | Sample Date | Type of Analysis | Original Analysis | Replicate Analysis ($10^{-2}$ pCi/m$^3$) | Split Analysis |
|---|---|---|---|---|---|
| Air Filter-A1 | 7/09/07 | Beta | 1.8±0.2 | 2.0±0.2 | ** |
| Air Filter-A2 | 7/09/07 | Beta | 1.3±0.2 | 1.2±0.2 | ** |
| Air Filter-A3 | 7/09/07 | Beta | 1.3±0.2 | 1.3±0.2 | ** |
| Air Filter-A4 | 7/09/07 | Beta | 1.8±0.2 | 2.0±0.2 | ** |
| Air Filter-A5 | 7/09/07 | Beta | 1.7±0.2 | 1.7±0.2 | ** |
| Air Filter-SFA1 | 7/09/07 | Beta | 1.7±0.2 | 1.6±0.2 | ** |
| Air Filter-SFA2 | 7/09/07 | Beta | 1.8±0.2 | 1.8±0.2 | ** |
| Air Filter-SFA3 | 7/09/07 | Beta | 1.8±0.2 | 1.8±0.2 | ** |
| Air Filter-SFA4 | 7/09/07 | Beta | 1.9±0.2 | 1.8±0.2 | ** |
| | | | | ($10^{-2}$ pCi/m$^3$) | |
| Air Iodine-A3 | 7/09/07 | I-131 | <MDA | <MDA | ** |
| Air Iodine-A4 | 7/09/07 | I-131 | <MDA | <MDA | ** |
| | | | | (pCi /kg) | |
| Vegetation-Ib1 | 7/23/07 | Cs-137 | <MDA | 18±11 | <MDA |
| Vegetation-Ib3 | 7/23/07 | Gamma | <MDA | <MDA | <MDA |
| Vegetation-Ib4 | 7/23/07 | Gamma | <MDA | <MDA | <MDA |
| Vegetation-Ib5 | 7/23/07 | Gamma | <MDA | <MDA | <MDA |
| Vegetation-Ib6 | 7/23/07 | Gamma | <MDA | <MDA | <MDA |
| Vegetation-Ib7 | 7/23/07 | Gamma | <MDA | <MDA | <MDA |
| Vegetation-Ib8 | 7/23/07 | Gamma | <MDA | <MDA | <MDA |
| Vegetation-Ib9 | 7/23/07 | Gamma | <MDA | <MDA | <MDA |
| | | | | ($10^{-2}$ pCi/m$^3$) | |
| Air Filter-A1 | 8/06/07 | Beta | 2.8±0.3 | 2.7±0.3 | ** |
| Air Filter-A2 | 8/06/07 | Beta | 2.2±0.2 | 2.3±0.2 | ** |
| Air Filter-A3 | 8/06/07 | Beta | 2.6±0.2 | 2.2±0.2 | ** |
| Air Filter-A4 | 8/06/07 | Beta | 2.0±0.2 | 2.1±0.2 | ** |
| Air Filter-A5 | 8/06/07 | Beta | 2.7±0.2 | 2.5±0.2 | ** |
| Air Filter-SFA1 | 8/06/07 | Beta | 2.7±0.2 | 2.4±0.2 | ** |
| Air Filter-SFA2 | 8/06/07 | Beta | 2.8±0.2 | 2.6±0.2 | ** |
| Air Filter-SFA3 | 8/06/07 | Beta | 2.3±0.2 | 2.1±0.2 | ** |
| Air Filter-SFA4 | 8/06/07 | Beta | 2.9±0.2 | 2.7±0.2 | ** |

**The nature of these samples precluded splitting them with an independent laboratory.

## TABLE C-2 (Continued)

Results of Quality Assurance Program

| Sample Type And Location | Sample Date | Type of Analysis | Original Analysis | Replicate Analysis ($10^{-2}$ pCi/$m^3$) | Split Analysis |
|---|---|---|---|---|---|
| Air Iodine-A1 | 8/06/07 | I-131 | <MDA | <MDA | ** |
| Air Iodine-A2 | 8/06/07 | I-131 | <MDA | <MDA | ** |
| | | | | (pCi/kg) | |
| Fish-Ia1 | 8/22/07 | Cs-137 | 7±9 | 9±10 | <MDA |
| Oysters-Ia3 | 8/22/07 | Gamma | <MDA | <MDA | <MDA |
| | | | | (pCi/L) | |
| Bay Water-Wa1 | 8/31/07 | Gamma | <MDA | <MDA | <MDA |
| | | | | (pCi/kg) | |
| Vegetation-Ib4 | 8/13/07 | Gamma | <MDA | <MDA | <MDA |
| Vegetation-Ib6 | 8/13/07 | Gamma | <MDA | <MDA | <MDA |
| | | | | ($10^{-2}$ pCi/$m^3$) | |
| Air Iodine-A3 | 9/10/07 | I-131 | <MDA | <MDA | ** |
| Air Iodine-A4 | 9/10/07 | I-131 | <MDA | <MDA | ** |
| | | | | ($10^{-2}$ pCi/$m^3$) | |
| Air Filter-A1 | 9/10/07 | Beta | 2.7±0.3 | 2.5±0.3 | ** |
| Air Filter-A2 | 9/10/07 | Beta | 2.0±0.2 | 2.0±0.2 | ** |
| Air Filter-A3 | 9/10/07 | Beta | 1.9±0.2 | 2.1±0.2 | ** |
| Air Filter-A4 | 9/10/07 | Beta | 2.0±0.2 | 2.2±0.2 | ** |
| Air Filter-A5 | 9/10/07 | Beta | 2.2±0.3 | 2.1±0.2 | ** |
| Air Filter-SFA1 | 9/10/07 | Beta | 2.3±0.3 | 2.2±0.3 | ** |
| Air Filter-SFA2 | 9/10/07 | Beta | 2.4±0.3 | 2.5±0.3 | ** |
| Air Filter-SFA3 | 9/10/07 | Beta | 2.2±0.2 | 2.2±0.2 | ** |
| Air Filter-SFA4 | 9/10/07 | Beta | 2.1±0.2 | 2.2±0.3 | ** |
| | | | | ($10^{-3}$ pCi/$m^3$) | |
| Air Filters-A1 | 10/15/07 | Gamma | <MDA | <MDA | <MDA |
| Air Filters-A2 | 10/15/07 | Gamma | <MDA | <MDA | <MDA |
| Air Filters-A3 | 10/15/07 | Gamma | <MDA | <MDA | <MDA |

**The nature of these samples precluded splitting them with an independent laboratory.

## TABLE C-2 (Continued)

## Results of Quality Assurance Program

| Sample Type And Location | Sample Date | Type of Analysis | Original Analysis | Replicate Analysis ($10^{-3}$ pCi/m$^3$) | Split Analysis |
|---|---|---|---|---|---|
| Air Filters-A4 | 10/15/07 | Gamma | <MDA | <MDA | <MDA |
| Air Filters-A5 | 10/15/07 | Gamma | <MDA | <MDA | <MDA |
| Air Filters-SFA1 | 10/15/07 | Gamma | <MDA | <MDA | <MDA |
| Air Filters-SFA2 | 10/15/07 | Gamma | <MDA | <MDA | <MDA |
| Air Filters-SFA3 | 10/15/07 | Gamma | <MDA | <MDA | <MDA |
| Air Filters-SFA4 | 10/15/07 | Gamma | <MDA | <MDA | <MDA |
| | | | | ($10^{-2}$ pCi/m$^3$) | |
| Air Iodine-A1 | 10/08/07 | I-131 | <MDA | <MDA | ** |
| Air Iodine-A2 | 10/08/07 | I-131 | <MDA | <MDA | ** |
| | | | | ($10^{-2}$ pCi/m$^3$) | |
| Air Filter-A1 | 10/08/07 | Beta | 3.1±0.3 | 3.3±0.3 | ** |
| Air Filter-A2 | 10/08/07 | Beta | 2.0±0.2 | 2.1±0.2 | ** |
| Air Filter-A3 | 10/08/07 | Beta | 3.3±0.3 | 3.4±0.3 | ** |
| Air Filter-A4 | 10/08/07 | Beta | 2.1±0.2 | 2.1±0.2 | ** |
| Air Filter-A5 | 10/08/07 | Beta | 2.2±0.2 | 2.4±0.2 | ** |
| Air Filter-SFA1 | 10/08/07 | Beta | 2.3±0.2 | 2.6±0.2 | ** |
| Air Filter-SFA2 | 10/08/07 | Beta | 2.5±0.2 | 2.3±0.2 | ** |
| Air Filter-SFA3 | 10/08/07 | Beta | 2.3±0.2 | 2.6±0.2 | ** |
| Air Filter-SFA4 | 10/08/07 | Beta | 2.3±0.2 | 2.5±0.2 | ** |
| | | | | ($10^{-2}$ pCi/m$^3$) | |
| Air Filter-A1 | 11/05/07 | Beta | 1.9±0.2 | 2.0±0.2 | ** |
| Air Filter-A2 | 11/05/07 | Beta | 2.0±0.2 | 2.0±0.2 | ** |
| Air Filter-A3 | 11/05/07 | Beta | 1.7±0.2 | 1.9±0.2 | ** |
| Air Filter-A4 | 11/05/07 | Beta | 2.1±0.2 | 2.2±0.2 | ** |
| Air Filter-A5 | 11/05/07 | Beta | 2.3±0.2 | 2.2±0.2 | ** |
| Air Filter-SFA1 | 11/05/07 | Beta | 2.3±0.2 | 2.4±0.2 | ** |
| Air Filter-SFA2 | 11/05/07 | Beta | 2.2±0.2 | 2.2±0.2 | ** |
| Air Filter-SFA3 | 11/05/07 | Beta | 2.4±0.2 | 2.4±0.2 | ** |
| Air Filter-SFA4 | 11/05/07 | Beta | 2.4±0.2 | 2.2±0.2 | ** |

**The nature of these samples precluded splitting them with an independent laboratory.

## TABLE C-2 (Continued)

### Results of Quality Assurance Program

| Sample Type And Location | Sample Date | Type of Analysis | Original Analysis | Replicate Analysis ($10^{-2}$ pCi/m$^3$) | Split Analysis |
|---|---|---|---|---|---|
| Air Iodine-A3 | 11/05/07 | I-131 | <MDA | <MDA | ** |
| Air Iodine-A5 | 11/05/07 | I-131 | <MDA | <MDA | ** |
| | | | | (pCi/L) | |
| Bay Water-Wa2 | 11/30/07 | Gamma | <MDA | <MDA | <MDA |
| | | | | ($10^{-2}$ pCi/m$^3$) | |
| Air Filter-A1 | 12/10/07 | Beta | 1.9±0.2 | 1.7±0.2 | ** |
| Air Filter-A2 | 12/10/07 | Beta | 1.5±0.2 | 1.6±0.2 | ** |
| Air Filter-A3 | 12/10/07 | Beta | 1.7±0.2 | 1.6±0.2 | ** |
| Air Filter-A4 | 12/10/07 | Beta | 1.8±0.2 | 2.1±0.2 | ** |
| Air Filter-A5 | 12/10/07 | Beta | 1.9±0.2 | 1.8±0.2 | ** |
| Air Filter-SFA1 | 12/10/07 | Beta | 1.7±0.2 | 1.5±0.2 | ** |
| Air Filter-SFA2 | 12/10/07 | Beta | 2.0±0.2 | 2.1±0.2 | ** |
| Air Filter-SFA3 | 12/10/07 | Beta | 2.0±0.2 | 1.9±0.2 | ** |
| Air Filter-SFA4 | 12/10/07 | Beta | 1.9±0.2 | 1.8±0.2 | ** |
| | | | | ($10^{-2}$ pCi/m$^3$) | |
| Air Iodine-A1 | 12/10/07 | I-131 | <MDA | <MDA | ** |
| Air Iodine-A2 | 12/10/07 | I-131 | <MDA | <MDA | ** |
| | | | | (pCi/Kg) | |
| Soil-SFS2 | 12/18/07 | Cs-137 | 103±39 | 131±46 | 99±71 |
| Soil-SFS3 | 12/18/07 | Cs-137 | 502±91 | 565±91 | 565±91 |
| | | | | (pCi/Kg) | |
| Vegetation-SFb2 | 12/18/07 | Gamma | <MDA | <MDA | <MDA |
| Vegetation-SFb3 | 12/18/07 | Cs-137 | 27±24 | <MDA | <MDA |

**The nature of these samples precluded splitting them with an independent laboratory.

## TABLE C-2 (Continued)

Results of Quality Assurance Program

| Sample Type And Location | Sample Date | Type of Analysis | Original Analysis | Replicate Analysis (mR/90 | Split Analysis |
|---|---|---|---|---|---|
| DR05 | 01/03/08 | TLD | 13.39±1.34 | 11.79±1.17 | ** |
| DR06 | 01/03/08 | TLD | 11.02±1.06 | 10.28±1.02 | ** |
| DR07 | 01/03/08 | TLD | 11.26±1.37 | 10.15±1.22 | ** |
| DR08 | 01/03/08 | TLD | 16.04±1.68 | 15.27±0.99 | ** |
| DR09 | 01/03/08 | TLD | 12.29±0.45 | 11.66±0.69 | ** |
| DR10 | 01/03/08 | TLD | 11.60±1.19 | 11.09±0.81 | ** |
| DR11 | 01/03/08 | TLD | 11.88±2.32 | 11.18±1.12 | ** |
| SFDR14 | 01/03/08 | TLD | 17.90±3.71 | 17.28±2.55 | ** |
| SFDR15 | 01/03/08 | TLD | 20.18±3.71 | 20.83±2.71 | ** |
| DR29 | 01/03/08 | TLD | 16.30±2.17 | 15.39±1.05 | ** |
| DR31 | 01/03/08 | TLD | 16.91±1.74 | 15.66±1.07 | ** |

**The nature of these samples precluded splitting them with an independent laboratory.

## TABLE C-3

### Teledyne Brown Engineering's Typical MDAs for Gamma Spectrometry

| Selected Nuclides | Bay Water pCi/l | Fish pCi/kg | Shellfish pCi/kg | Sediment pCi/kg | Vegetation pCi/kg | Particulates $10^{-3}$pCi/m$^3$ |
|---|---|---|---|---|---|---|
| H-3 | 175 | -- | -- | -- | -- | -- |
| Na-22 | 1 | 8 | 3 | 12 | 6 | 5 |
| Cr-51 | 12 | 105 | 4 | 104 | 50 | 63 |
| Mn-54 | 1 | 9 | 3 | 12 | 5 | 4 |
| Co-58 | 1 | 9 | 4 | 9 | 4 | 5 |
| Fe-59 | 3 | 28 | 9 | 24 | 10 | 12 |
| Co-60 | 1 | 9 | 4 | 12 | 5 | 6 |
| Zn-65 | 2 | 20 | 8 | 25 | 10 | 9 |
| Nb-95 | 1 | 12 | 7 | 14 | 6 | 9 |
| Zr-95 | 2 | 18 | 8 | 20 | 9 | 9 |
| Ru-106 | 9 | 75 | 30 | 90 | 41 | 40 |
| Ag-110m | 1 | 10 | 10 | 10 | 5 | 4 |
| Te-129m | 16 | 131 | 60 | 162 | 79 | 95 |
| I-131 | 4 | 65 | 30 | 35 | 22 | 74 |
| Cs-134 | 1 | 8 | 4 | 10 | 5 | 4 |
| Cs-137 | 1 | 9 | 4 | 10 | 5 | 4 |
| BaLa-140 | 3 | 32 | 15 | 25 | 14 | 36 |
| Ce-144 | 7 | 40 | 16 | 54 | 26 | 18 |

# APPENDIX D

## Land Use Survey

Summary of Appendix D Content:

Appendix D contains the results of a Land Use Survey conducted around R. E. Ginna Nuclear Power Plant during this operating period. A table listing the raw data of this survey and a discussion of the results are included in this appendix.

# Land Use Survey

## Discussion

A Land Use Survey was conducted to identify the location of the nearest milk animal, the nearest residence, and the nearest garden greater than 50 square meters in each of the nine sectors within a 5-mile radius of the power plant. A detailed description of the Land Use Survey is given in a separate document (Ref. 4). The position of the nearest residence and garden and animals producing milk for human consumption in each sector is provided in Table D-1.

**Table D-1**
Land Use Survey Distances

| Sector | Distance to Nearest Residence | Distance to Nearest Garden | Distance to Milk Producing Animals |
|---|---|---|---|
| E | 1260 m | N/A | N/A |
| ESE | 1050 m | Onsite Garden | N/A |
| SE | 610 m | N/A | 8270 m |
| SSE | 660 m | Onsite Supplemental Garden | N/A |
| S | 1560 m | N/A | N/A |
| SSW | 760 m | N/A | N/A |
| SW | 660 m | N/A | N/A |
| WSW | 1350 m | N/A | N/A |
| W | 1160 m | N/A | N/A |

The closest residence is situated in the SE sector (610 meter from the power plant), the nearest garden is in the SSE sector (660 meters), and the nearest milk producing animals was in the SE sector (8,270 meters).

## Changes from Previous Years:

The following land use changes have occurred over the within a 5-mile radius of the power plant:

- Development of single family homes continues at a pace consistent with prior years.
- Interviews with area farmers indicate that the number of acres farmed will continue to decrease.
- No new agricultural land use was noted.
- No new food producing facilities were noted.

**Milk Animal Locations:**

The milk animal location with a 5-mile radius of the power plant are as follows:

- Eaton Farm -- 6747 Salmon Creek Road, Williamson, NY
- No new milk producing animals were identified in the 2007 Census.