

Enclosure (2)

**Annual Radiological Environmental Operating Report:
January 1, 2012 - December 31, 2012**

**R.E. Ginna Nuclear Power Plant, LLC
May 14, 2013**

CENG

a joint venture of



**Constellation
Energy**



EDF

ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT: JANUARY 1, 2012 – DECEMBER 31, 2012

MAY 2013



R.E. Ginna Nuclear Power Plant
1503 Lake Road
Ontario, New York 14519

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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.

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 2012 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 2011 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 2012, 1317 samples were collected for analysis by gross beta counting and/or gamma spectroscopy. These included 76 surface water samples, 16 fish samples, 6 sediment samples, 624 air particulate samples, 312 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), Environmental Dosimetry Company in Sterling Massachusetts (direct radiation samples), or Exelon Industrial Services – 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 "not detected." Typical MDA values are listed in Appendix B, Table B-10.

3.3 Quality Assurance Program

Appendix C provides a summary of Exelon Industrial Services – Ft. Smallwood Environmental Laboratory's quality assurance program for 2012. It consists of Table C-1, which represents a compilation of the results of the Exelon Industrial Services – Ft. Smallwood Environmental 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. Table C-3 identifies a list of typical MDA's achieved by Teledyne Brown for Gamma Spectroscopy.

All the Exelon Industrial Services – Ft. Smallwood Environmental Laboratory results contained in Table C-1 generally agree with the intercomparison laboratory results within the range of $\pm 2 \sigma$ of each other with the exception of a beta result for the water sample type on 6/14/12 from

Analytics. It was determined that the laboratory's result was high due to the interference of alpha from the Americium. All other intercomparisons for beta filters and water samples analyzed on the instrument, prior to and after this sample, were in full agreement.

All the results contained in Table C-2 agree within the range of $\pm 2 \sigma$ of each other with their respective Exelon Industrial Services – Ft. Smallwood Laboratory original, replicate and/or Teledyne Brown Engineering's split laboratory samples, except for the comparisons of two soil samples and an oyster sample involving Cs-137 results. These minor discrepancies, which have been observed in previous reporting periods, are most likely due to counting statistics and/or the non-homogeneous nature of this type of sample.

The introduction to Appendix C provides more detailed information regarding these exceptions.

3.4 Land Use Survey

In September 2012, 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 nearest residence is located in the SSE sector, approximately 610 meters from the reactor.
- The Monroe County Water Authority (MCWA) continues construction of a new municipal water pump station 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 Radiological Environmental Monitoring Program (REMP) upon completion.
- A new commercial building was constructed at the southeast corner of Route 350 and Route 104 (drugstore).
- A new Rochester Gas & Electric (RG&E) substation was constructed at Slocum Rd and Route 104 (no occupancy).
- The Summer Lake Subdivision, located west of the plant along Lake Road between County Line Road and Lakeside Road, continues to build homes as part of its final phase of construction.
- Single family home construction was observed sporadically within 5-miles of the plant.
- 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. April 30, 2012: Vendor laboratory staff notified Ginna that approximately one half of the charcoal media from the Environmental Monitoring Station #2 air filter was found to have leaked charcoal media during shipping. It was believed that this condition occurred as a result of a manufacturing defect in the filter cartridge housing. The filter media was analyzed for the 04/16/2012 – 04/26/2012 sampling period.
2. June 11, 2012: The air sampler at Environmental Monitoring Station #2 was found tripped. An attempt to reset the unit was successful. However, the volume of air collected during the 06/04/2012 – 06/11/2012 sampling period was approximately 87.7 cubic meters, which did not meet the minimum volume requirements of 100 cubic meters.
3. August 14, 2012: A Circulating Water discharge composite sample was not obtained for the 08/07/12 – 08/14/12 sample period. It was determined that the supply line valve had been erroneously closed during this period.
4. October 4, 2012: The Circulating Water discharge monthly composite sampler was removed from service on 10/04/2012 at 08:20 for maintenance and returned to service on 10/04/2012 at 10:16 for maintenance. The composite sampler was offline for a total of 1 hour, 56 minutes during the 09/26/2012 through 10/23/2012 sampling period.
5. December 31, 2012: The air sampler at Environmental Monitoring Station #2 was found tripped. An attempt to reset the unit was successful. However, the volume of air collected during the 12/26/2012 – 12/31/2012 sampling period was approximately 49.5 cubic meters, which did not meet the minimum volume requirements of 100 cubic meters.

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 2012, the gross beta averages for the upstream Lake Ontario monitoring locations (controls) and downstream Lake Ontario monitoring locations (indicators) were 3.96 pCi/Liter and 2.24 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 5.42 PCi/Liter. The July 16, 2012 samples at both the Mill Creek (control) and Deer Creek (indicator) locations indicated higher than normal gross beta concentrations at 16.8 PCi/Liter and 16.9 PCi/Liter, respectively. These elevated concentrations in these sample is suspected to have been caused by an usually dry summer period and subsequent large rain event when the samples were collected. The high concentration of solids in the samples, and corresponding elevated gross beta activity were seen at both the control and indicator locations. 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. Samples taken from Mill Creek (upstream sources waters of Deer Creek) at the site boundary had an average gross beta concentration of 5.25 PCi/L. A comparative analysis of the monthly composite samples showed no statistically significant difference between the indicator and control locations.

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 2012, 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 2012, 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 2012, 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 2012, 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. No positive analytical results were found on any sample. A list of values for these cartridges is given in Table B-4.

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 sample 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., offsite sampling locations) was 0.0240 pCi/m³ and the averages for the indicator samples (i.e., onsite sampling locations) was 0.0240 pCi/m³ for the period of January to December 2010. Maximum weekly concentrations for all control stations and all indicator stations were 0.043 and 0.044 pCi/m³, 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. No positive analytical results were found on any sample. The results of these analyses are listed in Tables B-7.

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 2012. 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 2012, 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 and 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. Environmental Station 13, the closest sampling location to the ISFSI, received an average quarterly dose of 15.7 mRem during 2012. All onsite indicators averaged 12.6 mRem/qtr.

For the year of 2012, 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	12.6	8.8	16.1
Site Boundary Indicators	12.3	9.7	15.3
Offsite Indicators	11.7	9.2	14.9
Control Locations	11.0	8.7	12.8

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 11.0 millirems monthly or

44.0 millirem annually), while the highest total annual dosimeter reading at an individual site boundary environmental monitoring location (55.0 millirem) was 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 2012 was determined to be 11.0 millirem annually.

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

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 9 groundwater monitoring wells during 2012:

- 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
- 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, and for gamma emitting radionuclides to the environmental LLDs. No positive tritium results were identified in any of the groundwater monitoring wells during 2012. Results of the groundwater monitoring well sampling are presented in Table B-13.

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 2012 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 27 (Effective Date: 05/31/2011).
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 2012.
5. Exelon Industrial Services – 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 ¹	Number of Locations	Number Collected	Analysis	Analysis Frequency ¹	Number Analyzed
Aquatic Environment						
Surface & Drinking Water	MC	6	76 76	Gamma Gross Beta	MC/MG MC/MG	76 76
Bottom Sediment	SA	1	2	Gamma	SA	2
Fish ²	A	4	16	Gamma	A	16
Shoreline Sediment	SA	2	4	Gamma	SA	4
Groundwater	M/Q	9	53	Tritium	M/Q	53
Atmospheric Environment						
Air Iodine ³	W	6	312	I-131	W	312
Air Particulates ⁴	W	12	624 48	Gross Beta Gamma	W QC	624 48
Direct Radiation Ambient Radiation	Q	41	164	TLD	Q	164
Terrestrial Environment						
Milk ⁵	M/BW	2	38	Gamma	M/BW	38
Vegetation ⁶	A	8	28	Gamma	A	28

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

² Twice during fishing season including at least four species

³ The collection device contains activated charcoal

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

⁵ Bi-Weekly during growing season.

⁶ 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 ¹	Location with Highest Annual Mean Name/Distance & Direction ²	Highest Annual Mean (F) / Range ¹	Control Locations Mean (F)/Range
Aquatic Environment						
Surface & Drinking Water (pCi/L)	Gamma (76)	2.3 (Cs-137)	-- (51/51)	--	-- (13/13) (--)	-- (25/25) --
Surface & Drinking Water, (pCi/L)	Gross Beta (76)	0.5	3.21 (51/51) (1.49-16.90)	Deer Creek – 0.29 km ESE	5.42 (12/12) (2.78 – 16.90)	4.58 (25/25) (1.75-16.80)
Sediment (pCi/kg)	Gamma (6)	17 (Cs-137)	-- (4/4) --	--	-- (2/2) --	-- (2/2) --
Fish (pCi/kg)	Gamma (16)	15 (Cs-137)	-- (8/8) (--)	--	-- (5/5) (--)	-- (8/8) --
Groundwater (PCi/L)	Tritium (53)	500	-- (45/45)	--	-- (13/13)	-- (8/8)
Direct Radiation						
Ambient Radiation (mR/91 days)	Dosimeters (164)	--	12.2 (128/128) (8.8-16.1)	Env. Station 13 1.19 km W	15.7 (4/4) (14.7-16.1)	11.0 (36/36) (8.7-12.8)

Table 2

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

Medium or Pathway Sampled (Unit of Measurement)	Type and Total Number of Analyses Performed	Lower Limit of Detection (LLD)	Indicator Locations Mean (F)/Range ¹	Location with Highest Annual Mean Name/Distance & Direction ²	Highest Annual Mean (F) / Range ¹	Control Locations Mean (F)/Range
Atmospheric Environment						
Air Iodine (10 ⁻² pCi/m ³)	I-131 (312)	0.15	-- (260/260) (--)	--	-- (52/52) (--)	-- (52/52) (--)
Air Particulates (10 ⁻² pCi/m ³)	Gross Beta (624)	0.5	2.4 (468/468) (0.0 – 4.4)	Williamson – 11 11.5 km ESE	2.6 (52/52) (0.7 – 4.4)	2.4 (156/156) (0.5 – 4.3)
Air Particulates (10 ⁻³ pCi/m ³)	Gamma (48)	--	-- (36/36) (--)	--	-- (4/4) (--)	-- (12/12) (--)
Terrestrial Environment						
Milk (pCi/L)	Gamma (38)	5 (Cs-137)	-- (19/19) (--)	--	-- (19/19) (--)	-- (19/19) (--)
Vegetation (pCi/L)	Gamma (28)	27 (Cs-137)	-- (21/21) --	--	-- (8/8) --	--(7/7) --

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

² From the center point of the containment building.

-- 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.

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

Station	Description	Distance		Direction
		Meters	Miles	Sector
Air Samplers				
2	Manor House Yard	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
Direct Radiation				
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	Miles	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 Stoney 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
Fish				
	Lake Ontario Discharge Plume	2200	1.4	ENE

	Russell Station	25600	15.9	W
Produce (Vegetation)				
Indicator and background samples of lettuce, apples, tomatoes, and cabbage are collected from gardens grown on company property and purchased from farms >10 miles from the plant.				
Station	Description	Distance		Direction
		Meters	Miles	Sector
Water				
	Shoremont/MCWA	27160	16.9	W
	Ontario Water District	2200	1.4	ENE
	Circ Water Intake	420	0.3	N
	Circ Water Discharge	130	0.1	NNE
	Deer Creek	260	0.2	ESE
Sediment				
	Lake Ontario Discharge Plume	2200	1.4	ENE
	Russell Station	25600	15.9	W
	Bethnic	1070	0.7	N
Milk				
	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

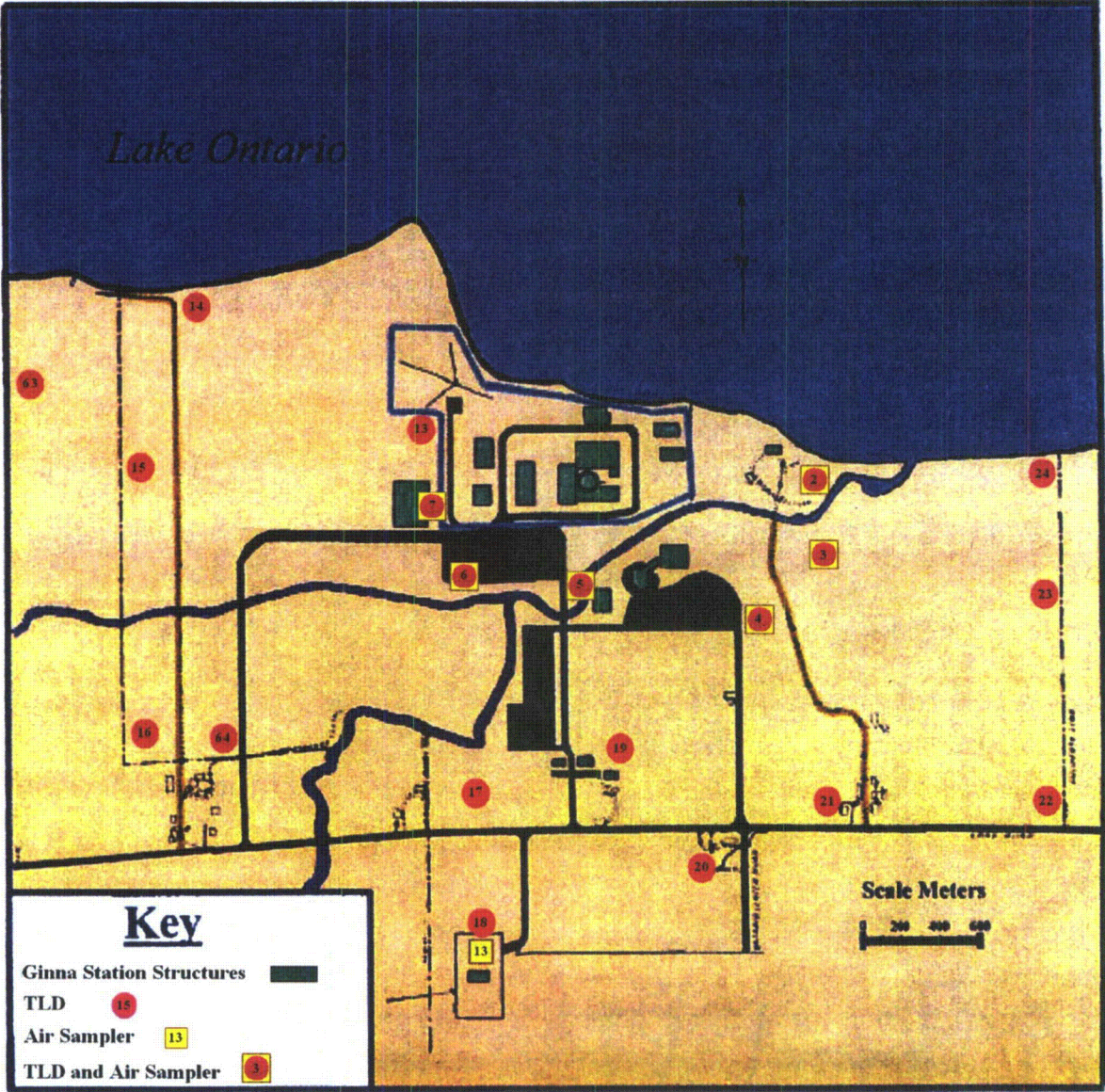
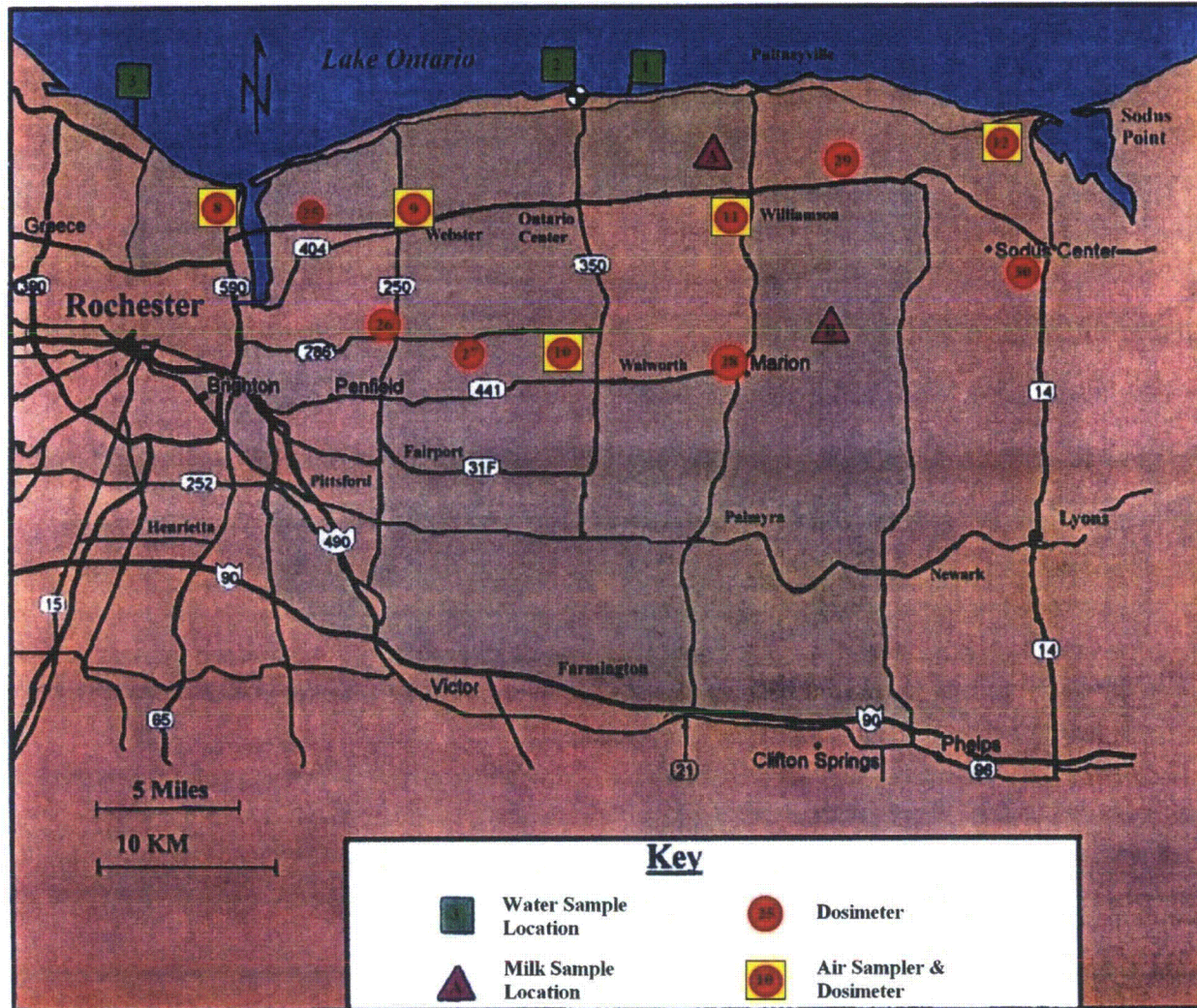


Figure A-4
Water Sample, Milk Farms and TLD Locations



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.

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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
CIRC-IN			
Circulating Water Inlet - N	1/17/2012	*	2.08 +/- 0.58
	2/14/2012	*	2.54 +/- 0.55
	3/13/2012	*	2.18 +/- 0.53
	4/10/2012	*	1.82 +/- 0.55
	5/8/2012	*	1.77 +/- 0.59
	6/5/2012	*	1.99 +/- 0.54
	7/3/2012	*	2.58 +/- 0.57
	7/31/2012	*	2.21 +/- 0.57
	8/28/2012	*	2.95 +/- 0.56
	9/25/2012	*	3.51 +/- 0.61
	10/23/2012	*	2.11 +/- 0.56
	11/20/2012	*	2.25 +/- 0.58
12/18/2012	*	2.02 +/- 0.54	
CIRC-OUT			
Circulating Water Outlet - N	1/17/2012	*	1.57 +/- 0.55
	2/14/2012	*	2.16 +/- 0.53
	3/13/2012	*	2.31 +/- 0.54
	4/10/2012	*	1.98 +/- 0.55
	5/8/2012	*	1.81 +/- 0.60
	6/5/2012	*	2.25 +/- 0.55
	7/3/2012	*	2.33 +/- 0.56
	7/31/2012	*	1.91 +/- 0.55
	8/28/2012	*	2.41 +/- 0.55
	9/25/2012	*	2.40 +/- 0.56
	10/23/2012	*	2.06 +/- 0.56
	11/20/2012	*	1.83 +/- 0.55
12/18/2012	*	1.91 +/- 0.54	
DC			
Deer Creek - ESE	1/4/2012	*	3.56 +/- 0.73
	2/6/2012	*	3.66 +/- 0.69
	3/5/2012	*	3.07 +/- 0.66
	4/2/2012	*	3.20 +/- 0.71
	5/1/2012	*	2.78 +/- 0.74
	6/18/2012	*	3.41 +/- 1.92
	7/16/2012	*	16.98 +/- 2.74
	8/14/2012	*	6.77 +/- 1.03
	9/10/2012	*	5.21 +/- 0.86
	10/8/2012	*	5.77 +/- 0.85
	11/5/2012	*	5.95 +/- 0.85
	12/3/2012	*	4.81 +/- 0.92

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
MCWA			
Monroe County			
Water/Shoremont,			
Greece – W ¹			
	1/16/2012	*	1.75 +/- 0.56
	2/13/2012	*	2.03 +/- 0.44
	3/12/2012	*	3.69 +/- 0.43
	4/9/2012	*	4.26 +/- 0.47
	5/7/2012	*	4.58 +/- 0.49
	6/4/2012	*	4.13 +/- 0.47
	7/2/2012	*	3.97 +/- 0.45
	7/30/2012	*	4.51 +/- 0.49
	8/27/2012	*	4.36 +/- 0.47
	9/24/2012	*	6.06 +/- 0.57
	10/22/2012	*	4.46 +/- 0.48
	11/19/2012	*	3.92 +/- 0.44
	12/17/2012	*	3.79 +/- 0.44
ML			
Mill Creek – SW ¹			
	1/4/2012	*	3.37 +/- 0.58
	2/6/2012	*	2.77 +/- 0.67
	3/5/2012	*	3.40 +/- 0.67
	4/2/2012	*	2.76 +/- 0.69
	5/1/2012	*	3.08 +/- 0.73
	6/18/2012	*	4.03 +/- 1.87
	7/16/2012	*	16.87 +/- 4.17
	8/14/2012	*	6.42 +/- 1.00
	9/10/2012	*	5.30 +/- 0.78
	10/8/2012	*	5.87 +/- 0.83
	11/5/2012	*	4.52 +/- 0.80
	12/3/2012	*	4.62 +/- 0.90
OWD			
Ontario Water			
District - NE			
	1/16/2012	*	1.93 +/- 0.56
	2/13/2012	*	2.45 +/- 0.56
	3/12/2012	*	2.26 +/- 0.54
	4/9/2012	*	1.94 +/- 0.55
	5/7/2012	*	1.49 +/- 0.57
	6/4/2012	*	1.98 +/- 0.53
	7/2/2012	*	2.57 +/- 0.60
	7/30/2012	*	2.43 +/- 0.58
	8/27/2012	*	2.32 +/- 0.53
	9/24/2012	*	2.73 +/- 0.57
	10/22/2012	*	2.63 +/- 0.68
	11/19/2012	*	2.82 +/- 0.61
	12/17/2012	*	2.70 +/- 0.58

¹ Control Location

* All Non-Natural Gamma Emitters. Tritium not detected.

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
CONTROL¹			
Local Sites in Control Sectors	5/21/2012	Lake Trout	*
	6/7/2012	White Bass	*
EAST			
East Sector	2/23/2012	Brown Trout	*
	2/29/2012	Rainbow Trout	*
	5/4/2012	Freshwater Drum	*
HAMLIN¹			
Control	5/23/2012	Brown Trout	*
	5/23/2012	Rainbow Trout	*
	8/29/2012	Carp	*
	8/29/2012	Gizzard Shad	*
	8/29/2012	Largemouth Bass	*
	8/29/2012	Pike	*
NORTH			
North Sector	3/2/2012	Smallmouth Bass	*
	10/25/2012	Brown Trout	*
	11/16/2012	Rainbow Trout	*
	11/28/2012	Lake Trout	*
	12/15/2012	Freshwater Drum	*

¹ Control Location including Greece and Irondequit.

* All non-natural gamma emitters not detected.

Table B-3

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

Sample Code	Sample Date	Gamma Emitters
Shoreline		
EAST East Sector	4/30/2012	*
	7/16/2012	*
GREECE ¹ Control	4/30/2012	*
	7/16/2012	*
Benthic		
NORTH	4/19/2012	*
	11/17/2012	*

¹ Control Location

* All non-natural gamma emitters not detected.

Table B-4

Concentration of Iodine-131 in Filtered Air (Charcoal Cartridges)
(Results in units of 10^{-2} pCi/m³ +/- 2 σ)

Start Date	Stop Date	STATION-02 Manor House Yard	STATION-04 Training Center Parking Lot	STATION-07 West Fence Line	STATION-08 ¹ Seabreeze	STATION-09 Webster	STATION-11 Williamson
1/2/2012	1/9/2012	*	*	*	*	*	*
1/9/2012	1/16/2012	*	*	*	*	*	*
1/16/2012	1/23/2012	*	*	*	*	*	*
1/23/2012	1/30/2012	*	*	*	*	*	*
1/30/2012	2/6/2012	*	*	*	*	*	*
2/6/2012	2/13/2012	*	*	*	*	*	*
2/13/2012	2/20/2012	*	*	*	*	*	*
2/20/2012	2/27/2012	*	*	*	*	*	*
2/27/2012	3/5/2012	*	*	*	*	*	*
3/5/2012	3/12/2012	*	*	*	*	*	*
3/12/2012	3/19/2012	*	*	*	*	*	*
3/19/2012	3/26/2012	*	*	*	*	*	*
3/26/2012	4/2/2012	*	*	*	*	*	*
4/2/2012	4/9/2012	*	*	*	*	*	*
4/9/2012	4/16/2012	*	*	*	*	*	*
4/16/2012	4/23/2012	*	*	*	*	*	*
4/23/2012	4/30/2012	*	*	*	*	*	*
4/30/2012	5/7/2012	*	*	*	*	*	*
5/7/2012	5/14/2012	*	*	*	*	*	*
5/14/2012	5/21/2012	*	*	*	*	*	*
5/21/2012	5/28/2012	*	*	*	*	*	*
5/28/2012	6/4/2012	*	*	*	*	*	*
6/4/2012	6/11/2012	*	*	*	*	*	*
6/11/2012	6/18/2012	*	*	*	*	*	*
6/18/2012	6/25/2012	*	*	*	*	*	*
6/25/2012	7/2/2012	*	*	*	*	*	*
7/2/2012	7/9/2012	*	*	*	*	*	*
7/9/2012	7/16/2012	*	*	*	*	*	*
7/16/2012	7/23/2012	*	*	*	*	*	*
7/23/2012	7/30/2012	*	*	*	*	*	*
7/30/2012	8/6/2012	*	*	*	*	*	*
8/6/2012	8/13/2012	*	*	*	*	*	*
8/13/2012	8/20/2012	*	*	*	*	*	*
8/20/2012	8/27/2012	*	*	*	*	*	*
8/27/2012	9/3/2012	*	*	*	*	*	*

¹ Control Location
* <MDA (I-131)

Table B-4

Concentration of Iodine-131 in Filtered Air (Charcoal Cartridges)
(Results in units of 10^{-2} pCi/m³ +/- 2 σ)

Start Date	Stop Date	STATION-02 Manor House Yard	STATION-04 Training Center Parking Lot	STATION-07 West Fence Line	STATION-08 ¹ Seabreeze	STATION-09 Webster	STATION-11 Williamson
9/3/2012	9/10/2012	*	*	*	*	*	*
9/10/2012	9/17/2012	*	*	*	*	*	*
9/17/2012	9/24/2012	*	*	*	*	*	*
9/24/2012	10/1/2012	*	*	*	*	*	*
10/1/2012	10/8/2012	*	*	*	*	*	*
10/8/2012	10/15/2012	*	*	*	*	*	*
10/15/2012	10/22/2012	*	*	*	*	*	*
10/22/2012	10/29/2012	*	*	*	*	*	*
10/29/2012	11/5/2012	*	*	*	*	*	*
11/5/2012	11/12/2012	*	*	*	*	*	*
11/12/2012	11/19/2012	*	*	*	*	*	*
11/19/2012	11/26/2012	*	*	*	*	*	*
11/26/2012	12/3/2012	*	*	*	*	*	*
12/3/2012	12/10/2012	*	*	*	*	*	*
12/10/2012	12/17/2012	*	*	*	*	*	*
12/17/2012	12/24/2012	*	*	*	*	*	*
12/24/2012	12/31/2012	*	*	*	*	*	*

¹ Control Location

* I-131 not detected.

Table B-5

**Concentration of Beta Emitters in Air Particulates – Onsite Samples
(Results in units of 10^{-2} pCi/m³ +/- 2 σ 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
1/2/2012	1/9/2012	2.7 +/- 0.2	2.7 +/- 0.2	2.7 +/- 0.2	2.7 +/- 0.1	2.9 +/- 0.2	2.5 +/- 0.1	3.0 +/- 0.3
1/9/2012	1/16/2012	1.8 +/- 0.1	1.9 +/- 0.1	1.9 +/- 0.1	1.9 +/- 0.1	2.0 +/- 0.1	1.9 +/- 0.1	2.0 +/- 0.2
1/16/2012	1/23/2012	2.0 +/- 0.1	1.9 +/- 0.1	1.8 +/- 0.1	1.8 +/- 0.1	1.9 +/- 0.1	1.7 +/- 0.1	2.1 +/- 0.2
1/23/2012	1/30/2012	2.4 +/- 0.1	2.3 +/- 0.1	2.3 +/- 0.1	2.4 +/- 0.1	2.7 +/- 0.2	2.2 +/- 0.1	2.7 +/- 0.2
1/30/2012	2/6/2012	2.4 +/- 0.1	2.3 +/- 0.1	2.4 +/- 0.1	2.4 +/- 0.1	2.7 +/- 0.2	2.3 +/- 0.1	2.6 +/- 0.2
2/6/2012	2/13/2012	1.9 +/- 0.1	1.9 +/- 0.1	1.8 +/- 0.1	1.8 +/- 0.1	1.9 +/- 0.1	1.7 +/- 0.1	2.2 +/- 0.2
2/13/2012	2/20/2012	2.5 +/- 0.1	2.6 +/- 0.1	2.2 +/- 0.1	2.3 +/- 0.1	2.7 +/- 0.2	2.3 +/- 0.1	2.6 +/- 0.2
2/20/2012	2/27/2012	2.0 +/- 0.1	2.0 +/- 0.1	2.1 +/- 0.1	2.1 +/- 0.1	2.3 +/- 0.1	2.0 +/- 0.1	2.2 +/- 0.2
2/27/2012	3/5/2012	2.4 +/- 0.1	2.2 +/- 0.1	2.4 +/- 0.1	2.3 +/- 0.1	2.5 +/- 0.1	2.2 +/- 0.1	2.7 +/- 0.2
3/5/2012	3/12/2012	2.5 +/- 0.1	2.3 +/- 0.1	2.1 +/- 0.1	2.4 +/- 0.1	2.5 +/- 0.2	2.4 +/- 0.1	2.6 +/- 0.2
3/12/2012	3/19/2012	2.3 +/- 0.1	2.2 +/- 0.1	2.5 +/- 0.1	2.4 +/- 0.1	2.6 +/- 0.2	2.2 +/- 0.1	2.6 +/- 0.2
3/19/2012	3/26/2012	1.8 +/- 0.1	1.9 +/- 0.1	1.9 +/- 0.1	1.9 +/- 0.1	2.2 +/- 0.1	1.8 +/- 0.1	1.9 +/- 0.2
3/26/2012	4/2/2012	2.1 +/- 0.1	2.1 +/- 0.2	2.1 +/- 0.1	2.1 +/- 0.1	2.3 +/- 0.1	1.9 +/- 0.1	2.2 +/- 0.2
4/2/2012	4/9/2012	2.2 +/- 0.1	0.0 +/- 0.6 ¹	2.3 +/- 0.1	2.3 +/- 0.1	2.4 +/- 0.2	2.1 +/- 0.1	2.2 +/- 0.2
4/9/2012	4/16/2012	1.7 +/- 0.1	1.9 +/- 0.1	1.8 +/- 0.1	1.9 +/- 0.1	2.2 +/- 0.1	1.8 +/- 0.1	2.3 +/- 0.2
4/16/2012	4/23/2012	1.5 +/- 0.1	1.7 +/- 0.1	1.8 +/- 0.1	1.7 +/- 0.1	1.6 +/- 0.1	1.3 +/- 0.1	1.6 +/- 0.2
4/23/2012	4/30/2012	1.8 +/- 0.1	2.3 +/- 0.1	2.0 +/- 0.1	1.8 +/- 0.1	2.5 +/- 0.2	2.1 +/- 0.1	2.3 +/- 0.2
4/30/2012	5/7/2012	2.0 +/- 0.1	2.1 +/- 0.1	2.1 +/- 0.1	2.1 +/- 0.1	2.2 +/- 0.1	2.0 +/- 0.1	2.2 +/- 0.2
5/7/2012	5/14/2012	2.0 +/- 0.1	2.2 +/- 0.1	2.2 +/- 0.1	2.3 +/- 0.1	2.4 +/- 0.2	2.2 +/- 0.1	2.3 +/- 0.2
5/14/2012	5/21/2012	2.3 +/- 0.1	2.1 +/- 0.1	2.5 +/- 0.1	2.5 +/- 0.1	2.4 +/- 0.2	2.1 +/- 0.1	2.8 +/- 0.3
5/21/2012	5/28/2012	2.3 +/- 0.1	2.4 +/- 0.1	2.5 +/- 0.1	2.5 +/- 0.1	2.7 +/- 0.1	2.4 +/- 0.1	2.5 +/- 0.2

Table B-5

**Concentration of Beta Emitters in Air Particulates – Onsite Samples
(Results in units of 10^{-2} pCi/m³ +/- 2 σ 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
5/28/2012	6/4/2012	1.1 +/- 0.2	1.2 +/- 0.1	1.3 +/- 0.1	1.3 +/- 0.1	1.3 +/- 0.1	1.1 +/- 0.1	1.5 +/- 0.2
6/4/2012	6/11/2012	1.4 +/- 0.7	1.9 +/- 0.1	2.0 +/- 0.1	2.0 +/- 0.1	2.1 +/- 0.1	2.0 +/- 0.1	2.1 +/- 0.2
6/11/2012	6/18/2012	1.8 +/- 0.1	1.7 +/- 0.1	3.2 +/- 0.2	1.9 +/- 0.1	2.0 +/- 0.1	1.8 +/- 0.1	2.7 +/- 0.2
6/18/2012	6/25/2012	2.2 +/- 0.1	2.1 +/- 0.1	2.3 +/- 0.2	2.4 +/- 0.2	2.4 +/- 0.2	2.2 +/- 0.1	2.2 +/- 0.1
6/25/2012	7/2/2012	2.2 +/- 0.1	2.3 +/- 0.1	2.5 +/- 0.2	2.5 +/- 0.1	2.6 +/- 0.2	2.4 +/- 0.1	2.4 +/- 0.1
7/2/2012	7/9/2012	2.3 +/- 0.2	2.2 +/- 0.1	2.3 +/- 0.2	2.4 +/- 0.1	2.4 +/- 0.1	2.3 +/- 0.1	2.2 +/- 0.1
7/9/2012	7/16/2012	2.7 +/- 0.3	2.8 +/- 0.1	3.2 +/- 0.2	2.9 +/- 0.2	3.0 +/- 0.2	2.9 +/- 0.2	3.0 +/- 0.2
7/16/2012	7/23/2012	2.6 +/- 0.2	2.3 +/- 0.1	2.5 +/- 0.2	2.4 +/- 0.1	2.6 +/- 0.2	2.5 +/- 0.1	2.5 +/- 0.1
7/23/2012	7/30/2012	2.6 +/- 0.3	2.3 +/- 0.1	2.3 +/- 0.2	2.5 +/- 0.1	2.3 +/- 0.1	2.3 +/- 0.1	2.4 +/- 0.1
7/30/2012	8/6/2012	3.2 +/- 0.3	2.5 +/- 0.1	2.9 +/- 0.2	2.7 +/- 0.1	2.7 +/- 0.1	2.9 +/- 0.1	2.7 +/- 0.1
8/6/2012	8/13/2012	2.1 +/- 0.2	2.3 +/- 0.1	2.2 +/- 0.1	2.3 +/- 0.1	2.2 +/- 0.1	2.3 +/- 0.1	2.3 +/- 0.1
8/13/2012	8/20/2012	2.6 +/- 0.3	2.3 +/- 0.1	2.4 +/- 0.2	1.7 +/- 0.2	2.3 +/- 0.1	2.4 +/- 0.2	2.4 +/- 0.1
8/20/2012	8/27/2012	3.5 +/- 0.3	2.9 +/- 0.2	3.4 +/- 0.2	3.2 +/- 0.2	3.1 +/- 0.2	3.4 +/- 0.2	3.2 +/- 0.2
8/27/2012	9/3/2012	3.0 +/- 0.3	2.6 +/- 0.1	2.8 +/- 0.1	3.0 +/- 0.1	2.9 +/- 0.1	3.0 +/- 0.1	2.8 +/- 0.1
9/3/2012	9/10/2012	2.9 +/- 0.3	2.6 +/- 0.2	2.6 +/- 0.2	3.1 +/- 0.2	2.6 +/- 0.2	2.7 +/- 0.2	2.6 +/- 0.2
9/10/2012	9/17/2012	2.7 +/- 0.3	2.7 +/- 0.1	2.7 +/- 0.2	2.8 +/- 0.1	2.9 +/- 0.2	2.8 +/- 0.2	2.7 +/- 0.1
9/17/2012	9/24/2012	2.3 +/- 0.3	2.0 +/- 0.1	1.9 +/- 0.1	2.1 +/- 0.1	1.9 +/- 0.1	1.8 +/- 0.1	1.9 +/- 0.1
9/24/2012	10/1/2012	2.5 +/- 0.3	1.9 +/- 0.1	2.2 +/- 0.1	0.6 +/- 0.1	2.2 +/- 0.1	2.1 +/- 0.1	2.1 +/- 0.1
10/1/2012	10/8/2012	3.3 +/- 0.3	2.8 +/- 0.1	2.8 +/- 0.2	3.0 +/- 0.2	3.1 +/- 0.2	3.1 +/- 0.2	3.0 +/- 0.1
10/8/2012	10/15/2012	2.6 +/- 0.3	2.2 +/- 0.1	2.2 +/- 0.1	2.4 +/- 0.1	2.2 +/- 0.1	2.5 +/- 0.1	2.4 +/- 0.1
10/15/2012	10/22/2012	2.1 +/- 0.3	1.8 +/- 0.1	1.9 +/- 0.1	2.1 +/- 0.1	2.1 +/- 0.1	2.2 +/- 0.1	1.9 +/- 0.1
10/22/2012	10/29/2012	4.2 +/- 0.3	3.7 +/- 0.2	3.9 +/- 0.2	4.1 +/- 0.2	4.1 +/- 0.2	3.9 +/- 0.2	3.8 +/- 0.2

Table B-5

**Concentration of Beta Emitters in Air Particulates – Onsite Samples
(Results in units of 10^{-2} pCi/m³ +/- 2 σ 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
10/29/2012	11/5/2012	0.6 +/- 0.2	0.5 +/- 0.1	0.5 +/- 0.1	0.4 +/- 0.1	0.4 +/- 0.1	0.4 +/- 0.1	0.5 +/- 0.1
11/5/2012	11/12/2012	3.7 +/- 0.3	3.1 +/- 0.2	3.3 +/- 0.2	3.6 +/- 0.2	3.5 +/- 0.2	3.5 +/- 0.2	3.3 +/- 0.2
11/12/2012	11/19/2012	3.7 +/- 0.3	3.2 +/- 0.2	3.5 +/- 0.2	3.5 +/- 0.2	3.5 +/- 0.2	3.6 +/- 0.2	3.5 +/- 0.2
11/19/2012	11/26/2012	4.2 +/- 0.3	3.9 +/- 0.2	4.1 +/- 0.2	4.1 +/- 0.2	4.3 +/- 0.2	4.2 +/- 0.2	4.2 +/- 0.2
11/26/2012	12/3/2012	4.4 +/- 0.3	3.7 +/- 0.2	4.0 +/- 0.2	4.0 +/- 0.2	3.9 +/- 0.2	4.1 +/- 0.2	4.1 +/- 0.2
12/3/2012	12/10/2012	3.0 +/- 0.3	2.5 +/- 0.1	2.4 +/- 0.2	2.6 +/- 0.1	2.5 +/- 0.1	2.5 +/- 0.1	2.3 +/- 0.1
12/10/2012	12/17/2012	3.7 +/- 0.3	3.3 +/- 0.2	3.5 +/- 0.2	3.6 +/- 0.2	3.6 +/- 0.2	3.5 +/- 0.2	3.8 +/- 0.2
12/17/2012	12/24/2012	2.6 +/- 0.3	2.0 +/- 0.1	2.3 +/- 0.1	2.3 +/- 0.2	2.3 +/- 0.1	2.1 +/- 0.1	2.3 +/- 0.1
12/24/2012	12/31/2012	1.9 +/- 0.2	1.8 +/- 0.1	1.9 +/- 0.1	1.9 +/- 0.1	3.9 +/- 1.1	2.2 +/- 0.2	2.2 +/- 0.2

¹ Sampler malfunction/Low flow.

* < MDA (Beta)

Table B-6

**Concentration of Beta Emitters in Air Particulates - Offsite Samples
(Results in units of 10^{-2} pCi/m³ +/- 2 σ Uncertainty)**

Start Date	Stop Date	STATION-08 ¹ Seabreeze	STATION-09 Webster	STATION-10 ¹ Walworth	STATION-11 Williamson	STATION-12 ¹ Sodus Point
1/2/2012	1/9/2012	2.6 +/- 0.2	2.5 +/- 0.2	2.0 +/- 0.1	2.7 +/- 0.2	2.7 +/- 0.2
1/9/2012	1/16/2012	1.6 +/- 0.1	1.7 +/- 0.1	1.5 +/- 0.1	1.9 +/- 0.1	2.0 +/- 0.1
1/16/2012	1/23/2012	1.6 +/- 0.1	1.7 +/- 0.1	1.5 +/- 0.1	1.8 +/- 0.1	2.1 +/- 0.1
1/23/2012	1/30/2012	2.3 +/- 0.1	2.3 +/- 0.1	1.9 +/- 0.1	2.5 +/- 0.1	2.4 +/- 0.1
1/30/2012	2/6/2012	2.1 +/- 0.1	2.1 +/- 0.1	1.9 +/- 0.1	2.5 +/- 0.2	2.6 +/- 0.1
2/6/2012	2/13/2012	1.8 +/- 0.1	1.7 +/- 0.1	1.5 +/- 0.1	2.0 +/- 0.1	1.9 +/- 0.1
2/13/2012	2/20/2012	2.1 +/- 0.1	2.0 +/- 0.1	1.8 +/- 0.1	2.5 +/- 0.1	2.7 +/- 0.1
2/20/2012	2/27/2012	1.8 +/- 0.1	1.8 +/- 0.1	1.6 +/- 0.1	2.0 +/- 0.1	2.2 +/- 0.1
2/27/2012	3/5/2012	2.3 +/- 0.1	2.1 +/- 0.1	1.9 +/- 0.1	2.4 +/- 0.1	2.3 +/- 0.1
3/5/2012	3/12/2012	2.2 +/- 0.1	2.2 +/- 0.1	2.0 +/- 0.1	2.4 +/- 0.1	2.4 +/- 0.1
3/12/2012	3/19/2012	2.6 +/- 0.1	2.6 +/- 0.1	2.0 +/- 0.1	2.6 +/- 0.2	2.6 +/- 0.1
3/19/2012	3/26/2012	1.8 +/- 0.1	1.9 +/- 0.1	1.6 +/- 0.1	2.0 +/- 0.1	1.9 +/- 0.1
3/26/2012	4/2/2012	2.0 +/- 0.1	2.0 +/- 0.1	1.6 +/- 0.1	2.1 +/- 0.1	2.3 +/- 0.1
4/2/2012	4/9/2012	2.1 +/- 0.1	2.2 +/- 0.1	1.7 +/- 0.1	2.2 +/- 0.1	2.2 +/- 0.1
4/9/2012	4/16/2012	1.9 +/- 0.1	2.0 +/- 0.1	1.6 +/- 0.1	2.0 +/- 0.1	1.9 +/- 0.1
4/16/2012	4/23/2012	1.5 +/- 0.1	1.5 +/- 0.1	1.3 +/- 0.1	1.5 +/- 0.1	1.6 +/- 0.1
4/23/2012	4/30/2012	2.0 +/- 0.1	2.5 +/- 0.2	2.0 +/- 0.1	2.3 +/- 0.2	2.2 +/- 0.1
4/30/2012	5/7/2012	2.1 +/- 0.1	2.3 +/- 0.1	1.9 +/- 0.1	2.6 +/- 0.2	2.2 +/- 0.1
5/7/2012	5/14/2012	2.0 +/- 0.1	2.1 +/- 0.1	1.9 +/- 0.1	2.5 +/- 0.2	2.2 +/- 0.1
5/14/2012	5/21/2012	2.4 +/- 0.1	2.3 +/- 0.1	2.1 +/- 0.1	2.2 +/- 0.2	2.3 +/- 0.1
5/21/2012	5/28/2012	2.3 +/- 0.1	2.5 +/- 0.1	2.2 +/- 0.1	2.9 +/- 0.2	2.3 +/- 0.1
5/28/2012	6/4/2012	1.6 +/- 0.1	1.5 +/- 0.1	1.5 +/- 0.1	1.7 +/- 0.2	1.4 +/- 0.1
6/4/2012	6/11/2012	1.9 +/- 0.1	2.1 +/- 0.1	1.9 +/- 0.1	2.4 +/- 0.2	1.9 +/- 0.1
6/11/2012	6/18/2012	1.9 +/- 0.1	1.9 +/- 0.1	1.7 +/- 0.1	1.8 +/- 0.2	1.7 +/- 0.1
6/18/2012	6/25/2012	2.2 +/- 0.1	2.4 +/- 0.2	2.1 +/- 0.1	2.7 +/- 0.2	2.1 +/- 0.1
6/25/2012	7/2/2012	2.5 +/- 0.1	2.5 +/- 0.2	2.3 +/- 0.1	2.7 +/- 0.2	2.3 +/- 0.1
7/2/2012	7/9/2012	2.4 +/- 0.1	2.4 +/- 0.2	2.2 +/- 0.1	2.4 +/- 0.2	2.1 +/- 0.1
7/9/2012	7/16/2012	2.8 +/- 0.2	3.1 +/- 0.2	2.7 +/- 0.1	3.1 +/- 0.3	2.7 +/- 0.1
7/16/2012	7/23/2012	2.5 +/- 0.1	2.6 +/- 0.2	2.4 +/- 0.1	2.9 +/- 0.3	2.4 +/- 0.1
7/23/2012	7/30/2012	2.4 +/- 0.1	2.5 +/- 0.2	1.6 +/- 0.1	2.5 +/- 0.2	2.2 +/- 0.1
7/30/2012	8/6/2012	3.1 +/- 0.2	3.1 +/- 0.2	3.3 +/- 0.2	3.3 +/- 0.3	3.1 +/- 0.1
8/6/2012	8/13/2012	2.2 +/- 0.1	2.3 +/- 0.1	2.1 +/- 0.1	2.5 +/- 0.2	2.1 +/- 0.1
8/13/2012	8/20/2012	2.5 +/- 0.1	2.3 +/- 0.1	2.5 +/- 0.2	2.6 +/- 0.2	2.1 +/- 0.1
8/20/2012	8/27/2012	3.7 +/- 0.2	3.4 +/- 0.2	3.2 +/- 0.2	3.5 +/- 0.3	3.0 +/- 0.1
8/27/2012	9/3/2012	3.1 +/- 0.1	3.0 +/- 0.2	3.0 +/- 0.2	3.3 +/- 0.2	2.6 +/- 0.1

¹ Control Location

² Extended sample period to the week ending 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/m³ +/- 2 σ Uncertainty)**

Start Date	Stop Date	STATION-08 ¹ Seabreeze	STATION-09 Webster	STATION-10 ¹ Walworth	STATION-11 Williamson	STATION-12 ¹ Sodus Point
9/3/2012	9/10/2012	3.0 +/- 0.2	2.8 +/- 0.2	2.4 +/- 0.2	2.8 +/- 0.3	2.4 +/- 0.1
9/10/2012	9/17/2012	3.1 +/- 0.2	2.8 +/- 0.2	2.9 +/- 0.2	3.0 +/- 0.3	2.6 +/- 0.1
9/17/2012	9/24/2012	2.0 +/- 0.1	1.9 +/- 0.1	2.0 +/- 0.1	1.9 +/- 0.2	1.8 +/- 0.1
9/24/2012	10/1/2012	2.2 +/- 0.1	2.1 +/- 0.1	2.2 +/- 0.1	2.4 +/- 0.2	1.9 +/- 0.1
10/1/2012	10/8/2012	3.1 +/- 0.2	3.1 +/- 0.2	3.0 +/- 0.2	3.1 +/- 0.3	3.0 +/- 0.1
10/8/2012	10/15/2012	2.6 +/- 0.1	2.4 +/- 0.1	2.4 +/- 0.1	2.5 +/- 0.2	2.2 +/- 0.1
10/15/2012	10/22/2012	2.2 +/- 0.1	2.1 +/- 0.1	2.1 +/- 0.1	2.2 +/- 0.2	1.9 +/- 0.1
10/22/2012	10/29/2012	4.1 +/- 0.2	4.0 +/- 0.2	3.8 +/- 0.2	4.3 +/- 0.3	3.6 +/- 0.2
10/29/2012	11/5/2012	0.6 +/- 0.1	0.6 +/- 0.1	0.5 +/- 0.1	0.7 +/- 0.2	0.5 +/- 0.1
11/5/2012	11/12/2012	3.7 +/- 0.2	3.4 +/- 0.2	3.5 +/- 0.2	3.7 +/- 0.3	3.5 +/- 0.2
11/12/2012	11/19/2012	3.9 +/- 0.2	3.8 +/- 0.2	3.5 +/- 0.2	3.6 +/- 0.3	3.2 +/- 0.1
11/19/2012	11/26/2012	4.3 +/- 0.2	4.3 +/- 0.2	4.3 +/- 0.2	4.4 +/- 0.3	4.1 +/- 0.2
11/26/2012	12/3/2012	4.1 +/- 0.2	4.0 +/- 0.2	3.7 +/- 0.2	4.3 +/- 0.3	4.0 +/- 0.2
12/3/2012	12/10/2012	2.8 +/- 0.1	2.5 +/- 0.1	2.4 +/- 0.1	2.5 +/- 0.2	2.2 +/- 0.1
12/10/2012	12/17/2012	3.6 +/- 0.2	3.9 +/- 0.2	3.7 +/- 0.2	3.8 +/- 0.3	3.4 +/- 0.2
12/17/2012	12/24/2012	2.4 +/- 0.1	2.4 +/- 0.1	2.1 +/- 0.1	2.3 +/- 0.2	2.1 +/- 0.1
12/24/2012	12/31/2012	1.9 +/- 0.2	2.0 +/- 0.1	1.8 +/- 0.1	2.1 +/- 0.2	2.0 +/- 0.1

¹ Control Location

² Extended sample period to the week ending 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/m³ +/- 2σ)**

Location	Description	4/2/2012	7/2/2012	10/1/2012	12/31/2012
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-08 ¹	Seabreeze	*	*	*	*
STATION-09	Webster	*	*	*	*
STATION-10 ¹	Walworth	*	*	*	*
STATION-11	Williamson	*	*	*	*
STATION-12 ¹	Sodus Point	*	*	*	*
STATION-13	Substation 13	*	*	*	*

¹ Control Location

* All non-natural gamma emitters not detected.

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
CONTROL¹			
Local Sites in Control Sectors	7/26/2012	Greens	*
	7/26/2012	Onion (Root)	*
	7/26/2012	Squash	*
	7/26/2012	Tomato	*
	10/18/2012	Apples	*
	10/18/2012	Tuber (Potato)	*
EAST			
East Sector	6/12/2012	Greens	*
	7/23/2012	Onion (Root)	*
	8/7/2012	Tomato	*
	8/7/2012	Tuber (Potato)	*
	8/7/2012	Veg. Beets	*
	8/24/2012	Cabbage	*
	10/15/2012	Chard	*
	10/15/2012	Raspberries	*
ESE			
East South East Sector	7/9/2012	Greens	*
	7/23/2012	Blackberries	*
	7/23/2012	Cucumbers	*
	8/7/2012	Onion (Root)	*
	8/29/2012	Grapes	*
	10/15/2012	Cabbage	*
	10/15/2012	Chard	*
HAMLIN¹			
Control	7/26/2012	Cucumbers	*
SSE			
South South East Garden	6/25/2012	Greens	*
	7/16/2012	Squash	*
	7/23/2012	Cucumbers	*
	8/14/2012	Tomato	*
	8/24/2012	Cabbage	*
	9/10/2012	Apples	*

¹ Control Location

* All non-natural gamma emitters not detected.

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	1/24/2012	*
	2/21/2012	*
	3/20/2012	*
	4/17/2012	*
	5/15/2012	*
	5/30/2012	*
	6/12/2012	*
	6/26/2012	*
	7/10/2012	*
	7/24/2012	*
	8/7/2012	*
	8/17/2012	*
	9/5/2012	*
	9/18/2012	*
	10/2/2012	*
	10/16/2012	*
10/30/2012	*	
11/27/2012	*	
12/26/2012	*	
SCHULTZ ¹ South Sodus Control	1/24/2012	*
	2/21/2012	*
	3/20/2012	*
	4/17/2012	*
	5/15/2012	*
	5/30/2012	*
	6/12/2012	*
	6/26/2012	*
	7/10/2012	*
	7/24/2012	*
	8/7/2012	*
	8/17/2012	*
	9/5/2012	*
	9/18/2012	*
	10/2/2012	*
	10/16/2012	*
10/30/2012	*	
11/27/2012	*	
12/26/2012	*	

¹ Control Location

* All non-natural gamma emitters not detected.

Table B-10

Typical MDA Ranges for Gamma Spectrometry

Selected Nuclides	Air Particulates (10 ⁻² pCi/m ³)	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	3.2 - 7	18.1 - 34.8	3.3 - 7.2	5.2 - 10.2	15.8 - 20.7	38.2 - 80.9	41.4 - 84.1	16.7 - 50.5
K-40	0 - 0	32 - 77.2	131.6 - 286.4	35.7 - 84	44.4 - 85.1	106 - 176.2	225.2 - 566.4	328.2 - 741.4	101.4 - 470.7
Cr-51	0 - 0.1	25.6 - 48.1	107 - 332	24.1 - 49.2	29.9 - 55.2	105.9 - 152.8	345.4 - 425.4	275 - 551.9	86.5 - 296.6
Mn-54	0 - 0	2.8 - 6.2	14.2 - 26.2	2.9 - 6.5	3.9 - 7.8	12 - 16.3	32.2 - 56.9	36.9 - 70.8	13 - 40.4
Co-58	0 - 0	2.9 - 6.2	16.1 - 30.3	3.1 - 6.5	3.9 - 7.8	12.9 - 16.6	37.8 - 58.9	34.6 - 70.4	13.6 - 40.2
Fe-59	0 - 0	6.3 - 12.9	39.9 - 88	5.9 - 12.5	9.2 - 18.3	34.8 - 43	93.1 - 143.3	75.5 - 163.8	31.4 - 92.9
Co-60	0 - 0	3 - 6.8	15.8 - 31.7	3.2 - 6.9	4.7 - 9.3	14.3 - 19.1	32.7 - 71.4	37.5 - 72.7	14.8 - 48.3
Zn-65	0 - 0	6 - 13.5	36.9 - 67.9	8.1 - 17.5	9.6 - 19.6	31.3 - 37.5	88.1 - 158.9	85.5 - 191.6	32.2 - 99.1
Nb-95	0 - 0	3 - 6.4	15.4 - 42.8	2.8 - 6.8	3.7 - 7.9	14.4 - 22.1	49.9 - 68.2	42.7 - 84.9	13.1 - 42.6
Zr-95	0 - 0	4.8 - 10.6	27.5 - 51.8	4.5 - 11.1	6.3 - 13.3	21.8 - 29.4	66.5 - 97.3	63.9 - 127.8	20.9 - 69.7
Ru-106	0 - 0	23.5 - 55	110.2 - 211.1	23.1 - 56.7	32.1 - 65.6	102.2 - 123.1	256.2 - 429.8	296.1 - 576.7	102.3 - 351.1
Ag-110m	0 - 0	2.6 - 5.9	12.7 - 25.8	2.5 - 5.9	3.5 - 7.1	11.6 - 13.9	28.5 - 53.1	38 - 70.3	11.4 - 37.9
I-131 ¹	0 - 2.7	0 - 5.6	19.7 - 1786.3	2.2 - 10.2	0.5 - 0.8	22.2 - 132.1	62.3 - 331.6	58.2 - 153.3	14.2 - 58
Cs-134	0 - 0	2.6 - 6.1	11.3 - 22.9	2.7 - 7	3.3 - 7.3	11.5 - 13.2	26.8 - 61.8	33.5 - 76.8	11.1 - 38.2
Cs-137	0 - 0	2.6 - 6.4	9.9 - 26.1	3 - 6.8	3.6 - 7.9	11.2 - 14.6	30.1 - 59	32.5 - 71.4	11.9 - 41
Ba-140	0 - .2	5.6 - 11.9	24 - 361	4.6 - 10.9	5.3 - 11.2	16.3 - 84.1	93.3 - 202.2	75.7 - 178.8	20.5 - 65.1
La-140	0 - .2	5.6 - 11.9	24 - 361	4.6 - 10.9	5.3 - 11.2	16.3 - 84.1	93.3 - 202.2	75.7 - 178.8	20.6 - 65.1
Ce-144	0 - 0	14.4 - 32.5	53.3 - 96.8	14.9 - 38.1	19.4 - 38.3	54.8 - 61.8	124.3 - 194.9	138.4 - 278.7	45.3 - 169.8

¹ This MDA range for I-131 on a silver zeolite cartridge is typically 4.16 x 10⁻³ to 3.40 x 10⁻².

Table B-11

Typical LLDs for Gamma Spectrometry

Selected Nuclides	Air Particulates 10 ⁻³ pCi/m ³	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 x10⁻³ pCi/m³

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	12.9 ± 0.9	14.5 ± 1.6	11.9 ± 0.5	13.4 ± 0.7
3	Onsite-In field approximately 200 ft SE of station #2	12.7 ± 0.9	14.2 ± 0.6	12.4 ± 0.9	12.8 ± 0.7
4	Onsite-Training Center yard driveway circle	11.3 ± 0.8	13.0 ± 0.6	10.2 ± 0.5	12.0 ± 0.6
5	Onsite-Between creek and plant entry road	12.5 ± 1.1	14.2 ± 0.8	12.8 ± 1.0	13.8 ± 0.6
6	Onsite-SW side of plant parking lot	9.3 ± 1.0	10.3 ± 0.9	8.8 ± 0.4	12.2 ± 1.8
7	Onsite-utility pole along West plant fence	12.9 ± 0.9	14.9 ± 0.9	13.4 ± 0.7	14.9 ± 0.8
8 ¹	Topper Drive-Irondequoit, Seabreeze Substation #51	10.8 ± 1.2	11.9 ± 0.5	10.4 ± 0.6	11.6 ± 0.5
9	Phillips Road-Webster, intersection with Highway #104, Substation #74	11.2 ± 0.9	11.3 ± 0.8	10.3 ± 0.7	11.7 ± 0.6
10 ¹	Atlantic Avenue-Walworth, Substation #230	9.6 ± 0.8	10.9 ± 0.6	9.1 ± 0.5	10.9 ± 0.7
11	W. Main Street-Williamson, Substation #207	9.3 ± 0.8	11.6 ± 0.6	9.6 ± 0.5	10.8 ± 0.6
12 ¹	12 Seaman Avenue-Sodus Point-Off Lake Road by Sewer district, Substation #209	11.3 ± 0.8	12.6 ± 0.7	11.0 ± 0.5	12.7 ± 0.9
13	Onsite- South of Meteorological Tower	15.8 ± 1.2	16.0 ± 0.6	14.7 ± 1.4	16.1 ± 0.6
14	NW corner of field along lake shore	11.0 ± 0.9	13.2 ± 0.8	11.7 ± 0.6	12.6 ± 0.6
15	Field access road, west of orchard, approximately 3000' West of plant	12.0 ± 1.2	13.8 ± 1.0	13.0 ± 0.7	14.1 ± 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
16	SW Corner of orchard, approximately 3000' West of plant, approximately 200' North of Lake Road	11.6 \pm 1.0	13.1 \pm 0.8	11.7 \pm 0.7	13.2 \pm 0.8
17	Utility pole in orchard, approximately 75' North of Lake Road	11.9 \pm 0.9	13.3 \pm 0.7	11.0 \pm 0.7	12.5 \pm 0.9
18	Approximately 30' North of NE corner of Substation 13A fence	9.7 \pm 0.9	11.4 \pm 1.0	9.2 \pm 0.5	11.2 \pm 0.6
19	On NW corner of house 100' East of plant access road	9.9 \pm 0.8	11.5 \pm 0.5	10.3 \pm 0.5	11.0 \pm 0.8
20	Approximately 150' West of Ontario Center Road and approximately 170' South of Lake Road	11.7 \pm 0.8	13.9 \pm 0.7	11.5 \pm 0.5	13.3 \pm 0.9
21	North side of Lake Road, approximately 200' East of Ontario Center Road	11.5 \pm 1.0	13.1 \pm 0.7	11.4 \pm 0.6	12.6 \pm 0.7
22	North side of Lake Road, SE, property owner	10.0 \pm 0.8	12.1 \pm 0.7	9.7 \pm 0.8	10.9 \pm 0.9
23	East property line, midway between Lake Road and Lake shore	12.2 \pm 0.9	13.6 \pm 0.6	12.3 \pm 0.6	12.2 \pm 0.8
24	Lake shore near NE corner of property	12.7 \pm 0.9	13.9 \pm 0.9	12.1 \pm 0.6	13.4 \pm 0.5
25 ¹	Substation #73, Klem Road, adjacent to 897 Klem Road	11.2 \pm 1.3	11.5 \pm 0.7	9.4 \pm 0.8	11.4 \pm 0.6
26 ¹	Service Center, Plank Road, West of 250	10.7 \pm 0.9	12.8 \pm 0.6	10.5 \pm 0.5	11.1 \pm 0.5
27 ¹	Atlantic Avenue at Knollwood Drive utility pole, North side of road	11.2 \pm 0.8	12.8 \pm 0.6	11.9 \pm 0.7	11.7 \pm 0.8
28 ¹	Substation #193, Marion, behind Stanton Ag. Service, North Main Street	10.6 \pm 0.9	12.4 \pm 0.9	9.9 \pm 0.9	11.7 \pm 0.6

TABLE B-12 (Continued)

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

Station	Location	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
29 ¹	Substation #208, Town Line Road (CR-118), 1000' North of Route 104	9.7 \pm 0.8	11.7 \pm 0.8	10.3 \pm 0.7	11.7 \pm 0.5
30 ¹	District Office, Sodus, on pole, West side of bldg	8.7 \pm 0.9	10.6 \pm 0.6	9.1 \pm 0.9	11.1 \pm 0.8
31	Lake Road, pole 20' North of road, 500' East of Salt Road	12.6 \pm 1.0	13.7 \pm 0.8	12.2 \pm 0.5	13.0 \pm 0.7
32	Woodard Road at County Line Road, pole @ BW corner	11.0 \pm 0.8	12.1 \pm 0.7	10.6 \pm 0.7	10.8 \pm 0.6
33	County Line Road at RR tracks, pole approximately 100' East along tracks	10.1 \pm 0.8	11.5 \pm 0.8	10.6 \pm 0.7	10.9 \pm 0.5
34	Lincoln Road, pole midway between Ridge Road and Route 104	13.3 \pm 0.9	14.9 \pm 0.9	12.9 \pm 0.6	13.9 \pm 0.5
35	Transmission Right of Way, North of Clevenger Road on pole	12.6 \pm 1.1	14.1 \pm 0.6	12.9 \pm 0.6	13.1 \pm 0.7
36	Substation #205, Route 104, East of Ontario Center Road, North side of fence	11.3 \pm 0.9	12.7 \pm 0.5	10.2 \pm 0.5	11.6 \pm 0.7
37	Rail Road Avenue, pole at 2048	10.0 \pm 0.9	12.0 \pm 0.5	9.8 \pm 0.6	10.2 \pm 0.5
38	Fisher Road at RR Tracks, pole East of road	11.3 \pm 0.9	13.6 \pm 0.6	12.0 \pm 0.8	12.4 \pm 1.1
39	Seeley Road, Pole South side 100' West of intersection with Stony Lonesome Road	11.3 \pm 0.9	14.3 \pm 0.8	12.0 \pm 0.6	12.7 \pm 0.9
40	Lake Road at Stony Lonesome Road, pole at SE corner	10.3 \pm 0.9	12.1 \pm 0.9	10.0 \pm 0.9	10.9 \pm 0.6
63	Westside of warehouse access road	11.8 \pm 0.8	13.5 \pm 1.1	12.0 \pm 0.8	13.3 \pm 0.9
64	Westside of direct road, adjacent to orchard	12.9 \pm 1.1	15.3 \pm 0.7	12.9 \pm 0.9	14.0 \pm 0.8

1 - Control Location

TABLE B-13

Groundwater Monitoring Wells

Location	Sample Date	Tritium (uCi/ml)
GW01: Warehouse Access Road (Control)	02/11/12	*
	03/14/12	*
	04/13/12	*
	05/17/12	*
	06/14/12	*
	07/25/12	*
	08/21/12	*
	12/20/12	*
	GW03: Screenhouse West, South Well	08/22/12
GW04: Screenhouse West, North Well	01/27/12	*
	02/10/12	*
	03/14/12	*
	04/13/12	*
	05/17/12	*
	06/14/12	*
	07/22/12	*
	08/22/12	*
	10/01/12	*
	10/19/12	*
	11/30/12	*
	12/20/12	*
	GW05: Screenhouse East, South (15.5')	03/14/12
06/14/12		*
08/22/12		*
12/20/12		*
GW06: Screenhouse East, Middle (20.0')	03/14/12	*
	06/14/12	*
	08/22/12	*
	12/20/12	*
GW07: Screenhouse East, North (24.0')	02/10/12	*
	03/14/12	*
	04/13/12	*
	05/17/12	*
	06/14/12	*
	07/22/12	*
	08/22/12	*
	12/20/12	*

TABLE B-13 (Continued)

Groundwater Monitoring Wells

Location	Sample Date	Tritium (uCi/ml)
GW08: All Volatiles Treatment Building	01/27/12	*
	02/11/12	*
	03/14/12	*
	04/13/12	*
	05/17/12	*
	06/14/12	*
	07/22/12	*
	08/22/12	*
	10/01/12	*
	10/19/12	*
	11/08/12	*
	11/30/12	*
	12/20/12	*
GW10: Technical Support Center, South	03/14/12	*
	08/22/12	*
	12/20/12	*

* Activity not detected (Tritium)

APPENDIX C

Quality Assurance Program

Summary of Appendix C Content:

Appendix C is a summary of Exelon Industrial Services – Ft. Smallwood Environmental Laboratory 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 Ft. Smallwood Environmental 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 Ft. Smallwood Environmental Laboratory's results contained in Table C-1 generally agree with the intercomparison laboratory results within the range of $\pm 2 \sigma$ of each other with the exception of a beta result for the water sample type on 6/14/12 from Analytics. In 2011, the June water study had a similar performance issue and the initial investigation into the matter yielded no apparent cause for this discrepancy. A sample preparation error was thought to be the most probable explanation. Further investigation into the 2012 and 2011 samples revealed that they contained a similarly high level of Americium-241 as compared to Cesium-137. It was determined that the lab's result was high due to the interference of alpha from the Americium. The laboratory does not encounter alpha emitters in the Constellation Energy Nuclear Generation Fleet and so does not have an alpha correction in its Beta result calculations. All other intercomparisons for beta filters and water samples analyzed on the instrument, prior to and after this sample, were in full agreement.

With this one exception, all other sets of intercomparison results listed in the table are in full agreement when they were further evaluated using the NRC Resolution Test Criteria.¹ The uncertainties for the Ft. Smallwood Environmental Laboratory's results and Analytics' results are $\pm 2\sigma$ while the ERA laboratory's uncertainty is based on USEPA guidelines.²

All the results contained in Table C-2 agree within the range of $\pm 2 \sigma$ of each other with their respective Ft. Smallwood Environmental Laboratory original, replicate and/or Teledyne Brown Engineering's split laboratory samples, except for the comparisons of two soil samples and an oyster sample involving Cs-137 results. The original and replicate analysis of the soil sample from SFS3 collected on 6/11/2012 do agree within $\pm 2 \sigma$ of each other and do not agree within $\pm 2 \sigma$ of the split lab results. The original analysis of the soil sample from SFS5 collected on 6/11/2012, and the original analysis of the oyster sample collected on 8/23/2012 do not agree within the range of $\pm 2\sigma$ of their respective QC comparison samples analyzed. These minor discrepancies, which have been observed in previous reporting periods, are most probably due to counting statistics and/or the non-homogeneous nature of this type of sample. Other samples whose nature generally precludes sample splitting are marked "***" in the Split Analysis column.

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TABLE C-1
Results of Participation in Cross Check Programs

Sample Date	Sample Type and Units	Isotope Observed	Reported Laboratory's Results	Cross Check Lab Results
03/15/12	Air Iodine – pCi	I-131	84.0 +/- 5.0	93.2 +/- 1.6
03/15/12	Milk – pCi/L	Co-58	116.0 +/- 14.0	132.0 +/- 2.2
		Co-60	269.0 +/- 14.0	279.0 +/- 4.7
		Zn-65	302.0 +/- 31.0	333.0 +/- 5.6
		I-131	91.0 +/- 22.0	92.5 +/- 1.5
		Cs-134	118.0 +/- 9.0	149.0 +/- 2.5
		Cs-137	144.0 +/- 14.0	159.0 +/- 2.7
		Ce-141	238.0 +/- 17.0	260.0 +/- 4.3
		Cr-51	443.0 +/- 86.0	436.0 +/- 7.3
		Mn-54	188.0 +/- 16.0	195.0 +/- 3.3
		Fe-59	158.0 +/- 19.0	168.0 +/- 2.8
03/15/12	Water - pCi/L	Gross Beta	336.0 +/- 4.0	297.0 +/- 4.96
06/14/12	Air Filter - pCi	Ce-141	50.0 +/- 4.0	46.5 +/- 0.8
		Cs-137	127.0 +/- 8.0	120.0 +/- 2.0
		Mn-54	78.0 +/- 7.0	74.9 +/- 1.3
		Zn-65	128.0 +/- 16.0	113.0 +/- 1.9
		Co-60	207.0 +/- 9.0	201.0 +/- 3.4
		Co-58	51.0 +/- 7.0	52.3 +/- 0.9
		Fe-59	84.0 +/- 10.0	72.3 +/- 1.2
		Cr-51	244.0 +/- 4.0	22.7 +/- 3.8
		Cs-134	85.0 +/- 5.0	98.8 +/- 1.7
06/14/12	Water – pCi/L	H-3	26.3E+04	25.0E+04
06/14/12	Water – pCi/L	Cr-51	595.0 +/- 110.0	548.0 +/- 9.1
		Cs-137	285.0 +/- 18.0	289.0 +/- 4.8
		Cs-134	213.0 +/- 10.0	238.0 +/- 4.0
		I-131	106.0 +/- 22.0	99.4 +/- 1.7
		Ce-141	123.0 +/- 18.0	112.0 +/- 1.9
		Co-60	504.0 +/- 18.0	484.0 +/- 8.1
		Co-58	114.0 +/- 14.0	126.0 +/- 2.1
		Fe-59	191.0 +/- 21.0	174.0 +/- 2.9
		Mn-54	179.0 +/- 16.0	180.0 +/- 3.0
		Zn-65	275.0 +/- 30.0	272.0 +/- 4.5
06/14/12	Water - pCi/L ¹	Gross Beta	219.0 +/- 3.0	148.0 +/- 2.47

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		
07/09/12	Water – pCi/L	Co-60	46.0 +/- 2.0	51.3		
		Zn-65	101.0 +/- 7.0	98.9		
		Cs-134	75.2 +/- 2.0	92.5		
		Cs-137	196.0 +/- 6.0	216.0		
		Ba-133	54.1 +/- 3.0	65.0		
		I-131	24.7 +/- 4.0	26.5		
07/09/12	Water - pCi/L	Gross Beta	24.88	36.8		
09/13/12	Air Filter - pCi	Gross Beta	97.2 +/- 2.0	94.9 +/- 1.58		
09/13/12	Water – pCi/L	H-3	9.23E+05	1.00E+06		
10/05/12	Water – pCi/L	Co-60	78.0 +/- 4.0	78.3		
		Zn-65	212.0 +/- 14.0	204.0		
		Cs-134	70.0 +/- 3.0	76.6		
		Cs-137	185.0 +/- 8.0	183.0		
		Ba-133	82.0 +/- 4.0	84.8		
		I-131	23.0 +/- 4.0	24.8		
		12/06/12	Air Filter – pCi	Mn-54	101.0 +/- 7.0	104.0 +/- 1.7
Fe-59	109.0 +/- 8.0			104.0 +/- 1.7		
Co-58	82.0 +/- 7.0			88.8 +/- 1.5		
Co-60	154.0 +/- 6.0			153.0 +/- 2.6		
Cr-51	281.0 +/- 29.0			313.0 +/- 5.2		
Cs-134	118.0 +/- 5.0			149.0 +/- 2.5		
Cs-137	102.0 +/- 6.0			105.0 +/- 1.8		
Ce-141	43.0 +/- 4.0			46.0 +/- 0.8		
Zn-65	178.0 +/- 15.0			167.0 +/- 2.8		
12/06/12	Air Iodine - pCi			I-131	66.0 +/- 4.0	72.8 +/- 1.2
12/06/12	Water - pCi	H-3	9.30E+02	2.50E+02		

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
12/06/12	Milk – pCi/L	Fe-59	149.0 +/- 19.0	116.0 +/- 1.9
		Co-58	113.0 +/- 14.0	98.5 +/- 1.7
		Co-60	203.0 +/- 13.0	170.0 +/- 2.8
		Mn-54	119.0 +/- 13.0	116.0 +/- 1.9
		Zn-65	220.0 +/- 31.0	186.0 +/- 3.1
		I-131	106.0 +/- 15.0	90.0 +/- 1.5
		Cs-134	184.0 +/- 10.0	165.0 +/- 2.8
		Cs-137	129.0 +/- 13.0	117.0 +/- 2.0
		Ce-141	63.0 +/- 13.1	51.0 +/- 0.9
	Cr-51	427.0 +/- 69.0	348.0 +/- 5.8	
12/06/12	Water - pCi/L	Gross Beta	219.0 +/- 3.0	274.0 +/- 4.57

¹ See discussion at the beginning of the Appendix

TABLE C-2

Results of Quality Assurance Program

Sample Type and Location ⁽²⁾	Sample Date	Type of Analysis	Original Analysis	Replicate Analysis	Split Analysis
Air Filter - A1	01/09/12	Gross Beta	2.5 +/- 0.2	2.7 +/- 0.2	**
Air Filter - A2	01/09/12	Gross Beta	2.2 +/- 0.1	2.3 +/- 0.2	**
Air Filter - A3	01/09/12	Gross Beta	2.4 +/- 0.2	2.3 +/- 0.2	**
Air Filter - A4	01/09/12	Gross Beta	2.5 +/- 0.2	2.7 +/- 0.2	**
Air Filter - A5	01/09/12	Gross Beta	2.4 +/- 0.2	2.4 +/- 0.2	**
Air Filter - SFA1	01/09/12	Gross Beta	2.7 +/- 0.2	2.6 +/- 0.2	**
Air Filter - SFA2	01/09/12	Gross Beta	2.7 +/- 0.2	2.5 +/- 0.2	**
Air Filter - SFA3	01/09/12	Gross Beta	2.8 +/- 0.2	2.8 +/- 0.2	**
Air Filter - SFA4	01/09/12	Gross Beta	2.6 +/- 0.2	2.5 +/- 0.2	**
Air Iodine - A2	01/16/12	I-131	<MDA	<MDA	**
Air Iodine - A4	01/16/12	I-131	<MDA	<MDA	**
Air Iodine - A5	01/16/12	I-131	<MDA	<MDA	**
Air Filter - A1	02/06/12	Gross Beta	2.4 +/- 0.1	2.2 +/- 0.1	**
Air Filter - A3	02/06/12	Gross Beta	2.2 +/- 0.1	2.1 +/- 0.1	**
Air Filter - A4	02/06/12	Gross Beta	2.5 +/- 0.1	2.4 +/- 0.1	**
Air Filter - A5	02/06/12	Gross Beta	2.4 +/- 0.1	2.3 +/- 0.1	**
Air Filter - SFA1	02/06/12	Gross Beta	2.3 +/- 0.1	2.3 +/- 0.1	**
Air Filter - SFA2	02/06/12	Gross Beta	2.3 +/- 0.1	2.4 +/- 0.1	**
Air Filter - SFA3	02/06/12	Gross Beta	2.4 +/- 0.1	2.4 +/- 0.1	**
Air Filter - SFA4	02/06/12	Gross Beta	2.3 +/- 0.1	2.2 +/- 0.1	**
Air Iodine - A2	02/06/12	I-131	<MDA	<MDA	**
Air Iodine - A3	02/06/12	I-131	<MDA	<MDA	**
Air Filter - A1	02/14/12	Gamma	<MDA	<MDA	<MDA
Air Filter - A2	02/14/12	Gamma	<MDA	<MDA	<MDA
Air Filter - A3	02/14/12	Gamma	<MDA	<MDA	<MDA
Air Filter - A4	02/14/12	Gamma	<MDA	<MDA	<MDA
Air Filter - A5	02/14/12	Gamma	<MDA	<MDA	<MDA
Air Filter - SFA1	02/14/12	Gamma	<MDA	<MDA	<MDA
Air Filter - SFA2	02/14/12	Gamma	<MDA	<MDA	<MDA
Air Filter - SFA3	02/14/12	Gamma	<MDA	<MDA	<MDA
Air Filter - SFA4	02/14/12	Gamma	<MDA	<MDA	<MDA

TABLE C-2 - Continued

Results of Quality Assurance Program

Sample Type and Location ⁽²⁾	Sample Date	Type of Analysis	Original Analysis	Replicate Analysis	Split Analysis
Air Filter - A1	03/05/12	Gross Beta	2.2 +/- 0.1	2.2 +/- 0.1	**
Air Filter - A2	03/05/12	Gross Beta	2.2 +/- 0.1	2.2 +/- 0.1	**
Air Filter - A3	03/05/12	Gross Beta	2.2 +/- 0.1	2.1 +/- 0.1	**
Air Filter - A4	03/05/12	Gross Beta	2.7 +/- 0.2	3.1 +/- 0.2	**
Air Filter - A5	03/05/12	Gross Beta	2.2 +/- 0.1	2.3 +/- 0.1	**
Air Filter - SFA1	03/05/12	Gross Beta	2.3 +/- 0.1	2.3 +/- 0.1	**
Air Filter - SFA2	03/05/12	Gross Beta	2.2 +/- 0.1	2.3 +/- 0.1	**
Air Filter - SFA3	03/05/12	Gross Beta	2.3 +/- 0.1	2.4 +/- 0.1	**
Air Filter - SFA4	03/05/12	Gross Beta	2.3 +/- 0.1	2.3 +/- 0.1	**
Soil - SFS1	03/12/12	Gamma	<MDA	<MDA	<MDA
Soil - SFS4	03/12/12	Gamma	<MDA	<MDA	<MDA
Oysters - IA3	03/14/12	Gamma	<MDA	<MDA	**
Air Iodine - A1	03/28/12	I-131	<MDA	<MDA	**
Air Iodine - A2	03/28/12	I-131	<MDA	<MDA	**
Shoreline sediment - WB1	03/28/12	Gamma	<MDA	<MDA	**
Air Filter - A1	04/09/12	Gross Beta	2.0 +/- 0.1	2.0 +/- 0.1	**
Air Filter - A2	04/09/12	Gross Beta	1.6 +/- 0.1	1.6 +/- 0.1	**
Air Filter - A3	04/09/12	Gross Beta	1.5 +/- 0.1	1.6 +/- 0.1	**
Air Filter - A4	04/09/12	Gross Beta	2.0 +/- 0.1	2.1 +/- 0.1	**
Air Filter - A5	04/09/12	Gross Beta	1.8 +/- 0.1	1.8 +/- 0.1	**
Air Filter - SFA1	04/09/12	Gross Beta	2.0 +/- 0.1	2.0 +/- 0.1	**
Air Filter - SFA2	04/09/12	Gross Beta	1.9 +/- 0.1	2.0 +/- 0.1	**
Air Filter - SFA3	04/09/12	Gross Beta	1.8 +/- 0.1	1.9 +/- 0.1	**
Air Filter - SFA4	04/09/12	Gross Beta	2.0 +/- 0.1	1.9 +/- 0.1	**
Air Iodine - A3	04/09/12	I-131	<MDA	<MDA	**
Air Iodine - A4	04/09/12	I-131	<MDA	<MDA	**
Air Filter - A1	05/07/12	Gross Beta	1.5 +/- 0.1	1.4 +/- 0.1	**
Air Filter - A2	05/07/12	Gross Beta	1.2 +/- 0.1	1.3 +/- 0.1	**
Air Filter - A3	05/07/12	Gross Beta	1.4 +/- 0.1	1.3 +/- 0.1	**
Air Filter - A4	05/07/12	Gross Beta	1.6 +/- 0.1	1.6 +/- 0.1	**
Air Filter - A5	05/07/12	Gross Beta	1.4 +/- 0.1	1.4 +/- 0.1	**
Air Filter - SFA1	05/07/12	Gross Beta	1.4 +/- 0.1	1.4 +/- 0.1	**
Air Filter - SFA2	05/07/12	Gross Beta	1.4 +/- 0.1	1.5 +/- 0.1	**

TABLE C-2 - Continued

Results of Quality Assurance Program

Sample Type and Location ⁽²⁾	Sample Date	Type of Analysis	Original Analysis	Replicate Analysis	Split Analysis
Air Filter - SFA4	05/07/12	Gross Beta	1.5 +/- 0.1	1.4 +/- 0.1	**
Air Iodine - A1	05/28/12	I-131	<MDA	<MDA	**
Air Iodine - A2	05/28/12	I-131	<MDA	<MDA	**
Misc ground coverage - SFB2	06/11/12	Gamma	<MDA	<MDA	<MDA
Misc ground coverage - SFB3	06/11/12	Gamma	<MDA	<MDA	<MDA
Misc ground coverage - SFB5	06/11/12	Gamma	<MDA	<MDA	<MDA
Soil - SFS2	06/11/12	Gamma	<MDA	<MDA	<MDA
Soil - SFS3 ¹	06/11/12	Cs-137	34.7 +/- 27.0	56.5 +/- 24.8	120.0 +/- 40.1
Soil - SFS5 ¹	06/11/12	Cs-137	324.2 +/- 33.9	260.0 +/- 31.7	663.0 +/- 49.3
Bottom sediment - WBS2	06/19/12	Cs-137	128.9 +/- 39.2	92.4 +/- 43.0	196.0 +/- 46.8
Bottom sediment - WBS4	06/19/12	Cs-137	128.6 +/- 35.3	85.4 +/- 37.7	163.0 +/- 46.8
Oysters - IA3	06/19/12	Gamma	<MDA	<MDA	<MDA
Oysters - IA6	06/19/12	Gamma	<MDA	<MDA	<MDA
Air Iodine - A1	06/25/12	I-131	<MDA	<MDA	**
Air Iodine - A3	06/25/12	I-131	<MDA	<MDA	**
Air Iodine - A4	06/25/12	I-131	<MDA	<MDA	**
Bay Water - WA1	06/28/12	Gamma	<MDA	**	<MDA
Bay Water - WA2	06/28/12	Gamma	<MDA	**	<MDA
Air Iodine - A1	07/09/12	I-131	<MDA	<MDA	**
Air Iodine - A2	07/09/12	I-131	<MDA	<MDA	**
Air Iodine - A5	07/09/12	I-131	<MDA	<MDA	**
Brussels sprouts - IB3	07/16/12	Gamma	<MDA	<MDA	**
Brussels sprouts - IB9	07/16/12	Gamma	<MDA	<MDA	<MDA
Cabbage - IB1	07/16/12	Gamma	<MDA	<MDA	**
Cabbage - IB4	07/16/12	Gamma	<MDA	<MDA	**
Cabbage - IB7	07/16/12	Gamma	<MDA	<MDA	<MDA
Collards - IB2	07/16/12	Gamma	<MDA	<MDA	<MDA
Collards - IB5	07/16/12	Gamma	<MDA	<MDA	**

TABLE C-2 - Continued

Results of Quality Assurance Program

Sample Type and Location ⁽²⁾	Sample Date	Type of Analysis	Original Analysis	Replicate Analysis	Split Analysis
Collards - IB8	07/16/12	Gamma	<MDA	<MDA	<MDA
Air Filter - A1	08/06/12	Gross Beta	2.3 +/- 0.1	2.3 +/- 0.1	**
Air Filter - A2	08/06/12	Gross Beta	2.2 +/- 0.1	2.3 +/- 0.1	**
Air Filter - A3	08/06/12	Gross Beta	2.1 +/- 0.1	2.2 +/- 0.1	**
Air Filter - A4	08/06/12	Gross Beta	2.6 +/- 0.1	2.5 +/- 0.1	**
Air Filter - A5	08/06/12	Gross Beta	2.5 +/- 0.1	2.3 +/- 0.1	**
Air Filter - SFA1	08/06/12	Gross Beta	2.1 +/- 0.1	2.4 +/- 0.1	**
Air Filter - SFA2	08/06/12	Gross Beta	2.1 +/- 0.1	2.1 +/- 0.1	**
Air Filter - SFA3	08/06/12	Gross Beta	2.3 +/- 0.2	2.3 +/- 0.1	**
Air Filter - SFA4	08/06/12	Gross Beta	2.1 +/- 0.1	2.3 +/- 0.1	**
Air Iodine - A4	08/13/12	I-131	<MDA	<MDA	**
Air Iodine - A5	08/13/12	I-131	<MDA	<MDA	**
Lake Trout - NORTH	08/23/12	Gamma	<MDA	<MDA	<MDA
Oysters - IA3	08/23/12	Gamma	<MDA	**	<MDA
Oysters - IA6 ¹	08/23/12	Cs-137	15.3 +/- 6.5	**	<MDA
Striped bass - IA5	08/23/12	Gamma	<MDA	<MDA	**
Air Filter - A1	09/10/12	Gross Beta	2.2 +/- 0.1	2.1 +/- 0.1	**
Air Filter - A2	09/10/12	Gross Beta	2.0 +/- 0.1	2.0 +/- 0.1	**
Air Filter - A3	09/10/12	Gross Beta	2.0 +/- 0.1	2.0 +/- 0.1	**
Air Filter - A4	09/10/12	Gross Beta	2.3 +/- 0.1	2.4 +/- 0.1	**
Air Filter - A5	09/10/12	Gross Beta	2.1 +/- 0.1	2.1 +/- 0.1	**
Air Filter - SFA1	09/10/12	Gross Beta	2.0 +/- 0.1	2.2 +/- 0.1	**
Air Filter - SFA2	09/10/12	Gross Beta	2.1 +/- 0.2	2.1 +/- 0.2	**
Air Filter - SFA3	09/10/12	Gross Beta	2.0 +/- 0.1	2.1 +/- 0.1	**
Air Filter - SFA4	09/10/12	Gross Beta	2.0 +/- 0.1	2.0 +/- 0.1	**
Air Iodine - A1	09/17/12	I-131	<MDA	<MDA	**
Air Iodine - A2	09/17/12	I-131	<MDA	<MDA	**
Air Filter - A1	10/15/12	Gross Beta	2.2 +/- 0.2	2.3 +/- 0.2	**
Air Filter - A2	10/15/12	Gross Beta	2.1 +/- 0.2	2.2 +/- 0.2	**
Air Filter - A3	10/15/12	Gross Beta	2.5 +/- 0.2	2.3 +/- 0.2	**
Air Filter - A4	10/15/12	Gross Beta	2.5 +/- 0.2	2.7 +/- 0.2	**
Air Filter - A5	10/15/12	Gross Beta	2.8 +/- 0.2	2.6 +/- 0.2	**

TABLE C-2 - Continued
Results of Quality Assurance Program

Sample Type and Location ⁽²⁾	Sample Date	Type of Analysis	Original Analysis	Replicate Analysis	Split Analysis
Air Filter - SFA1	10/15/12	Gross Beta	2.3 +/- 0.2	2.3 +/- 0.2	**
Air Filter - SFA2	10/15/12	Gross Beta	2.2 +/- 0.2	2.2 +/- 0.2	**
Air Filter - SFA3	10/15/12	Gross Beta	2.1 +/- 0.2	2.2 +/- 0.2	**
Air Filter - SFA4	10/15/12	Gross Beta	2.6 +/- 0.2	2.4 +/- 0.2	**
Oysters - IA3	10/25/12	Gamma	<MDA	<MDA	<MDA
Oysters - IA6	10/25/12	Gamma	<MDA	<MDA	<MDA
Rainbow Trout - NORTH	11/16/12	Gamma	<MDA	<MDA	<MDA
Air Filter - A1	11/19/12	Gross Beta	2.9 +/- 0.2	2.8 +/- 0.2	**
Air Filter - A2	11/19/12	Gross Beta	2.9 +/- 0.2	2.8 +/- 0.2	**
Air Filter - A3	11/19/12	Gross Beta	3.0 +/- 0.2	3.1 +/- 0.2	**
Air Filter - A4	11/19/12	Gross Beta	3.3 +/- 0.2	3.3 +/- 0.2	**
Air Filter - A5	11/19/12	Gross Beta	3.7 +/- 0.2	3.5 +/- 0.2	**
Air Filter - SFA1	11/19/12	Gross Beta	3.2 +/- 0.2	3.2 +/- 0.2	**
Air Filter - SFA2	11/19/12	Gross Beta	2.9 +/- 0.2	2.6 +/- 0.2	**
Air Filter - SFA3	11/19/12	Gross Beta	2.7 +/- 0.2	2.7 +/- 0.2	**
Air Filter - SFA4	11/19/12	Gross Beta	3.2 +/- 0.2	3.2 +/- 0.2	**
Air Iodine - A1	12/10/12	I-131	<MDA	<MDA	**
Air Iodine - A2	12/10/12	I-131	<MDA	<MDA	**
Air Iodine - A3	12/10/12	I-131	<MDA	<MDA	**
Bay Water - WA1	12/28/12	Gamma	<MDA	<MDA	<MDA
Bay Water - WA2	12/28/12	Gamma	<MDA	<MDA	<MDA
Air Iodine - A1	12/31/12	I-131	<MDA	<MDA	**
Air Iodine - A5	12/31/12	I-131	<MDA	<MDA	**

¹ See discussion at the beginning of the Appendix

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

APPENDIX D

Land Use Survey

Summary of Appendix D Content:

Appendix D contains the results of a Land Use Survey conducted around R.E. Ginna Nuclear Power Plant during this operating period. A discussion of the results is included in Section 3.4 of this report.

TABLE D-1

Land Use Survey Distances

Sector	Distance to Nearest Residence	Distance to Nearest Garden	Distance to Milk Producing Animals
E	1170 m	580 m Onsite Supplemental Garden	N/A
ESE	1660 m	390 m Onsite Garden	N/A
SE	840 m	N/A	8270 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 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).