

**Enclosure (2)**

**Annual Radiological Environmental Operating  
Report: January 1, 2011 - December 31, 2011**

# CENG

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# **ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT: JANUARY 1, 2011 – DECEMBER 31, 2011**

**MAY 2012**



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

1503 Lake Road  
Ontario, New York 14519

## TABLE OF CONTENTS

LIST OF FIGURES .....	ii
LIST OF TABLES .....	iii
1. EXECUTIVE SUMMARY .....	1
2. INTRODUCTION .....	2
2.1 Station Description .....	2
2.2 Program Description and Background .....	2
2.3 Program Objectives .....	2
3. PROGRAM DESCRIPTION .....	3
3.1 Sample Collection .....	3
3.2 Data Interpretation .....	3
3.3 Quality Assurance Program .....	3
3.4 Land Use Survey .....	4
3.5 Program Exceptions .....	4
3.6 Corrections to Previous Reports .....	6
4. RESULTS AND DISCUSSIONS .....	7
4.1 Aquatic Environment .....	7
4.1.a Surface and Drinking Water .....	7
4.1.b Aquatic Organisms .....	8
4.1.c Shoreline Sediment .....	8
4.2 Atmospheric Environment .....	8
4.2.a Air Iodine .....	9
4.2.b Air Particulate Filters .....	9
4.3 Terrestrial Environment .....	10
4.3.a Vegetation .....	10
4.3.b Milk .....	10
4.4 Direct Radiation .....	11
4.5 Groundwater .....	12
4.6 Summary and Conclusion .....	13
5. REFERENCES .....	14
Appendix A REMP Sample Locations .....	18
Appendix B REMP Analytical Results .....	27
Appendix C Quality Assurance Program .....	51
Appendix D Land Use Survey .....	63

**LIST OF FIGURES**

<b>Figure Title</b>	<b>Page</b>
A-1 Map of New York State and Lake Ontario Showing Location of R. E. Ginna Nuclear Power Plant.....	23
A-2 Onsite Sample Locations.....	24
A-3 Offsite Sample Locations (TLDs and milk farms within 5 miles).....	25
A-4 Water Sample, Milk Farms and TLD Locations .....	26

**LIST OF TABLES**

Table	Title	Page
1	Synopsis of Ginna Nuclear Power Plant Radiological Environmental Monitoring Program ....	15
2	Annual Summary of Radioactivity in the Environs of the Ginna Nuclear Power Plant .....	16
A-1	Locations of Environmental Sampling Stations for the R. E. Ginna Nuclear Plant .....	20
B-1	Concentration of Tritium, Gamma Emitters and Gross Beta in Surface and Drinking Water...29	
B-2	Concentration of Gamma Emitters in the Flesh of Edible Fish .....	31
B-3	Concentration of Gamma Emitters in Sediment.....	32
B-4	Concentration of Iodine-131 in Filtered Air (Charcoal Cartridges).....	33
B-5	Concentration of Beta Emitters in Air Particulates – Onsite Samples .....	35
B-6	Concentration of Beta Emitters in Air Particulates - Offsite Samples .....	38
B-7	Concentration of Gamma Emitters in Air Particulates.....	40
B-8	Concentration of Gamma Emitters in Vegetation Samples.....	41
B-9	Concentration of Gamma Emitters (including I-131) in Milk .....	42
B-10	Typical MDA Ranges for Gamma Spectrometry .....	43
B-11	Typical LLDs for Gamma Spectrometry .....	44
B-12	Direct Radiation .....	45
B-13	Groundwater Monitoring Wells .....	49
C-1	Results of Participation in Cross Check Programs.....	53
C-2	Results of Quality Assurance Program .....	55
C-3	Teledyne Brown Engineering’s Typical MDAs for Gamma Spectrometry .....	62
D-1	Land Use Survey Distances.....	64

## 1. EXECUTIVE SUMMARY

The Radiological Environmental Monitoring Program (REMP) is a comprehensive surveillance program, which is implemented to assess the impact of site operations on the environment and compliance with 10 CFR 50 Appendix I and 40 CFR 190. Samples are collected from the aquatic and terrestrial pathways applicable to the site. The aquatic pathways include Lake Ontario fish, surface waters, and lakeshore sediment. The terrestrial pathways include airborne particulate and radioiodine, milk, food products, and direct radiation.

Results of the monitoring program for the current operational period for R.E. Ginna Nuclear Power Plant are included in this report. This report presents a synopsis of the REMP (Table 1), summary of the detectable activity analytical results (Table 2), sampling locations (Appendix A), compilation of the analytical data (Appendix B), results of the Quality Assurance Program (Appendix C), and results of the Land Use Survey (Appendix D). Interpretation of the data and conclusions are presented in the body of this report.

On March 11, 2011, a magnitude 9.0 earthquake struck off the east coast of Japan. The Fukushima Daiichi Nuclear Power Station, operated by Tokyo Electric Power Co., was hit with a series of tsunamis, lost all AC power, and went into a state of emergency. The Nuclear Safety Commission of Japan estimated approximately 17 million curies of iodine-131 (I-131) equivalent radioactive material was released into the air and 0.127 million curies into the sea between March 11 and April 5, 2011. I-131 was detected at the R.E. Ginna Nuclear Power Plant monitoring locations at both the indicator and control air sampling locations from March 14 through April 18, 2011.

The results of the REMP demonstrate that there was no significant or measurable radiological impact from the operation of R.E. Ginna Nuclear Power Plant. The 2011 results for all pathways sampled were consistent with the previous five-year historical results and exhibited no adverse trends. The results of the REMP continue to demonstrate that the operation of the plant did not result in a significant measurable dose to a member of the general population, or adversely impact the environment as a result of radiological effluents. The program continues to demonstrate that the dose to a member of the public, as a result of the operation of R.E. Ginna Nuclear Power Plant, remains significantly below the federally required dose limits specified in 10 CFR 20 and 40 CFR 190.

## **2. INTRODUCTION**

### **2.1 Station Description**

The R.E. Ginna Nuclear Power Plant (Ginna), owned by Constellation Energy Nuclear Group, LLC (CENG), is an operating nuclear generating facility consisting of one pressurized water reactor. Ginna achieved criticality in 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.

### **2.2 Program Description and Background**

The Annual Radiological Environmental Operating Report is published in accordance with Section 5.0 of the Offsite Dose Calculation Manual (ODCM, Ref. 1) and the Plant's Technical Specifications (Ref. 2). This report describes the REMP, and its implementation as required by the ODCM. 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. Results of the monitoring program for the pre-operational and previous operational periods through 2010 have been reported in a series of previously released documents.

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 Cs-137 resulting from past atmospheric nuclear weapons testing. Terrestrial pathways monitored included airborne particulate and radioiodine, milk, food products, and direct radiation.

### **2.3 Program 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 R.E. Ginna Nuclear Power Plant.

### **3. PROGRAM DESCRIPTION**

#### **3.1 Sample Collection and Analysis**

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 and analyzed by CENG personnel or its contractors in accordance with Ginna procedures (Ref. 3).

During 2011, 1300 samples were collected for analysis by gross beta counting and/or gamma spectroscopy. These included 64 surface water samples, 16 fish samples, 5 sediment samples, 621 air particulate samples, 311 air iodine samples, 28 vegetation samples, 38 milk samples, 53 groundwater samples, and 164 dosimeter measurements. Deviations from the REMP sampling schedule are described in section 3.5. This monitoring program satisfied the minimum number of samples required by the ODCM for all pathways.

R.E. Ginna Nuclear Power Plant's Chemistry personnel collected all REMP samples. Analysis was performed at either Ginna's onsite laboratory (groundwater samples), Stanford Dosimetry in Sterling Massachusetts (direct radiation samples), or Constellation Energy's Ft. Smallwood Environmental Laboratory in Baltimore, Maryland (surface and drinking water, aquatic organisms, shoreline sediment, air particulate filters, air iodine, and vegetation samples). A summary of the content of the REMP and the results of the data collected for indicator and control locations are provided in Tables 1 and 2.

#### **3.2 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 Appendix B, Table B-10.

#### **3.3 Quality Assurance Program**

Appendix C provides a summary of Constellation Energy Ft. Smallwood Laboratory's quality assurance program for 2011. It consists of Table C-1, which represents a compilation of the results of the Constellation Energy Ft. Smallwood 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 Ft. Smallwood Laboratory's participation in a split sample program with Teledyne Brown Engineering located in Knoxville, Tennessee.

All the Constellation Energy Laboratory's results contained in Table C-1 generally agree with the intercomparison laboratory's results within the range of  $\pm 2 \sigma$  of each other with the exception of a beta result for the water sample type on 6/16/11 from Analytics. Investigation into the matter yielded no apparent cause for the discrepancy. All the results contained in Table C-2 agree within the range of  $\pm 2 \sigma$  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 four samples involving Cs-137 results. These minor discrepancies, occurring very close to or below the analyses MDA's, are most likely due to counting statistical fluctuations, the non-homogeneous nature of the sample-splitting process and in the case of I-131, a short decay time (approximately 8.02 day half life). Repeat analysis of these samples for laboratory replicates yielded results within range of  $\pm 2 \sigma$ .

Table C-3 identifies a list of typical MDA's achieved by Teledyne Brown for Gamma Spectroscopy.

### **3.4 Land Use Survey**

In September 2011, 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. The Land Use Survey is conducted in accordance with Ginna procedures (Ref. 4). The position of the nearest residence and garden and animals producing milk for human consumption in each sector is provided in Appendix D, Table D-3.

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

- The closest residential dwelling in the SE sector (1601 Lake Road) is no longer occupied. The new nearest residence is located in the SE sector, approximately 840 meters from the reactor.
- The Monroe County Water Authority (MCWA) continues construction of a new municipal water treatment facility on Lake Road between Salt Road and Basket Road. While this facility not yet in service, its construction will be tracked and added to the REMP upon completion.
- The construction of two small subdivisions occurred on the south side of Boston Rd. (eastern end).
- The Summer Lake Subdivision expanded into its final construction phase, adding 14 additional homes.
- No new agricultural land use was identified.
- No new food producing facilities were identified.
- No new milk producing animals were identified.

### **3.5 Program Exceptions**

The reportable items in the Annual Environmental Radiological Operating Report under procedure CHA-RETS-VARIATION are as follows:

1. January 18, 2011: The air sampler at Environmental Monitoring Station #5 was removed from service on January 17, 2011 after it was determined to be out of service. Consistent

with the normal sampling schedule, the Environmental Technician collected the air sample from the unit later that same day. It was determined that the “new” filter had sampled an insufficient volume of air (6.4 cubic meters), invalidating the air sample for the January 10, 2011 through January 18, 2011 sampling period. The filter from the non-functional air sampler was not retrieved for analysis.

2. April 5, 2011: At Environmental Monitoring Station #8 a small portion of the filter (approximately 3mm x 3mm) rolled back onto itself during the filter change out process, disturbing some of the captured particulates. This sample was analyzed.
3. May 3, 2011: The air sampler at Environmental Monitoring Station #2 remained out of service after being tripped on April 25, 2011. Attempt to reset the unit failed. No sample was collected during the period of April 25, 2011 through May 2, 2011. The unit was ultimately returned to service on May 6, 2011.
4. August 4, 2011: The July 25, 2011 – August 1, 2011 air sample at Environmental Monitoring Station #12 was not obtained due to safety concerns at the substation in which the monitoring station is located. Limbs from two separate trees were in contact with a transformer and the air sampler. The Environmental Technician was not comfortable proceeding under the tree limb to obtain the sample. The Environmental Technician contacted supervision and Personnel at Rochester Gas & Electric (RG&E) to coordinate the tree limb removal. The monitoring station area was cleared of hazards on August 10, 2011, allowing the Environmental Technician to resume sample collection. Approximately 1,473 cubic meters of air were collected by this air sampler during the sampling period, which meets the minimum sample volume requirements. This sample was ultimately analyzed for the August 1, 2011 – August 8, 2011 sampling period.
5. September 8, 2011: The gas meter associated with the air sampler at Environmental Monitoring #11 failed its calibration check after being removed from the field on June 13, 2011. The calibration indicated the volume noted on the unit meter recorded a value approximately 3.9 percent more than the unit actually sampled. The air samples taken with this pump began in June 2010 and continued through June 2011. Initial calibration of the unit indicated the gas meter was under reporting the volume of sampled air by approximately 0.4 percent. The acceptable calibration range for gas meters is +/- 2 percent. Ginna staff reviewed the air volumes sampled by this pump from June 2010 through June 2011 and determined that the lowest sample volume occurred during the July 5, 2010 through July 12, 2010 sampling period – 303.4 cubic meters, which does not challenge the minimum air sampling volume requirement of 100 cubic meters.
6. December 13, 2011: The weekly composite surface water sample volumes collected at Ontario Water District for the sampling periods of November 28, 2011 through December 5, 2011 and December 5, 2011 through December 11, 2011 were less than normal. It is suspected that the compositors could not obtain fully representative samples during these periods. Ontario Water District personnel took the plant offline during these sampling periods to perform facility modifications. The plant was returned to service on December 12, 2011.

**3.6 Corrections to Previous Reports**

No modifications are required to previously submitted Annual Radiological Environmental Operating Reports at this time.

## **4. RESULTS AND DISCUSSIONS**

All environmental samples collected during the year were analyzed in accordance with Constellation Energy analytical procedures (Ref. 5). The analytical results for this reporting period are presented in Appendix B and the detectable activity results are also summarized in Table 2. For discussion purposes, the analytical results are divided into four categories: Aquatic Environment, the Atmospheric Environment, the Terrestrial Environment, Direct Radiation, and Groundwater.

### **4.1 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 near the plant.

#### **4.1.a Surface and Drinking Water**

Monthly composite samples are collected from Lake Ontario at upstream control locations (Russell Station or Monroe County Water Authority - Shoremont) and downstream indicator locations (Ontario Water District Plant - OWD) and analyzed for gross beta activity (Table B-1). A grab sample of Deer Creek is collected and analyzed monthly for gross beta activity (Table B-1).

In 2011, the gross beta averages for the upstream Lake Ontario monitoring locations (controls) and downstream Lake Ontario monitoring locations (indicators) were 2.12 pCi/Liter and 2.08 pCi/Liter, respectively. Gross beta analysis of the monthly composite samples showed no statistically significant difference in activity between the indicator and control locations.

The average gross beta concentration seen in the Deer Creek samples was 4.32 PCi/Liter. Historically, 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. During 2011, no sample results indicated detection of 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 2011, no surface water or drinking water sample results indicated tritium activity.

#### **4.1.b Aquatic Organisms**

Indicator fish are caught in the vicinity of the Discharge Canal 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.

At a minimum, four different species of fish are analyzed during each half-year from the indicator and background 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 listed in Table B-2.

During 2011, none of the indicator samples indicated activity other than naturally occurring radionuclides. There was no significant difference in the radiological activity in the indicator and control sampling locations.

#### **4.1.c Shoreline Sediment**

Samples of shoreline sediment are taken upstream (Town of Greece near Slater Creek) and downstream (Near the 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 from Lake Ontario. During 2011, all sediment samples indicated that gamma emitters were below detection limits. There was no difference in the radiological activity observed in the indicator and control sampling locations.

### **4.2 Atmospheric Environment**

Radioactive particles in air are collected by drawing approximately one standard cubic foot per minute (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 six sampling stations is located on the plant site from 150 to 420 meters from the reactor centerline near the point of the maximum annual average ground level concentration, one additional sampling location is located on-site at 690 meters, and two others offsite at approximately 7 miles. In addition, there are three sampling stations located approximately 7 to 16 miles from the site that serve as control stations. See Figure A-2 and Figure A-4.

#### **4.2.a Air Iodine**

Radioiodine cartridges are placed at six locations. These cartridges are changed and analyzed each week.

During the 2011 air sampling program, airborne radioiodine was detected in 26 of the 311 weekly samples collected at the six sampling stations. I-131 was detected at both the indicator and control stations during five weekly sampling periods: March 14, 2011 – March 21, 2011; March 21, 2011 – March 28, 2011; March 28, 2011 – April 4, 2011; April 4, 2011 – April 11, 2011; and April 11 – April 18, 2011. Detectable I-131 concentrations at indicator stations averaged 0.054 pCi/m<sup>3</sup>, ranging from 0.012 to 0.128 pCi/m<sup>3</sup>. Detectable I-131 concentrations at control location averaged 0.065 pCi/m<sup>3</sup>, ranging from 0.012 to 0.135 pCi/m<sup>3</sup>. Comparisons between indicator and control sample location showed no statistically significant difference in activity. Analytical data is summarized in Table B-4.

The measurable concentrations of I-131 are attributed to the trans-continental transport and fallout of airborne releases from the Fukushima Daiichi Nuclear Power Station event that followed the magnitude 9.0 earthquake struck off the east coast of Japan on March 11, 2011. These I-131 detections are not attributed to operations at Ginna.

#### **4.2.b Air Particulate Filters**

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 radioiodine is released as airborne particulate and some of the particulate activity is due to short lived noble gas decay products. Tables B-5 provides 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.

Based on weekly comparisons, there was no statistical difference between the Control and Indicator radioactive particulate concentrations. The average for the control samples (i.e., monitoring locations 8, 10, and 12) was 0.024 pCi/m<sup>3</sup> and the averages for the indicator samples (i.e., monitoring locations 2, 3, 4, 5, 6, 7, 8, 11, and 13) was 0.023 pCi/m<sup>3</sup> for the period of January to December 2011. Maximum weekly concentrations for all control stations and all indicator stations were 0.047 and 0.050 pCi/m<sup>3</sup>, respectively.

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.

Positive results for Cs-134 and Cs-137 were identified in samples taken during the second quarter of 2011. Detectable Cs-134 was identified at one control location at a concentration of 0.0006 pCi/m<sup>3</sup>. Detectable Cs-134 concentrations at indicator locations averaged 0.0007 pCi/m<sup>3</sup>, ranging from 0.0003 to 0.0013 pCi/m<sup>3</sup>. Detectable Cs-137 concentrations at control locations averaged 0.0011 pCi/m<sup>3</sup>, ranging from 0.0008 to 0.0013 pCi/m<sup>3</sup>. Detectable Cs-137 concentrations at indicator locations averaged 0.0009 pCi/m<sup>3</sup>, ranging from 0.0006 to 0.0012

pCi/m<sup>3</sup>. Comparisons between indicator and control sample location showed no statistically significant difference in activity. Analytical data is summarized in Table B-7.

The measurable concentrations of Cs-134 and Cs-137 are attributed to the trans-continental transport and fallout of airborne releases from the Fukushima Daiichi Nuclear Power Station event that followed the magnitude 9.0 earthquake struck off the east coast of Japan on March 11, 2011. Although the I-131 was detected in both late first quarter 2011 samples and early second quarter 2011 samples, Cs-134 and Cs-137 was identified only in air particulates during the second quarter 2011. A closer review of the I-131 data (Table B-4) indicates that the highest concentrations were detected in samples occurring in the second quarter 2011. It is theorized that any Cs-134 and Cs-137 from the Fukushima Daiichi Nuclear Power Station event was below detectable levels in first quarter 2011 samples. The Cs-134 and Cs-137 detections observed during the second quarter 2011 are not attributed to operations at Ginna.

### **4.3 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.

#### **4.3.a Vegetation**

There was no indication in the vegetation samples contained activity greater than naturally occurring background levels. There was no difference in the radiological activity observed in the indicator and control sampling locations. Gamma isotopic data is provided in Table B-8.

#### **4.3.b Milk**

There was one indicator dairy herd located within five miles from the plant in 2011. 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.

During 2011, no samples indicated I-131 activity above detection levels. There was no difference in the radiological activity observed in the indicator and control sampling locations. Table B-9 provides a listing of all samples collected during 2011 with analytical results.

#### **4.4 Direct Radiation**

Dosimeters are placed as part of the environmental monitoring program. Thirty-nine dosimeter badges are currently placed in four rings around the plant. These rings range from less than 1,000 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. Each direct radiation sampling location is described in Table A-1 and identified in Figure A-2.

Direct radiation readings at locations #7 and #13 are influenced by their close proximity to the site's Independent Spent Fuel Storage Installation (ISFSI) and will normally read slightly higher than other locations. These dosimeters received an average quarterly dose of 13.0 mRem/qtr after the ISFSI had received fuel (i.e., the second half of 2010). Environmental Station 13, the closest sampling location to the ISFSI, received an average dose of 13.4 mRem/quarter during 2011. All onsite indicators averaged 12.8 mRem/qtr.

For the year of 2011, the average, minimum, and maximum exposure readings was as follows:

<u>Monitoring Group</u>	<u>Average</u> <u>(mrem/qtr)</u>	<u>Min.</u> <u>(mrem/qtr)</u>	<u>Max</u> <u>(mrem/qtr)</u>
Onsite Indicators	12.8	10.0	16.1
Site Boundary Indicators	12.7	10.3	16.1
Offsite Indicators	11.8	10.1	14.3
Control Locations	11.1	9.4	13.0

40 CFR 190 requires that the annual dose equivalent not exceed 25 millirem to the whole body of any member of the public. The average quarterly exposure observed at the control monitoring stations was used to determine the background level (equivalent to 44.4 millirem annually), while the highest total annual dosimeter reading at an individual site boundary environmental monitoring location (56.8 millirem observed at Environmental Monitoring Station 64). The difference in these values determines the maximum possible direct radiation dose exposure to an offsite member of the public. Accordingly, the hypothetical maximum direct radiation dose exposure to the public for 2011 was determined to be 12.4 millirem.

Table B-12 provides quarterly dosimeter readings at each location.

On May 1, 2012, an apparent trend associated was identified with the reported average annual direct radiation dose to the general public. It was noted that the average annual direct dose to an offsite member of the public has increased 2 – 3 mRem over the past 2 to 3 years. Condition report CR-2012-001275 was entered into the site's corrective action process to further evaluate this observation. At the time this report was published, Ginna staff had not completed their evaluation of this trend. It is anticipated it will be completed by mid-July 2011.



#### **4.5 Groundwater**

At a minimum, environmental groundwater monitoring wells are sampled quarterly. There are currently a total of 8 functional onsite groundwater monitoring wells: Ginna sampled from 10 groundwater monitoring wells during 2011:

- GW01: Warehouse Access Road (Control)
- GW03: Screenhouse West, South Well
- GW04: Screenhouse West, North Well
- GW05: Screenhouse East, South (15.5')
- GW06: Screenhouse East, Middle (20.0')
- GW07: Screenhouse East, North (24.0')
- GW08: All Volatiles Treatment Building
- GW09: Technical Support Center, North
- GW10: Technical Support Center, South
- GW11: Contaminated Storage Building, SE (24.0')

Groundwater samples are analyzed for tritium to a detection limit of 500 pCi/L. Groundwater samples are analyzed for tritium to a detection limit of 500 pCi/L, and for gamma emitting radionuclides to the environmental LLDs. Results of the groundwater monitoring well sampling are presented in Table B-13.

Positive tritium results were identified in GW03, GW04, GW09 and GW11 on February 9, 2011. Condition Report CR-2011-001113 was initiated in the Ginna Corrective Action Program and an Apparent Cause Evaluation was performed. The subsequent information was gathered regarding these positive results:

- GW03, GW09 and GW11 were re-sampled on 2/18/2011. The results indicated positive tritium concentrations at these sampling locations.
- GW03 was declared out of service due to the depth to water being 3 feet higher than adjacent groundwater monitoring well, GW04. The discrepancy in water height is indicative of a degraded well material condition.
- GW04 was not re-sampled due to ground surrounding well location being submerged in standing water due to inadequate ground gradient. It was determined the standing water compromised the integrity of the groundwater sample. Sampling of this well continued after the surrounding ground gradient was corrected to improve drainage in the area surrounding the groundwater well. Subsequent samples taken at these locations did not have tritium at detectable levels.
- GW09 was declared out of service due to a significant amount of clay and silt during sampling. These conditions are indicative of well screen damage.
- The Apparent Cause Evaluation determined that the likely cause of the positive February 2011 tritium results was related to a significant snow melt that occurred the week prior to groundwater well sampling. It was suspected that snow containing tritium was recaptured from Auxiliary Building Plant Ventilation, accumulated in areas surrounding the groundwater monitoring wells, melted during warm weather occurred, and entered the

groundwater. Subsequent samples taken at these locations did not have tritium at detectable levels. No adverse trends have been identified.

The average and maximum tritium concentration found in the groundwater monitoring wells during February 2011 were 841 PCi/L and 1820 PCi/L, respectively. These concentrations are consistent with concentrations seen in precipitation samples taken around Ginna and are well below the Environmental Protection Agency drinking water standard of 20,000 PCi/L. No continued or upward trend in tritium concentrations was identified in any groundwater monitoring wells. All other samples taken during 2011 did not indicate positive results for tritium (i.e., all other samples were below MDA).

#### **4.6 Summary and Conclusion**

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. The analytical results from the Radiological Environmental Monitoring program indicate the operation of the R.E. Ginna Nuclear Power Plant had no measurable radiological impact on the environment or significant build-up of plant-related radionuclides in the environment. The results also indicate operation of the plant did not result in a measurable radiation dose to the general population above natural background levels.

Additionally, the 2011 results are consistent with data for the past five years and exhibited no detectable increases or adverse trends.

**5. REFERENCES**

1. R.E. Ginna Nuclear Power Plant, Offsite Dose Calculation Manual, Revisions 26 (Effective Date: 12/10/2010) and 27 (Effective Date: 05/03/2011).
2. R.E. Ginna Nuclear Power Plant, Technical Specification 5.6.2; Annual Radiological Environmental Operating Report.
3. Procedure CNG-EV-1.01-1000, Radiological Environmental Monitoring Program (REMP).
4. Procedure CH-ENV-LAND-USE, Land Use Census; completed September 2011.
5. Constellation Energy Ft. Smallwood Environmental Laboratory Procedures Manual, General Services Department.

**Table 1**

**Synopsis of Ginna Nuclear Power Plant Radiological Environmental Monitoring Program**

Sample Type	Sampling Frequency <sup>1</sup>	Number of Locations	Number Collected	Analysis	Analysis Frequency <sup>1</sup>	Number Analyzed
<b>Aquatic Environment</b>						
Surface Water, Drinking Water	MC	5	64	Gamma Gross Beta	MC/MG MC/MG	64 64
Bottom Sediment	A	1	1	Gamma	A	1
Fish <sup>2</sup>	A	4	16	Gamma	SA	16
Shoreline Sediment	SA	2	4	Gamma	SA	4
Groundwater	Q	10	53	Tritium	Q	53
<b>Atmospheric Environment</b>						
Air Iodine <sup>3</sup>	W	6	311	I-131	W	311
Air Particulates <sup>4</sup>	W	12	621	Gross Beta Gamma	W QC	621 48
Direct Radiation Ambient Radiation	Q	41	164	TLD	Q	164
<b>Terrestrial Environment</b>						
Milk <sup>5</sup>	M/BW	2	38	Gamma	M/BW	38
Vegetation <sup>6</sup>	A	8	28	Gamma	A	28

<sup>1</sup> W=Weekly, BW=BiWeekly (15 days), M=Monthly (31 days), Q=Quarterly (92 days), SA=Semiannual, A=Annual, C=Composite

<sup>2</sup> Twice during fishing season including at least four species

<sup>3</sup> The collection device contains activated charcoal

<sup>4</sup> Beta counting is performed >= 24 hours following filter change. Gamma spectroscopy performed on quarterly composite of weekly samples

<sup>5</sup> Bi-Weekly during growing season.

<sup>6</sup> Annual at time of harvest. Samples include broad leaf vegetation

**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 <sup>1</sup>	Location with Highest Annual Mean Name/Distance & Direction <sup>2</sup>	Highest Annual Mean (F) / Range <sup>1</sup>	Control Locations Mean (F)/Range
<b>Aquatic Environment</b>						
Surface Water, (pCi/L)	Gamma (36)	2.3 (Cs-137)	-- (51/51)	--	-- (51/51) (–)	-- (13/13) --
Surface Water, (pCi/L)	Gross Beta (36)	0.5	2.64 (51/51) (1.41-7.64)	Deer Creek – E DC 0.29 km ESE	4.32 (12/12) (3.40 – 7.64)	2.12 (13/13) (1.82-2.61)
Sediment (pCi/kg)	Gamma (5)	17 (Cs-137)	-- (3/3) --	--	-- (3/3) --	-- (2/2) --
Fish (pCi/kg)	Gamma (16)	15 (Cs-137)	-- (8/8) (–)	--	-- (8/8) (–)	-- (8/8) --
Groundwater (PCi/L)	Tritium	500	841 (48/48)	GW03 – Screenhouse West, South Well	1090 (2/2)	-- (5/5)
<b>Direct Radiation</b>						
Ambient Radiation (mR/91 days)	Dosimeters (164)	--	12.4 (128/128) (10.0-16.1)	Env. Station 64 1.19 km W	14.2 (1/32) (13.5-14.9)	11.1 (9/9) (9.4-13.0)

**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 <sup>1</sup>	Location with Highest Annual Mean Name/Distance & Direction <sup>2</sup>	Highest Annual Mean (F) / Range <sup>1</sup>	Control Locations Mean (F)/Range
<b>Atmospheric Environment</b>						
Air Iodine (10 <sup>-2</sup> pCi/m <sup>3</sup> )	I-131 (311)	0.15	5.4 (22/259) (1.2 - 12.8)	Williamson – 11 11.5 km ESE	7.3 (3/52) (4.7 - 11.0)	6.5 (4/52) (1.2 – 13.5)
Air Particulates (10 <sup>-2</sup> pCi/m <sup>3</sup> )	Gross Beta (621)	0.5	2.34 (466/466) (0.6 – 5.0)	Main Parking Lot – 06 0.23 km SW	2.44 (52/52) (1.1 – 4.6)	2.35 (155/155) (0.6 – 4.7)
Air Particulates (10 <sup>-3</sup> pCi/m <sup>3</sup> )	Gamma (48)	--	0.6 (8/36) (0.3 – 1.0)	Webster – 09 11.4 km SW	1.0 (1/4) (1.0 – 1.0)	1.0 (2/8) (0.6-1.3)
Air Particulates (10 <sup>-3</sup> pCi/m <sup>3</sup> )	Gamma (48)	--	0.9 (9/36) (0.6 – 1.2)	West Fence Line – 07 0.2 km WSW	1.2 (1/4) (1.2 – 1.2)	1.1 (3/8) (0.8-1.3)
<b>Terrestrial Environment</b>						
Milk (pCi/L)	Gamma (38)	5 (Cs-137)	-- (19/19) (--)	--	-- (19/19) (--)	-- (19/19) (--)
Vegetation (pCi/L)	Gamma (28)	27 (Cs-137)	-- (19/19) --	--	-- (19/19) --	--(9/9) --

<sup>1</sup> Mean and range based upon detectable measurements only. Fraction (F) of detectable measurements at specified location is indicated in parentheses

<sup>2</sup> From the center point of the containment building.

-- No detectable activity at specified location.

## **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 is provided 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.

**TABLE OF CONTENTS - SAMPLING LOCATIONS**

Table	Title	Page
A-1	Locations of Environmental Sampling Stations for the Ginna Nuclear Power Plant .....	20

Figure	Title	Page
A-1	Map of New York State and Lake Ontario Showing Location of R.E. Ginna Nuclear Power Plant .....	23
A-2	Onsite Sample Locations.....	24
A-3	Offsite Sample Locations (TLDs and milk farms within 5 miles).....	25
A-4	Water Sample, Milk Farms and TLD Locations .....	26



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

Station	Description	Distance		Direction
		Meters	Miles	Sector
<b>Air Samplers</b>				
2	Manor House Yard	360	0.22	E
3	East Field	440	0.27	ESE
4	East of Training Center Parking Lot	320	0.20	SE
5	Creek Bridge	180	0.11	SSE
6	Onsite-SW side of plant parking lot	300	0.19	SW
7	Onsite-utility pole along West plant fence	240	0.15	WSW
8	Seabreeze	19840	12.33	WSW
9	Webster	11150	6.93	SW
10	Walworth	12730	7.91	S
11	Williamson	11540	7.17	ESE
12	Sodus Point	25170	15.64	E
13	Substation 13	690	0.43	SSW
<b>Direct Radiation</b>				
2	Onsite-Manor House Yard	360	0.22	E
3	Onsite-In field approximately 200 ft SE of station #2	440	0.27	ESE
4	Onsite- East of Training Center Parking Lot	320	0.20	SE
5	Onsite-Between creek and plant entry road	180	0.11	SSE
6	Onsite-SW side of plant parking lot	300	0.19	SW
7	Onsite-utility pole along West plant fence	240	0.15	WSW
8	Topper Drive-Irondequoit, Seabreeze Substation #51	19840	12.33	WSW
9	Phillips Road-Webster, intersection with Highway #104, Substation #74	11150	6.93	SW
10	Atlantic Avenue-Walworth, Substation #230	12730	7.91	S
11	W. Main Street-Williamson, Substation #207	11540	7.17	ESE
12	12 Seaman Avenue-Sodus Point-Off Lake Road by Sewer district, Substation #209	25170	15.64	E
13	Onsite - South of Meteorological Tower	260	0.16	WNW
14	NW corner of field along lake shore	860	0.53	WNW
15	Field access road, west of orchard, approximately 3000' West of plant	920	0.57	W
16	SW Corner of orchard, approximately 3000' West of plant, approximately 200' North of Lake Road	1030	0.64	WSW
17	Utility pole in orchard, approximately 75" North of Lake Road	510	0.32	SSW
18	Substation 13A fence, North Side	730	0.45	SSW
19	On NW corner of house 100' East of plant access road	460	0.29	S
20	Approximately 150' West of Ontario Center Road and approximately 170' South of Lake Road	650	0.40	SSE

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

Station	Description	Distance		Distance
		Meters	Meters	Sector
21	North side of Lake Road, approximately 200' East of Ontario Center Road	660	0.41	SE
22	North side of Lake Road, SE, property corner	920	0.57	SE
23	East property line, midway between Lake Road and Lake shore	780	0.49	ESE
24	Lake shore near NE corner of property	730	0.45	E
25	Substation #73, Klem Road, adjacent to 897 Klem Road	14000	8.70	WSW
26	Service Center, Plank Road, West of 250	14600	9.07	SW
27	Atlantic Avenue at Knollwood Drive utility pole, North side of road	14120	8.77	SSW
28	Substation #193, Marion, behind Stanton Ag. Service, North Main Street	17450	10.84	SE
29	Substation #208, Town Line Road (CR-118), 1000' North of Route 104	14050	8.73	ESE
30	District Office, Sodus, on pole, West side of bldg	20760	12.90	ESE
31	Lake Road, pole 20' North of road, 500' East of Salt Road	7330	4.56	W
32	Woodard Road at County Line Road, pole @ Northwest corner.	6070	3.77	WSW
33	County Line Road at RR tracks, pole approximately 100' East along tracks	7950	4.94	SW
34	Pole at Route 104, Lincoln Road, SW Corner.	6520	4.05	SSW
35	Transmission Right of Way, North of Clevenger Road on pole.	7490	4.65	SSW
36	Substation #205, Route 104, East of Ontario Center Road, North side of fence.	5480	3.41	S
37	Rail Road Avenue, pole at 2048	5770	3.59	SSE
38	Fisher Road at RR Tracks, pole East of road	6910	4.29	SE
39	Seeley Road, Pole South side 100' West of intersection with Stony Lonesome Road	6930	4.31	ESE
40	Lake Road at Stony Lonesome Road, pole at SE corner	6440	4.00	E
63	Westside of warehouse access road	740	0.46	SW
64	Westside of direct road, adjacent to orchard	1190	0.74	W
<b>Fish</b>				
	Lake Ontario Discharge Plume	2200	1.4	ENE

	Russell Station	25600	15.9	W
<b>Produce (Vegetation)</b>				
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.				
Station	Description	Distance		Direction
		Meters	Miles	Sector
<b>Water</b>				
	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
<b>Sediment</b>				
	Lake Ontario Discharge Plume	2200	1.4	ENE
	Russell Station	25600	15.9	W
	Bethnic	1070	0.7	N
<b>Milk</b>				
	Eaton Farm, Williamson (Indicator)	8270	5.1	ESE
	Schultz Farm, S. Sodus (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

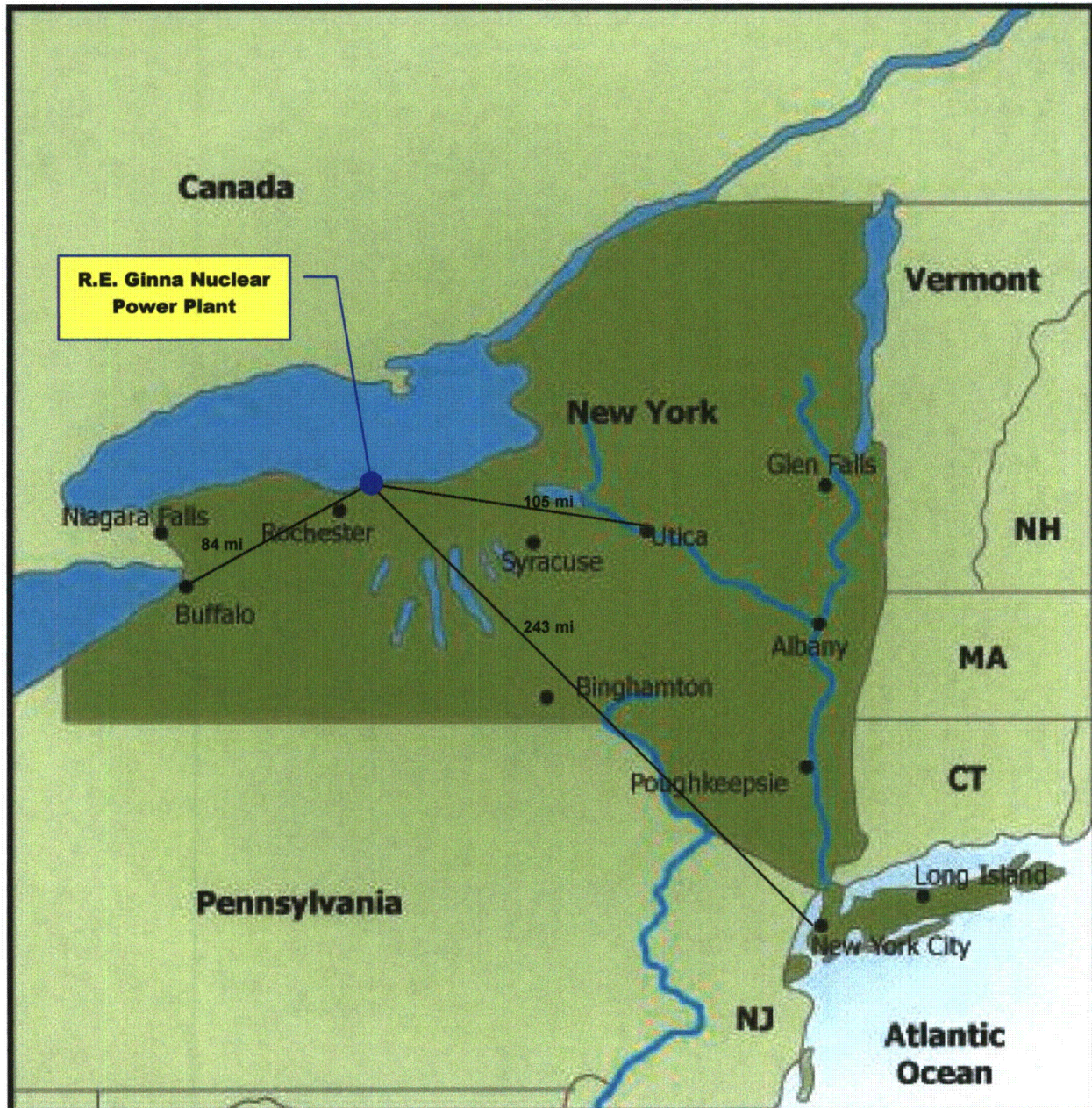


Figure A-2  
Onsite Sample Locations

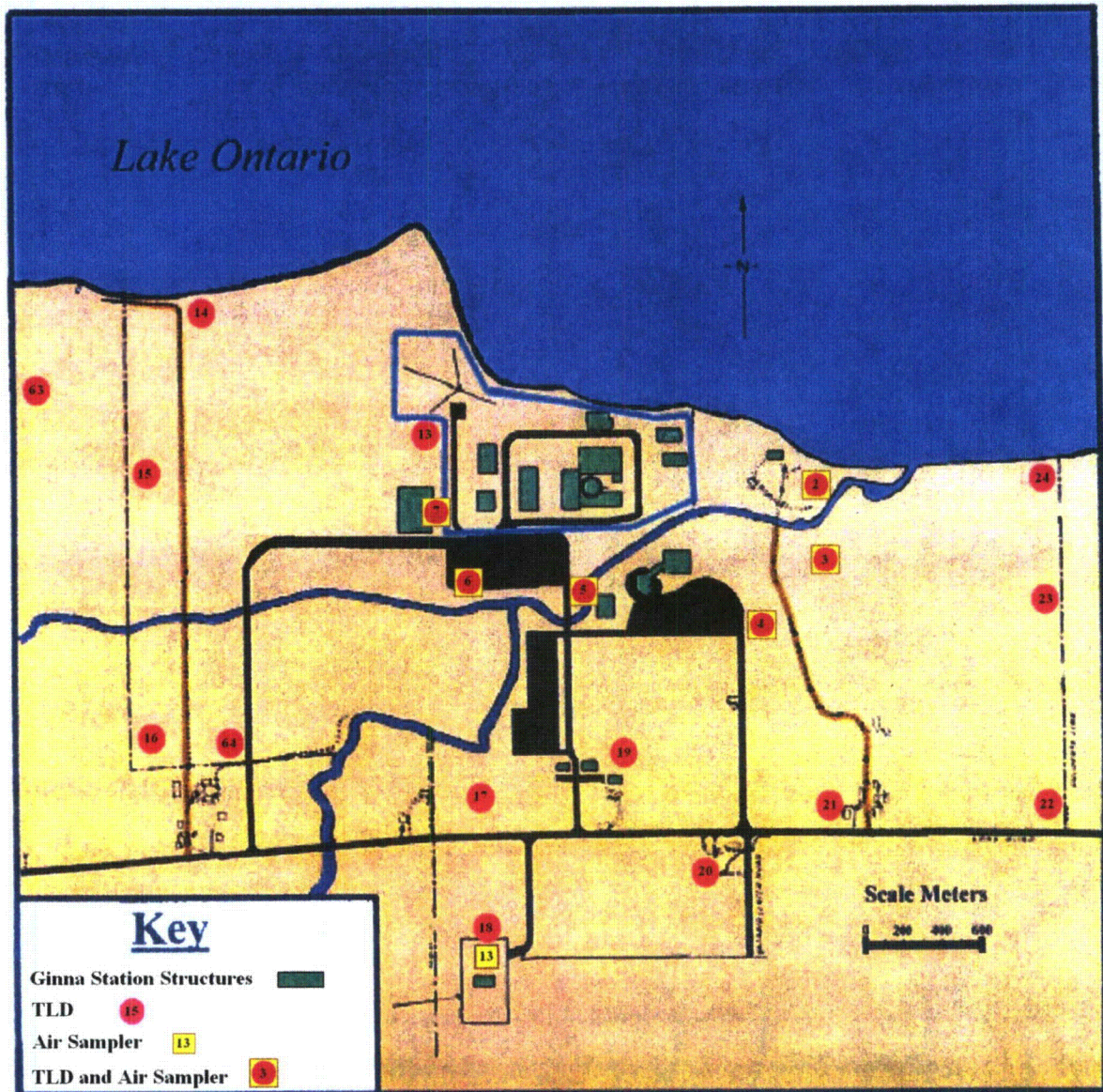
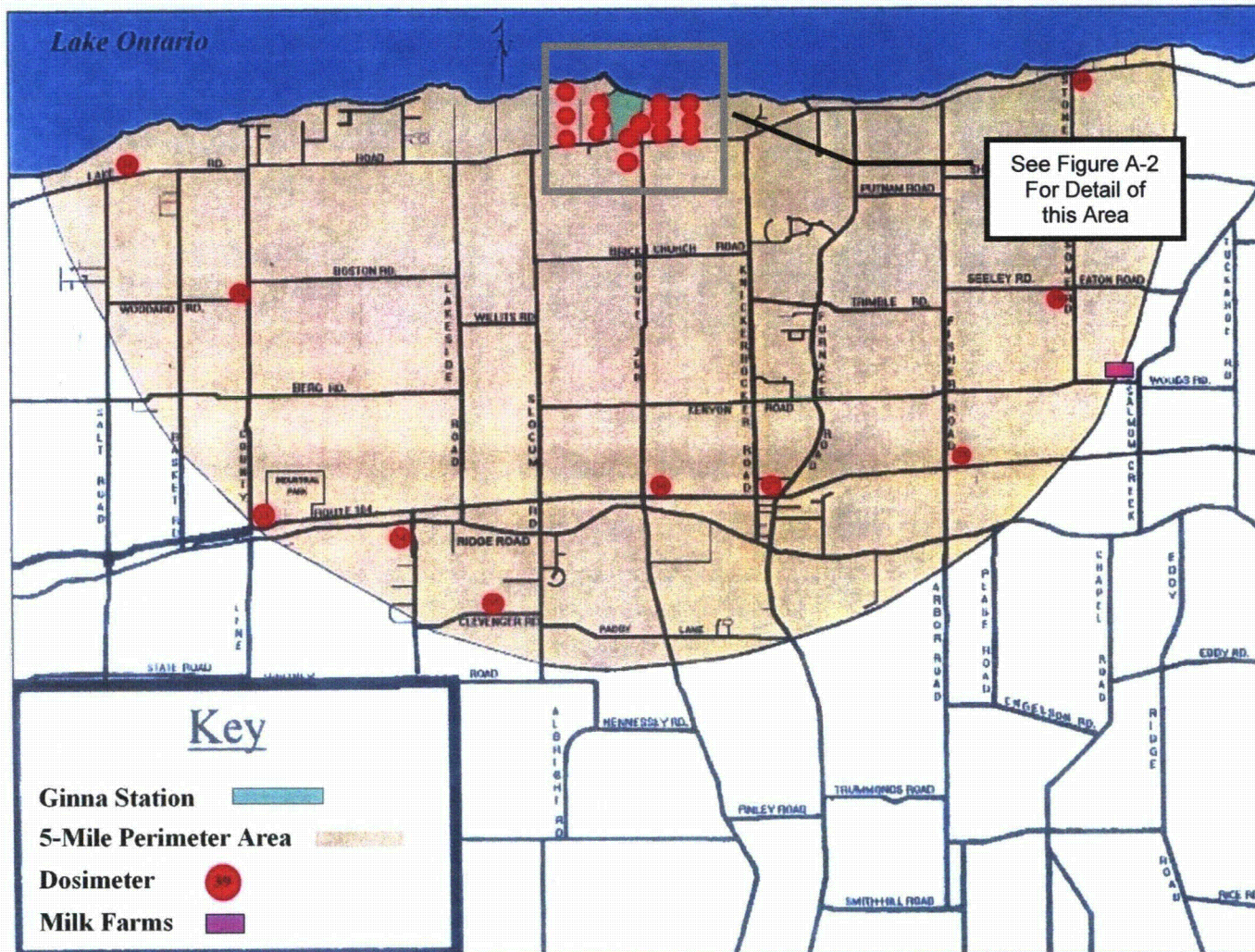
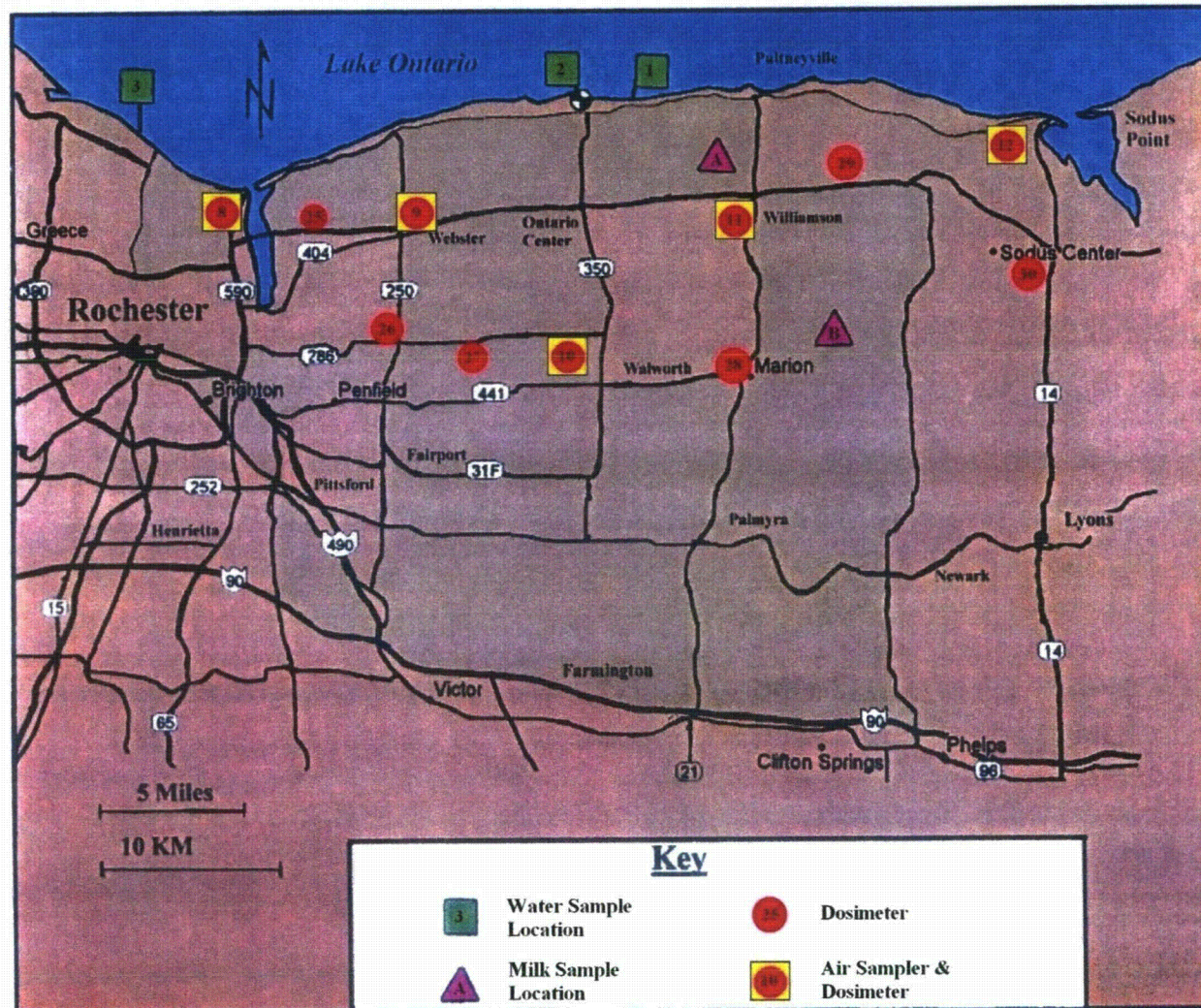


Figure A-3

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.



**TABLE OF CONTENTS - ANALYTICAL RESULTS**

Table	Title	Page
B-1	Concentration of Tritium, Gamma Emitters and Gross Beta in Surface and Drinking Water...	29
B-2	Concentration of Gamma Emitters in the Flesh of Edible Fish .....	31
B-3	Concentration of Gamma Emitters in Sediment.....	32
B-4	Concentration of Iodine-131 in Filtered Air (Charcoal Cartridges).....	33
B-5	Concentration of Beta Emitters in Air Particulates – Onsite Samples .....	35
B-6	Concentration of Beta Emitters in Air Particulates - Offsite Samples .....	38
B-7	Concentration of Gamma Emitters in Air Particulates.....	40
B-8	Concentration of Gamma Emitters in Vegetation Samples.....	41
B-9	Concentration of Gamma Emitters (including I-131) in Milk .....	42
B-10	Typical MDA Ranges for Gamma Spectrometry.....	43
B-11	Typical LLDs for Gamma Spectrometry .....	44
B-12	Direct Radiation .....	45
B-13	Groundwater Monitoring Wells .....	49

**Table B-1**

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

Sample Code	Sample Date	Gamma Emitters	Gross Beta
<b>CIRC-IN</b>			
Circulating Water			
Inlet - N	1/17/2011	*	1.85 +/- 0.54
	2/15/2011	*	1.88 +/- 0.55
	3/15/2011	*	1.90 +/- 0.52
	4/12/2011	*	2.86 +/- 0.59
	5/10/2011	*	2.26 +/- 0.54
	6/7/2011	*	2.42 +/- 0.56
	7/6/2011	*	1.99 +/- 0.53
	8/2/2011	*	2.33 +/- 0.56
	8/30/2011	*	1.41 +/- 0.54
	9/27/2011	*	1.59 +/- 0.55
	10/26/2011	*	2.18 +/- 0.55
	11/22/2011	*	1.86 +/- 0.54
	12/20/2011	*	2.35 +/- 0.55
<b>CIRC-OUT</b>			
Circulating Water			
Outlet - N	1/17/2011	*	2.27 +/- 0.56
	2/15/2011	*	2.31 +/- 0.57
	3/15/2011	*	2.23 +/- 0.55
	4/12/2011	*	2.67 +/- 0.58
	5/10/2011	*	2.29 +/- 0.55
	6/7/2011	*	2.11 +/- 0.55
	7/6/2011	*	1.91 +/- 0.54
	8/2/2011	*	2.49 +/- 0.56
	8/30/2011	*	1.64 +/- 0.55
	9/27/2011	*	1.49 +/- 0.51
	10/26/2011	*	1.77 +/- 0.52
	11/22/2011	*	2.01 +/- 0.54
	12/20/2011	*	2.22 +/- 0.54
<b>DC</b>			
Deer Creek - ESE	1/3/2011	*	3.43 +/- 0.67
	2/21/2011	*	3.80 +/- 0.75
	3/7/2011	*	3.40 +/- 0.67
	4/4/2011	*	3.98 +/- 0.74
	5/2/2011	*	3.46 +/- 0.65
	6/21/2011	*	3.42 +/- 0.70
	7/18/2011	*	7.64 +/- 1.09
	8/15/2011	*	3.52 +/- 0.70
	9/12/2011	*	4.39 +/- 0.82
	10/10/2011	*	5.77 +/- 0.85
	11/7/2011	*	4.58 +/- 0.78
	12/5/2011	*	4.42 +/- 0.76

**Table B-1**

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

Sample Code	Sample Date	Gamma Emitters	Gross Beta
<b>MCWA</b>			
Monroe County			
Water/Shoremont,			
Greece – W <sup>1</sup>	1/17/2011	*	1.94 +/- 0.55
	2/15/2011	*	1.91 +/- 0.54
	3/14/2011	*	2.38 +/- 0.55
	4/11/2011	*	2.24 +/- 0.55
	5/9/2011	*	2.08 +/- 0.53
	6/6/2011	*	2.68 +/- 0.57
	7/5/2011	*	2.05 +/- 0.53
	8/1/2011	*	1.82 +/- 0.53
	8/29/2011	*	2.03 +/- 0.06
	9/26/2011	*	2.33 +/- 0.58
	10/24/2011	*	1.82 +/- 0.54
	11/21/2011	*	2.26 +/- 0.55
	12/19/2011	*	1.98 +/- 0.52
<b>OWD</b>			
Ontario Water			
District - NE	1/17/2011	*	2.21 +/- 0.56
	2/14/2011	*	2.24 +/- 0.57
	3/14/2011	*	2.61 +/- 0.56
	4/11/2011	*	2.52 +/- 0.56
	5/9/2011	*	2.09 +/- 0.54
	6/6/2011	*	1.91 +/- 0.55
	7/5/2011	*	1.71 +/- 0.53
	8/1/2011	*	1.95 +/- 0.53
	8/29/2011	*	1.44 +/- 0.53
	9/26/2011	*	1.88 +/- 0.55
	10/26/2011	*	2.06 +/- 0.54
	11/21/2011	*	1.85 +/- 0.53
	12/19/2011	*	2.21 +/- 0.54

<sup>1</sup> Control Location

\* All Non-Natural Gamma Emitters. Tritium less than MDA.

**Table B-2**

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

Sample Code	Sample Date	Sample Type	Gamma Emitters
EAST East Sector	5/20/2011	Carp	*
	11/1/2011	Brown Trout	*
	11/2/2011	Chinook Salmon	*
GREECE <sup>1</sup> Control	7/25/2011	Smallmouth Bass	*
HAMLIN <sup>1</sup> Control	5/13/2011	Bowfin	*
	5/13/2011	Largemouth Bass	*
	5/13/2011	Perch	*
	5/13/2011	Pike	*
	9/26/2011	Brown Trout	*
	9/26/2011	Chinook Salmon	*
	9/26/2011	Salmon	*
NORTH North Sector	5/13/2011	Freshwater Drum	*
	6/17/2011	Smallmouth Bass	*
	6/22/2011	Lake Trout	*
	7/20/2011	Smallmouth Bass	*
	11/23/2011	Lake Trout	*

<sup>1</sup> Control Location

\* All Non-Natural Gamma Emitters <MDA

**Table B-3**

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

<b>Sample Code</b>	<b>Sample Date</b>	<b>Gamma Emitters</b>
<b>Shoreline</b>		
EAST		
East Sector	4/25/2011	*
	7/18/2011	*
<b>GREECE<sup>1</sup></b>		
Control	4/25/2011	*
	7/18/2011	*
<b>Benthic</b>		
NORTH	7/20/2011	*

<sup>1</sup> Control Location

\* 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<sup>3</sup> +/- 2 $\sigma$ )**

Start Date	Stop Date	STATION-02 Manor House Yard	STATION-04 Training Center Parking Lot	STATION-07 West Fence Line	STATION-08 <sup>1</sup> Seabreeze	STATION-09 Webster	STATION-11 Williamson
1/3/2011	1/10/2011	*	*	*	*	*	*
1/10/2011	1/17/2011	*	*	*	*	*	*
1/17/2011	1/24/2011	*	*	*	*	*	*
1/24/2011	1/31/2011	*	*	*	*	*	*
1/31/2011	2/7/2011	*	*	*	*	*	*
2/7/2011	2/14/2011	*	*	*	*	*	*
2/14/2011	2/21/2011	*	*	*	*	*	*
2/21/2011	2/28/2011	*	*	*	*	*	*
2/28/2011	3/7/2011	*	*	*	*	*	*
3/7/2011	3/14/2011	*	*	*	*	*	*
3/14/2011	3/21/2011	1.2 +/- 0.3	1.4 +/- 0.7	1.7 +/- 1.2	*	*	*
3/21/2011	3/28/2011	5.4 +/- 0.6	6.3 +/- 0.9	5.8 +/- 1.8	7.1 +/- 0.7	6.5 +/- 0.8	6.1 +/- 2.5
3/28/2011	4/4/2011	11.2 +/- 1.0	12.3 +/- 2.5	11.8 +/- 0.8	13.5 +/- 2.6	12.8 +/- 2.2	11.0 +/- 2.1
4/4/2011	4/11/2011	3.9 +/- 0.5	3.8 +/- 0.6	4.0 +/- 0.6	4.3 +/- 1.2	3.9 +/- 0.5	4.7 +/- 0.9
4/11/2011	4/18/2011	1.4 +/- 0.4	1.3 +/- 0.4	1.8 +/- 1.6	1.2 +/- 0.4	1.3 +/- 0.8	*
4/18/2011	4/25/2011	*	*	*	*	*	*
4/25/2011	5/2/2011	<sup>2</sup>	*	*	*	*	*
5/2/2011	5/9/2011	*	*	*	*	*	*
5/9/2011	5/16/2011	*	*	*	*	*	*
5/16/2011	5/23/2011	*	*	*	*	*	*
5/23/2011	5/30/2011	*	*	*	*	*	*
5/30/2011	6/6/2011	*	*	*	*	*	*
6/6/2011	6/13/2011	*	*	*	*	*	*
6/13/2011	6/20/2011	*	*	*	*	*	*
6/20/2011	6/27/2011	*	*	*	*	*	*
6/27/2011	7/4/2011	*	*	*	*	*	*
7/4/2011	7/11/2011	*	*	*	*	*	*
7/11/2011	7/18/2011	*	*	*	*	*	*
7/18/2011	7/25/2011	*	*	*	*	*	*
7/25/2011	8/1/2011	*	*	*	*	*	*
8/1/2011	8/8/2011	*	*	*	*	*	*
8/8/2011	8/15/2011	*	*	*	*	*	*
8/15/2011	8/22/2011	*	*	*	*	*	*
8/22/2011	8/29/2011	*	*	*	*	*	*

<sup>1</sup> Control Location

<sup>2</sup> Sample not collected. Sampler out of service.

\* <MDA (I-131)

**Table B-4**

**Concentration of Iodine-131 in Filtered Air (Charcoal Cartridges)**  
**(Results in units of  $10^{-2}$  pCi/m<sup>3</sup> +/- 2 $\sigma$ )**

Start Date	Stop Date	STATION-02 Manor House Yard	STATION-04 Training Center Parking Lot	STATION-07 West Fence Line	STATION-08 <sup>1</sup> Seabreeze	STATION-09 Webster	STATION-11 Williamson
8/29/2011	9/5/2011	*	*	*	*	*	*
9/5/2011	9/12/2011	*	*	*	*	*	*
9/12/2011	9/19/2011	*	*	*	*	*	*
9/19/2011	9/26/2011	*	*	*	*	*	*
9/26/2011	10/3/2011	*	*	*	*	*	*
10/3/2011	10/10/2011	*	*	*	*	*	*
10/10/2011	10/17/2011	*	*	*	*	*	*
10/17/2011	10/24/2011	*	*	*	*	*	*
10/24/2011	10/31/2011	*	*	*	*	*	*
10/31/2011	11/7/2011	*	*	*	*	*	*
11/7/2011	11/14/2011	*	*	*	*	*	*
11/14/2011	11/21/2011	*	*	*	*	*	*
11/21/2011	11/28/2011	*	*	*	*	*	*
11/28/2011	12/5/2011	*	*	*	*	*	*
12/5/2011	12/12/2011	*	*	*	*	*	*
12/12/2011	12/19/2011	*	*	*	*	*	*
12/19/2011	12/26/2011	*	*	*	*	*	*
12/26/2011	1/2/2012	*	*	*	*	*	*

<sup>1</sup> Control Location

<sup>2</sup> Sample not collected. Sampler out of service.

\* <MDA (I-131)

**Table B-5**

**Concentration of Beta Emitters in Air Particulates – Onsite Samples**  
(Results in units of  $10^{-2}$  pCi/m<sup>3</sup> +/- 2σ Uncertainty)

Start Date	Stop Date	STATION-02 Manor House Yard	STATION-03 East Field	STATION-04 Training Center Parking Lot	STATION-05 Creek Bridge	STATION-06 Main Parking Lot	STATION-07 West Fence Line	STATION-13 Substation 13
1/3/2011	1/10/2011	3.0 +/- 0.1	3.0 +/- 0.1	2.9 +/- 0.1	3.5 +/- 0.2	3.1 +/- 0.1	3.0 +/- 0.1	3.1 +/- 0.1
1/10/2011	1/17/2011	1.5 +/- 0.1	1.5 +/- 0.1	1.6 +/- 0.1	<sup>2</sup>	1.6 +/- 0.1	1.5 +/- 0.1	1.5 +/- 0.1
1/17/2011	1/24/2011	2.2 +/- 0.1	2.2 +/- 0.1	2.0 +/- 0.1	2.6 +/- 0.1	2.4 +/- 0.1	2.5 +/- 0.1	2.3 +/- 0.1
1/24/2011	1/31/2011	3.0 +/- 0.1	3.1 +/- 0.1	3.0 +/- 0.1	3.2 +/- 0.1	3.1 +/- 0.2	3.1 +/- 0.2	2.9 +/- 0.1
1/31/2011	2/7/2011	2.6 +/- 0.1	2.5 +/- 0.1	2.3 +/- 0.1	2.6 +/- 0.1	2.9 +/- 0.1	2.6 +/- 0.1	2.7 +/- 0.1
2/7/2011	2/14/2011	2.6 +/- 0.1	2.6 +/- 0.1	2.6 +/- 0.1	2.8 +/- 0.1	2.9 +/- 0.1	2.7 +/- 0.1	2.7 +/- 0.1
2/14/2011	2/21/2011	2.1 +/- 0.1	2.3 +/- 0.1	2.3 +/- 0.1	2.4 +/- 0.1	2.3 +/- 0.1	2.4 +/- 0.1	2.3 +/- 0.1
2/21/2011	2/28/2011	2.4 +/- 0.1	2.2 +/- 0.1	2.3 +/- 0.1	2.3 +/- 0.1	2.4 +/- 0.1	2.4 +/- 0.1	2.3 +/- 0.1
2/28/2011	3/7/2011	2.4 +/- 0.1	2.2 +/- 0.1	2.5 +/- 0.1	2.4 +/- 0.1	2.4 +/- 0.1	2.5 +/- 0.1	2.5 +/- 0.1
3/7/2011	3/14/2011	1.6 +/- 0.1	1.5 +/- 0.1	1.6 +/- 0.1	1.6 +/- 0.1	1.8 +/- 0.1	1.8 +/- 0.1	1.7 +/- 0.1
3/14/2011	3/21/2011	2.4 +/- 0.1	2.5 +/- 0.1	2.7 +/- 0.1	2.7 +/- 0.1	2.5 +/- 0.1	2.6 +/- 0.1	2.4 +/- 0.1
3/21/2011	3/28/2011	3.2 +/- 0.2	3.3 +/- 0.2	3.5 +/- 0.2	3.8 +/- 0.2	4.3 +/- 0.5	3.6 +/- 0.2	3.3 +/- 0.2
3/28/2011	4/4/2011	4.1 +/- 0.2	4.4 +/- 0.2	4.5 +/- 0.2	4.9 +/- 0.2	4.6 +/- 0.2	4.3 +/- 0.2	4.7 +/- 0.2
4/4/2011	4/11/2011	2.5 +/- 0.1	2.4 +/- 0.1	2.3 +/- 0.1	2.4 +/- 0.1	2.5 +/- 0.1	2.4 +/- 0.1	2.3 +/- 0.1
4/11/2011	4/18/2011	2.3 +/- 0.1	2.5 +/- 0.1	2.7 +/- 0.1	2.7 +/- 0.1	2.6 +/- 0.1	2.6 +/- 0.1	2.6 +/- 0.1
4/18/2011	4/25/2011	2.0 +/- 0.2	1.7 +/- 0.1	1.8 +/- 0.1	1.9 +/- 0.1	2.0 +/- 0.1	1.8 +/- 0.1	1.7 +/- 0.1
4/25/2011	5/2/2011	<sup>1</sup>	1.2 +/- 0.1	1.4 +/- 0.1	1.4 +/- 0.1	1.5 +/- 0.1	1.4 +/- 0.1	1.3 +/- 0.1
5/2/2011	5/9/2011	1.8 +/- 0.2	1.4 +/- 0.1	1.7 +/- 0.1	1.6 +/- 0.1	1.4 +/- 0.1	1.5 +/- 0.1	1.5 +/- 0.1
5/9/2011	5/16/2011	1.0 +/- 0.1	0.9 +/- 0.1	1.0 +/- 0.1	1.0 +/- 0.1	1.1 +/- 0.1	1.6 +/- 0.1	1.1 +/- 0.1
5/16/2011	5/23/2011	0.6 +/- 0.2	1.0 +/- 0.1	0.9 +/- 0.1	1.0 +/- 0.1	1.1 +/- 0.1	1.0 +/- 0.1	0.9 +/- 0.1
5/23/2011	5/30/2011	0.7 +/- 0.1	1.1 +/- 0.1	1.2 +/- 0.1	1.2 +/- 0.1	1.2 +/- 0.1	1.2 +/- 0.1	1.0 +/- 0.1



**Table B-5**

**Concentration of Beta Emitters in Air Particulates – Onsite Samples**  
**(Results in units of  $10^{-2}$  pCi/m<sup>3</sup> +/- 2 $\sigma$  Uncertainty)**

Start Date	Stop Date	STATION-02 Manor House Yard	STATION-03 East Field	STATION-04 Training Center Parking Lot	STATION-05 Creek Bridge	STATION-06 Main Parking Lot	STATION-07 West Fence Line	STATION-13 Substation 13
5/30/2011	6/6/2011	1.9 +/- 0.1	1.9 +/- 0.1	2.2 +/- 0.2	2.3 +/- 0.2	2.2 +/- 0.1	2.2 +/- 0.2	2.2 +/- 0.1
6/6/2011	6/13/2011	2.7 +/- 0.2	2.3 +/- 0.1	2.4 +/- 0.1	2.5 +/- 0.1	2.5 +/- 0.1	2.2 +/- 0.1	2.2 +/- 0.1
6/13/2011	6/20/2011	1.5 +/- 0.1	1.6 +/- 0.1	1.7 +/- 0.1	1.5 +/- 0.1	1.6 +/- 0.1	1.6 +/- 0.1	1.6 +/- 0.1
6/20/2011	6/27/2011	1.1 +/- 0.1	1.0 +/- 0.1	1.1 +/- 0.1	1.0 +/- 0.1	1.2 +/- 0.1	1.1 +/- 0.1	1.0 +/- 0.2
6/27/2011	7/4/2011	1.4 +/- 0.1	1.8 +/- 0.1	1.7 +/- 0.1	1.7 +/- 0.1	1.7 +/- 0.1	1.7 +/- 0.1	1.8 +/- 0.2
7/4/2011	7/11/2011	1.8 +/- 0.1	1.9 +/- 0.1	2.0 +/- 0.1	2.0 +/- 0.1	2.1 +/- 0.1	1.9 +/- 0.1	2.0 +/- 0.2
7/11/2011	7/18/2011	2.5 +/- 0.2	2.4 +/- 0.1	2.5 +/- 0.1	2.5 +/- 0.1	2.5 +/- 0.1	2.4 +/- 0.1	2.6 +/- 0.2
7/18/2011	7/25/2011	2.9 +/- 0.2	2.8 +/- 0.1	2.9 +/- 0.2	2.7 +/- 0.1	2.7 +/- 0.1	2.6 +/- 0.1	2.9 +/- 0.2
7/25/2011	8/1/2011	2.3 +/- 0.1	2.2 +/- 0.1	2.4 +/- 0.1	2.2 +/- 0.1	2.3 +/- 0.1	2.2 +/- 0.1	2.6 +/- 0.2
8/1/2011	8/8/2011	2.4 +/- 0.1	2.4 +/- 0.1	2.5 +/- 0.1	2.5 +/- 0.1	2.4 +/- 0.1	2.3 +/- 0.1	2.4 +/- 0.2
8/8/2011	8/15/2011	2.3 +/- 0.1	2.1 +/- 0.1	2.3 +/- 0.1	1.8 +/- 0.1	2.1 +/- 0.2	2.1 +/- 0.1	2.3 +/- 0.2
8/15/2011	8/22/2011	3.1 +/- 0.2	2.9 +/- 0.2	3.1 +/- 0.2	2.8 +/- 0.1	3.2 +/- 0.2	2.9 +/- 0.1	3.3 +/- 0.2
8/22/2011	8/29/2011	1.8 +/- 0.1	1.8 +/- 0.1	1.8 +/- 0.1	1.9 +/- 0.1	1.9 +/- 0.1	1.7 +/- 0.1	1.9 +/- 0.2
8/29/2011	9/5/2011	2.5 +/- 0.4	3.8 +/- 0.2	3.7 +/- 0.2	3.7 +/- 0.1	3.9 +/- 0.2	3.6 +/- 0.1	3.8 +/- 0.2
9/5/2011	9/12/2011	1.6 +/- 0.1	1.6 +/- 0.1	1.7 +/- 0.1	1.4 +/- 0.1	1.6 +/- 0.1	1.6 +/- 0.1	1.7 +/- 0.2
9/12/2011	9/19/2011	1.9 +/- 0.1	1.9 +/- 0.1	2.0 +/- 0.1	1.8 +/- 0.1	1.9 +/- 0.1	1.8 +/- 0.1	2.1 +/- 0.2
9/19/2011	9/26/2011	2.5 +/- 0.1	2.6 +/- 0.1	2.7 +/- 0.1	2.5 +/- 0.1	2.8 +/- 0.2	2.4 +/- 0.1	2.7 +/- 0.2
9/26/2011	10/3/2011	1.5 +/- 0.1	1.6 +/- 0.1	1.5 +/- 0.1	1.6 +/- 0.1	1.6 +/- 0.1	1.5 +/- 0.1	1.9 +/- 0.2
10/3/2011	10/10/2011	3.6 +/- 0.2	3.5 +/- 0.1	3.2 +/- 0.2	3.5 +/- 0.1	3.8 +/- 0.2	3.8 +/- 0.2	3.9 +/- 0.2
10/10/2011	10/17/2011	2.7 +/- 0.2	2.7 +/- 0.2	3.3 +/- 0.2	2.7 +/- 0.1	2.8 +/- 0.2	2.6 +/- 0.1	2.9 +/- 0.3
10/17/2011	10/24/2011	1.7 +/- 0.1	1.8 +/- 0.1	1.8 +/- 0.1	1.6 +/- 0.1	1.8 +/- 0.1	1.8 +/- 0.1	1.8 +/- 0.2
10/24/2011	10/31/2011	1.8 +/- 0.1	1.8 +/- 0.1	1.9 +/- 0.1	1.9 +/- 0.1	2.0 +/- 0.1	1.7 +/- 0.1	1.9 +/- 0.2

**Table B-5**

**Concentration of Beta Emitters in Air Particulates – Onsite Samples**  
(Results in units of  $10^{-2}$  pCi/m<sup>3</sup> +/- 2 $\sigma$  Uncertainty)

Start Date	Stop Date	STATION-02 Manor House Yard	STATION-03 East Field	STATION-04 Training Center Parking Lot	STATION-05 Creek Bridge	STATION-06 Main Parking Lot	STATION-07 West Fence Line	STATION-13 Substation 13
10/31/2011	11/7/2011	2.6 +/- 0.2	2.5 +/- 0.1	2.8 +/- 0.1	2.6 +/- 0.1	2.8 +/- 0.2	2.7 +/- 0.1	2.8 +/- 0.2
11/7/2011	11/14/2011	3.4 +/- 0.2	3.6 +/- 0.2	3.6 +/- 0.2	3.6 +/- 0.2	3.7 +/- 0.2	3.5 +/- 0.2	3.7 +/- 0.3
11/14/2011	11/21/2011	2.9 +/- 0.2	2.8 +/- 0.1	2.9 +/- 0.2	2.8 +/- 0.1	2.7 +/- 0.1	2.7 +/- 0.1	2.9 +/- 0.2
11/21/2011	11/28/2011	2.4 +/- 0.1	2.4 +/- 0.1	2.5 +/- 0.1	2.3 +/- 0.1	2.6 +/- 0.2	2.4 +/- 0.1	2.4 +/- 0.2
11/28/2011	12/5/2011	2.2 +/- 0.1	2.2 +/- 0.1	2.1 +/- 0.1	2.2 +/- 0.1	2.3 +/- 0.1	2.0 +/- 0.1	2.2 +/- 0.2
12/5/2011	12/12/2011	2.7 +/- 0.2	2.6 +/- 0.1	2.8 +/- 0.1	2.7 +/- 0.1	2.8 +/- 0.2	2.6 +/- 0.1	2.8 +/- 0.2
12/12/2011	12/19/2011	4.0 +/- 0.2	4.1 +/- 0.2	4.0 +/- 0.2	4.0 +/- 0.2	4.4 +/- 0.2	3.9 +/- 0.2	4.0 +/- 0.3
12/19/2011	12/26/2011	2.4 +/- 0.1	2.5 +/- 0.1	2.6 +/- 0.1	2.5 +/- 0.1	2.7 +/- 0.1	2.4 +/- 0.1	2.6 +/- 0.2
12/26/2011	1/2/2012	2.1 +/- 0.1	2.1 +/- 0.1	2.3 +/- 0.1	2.2 +/- 0.1	2.4 +/- 0.1	2.1 +/- 0.1	2.5 +/- 0.2

<sup>1</sup> Sample not collected. Sampler out of service.

<sup>2</sup> Insufficient sample collected for analysis.

\* < MDA (Beta)

**Table B-6**

**Concentration of Beta Emitters in Air Particulates - Offsite Samples  
(Results in units of  $10^{-2}$  pCi/m<sup>3</sup> +/- 2 $\sigma$  Uncertainty)**

Start Date	Stop Date	STATION-08 <sup>1</sup> Seabreeze	STATION-09 Webster	STATION-10 <sup>1</sup> Walworth	STATION-11 Williamson	STATION-12 <sup>1</sup> Sodus Point
1/3/2011	1/10/2011	3.0 +/- 0.1	2.8 +/- 0.1	3.1 +/- 0.2	2.9 +/- 0.2	3.4 +/- 0.2
1/10/2011	1/17/2011	1.5 +/- 0.1	1.5 +/- 0.1	1.7 +/- 0.2	1.6 +/- 0.2	1.6 +/- 0.1
1/17/2011	1/24/2011	2.3 +/- 0.1	2.2 +/- 0.1	2.3 +/- 0.2	2.4 +/- 0.2	2.6 +/- 0.1
1/24/2011	1/31/2011	2.9 +/- 0.1	2.7 +/- 0.1	3.1 +/- 0.2	3.1 +/- 0.2	3.3 +/- 0.2
1/31/2011	2/7/2011	2.1 +/- 0.1	2.2 +/- 0.1	2.8 +/- 0.2	2.6 +/- 0.2	2.9 +/- 0.2
2/7/2011	2/14/2011	2.7 +/- 0.1	2.4 +/- 0.1	2.8 +/- 0.2	2.6 +/- 0.2	2.8 +/- 0.1
2/14/2011	2/21/2011	2.3 +/- 0.1	2.2 +/- 0.1	2.5 +/- 0.2	2.4 +/- 0.2	2.4 +/- 0.2
2/21/2011	2/28/2011	2.4 +/- 0.1	1.8 +/- 0.1	2.2 +/- 0.2	2.3 +/- 0.2	2.5 +/- 0.1
2/28/2011	3/7/2011	2.5 +/- 0.1	2.3 +/- 0.1	2.3 +/- 0.2	2.4 +/- 0.2	2.5 +/- 0.1
3/7/2011	3/14/2011	1.7 +/- 0.1	1.5 +/- 0.1	1.6 +/- 0.2	1.6 +/- 0.2	1.7 +/- 0.1
3/14/2011	3/21/2011	2.8 +/- 0.1	2.2 +/- 0.1	2.5 +/- 0.2	2.3 +/- 0.2	2.6 +/- 0.2
3/21/2011	3/28/2011	3.5 +/- 0.2	3.3 +/- 0.1	3.3 +/- 0.3	3.2 +/- 0.2	3.5 +/- 0.2
3/28/2011	4/4/2011	4.7 +/- 0.2	5.0 +/- 0.2	4.4 +/- 0.3	4.3 +/- 0.2	4.5 +/- 0.2
4/4/2011	4/11/2011	2.5 +/- 0.1	2.4 +/- 0.1	2.4 +/- 0.2	2.3 +/- 0.2	2.6 +/- 0.2
4/11/2011	4/18/2011	4.6 +/- 0.2	2.5 +/- 0.1	2.7 +/- 0.2	2.9 +/- 0.2	2.7 +/- 0.2
4/18/2011	4/25/2011	2.0 +/- 0.1	1.9 +/- 0.1	2.0 +/- 0.2	1.7 +/- 0.2	1.9 +/- 0.1
4/25/2011	5/2/2011	1.5 +/- 0.1	1.3 +/- 0.1	1.6 +/- 0.2	1.3 +/- 0.2	1.2 +/- 0.1
5/2/2011	5/9/2011	1.6 +/- 0.1	1.4 +/- 0.1	1.5 +/- 0.2	1.4 +/- 0.2	1.6 +/- 0.1
5/9/2011	5/16/2011	1.2 +/- 0.1	1.0 +/- 0.1	1.2 +/- 0.2	1.1 +/- 0.1	1.1 +/- 0.1
5/16/2011	5/23/2011	1.0 +/- 0.1	1.0 +/- 0.1	1.2 +/- 0.2	0.9 +/- 0.1	0.6 +/- 0.3
5/23/2011	5/30/2011	1.1 +/- 0.1	0.8 +/- 0.1	1.3 +/- 0.2	1.2 +/- 0.1	1.3 +/- 0.1
5/30/2011	6/6/2011	2.5 +/- 0.2	2.1 +/- 0.1	2.5 +/- 0.3	2.2 +/- 0.2	2.2 +/- 0.2
6/6/2011	6/13/2011	2.5 +/- 0.1	2.2 +/- 0.1	2.6 +/- 0.2	2.2 +/- 0.2	2.4 +/- 0.1
6/13/2011	6/20/2011	1.7 +/- 0.1	1.6 +/- 0.1	1.6 +/- 0.2	1.7 +/- 0.1	1.6 +/- 0.1
6/20/2011	6/27/2011	1.1 +/- 0.1	1.0 +/- 0.1	1.2 +/- 0.2	1.2 +/- 0.1	1.1 +/- 0.1
6/27/2011	7/4/2011	2.0 +/- 0.1	1.7 +/- 0.1	1.9 +/- 0.2	1.9 +/- 0.1	1.7 +/- 0.1
7/4/2011	7/11/2011	2.3 +/- 0.2	2.1 +/- 0.1	2.3 +/- 0.3	2.5 +/- 0.2	2.0 +/- 0.1
7/11/2011	7/18/2011	2.8 +/- 0.2	2.6 +/- 0.1	2.8 +/- 0.2	2.6 +/- 0.2	2.4 +/- 0.1
7/18/2011	7/25/2011	3.0 +/- 0.2	2.8 +/- 0.1	3.0 +/- 0.3	2.8 +/- 0.2	2.9 +/- 0.1
7/25/2011	8/1/2011	2.4 +/- 0.1	2.2 +/- 0.1	2.3 +/- 0.2	2.4 +/- 0.2	<sup>2</sup>
8/1/2011	8/8/2011	2.6 +/- 0.1	2.4 +/- 0.1	2.6 +/- 0.2	2.4 +/- 0.2	2.0 +/- 0.1 <sup>(2)</sup>
8/8/2011	8/15/2011	2.5 +/- 0.1	2.2 +/- 0.1	2.4 +/- 0.2	2.2 +/- 0.2	2.4 +/- 0.2
8/15/2011	8/22/2011	3.4 +/- 0.2	3.2 +/- 0.2	3.4 +/- 0.3	3.3 +/- 0.2	2.9 +/- 0.2
8/22/2011	8/29/2011	1.9 +/- 0.1	1.8 +/- 0.1	2.0 +/- 0.2	1.9 +/- 0.1	1.8 +/- 0.1

<sup>1</sup> Control Location

<sup>2</sup> Extended Sample Period to weekend 8/8/11 due to safety concern at substation.

**Table B-6**

**Concentration of Beta Emitters in Air Particulates - Offsite Samples  
(Results in units of  $10^{-2}$  pCi/m<sup>3</sup> +/- 2 $\sigma$  Uncertainty)**

Start Date	Stop Date	STATION-08 <sup>1</sup> Seabreeze	STATION-09 Webster	STATION-10 <sup>1</sup> Walworth	STATION-11 Williamson	STATION-12 <sup>1</sup> Sodus Point
8/29/2011	9/5/2011	3.7 +/- 0.2	3.9 +/- 0.2	3.6 +/- 0.2	3.7 +/- 0.2	3.6 +/- 0.2
9/5/2011	9/12/2011	1.5 +/- 0.1	1.7 +/- 0.1	1.8 +/- 0.2	1.7 +/- 0.2	1.6 +/- 0.1
9/12/2011	9/19/2011	1.9 +/- 0.1	1.8 +/- 0.1	1.3 +/- 0.1	1.9 +/- 0.1	1.8 +/- 0.1
9/19/2011	9/26/2011	2.7 +/- 0.1	2.6 +/- 0.1	1.8 +/- 0.1	2.7 +/- 0.2	2.7 +/- 0.1
9/26/2011	10/3/2011	1.6 +/- 0.1	1.5 +/- 0.1	1.2 +/- 0.1	1.8 +/- 0.1	1.6 +/- 0.1
10/3/2011	10/10/2011	3.3 +/- 0.2	3.3 +/- 0.2	2.9 +/- 0.1	3.5 +/- 0.2	3.2 +/- 0.2
10/10/2011	10/17/2011	3.4 +/- 0.2	3.4 +/- 0.2	2.0 +/- 0.1	3.6 +/- 0.2	3.5 +/- 0.2
10/17/2011	10/24/2011	1.8 +/- 0.1	1.8 +/- 0.1	1.4 +/- 0.1	1.8 +/- 0.1	1.7 +/- 0.1
10/24/2011	10/31/2011	1.9 +/- 0.1	1.9 +/- 0.1	1.5 +/- 0.1	1.8 +/- 0.1	1.9 +/- 0.1
10/31/2011	11/7/2011	2.6 +/- 0.1	2.7 +/- 0.1	2.2 +/- 0.1	2.7 +/- 0.2	2.6 +/- 0.1
11/7/2011	11/14/2011	3.4 +/- 0.2	3.4 +/- 0.2	2.8 +/- 0.2	3.9 +/- 0.2	3.7 +/- 0.2
11/14/2011	11/21/2011	2.7 +/- 0.1	2.8 +/- 0.1	2.3 +/- 0.1	2.7 +/- 0.2	2.9 +/- 0.1
11/21/2011	11/28/2011	2.4 +/- 0.2	2.4 +/- 0.1	1.8 +/- 0.1	2.6 +/- 0.2	2.5 +/- 0.2
11/28/2011	12/5/2011	2.2 +/- 0.1	2.2 +/- 0.1	1.7 +/- 0.1	2.2 +/- 0.1	2.1 +/- 0.1
12/5/2011	12/12/2011	2.7 +/- 0.1	2.4 +/- 0.1	2.2 +/- 0.1	2.9 +/- 0.2	2.9 +/- 0.1
12/12/2011	12/19/2011	3.6 +/- 0.2	3.8 +/- 0.2	3.1 +/- 0.2	3.9 +/- 0.2	4.3 +/- 0.2
12/19/2011	12/26/2011	2.3 +/- 0.1	2.3 +/- 0.1	2.0 +/- 0.1	2.5 +/- 0.1	2.7 +/- 0.1
12/26/2011	1/2/2012	1.9 +/- 0.1	1.9 +/- 0.1	1.8 +/- 0.1	2.1 +/- 0.1	2.2 +/- 0.1

<sup>1</sup> Control Location

<sup>2</sup> Extended Sample Period to weekending 8/8/11 due to safety concern at substation.

**Table B-7**

**Concentration of Gamma Emitters in Air Particulates  
(Results in units of  $10^{-3}$  pCi/m<sup>3</sup> +/- 2 $\sigma$ )**

Sample Location	Description	3/28/2011		6/27/2011 <sup>2</sup>		10/3/2011		01/02/2012	
		Cs134	Cs 137	Cs134	Cs 137	Cs 134	Cs 137	Cs 134	Cs 137
STATION-02	Manor House Yard	*	*	0.7±0.3	0.9±0.4	*	*	*	*
STATION-03	East Field	*	*	0.5±0.2	0.7±0.3	*	*	*	*
STATION-04	Training Center Parking Lot	*	*	0.3±0.2	1.1±0.3	*	*	*	*
STATION-05	Creek Bridge	*	*	0.6±0.3	0.6±0.3	*	*	*	*
STATION-06	Main Parking Lot	*	*	0.8±0.2	0.7±0.3	*	*	*	*
STATION-07	West Fence Line	*	*	0.5±0.2	1.2±0.3	*	*	*	*
STATION-08 <sup>1</sup>	Seabreeze	*	*	1.3±0.3	1.1±0.4	*	*	*	*
STATION-09	Webster	*	*	1.0±0.3	0.8±0.4	*	*	*	*
STATION-10 <sup>1</sup>	Walworth	*	*	*	1.3±0.5	*	*	*	*
STATION-11	Williamson	*	*	*	*	*	*	*	*
STATION-12 <sup>1</sup>	Sodus Point	*	*	0.6±0.3	0.8±0.3	*	*	*	*
STATION-13	Substation 13	*	*	0.7±0.2	1.0±0.3	*	*	*	*

<sup>1</sup> Control Location

<sup>2</sup> Cs134 and Cs137 were uniquely detected in the sample period that is a composite of 13 weeks from 03/28/2011 to 6/27/11. These positive detections are attributed to Fukushima Daiichi Nuclear Power Station event that occurred in March 2011.

\* All Non-Natural Gamma Emitters <MDA

**Table B-8**

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

Sample Code	Sample Date	Sample Type	Gamma Emitters
<b>CONTROL<sup>1</sup></b>			
Local Sites in Control Sectors	7/9/2011	Raspberries	*
	7/28/2011	Cucumbers	*
	7/28/2011	Squash	*
	9/15/2011	Grapes	*
<b>EAST</b>			
East Sector	7/13/2011	Greens	*
	7/25/2011	Squash	*
	9/14/2011	Cabbage	*
	9/14/2011	Tomato	*
<b>ESE</b>			
East South East Sector	7/18/2011	Raspberries	*
	7/28/2011	Greens	*
	7/28/2011	Squash	*
	8/1/2011	Blackberries	*
	9/9/2011	Grapes	*
	9/14/2011	Cabbage	*
<b>HAMLIN<sup>1</sup></b>			
Control	7/28/2011	Greens	*
	9/15/2011	Cabbage	*
<b>LYNDONVILLE<sup>1</sup></b>			
Control	9/15/2011	Apples	*
	9/15/2011	Blackberries	*
	9/15/2011	Tomato	*
<b>SE</b>			
South East Garden	9/14/2011	Apples	*
<b>SSE</b>			
South South East Garden	7/25/2011	Squash	*
	7/28/2011	Greens	*
	7/28/2011	Turnips	*
	9/12/2011	Apples	*
	9/14/2011	Tomato	*
11/1/2011	Cabbage	*	
<b>SW</b>			
South West Sector	7/8/2011	Raspberries	*

<sup>1</sup> Control Location

\* 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)**

Sample Code	Sample Date	Gamma Emitters
EATON ESE Indicator	1/25/2011	*
	2/22/2011	*
	3/22/2011	*
	4/19/2011	*
	5/17/2011	*
	6/1/2011	*
	6/14/2011	*
	6/28/2011	*
	7/12/2011	*
	7/26/2011	*
	8/9/2011	*
	8/23/2011	*
	9/7/2011	*
	9/20/2011	*
	10/4/2011	*
	10/18/2011	*
11/1/2011	*	
11/29/2011	*	
12/28/2011	*	
SCHULTZ <sup>1</sup> South Sodus Control	1/25/2011	*
	2/22/2011	*
	3/22/2011	*
	4/19/2011	*
	5/17/2011	*
	6/1/2011	*
	6/14/2011	*
	6/28/2011	*
	7/12/2011	*
	7/26/2011	*
	8/9/2011	*
	8/23/2011	*
	9/7/2011	*
	9/20/2011	*
	10/4/2011	*
	10/18/2011	*
11/1/2011	*	
11/29/2011	*	
12/28/2011	*	

<sup>1</sup> Control Location

\* All Non-Natural Gamma Emitters <MDA

Table B-10

Typical MDA Ranges for Gamma Spectrometry

Selected Nuclides	Air Particulates (10 <sup>-2</sup> pCi/m <sup>3</sup> )	Surface Water, Drinking Water (pCi/L)	Fish	Ground-water	Milk	Oysters (pCi/kg)	Shoreline Sediment	Soil (pCi/kg)	Vegetation (pCi/L)
Na-22	0 - 0	2.9 - 6.9	18.8 - 46.8	3.8 - 9.7	5 - 9.1	5.7 - 36.3	12.1 - 49.6	26.7 - 79	.9 - 40
K-40	0 - 0	31.1 - 68.3	170.9 - 340	40.8 - 82.2	41.6 - 74.4	87.1 - 325	130 - 438.2	346 - 770	13 - 323
Cr-51	0 - 0.1	21.7 - 44.2	133 - 351	25.5 - 52.7	27.6 - 49.6	38.2 - 219	97.2 - 377	200 - 594	15 - 363
Mn-54	0 - 0	2.6 - 5.9	16.3 - 32.1	3.5 - 7.5	3.7 - 6.9	5.6 - 29.2	11.3 - 38.5	23 - 66.2	.4 - 32.8
Co-58	0 - 0	2.6 - 6	20 - 38.1	3.3 - 7.6	3.7 - 6.8	5.1 - 28.6	11.8 - 41.5	24.3 - 70.6	0 - 70.3
Fe-59	0 - 0	5.7 - 13.4	55 - 110	7 - 16.5	9.2 - 16.8	15.8 - 63.4	28.1 - 116	56.3 - 170	21-363
Co-60	0 - 0	2.7 - 6.7	19.7 - 39.6	3.5 - 8.3	4.5 - 8.4	5.8 - 34.2	12.2 - 44.2	24.6 - 72.2	0.6 - 37.5
Zn-65	0 - 0	5.8 - 13.5	43 - 94.1	9 - 18.6	9.7 - 17.9	14 - 71.5	36.4 - 120	62.7 - 191	1.2 - 82.5
Nb-95	0 - 0	2.8 - 6.3	19.6 - 50.4	3.6 - 8.3	3.9 - 7	5.8 - 30	14.3 - 56.4	28.6 - 90.3	8.9-69
Zr-95	0 - 0	4.6 - 10.5	29.2 - 66.9	5.8 - 13.7	6.4 - 12	8.6 - 49.1	21.1 - 75.5	42.7 - 128	16-131
Ru-106	0 - 0	22 - 51	114 - 264	27.9 - 64.9	29 - 58.3	35 - 232	87.1 - 299	182 - 530	0 - 277
Ag-110m	0 - 0	2.5 - 5.5	13.6 - 30.4	3.2 - 7	3.3 - 6.5	4.4 - 26.8	9.4 - 35.1	24.6 - 72.9	0 - 30.9
I-131 <sup>1</sup>	0 - 1.1	0 - 6	0 - 470.3	3.2 - 9.4	.1 - 1.4	0 - 80.2	0 - 326	63.4 - 248	9.0 - 57
Cs-134	0 - 0	2.5 - 5.6	13.9 - 26.6	3.2 - 7.6	3.1 - 6.4	11.1 - 34.1	22.5 - 42.5	40.2 - 70.3	.6 - 31.4
Cs-137	0 - 0	2.5 - 5.9	13.9 - 30.7	3.5 - 7.9	3.4 - 7.1	12.9 - 36.1	21.4 - 43.5	35.9 - 68.6	.6 - 32.4
Ba-140	0 - 0.1	5.2 - 10.7	33 - 198	5.4 - 11.6	5.3 - 9.9	6.1 - 67.3	13.5 - 216	70.9 - 238	14-120
La-140	0 - 0.1	5.0 - 10.7	33 - 198	5.4 - 11.6	5.3 - 9.9	6.1 - 67.3	13.4 - 216	70.9 - 238	14-120
Ce-144	0 - 0	13.4 - 28.5	50.4 - 115	17.9 - 37.4	17.5 - 32.9	19.1 - 108	41.8 - 139	84.5 - 244	0 - 132

<sup>1</sup> This MDA range for I-131 on a silver zeolite cartridge is typically 4.16 x 10<sup>-3</sup> to 3.40 x 10<sup>-2</sup>



**Table B-11**

**Typical LLDs for Gamma Spectrometry**

Selected Nuclides	Air Particulates 10 <sup>-3</sup> pCi/m <sup>3</sup>	Surface Water, pCi/L	Fish pCi/kg (wet)	Groundwater pCi/L	Oysters pCi/kg (wet)	Precipitation pCi/L	Soil pCi/kg (dry)	Vegetation pCi/kg (dry)
Na-22	2.9	2.9	22	2.9	22	2.9	24	35
Cr-51	12	17	88	17	88	17	110	162
Mn-54	2.1	2.4	17	2.4	17	2.4	18	27
Co-58	2	2.4	16	2.4	16	2.4	17	25
Fe-59	4.6	5.2	37	5.2	37	5.2	38	60
Co-60	2.7	2.8	22	2.8	22	2.8	21	33
Zn-65	2.8	5.6	23	5.6	23	5.6	54	66
Nb-95	1.9	2.2	15	2.2	15	2.2	18	25
Zr-95	3.3	3.8	27	3.8	27	3.8	29	44
Ru-106	17	20	135	20	135	20	146	223
Ag-110m	1.8	2.1	14	2.1	14	2.1	16	25
Te-129m	20	26	149	26	149	26	180	265
I-131	1.5	2	11	2	11	2	14	20
Cs-134	1.9	2.2	15	2.2	15	2.2	20	24
Cs-137	1.8	2.3	15	2.3	15	2.3	17	27
Ba-140	6.1	7.3	48	7.3	48	7.3	54	80
La-140	3.4	4.1	26	4.1	26	4.1	25	41
Ce-144	5.5	12	43	12	43	12	75	101

\* The LLD for I-131 measured on a silver zeolite cartridge is 2.0 x10<sup>-3</sup> pCi/m<sup>3</sup>

**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 ± 0.7	13.2 ± 0.9	15.2 ± 0.8	13.9 ± 0.7
3	Onsite-In field approximately 200 ft SE of station #2	12.5 ± 0.9	14.0 ± 0.9	14.5 ± 0.9	13.5 ± 2.0
4	Onsite-Training Center yard driveway circle	11.7 ± 0.8	12.7 ± 0.8	12.9 ± 1.2	13.1 ± 0.8
5	Onsite-Between creek and plant entry road	12.8 ± 0.6	14.4 ± 1.2	14.8 ± 0.6	14.1 ± 0.8
6	Onsite-SW side of plant parking lot	10.0 ± 0.7	10.4 ± 1.0	11.1 ± 0.7	10.6 ± 0.6
7	Onsite-utility pole along West plant fence	12.1 ± 0.5	12.9 ± 1.1	14.0 ± 0.7	13.7 ± 1.1
8 <sup>1</sup>	Topper Drive-Irondequoit, Seabreeze Substation #51	11.1 ± 0.5	10.6 ± 1.1	12.0 ± 0.7	11.3 ± 0.8
9	Phillips Road-Webster, intersection with Highway #104, Substation #74	10.7 ± 0.7	11.0 ± 0.8	12.3 ± 0.8	11.7 ± 0.9
10 <sup>1</sup>	Atlantic Avenue-Walworth, Substation #230	9.6 ± 0.7	10.7 ± 1.1	10.8 ± 0.6	10.3 ± 0.8
11	W. Main Street-Williamson, Substation #207	11.2 ± 0.6	10.6 ± 0.8	11.5 ± 0.9	10.8 ± 0.8
12 <sup>1</sup>	12 Seaman Avenue-Sodus Point-Off Lake Road by Sewer district, Substation #209	11.5 ± 0.7	12.3 ± 0.9	13.0 ± 0.8	11.1 ± 1.1
13	Onsite- South of Meteorological Tower	12.4 ± 0.9	13.2 ± 0.9	13.2 ± 0.9	16.1 ± 0.8
14	NW corner of field along lake shore	11.1 ± 0.6	14.2 ± 2.1	12.8 ± 0.6	12.6 ± 0.8
15	Field access road, west of orchard, approximately 3000' West of plant	12.5 ± 0.7	13.2 ± 1.2	13.1 ± 0.7	13.8 ± 0.7

**TABLE B-12 (Continued)**

**Direct Radiation**  
(Results in Units of mR/90 days  $\pm 2\sigma$ )

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	11.9 $\pm$ 0.6	12.7 $\pm$ 0.9	14.2 $\pm$ 0.8	12.8 $\pm$ 0.7
17	Utility pole in orchard, approximately 75' North of Lake Road	11.5 $\pm$ 0.6	12.9 $\pm$ 1.1	12.6 $\pm$ 0.6	12.4 $\pm$ 0.7
18	Approximately 30' North of NE corner of Substation 13A fence	10.6 $\pm$ 0.6	10.4 $\pm$ 0.7	10.7 $\pm$ 0.6	11.2 $\pm$ 0.8
19	On NW corner of house 100' East of plant access road	10.3 $\pm$ 0.5	10.7 $\pm$ 0.7	11.3 $\pm$ 0.7	11.9 $\pm$ 0.9
20	Approximately 150' West of Ontario Center Road and approximately 170' South of Lake Road	12.0 $\pm$ 0.6	12.2 $\pm$ 0.8	13.1 $\pm$ 1.6	12.5 $\pm$ 0.8
21	North side of Lake Road, approximately 200' East of Ontario Center Road	11.3 $\pm$ 0.5	12.4 $\pm$ 1.1	13.6 $\pm$ 0.6	12.5 $\pm$ 0.7
22	North side of Lake Road, SE, property owner	10.9 $\pm$ 0.6	10.3 $\pm$ 0.8	12.1 $\pm$ 0.7	11.1 $\pm$ 0.9
23	East property line, midway between Lake Road and Lake shore	11.8 $\pm$ 0.6	12.5 $\pm$ 1.1	14.5 $\pm$ 1.2	13.2 $\pm$ 1.2
24	Lake shore near NE corner of property	12.8 $\pm$ 0.6	12.0 $\pm$ 1.1	14.0 $\pm$ 0.9	14.4 $\pm$ 0.7
25 <sup>1</sup>	Substation #73, Klem Road, adjacent to 897 Klem Road	10.3 $\pm$ 0.5	11.5 $\pm$ 0.8	11.8 $\pm$ 0.9	11.4 $\pm$ 0.7
26 <sup>1</sup>	Service Center, Plank Road, West of 250	10.5 $\pm$ 0.7	11.5 $\pm$ 0.7	12.0 $\pm$ 0.9	12.2 $\pm$ 0.8
27 <sup>1</sup>	Atlantic Avenue at Knollwood Drive utility pole, North side of road	10.6 $\pm$ 0.5	11.2 $\pm$ 0.9	13.0 $\pm$ 1.1	12.1 $\pm$ 1.0

**TABLE B-12 (Continued)**  
**Direct Radiation**  
(Results in Units of mR/90 days  $\pm 2\sigma$ )

Station	Location	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
28 <sup>1</sup>	Substation #193, Marion, behind Stanton Ag. Service, North Main Street	9.6 $\pm$ 0.6	11.5 $\pm$ 0.7	13.0 $\pm$ 1.1	11.1 $\pm$ 0.6
29 <sup>1</sup>	Substation #208, Town Line Road (CR-118), 1000' North of Route 104	10.0 $\pm$ 0.5	10.6 $\pm$ 0.7	11.7 $\pm$ 0.6	11.4 $\pm$ 0.7
30 <sup>1</sup>	District Office, Sodus, on pole, West side of bldg	9.4 $\pm$ 0.5	9.9 $\pm$ 0.8	10.8 $\pm$ 0.6	9.9 $\pm$ 0.9
31	Lake Road, pole 20' North of road, 500' East of Salt Road	11.7 $\pm$ 0.5	13.0 $\pm$ 0.8	13.7 $\pm$ 0.7	12.3 $\pm$ 0.9
32	Woodard Road at County Line Road, pole @ BW corner	11.4 $\pm$ 0.5	11.4 $\pm$ 1.1	12.7 $\pm$ 1.0	11.2 $\pm$ 0.6
33	County Line Road at RR tracks, pole approximately 100' East along tracks	10.6 $\pm$ 0.5	10.2 $\pm$ 0.9	12.1 $\pm$ 1.0	10.5 $\pm$ 0.7
34	Lincoln Road, pole midway between Ridge Road and Route 104	12.6 $\pm$ 0.6	14.3 $\pm$ 0.9	14.0 $\pm$ 0.7	13.8 $\pm$ 0.8
35	Transmission Right of Way, North of Clevenger Road on pole	11.5 $\pm$ 0.5	13.5 $\pm$ 1.0	13.5 $\pm$ 0.8	12.3 $\pm$ 1.0
36	Substation #205, Route 104, East of Ontario Center Road, North side of fence	10.7 $\pm$ 0.8	11.6 $\pm$ 0.8	12.1 $\pm$ 0.8	11.7 $\pm$ 0.7
37	Rail Road Avenue, pole at 2048	10.1 $\pm$ 0.5	10.6 $\pm$ 0.8	12.4 $\pm$ 1.7	10.5 $\pm$ 0.9
38	Fisher Road at RR Tracks, pole East of road	11.5 $\pm$ 0.5	12.8 $\pm$ 1.0	13.0 $\pm$ 0.9	12.5 $\pm$ 0.8
39	Seeley Road, Pole South side 100' West of intersection with Stony Lonesome Road	11.2 $\pm$ 0.6	12.8 $\pm$ 0.9	13.2 $\pm$ 0.7	12.7 $\pm$ 0.9
40	Lake Road at Stoney Lonesome Road, pole at SE corner	10.5 $\pm$ 0.6	10.7 $\pm$ 0.7	11.4 $\pm$ 1.0	10.7 $\pm$ 0.6

**TABLE B-12 (Continued)**

**Direct Radiation**  
(Results in Units of mR/90 days  $\pm 2\sigma$ )

Station	Location	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
63	Westside of warehouse access road	12.1 $\pm$ 0.8	12.5 $\pm$ 0.9	13.4 $\pm$ 1.1	12.5 $\pm$ 0.7
64	Westside of direct road, adjacent to orchard	14.1 $\pm$ 0.8	14.9 $\pm$ 1.0	14.4 $\pm$ 0.7	13.5 $\pm$ 0.8

1 - Control Location

**TABLE B-13**

**Groundwater Monitoring Wells**

<b>Location</b>	<b>Sample Date</b>	<b>Tritium</b>
GW01: Warehouse Access Road (Control)	02/09/11	*
	03/03/11	*
	06/22/11	*
	08/30/11	*
	12/08/11	*
GW03: Screenhouse West, South Well	02/09/11	3.53E-07
	02/18/11	1.82E-06
GW04: Screenhouse West, North Well	01/21/11	*
	02/09/11	3.49E-07
	06/29/11	*
	07/21/11	*
	08/30/11	*
	09/29/11	*
	10/27/11	*
	11/29/11	*
12/14/11	*	
GW05: Screenhouse East, South (15.5')	02/09/11	*
	06/22/11	*
	08/30/11	*
	12/08/11	*
GW06: Screenhouse East, Middle (20.0')	02/09/11	*
	06/22/11	*
	07/21/11	*
	08/30/11	*
	12/08/11	*
GW07: Screenhouse East, North (24.0')	02/09/11	*
	03/03/11	*
	03/18/11	*
	04/01/11	*
	05/06/11	*
	06/22/11	*
	08/30/11	*
	12/08/11	*
GW08: All Volatiles Treatment Building	01/21/11	*
	02/09/11	*
	06/29/11	*
	09/29/11	*
	10/27/11	*
	11/29/11	*
	12/08/11	*
GW09: Technical Support Center, North	02/09/11	4.98E-07
	02/18/11	9.73E-07

**TABLE B-13**

**Groundwater Monitoring Wells**

<b>Location</b>	<b>Sample Date</b>	<b>Tritium</b>
GW10: Technical Support Center, South	02/09/11	*
	03/03/11	*
	06/22/11	*
	08/30/11	*
	12/08/11	*
GW11: Contaminated Service Building, SE (24.0')	02/09/11	4.36E-07
	02/18/11	9.66E-07
	03/03/11	*
	06/22/11	*
	08/30/11	*
	12/08/11	*

\* < MDA (Tritium - 500 PCi/L)

## APPENDIX C

### Quality Assurance Program

#### Summary of Appendix C Content:

Appendix C is a summary of Constellation Energy Laboratory's quality assurance program. It consists of Table C-1 which is a compilation of 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. It also includes Table C-2 which is a compilation of the results of the Constellation Energy Laboratory's participation in a split sample program with Teledyne Brown Engineering located in Knoxville, Tennessee and Table C-3 which is a list of typical MDA's 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  $\pm 2 \sigma$  of each other with the exception of a beta result for the water sample type on 6/16/11 from Analytics. Investigation into the matter yielded no apparent cause for the discrepancy. A new calibration source was used to calibrate the instrument prior to analyzing this study. Results for a study run prior to and after this calibration were in agreement within  $\pm 2 \sigma$ . Repeat analysis yielded results consistent with the initial reported value. Further analysis on another instrument did not identify any factor that would explain the erroneous result. All other intercomparisons for beta filters and water prior to and after this sample were in full agreement. With this one exception all the sets of intercomparison results in the table are in full agreement when they were further evaluated using the NRC Resolution Test Criteria.<sup>1</sup> The uncertainties for the Constellation Energy Laboratory's results and Analytics' results are  $\pm 2\sigma$ , while the ERA laboratory's uncertainty is based on USEPA guidelines.<sup>2</sup>

All the results contained in Table C-2 agree within the range of  $\pm 2 \sigma$  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 four samples involving Cs-137 results: a soil at SFS2 collected 3/22/11, a soil at SFS2 collected 9/19/11, a soil at SFS3 collected 9/19/11 and a cabbage at IB9 collected 07/25/11. In addition, two samples involving I-131 results in vegetation: SFb2 collected 03/22/11 and SFb3 collected 03/22/11, had results that fell outside the range of  $\pm 2 \sigma$ . In all cases low levels of Cs-137 or I-131 were observed in one or more of the results of the comparison set and not observed in all three. These minor discrepancies, occurring very close to or below the analyses MDA's, are most likely due to counting statistical fluctuations, the non-homogeneous nature of the sample-splitting process and in the case of I-131 a short decay time. Weekly air samples were collected on 4/11/11 at A4 and A5 and found to contain low levels of I-131 consistent with other sites in the program and around the country attributable to Fukushima releases. The low levels and short decay time of I-131 observed in these air samples precludes them from splitting to an outside laboratory. Repeat analysis of these samples for laboratory replicates yielded results within range of  $\pm 2 \sigma$ . Other samples whose nature generally precludes sample splitting are marked "\*\*\*" in the Split Analysis column.

<sup>1</sup> NRC Inspection Manual, Inspection Procedure 84750, March 15, 1994

<sup>2</sup> National Standards for Water Proficiency Testing Studies Criteria Document, December 1998



**TABLE OF CONTENTS - ANALYTICAL RESULTS**

Table	Title	Page
C-1	Results of Participation in Cross Check Programs .....	53
C-2	Results of Quality Assurance Program .....	55
C-3	Teledyne Brown Engineering's Typical MDAs for Gamma Spectrometry .....	62

**TABLE C-1**

**Results of Participation in Cross Check Programs**

<b>Sample Date</b>	<b>Sample Type and Units</b>	<b>Isotope Observed</b>	<b>Reported Laboratory's Results</b>	<b>Cross Check Lab Results</b>
03/17/11	Air Iodine – pCi	I-131	115.0 +/- 6.0	96.9 +/- 1.6
03/17/11	Milk – pCi/L	Fe-59	164.0 +/- 27.0	175.0 +/- 2.9
		Co-58	106.0 +/- 17.0	113.0 +/- 1.9
		Co-60	157.0 +/- 14.0	172.0 +/- 2.9
		Zn-65	264.0 +/- 39.0	261.0 +/- 4.4
		Cs-134	104.0 +/- 11.0	130.0 +/- 2.2
		Cs-137	214.0 +/- 20.0	205.0 +/- 3.4
		Cr-51	263.0 +/- 104.0	298.0 +/- 5.0
		Mn-54	254.0 +/- 22.0	266.0 +/- 4.5
		I-131	98.0 +/- 31.0	96.9 +/- 1.6
03/17/11	Water – pCi/L	Gross Beta	199.0 +/- 3.0	205.0 +/- 3.4
04/04/11	Water– pCi/L	Ba-133	69.7 +/- 5.0	75.3
		Cs-137	73.3 +/- 6.0	77.0
		Co-60	87.0 +/- 5.0	88.0
		Zn-65	108.0 +/- 14.0	98.9
		Cs-134	63.5 +/- 4.0	72.9
06/16/11	Air particulates on filter – pCi	Cr-51	162.0 +/- 30.0	142.0 +/- 2.4
		Ce-141	68.0 +/- 5.0	55.2 +/- 0.9
		Cs-137	116.0 +/- 9.0	95.3 +/- 1.6
		Cs-134	116.0 +/- 6.0	131.0 +/- 2.2
		Zn-65	213.0 +/- 19.0	180.0 +/- 3.0
		Co-60	157.0 +/- 8.0	134.0 +/- 2.2
		Co-58	122.0 +/- 8.0	105.0 +/- 1.8
		Fe-59	99.0 +/- 10.0	85.2 +/- 1.4
		Mn-54	104.0 +/- 8.0	95.2 +/- 1.6
06/16/11	Water – pCi/L	H-3	34.3	37.2
06/16/11	Water – pCi/L	Co-58	184.0 +/- 17.0	177.0 +/- 3.0
		Zn-65	344.0 +/- 30.0	305.0 +/- 5.1
		Co-60	243.0 +/- 10.0	228.0 +/- 3.8
		Cs-134	205.0 +/- 7.0	222.0 +/- 3.7
		Cs-137	179.0 +/- 12.0	161.0 +/- 2.7
		Fe-59	162.0 +/- 28.0	144.0 +/- 2.4
		Mn-54	168.0 +/- 14.0	161.0 +/- 2.7
		Ce-141	77.0 +/- 28.0	93.5 +/- 1.6
06/16/11	Water –pCi/L	Gross Beta <sup>(1)</sup>	171.0 +/- 3.0	123.0 +/- 2.1

**TABLE C-1 - Continued**  
**Results of Quality Assurance Program**

Sample Date	Sample Type and Units	Isotope Observed	Reported Laboratory's Results	Cross Check Lab Results
07/05/11	Water – pCi/L	I-131	23.0 +/- 5.6	26.0
07/05/11	Water –pCi/L	Gross Beta	44.1 +/- 2.3	63.4
09/15/11	Filter –pCi	Gross Beta	59.8 +/- 1.6	54.6 +/- 0.9
09/19/11	Particulate Filter pCi	Cs-137	533.0 +/- 11.8	486.0
		Co-60	596.0 +/- 15.0	524.0
		Zn-65	601.0 +/- 34.0	464.0
		Cs-134	416.0 +/- 11.0	429.0
10/07/11	Water – pCi/L	I-131	28.0 +/- 11.0	27.5
12/08/11	Charcoal – pCi	I-131	85.0 +/- 7.0	89.5 +/- 1.5
12/08/11	Particulates filter pCi	Cr-51	354.0 +/- 43.0	339.0 +/- 5.7
		Cs-137	131.0 +/- 9.0	126.0 +/- 2.1
		Cs-134	90.0 +/- 5.0	103.0 +/- 1.7
		Zn-65	193.0 +/- 17.0	174.0 +/- 2.9
		Co-58	134.0 +/- 9.0	132.0 +/- 2.2
		Fe-59	124.0 +/- 11.0	110.0 +/- 1.8
		Mn-54	149.0 +/- 10.0	144.0 +/- 2.4
		Co-60	169.0 +/- 8.0	162.0 +/- 2.7
12/08/11	Water – pCi/L	H-3	25.1	25.2
12/08/11	Milk – pCi/L	Cs-134	148.0 +/- 7.0	171.0 +/- 2.9
		I-131	97.0 +/- 20.0	90.2 +/- 1.5
		Zn-65	288.0 +/- 26.0	291.0 +/- 4.9
		Co-60	255.0 +/- 11.0	270.0 +/- 4.5
		Cr-51	523.0 +/- 80.0	566.0 +/- 9.5
		Fe-59	175.0 +/- 16.0	183.0 +/- 3.1
		Mn-54	232.0 +/- 15.0	241.0 +/- 4.0
		Cs-137	203.0 +/- 13.0	210.0 +/- 3.5
	Co-58	194.0 +/- 14.0	221.0 +/- 3.7	
12/08/11	Water –pCi/L	Gross Beta	292.0 +/- 3.0	281.0 +/- 4.7

<sup>1</sup> See discussion at the beginning of the Appendix

**TABLE C-2**

**Results of Quality Assurance Program**

<b>Sample Type and Location</b>	<b>Sample Date</b>	<b>Type of Analysis</b>	<b>Original Analysis</b>	<b>Replicate Analysis</b>	<b>Split Analysis</b>
Air Iodine - A1	01/17/11	I-131	#	#	**
Air Iodine - A2	01/17/11	I-131	#	#	**
Air Filter - A1	01/24/11	Gross Beta	3.2 +/- 0.2	3.4 +/- 0.2	**
Air Filter - A2	01/24/11	Gross Beta	2.9 +/- 0.3	2.9 +/- 0.3	**
Air Filter - A3	01/24/11	Gross Beta	2.7 +/- 0.4	2.9 +/- 0.4	**
Air Filter - A4	01/24/11	Gross Beta	2.6 +/- 0.3	2.8 +/- 0.3	**
Air Filter - A5	01/24/11	Gross Beta	2.9 +/- 0.2	3.1 +/- 0.2	**
Air Filter - SFA1	01/24/11	Gross Beta	3.6 +/- 0.2	3.5 +/- 0.2	**
Air Filter - SFA2	01/24/11	Gross Beta	3.2 +/- 0.2	3.2 +/- 0.2	**
Air Filter - SFA3	01/24/11	Gross Beta	2.9 +/- 0.3	2.8 +/- 0.3	**
Air Filter - SFA4	01/24/11	Gross Beta	2.6 +/- 0.3	2.4 +/- 0.3	**
Air Filter - A1	02/07/11	Gross Beta	2.1 +/- 0.1	2.1 +/- 0.1	**
Air Filter - A2	02/07/11	Gross Beta	1.6 +/- 0.3	1.6 +/- 0.2	**
Air Filter - A3	02/07/11	Gross Beta	1.6 +/- 0.3	1.8 +/- 0.3	**
Air Filter - A4	02/07/11	Gross Beta	1.3 +/- 0.2	1.5 +/- 0.2	**
Air Filter - A5	02/07/11	Gross Beta	1.8 +/- 0.1	1.9 +/- 0.1	**
Air Filter - SFA1	02/07/11	Gross Beta	2.3 +/- 0.1	2.2 +/- 0.1	**
Air Filter - SFA2	02/07/11	Gross Beta	1.8 +/- 0.1	1.8 +/- 0.1	**
Air Filter - SFA3	02/07/11	Gross Beta	2.0 +/- 0.2	1.9 +/- 0.2	**
Air Filter - SFA4	02/07/11	Gross Beta	1.4 +/- 0.2	1.5 +/- 0.2	**
Air Iodine - A4	02/14/11	I-131	#	#	**
Air Iodine - A5	02/14/11	I-131	#	#	**
Air Iodine - CA	03/14/11	I-131	#	#	**
Air Iodine - LB	03/14/11	I-131	#	#	**

**TABLE C-2 - Continued**

**Results of Quality Assurance Program**

Sample Type and Location	Sample Date	Type of Analysis	Original Analysis	Replicate Analysis	Split Analysis
Oysters - IA3	03/15/11	Gamma	#	#	#
Oysters - IA6	03/15/11	Gamma	#	#	#
Misc ground coverage - SFB2	03/22/11	I-131 <sup>(1)</sup>	71.5 +/- 41.7	#	#
Misc ground coverage - SFB3	03/22/11	I-131 <sup>(1)</sup>	180.1 +/- 33.0	173.6 +/- 32.8	#
Soil - SFS2	03/22/11	Cs-137	#	59.0 +/- 29.1	78.6 +/- 57.6
Soil - SFS3	03/22/11	Cs-137	37.2 +/- 26.9	62.3 +/- 30.2	81.4 +/- 57.2
Shoreline Sediment - WB1	03/30/11	Gamma	#	#	#
Bay Water - WA2	03/31/11	Gamma	#	#	#
Air Iodine - A4	04/11/11	I-131 <sup>(1)</sup>	0.47 +/- 0.25	0.31 +/- 0.1	**
Air Iodine - A5	04/11/11	I-131 <sup>(1)</sup>	0.34 +/- 0.27	0.38 +/- 0.1	**
Air Filter - A1	04/11/11	Gross Beta	2.4 +/- 0.2	2.5 +/- 0.2	**
Air Filter - A2	04/11/11	Gross Beta	1.6 +/- 0.2	1.7 +/- 0.2	**
Air Filter - A3	04/11/11	Gross Beta	1.4 +/- 0.2	1.8 +/- 0.2	**
Air Filter - A4	04/11/11	Gross Beta	2.5 +/- 0.3	2.7 +/- 0.3	**
Air Filter - A5	04/11/11	Gross Beta	2.0 +/- 0.2	2.1 +/- 0.2	**
Air Filter - SFA1	04/11/11	Gross Beta	2.0 +/- 0.2	2.3 +/- 0.2	**
Air Filter - SFA2	04/11/11	Gross Beta	2.0 +/- 0.2	2.1 +/- 0.2	**
Air Filter - SFA3	04/11/11	Gross Beta	2.3 +/- 0.3	2.3 +/- 0.3	**
Air Filter - SFA4	04/11/11	Gross Beta	1.9 +/- 0.1	2.0 +/- 0.1	**
Air Iodine - A3	05/16/11	I-131	#	#	**
Air Iodine - A4	05/16/11	I-131	#	#	**
Air Filter - A1	05/16/11	Gross Beta	1.0 +/- 0.1	1.0 +/- 0.1	**
Air Filter - A2	05/16/11	Gross Beta	0.8 +/- 0.2	0.8 +/- 0.2	**
Air Filter - A3	05/16/11	Gross Beta	0.9 +/- 0.2	0.8 +/- 0.2	**
Air Filter - A4	05/16/11	Gross Beta	1.2 +/- 0.2	1.1 +/- 0.2	**
Air Filter - A5	05/16/11	Gross Beta	1.1 +/- 0.1	1.2 +/- 0.1	**
Air Filter - SFA1	05/16/11	Gross Beta	1.2 +/- 0.1	1.1 +/- 0.1	**
Air Filter - SFA2	05/16/11	Gross Beta	1.0 +/- 0.1	0.9 +/- 0.1	**

**TABLE C-2 - Continued**

**Results of Quality Assurance Program**

<b>Sample Type and Location</b>	<b>Sample Date</b>	<b>Type of Analysis</b>	<b>Original Analysis</b>	<b>Replicate Analysis</b>	<b>Split Analysis</b>
Air Filter - SFA3	05/16/11	Gross Beta	1.0 +/- 0.3	0.8 +/- 0.3	**
Air Filter - SFA4	05/16/11	Gross Beta	0.9 +/- 0.1	0.9 +/- 0.1	**
Air Filter - A1	05/30/11	Gamma	#	#	#
Air Filter - A2	05/30/11	Gamma	#	#	#
Air Filter - A3	05/30/11	Gamma	#	#	#
Air Filter - A4	05/30/11	Gamma	#	#	#
Air Filter - A5	05/30/11	Gamma	#	#	#
Air Filter - SFA1	05/30/11	Gamma	#	#	#
Air Filter - SFA2	05/30/11	Gamma	#	#	#
Air Filter - SFA3	05/30/11	Gamma	#	#	#
Air Filter - SFA4	05/30/11	Gamma	#	#	#
Air Filter - A1	06/06/11	Gross Beta	2.4 +/- 0.2	2.5 +/- 0.2	**
Air Filter - A2	06/06/11	Gross Beta	1.9 +/- 0.3	2.0 +/- 0.3	**
Air Filter - A3	06/06/11	Gross Beta	2.1 +/- 0.3	2.1 +/- 0.3	**
Air Filter - A4	06/06/11	Gross Beta	2.4 +/- 0.3	2.3 +/- 0.3	**
Air Filter - A5	06/06/11	Gross Beta	2.5 +/- 0.2	2.4 +/- 0.2	**
Air Filter - SFA1	06/06/11	Gross Beta	2.7 +/- 0.2	3.0 +/- 0.2	**
Air Filter - SFA2	06/06/11	Gross Beta	2.5 +/- 0.6	2.7 +/- 0.6	**
Air Filter - SFA3	06/06/11	Gross Beta	3.8 +/- 0.5	4.2 +/- 0.5	**
Air Filter - SFA4	06/06/11	Gross Beta	2.3 +/- 0.2	2.4 +/- 0.2	**
Soil - SFS3	06/13/11	Cs-137	69.2 +/- 30.5	78.2 +/- 29.0	160.0 +/- 86.5
Soil - SFS5	06/13/11	Cs-137	212.7 +/- 44.6	240.3 +/- 39.3	333.0 +/- 84.2
Air Iodine - A2	06/20/11	I-131	#	#	**
Air Iodine - A3	06/20/11	I-131	#	#	**
Oysters - IA3	06/22/11	Gamma	#	#	#
Oysters - IA6	06/22/11	Gamma	#	#	#
Eggplant- IB2	06/27/11	Gamma	#	#	#
Cabbage- IB3	06/27/11	Gamma	#	#	#

**TABLE C-2 - Continued**

**Results of Quality Assurance Program**

<b>Sample Type and Location</b>	<b>Sample Date</b>	<b>Type of Analysis</b>	<b>Original Analysis</b>	<b>Replicate Analysis</b>	<b>Split Analysis</b>
Eggplant- IB5	06/27/11	Gamma	#	#	#
Cabbage- IB6	06/27/11	Gamma	#	#	#
Squash - IB7	06/27/11	Gamma	#	#	#
Eggplant- IB9	06/27/11	Gamma	#	#	#
Air Filter - A1	07/04/11	Gross Beta	2.0 +/- 0.1	2.0 +/- 0.1	**
Air Filter - A2	07/04/11	Gross Beta	1.9 +/- 0.1	1.8 +/- 0.1	**
Air Filter - A3	07/04/11	Gross Beta	1.6 +/- 0.2	1.7 +/- 0.2	**
Air Filter - A4	07/04/11	Gross Beta	1.3 +/- 0.2	1.5 +/- 0.2	**
Air Filter - A5	07/04/11	Gross Beta	2.2 +/- 0.1	2.2 +/- 0.1	**
Air Filter - SFA1	07/04/11	Gross Beta	2.4 +/- 0.1	2.4 +/- 0.1	**
Air Filter - SFA2	07/04/11	Gross Beta	2.0 +/- 0.1	1.8 +/- 0.1	**
Air Filter - SFA3	07/04/11	Gross Beta	2.0 +/- 0.1	2.2 +/- 0.1	**
Air Filter - SFA4	07/04/11	Gross Beta	2.0 +/- 0.1	2.0 +/- 0.1	**
DR05	07/06/11	TLD	16.6 +/- 0.8	17.4 +/- 1.8	**
DR06	07/06/11	TLD	14.3 +/- 1.2	15.2 +/- 1.3	**
DR07	07/06/11	TLD	14.4 +/- 1.6	15.4 +/- 1.3	**
DR08	07/06/11	TLD	20.8 +/- 1.6	20.9 +/- 2.8	**
DR09	07/06/11	TLD	15.2 +/- 1.1	16.9 +/- 0.9	**
DR10	07/06/11	TLD	14.9 +/- 2.3	15.5 +/- 1.1	**
DR11	07/06/11	TLD	14.9 +/- 2.3	16.3 +/- 0.7	**
DR29	07/06/11	TLD	21.2 +/- 3.4	20.7 +/- 1.2	**
DR31	07/06/11	TLD	22.7 +/- 3.9	23.3 +/- 4.6	**
SFDR14	07/06/11	TLD	23.2 +/- 4.3	25.1 +/- 6.3	**
SFDR15	07/06/11	TLD	26.1 +/- 5.3	30.6 +/- 5.6	**
Shoreline Sediment - WB1	07/06/11	Gamma	#	**	#
Cabbage - IB3	07/25/11	Gamma	#	#	#
Cabbage - IB9	07/25/11	Cs-137 <sup>(1)</sup>	12.2 +/- 7.7	#	#

**TABLE C-2 - Continued**

**Results of Quality Assurance Program**

<b>Sample Type and Location</b>	<b>Sample Date</b>	<b>Type of Analysis</b>	<b>Original Analysis</b>	<b>Replicate Analysis</b>	<b>Split Analysis</b>
Bay Water - WA2	08/01/11	Gamma	#	#	#
Spot - IA4	08/25/11	Gamma	#	#	#
Air Iodine - A2	08/29/11	I-131	#	#	**
Air Iodine - A5	08/29/11	I-131	#	#	**
Air Filter - A2	08/29/11	Gross Beta	1.7 +/- 0.2	1.6 +/- 0.1	**
Air Filter - A3	08/29/11	Gross Beta	2.6 +/- 0.4	2.6 +/- 0.4	**
Air Filter - A4	08/29/11	Gross Beta	1.4 +/- 0.3	1.7 +/- 0.3	**
Air Filter - A5	08/29/11	Gross Beta	1.8 +/- 0.1	1.8 +/- 0.1	**
Air Filter - SFA1	08/29/11	Gross Beta	1.7 +/- 0.1	1.5 +/- 0.1	**
Air Filter - SFA2	08/29/11	Gross Beta	1.4 +/- 0.2	1.4 +/- 0.2	**
Air Filter - SFA3	08/29/11	Gross Beta	1.7 +/- 0.1	1.7 +/- 0.1	**
Air Filter - SFA4	08/29/11	Gross Beta	1.0 +/- 0.1	1.1 +/- 0.1	**
Peppers- IB6	08/30/11	Gamma	#	#	#
Mint- IB7	08/30/11	Gamma	#	#	#
Bay Water - WA2	08/31/11	Gamma	#	#	#
Misc ground coverage - SFB2	09/19/11	Gamma	#	#	#
Misc ground coverage - SFB3	09/19/11	Gamma	#	#	#
Soil - SFS2	09/19/11	Cs-137	60.5 +/- 25.6	**	91.9 +/- 43.2
Soil - SFS3	09/19/11	Cs-137	47.6 +/- 23.5	**	**
DR05	09/27/11	TLD	13.5 +/- 1.2	13.6 +/- 1.2	**
DR06	09/27/11	TLD	11.7 +/- 0.9	12.5 +/- 0.8	**
DR07	09/27/11	TLD	12.2 +/- 1.6	12.5 +/- 0.8	**
DR08	09/27/11	TLD	16.8 +/- 1.6	17.3 +/- 1.2	**
DR09	09/27/11	TLD	13.0 +/- 1.6	13.5 +/- 1.1	**
DR11	09/27/11	TLD	13.1 +/- 1.6	13.0 +/- 0.6	**



**TABLE C-2 - Continued**  
**Results of Quality Assurance Program**

<b>Sample Type and Location</b>	<b>Sample Date</b>	<b>Type of Analysis</b>	<b>Original Analysis</b>	<b>Replicate Analysis</b>	<b>Split Analysis</b>
DR29	09/27/11	TLD	16.4 +/- 1.3	17.6 +/- 1.8	**
DR31	09/27/11	TLD	18.5 +/- 2.3	18.5 +/- 1.9	**
SFDR14	09/27/11	TLD	19.1 +/- 2.9	21.0 +/- 3.3	**
SFDR15	09/27/11	TLD	24.9 +/- 3.0	25.8 +/- 5.9	**
Air Iodine - A1	10/03/11	I-131	#	#	**
Air Iodine - A2	10/03/11	I-131	#	#	**
Air Filter - A1	10/03/11	Gross Beta	1.7 +/- 0.1	1.6 +/- 0.1	**
Air Filter - A2	10/03/11	Gross Beta	1.2 +/- 0.1	1.4 +/- 0.1	**
Air Filter - A3	10/03/11	Gross Beta	1.2 +/- 0.2	1.3 +/- 0.2	**
Air Filter - A4	10/03/11	Gross Beta	1.4 +/- 0.2	1.6 +/- 0.2	**
Air Filter - A5	10/03/11	Gross Beta	1.3 +/- 0.1	1.3 +/- 0.1	**
Air Filter - SFA1	10/03/11	Gross Beta	1.6 +/- 0.1	1.6 +/- 0.1	**
Air Filter - SFA2	10/03/11	Gross Beta	1.5 +/- 0.1	1.6 +/- 0.1	**
Air Filter - SFA3	10/03/11	Gross Beta	1.3 +/- 0.1	1.5 +/- 0.1	**
Air Filter - SFA4	10/03/11	Gross Beta	1.3 +/- 0.1	1.5 +/- 0.1	**
Air Iodine - A4	10/10/11	I-131	#	#	**
Air Iodine - A5	10/10/11	I-131	#	#	**
Air Filter - A1	10/10/11	Gross Beta	3.0 +/- 0.2	3.0 +/- 0.2	**
Air Filter - A2	10/10/11	Gross Beta	2.3 +/- 0.2	2.5 +/- 0.2	**
Air Filter - A3	10/10/11	Gross Beta	2.3 +/- 0.2	2.5 +/- 0.2	**
Air Filter - A4	10/10/11	Gross Beta	2.5 +/- 0.2	2.7 +/- 0.2	**
Air Filter - A5	10/10/11	Gross Beta	2.6 +/- 0.2	2.7 +/- 0.2	**
Air Filter - SFA1	10/10/11	Gross Beta	4.0 +/- 0.2	4.1 +/- 0.2	**
Air Filter - SFA2	10/10/11	Gross Beta	2.4 +/- 0.2	2.6 +/- 0.2	**
Air Filter - SFA3	10/10/11	Gross Beta	2.7 +/- 0.2	2.6 +/- 0.2	**
Air Filter - SFA4	10/10/11	Gross Beta	2.5 +/- 0.2	2.6 +/- 0.2	**
Oysters - IA3	10/13/11	Gamma	#	#	#
Air Filter - A1	11/07/11	Gross Beta	1.9 +/- 0.1	1.8 +/- 0.1	**

**TABLE C-2 - Continued**  
**Results of Quality Assurance Program**

Sample Type and Location	Sample Date	Type of Analysis	Original Analysis	Replicate Analysis	Split Analysis
Air Filter - A2	11/07/11	Gross Beta	1.9 +/- 0.1	1.8 +/- 0.1	**
Air Filter - A3	11/07/11	Gross Beta	1.7 +/- 0.1	1.8 +/- 0.1	**
Air Filter - A4	11/07/11	Gross Beta	2.0 +/- 0.1	2.0 +/- 0.1	**
Air Filter - A5	11/07/11	Gross Beta	2.0 +/- 0.1	2.0 +/- 0.1	**
Air Filter - SFA1	11/07/11	Gross Beta	1.8 +/- 0.1	2.0 +/- 0.1	**
Air Filter - SFA2	11/07/11	Gross Beta	1.7 +/- 0.1	1.7 +/- 0.1	**
Air Filter - SFA3	11/07/11	Gross Beta	1.7 +/- 0.1	1.7 +/- 0.1	**
Air Filter - SFA4	11/07/11	Gross Beta	1.9 +/- 0.1	1.9 +/- 0.1	**
Air Iodine - A1	11/14/11	I-131	#	#	**
Air Iodine - A5	11/14/11	I-131	#	#	**
Air Iodine - A1	12/05/11	I-131	#	#	**
Air Iodine - A3	12/05/11	I-131	#	#	**
Air Filter - A1	12/05/11	Gross Beta	1.5 +/- 0.1	1.7 +/- 0.1	**
Air Filter - A2	12/05/11	Gross Beta	1.5 +/- 0.1	1.6 +/- 0.1	**
Air Filter - A3	12/05/11	Gross Beta	1.5 +/- 0.1	1.6 +/- 0.1	**
Air Filter - A4	12/05/11	Gross Beta	1.7 +/- 0.1	1.8 +/- 0.1	**
Air Filter - A5	12/05/11	Gross Beta	1.7 +/- 0.1	1.8 +/- 0.1	**
Air Filter - SFA1	12/05/11	Gross Beta	1.6 +/- 0.1	1.6 +/- 0.1	**
Air Filter - SFA2	12/05/11	Gross Beta	1.5 +/- 0.1	1.6 +/- 0.1	**
Air Filter - SFA3	12/05/11	Gross Beta	1.4 +/- 0.1	1.4 +/- 0.1	**
Air Filter - SFA4	12/05/11	Gross Beta	1.6 +/- 0.1	1.7 +/- 0.1	**

<sup>1</sup> See discussion at the beginning of the Appendix

<sup>2</sup> Results reported for Air samples I-131 and Beta are in 10-2 pCi/m3. All Vegetation and Soil, Oysters and Fish are in pCi/Kg. All water and milk are in pCi/L, TLD are in mR/90 Day

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

# All Non natural Gamma Emitters are <MDA

**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 <sup>-3</sup> pCi/m <sup>3</sup>
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 discussion of the results is included in Section 3.4 of this report.

**TABLE D-1**

**Land Use Survey Distances**

<b>Sector</b>	<b>Distance to Nearest Residence</b>	<b>Distance to Nearest Garden</b>	<b>Distance to Milk Producing Animals</b>
E	1170 m	580 m Onsite Supplemental Garden	N/A
ESE	1660 m	390 m Onsite Garden	N/A
SE	840 m	N/A	8,270 m
SSE	610 m	620 m Onsite Supplemental Garden	N/A
S	1500 m	N/A	N/A
SSW	620 m	N/A	N/A
SW	740 m	N/A	N/A
WSW	1470 m	N/A	N/A
W	2420 m	N/A	N/A

The house located at 1601 Lake Road has been abandoned (SE sector). The new closest residence in this sector is situated in the SE sector is now 1652 Lake Road, Ontario New York at a distance of 840 meters from the reactor.

The nearest milk producing animals within a 5-mile radius of the power plant are located in the SE sector at Eaton Farm located at 6747 Salmon Creek Road, Williamson, NY (8,270 meters).