

ATTACHMENT 4

**ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING
REPORT**

JANUARY 1, 2014 – DECEMBER 31, 2014



ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT: JANUARY 1, 2014 – DECEMBER 31, 2014

MAY 2015



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 and Analysis	3
3.2 Data Interpretation.....	3
3.3 Quality Assurance Program	3
3.4 Land Use Survey	4
3.5 Program Exceptions	5
3.6 Corrections to Previous Reports.....	5
4. RESULTS AND DISCUSSIONS	5
4.1 Aquatic Environment	5
4.1.a Surface and Drinking Water.....	5
4.1.b Aquatic Organisms	6
4.1.c Shoreline Sediment	6
4.2 Atmospheric Environment	7
4.2.a Air Iodine	7
4.2.b Air Particulate Filters	7
4.3 Terrestrial Environment	8
4.3.a Vegetation	8
4.3.b Milk	8
4.4 Direct Radiation	8
4.5 Groundwater.....	10
4.6 Summary and Conclusion	11
5. REFERENCES.....	11
Appendix A REMP Sample Locations	15
Appendix B REMP Analytical Results.....	24
Appendix C Quality Assurance Program	49
Appendix D Land Use Survey	60

LIST OF FIGURES

Figure	Title	Page
1	Hypothetical Maximum Direct Radiation Dose Exposure per Year	10
A-1	Map of New York State and Lake Ontario Showing Location of R.E. Ginna Nuclear Power Plant	20
A-2	Onsite Sample Locations.....	21
A-3	Offsite Sample Locations (TLDs and milk farms within 5 miles).....	22
A-4	Water Sample, Milk Farms and TLD Locations	23

LIST OF TABLES

Table	Title	Page
1	Synopsis of R.E. Ginna Nuclear Power Plant Radiological Environmental Monitoring Program.....	12
2	Annual Summary of Radioactivity in the Environs of the R.E. Ginna Nuclear Power Plant	13
A-1	Locations of Environmental Sampling Stations for the R.E. Ginna Nuclear Plant.....	17
B-1	Concentration of Tritium, Gamma Emitters and Gross Beta in Surface and Drinking Water...	26
B-2	Concentration of Gamma Emitters in the Flesh of Edible Fish	29
B-3	Concentration of Gamma Emitters in Sediment.....	30
B-4	Concentration of Iodine-131 in Filtered Air (Charcoal Cartridges).....	31
B-5	Concentration of Beta Emitters in Air Particulates – Onsite Samples	33
B-6	Concentration of Beta Emitters in Air Particulates - Offsite Samples	36
B-7	Concentration of Gamma Emitters in Air Particulates.....	38
B-8	Concentration of Gamma Emitters in Vegetation Samples.....	39
B-9	Concentration of Gamma Emitters (including I-131) in Milk	40
B-10	Typical MDA Ranges for Gamma Spectrometry.....	41
B-11	Typical LLDs for Gamma Spectrometry	42
B-12	Direct Radiation	43
B-13	Groundwater Monitoring Wells	46
C-1	Results of Participation in Cross Check Programs.....	51
C-2	Results of Quality Assurance Program	53
C-3	Teledyne Brown Engineering’s Typical MDAs for Gamma Spectrometry.....	59
D-1	Land Use Survey Distances.....	62

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, groundwater, and lakeshore sediment. The terrestrial pathways include airborne particulate and radioiodine, milk, food products, and direct radiation.

Results of the monitoring program for the 2014 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 verify that the effluent releases did not impact the environment with a measurable concentration of radioactive materials and/or levels of radiation that are higher than expected. The 2014 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 Exelon Generation, 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 2013 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, surface waters, groundwater, and lakeshore sediment. 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 Exelon personnel or its contractors in accordance with Ginna procedures (Ref. 3).

During 2014, 1337 samples were collected for analysis by gross beta counting and/or gamma spectroscopy. These included 84 surface water samples, 16 fish samples, 5 sediment samples, 617 air particulate samples, 310 air iodine samples, 32 vegetation samples, 38 milk samples, 71 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 2014. 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 Exelon Industrial Services 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 agree with the intercomparison laboratory results within the range of $\pm 2 \sigma$ between

the analytical values or are in agreement with the ranges established in the NRC Resolution Test Criteria.

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.

3.4 Land Use Survey

In September 2014, Ginna staff conducted a Land Use Survey to identify the location of the nearest milk animal, the nearest residence, and the nearest garden greater than 500 square feet in each of the nine sectors within a five-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-1.

Over the past year, the following land use observations were made within a 5-mile radius of the power plant:

- The nearest residence remains in the SSE sector, approximately 610 meters from the reactor.
- The Monroe County Water Authority (MCWA) completed construction of a new municipal water facility which began operation in 2014. The first composite supplemental REMP samples were collected from this facility in June 2014.
- Single-family home construction was observed south of the plant on Ontario Center Road between Brick Church Road and Kenyon Road.
- Other 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:

- Environmental air sample #4 was found on 3/3/14 with GFI tripped at time of weekly sample collection. Less sample volume than required to meet procedural LLD requirements was collected.
- Circulating water outlet compositor was found failed in high flow from 5/5/14 through 5/19/14 requiring compensatory grab samples every two hours during period compositor was out of service. All sample requirements were met.
- Moisture was found in environmental sample station #2 charcoal filter for the sample period of 6/9/14 through 6/16/14, resulting in no sample result for airborne radioiodine at this sample station for this period.

3.6 Corrections to Previous Reports

The 2013 Land Use Census listed Eaton milk farm as in the South East sector at 8270 meters. The Eaton milk farm is actually in the East South East sector at 8240 meters.

4. RESULTS AND DISCUSSIONS

All environmental samples collected during the year were analyzed in accordance with Exelon 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 five 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, Lake Ontario fish, 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 an upstream control location (Monroe County Water Authority - Shoremont) and a downstream indicator location (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 2014, the gross beta averages for the upstream Lake Ontario monitoring locations (controls) and downstream Lake Ontario monitoring locations (indicators) were 4.34 pCi/Liter and 2.83 pCi/Liter, respectively. Gross beta analysis of the monthly composite samples showed no statistically significant difference in activity between the control and indicator locations that would indicate plant related activity higher than background.

The average gross beta concentration seen in the Mill Creek samples (control) and the Deer Creek samples were 4.48 pCi/Liter and 4.54 pCi/Liter, respectively.

Gamma isotopic analysis is performed on each monthly composite sample. These are listed in Table B-1 and are separated by source of sample. During 2014, no sample results indicated detection of Gamma 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 2014, no surface water or drinking water sample results indicated detectable 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 edible 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 Chemistry personnel and are analyzed by gamma spectroscopy after being held for periods typically less than two weeks 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 2014, 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. During 2014, 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 180 to 440 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 770 meters, and two others offsite at approximately seven miles. In addition, there are three sampling stations located approximately seven 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 0.022 pCi/m³ and the averages for the indicator samples (i.e., onsite sampling locations) was 0.022 pCi/m³ for the period of January to December 2014. Maximum weekly concentrations for all control stations and all indicator stations were 0.039 pCi/m³ 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 10 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 2014. 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.

During 2014, 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. 41 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 three 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 15.8 mRem during 2014. All onsite indicators averaged 12.2 mRem/qtr.

For the year of 2014, the average, minimum, and maximum exposure readings was as follows:

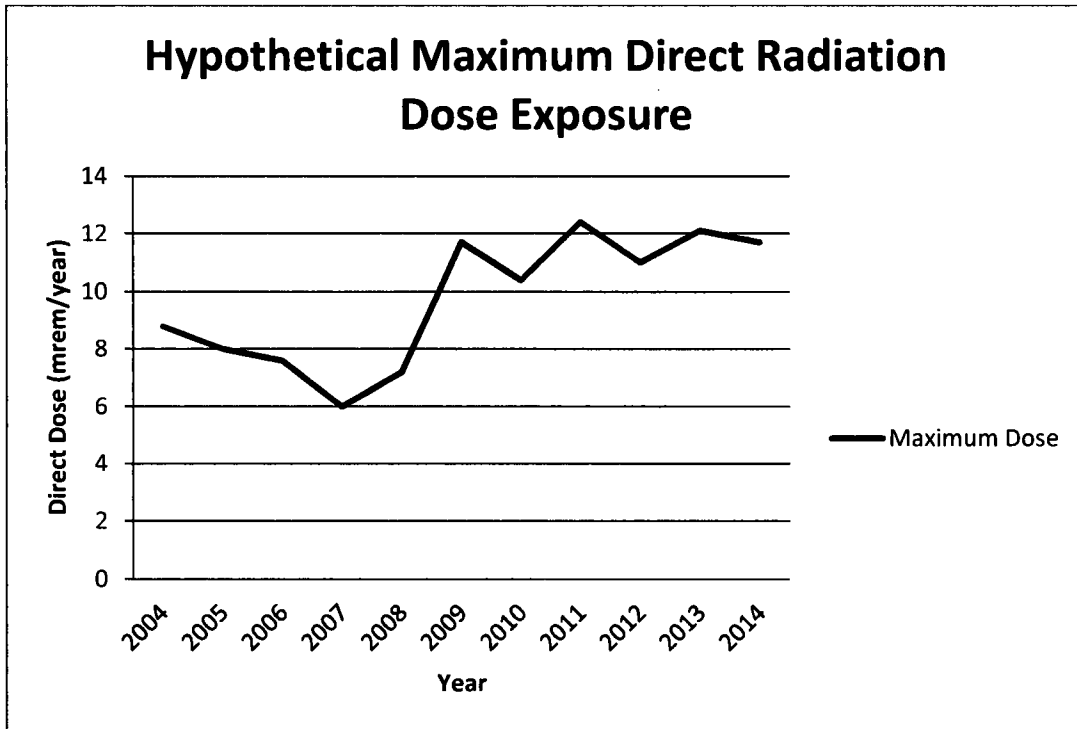
<u>Monitoring Group</u>	<u>Average</u> <u>(mrem/qtr)</u>	<u>Min.</u> <u>(mrem/qtr)</u>	<u>Max</u> <u>(mrem/qtr)</u>
Onsite Indicators	12.2	7.9	17.0
Site Boundary Indicators	12.2	8.0	14.8
Offsite Indicators	11.4	8.1	14.3
Control Locations	10.8	7.6	12.7

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 10.8 millirems monthly or 43.2 millirem annually), while the highest total annual dosimeter reading at an individual site boundary environmental monitoring location (54.9 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 2014 was determined to be 11.7 millirem by subtraction of average background from the maximum annual indicator site.

Figure 1 presents the hypothetical maximum direct radiation dose exposure over the past 10 years. As noted in the 2011 Annual Radiological Environmental Operating Report (AREOR), an apparent upward trend with the reported average annual direct radiation dose was identified. It was noted that the average annual direct dose to an offsite member of the public had increased 2 – 3 mRem since 2008 (Condition Report CR-2012-001275). Ginna staff evaluated this apparent trend and concluded the elevated dosimeter readings were likely the result of increased onsite hold times after the dosimeters had been collected. In an effort to reduce onsite hold times, Ginna changed its process for collecting and shipping dosimeters beginning in third quarter 2014.

Figure 1

Hypothetical Maximum Direct Radiation Dose Exposure per Year



4.5 Groundwater

In accordance with R.E. Ginna Nuclear Power Plant's Chemistry procedures, at a minimum, environmental groundwater monitoring wells are sampled quarterly. During 2013, five new groundwater monitoring wells were installed. In 2014, Ginna staff collected and analyzed samples collected from a total of 14 groundwater monitoring wells:

- 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')
- GW12: West of Orchard Access Road
- GW13: North of Independent Spent Fuel Storage Installation (ISFSI)
- GW14: South of Canister Preparation Building
- GW15: West of Manor House
- GW16: Southeast of Manor House

Groundwater samples are analyzed for tritium to a detection limit of 500 pCi/L, and for gamma emitting radionuclides to the environmental LLDs. The analytical results for groundwater monitoring well samples collected during 2014 are presented in table B-13.

No positive tritium results were identified in any of the groundwater monitoring wells during 2014.

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 2014 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 (ODCM), Revision 29 (Effective Date: 06/27/2014).
2. R.E. Ginna Nuclear Power Plant, Technical Specification 5.6.2; Annual Radiological Environmental Operating Report.
3. Procedure CY-AA-170-100, Radiological Environmental Monitoring Program.
4. Procedure CH-ENV-LAND-USE, Land Use Census; Completed September 2014.
5. Exelon Industrial Services – Ft. Smallwood Environmental Laboratory Procedures Manual, General Services Department.

Table 1

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

Sample Type	Sampling Frequency ¹	Number of Locations	Number Collected	Analysis	Analysis Frequency ¹	Number Analyzed
Aquatic Environment						
Surface & Drinking Water	M/C	7	84	Gamma Gross Beta Tritium	MC/MG	84
			84		MC/MG	84
			84		M/Q	84
Fish ²	A	4	16	Gamma	A	16
Shoreline Sediment	SA	3	5	Gamma	SA	5
Groundwater	M/Q	14	71	Tritium	M/Q	71
			71	Gamma	M/Q	71
Atmospheric Environment						
Air Iodine ³	W	6	310	I-131	W	310
Air Particulates ⁴	W	12	617	Gross Beta Gamma	W	617
			48		QC	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	M	6	32	Gamma	M	32

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
R.E. 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 (84) Tritium (84)	2.3 (Cs-137) 500	-- (0/52) -- (0/52)	OWD 2.22km ENE	(13/13) (--)	-- (25/25) --
Surface & Drinking Water, (pCi/L)	Gross Beta (84)	0.5	2.83 (52/52) (1.41 - 6.98)	MCWA, Greece – 27.20 km W	4.21 (13/13) (3.14 – 5.01)	4.34 (25/25) (2.72 - 13.18)
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 (71) Gamma (71)	500 18 (Cs-137)	-- (67/67) -- (67/67)	-- --	-- (12/12) -- (12/12)	-- (4/4) -- (4/4)
Direct Radiation						
Ambient Radiation (mR/91 days)	Dosimeters (164)	--	11.8 (128/128) (7.9-17.0)	Env. Station 13 0.77km SSW	15.8 (4/4) (13.8-17.0)	10.8 (36/36) (7.6-12.7)

Table 2

**Annual Summary of Radioactivity in the Environs of the
R.E. 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 (310)	0.15	-- (258/258) (--)	--	-- (52/52) (--)	-- (52/52) (--)
Air Particulates (10 ⁻² pCi/m ³)	Gross Beta (617)	0.5	2.2 (461/461) (0.9 – 4.4)	Env. Station 5 - 0.18 km SSE	2.3 (51/51) (1.2 – 3.4)	2.3 (156/156) (1.0 – 3.9)
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 (32)	27 (Cs-137)	-- (23/23) --	--	-- (9/9) --	--(9/9) --

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 Ginna are 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 R.E Ginna Nuclear Power Plant ...	17

Figure	Title	Page
A-1	Map of New York State and Lake Ontario Showing Location of R.E. Ginna Nuclear Power Plant	20
A-2	Onsite Sample Locations	21
A-3	Offsite Sample Locations (TLDs and milk farms within 5 miles)	22
A-4	Water Sample, Milk Farms and TLD Locations	23

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	770	0.47	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		Direction
		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 various produce are collected from gardens grown on company property and purchased from farms >10 miles from the plant.				
Station	Description	Distance		Direction
		Meters	Miles	Sector
	Onsite Supplemental Garden (E)	610	0.38	E
	Onsite Supplemental Garden (ESE)	430	0.27	ESE
	Onsite Supplemental Garden (SSE)	660	0.41	SSE
Water				
	Shoremont/MCWA	27150	16.9	W
	Ontario Water District	2220	1.4	ENE
	Circ Water Intake	1070	0.7	N
	Circ Water Discharge	110	0.1	NNE
	Deer Creek	Points downstream of Outfall 006	Points downstream of Outfall 006	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)	8240	5.1	ESE
	Schultz Farm, S. Sodus (Control)	19030	11.8	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

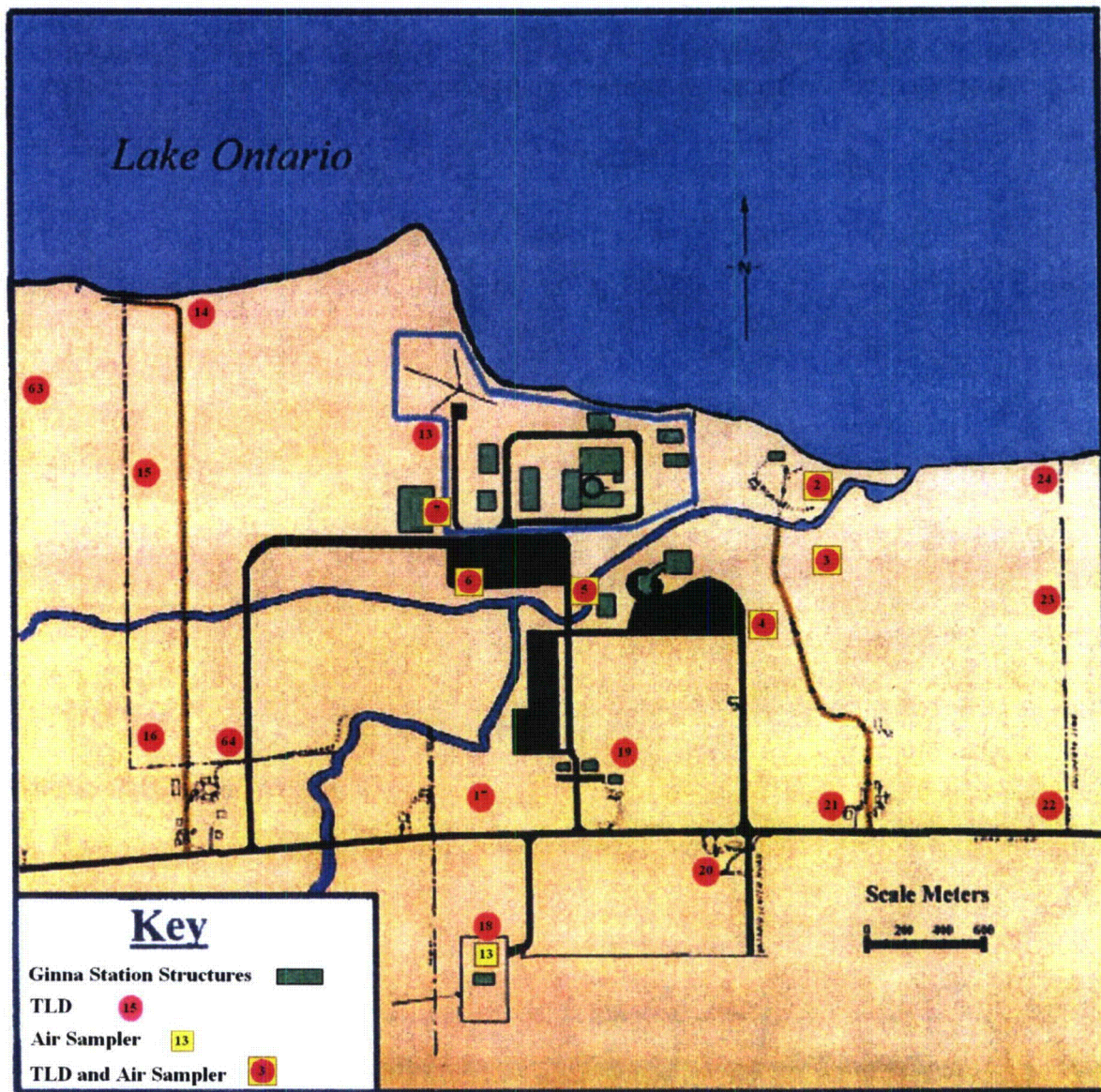


Figure A-3

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

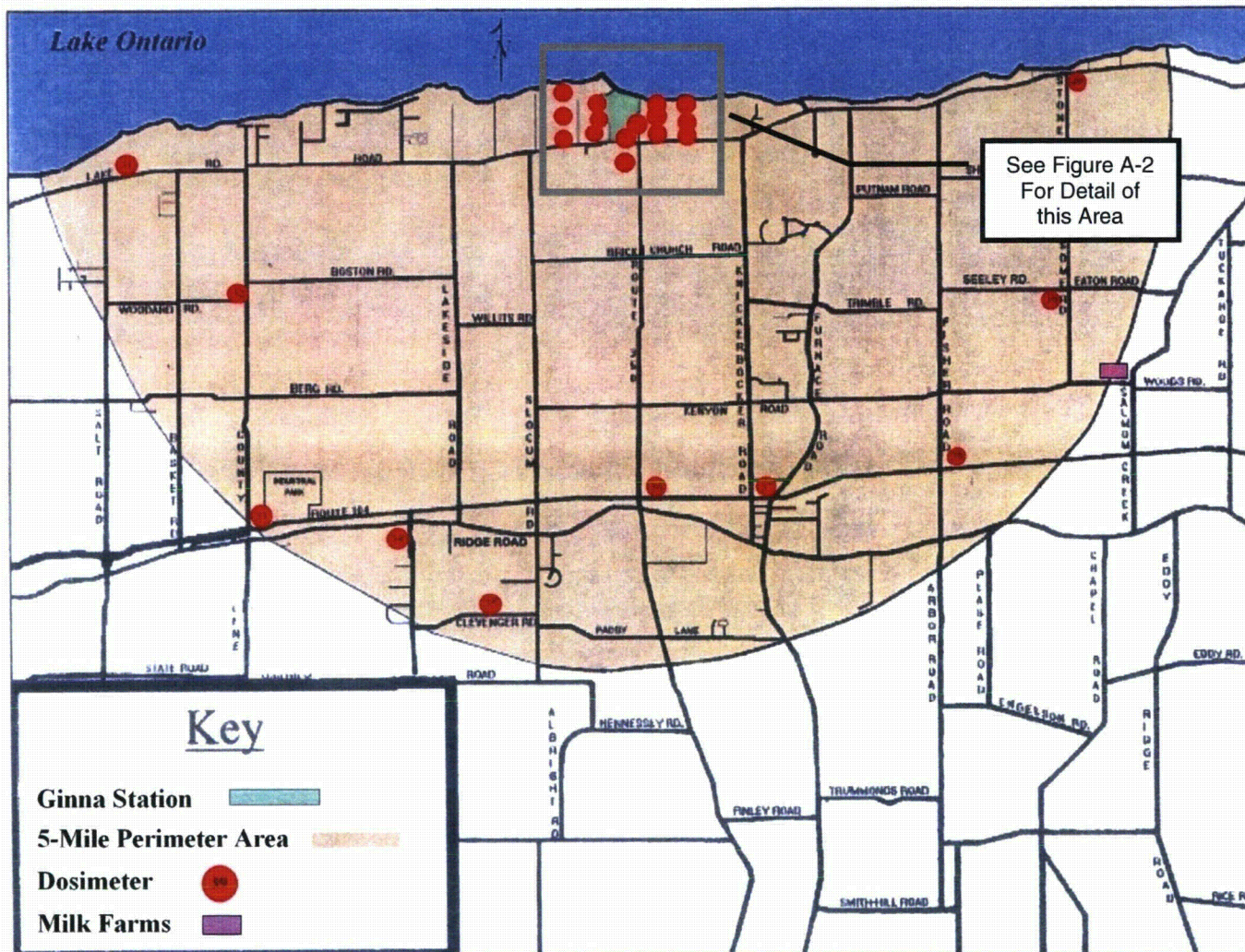
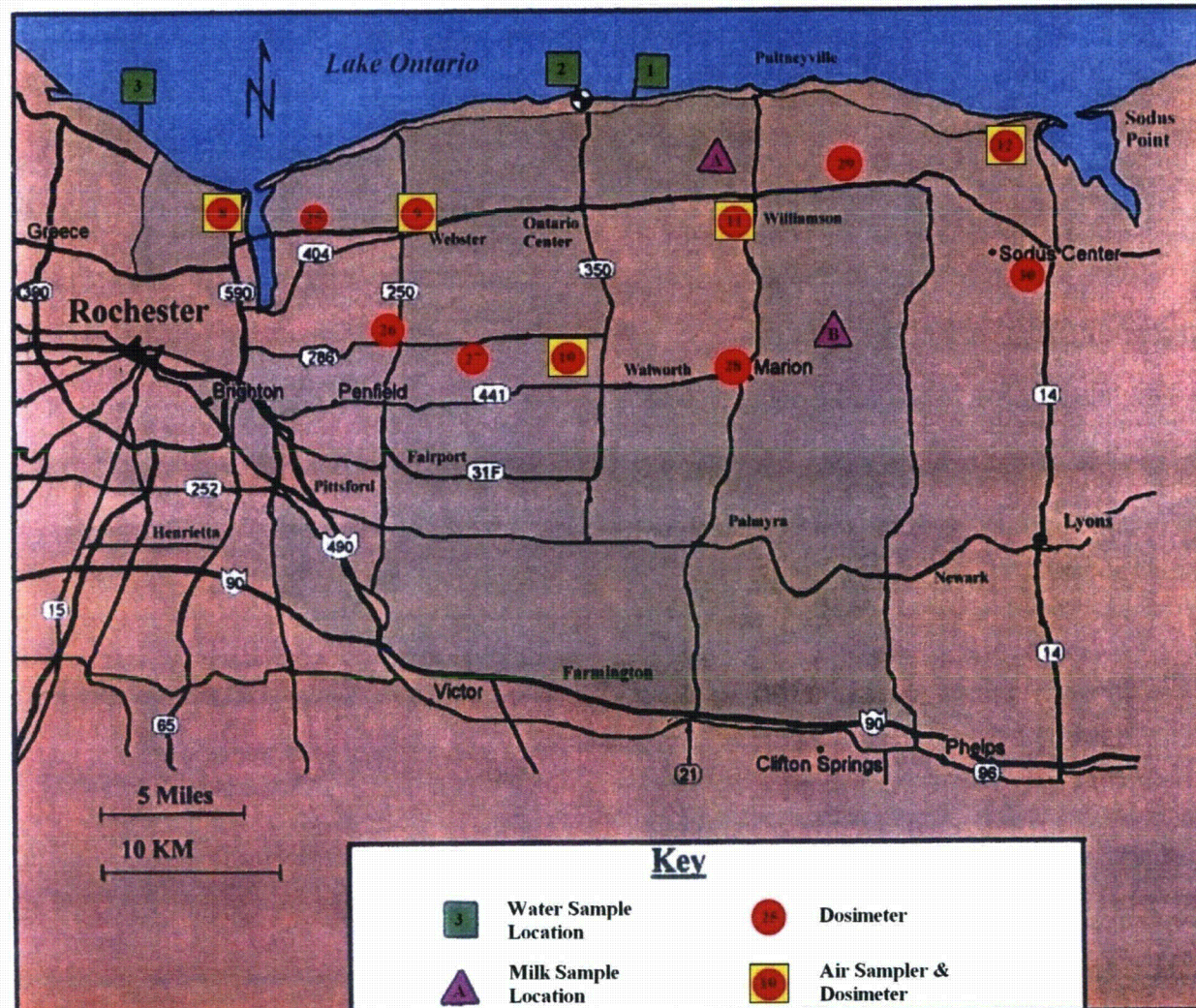


Figure A-4
Water Sample, Milk Farms and TLD Locations



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...	26
B-2	Concentration of Gamma Emitters in the Flesh of Edible Fish	29
B-3	Concentration of Gamma Emitters in Sediment.....	30
B-4	Concentration of Iodine-131 in Filtered Air (Charcoal Cartridges).....	31
B-5	Concentration of Beta Emitters in Air Particulates – Onsite Samples	33
B-6	Concentration of Beta Emitters in Air Particulates - Offsite Samples	36
B-7	Concentration of Gamma Emitters in Air Particulates.....	38
B-8	Concentration of Gamma Emitters in Vegetation Samples.....	39
B-9	Concentration of Gamma Emitters (including I-131) in Milk	40
B-10	Typical MDA Ranges for GammaSpectrometry.....	41
B-11	Typical LLDs for Gamma Spectrometry	42
B-12	Direct Radiation	43
B-13	Groundwater Monitoring Wells	46

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	Cs-137	Gamma Emitters	Gross Beta
<hr/>				
CIRC-IN				
Circulating Water				
Inlet - N	1/13/2014		*	2.26 +/- 0.57
	2/10/2014		*	2.22 +/- 0.57
	3/10/2014		*	2.30 +/- 0.58
	4/7/2014		*	2.02 +/- 0.59
	5/5/2014		*	2.34 +/- 0.60
	6/2/2014		*	2.08 +/- 0.58
	6/30/2014		*	1.65 +/- 0.58
	7/28/2014		*	2.61 +/- 0.06
	8/25/2014		*	2.88 +/- 0.61
	9/22/2014		*	2.82 +/- 0.62
	10/20/2014		*	1.68 +/- 0.55
	11/17/2014		*	2.97 +/- 1.39
	12/15/2014		*	2.42 +/- 1.45
CIRC-OUT				
Circulating Water				
Outlet - N	1/13/2014		*	2.17 +/- 0.56
	2/10/2014		*	3.86 +/- 0.63
	3/10/2014		*	2.19 +/- 0.59
	4/7/2014		*	2.19 +/- 0.62
	5/5/2014		*	2.01 +/- 0.58
	6/2/2014		*	2.14 +/- 0.56
	6/30/2014		*	1.41 +/- 0.57
	7/28/2014		*	2.63 +/- 0.61
	8/25/2014		*	2.48 +/- 0.60
	9/22/2014		*	2.08 +/- 0.57
	10/20/2014		*	1.57 +/- 0.55
	11/17/2014		*	3.92 +/- 1.51
	12/15/2014		*	1.88 +/- 1.41
DC				
Deer Creek - ESE	1/13/2014		*	3.39 +/- 0.69
	2/10/2014		*	3.85 +/- 0.84
	3/10/2014		*	3.52 +/- 0.70
	4/7/2014		*	3.53 +/- 0.80
	5/5/2014		*	4.28 +/- 0.79
	6/2/2014		*	3.15 +/- 0.77
	6/30/2014		*	6.16 +/- 0.81
	7/28/2014		*	4.25 +/- 0.88
	8/25/2014		*	4.60 +/- 0.96
	9/22/2014		*	4.90 +/- 0.88
	10/20/2014		*	6.98 +/- 2.27
	11/17/2014		*	5.86 +/- 2.32
	12/15/2014			

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	Cs-137	Gamma Emitters	Gross Beta
MCWA Monroe County Water/Shoremont, Greece – W ¹	1/13/2014		*	4.08 +/- 0.46
	2/10/2014		*	5.01 +/- 0.51
	3/10/2014		*	4.05 +/- 0.46
	4/7/2014		*	4.39 +/- 0.48
	5/5/2014		*	4.81 +/- 0.51
	6/2/2014		*	4.36 +/- 0.47
	6/30/2014		*	3.85 +/- 0.44
	7/28/2014		*	4.21 +/- 0.05
	8/25/2014		*	4.18 +/- 0.46
	9/22/2014		*	4.52 +/- 0.48
	10/20/2014		*	3.68 +/- 0.43
	11/17/2014		*	4.39 +/- 1.78
	12/15/2014		*	3.14 +/- 1.53
ML Mill Creek – SW ¹	1/13/2014		*	3.33 +/- 0.71
	2/10/2014		*	4.33 +/- 0.85
	3/10/2014		*	2.72 +/- 0.65
	4/7/2014		*	2.86 +/- 0.72
	5/5/2014		*	3.04 +/- 0.71
	6/2/2014		*	2.87 +/- 0.73
	6/30/2014		*	13.18 +/- 1.08
	7/28/2014		*	3.51 +/- 0.80
	8/25/2014		*	3.81 +/- 0.82
	9/22/2014		*	4.11 +/- 0.75
	10/20/2014		*	5.16 +/- 2.09
	11/17/2014		*	4.79 +/- 2.13
W Webster (Supplemental)	6/30/2014		*	4.24 +/- 0.46
	7/28/2014		*	4.31 +/- 0.05
	8/25/2014		*	3.86 +/- 0.45
	9/22/2014		*	4.73 +/- 0.50
	10/20/2014		*	4.26 +/- 0.46
	11/17/2014		*	2.87 +/- 1.42
	12/15/2014		*	2.87 +/- 1.50

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	Cs-137	Gamma Emitters	Gross Beta
<hr/>				
OWD				
Ontario Water				
District - NE	1/13/2014		*	2.44 +/- 0.57
	2/10/2014		*	3.81 +/- 0.62
	3/10/2014		*	1.79 +/- 0.56
	4/7/2014		*	2.08 +/- 0.59
	5/5/2014		*	2.31 +/- 0.59
	6/2/2014		*	1.85 +/- 0.56
	6/30/2014		*	1.47 +/- 0.57
	7/28/2014		*	1.74 +/- 0.06
	8/25/2014		*	1.84 +/- 0.56
	9/22/2014		*	2.03 +/- 0.58
	10/20/2014		*	1.73 +/- 0.56
	11/17/2014		*	2.92 +/- 1.42
	12/15/2014		*	3.09 +/- 1.51

¹ Control Location

* No Man-Made Gamma Emitters or Tritium 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
CONTROL ¹ Local Sites in Control Sectors	5/14/2014	Brown Bullhead	*
	5/14/2014	Carp	*
	5/14/2014	Largemouth Bass	*
	5/14/2014	Perch	*
EAST East Sector	10/21/2014	Chinook Salmon	*
Greece ¹ Control	9/29/2014	Brown Trout	*
	9/29/2014	Lake Trout	
	9/29/2014	Rainbow Trout	
	9/29/2014	Smallmouth Bass	
NORTH North Sector	2/7/2014	Brown Trout	*
	2/7/2014	Rainbow Trout	*
	2/7/2014	White Bass	*
	5/22/2014	Smallmouth Bass	*
	11/4/2014	Lake Trout	*
	11/7/2014	Freshwater Drum	*
	11/7/2014	White Bass	*

¹ Control Locations include Greece, NY and Irondequoit, NY.

* No Man-Made Gamma Emitters 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	4/21/2014	*
	8/11/2014	*
GREECE ¹		
Control	4/21/2014	*
	8/11/2014	*
NORTH		
North Sector	4/18/2014	*

¹ Control Location

* No Man-Made Gamma Emitters 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
12/30/2013	1/6/2014	*	*	*	*	*	*
1/6/2014	1/13/2014	*	*	*	*	*	*
1/13/2014	1/20/2014	*	*	*	*	*	*
1/20/2014	1/27/2014	*	*	*	*	*	*
1/27/2014	2/3/2014	*	*	*	*	*	*
2/3/2014	2/10/2014	*	*	*	*	*	*
2/10/2014	2/17/2014	*	*	*	*	*	*
2/17/2014	2/24/2014	*	*	*	*	*	*
2/24/2014	3/3/2014	*	2	*	*	*	*
3/3/2014	3/10/2014	*	*	*	*	*	*
3/10/2014	3/17/2014	*	*	*	*	*	*
3/17/2014	3/24/2014	*	*	*	*	*	*
3/24/2014	3/31/2014	*	*	*	*	*	*
3/31/2014	4/7/2014	*	*	*	*	*	*
4/7/2014	4/14/2014	*	*	*	*	*	*
4/14/2014	4/21/2014	*	*	*	*	*	*
4/21/2014	4/28/2014	*	*	*	*	*	*
4/28/2014	5/5/2014	*	*	*	*	*	*
5/5/2014	5/12/2014	*	*	*	*	*	*
5/12/2014	5/19/2014	*	*	*	*	*	*
5/19/2014	5/26/2014	*	*	*	*	*	*
5/26/2014	6/2/2014	*	*	*	*	*	*
6/2/2014	6/9/2014	*	*	*	*	*	*
6/9/2014	6/16/2014	3	*	*	*	*	*
6/16/2014	6/23/2014	*	*	*	*	*	*
6/23/2014	6/30/2014	*	*	*	*	*	*
6/30/2014	7/7/2014	*	*	*	*	*	*
7/7/2014	7/14/2014	*	*	*	*	*	*
7/14/2014	7/21/2014	*	*	*	*	*	*
7/21/2014	7/28/2014	*	*	*	*	*	*
7/28/2014	8/4/2014	*	*	*	*	*	*
8/4/2014	8/11/2014	*	*	*	*	*	*
8/11/2014	8/18/2014	*	*	*	*	*	*
8/18/2014	8/25/2014	*	*	*	*	*	*
8/25/2014	9/1/2014	*	*	*	*	*	*
9/1/2014	9/8/2014	*	*	*	*	*	*
9/8/2014	9/15/2014	*	*	*	*	*	*
9/15/2014	9/22/2014	*	*	*	*	*	*

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
9/22/2014	9/29/2014	*	*	*	*	*	*
9/29/2014	10/6/2014	*	*	*	*	*	*
10/6/2014	10/13/2014	*	*	*	*	*	*
10/13/2014	10/20/2014	*	*	*	*	*	*
10/20/2014	10/27/2014	*	*	*	*	*	*
10/27/2014	11/3/2014	*	*	*	*	*	*
11/3/2014	11/10/2014	*	*	*	*	*	*
11/10/2014	11/17/2014	*	*	*	*	*	*
11/17/2014	11/24/2014	*	*	*	*	*	*
11/24/2014	12/1/2014	*	*	*	*	*	*
12/1/2014	12/8/2014	*	*	*	*	*	*
12/8/2014	12/15/2014	*	*	*	*	*	*
12/15/2014	12/22/2014	*	*	*	*	*	*
12/22/2014	12/29/2014	*	*	*	*	*	*

¹ Control Location

* I-131 not detected.

² GFI Tripped. Collected sample did not meet LLD.

³ Wet filter sample was not analyzed.

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
12/30/2013	1/6/2014	2.2 +/- 0.1	2.0 +/- 0.1	2.2 +/- 0.1	2.1 +/- 0.1	2.0 +/- 0.1	2.0 +/- 0.1	2.3 +/- 0.1
1/6/2014	1/13/2014	2.5 +/- 0.2	2.5 +/- 0.2	2.7 +/- 0.2	2.3 +/- 0.2	2.5 +/- 0.2	2.7 +/- 0.2	2.7 +/- 0.2
1/13/2014	1/20/2014	2.5 +/- 0.1	2.6 +/- 0.1	2.3 +/- 0.2	2.6 +/- 0.1	2.7 +/- 0.1	2.8 +/- 0.1	2.6 +/- 0.1
1/20/2014	1/27/2014	1.9 +/- 0.1	2.0 +/- 0.1	2.0 +/- 0.1	1.9 +/- 0.1	2.1 +/- 0.1	1.9 +/- 0.1	1.9 +/- 0.1
1/27/2014	2/3/2014	2.5 +/- 0.1	2.4 +/- 0.1	2.3 +/- 0.1	2.5 +/- 0.1	2.5 +/- 0.1	2.2 +/- 0.1	2.6 +/- 0.1
2/3/2014	2/10/2014	2.6 +/- 0.1	2.5 +/- 0.1	2.6 +/- 0.1	2.5 +/- 0.1	2.7 +/- 0.3	2.7 +/- 0.1	2.7 +/- 0.1
2/10/2014	2/17/2014	2.9 +/- 0.1	2.8 +/- 0.1	2.8 +/- 0.2	2.8 +/- 0.1	3.0 +/- 0.1	2.7 +/- 0.1	2.8 +/- 0.1
2/17/2014	2/24/2014	2.1 +/- 0.1	2.0 +/- 0.1	2.1 +/- 0.1	1.9 +/- 0.1	2.1 +/- 0.1	2.1 +/- 0.1	2.1 +/- 0.1
2/24/2014	3/3/2014	3.2 +/- 0.2	3.3 +/- 0.1	1	3.3 +/- 0.2	3.3 +/- 0.1	3.3 +/- 0.1	3.4 +/- 0.2
3/3/2014	3/10/2014	2.7 +/- 0.1	2.5 +/- 0.1	2.7 +/- 0.2	2.5 +/- 0.1	2.7 +/- 0.1	2.6 +/- 0.1	2.7 +/- 0.1
3/10/2014	3/17/2014	3.2 +/- 0.3	2.3 +/- 0.1	2.4 +/- 0.1	2.4 +/- 0.1	3.7 +/- 0.4	2.4 +/- 0.1	2.1 +/- 0.1
3/17/2014	3/24/2014	1.7 +/- 0.1	1.6 +/- 0.1	1.8 +/- 0.1	1.6 +/- 0.1	1.9 +/- 0.1	1.8 +/- 0.1	1.9 +/- 0.1
3/24/2014	3/31/2014	2.4 +/- 0.1	2.6 +/- 0.1	2.5 +/- 0.1	2.5 +/- 0.1	2.7 +/- 0.2	2.7 +/- 0.1	2.5 +/- 0.1
3/31/2014	4/7/2014	1.9 +/- 0.1	1.9 +/- 0.1	1.9 +/- 0.1	1.9 +/- 0.1	1.9 +/- 0.1	1.8 +/- 0.1	1.8 +/- 0.1
4/7/2014	4/14/2014	2.4 +/- 0.1	2.2 +/- 0.1	2.5 +/- 0.2	2.3 +/- 0.1	1.9 +/- 0.1	2.3 +/- 0.1	2.2 +/- 0.1
4/14/2014	4/21/2014	2.4 +/- 0.1	2.3 +/- 0.1	2.5 +/- 0.1	2.3 +/- 0.1	2.5 +/- 0.1	2.5 +/- 0.1	2.7 +/- 0.1
4/21/2014	4/28/2014	2.6 +/- 0.1	2.3 +/- 0.1	2.6 +/- 0.1	2.9 +/- 0.2	2.4 +/- 0.1	2.5 +/- 0.1	2.1 +/- 0.1
4/28/2014	5/5/2014	1.0 +/- 0.1	1.0 +/- 0.1	1.1 +/- 0.1	1.2 +/- 0.2	0.9 +/- 0.1	1.0 +/- 0.1	1.0 +/- 0.1
5/5/2014	5/12/2014	2.2 +/- 0.1	2.2 +/- 0.1	2.2 +/- 0.1	2.4 +/- 0.3	2.4 +/- 0.1	2.3 +/- 0.1	2.5 +/- 0.1
5/12/2014	5/19/2014	1.6 +/- 0.1	1.6 +/- 0.1	1.6 +/- 0.1	1.8 +/- 0.2	1.4 +/- 0.1	1.5 +/- 0.1	1.6 +/- 0.1
5/19/2014	5/26/2014	2.0 +/- 0.1	2.9 +/- 0.2	2.3 +/- 0.1	2.5 +/- 0.2	2.2 +/- 0.1	2.3 +/- 0.1	2.1 +/- 0.1
5/26/2014	6/2/2014	1.4 +/- 0.1	2.0 +/- 0.2	1.6 +/- 0.1	1.9 +/- 0.2	1.4 +/- 0.1	1.5 +/- 0.1	1.7 +/- 0.1
6/2/2014	6/9/2014	1.5 +/- 0.1	1.4 +/- 0.1	1.5 +/- 0.1	1.7 +/- 0.2	1.5 +/- 0.1	1.4 +/- 0.1	1.5 +/- 0.1

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
6/16/2014	6/23/2014	1.6 +/- 0.1	1.4 +/- 0.1	2.2 +/- 0.3	1.8 +/- 0.2	1.5 +/- 0.1	1.5 +/- 0.1	1.7 +/- 0.1
6/23/2014	6/30/2014	2.4 +/- 0.3	2.1 +/- 0.1	2.2 +/- 0.1	2.4 +/- 0.2	2.0 +/- 0.1	2.1 +/- 0.1	2.3 +/- 0.2
6/30/2014	7/7/2014	1.9 +/- 0.1	2.0 +/- 0.1	2.1 +/- 0.1	2.2 +/- 0.2	1.8 +/- 0.1	2.0 +/- 0.2	2.3 +/- 0.2
7/7/2014	7/14/2014	1.5 +/- 0.1	2.1 +/- 0.1	2.0 +/- 0.1	2.4 +/- 0.2	1.9 +/- 0.1	2.3 +/- 0.2	2.1 +/- 0.1
7/14/2014	7/21/2014	1.8 +/- 0.3	2.0 +/- 0.1	1.8 +/- 0.1	2.0 +/- 0.2	1.9 +/- 0.1	1.9 +/- 0.1	2.2 +/- 0.2
7/21/2014	7/28/2014	2.5 +/- 0.1	2.7 +/- 0.1	2.3 +/- 0.1	2.5 +/- 0.2	2.3 +/- 0.1	2.5 +/- 0.2	2.4 +/- 0.2
7/28/2014	8/4/2014	2.0 +/- 0.1	2.3 +/- 0.1	2.2 +/- 0.1	2.4 +/- 0.2	2.2 +/- 0.1	2.4 +/- 0.1	2.9 +/- 0.2
8/4/2014	8/11/2014	2.1 +/- 0.1	2.2 +/- 0.1	2.0 +/- 0.1	2.6 +/- 0.2	2.2 +/- 0.1	2.1 +/- 0.2	2.2 +/- 0.2
8/11/2014	8/18/2014	1.4 +/- 0.1	1.5 +/- 0.1	1.5 +/- 0.1	1.7 +/- 0.2	1.4 +/- 0.1	1.7 +/- 0.1	1.3 +/- 0.1
8/18/2014	8/25/2014	2.2 +/- 0.1	2.4 +/- 0.1	2.2 +/- 0.1	2.6 +/- 0.2	2.2 +/- 0.1	2.4 +/- 0.2	2.9 +/- 0.2
8/25/2014	9/1/2014	3.1 +/- 0.2	2.3 +/- 0.1	2.3 +/- 0.2	2.4 +/- 0.2	2.1 +/- 0.1	2.3 +/- 0.1	2.6 +/- 0.1
9/1/2014	9/8/2014	2.7 +/- 0.2	2.9 +/- 0.2	2.8 +/- 0.2	3.4 +/- 0.3	2.6 +/- 0.2	3.2 +/- 0.2	3.0 +/- 0.2
9/8/2014	9/15/2014	1.3 +/- 0.1	1.5 +/- 0.1	1.3 +/- 0.1	1.4 +/- 0.2	1.3 +/- 0.1	1.5 +/- 0.1	1.6 +/- 0.1
9/15/2014	9/22/2014	2.5 +/- 0.1	2.9 +/- 0.1	2.6 +/- 0.1	2.7 +/- 0.2	2.4 +/- 0.1	2.7 +/- 0.2	2.7 +/- 0.2
9/22/2014	9/29/2014	3.0 +/- 0.1	3.3 +/- 0.1	2.9 +/- 0.1	3.4 +/- 0.2	3.2 +/- 0.1	3.4 +/- 0.2	3.9 +/- 0.2
9/29/2014	10/6/2014	2.5 +/- 0.2	2.8 +/- 0.2	2.7 +/- 0.2	2.9 +/- 0.2	2.6 +/- 0.2	2.9 +/- 0.2	2.8 +/- 0.2
10/6/2014	10/13/2014	1.8 +/- 0.1	1.9 +/- 0.1	1.9 +/- 0.1	2.0 +/- 0.2	1.9 +/- 0.1	1.9 +/- 0.1	1.9 +/- 0.1
10/13/2014	10/20/2014	1.6 +/- 0.1	1.9 +/- 0.1	1.8 +/- 0.1	1.9 +/- 0.2	1.9 +/- 0.1	1.8 +/- 0.1	1.9 +/- 0.1
10/20/2014	10/27/2014	1.8 +/- 0.2	2.0 +/- 0.1	2.0 +/- 0.1	2.3 +/- 0.2	2.0 +/- 0.1	2.1 +/- 0.1	2.2 +/- 0.1
10/27/2014	11/3/2014	2.2 +/- 0.1	1.9 +/- 0.1	1.9 +/- 0.1	2.2 +/- 0.2	1.8 +/- 0.1	2.2 +/- 0.1	2.5 +/- 0.1
11/3/2014	11/10/2014	2.0 +/- 0.1	2.2 +/- 0.1	2.0 +/- 0.1	2.1 +/- 0.2	2.4 +/- 0.1	2.1 +/- 0.1	2.3 +/- 0.1
11/10/2014	11/17/2014	2.0 +/- 0.1	2.0 +/- 0.1	2.0 +/- 0.1	2.2 +/- 0.2	1.8 +/- 0.1	2.1 +/- 0.1	2.1 +/- 0.1
11/17/2014	11/24/2014	2.6 +/- 0.1	2.6 +/- 0.1	2.3 +/- 0.1	2.7 +/- 0.2	2.5 +/- 0.1	2.5 +/- 0.1	2.7 +/- 0.1
11/24/2014	12/1/2014	2.1 +/- 0.1	2.2 +/- 0.1	2.1 +/- 0.1	2.3 +/- 0.2	2.1 +/- 0.1	2.1 +/- 0.1	2.2 +/- 0.1

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
12/1/2014	12/8/2014	2.6 +/- 0.1	2.7 +/- 0.1	2.6 +/- 0.1	2.7 +/- 0.2	2.6 +/- 0.1	2.6 +/- 0.1	2.8 +/- 0.1
12/8/2014	12/15/2014	2.1 +/- 0.1	2.3 +/- 0.1	2.1 +/- 0.1	2.2 +/- 0.2	2.2 +/- 0.1	2.3 +/- 0.1	2.3 +/- 0.1
12/15/2014	12/22/2014	1.8 +/- 0.1	1.9 +/- 0.1	1.9 +/- 0.1	2.0 +/- 0.2	1.9 +/- 0.1	1.8 +/- 0.1	1.8 +/- 0.1
12/22/2014	12/29/2014	1.8 +/- 0.1	1.9 +/- 0.1	1.8 +/- 0.1	2.0 +/- 0.2	1.9 +/- 0.1	1.9 +/- 0.1	2.0 +/- 0.1

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
12/30/2013	1/6/2014	2.3 +/- 0.1	2.5 +/- 0.2	2.1 +/- 0.1	2.2 +/- 0.1	2.4 +/- 0.1
1/6/2014	1/13/2014	2.7 +/- 0.2	2.9 +/- 0.3	2.5 +/- 0.1	2.8 +/- 0.2	2.8 +/- 0.2
1/13/2014	1/20/2014	2.6 +/- 0.1	2.7 +/- 0.2	2.6 +/- 0.1	2.6 +/- 0.2	2.6 +/- 0.1
1/20/2014	1/27/2014	2.0 +/- 0.1	2.3 +/- 0.2	1.8 +/- 0.1	2.1 +/- 0.1	2.2 +/- 0.1
1/27/2014	2/3/2014	2.7 +/- 0.2	3.0 +/- 0.2	2.6 +/- 0.1	3.0 +/- 0.2	2.8 +/- 0.1
2/3/2014	2/10/2014	2.9 +/- 0.2	2.9 +/- 0.2	2.6 +/- 0.1	2.9 +/- 0.2	2.8 +/- 0.1
2/10/2014	2/17/2014	2.8 +/- 0.2	3.0 +/- 0.2	2.6 +/- 0.1	2.7 +/- 0.2	2.8 +/- 0.1
2/17/2014	2/24/2014	2.4 +/- 0.1	2.2 +/- 0.2	2.1 +/- 0.1	2.2 +/- 0.2	2.4 +/- 0.1
2/24/2014	3/3/2014	3.6 +/- 0.2	3.7 +/- 0.3	3.2 +/- 0.1	3.8 +/- 0.2	3.7 +/- 0.2
3/3/2014	3/10/2014	2.8 +/- 0.2	3.0 +/- 0.2	2.6 +/- 0.1	2.9 +/- 0.2	2.9 +/- 0.1
3/10/2014	3/17/2014	2.3 +/- 0.1	2.3 +/- 0.2	2.0 +/- 0.1	4.4 +/- 0.7	2.1 +/- 0.1
3/17/2014	3/24/2014	1.9 +/- 0.1	2.0 +/- 0.2	1.8 +/- 0.1	1.9 +/- 0.1	1.9 +/- 0.1
3/24/2014	3/31/2014	2.6 +/- 0.2	2.4 +/- 0.2	2.3 +/- 0.1	2.7 +/- 0.2	2.5 +/- 0.1
3/31/2014	4/7/2014	1.8 +/- 0.1	2.0 +/- 0.2	1.8 +/- 0.1	1.9 +/- 0.1	2.0 +/- 0.1
4/7/2014	4/14/2014	2.4 +/- 0.2	2.5 +/- 0.2	2.2 +/- 0.1	2.4 +/- 0.2	2.3 +/- 0.1
4/14/2014	4/21/2014	2.8 +/- 0.2	3.0 +/- 0.2	2.7 +/- 0.1	2.9 +/- 0.2	2.9 +/- 0.1
4/21/2014	4/28/2014	2.2 +/- 0.1	2.2 +/- 0.2	2.0 +/- 0.1	2.3 +/- 0.1	2.2 +/- 0.1
4/28/2014	5/5/2014	1.1 +/- 0.1	1.3 +/- 0.2	1.0 +/- 0.1	0.9 +/- 0.1	1.0 +/- 0.1
5/5/2014	5/12/2014	2.4 +/- 0.1	2.6 +/- 0.2	2.6 +/- 0.1	2.6 +/- 0.1	2.4 +/- 0.1
5/12/2014	5/19/2014	1.8 +/- 0.1	2.2 +/- 0.2	1.6 +/- 0.1	1.8 +/- 0.1	1.6 +/- 0.1
5/19/2014	5/26/2014	2.3 +/- 0.1	1.2 +/- 0.1	2.1 +/- 0.1	2.2 +/- 0.1	2.1 +/- 0.1
5/26/2014	6/2/2014	1.7 +/- 0.1	1.6 +/- 0.1	1.5 +/- 0.1	1.6 +/- 0.1	1.6 +/- 0.1
6/2/2014	6/9/2014	1.5 +/- 0.1	1.2 +/- 0.1	1.4 +/- 0.1	1.5 +/- 0.1	1.6 +/- 0.2
6/9/2014	6/16/2014	1.4 +/- 0.1	1.1 +/- 0.1	1.1 +/- 0.1	1.3 +/- 0.1	1.3 +/- 0.2
6/16/2014	6/23/2014	1.8 +/- 0.1	1.6 +/- 0.1	1.5 +/- 0.1	1.6 +/- 0.1	1.8 +/- 0.2
6/23/2014	6/30/2014	2.4 +/- 0.1	2.2 +/- 0.1	1.9 +/- 0.1	2.1 +/- 0.1	2.3 +/- 0.2
6/30/2014	7/7/2014	2.2 +/- 0.1	1.9 +/- 0.1	2.2 +/- 0.1	2.1 +/- 0.1	2.0 +/- 0.2
7/7/2014	7/14/2014	2.1 +/- 0.1	1.8 +/- 0.1	1.9 +/- 0.1	2.0 +/- 0.1	2.0 +/- 0.2
7/14/2014	7/21/2014	2.1 +/- 0.1	1.9 +/- 0.1	2.0 +/- 0.1	2.0 +/- 0.1	2.2 +/- 0.2
7/21/2014	7/28/2014	2.1 +/- 0.1	2.0 +/- 0.1	2.2 +/- 0.1	2.2 +/- 0.1	2.2 +/- 0.2
7/28/2014	8/4/2014	3.0 +/- 0.2	2.6 +/- 0.1	2.5 +/- 0.1	2.5 +/- 0.1	2.8 +/- 0.2
8/4/2014	8/11/2014	2.0 +/- 0.1	1.9 +/- 0.1	1.8 +/- 0.1	2.0 +/- 0.1	1.9 +/- 0.2
8/11/2014	8/18/2014	1.4 +/- 0.1	1.3 +/- 0.1	1.4 +/- 0.1	1.4 +/- 0.3	1.4 +/- 0.2
8/18/2014	8/25/2014	2.9 +/- 0.2	2.5 +/- 0.2	2.4 +/- 0.1	2.5 +/- 0.2	2.5 +/- 0.2
8/25/2014	9/1/2014	2.4 +/- 0.1	2.2 +/- 0.1	2.4 +/- 0.1	2.3 +/- 0.1	2.4 +/- 0.2
9/1/2014	9/8/2014	2.9 +/- 0.2	2.6 +/- 0.2	2.7 +/- 0.2	2.8 +/- 0.2	2.9 +/- 0.3
9/8/2014	9/15/2014	1.6 +/- 0.1	1.4 +/- 0.1	1.4 +/- 0.1	1.5 +/- 0.1	1.4 +/- 0.2
9/15/2014	9/22/2014	2.8 +/- 0.2	2.5 +/- 0.1	2.6 +/- 0.1	2.5 +/- 0.1	2.5 +/- 0.2
9/22/2014	9/29/2014	3.8 +/- 0.2	3.2 +/- 0.2	3.4 +/- 0.2	3.5 +/- 0.2	3.9 +/- 0.3

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
9/29/2014	10/6/2014	2.9 +/- 0.2	2.5 +/- 0.1	2.7 +/- 0.1	2.8 +/- 0.2	2.8 +/- 0.2
10/6/2014	10/13/2014	2.1 +/- 0.1	1.7 +/- 0.1	1.9 +/- 0.1	1.8 +/- 0.1	1.8 +/- 0.2
10/13/2014	10/20/2014	1.8 +/- 0.1	1.7 +/- 0.1	1.6 +/- 0.1	1.6 +/- 0.1	2.0 +/- 0.2
10/20/2014	10/27/2014	2.2 +/- 0.1	1.8 +/- 0.1	2.0 +/- 0.1	2.0 +/- 0.1	2.1 +/- 0.2
10/27/2014	11/3/2014	2.2 +/- 0.1	2.0 +/- 0.1	2.0 +/- 0.1	2.0 +/- 0.1	2.0 +/- 0.2
11/3/2014	11/10/2014	2.4 +/- 0.1	2.0 +/- 0.1	2.3 +/- 0.1	2.2 +/- 0.1	2.1 +/- 0.2
11/10/2014	11/17/2014	2.0 +/- 0.1	1.8 +/- 0.1	2.0 +/- 0.1	2.0 +/- 0.1	2.0 +/- 0.2
11/17/2014	11/24/2014	2.5 +/- 0.1	2.1 +/- 0.1	2.6 +/- 0.1	2.3 +/- 0.1	2.7 +/- 0.2
11/24/2014	12/1/2014	2.0 +/- 0.1	1.8 +/- 0.1	2.1 +/- 0.1	2.3 +/- 0.1	2.2 +/- 0.2
12/1/2014	12/8/2014	2.8 +/- 0.1	2.5 +/- 0.1	2.5 +/- 0.1	2.4 +/- 0.1	2.7 +/- 0.2
12/8/2014	12/15/2014	2.4 +/- 0.1	1.9 +/- 0.1	2.1 +/- 0.1	2.1 +/- 0.1	2.3 +/- 0.2
12/15/2014	12/22/2014	1.6 +/- 0.1	1.5 +/- 0.1	1.6 +/- 0.1	1.5 +/- 0.1	1.8 +/- 0.2
12/22/2014	12/29/2014	2.1 +/- 0.1	1.8 +/- 0.1	1.8 +/- 0.1	2.1 +/- 0.1	1.9 +/- 0.2

¹ Control Location

Table B-7

**Concentration of Gamma Emitters in Air Particulates
(Results in units of 10^{-3} pCi/m³ +/- 2 σ)**

Location	Description	3/31/2014	6/30/2014	9/29/2014	12/29/2014
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

* No Man-Made Gamma Emitters 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	7/31/2014	Cucumbers	*
	7/31/2014	Onion (root)	*
	7/31/2014	Squash	*
	7/31/2014	Tomato	*
	7/31/2014	Tuber (potato)	*
	8/2/2014	Greens	*
	10/9/2014	Apples	*
	10/9/2014	Cabbage	*
	10/9/2014	Grapes	*
EAST			
East Sector	6/23/2014	Greens	*
	7/22/2014	Onion (root)	*
	7/22/2014	Tuber (potato)	*
	8/11/2014	Squash	*
	8/11/2014	Tomato	*
	8/18/2014	Corn	*
	8/25/2014	Cabbage	*
	9/30/2014	Grapes	*
ESE			
East South East Sector	6/23/2014	Greens	*
	7/14/2014	Cucumbers	*
	7/21/2014	Onion (root)	*
	7/21/2014	Tuber (potato)	*
	8/11/2014	Squash	*
	8/11/2014	Tomato	*
	9/22/2014	Grapes	*
SSE			
South South East Garden	6/23/2014	Greens	*
	7/21/2014	Onion (root)	*
	7/21/2014	Squash	*
	7/21/2014	Tuber (potato)	*
	7/31/2014	Cucumbers	*
	8/11/2014	Tomato	*
	8/25/2014	Cabbage	*
	9/22/2014	Apples	*

¹ Control Location

* No Man-Made Gamma Emitters Detected.

Table B-9

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

Sample Code	Sample Date	Gamma Emitters
EATON ESE Indicator	1/6/2014	*
	2/3/2014	*
	3/3/2014	*
	3/31/2014	*
	4/28/2014	*
	5/27/2014	*
	6/9/2014	*
	6/23/2014	*
	7/7/2014	*
	7/21/2014	*
	8/4/2014	*
	8/19/2014	*
	9/2/2014	*
	9/15/2014	*
	9/29/2014	*
	10/13/2014	*
	10/27/2014	*
	11/10/2014	*
	12/8/2014	*
SCHULTZ ² South Sodus Control	1/6/2014	*
	2/3/2014	*
	3/3/2014	*
	3/31/2014	*
	4/28/2014	*
	5/27/2014	*
	6/9/2014	*
	6/23/2014	*
	7/7/2014	*
	7/21/2014	*
	8/4/2014	*
	8/19/2014	*
	9/2/2014	*
	9/15/2014	*
	9/29/2014	*
	10/13/2014	*
	10/27/2014	*
	11/10/2014	*
	12/8/2014	*

* No Man-Made Gamma Emitters 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	1.7 - 4	1 - 54.5	2.2 - 4.2	3.9 - 5.3	4.4 - 21.1	32.5 - 60.2	22.4 - 86	11.2 - 34.1
K-40	0 - 0	18.6 - 44.1	120 - 421.3	22.4 - 47.8	30.7 - 43.5	37.2 - 152	318.5 - 453	163 - 734	77.6 - 287
Cr-51	0 - 0	13 - 34.8	118 - 533	20.1 - 33.2	20.7 - 31.2	24.5 - 112	242 - 364	126 - 706	57.6 - 206
Mn-54	0 - 0	1.7 - 3.6	12 - 51.4	2.1 - 3.7	2.9 - 3.9	4.4 - 36.3	29.5 - 42.3	21.3 - 78.2	8.5 - 29.7
Co-58	0 - 0	1.8 - 3.6	17 - 57.1	2.1 - 3.9	2.9 - 4	.5 - 44.8	28.4 - 46.2	21.6 - 72.2	8.4 - 28.6
Fe-59	0 - 0	3.7 - 8.2	35 - 147	4.7 - 8.2	6.9 - 9.9	6.2 - 91.7	70.6 - 111	46.1 - 173	19.7 - 62.3
Co-60	0 - 0	1.8 - 3.7	13 - 57.9	2.1 - 4	3.5 - 4.8	7.2 - 37.3	34.1 - 50.8	20.3 - 79.8	10.3 - 32.4
Zn-65	0 - 0	3.6 - 7.5	34 - 132	4.2 - 10.6	7.4 - 9.6	13.2 - 82.2	79.5 - 122	56.2 - 202	21.3 - 69.5
Nb-95	0 - 0	1.9 - 4.2	14 - 80.2	2.4 - 4.3	2.9 - 4	3.6 - 16.5	37.4 - 50	22.8 - 100	8.9 - 29.5
Zr-95	0 - 0	3.1 - 6.3	20 - 87.9	3.8 - 6.7	5 - 6.7	5.9 - 26.4	50.8 - 81.4	38.2 - 136	15 - 49
Ru-106	0 - 0	13.9 - 31.1	153 - 359	17.8 - 32.9	24.7 - 31.2	29 - 134	253 - 360	187 - 586	73.2 - 252
Ag-110m	0 - 0	1.5 - 3.4	13 - 46.7	1.9 - 3.5	2.7 - 3.4	3.3 - 15	27 - 40.6	25.1 - 75.1	7.4 - 28.1
I-131 ¹	0 - .4	0 - 63.2	21 - 1329	3.6 - 9	.4 - .6	4 - 18.6	46.2 - 109	35 - 4808	10.4 - 32.6
Cs-134	0 - 0	1.6 - 3.4	14 - 66.2	1.9 - 3.8	2.6 - 3.3	4.5 - 33.3	29.4 - 42	37 - 74.5	9.3 - 27.6
Cs-137	0 - 0	1.6 - 3.6	11 - 54.9	1.8 - 3.9	2.9 - 3.8	5.4 - 34.8	28.9 - 46.9	30.5 - 79.6	10.6 - 29.3
Ba-140	0 - .1	4 - 16.6	23 - 355	4.2 - 8.2	3 - 6.6	4.8 - 22.8	48.5 - 104	53 - 703	11 - 41.4
La-140	0 - .1	4 - 16.6	23 - 355	4.2 - 8.2	3 - 6.6	4.8 - 22.8	48.5 - 104	53 - 703	11 - 41.4
Ce-144	0 - 0	8.9 - 17.9	48 - 174	10.9 - 21.7	15.5 - 18.8	14 - 62.5	123 - 165	93.2 - 310	29.8 - 117

¹ This MDA range for I-131 on a charcoal cartridge is typically 4.16 x 10⁻³ to 3.40 x 10⁻² pCi/m³

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 charcoal cartridge is 2.0 x10⁻³ pCi/m³

Table B-12
Direct Radiation
(Results in Units of mR/90 days +/- 1σ)

Station	Location	First Quarter			Second Quarter			Third Quarter			Fourth Quarter		
2	Onsite-Manor House Yard	12.3	±	0.5	12.9	±	0.6	10.8	±	0.6	13.7	±	0.5
3	Onsite-In field approximately 200 ft SE of station #2	12.36	±	0.7	13.3	±	0.8	11.1	±	0.7	13.8	±	0.5
4	Onsite-Training Center yard driveway circle	11.2	±	0.7	11.9	±	0.6	10.0	±	0.6	12.8	±	0.5
5	Onsite-Between creek and plant entry road	13.8	±	0.7	12.7	±	0.6	11.1	±	0.7	14.0	±	1.0
6	Onsite-SW side of plant parking lot	9.5	±	0.6	10.3	±	0.7	7.9	±	0.7	11.3	±	0.4
7	Onsite-utility pole along West plant fence	11.2	±	0.5	11.4	±	0.5	9.2	±	0.7	12.6	±	0.6
8 ¹	Topper Drive-Irondequoit, Seabreeze Substation #51	12.4	±	0.7	11.9	±	0.8	8.8	±	0.5	12.6	±	0.8
9	Phillips Road-Webster, intersection with Highway #104, Substation #74	11.9	±	0.9	11.7	±	0.8	9.2	±	0.7	11.7	±	0.5
10 ¹	Atlantic Avenue-Walworth, Substation #230	10.5	±	0.6	10.6	±	0.8	8.5	±	0.6	11.1	±	0.6
11	W. Main Street-Williamson, Substation #207	10.7	±	0.5	11.7	±	0.5	8.7	±	0.7	12.3	±	0.7
12 ¹	12 Seaman Avenue-Sodus Point-Off Lake Road by Sewer district, Substation #209	11.5	±	0.5	12.5	±	0.6	10.0	±	0.5	12.7	±	1.0
13	Onsite- South of Meteorological Tower	15.3	±	0.8	16.9	±	0.7	13.8	±	0.7	17.0	±	0.6
14	NW corner of field along lake shore	11.7	±	0.6	12.5	±	0.6	10.3	±	0.6	14.1	±	0.5
15	Field access road, west of orchard, approximately 3000' West of plant	12.7	±	0.5	14.2	±	0.6	10.9	±	0.6	14.5	±	0.8

TABLE B-12 (Continued)

Direct Radiation
(Results in Units of mR/90 days $\pm 1\sigma$)

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	12.4	\pm	0.7	13.5	\pm	0.6	11.3	\pm	0.6	13.9	\pm	0.5
17	Utility pole in orchard, approximately 75" North of Lake Road	11.7	\pm	0.5	12.5	\pm	0.7	10.4	\pm	0.5	13.4	\pm	0.7
18	Approximately 30' North of NE corner of Substation 13A fence	10.3	\pm	0.5	11.0	\pm	0.6	8.3	\pm	0.6	11.4	\pm	0.6
19	On NW corner of house 100' East of plant access road	11.6	\pm	0.7	10.6	\pm	0.6	8.0	\pm	0.9	10.8	\pm	0.6
20	Approximately 150' West of Ontario Center Road and approximately 170' South of Lake Road	13.2	\pm	1.2	12.7	\pm	0.6	10.0	\pm	0.5	13.0	\pm	0.8
21	North side of Lake Road, approximately 200' East of Ontario Center Road	11.4	\pm	0.9	12.4	\pm	0.8	10.4	\pm	0.9	13.0	\pm	0.6
22	North side of Lake Road, SE, property owner	11.1	\pm	0.6	11.2	\pm	0.7	8.9	\pm	0.6	11.7	\pm	0.8
23	East property line, midway between Lake Road and Lake shore	11.5	\pm	1.0	13.0	\pm	1.1	11.0	\pm	0.5	14.5	\pm	0.7
24	Lake shore near NE corner of property	12.9	\pm	0.6	12.7	\pm	0.8	10.4	\pm	0.7	13.8	\pm	0.6
25 ¹	Substation #73, Klem Road, adjacent to 897 Klem Road	11.1	\pm	0.5	11.3	\pm	0.7	8.8	\pm	0.5	11.9	\pm	0.4
26 ¹	Service Center, Plank Road, West of 250	11.3	\pm	0.9	12.0	\pm	0.6	8.9	\pm	0.5	12.4	\pm	0.9
27 ¹	Atlantic Avenue at Knollwood Drive utility pole, North side of road	10.9	\pm	0.7	11.3	\pm	0.6	9.2	\pm	0.7	12.0	\pm	0.7
28 ¹	Substation #193, Marion, behind Stanton Ag. Service, North Main Street	10.0	\pm	0.6	11.3	\pm	0.7	9.3	\pm	0.5	12.3	\pm	0.5

TABLE B-12 (Continued)

Direct Radiation
(Results in Units of mR/90 days $\pm 1\sigma$)

Station	Location	First Quarter			Second Quarter			Third Quarter			Fourth Quarter		
29 ¹	Substation #208, Town Line Road (CR-118), 1000' North of Route 104	10.5	\pm	0.7	11.5	\pm	0.8	8.6	\pm	0.7	11.8	\pm	0.9
30 ¹	District Office, Sodus, on pole, West side of bldg	9.6	\pm	0.6	10.0	\pm	0.6	7.6	\pm	0.6	11.2	\pm	0.4
31	Lake Road, pole 20' North of road, 500' East of Salt Road	12.4	\pm	0.8	12.7	\pm	0.5	10.5	\pm	0.6	13.2	\pm	0.5
32	Woodard Road at County Line Road, pole @ BW corner	10.3	\pm	0.7	11.8	\pm	0.7	9.0	\pm	0.6	12.0	\pm	0.6
33	County Line Road at RR tracks, pole approximately 100' East along tracks	9.8	\pm	0.4	11.6	\pm	0.6	8.6	\pm	0.5	11.6	\pm	0.4
34	Lincoln Road, pole midway between Ridge Road and Route 104	12.4	\pm	0.8	13.9	\pm	0.7	11.7	\pm	0.6	14.3	\pm	1.2
35	Transmission Right of Way, North of Clevenger Road on pole	11.9	\pm	1.0	13.1	\pm	0.7	9.9	\pm	0.6	14.1	\pm	0.6
36	Substation #205, Route 104, East of Ontario Center Road, North side of fence	10.3	\pm	0.5	11.3	\pm	0.6	9.1	\pm	0.5	11.5	\pm	0.5
37	Rail Road Avenue, pole at 2048	9.7	\pm	0.6	10.8	\pm	0.7	8.1	\pm	0.5	11.6	\pm	0.5
38	Fisher Road at RR Tracks, pole East of road	11.3	\pm	0.5	12.9	\pm	1.0	10.3	\pm	0.5	13.4	\pm	0.7
39	Seeley Road, Pole South side 100' West of intersection with Stony Lonesome Road	11.4	\pm	0.6	13.9	\pm	0.7	10.2	\pm	0.8	13.5	\pm	1.0
40	Lake Road at Stoney Lonesome Road, pole at SE corner	10.5	\pm	0.6	11.0	\pm	0.5	8.7	\pm	0.7	12.0	\pm	0.9
63	Westside of warehouse access road	12.2	\pm	0.8	13.1	\pm	0.7	10.5	\pm	0.9	13.3	\pm	0.6
64	Westside of direct road, adjacent to orchard	13.3	\pm	0.6	14.2	\pm	1.6	12.6	\pm	0.6	14.8	\pm	0.7

1 - Control Location

TABLE B-13

Groundwater Monitoring Wells

Location	Sample Date	Tritium (uCi/ml)	Gamma (uCi/ml)
GW01: Warehouse Access Road (Control)	03/11/2014	*	*
	06/27/2014	*	*
	09/21/2014	*	*
	12/10/2014	*	*
GW03: Screenhouse West, South Well	01/24/2014	*	*
	02/25/2014	*	*
	03/11/2014	*	*
	04/18/2014	*	*
	05/14/2014	*	*
	06/27/2014	*	*
	07/24/2014	*	*
	08/23/2014	*	*
	09/21/2014	*	*
	10/31/2014	*	*
	11/14/2014	*	*
	12/10/2014	*	*
GW04: Screenhouse West, North Well	03/11/2014	*	*
	06/27/2014	*	*
	09/21/2014	*	*
	12/10/2014	*	*
GW05: Screenhouse East, South (15.5')	03/11/2014	*	*
	06/27/2014	*	*
	09/21/2014	*	*
	12/10/2014	*	*
GW06: Screenhouse East, Middle (20.0')	03/11/2014	*	*
	06/27/2014	*	*
	09/21/2014	*	*
	12/10/2014	*	*
GW07: Screenhouse East, North (24.0')	03/11/2014	*	*
	06/27/2014	*	*
	09/21/2014	*	*
	12/10/2014	*	*

TABLE B-13 (Continued)

Groundwater Monitoring Wells

Location	Sample Date	Tritium (uCi/ml)	Gamma (uCi/ml)
GW08: All Volatiles Treatment Building	01/24/2014	*	*
	02/25/2014	*	*
	03/11/2014	*	*
	04/18/2014	*	*
	05/14/2014	*	*
	06/27/2014	*	*
	07/24/2014	*	*
	08/23/2014	*	*
	09/21/2014	*	*
	10/31/2014	*	*
	11/14/2014	*	*
	12/10/2014	*	*
GW10: Technical Support Center, South	03/11/2014	*	*
	06/27/2014	*	*
	09/21/2014	*	*
	12/10/2014	*	*
GW11: Southeast of Contaminated Service Building (CSB)	02/28/2014	*	*
	03/11/2014	*	*
	06/27/2014	*	*
	09/21/2014	*	*
	12/10/2014	*	*
GW12: West of Orchard Access Road	03/11/2014	*	*
	06/27/2014	*	*
	09/21/2014	*	*
	12/10/2014	*	*
GW13: North of Independent Spent Fuel Storage Installation (ISFSI)	03/11/2014	*	*
	06/27/2014	*	*
	09/21/2014	*	*
	12/10/2014	*	*
GW14: South of Canister Preparation Building	03/11/2014	*	*
	06/27/2014	*	*
	09/21/2014	*	*
	12/10/2014	*	*

TABLE B-13 (Continued)

Groundwater Monitoring Wells

Location	Sample Date	Tritium (uCi/ml)	Gamma (uCi/ml)
GW15: West of Manor House	03/11/2014	*	*
	06/27/2014	*	*
	09/21/2014	*	*
	12/10/2014	*	*
GW16: Southeast of Manor House	03/11/2014	*	*
	06/27/2014	*	*
	09/21/2014	No sample – dry well	No sample
	12/10/2014	No sample – dry well	No sample

* No Man-Made Gamma Activity or Tritium Detected

APPENDIX C

Quality Assurance Program

Summary of Appendix C Content:

Appendix C is a summary of Exelon Industrial Services – Ft. Smallwood Environmental Laboratory's quality assurance program. It consists of Table C-1, which is 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. It also includes Table C-2, which is a compilation of the results of the Exelon Industrial Services – 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 MDAs achieved by Teledyne Brown for Gamma Spectroscopy.

All the Exelon Industrial Services – Ft. Smallwood Environmental 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. In addition, all the sets of intercomparison results in the table are in full agreement when they were further evaluated using the NRC Resolution Test Criteria¹. The uncertainties for the Exelon Industrial Services – Ft. Smallwood Environmental Laboratory's results and Analytics' results are $\pm 2\sigma$ while the ERA laboratory's uncertainty is based on USEPA guidelines².

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 Environmental Laboratory's original, replicate and/or Teledyne Brown Engineering's split laboratory samples, except for the comparisons of three samples involving Cs-137 results: a miscellaneous ground cover sample at SFB5 collected on 3/24/14, bottom sediment sample at WBS4 collected on 6/17/14, and soil at SFS2 collected on 9/15/14. The original and replicate analysis of the ground cover sample from SFB5 collected on 3/24/14 agree within $\pm 2 \sigma$ of each other and was not detected in the split lab results. Low level Cs-137 was observed in the split lab results of the comparison set for SFS2 collected on 9/15/14 and observed below MDA in the original and duplicate. In the bottom sediment sample, WBS4 collected on 6/17/14, the original and replicate analysis do agree within $\pm 2 \sigma$ of each other and one result does not agree within $\pm 2 \sigma$ of the split lab results. These minor discrepancies are most probably due to counting statistical fluctuations and/or the non-homogeneous nature of the sample-splitting process. Other samples whose nature generally precludes sample splitting are marked "***" in the Split Analysis column.

¹ NRC Inspection Manual, Inspection Procedure 84750, March 15, 1994

² National Standards for Water Proficiency Testing Studies Criteria Document, December 1998

TABLE OF CONTENTS - ANALYTICAL RESULTS

Table	Title	Page
C-1	Results of Participation in Cross Check Program.....	51
C-2	Results of Quality Assurance Program.....	53
C-3	Teledyne Brown Engineering's Typical MDAs for Gamma Spectrometry	59

TABLE C-1
Results of Participation in Cross Check Program

Sample Date	Sample Type and Units	Isotope Observed	Reported Laboratory's Results	Cross Check Lab Results
03/20/14	Air Iodine– pCi	I-131	67.0 +/- 5.0	75.1 +/- 1.3
03/20/14	Milk – pCi/L	Co-58	240 +/- 16	268 +/- 4.5
		Co-60	310 +/- 12	337 +/- 5.7
		Zn-65	306 +/- 26	323 +/- 5.4
		I-131	86.0 +/- 18	98.5 +/- 1.7
		Cs-134	166 +/- 8.0	210 +/- 3.5
		Cs-137	234 +/- 15	253 +/- 4.2
		Ce-141	113 +/- 14	119 +/- 2.0
		Cr-51	408 +/- 69	491 +/- 8.2
		Mn-54	285 +/- 16	297 +/- 5.0
		Fe-59	214 +/- 18	219 +/- 3.7
04/07/14	Water – pCi/L	Co-60	62.3 +/- 4.7	64.2
		Zn-65	25.6 +/- 18	23.5
		Cs-134	40.2 +/- 3.6	44.3
		Cs-137	87.4 +/- 6.8	89.1
		Ba-133	86.8 +/- 5.5	87.9
		I-131	29.0 +/- 5.0	25.7
		Cs-137	42.0 +/- 4.0	41.7
06/12/14	Air Filter– pCi	Fe-59	88.0 +/- 9.0	76.4 +/- 1.3
		Cr-51	194 +/- 33	189 +/- 3.2
		Ce-141	101 +/- 7.0	92.2 +/- 1.5
		Cs-137	96.0 +/- 6.0	89.4 +/- 1.5
		Cs-134	99.0 +/- 4.0	121 +/- 2.0
		Zn-65	211 +/- 16	188 +/- 3.1
		Co-60	172 +/- 7.0	167 +/- 2.8
		Co-58	83.0 +/- 7.0	83.7 +/- 1.4
		Mn-54	126 +/- 8.0	116 +/- 1.9
06/12/14	Water - pCi/L	Gross Beta	253 +/- 3.4	253 +/- 3.0
		Ce-141	108 +/- 12	110 +/- 1.8
		Cr-51	317 +/- 67	306 +/- 5.1
07/07/14	Water– pCi/L	Zn-65	94.0 +/- 18	82.0
		Ba-133	66.0 +/- 7.0	68.7
		I-131	21.0 +/- 7.0	26.1
		Cs-137	174 +/- 13	163
		Cs-134	68.0 +/- 6.0	72.3
		Co-60	78.0 +/- 8.0	75.5
07/07/14	Water - pCi/L	Gross Beta	28.3 +/- 1	33.5
09/11/14	Air Filter– pCi	Gross Beta	93.2 +/- 2.0	89.8 +/- 1.5

TABLE C-1 - Continued
Results of Participation in Cross Check Program

Sample Date	Sample Type and Units	Isotope Observed	Reported Laboratory's Results	Cross Check Lab Results
09/22/14	Air Filter– pCi	Am-241	34.0 +/- 15	38.6
		Co-60	553 +/- 10	523
		Cs-134	631 +/- 11	765
		Cs-137	714 +/- 16	647
		Zn-65	665 +/- 23	547
10/06/14	Water – pCi/L	Co-60	96.0 +/- 4.0	92.1
		Zn-65	340 +/- 16	310
		Cs-134	78.0 +/- 4.0	89.8
		Cs-137	97.0 +/- 5.0	98.8
		Ba-133	43.0 +/- 3.0	49.1
12/04/14	Air Filter– pCi	Mn-54	148 +/- 10	135 +/- 2.3
		Fe-59	127 +/- 11	105 +/- 1.8
		Co-58	80.0 +/- 8.0	78.0 +/- 1.3
		Co-60	151 +/- 7.0	141 +/- 2.4
		Cr-51	279 +/- 35	243 +/- 4.1
		Cs-134	88.0 +/- 6.0	98.7 +/- 1.7
		Cs-137	128 +/- 9.0	119 +/- 2.0
		Ce-141	144 +/- 7.0	131 +/- 2.2
		Zn-65	207 +/- 18	178 +/- 3.0
12/04/14	Air Iodine– pCi	I-131	93.0 +/- 4.0	97.3 +/- 1.6
12/04/14	Milk – pCi/L	Mn-54	253 +/- 21	225 +/- 3.8
		Fe-59	203 +/- 23	175 +/- 2.9
		Co-58	141 +/- 18	130 +/- 2.2
		Co-60	258 +/- 16	235 +/- 3.9
		Cr-51	428 +/- 93	406 +/- 6.8
		I-131	114 +/- 18	95.1 +/- 1.6
		Cs-134	159 +/- 11	164 +/- 2.8
		Cs-137	218 +/- 20	198 +/- 3.3
		Ce-141	248 +/- 22	219 +/- 3.7
		Zn-65	357 +/- 42	297 +/- 5.0

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 Iodine - A3	01/20/14	I-131	<MDA	<MDA	**
Air Iodine - A4	01/20/14	I-131	<MDA	<MDA	**
Air Iodine - A5	01/20/14	I-131	<MDA	<MDA	**
Air Filter - A1	01/27/14	Gross Beta	2.1 +/- 0.2	2.1 +/- 0.2	**
Air Filter - A2	01/27/14	Gross Beta	2.2 +/- 0.2	2.1 +/- 0.2	**
Air Filter - A3	01/27/14	Gross Beta	2.3 +/- 0.2	2.1 +/- 0.2	**
Air Filter - A4	01/27/14	Gross Beta	2.2 +/- 0.2	2.4 +/- 0.2	**
Air Filter - A5	01/27/14	Gross Beta	2.2 +/- 0.2	2.4 +/- 0.2	**
Air Filter - SFA1	01/27/14	Gross Beta	2.5 +/- 0.2	2.3 +/- 0.2	**
Air Filter - SFA2	01/27/14	Gross Beta	2.0 +/- 0.2	2.3 +/- 0.2	**
Air Filter - SFA3	01/27/14	Gross Beta	2.5 +/- 0.2	2.3 +/- 0.2	**
Air Filter - SFA4	01/27/14	Gross Beta	2.4 +/- 0.2	2.2 +/- 0.2	**
Air Iodine - A3	01/20/14	I-131	<MDA	<MDA	**
Air Iodine - A4	01/20/14	I-131	<MDA	<MDA	**
Air Iodine - A5	01/20/14	I-131	<MDA	<MDA	**
Air Filter - A1	01/27/14	Gross Beta	2.1 +/- 0.2	2.1 +/- 0.2	**
Air Filter - A2	01/27/14	Gross Beta	2.2 +/- 0.2	2.1 +/- 0.2	**
Air Filter - A3	01/27/14	Gross Beta	2.3 +/- 0.2	2.1 +/- 0.2	**
Air Filter - A4	01/27/14	Gross Beta	2.2 +/- 0.2	2.4 +/- 0.2	**
Air Filter - A5	01/27/14	Gross Beta	2.2 +/- 0.2	2.4 +/- 0.2	**
Air Filter - SFA1	01/27/14	Gross Beta	2.5 +/- 0.2	2.3 +/- 0.2	**
Air Filter - SFA2	01/27/14	Gross Beta	2.0 +/- 0.2	2.3 +/- 0.2	**
Air Filter - SFA3	01/27/14	Gross Beta	2.5 +/- 0.2	2.3 +/- 0.2	**
Air Filter - SFA4	01/27/14	Gross Beta	2.4 +/- 0.2	2.2 +/- 0.2	**
Air Iodine - A3	01/20/14	I-131	<MDA	<MDA	**
Air Filter - A1	02/03/14	Gamma	<MDA	<MDA	<MDA
Air Filter - A2	02/03/14	Gamma	<MDA	<MDA	<MDA
Air Filter - A3	02/03/14	Gamma	<MDA	<MDA	<MDA
Air Filter - A4	02/03/14	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 - A5	02/03/14	Gamma	<MDA	<MDA	<MDA
Air Filter - SFA1	02/03/14	Gamma	<MDA	<MDA	<MDA
Air Filter - SFA2	02/03/14	Gamma	<MDA	<MDA	<MDA
Air Filter - SFA3	02/03/14	Gamma	<MDA	<MDA	<MDA
Air Filter - SFA4	02/03/14	Gamma	<MDA	<MDA	<MDA
Air Iodine - A1	02/03/14	I-131	<MDA	<MDA	**
Air Iodine - A2	02/03/14	I-131	<MDA	<MDA	**
Air Iodine - A3	02/03/14	I-131	<MDA	<MDA	**
Air Iodine - A4	02/10/14	I-131	<MDA	<MDA	**
Air Iodine - A5	02/10/14	I-131	<MDA	<MDA	**
Air Iodine - A1	03/03/14	I-131	<MDA	<MDA	**
Air Iodine - A2	03/03/14	I-131	<MDA	<MDA	**
Air Iodine - A3	03/03/14	I-131	<MDA	<MDA	**
Air Iodine - A4	03/03/14	I-131	<MDA	<MDA	**
Air Iodine - A5	03/03/14	I-131	<MDA	<MDA	**
Air Filter - A5	02/03/14	Gamma	<MDA	<MDA	<MDA
Air Filter - SFA1	02/03/14	Gamma	<MDA	<MDA	<MDA
Air Filter - SFA2	02/03/14	Gamma	<MDA	<MDA	<MDA
Air Filter - SFA3	02/03/14	Gamma	<MDA	<MDA	<MDA
Air Filter - SFA4	02/03/14	Gamma	<MDA	<MDA	<MDA
Air Iodine - A1	02/03/14	I-131	<MDA	<MDA	**
Air Iodine - A2	02/03/14	I-131	<MDA	<MDA	**
Air Iodine - A3	02/03/14	I-131	<MDA	<MDA	**
Air Iodine - A4	03/03/14	I-131	<MDA	<MDA	**
Air Iodine - A5	03/03/14	I-131	<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	03/10/14	Gross Beta	2.1 +/- 0.2	2.3 +/- 0.2	**
Air Filter - A2	03/10/14	Gross Beta	2.2 +/- 0.2	2.2 +/- 0.2	**
Air Filter - A3	03/10/14	Gross Beta	2.1 +/- 0.2	2.1 +/- 0.2	**
Air Filter - A4	03/10/14	Gross Beta	2.2 +/- 0.2	2.1 +/- 0.2	**
Air Filter - A5	03/10/14	Gross Beta	2.3 +/- 0.2	2.4 +/- 0.2	**
Air Filter - SFA1	03/10/14	Gross Beta	2.5 +/- 0.2	2.5 +/- 0.2	**
Air Filter - SFA2	03/10/14	Gross Beta	2.3 +/- 0.2	2.4 +/- 0.2	**
Air Filter - SFA3	03/10/14	Gross Beta	2.3 +/- 0.2	2.3 +/- 0.2	**
Air Filter - SFA4	03/10/14	Gross Beta	2.4 +/- 0.2	2.4 +/- 0.2	**
Air Filter - A1	03/17/14	Gross Beta	1.8 +/- 0.1	1.9 +/- 0.1	**
Air Filter - A2	03/17/14	Gross Beta	1.8 +/- 0.1	1.8 +/- 0.1	**
Air Filter - A3	03/17/14	Gross Beta	2.0 +/- 0.1	2.0 +/- 0.1	**
Air Filter - A4	03/17/14	Gross Beta	2.1 +/- 0.1	1.9 +/- 0.1	**
Air Filter - A5	03/17/14	Gross Beta	2.0 +/- 0.1	2.0 +/- 0.1	**
Air Filter - SFA1	03/17/14	Gross Beta	2.0 +/- 0.1	2.0 +/- 0.1	**
Air Filter - SFA2	03/17/14	Gross Beta	1.9 +/- 0.1	1.9 +/- 0.1	**
Air Filter - SFA3	03/17/14	Gross Beta	2.1 +/- 0.1	1.9 +/- 0.1	**
Air Filter - SFA4	03/17/14	Gross Beta	2.0 +/- 0.1	1.8 +/- 0.1	**
Air Filter - A1	03/17/14	Gross Beta	1.8 +/- 0.1	1.9 +/- 0.1	**
Air Filter - A2	03/17/14	Gross Beta	1.8 +/- 0.1	1.8 +/- 0.1	**
Misc ground coverage - SFB5	03/24/14	Cs-137	68.4 +/- 24	52.1 +/- 21	**
Soil - SFS5	03/24/14	Cs-137	221 +/- 32	219 +/- 31	194 +/- 61
Bay Water - WA1	03/31/14	Gamma	<MDA	<MDA	<MDA
Bay Water - WA2	03/31/14	Gamma	<MDA	<MDA	<MDA
Oysters - IA3	04/01/14	Gamma	<MDA	<MDA	<MDA
Shoreline sediment - WB1	04/02/14	Gamma	<MDA	<MDA	<MDA
Air Iodine - A1	04/07/14	I-131	<MDA	<MDA	**
Air Iodine - A2	04/07/14	I-131	<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 Iodine - A3	04/07/14	I-131	<MDA	<MDA	**
Air Iodine - A4	04/07/14	I-131	<MDA	<MDA	**
Air Iodine - A5	04/07/14	I-131	<MDA	<MDA	**
Air Filter - A1	04/21/14	Gross Beta	1.8 +/- 0.1	1.6 +/- 0.1	**
Air Filter - A2	04/21/14	Gross Beta	1.7 +/- 0.1	1.7 +/- 0.1	**
Air Filter - A3	04/21/14	Gross Beta	1.8 +/- 0.1	1.7 +/- 0.1	**
Air Filter - A4	04/21/14	Gross Beta	1.8 +/- 0.1	1.8 +/- 0.1	**
Air Filter - A5	04/21/14	Gross Beta	1.9 +/- 0.1	1.9 +/- 0.1	**
Air Filter - SFA1	04/21/14	Gross Beta	1.8 +/- 0.1	1.8 +/- 0.1	**
Air Filter - SFA2	04/21/14	Gross Beta	1.8 +/- 0.1	1.9 +/- 0.1	**
Air Filter - SFA3	04/21/14	Gross Beta	1.9 +/- 0.1	1.8 +/- 0.1	**
Air Filter - SFA4	04/21/14	Gross Beta	1.8 +/- 0.1	1.8 +/- 0.1	**
Air Filter - A1	05/05/14	Gross Beta	1.3 +/- 0.1	1.2 +/- 0.1	**
Air Filter - A2	05/05/14	Gross Beta	1.3 +/- 0.1	1.5 +/- 0.1	**
Air Filter - A3	05/05/14	Gross Beta	1.4 +/- 0.1	1.2 +/- 0.1	**
Air Filter - A4	05/05/14	Gross Beta	1.3 +/- 0.1	1.4 +/- 0.1	**
Air Filter - A5	05/05/14	Gross Beta	1.4 +/- 0.1	1.4 +/- 0.1	**
Air Filter - SFA1	05/05/14	Gross Beta	1.3 +/- 0.1	1.3 +/- 0.1	**
Air Filter - SFA2	05/05/14	Gross Beta	1.6 +/- 0.1	1.5 +/- 0.1	**
Air Filter - SFA3	05/05/14	Gross Beta	1.4 +/- 0.1	1.4 +/- 0.1	**
Air Filter - SFA4	05/05/14	Gross Beta	1.5 +/- 0.1	1.4 +/- 0.1	**
Air Iodine - A1	05/05/14	I-131	<MDA	<MDA	**
Air Iodine - A2	05/05/14	I-131	<MDA	<MDA	**
Air Iodine - A3	05/05/14	I-131	<MDA	<MDA	**
Air Iodine - A4	05/05/14	I-131	<MDA	<MDA	**
Air Iodine - A5	05/05/14	I-131	<MDA	<MDA	**
Air Iodine - A1	06/09/14	I-131	<MDA	<MDA	**
Air Iodine - A2	06/09/14	I-131	<MDA	<MDA	**
Air Iodine - A4	06/09/14	I-131	<MDA	<MDA	**
Air Iodine - A5	06/09/14	I-131	<MDA	<MDA	**
Cabbage - IB1	06/09/14	Gamma	<MDA	<MDA	<MDA
Cabbage - IB7	06/09/14	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
Tree Leaves - IB4	06/09/14	Gamma	<MDA	<MDA	<MDA
Bottom sediment - WBS2	06/17/14	Cs-137	128 +/- 40	119 +/- 47	263 +/- 131
Bottom sediment - WBS4	06/17/14	Cs-137	117 +/- 56	83.6 +/- 38	215 +/- 87
Oysters - IA3	06/17/14	Gamma	<MDA	<MDA	<MDA
Oysters - IA6	06/17/14	Gamma	<MDA	<MDA	<MDA
Air Filter - A1	08/17/14	Gamma	<MDA	<MDA	<MDA
Air Filter - A2	08/17/14	Gamma	<MDA	<MDA	<MDA
Air Filter - A3	08/17/14	Gamma	<MDA	<MDA	<MDA
Air Filter - A4	08/17/14	Gamma	<MDA	<MDA	<MDA
Air Filter - A5	08/17/14	Gamma	<MDA	<MDA	<MDA
Air Filter - SFA1	08/17/14	Gamma	<MDA	<MDA	<MDA
Air Filter - SFA2	08/17/14	Gamma	<MDA	<MDA	<MDA
Air Filter - SFA3	08/17/14	Gamma	<MDA	<MDA	<MDA
Air Filter - SFA4	08/17/14	Gamma	<MDA	<MDA	<MDA
Oysters - IA3	08/18/14	Gamma	<MDA	<MDA	<MDA
Oysters - IA6	08/18/14	Gamma	<MDA	<MDA	<MDA
Perch - IA1	08/18/14	Gamma	<MDA	<MDA	<MDA
Perch - IA4	08/18/14	Gamma	<MDA	<MDA	<MDA
Bay Water - WA1	09/05/14	Gamma	<MDA	<MDA	<MDA
Bay Water - WA2	09/05/14	Gamma	<MDA	<MDA	<MDA
Misc ground coverage - SFB2	09/15/14	Gamma	<MDA	<MDA	<MDA
Misc ground coverage - SFB4	09/15/14	Gamma	<MDA	<MDA	<MDA
Misc ground coverage - SFB5	09/15/14	Gamma	<MDA	<MDA	<MDA
Soil - SFS2	09/15/14	Gamma	<MDA	<MDA	100+/- 45
Soil - SFS4	09/15/14	Gamma	<MDA	<MDA	<MDA
Soil - SFS5	09/15/14	Cs-137	132 +/- 28	133 +/- 31	130 +/- 53

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
Oysters - IA3	10/08/14	Gamma	<MDA	<MDA	<MDA
Oysters - IA6	10/08/14	Gamma	<MDA	<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 10⁻³pCi/m³
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 OF CONTENTS - LAND USE SURVEY

Table	Title	Page
D-1	Land Use Survey Distances.....	62

TABLE D-1

Land Use Survey Distances

Sector (Direction in Degrees)	Distance to Nearest Residence	Distance to Nearest Garden (Latitude N, Longitude W)	Distance to Milk Producing Animals (Latitude N, Longitude W)
E (94)	1170 m	610 m Onsite Supplemental Garden (43.27727, 77.30140)	N/A
ESE (111)	1660 m	430 m Onsite Garden (43.27627, 77.30389)	N/A
ESE (119)	840 m	N/A	8240 m (43.24196, 77.21978)
SSE (145)	610 m	660 m Onsite Supplemental Garden (43.27278, 77.30413)	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 ESE sector at Eaton Farm located at 6747 Salmon Creek Road, Williamson, NY (8,240 meters).