NEXTera ENERGY
POINT BEACH

April 26, 2013

NRC 2013-0038
10 CFR 72.44
TS 5.6.2

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Point Beach Nuclear Plant, Units 1 and 2
Dockets 50-266, 50-301 and 72-005
Renewed License Nos. DPR-24 and DPR-27

2012 Annual Monitoring Report

In accordance with Point Beach Nuclear Plant (PBNP) Technical Specification 5.6.2, enclosed is the Annual Monitoring Report for PBNP Units 1 and 2, for the period January 1 through December 31, 2012.

The Annual Monitoring Report contains information relating to the effluent impact upon the public, as well as information relating to plant releases, solid waste shipments, results from the radiological environmental monitoring program, and miscellaneous monitoring activities that occurred in 2012. The report also covers the results of radiological monitoring of the PBNP Independent Spent Fuel Storage Installation (ISFSI), as required by 10 CFR 72.44.

This letter contains no new regulatory commitments and no revisions to existing regulatory commitments.

Very truly yours,

NextEra Energy Point Beach, LLC

Michael Millan
Licensing Manager

Enclosures

cc: Administrator, Region III, USNRC
Project Manager, Point Beach Nuclear Plant, USNRC
Resident Inspector, Point Beach Nuclear Plant, USNRC
PSCW
American Nuclear Insurers
WI Division of Public Health, Radiation Protection Section
Office of Nuclear Material Safety and Safeguards, USNRC

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ENCLOSURE 1

ANNUAL MONITORING REPORT 2012

NEXTERA ENERGY POINT BEACH, LLC
POINT BEACH NUCLEAR PLANT

DOCKETS 50-266 (UNIT 1), 50-301 (UNIT 2), 72-005 (ISFSI)
RENEWED LICENSES DPR-24 and DPR-27

January 1, 2012 through December 31, 2012

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SUMMARY

The Annual Monitoring Report for the period from January 1, 2012, through December 31, 2012, is submitted in accordance with Point Beach Nuclear Plant (PBNP) Units 1 and 2, Technical Specification 5.6.2 and filed under Dockets 50-266 and 50-301 for Facility Operating Licenses DPR-24 and DPR-27, respectively. It also contains results of monitoring in support of the Independent Spent Fuel Storage Installation (ISFSI), Docket 72-005. The report presents the results of effluent and environmental monitoring programs, solid waste shipments, non-radioactive chemical releases, and circulating water system operation.

During 2012, the following Curies (Ci) of radioactive material were released via the liquid and atmospheric pathways:

	Liquid	Atmospheric
Tritium (Ci)	829	69.8
[1]Particulate (Ci)	0.0572	0.000087
Noble Gas (Ci)	(-)	0.887
C-14[2]	0.0143	11.67

(-)Noble gases in the liquids are added to the atmospheric release totals.
[1]Atmospheric particulate includes radioiodine (I-131 - I-133).
[2]Liquid is measured, atmospheric is calculated.

For the purpose of compliance with the effluent design objectives of 10 CFR 50, Appendix I, doses from effluents are calculated for the hypothetical maximally exposed individual (MEI) for each age group and compared to the Appendix I objectives. Doses less than or equal to the Appendix I values are considered to be evidence that PBNP releases are as low as reasonably achievable (ALARA). The maximum annual calculated doses in millirem (mrem) or milliard (mrad) are shown below and compared to the corresponding design objectives of 10 CFR 50, Appendix I.

LIQUID RELEASES

Dose Category	Calculated Dose	Appendix I Dose
Whole body dose	0.00684 mrem	6 mrem
Organ dose	0.00793 mrem	20 mrem

ATMOSPHERIC RELEASES

Dose Category	Calculated Dose	Appendix I Dose
Particulate organ dose	0.240 mrem	30 mrem
Noble gas beta air dose	0.000100 mrad	40 mrad
Noble gas gamma ray air dose	0.000236 mrad	20 mrad
Noble gas dose to the skin	0.000335 mrem	30 mrem
Noble gas dose to the whole body	0.000223 mrem	10 mrem

The results show that during 2012, the doses from PBNP effluents were a small percentage (≤0.80%) of the Appendix I design objectives. Therefore, operation of PBNP continues to be ALARA.

A survey of land use with respect to the location of dairy cattle was made pursuant to Section 2.5 of the PBNP Environmental Manual. As in previous years, no dairy cattle were found to be grazing at the site boundary. Therefore, the assumption that cattle graze at the site boundary used in the evaluation of doses from PBNP effluents remains conservative. Of the sixteen compass sectors around PBNP, six are over Lake Michigan. A land use census (LUC) of the remaining ten land containing sectors identified the closest garden, occupied dwelling and dairy in each sector. The LUC results confirm the assumption that the maximally exposed person lives at the south boundary. Therefore, the use of this assumption for the purpose of calculating effluent doses remains conservative.

The 2012 Radiological Environmental Monitoring Program (REMP) collected 788 individual samples for radiological analyses. Quarterly composites of weekly air particulate filters generated an additional 24 samples and quarterly composites of monthly lake water samples resulted in a further 16 samples. This yields a total of 828 samples. The ambient radiation measurements in the vicinity of PBNP and the ISFSI were conducted using 128 sets of thermoluminescent dosimeters (TLDs).

Air monitoring from six different sites did not reveal any effect from PBNP effluents.

Terrestrial monitoring consisting of soil, vegetation and milk found no influence from PBNP. Similarly, samples from the aquatic environment, consisting of lake water, well water, fish, and algae revealed no buildup of PBNP radionuclides released in liquid effluents. Therefore, the data show no effect on the environs from PBNP.

Nine new dry storage units were added to the ISFSI in 2012. This brings the total number to 39 dry storage casks: 16 ventilated, vertical storage casks (VSC-24) and 23 NUHOMS®, horizontally stacked storage modules. The subset of the PBNP REMP samples used to evaluate the environmental impact of the PBNP ISFSI showed no environmental impact from its operation.

The environmental monitoring conducted during 2012 confirmed that the effluent control program at PBNP ensured a minimal impact on the environment.

Two hundred twenty-three (223) samples were analyzed for tritium (H-3), a part of the groundwater protection program (GWPP). These samples came from drinking water wells, monitoring wells, yard drain outfalls, yard manholes, and surface water on site. Also included in this number were a sump and manholes associated with the subsurface drainage system (SSD) located under the plant foundation and four groundwater containment integrity monitoring wells located in the facades. The results show no substantial change in H-3 from previous years. Low levels of H-3 continue to be detected under the plant foundation. No drinking water wells (depth >100 feet) have any detectable H-3. Tritium continues to be confined to the upper soil layer where the flow is toward the lake. Groundwater samples from wells in the vicinity of the remediated, former earthen retention pond continue to show low levels of H-3 whereas none was detectable in the wells monitoring the potential offsite tritium movement.

In addition to the normal groundwater sampling, eight biota related samples associated with the former retention pond were analyzed for H-3. Three of the four grass samples gave positive indications for H-3 but the results could not be quantified because they were less than the associated MDC. Four samples of water transpired from trees at the retention pond area were collected. Although three positive results were obtained, only one was statistically significant, being slightly above its MDC.

The results of GWPP monitoring indicate no significant change from previous years.

Part A
EFFLUENT MONITORING

1.0 INTRODUCTION

The PBNP effluent monitoring program is designed to comply with federal regulations for ensuring the safe operation of PBNP with respect to releases of radioactive material to the environment and its subsequent impact on the public. Pursuant to 10 CFR 50.34a, operations should be conducted to keep the levels of radioactive material in effluents to unrestricted areas as low as reasonably achievable (ALARA). In 10 CFR 50, Appendix I, the Nuclear Regulatory Commission (NRC) provides the numerical values for what it considers to be the appropriate ALARA design objectives to which the licensee's calculated effluent doses may be compared. These doses are a small fraction of the dose limits specified by 10 CFR 20.1301 and lower than the Environmental Protection Agency (EPA) limits specified in 40 CFR 190.

10 CFR 20.1302 directs NextEra Energy Point Beach, LLC (NextEra) to make the appropriate surveys of radioactive materials in effluents released to unrestricted and controlled areas. Liquid wastes are monitored by inline radiation monitors as well as by isotopic analyses of samples of the waste stream prior to discharge from PBNP. Airborne releases of radioactive wastes are monitored in a similar manner. Furthermore, for both liquid and atmospheric releases, the appropriate portions of the radwaste treatment systems are used as required to keep releases ALARA. Prior to release, results of isotopic analyses are used to adjust the release rate of discrete volumes of liquid and atmospheric wastes (from liquid waste holdup tanks and from gas decay tanks) such that the concentrations of radioactive material in the air and water beyond PBNP are below the PBNP Technical Specification concentration limits for liquid effluents and release rate limits for gaseous effluents.

Solid wastes are shipped offsite for disposal at NRC licensed facilities. The amount of radioactivity in the solid waste is determined prior to shipment in order to determine the proper shipping configuration as regulated by the Department of Transportation and the NRC.

10 CFR 72.210 grants a general license for an Independent Spent Fuel Storage Installation (ISFSI) to all nuclear power reactor sites operating under 10 CFR 50. The annual reporting requirement pursuant to 10 CFR 72.44(d)(3) is no longer applicable. However, any release of radioactive materials from the operation of the ISFSI must also comply with the limits of Part 20 and Part 50 Appendix I design objectives. The dose criteria for effluents and direct radiation specified by 10 CFR 72.104 states that during normal operations and anticipated occurrences, the annual dose equivalent to any real individual beyond the controlled area must not exceed 25 mrem to the whole body, 75 mrem to the thyroid, and 25 mrem to any other organ. The dose from naturally occurring radon and its decay products are exempt. Because the loading of the storage casks occurs within the primary auxiliary building of PBNP, the doses from effluents due to the loading process will be assessed and quantified as part of the PBNP Radiological Effluent Control Program (RECM).

2.0 RADIOACTIVE LIQUID RELEASES

The radioactive liquid release path to the environment is via the circulating water discharge. A liquid waste treatment system in conjunction with administrative controls is used to minimize the impact on the environment and maintain doses to the public ALARA from the liquid releases.

2.1 Doses From Liquid Effluent

Doses from liquid effluent are calculated using the methodology of the Offsite Dose Calculation Manual (ODCM). These calculated doses use parameters such as the amount of radioactive material released, the total volume of liquid, the total volume of dilution water, and usage factors (e.g., water and fish consumption, shoreline and swimming factors). These calculations produce a conservative estimation of the dose. For compliance with 10 CFR 50, Appendix I design objectives, the annual dose is calculated to the hypothetical maximally exposed individual (MEI). The MEI is assumed to reside at the site boundary in the highest χ/Q sector and is maximized with respect to occupancy, food consumption, and other uses of this area. As such, the MEI represents an individual with reasonable deviations from the average for the general population in the vicinity of PBNP. A comparison of the calculated doses to the 10 CFR 50, Appendix I design objectives is presented in Table 2-1. The conservatively calculated dose to the MEI is a very small fraction of the Appendix I design objective.

Table 2-1
Comparison of 2012 Liquid Effluent Calculated Doses to 10 CFR 50 Appendix I Design Objectives

Annual Limit [mrem]	Highest Total Calculated Dose [mrem]	% of Design Objective
6 (whole body)	0.00684	0.114 %
20 (any organ)	0.00793	0.040 %

2.2 2012 Circulating Water Radionuclide Release Summary

Radioactive liquid releases via the circulating water discharge are summarized by individual source and total curies released on a monthly basis and presented in Table 2-2. These releases are composed of processed waste, wastewater effluent, and blowdown from Units 1 and 2. The wastewater effluent consists of liquid from turbine hall sumps, plant well house backwashes, sewage treatment plant effluent, water treatment plant backwashes, the Unit 1 and 2 facade sumps, and the subsurface drainage system sump.

2.3 2012 Isotopic Composition of Circulating Water Discharges

The isotopic composition of circulating water discharges during the current reporting period is presented in Table 2-3. The noble gases released in liquids are reported with the airborne releases in Section 3.

The total isotopic curie distribution (gamma emitters plus hard-to-detects other that strontium) decreased by about 30% from 2011. The isotopes of Co, Ag, Sn, and Sb decreased whereas Cr-51, Fe-59, Ni-63, Zn-65, and Nb/Zr-95 increased. As in 2011, there was no Sr-89/90 in liquids during 2012. H-3 was up about 60% compared to 2011. The major H-3 increases occurred in July and September and are associated with the reactor trips. Tritium continues to be the major radionuclide released via liquid discharges.

2.4 Beach Drain System Releases Tritium Summary

Beach drain is the term used to describe the point at which the site yard drainage system empties onto the beach of Lake Michigan. Six of these outfalls carry yard and roof drain runoff to the beach. A seventh outfall drains a small portion of the grassy area on top of the bluff overlooking the lake. Each of the drains is sampled monthly. The quarterly results of monitoring the beach drains are presented in Table 2-4. The total monthly flow is calculated assuming that the flow rate at the time of sampling persists for the whole month. During 2012, no tritium was observed in any of the beach drains at the effluent LLDs. The source of the previous H-3 in the beach drains has been determined to be recapture as described below. Therefore, if H-3 had been found in the beach drains, it would not be counted as effluent as including beach drain H-3 in the effluent totals would be double counting (NRC RIS 2008-03, Return/Re-use of Previously Discharged Radioactive Effluents).

The principle source of water for the beach drains is the yard drain system. Yard drain water sources are rain and snow melt. During the winter natural melting is enhanced by the use of snow melting machines. The melt water empties into the yard drains. Additionally, various roof drains connect to the yard drain system. In addition to precipitation, the roof drains also carry condensate from various building AC units. A secondary source appears to be groundwater inleakage. This is evidenced by flow during periods of no precipitation.

Because there are no external storage tanks or pipes that carry radioactive liquids, the main source of radioactivity for this system is recapture/washout of airborne H-3 discharges via the yard drain system. Groundwater inleakage may bring groundwater flow of H-3 from the up gradient area of the former retention pond as well as precipitation recharging the groundwater close to the plant in areas not drained by the yard drains. Because of these various recapture sources, the beach drains also are sampled as part of the ground water monitoring program. These results and other groundwater monitoring results are presented in Part D of this Annual Monitoring Report.

Table 2-2
Summary of Circulating Water Discharge
January 1, 2012 through December 31, 2012

	Jan	Feb	Mar	Apr	May	Jun	Total Jan-Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total
Total Activity Released (Ci)														
Gamma Scan(+HTDs)[1]	3.56E-05	5.09E-03	1.89E-04	7.98E-04	2.63E-03	4.64E-05	8.79E-03	1.79E-03	4.62E-03	7.42E-03	1.44E-03	1.94E-02	1.38E-02	5.72E-02
Gross Alpha	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Tritium	3.86E+00	9.98E+00	6.87E+00	5.97E+00	8.54E+01	1.36E+01	1.26E+02	2.56E+02	7.36E+01	2.27E+02	8.39E+01	3.07E+01	3.23E+01	8.29E+02
Strontium (89/90/92)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total Vol Released (gal)														
Processed Waste	2.41E+04	6.49E+04	4.93E+04	2.50E+04	7.18E+04	6.17E+04	2.97E+05	1.22E+05	5.78E+04	8.82E+04	1.14E+05	1.32E+05	1.03E+05	9.14E+05
Waste Water Effluent[2]	3.14E+06	3.10E+06	3.38E+06	3.05E+06	3.07E+06	2.39E+06	1.81E+07	2.97E+06	2.69E+06	9.75E+09	3.51E+06	3.06E+06	3.39E+06	9.78E+09
U1 SG Blowdown	6.14E+06	5.42E+06	4.60E+06	4.16E+06	4.43E+06	3.69E+06	2.84E+07	5.04E+06	5.13E+06	4.92E+06	2.93E+06	4.20E+06	2.64E+06	5.33E+07
U2 SG Blowdown	3.95E+06	3.55E+06	2.89E+06	4.37E+06	3.63E+06	2.90E+06	2.13E+07	5.00E+06	4.69E+06	4.23E+06	2.84E+06	1.81E+05	5.11E+06	4.34E+07
Total Gallons	1.33E+07	1.21E+07	1.09E+07	1.16E+07	1.12E+07	9.05E+06	6.82E+07	1.31E+07	1.26E+07	9.76E+09	9.40E+06	7.57E+06	1.12E+07	9.88E+09
Total cc	5.02E+10	4.59E+10	4.13E+10	4.39E+10	4.24E+10	3.42E+10	2.58E+11	4.97E+10	4.76E+10	3.69E+13	3.56E+10	2.87E+10	4.26E+10	3.74E+13
Dilution vol(cc)[3]	6.62E+13	5.98E+13	6.62E+13	1.03E+14	1.15E+14	1.11E+14	5.21E+14	1.15E+14	1.15E+14	1.11E+14	1.13E+14	5.91E+13	9.42E+13	1.13E+15
Avg diluted discharge conc (µCi/cc)														
Gamma Scan (+HTDs)[1]	5.38E-13	8.51E-11	2.85E-12	7.75E-12	2.29E-11	4.18E-13		1.56E-11	4.02E-11	6.67E-11	1.28E-11	3.28E-10	,	
Gross Alpha	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		1.76E-14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Tritium	5.83E-08	1.67E-07	1.04E-07	5.80E-08	7.43E-07	9.53E-07		2.23E-06	6.41E-07	2.04E-06	7.45E-07	5.19E-07	3.43E-07	
Strontium (89/90/92)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Max Batch Discharge Conc (µCi/cc)														
Tritium	5.28E-06	1.04E-05	3.71E-06	6.13E-06	3.37E-05	4.25E-06		3.73E-05	3.51E-05	3.98E-05	2.44E-05	9.74E-06	1.42E-05	
Gamma Scan	3.73E-11	6.80E-10	1.19E-11	5.82E-11	8.92E-11	9.65E-12		7.34E-10	4.07E-11	1.77E-11	1.21E-09	8.17E-09	8.55E-09	

1 HTDs include Fe-55, C-14, Ni-63, and Tc-99. Does not include strontium which is totaled separately.
2 The waste water effluent system replaced the Retention Pond which was taken out of service in September 2002.
3 Circulating water discharge from both units.
Note: Dissolved noble gases detected in liquid effluents (e.g., Xe-133, Xe-135, etc.) are added to the atmospheric release summaries

Table 2-3
Isotopic Composition of Circulating Water Discharges (Curies)
January 1, 2012 through December 31, 2012

							Total							Total
Nuclide	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jan-Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan-Dec**
H-3	3.86E+00	9.98E+00	6.87E+00	5.97E+00	8.54E+01	1.36E+01	1.26E+02	2.56E+02	7.36E+01	2.27E+02	8.39E+01	3.07E+01	3.23E+01	8.29E+02
C-14	0.00E+00	5.16E-04	0.00E+00	0.00E+00	1.17E-03	0.00E+00	1.69E-03	8.78E-04	3.72E-03	6.58E-03	7.34E-04	4.60E-04	2.04E-04	1.43E-02
F-18	1.76E-06	0.00E+00	1.78E-04	7.76E-04	1.21E-03	3.04E-05	2.20E-03	2.57E-06	7.79E-04	6.68E-04	4.47E-04	5.09E-04	7.76E-04	5.38E-03
Cr-51	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.53E-05	0.00E+00	0.00E+00	0.00E+00	9.28E-03	6.14E-03	1.55E-02
Mn-54	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.38E-06	0.00E+00	0.00E+00	0.00E+00	1.95E-04	1.25E-04	3.21E-04
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fe-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.24E-04	6.28E-05	1.86E-04
Co-57	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-58	6.83E-06	2.28E-05	1.55E-06	0.00E+00	3.08E-06	0.00E+00	3.43E-05	1.83E-04	4.12E-06	0.00E+00	0.00E+00	2.12E-03	1.50E-03	3.85E-03
Co-60	1.25E-05	1.01E-04	8.66E-06	2.27E-05	9.49E-05	1.60E-05	2.56E-04	4.12E-04	5.37E-05	7.89E-05	1.02E-04	2.27E-03	1.71E-03	4.88E-03
Ni-63	1.46E-05	4.13E-03	0.00E+00	0.00E+00	5.70E-05	0.00E+00	4.20E-03	1.15E-04	3.06E-05	6.34E-05	1.08E-04	8.01E-05	1.06E-04	4.71E-03
Zn-65	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.45E-04	6.53E-05	2.10E-04
As-76	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.71E-05	1.76E-04	2.03E-04
Sr-90	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nb-95	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.76E-06	0.00E+00	0.00E+00	0.00E+00	9.40E-04	7.08E-04	1.66E-03
Nb-97	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zr-95	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.63E-04	4.00E-04	9.63E-04
Tc-99	0.00E+00	2.95E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.95E-06	2.86E-05	9.40E-06	9.01E-06	2.76E-05	7.51E-06	6.66E-06	9.18E-05
Ag-110m	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.05E-06	0.00E+00	4.05E-06	3.13E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.18E-06
Sn-113	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.92E-05	4.29E-05	9.21E-05
Sn-117m	0.00E+00	1.45E-04	0.00E+00	0.00E+00	5.48E-05	0.00E+00	2.00E-04	2.48E-05	2.20E-05	2.36E-05	1.64E-05	2.57E-03	1.87E-03	4.73E-03
Sb-122	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.73E-06	0.00E+00	0.00E+00	0.00E+00	4.67E-06	2.32E-06	8.72E-06
Sb-124	0.00E+00	2.55E-05	0.00E+00	0.00E+00	1.80E-06	0.00E+00	2.73E-05	6.69E-05	3.31E-06	3.05E-06	1.46E-06	8.12E-05	4.56E-05	2.29E-04
Sb-125	0.00E+00	1.44E-04	0.00E+00	0.00E+00	4.51E-05	0.00E+00	1.89E-04	2.48E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.14E-04
I-131	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Te-132	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.28E-06	0.00E+00	1.28E-06
Cs-137	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.35E-06	0.00E+00	1.35E-06
Ba-140	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
La-140	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ce-141	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Note: The dissolved noble gases detected in liquid effluents (e.g., Xe-133, Xe-135, etc.) are added to the atmospheric release summaries. "-" = no analysis

Table 2-4
Subsoil System Drains - Tritium Summary
January 1, 2012, through December 31, 2012

	S-1	S-3	S-7	S-8	S-9	S-10	S-11
1st Qtr							
H-3 (Ci)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Flow (gal)	1.84E+06	1.88E+05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.46E+04
2nd Qtr							
H-3 (Ci)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Flow (gal)	7.93E+05	1.99E+05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.01E+04
3rd Qtr							
H-3 (Ci)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Flow (gal)	5.21E+05	1.25E+05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.03E+04
4th Qtr							
H-3 (Ci)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Flow (gal)	4.71E+05	2.44E+05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.76E+04

2.6 Land Application of Sewage Sludge

On January 13, 1988, pursuant to 10 CFR 20.302(a), NextEra received NRC approval for the disposal of sewage sludge, which may contain trace amounts of radionuclides, by land application on various properties surrounding the plant. Land application of sewage sludge is regulated by the Wisconsin Department of Natural Resources (WDNR). PBNP has not land applied sewage sludge for over a decade. Therefore, NextEra has not renewed its WDNR permit to dispose of sewage sludge in this manner.

There were no sludge disposals by land application during 2012. All disposals were done at the Manitowoc Sewage Treatment Plant.

2.7 Carbon-14

Carbon-14 (C-14) is a naturally occurring radionuclide. Nuclear weapons testing of the 1950s and 1960s significantly increased the amount of C-14 in the atmosphere. Small amounts of C-14 also are produced by nuclear reactors, but the amounts produced are less than C-14 produced by weapons testing or that occur naturally. NextEra began evaluating C-14 liquid discharges in 2009, prior to the issuance of Regulatory Guide (RG) 1.21, Rev 2 in June of 2009. NextEra continues to analyze batch liquid waste discharges for C-14 and reporting the results in the Annual Monitoring Report.

Beginning with the 2010 monitoring reports, the NRC requested that all nuclear plants report C-14 emissions. Pursuant to NRC guidance in RG 1.21, Rev 2, evaluation of C-14 in liquid wastes is not required because the quantity released via this pathway is much less than that contributed by gaseous emissions. However, based upon prior information received at the industry sponsored RETS-REMP Workshops, NextEra began C-14 analyses and reporting prior to the issuance of RG 1.21, Rev 2. The results show that C-14 meets the principal radionuclide criterion of RG 1.21. A principal radionuclide may be determined based on its relative contribution to the public dose compared to the 10 CFR 50, Appendix I, dose objectives, or the amount of activity discharged compared to other radionuclides in its effluent type. In this case, it is compared to other radionuclides discharged in liquids. Furthermore, RG 1.21 states that a radionuclide is a principal effluent component if it contributes greater than 1% of the Appendix I design objective dose compared to the other radionuclides in the effluent type, or, if it is greater than 1% of the activity of all radionuclides in the effluent type. The 2012 liquid discharge monthly and total C-14 in liquid discharges are documented in Table 2-3. The liquid C-14 dose contribution is included in the doses calculated for the hypothetically, maximally exposed individual.

3.0 RADIOACTIVE AIRBORNE RELEASES

The release paths to the environment contributing to radioactive airborne release totals during this reporting period were the auxiliary building vent stack, the drumming area vent stack, the letdown gas stripper, the Unit 1 containment purge stack, and the Unit 2 containment purge stack. A gaseous radioactive effluent treatment system in conjunction with administrative controls is used to minimize the impact on the environment from the airborne releases and maintain doses to the public ALARA.

3.1 Doses from Airborne Effluent

Doses from airborne effluent are calculated for the MEI following the methodology contained in the PBNP ODCM. These calculated doses use parameters such as the amount of radioactive material released, the concentration at and beyond the site boundary, the average site weather conditions, and usage factors (e.g., breathing rates, food consumption). In addition to the MEI doses, the energy deposited in the air by noble gas beta particles and gamma rays is calculated and compared to the corresponding Appendix I design objectives. A comparison of the annual Appendix I design objectives for atmospheric effluents to the highest organ dose and the noble gas doses calculated using ODCM methodology is listed in Table 3-1. The calculated doses include the C-14 contribution. The C-14 dose contribution has been required since 2010 (see Sections 3.4 through 3.6 for a more detailed description). The comparison between airborne effluent doses with and without C-14 is shown in Table 3-4. The highest dose is the child-bone category. The doses demonstrate that releases from PBNP to the atmosphere continue to be ALARA.

3.2 Radioactive Airborne Release Summary

Radioactivity released in airborne effluents for 2012 is summarized in Table 3-2. The total noble gas is about one-tenth of the 2011 value. Airborne particulates are about 25% of the 2011 total. Airborne tritium is about 10% lower.

3.3 Isotopic Airborne Releases

The monthly isotopic airborne releases for 2012, from which the airborne doses were calculated, are presented in Table 3-3. C-14 is not included in Table 3-3 because it was calculated and not measured. C-14 is discussed in the following sections.

3.4 Carbon-14

C-14 is a naturally occurring radionuclide. Nuclear weapons testing of the 1950s and 1960s significantly increased the amount of C-14 in the atmosphere. Small amounts of C-14 also are produced by nuclear reactors as neutrons interact with the dissolved oxygen and nitrogen in the primary coolant. However, these amounts produced by nuclear reactors are much less that those produced by weapons testing or that occur naturally. The NRC has requested that nuclear plants report C-14 emissions.

Pursuant to NRC guidance RG 1.21, Rev 2, most of the C-14 emissions from nuclear plant occur in the gaseous phase.

C-14 is a hard-to-detect radionuclide. It is not a gamma emitter and must be chemically separated from the effluent stream before it can be measured. Because nuclear plants currently are not equipped to perform this type of sampling, RG 1.21 allows for calculating C-14 discharges based on fission rates.

The Electric Power Research Institute (EPRI) undertook the task of developing the methodology for calculating C-14 generation and releases for the nuclear industry. The results were published as Technical Report 1021106, December 2010, "Estimation of Carbon-14 in Nuclear Power Plant Gaseous Effluents."

The PBNP C-14 generation for 2012 was calculated using the EPRI guidance and the new core parameter resulting from the power uprate. The calculated amounts were 5.85 Ci for Unit 1 and 5.83 Ci for Unit 2 yielding a total of 11.67 Ci. This total is higher than the calculated amount for 2010 and 2011 due to the power uprate. This calculated total is roughly 800 times higher than the 1.43E-02 Ci of C-14 determined by analyses of composites from liquid waste batch discharges, steam generator blowdown, and other waste streams.

3.5 C-14 Airborne Effluent Dose Calculation

The dose from the airborne C-14 is dependent on its chemical form. The C-14 released to the atmosphere consists of both organic and inorganic species. Both the inorganic and organic C-14 contributes to the inhalation dose. Only the inorganic $^{14}CO_2$ species contributes to the dose from the ingestion of photosynthetically incorporated C-14. The organic forms such as methane, CH_4, are not photosynthetically active. For PWRs such as PBNP, most of the gaseous C-14 occurs as methane, $^{14}CH_4$, not as carbon dioxide, $^{14}CO_2$.

The amount of $^{14}CO_2$ present in the PBNP airborne effluent has not been measured. However, such measurements have been made at a comparable PWR sites similar to the PBNP design. The Ginna Nuclear Generating Station is of similar design to PBNP. It is a Westinghouse 2-loop PWR of the same vintage as PBNP and approximately the same power (prior to the PBNP power uprate). Measurements at Ginna for 18 months in 1980 - 1981 (Kunz, "Measurement of ^{14}C Production and Discharge From the Ginna Nuclear Power Reactor," 1982) found that ten percent of the C-14 was discharged as $^{14}CO_2$. Therefore, 10% of the 11.67 Ci of C-14 calculated for PBNP by EPRI will be used in the ingestion dose calculations.

C-14 dose calculations were made using the dose factors and the methodology of RG 1.109. The inhalation dose was calculated using all of the C-14 calculated to be released. All the C-14 is used because whether the C-14 is in the form of $^{14}CO_2$ or one of the organic forms, such as CH_4, both would be inhaled and contribute to a lung dose.

For the other existing pathways, milk, meat, and produce, the dose depends upon the amount incorporated into biomass consumed by cattle and people; forage for cattle and produce for humans. Incorporation only occurs via photosynthesis. Photosynthesis only incorporates $^{14}CO_2$ and hence the use of only the 10% fraction of the total C-14 release for these pathways.

The airborne effluent C-14 dose calculations were made as described above. They were made for the MEI as explained in Section 2.1. This approach utilizes all the pathways that are applicable to a hypothetical person residing at the site boundary. Because C-14 is present as a gas, the pathways are milk, meat, and produce (vegetables, fruit, and grain) and the RG 1.109, Table E-5, usage factors applied to the calculation. As such, the resulting dose will be conservative in that the produce usage factor includes grain and fruit and these pathways do not exist in the vicinity of the point for which the C-14 doses are calculated. Furthermore, because leafy vegetables are included in the produce pathway, they are not used as a separate pathway because that would result in double accounting for leafy vegetable dose contribution.

3.6 C-14 Measurements

No C-14 measurements were made of PBNP airborne effluents. In 2010, C-14 was measured in crops grown on fields in the owner controlled area located in the highest χ/Q sector at the site's south boundary. One field is leased for feed corn by a dairy south of the plant. That dairy is part of the REMP. In an adjacent field soybeans are grown by another farmer. These two crops were sampled in this sector and as well as in a background location about 17 miles SW of the plant. Based on the measurement error, there was no statistical difference between the results obtained on site in the highest χ/Q sector as compared to the background site some 17 miles away (2011 AMR, Table 10-3). These results demonstrated that the dose from C-14 in PBNP airborne effluents should not measurably increase the C-14 dose compared to that received from naturally occurring C-14 in plants (1 mrem: NCRP Report 93, Ionizing Radiation Exposure of the Population of the United States, 1987, p.12).

3.7 Errata to Previous Annual Monitoring Reports

There are no airborne effluent corrections required for the 2011 Annual Monitoring Report.

Table 3-1
Comparison of 2012 Airborne Effluent Calculated Doses to 10 CFR 50 Appendix I Design Objectives

Category	Annual Appendix I Design Objective	January-December Calculated Dose	Percent of Appendix I Design Objective
Particulate	30 mrem/organ	0.240 mrem	0.800
Noble gas	40 mrad (beta air)	0.000100 mrad	0.00025
Noble gas	20 mrad (gamma air)	0.000236 mrad	0.00118
Noble gas	30 mrem/skin	0.000335 mrem	0.00011
Noble gas	10 mrem (whole body)	0.000223 mrem	0.00223

Table 3-2
Radioactive Airborne Effluent Release Summary
January 1, 2012, through December 31, 2012

	Jan	Feb	Mar	Apr	May	Jun	Total Jan-Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Total NG from Liq (Ci)	0.00E+00	4.76E-04	0.00E+00	0.00E+00	1.81E-04	0.00E+00	6.57E-04	3.80E-03	5.44E-04	2.18E-03	1.03E-02	1.06E-02	1.51E-02	4.32E-02
Total Noble Gas (Ci)[1]	6.79E-02	6.11E-02	6.48E-02	5.03E-02	5.15E-02	4.99E-02	3.46E-01	6.63E-02	4.73E-02	4.33E-02	1.35E-01	1.85E-01	6.47E-02	8.87E-01
Total Radioiodines (Ci)[2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.80E-05	0.00E+00	0.00E+00	0.00E+00	1.04E-05	0.00E+00	2.85E-05
Total Particulate (Ci)[3]	1.34E-10	9.78E-11	1.28E-10	7.28E-11	5.81E-11	5.84E-11	5.49E-10	1.01E-06	1.25E-06	9.89E-07	0.00E+00	5.48E-05	0.00E+00	5.80E-05
Alpha (Ci)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Strontium(Ci)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
All other beta + gamma (Ci)	1.34E-10	9.78E-11	1.28E-10	7.28E-11	5.81E-11	5.84E-11	5.49E-10	1.01E-06	1.25E-06	9.89E-07	0.00E+00	5.48E-05	0.00E+00	5.80E-05
Total Tritium (Ci)	6.29E+00	4.38E+00	6.41E+00	7.04E+00	7.02E+00	4.57E+00	3.57E+01	6.32E+00	8.69E+00	2.66E+00	3.81E+00	7.66E+00	4.99E+00	6.98E+01
Max NG H'rly Rel.(Ci/sec)	4.60E-08	9.19E-08	5.99E-08	5.38E-08	5.61E-08	6.15E-08		5.61E-08	6.54E-08	5.88E-08	6.01E-08	4.76E-08	5.18E-08	

[1] Total noble gas (airborne + liquid releases).
[2] Airborne radioiodines only include I-131 and I-133. Although for dose calculations iodines are grouped with particulates, for this reporting table they are separated from the particulate group.
[3] Total Particulate is the sum of alpha, strontium, and others. It does not include radioiodines or C-14. C-14 was calculated for the year and no monthly values are available.

TABLE 3-3
Isotopic Composition of Airborne Releases
January 1, 2012 through December 31, 2012

Nuclide	Jan (Ci)	Feb (Ci)	Mar (Ci)	Apr (Ci)	May (Ci)	Jun (Ci)	Semi-Annual	Jul (Ci)	Aug (Ci)	Sep (Ci)	Oct (Ci)	Nov (Ci)	Dec (Ci)	Total (Ci)
H-3	6.29E+00	4.38E+00	6.41E+00	7.04E+00	7.02E+00	4.57E+00	3.57E+01	6.32E+00	8.69E+00	2.66E+00	3.81E+00	7.66E+00	4.99E+00	6.98E+01
Ar-41	4.42E-02	4.15E-02	5.21E-02	4.25E-02	4.54E-02	4.24E-02	2.68E-01	5.45E-02	3.75E-02	3.49E-02	5.62E-02	1.48E-02	4.81E-02	5.14E-01
Kr-85	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Kr-85m	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E-05	7.62E-04	0.00E+00	7.75E-04
Kr-87	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.98E-04	0.00E+00	1.98E-04
Kr-88	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.54E-04	0.00E+00	9.54E-04
Xe-131m	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.23E-04	0.00E+00	3.23E-04
Xe-133	2.35E-02	1.97E-02	1.27E-02	7.74E-03	6.14E-03	7.44E-03	7.72E-02	1.15E-02	9.67E-03	8.40E-03	7.58E-02	1.47E-01	1.62E-02	3.46E-01
Xe-133m	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.07E-06	0.00E+00	0.00E+00	1.08E-03	2.33E-03	1.50E-04	3.57E-03
Xe-135	2.82E-04	1.72E-06	0.00E+00	7.49E-05	0.00E+00	0.00E+00	3.59E-04	2.91E-04	4.71E-05	4.72E-05	1.79E-03	1.82E-02	2.34E-04	2.09E-02
Xe-135m	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Xe-138	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
F-18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.47E-08	0.00E+00	0.00E+00	0.00E+00	1.47E-08
Cr-51	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.36E-05	0.00E+00	2.36E-05
Mn-54	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.75E-06	0.00E+00	4.75E-06
Co-58	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.90E-06	0.00E+00	5.90E-06
Co-60	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.30E-06	0.00E+00	7.30E-06
Zn-65	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.39E-07	0.00E+00	4.39E-07
Nb-95	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.80E-06	0.00E+00	5.80E-06
Zr-95	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.49E-06	0.00E+00	3.49E-06
I-131	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.48E-06	0.00E+00	0.00E+00	0.00E+00	6.05E-07	0.00E+00	2.09E-06
I-132	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.84E-06	0.00E+00	9.84E-06
I-133	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.66E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.66E-05
Sb-124	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.98E-08	0.00E+00	6.98E-08
Sb-125	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.55E-08	0.00E+00	4.55E-08
Cs-137	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.44E-07	0.00E+00	0.00E+00	1.12E-08	0.00E+00	2.56E-07
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.39E-06	0.00E+00	2.39E-06
Ni-63	1.34E-10	9.78E-11	1.28E-10	0.00E+00	0.00E+00	0.00E+00	3.60E-10	1.01E-06	1.01E-06	9.75E-07	0.00E+00	1.52E-06	0.00E+00	4.51E-06
Tc-99	0.00E+00	0.00E+00	0.00E+00	7.28E-11	5.81E-11	5.84E-11	1.89E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.89E-10
Sr-89	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sr-90	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Note: The Noble Gases listed above include the liquid contribution

Table 3-4
Comparison of Airborne Effluent Doses

2012 Airborne Particulate + Tritium Dose (mrem)

	Bone	Liver	T-WB	Thyroid	Kidney	Lung	GI-LLI	Skin
Adult	1.71E-04	1.63E-02	1.66E-02	1.64E-02	1.63E-02	1.63E-02	1.64E-02	2.83E-04
Teen	2.30E-04	1.88E-02	1.90E-02	1.88E-02	1.88E-02	1.87E-02	1.88E-02	2.83E-04
Child	3.66E-04	2.74E-02	2.77E-02	2.75E-02	2.74E-02	2.74E-02	2.74E-02	2.83E-04
Infant	1.05E-04	1.21E-02	1.23E-02	1.22E-02	1.21E-02	1.21E-02	1.21E-02	2.83E-04

2012 Carbon-14 Dose (mrem)

	Bone	Liver	T. Body	Thyroid	Kidney	Lungs	GI-LLI	Skin
Adult	6.61E-02	1.31E-02	1.31E-02	1.31E-02	1.31E-02	1.31E-02	1.31E-02	0.00E+00
Teen	1.04E-01	2.06E-02	2.06E-02	2.06E-02	2.06E-02	2.06E-02	2.06E-02	0.00E+00
Child	2.40E-01	4.78E-02	4.78E-02	4.78E-02	4.78E-02	4.78E-02	4.78E-02	0.00E+00
Infant	1.22E-01	2.59E-02	2.59E-02	2.59E-02	2.59E-02	2.59E-02	2.59E-02	0.00E+00

2012 Total Airborne Non-Noble Gas Dose
(Particulate + H-3 + C-14 (mrem))

	Bone	Liver	T-WB	Thyroid	Kidney	Lung	GI-LLI	Skin
Adult	6.63E-02	2.95E-02	2.97E-02	2.95E-02	2.95E-02	2.95E-02	2.95E-02	2.83E-04
Teen	1.04E-01	3.94E-02	3.96E-02	3.94E-02	3.94E-02	3.94E-02	3.94E-02	2.83E-04
Child	2.40E-01	7.52E-02	7.55E-02	7.53E-02	7.52E-02	7.52E-02	7.52E-02	2.83E-04
Infant	1.22E-01	3.80E-02	3.82E-02	3.81E-02	3.80E-02	3.80E-02	3.80E-02	2.83E-04
Ann.Limit	3.00E+01	3.00E+01		3.00E+01	3.00E+01	3.00E+01	3.00E+01	3.00E+01
% Limit	8.00E-01	2.51E-01		2.51E-01	2.51E-01	2.51E-01	2.51E-01	9.43E-04

The percent of limit is calculated using the highest total dose, the Child Age Group.

4.0 RADIOACTIVE SOLID WASTE SHIPMENTS

4.1 Types, Volumes, and Activity of Shipped Solid Waste

The following types, volumes, and activity of solid waste were shipped from PBNP for offsite disposal or burial during 2012. No Type C or D waste was shipped. No irradiated fuel was shipped offsite. The volume, activity and type of waste are listed in Table 4-1.

Table 4-1
Quantities and Types of Waste Shipped from PBNP in 2012

Type of Waste	Quantity	Activity
A. Spent resins, filter sludge, evaporator bottoms, etc.	9.900 m^3	71.590 Ci
	349.6 ft^3	
B. Dry compressible waste, contaminated equipment, etc	335.7 m^3	0.925 Ci
	11854.6 ft^3	
C. Irradiated components, control rods, etc.	N/A m^3	N/A Ci
	ft^3	
D. Other	N/A m^3	N/A Ci
	ft^3	

4.2 Major Nuclide Composition (by Type of Waste)

The major radionuclide content of the 2012 solid waste was determined by gamma isotopic analysis and the application of scaling factors for certain indicator radionuclides based on the measured isotopic content of representative waste stream samples. The estimated isotopic content is presented in Table 4-2. Only those radionuclides with detectable activity are listed.

Table 4-2
2012 Estimated Solid Waste Major Radionuclide Composition

TYPE A		TYPE B	
	Percent		Percent
Nuclide	Abundance	Nuclide	Abundance
Ni-63	45.5055%	Co-60	34.1720%
Co-60	25.2948%	Ni-63	19.2701%
Fe-55	10.5678%	Cs-137	14.3109%
Co-58	8.7378%	Fe-55	12.1233%
Mn-54	3.2226%	Nb-95	6.2200%
Cs-137	3.1089%	Sb-125	2.3689%
Sb-125	1.9609%	Co-58	1.6714%
Ni-59	0.4015%	Zr-95	1.5739%
Ce-144	0.2735%	Tc-99	0.9741%
H-3	0.2017%	H-3	0.9688%
C-14	0.1917%	Mn-54	0.9469%
Co-57	0.1373%	Pu-241	0.8838%
Pu-241	0.1012%	Cr-51	0.7354%
Nb-95	0.0854%	Sb-124	0.6978%
Sr-90	0.0737%	Sr-90	0.6841%
Sb-124	0.0432%	Ag-110m	0.4424%
Sr-89	0.0279%	Am-241	0.4306%
Ag-110m	0.0248%	Ce-144	0.3979%
Zr-95	0.0190%	Zn-65	0.3079%
Tc-99	0.0097%	Pu-238	0.1282%
Zn-65	0.0033%	Pu-239	0.1207%
Am-241	0.0025%	Pu-240	0.1198%
Nb-94	0.0011%	Nb-94	0.1126%
Pu-238	0.0010%	Ag-108m	0.0855%
Pu-239	0.0009%	Co-57	0.0755%
Ag-108m	0.0009%	Sr-89	0.0689%
Cm-243	0.0007%	C-14	0.0682%
Pu-240	0.0002%	Cm-243	0.0212%
Cm-244	0.0002%	Cm-244	0.0165%
Cm-242	0.0001%	Cm-242	0.0029%
Pu-242	0.0001%		

4.3 Solid Waste Disposition

There were nine solid waste shipments from PBNP during 2012. The dates and destinations are shown in Table 4-3.

Table 4-3
2012 PBNP Radioactive Waste Shipments

Date	Destination
01/15/12	Erwin, TN
02/29/12	Oak Ridge, TN
03/09/12	Oak Ridge, TN
06/15/12	Oak Ridge, TN
09/25/12	Erwin, TN
10/11/12	Clive, UT
11/06/12	Oak Ridge, TN
11/28/12	Oak Ridge, TN
11/30/12	Clive, UT

5.0 NONRADIOACTIVE CHEMICAL RELEASES

5.1 Scheduled Chemical Waste Releases

Scheduled chemical waste releases to the circulating water system from January 1, 2012, to June 30, 2012, included 8.60E+05 gallons of neutralized wastewater. The wastewater contained 0 lbs. of suspended solids and 8.64E+03 lbs. of dissolved solids.

Scheduled chemical waste releases to the circulating water system from July 1, 2012, to December 31, 2012, included 5.47E+05 gallons of neutralized wastewater. The wastewater contained 1.36E+00 lbs. of suspended solids and 1.36E+03 lbs. of dissolved solids.

Scheduled chemical waste releases are based on the average analytical results obtained from sampling a representative number of neutralizing tanks.

5.2 Miscellaneous Chemical Waste Releases

Miscellaneous chemical waste releases from the wastewater effluent (based on effluent analyses) to the circulating water for January 1, 2012, to June 30, 2012, included 1.82E+07 gallons of clarified wastewater. The wastewater contained 4.05E+03 lbs. of suspended solids.

Miscellaneous chemical waste releases from the wastewater effluent (based on effluent analyses) to the circulating water for July 1, 2012, to December 31, 2012, included 1.81E+07 gallons of clarified wastewater. The wastewater contained 2.93E+03 lbs. of suspended solids.

Miscellaneous chemical waste released directly to the circulating water, based on amount of chemicals used from January 1, 2012, to June 30, 2012, included 4.36E+05 lbs. of sodium bisulfite solution (1.66E+05 lbs. sodium bisulfite), 4.70E+05 lbs of Sodium Hypochlorite Solution (5.87E+04 lbs. sodium hypochlorite), and 5.48E+03 lbs. Acti-Brom 1338 (2.47E+03 lbs. sodium bromide).

Miscellaneous chemical waste released directly to the circulating water, based on amount of chemicals used from July 1, 2012, to December 31, 2012, included 5.80E+05 lbs. of sodium bisulfite solution (2.20E+05 lbs sodium bisulfite), 54.38E+05 lbs. Sodium Hypochlorite Solution (5.48E+04 lbs. sodium hypochlorite), 6.04E+03 lbs. Acti-Brom 1338 (2.72E+03 lbs. sodium bromide).

6.0 CIRCULATING WATER SYSTEM OPERATION

The circulating water system operation during this reporting period for periods of plant operation is described in Table 6-1.

Table 6-1
Circulating Water System Operation for 2012

	UNIT	JAN	FEB	MAR	APR	MAY	JUN
Average Volume Cooling Water Discharge [million gal/day]**	1	291.9	291.9	291.5	460.9	499.3	495.9
	2	291.9	291.9	291.5	460.6	499.3	495.9
Average Cooling Water Intake Temperature [°F]	1	41.0	41.8	44.8	48.0	49.6	53.0
	2	41.8	42.1	44.5	48.6	50.1	52.1
Average Cooling Water Discharge Temperature [°F]	1	79.8	79.9	82.5	72.1	70.9	71.3
	2	78.0	78.6	80.9	68.2	67.3	66.4
Average Ambient Lake Temperature [°F]		35.0	35.7	39.5	44.1	45.2	46.2

OOS - Data not available due to instrument issues.

Table 6-1(continued)
Circulating Water System Operation for 2012

	UNIT	JUL	AUG	SEP	OCT	NOV*	DEC
Average Volume Cooling Water Discharge [million gal/day]**	1	498.6	499.3	499.3	499.8	491.0	438.0
	2	498.6	499.3	499.3	479.3	203.9	409.6
Average Cooling Water Intake Temperature [°F]	1	68.0	66.8	59.7	51.9	43.7	41.3
	2	57.8	65.2	59.8	51.4	44.7	40.5
Average Cooling Water Discharge Temperature [°F]	1	89.2	86.0	79.1	71.7	67.9	66.1
	2	84.0	84.4	77.6	71.1	41.3	64.6
Average Ambient Lake Temperature [°F]		62.4	61.1	54.8	47.5	42.6	36.8

*U2 outage circ water shut down 11/2/12 - 11/25/12
** For days with cooling water discharge flow.

Part B
Miscellaneous Reporting Requirements

7.0 ADDITIONAL REPORTING REQUIREMENTS

7.1 Revisions to the PBNP Effluent and Environmental Programs

The ODCM, the EM, and the RECM were not revised in 2012.

7.2 Interlaboratory Comparison Program

ATI Environmental, Inc, Midwest Laboratory, the analytical laboratory contracted to perform the radioanalyses of the PBNP environmental samples, participated in the Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP) as well as in the interlaboratory comparison studies administered by Environmental Resources Associates (ERA) during 2012. The ERA environmental crosscheck program replaces the Environmental Measurements Laboratory (EML) Quality Assessment Program which was discontinued. The results of these comparisons can be found in Appendix A.

7.3 Special Circumstances

No special circumstances report regarding operation of the explosive gas monitor for the waste gas holdup system was needed during 2012.

Part C
RADIOLOGICAL ENVIRONMENTAL MONITORING

8.0 INTRODUCTION

The objective of the PBNP Radiological Environmental Monitoring Program (REMP) is to determine whether the operation of PBNP or the ISFSI has radiologically impacted the environment. To accomplish this, the REMP collects and analyzes air, water, milk, soil, vegetation, and fish samples for radionuclides and uses thermoluminescent dosimeters (TLDs) to determine the ambient radiation background. The analyses of the various environmental media provide data on measurable levels of radiation and radioactive materials in the principal pathways of environmental exposure. These measurements also serve as a check of the efficacy of PBNP effluent controls.

The REMP fulfills the requirements of 10 CFR 20.1302, PBNP General Design Criterion (GDC) 17, GDC 64 of 10 CFR 50, Appendix A, and Sections IV.B.2 and IV.B.3 of 10 CFR 50, Appendix I, for the operation of the plant. A subset of the PBNP REMP samples, consisting of air, soil and vegetation, also fulfills 10 CFR 72.44(d)(2) for operation of the ISFSI. Additionally, TLDs provide the means to measure changes in the ambient environmental radiation levels at sites near the ISFSI and at the PBNP site boundary to ensure that radiation levels from the ISFSI are maintained within the dose limits of 10 CFR 72.104. Because the ISFSI is within the PBNP site boundary, radiation doses from PBNP and the ISFSI, combined, must be used to assess compliance with 10 CFR 72.122 and 40 CFR 190. Therefore, radiological environmental monitoring for the ISFSI is provided by selected sampling sites, which are part of the PBNP REMP.

For the aquatic environment, the samples include water as well as the biological integrators, such as fish and filamentous algae. Because of their migratory behavior, fish are wide area integrators. In contrast, the filamentous algae periphyton is attached to shoreline rocks and concentrate nuclides from the water flowing by their point of attachment. Grab samples of lake water provide a snapshot of radionuclide concentrations at the time the sample is taken; whereas analysis of fish and filamentous algae yield concentrations integrated over time.

The air-grass-cow-milk exposure pathway unites the terrestrial and atmospheric environments. This pathway is important because of the many dairy farms around PBNP. Therefore, the REMP includes samples of air, general grasses and milk from the PBNP environs. An annual land use survey is made to determine whether the assumptions on the location of dairy cattle remain conservative with respect to dose calculations for PBNP effluents. The dose calculations assume that the dairy cattle are located at the south site boundary, the highest depositional sector. In addition, soil samples are collected and analyzed in order to monitor the potential for long-term buildup of radionuclides in the vicinity of PBNP.

For the measurement of ambient environmental radiation levels that may be affected by direct radiation from PBNP or by noble gas effluents, the REMP employs a series of TLDs situated around PBNP and the ISFSI.

9.0 PROGRAM DESCRIPTION

9.1 Results Reporting Convention

The vendor used by NextEra to analyze the environmental samples is directed to report analysis results as measured by a detector, which can meet the required lower limit of detection (LLD) as specified in Table 2-2 of the Environmental Manual for each sample. The report provided by the vendor (see Appendix 1) contains values, which can be either negative, positive or zero plus/minus the two sigma counting uncertainty, which provide the 95% confidence level for the measured value.

The LLD is an *a priori* concentration value that specifies the performance capability of the counting system used in the analyses of the REMP samples. The parameters for the *a priori* LLD are chosen such that only a 5% chance exists of falsely concluding a specific radionuclide is present when it is not present at the specified LLD. Based on detector efficiency and average background activity, the time needed to count the sample in order to achieve the desired LLD depends upon the sample size. Hence, the desired LLD may be achieved by adjusting various parameters. When a suite of radionuclides are required to be quantified in an environmental sample such as lake water, the count time used is that required to achieve the LLD for the radionuclide with the longest counting time. Therefore, in fulfilling the requirement for the most difficult to achieve radionuclide LLD, the probability of detecting the other radionuclides is increased because the counting time used is longer than that required to achieve the remaining radionuclide LLDs.

The REMP results in this report are reported as averages of the measurements made throughout the calendar year plus/minus the associated standard deviation. If all net sample concentrations are equal to or less than zero, the result is reported as "Not Detectable" (ND), indicating no detectable level of activity present in the sample. If any of the net sample concentrations indicate a positive result statistically greater than zero, all of the data reported are used to generate the reported statistics. Because of the statistical nature of radioactive decay, when the radionuclide of interest is not present in the sample, negative and positive results centered about zero will be seen. Excluding validly measured concentrations, whether negative or as small positive values below the LLD, artificially inflates the calculated average value. Therefore, all generated data are used to calculate the statistical values (i.e., average, standard deviation) presented in this report. The calculated average may be a negative number.

As mentioned above, radioactive decay is a statistical process that has an inherent uncertainty in the analytical result. No two measurements will yield exactly the same result. However, the results are considered equal if the results fall within a certain range based upon the statistical parameters involved in the process. The REMP analytical results are reported at the 95% confidence limit in which the true result may be two standard deviations above or below the reported result. This means that there is only a 5% chance of concluding that the identified radioactive atom is not there when it really is present in the sample. A false positive is an analytical result which statistically shows that the radionuclide is present in the sample when it really is not there. Typically, if the 95%

confidence interval for a positive does not include zero, the radionuclide is considered to be present. For example, the result is reported as 100 ± 90. One hundred minus 90 yields a positive result and therefore may be considered to be present. However, this may be a false positive. If the radionuclide was not in the plant effluent, this result would fall into that category which 5% of the time it is falsely concluded that the radionuclide is present when in actuality it is not. This usually happens at low concentrations at or near the LLD where fluctuations in the background during the counting process skew the results to produce a positive result.

In interpreting the data, effects due to the plant must be distinguished from those due to other sources. A key interpretive aid in assessment of these effects is the design of the PBNP REMP, which is based upon the indicator-control concept. Most types of samples are collected at both indicator locations and at control locations. A plant effect would be indicated if the radiation level at an indicator location was significantly larger than that at the control location. The difference would have to be greater than could be accounted for by typical fluctuation in radiation levels arising from other sources.

9.2 Sampling Parameters

Samples are collected and analyzed at the frequency indicated in Table 9-1 from the locations described in Table 9-2 and shown in Figures 9-1, 9-2 and 9-3. (The latter two figures show sampling locations not shown in preceding figures due to space limitations. The location of the former retention pond, retired and remediated to NRC unrestricted access criteria, is indicated in Figure 9-3). The list of PBNP REMP sampling sites used to determine environmental impact around the ISFSI is found in Table 9-3. The minimum acceptable sample size is found in Table 9-4. In addition, Table 9-1 indicates the collection and analysis frequency of the ISFSI fence TLDs.

9.3 Deviations from Required Collection Frequency

Deviations from the collection frequency given in Table 9-1 are allowed because of hazardous conditions, automatic sampler malfunction, seasonal unavailability, and other legitimate reasons (Section 2.2.6 of the Environmental Manual). Table 9-5 lists the deviations from the scheduled sampling frequency that occurred during the reporting period.

9.4 Assistance to the State of Wisconsin

The Radiation Protection Unit of the Wisconsin Department of Health and Family Services maintains a radiological environmental monitoring program to confirm the results from the PBNP REMP. As a courtesy to the State of Wisconsin, NextEra personnel also collect certain environmental samples (Table 9-6) for the State from sites that are near PBNP sampling sites, or are co-located.

9.5 Program Modifications

No new permanent monitoring sites were added in 2012.

Table 9-1
PBNP REMP Sample Analysis and Frequency

Sample Type	Sample Codes	Analyses	Frequency
Environmental Radiation Exposure	E-01, -02, -03, -04, -05 -06, -07, -08, -09, -12 -14, -15, -16, -17, -18, -20, -22, -23, -24, -25, -26, -27, -28, -29, -30, -31, -32, -38, -39,-41, -42,-43, -TC	TLD	Quarterly
Vegetation	E-01, -02, -03, -04, -06, -08, -09, -20,	Gross Beta Gamma Isotopic Analysis	3x/yr as available
Algae	E-05, -12	Gross Beta Gamma Isotopic Analysis	3x/yr as available
Fish	E-13	Gross Beta Gamma Isotopic Analysis (Analysis of edible portions only)	3x/yr as available
Well Water	E-10	Gross Beta, H-3 Sr-89, 90, I-131 Gamma Isotopic Analysis	Quarterly
Lake Water	E-01, -05, -06, -33	Gross Beta, Sr-89/90, H-3 I-131 Gamma Isotopic Analysis	Monthly / Quarterly composite of monthly collections Monthly Monthly
Milk	E-11, -40, -21	Sr-89, 90 I-131 Gamma Isotopic Analysis	Monthly
Air Filters	E-01, -02, -03, -04, -08, -20	Gross Beta I-131 Gamma Isotopic Analysis	Weekly (particulate) Weekly (charcoal) Quarterly (on composite particulate filters)
Soil	E-01, -02, -03, -04, -06, -08, -09, -20,	Gross Beta Gamma Isotopic Analysis	2x/yr
Shoreline Sediment	E-01, -05, -06, -12, -33,	Gross Beta Gamma Isotopic Analysis	2x/yr
ISFSI Ambient Radiation Exposure	North, East, South, West Fence Sections	TLD	Quarterly

Table 9-2
PBNP REMP Sampling Locations

Location Code	Location Description
E-01	Primary Meteorological Tower South of the Plant
E-02	Site Boundary Control Center - East Side of Building
E-03	Tapawingo Road, about 0.4 Miles West of Lakeshore Road
E-04	North Boundary
E-05	Two Creeks Park
E-06	Point Beach State Park - Coast Guard Station; TLD located South of the Lighthouse on Telephone pole
E-07	WPSC Substation on County V, about 0.5 Miles West of Hwy 42
E-08	G.J. Francar Property at Southeast Corner of the Intersection of Cty. B and Zander Road
E-09	Nature Conservancy
E-10	PBNP Site Well
E-11	Dairy Farm about 3.75 Miles West of Site
E-12	Discharge Flume/Pier
E-13	Pumphouse
E-14	South Boundary, about 0.2 miles East of Site Boundary Control Center
E-15	Southwest Corner of Site
E-16	WSW, Hwy 42, a residence about 0.25 miles North of Nuclear Road
E-17	North of Mishicot, Cty. B and Assman Road, Northeast Corner of Intersection
E-18	Northwest of Two Creeks at Zander and Tannery Roads
E-20	Reference Location, 17 miles Southwest, at Silver Lake College
E-21	Local Dairy Farm just South of Site on Lakeshore and Irish Roads
E-22	West Side of Hwy 42, about 0.25 miles North of Johanek Road
E-23	Greenfield Lane, about 4.5 Miles South of Site, 0.5 Miles East of Hwy 42
E-24	North Side of County Rt. V, near intersection of Saxonburg Road
E-25	South Side of County Rt. BB, about 0.5 miles West of Norman Road
E-26	804 Tapawingo Road, about 0.4 miles East of Cty. B, North Side of Road
E-27	Intersection of Saxonburg and Nuclear Roads, Southwest Corner, about 4 Miles WSW
E-28	TLD site on western most pole between the 2nd and 3rd parking lots.
E-29	Area of North Meteorological Tower.
E-30	NE corner at Intersection of Tapawingo and Lakeshore Roads.
E-31	On utility pole North side of Tapawingo Road closest to the gate at the West property line.
E-32	On a tree located at the junction of property lines, as indicated by trees and shrubs, about 500 feet east of the west gate on Tapawingo Road and about 1200 feet south of Tapawingo Road. The location is almost under the power lines between the blue and gray transmission towers.
E-33	Lake Michigan shoreline accessed from the SE corner of KNPP parking lot. Sample South of creek.
E-38	Tree located at the West end of the area previously containing the Retention Pond.
E-39	Tree located at the East end of the area previously containing the Retention Pond.
E-40	Local Dairy Farm, W side of Hwy 42, about 1.8 miles north of the Nuclear Rd intersection
E-41	NW corner of Woodside and Nuclear Rds (Kewaunee County)
E-42	NW corner of Church and Division, East of Mishicot
E-43	West side of Tannery Rd south of Elmwood (7th pole south of Elmwood)
E-TC	Transportation Control; Reserved for TLDs

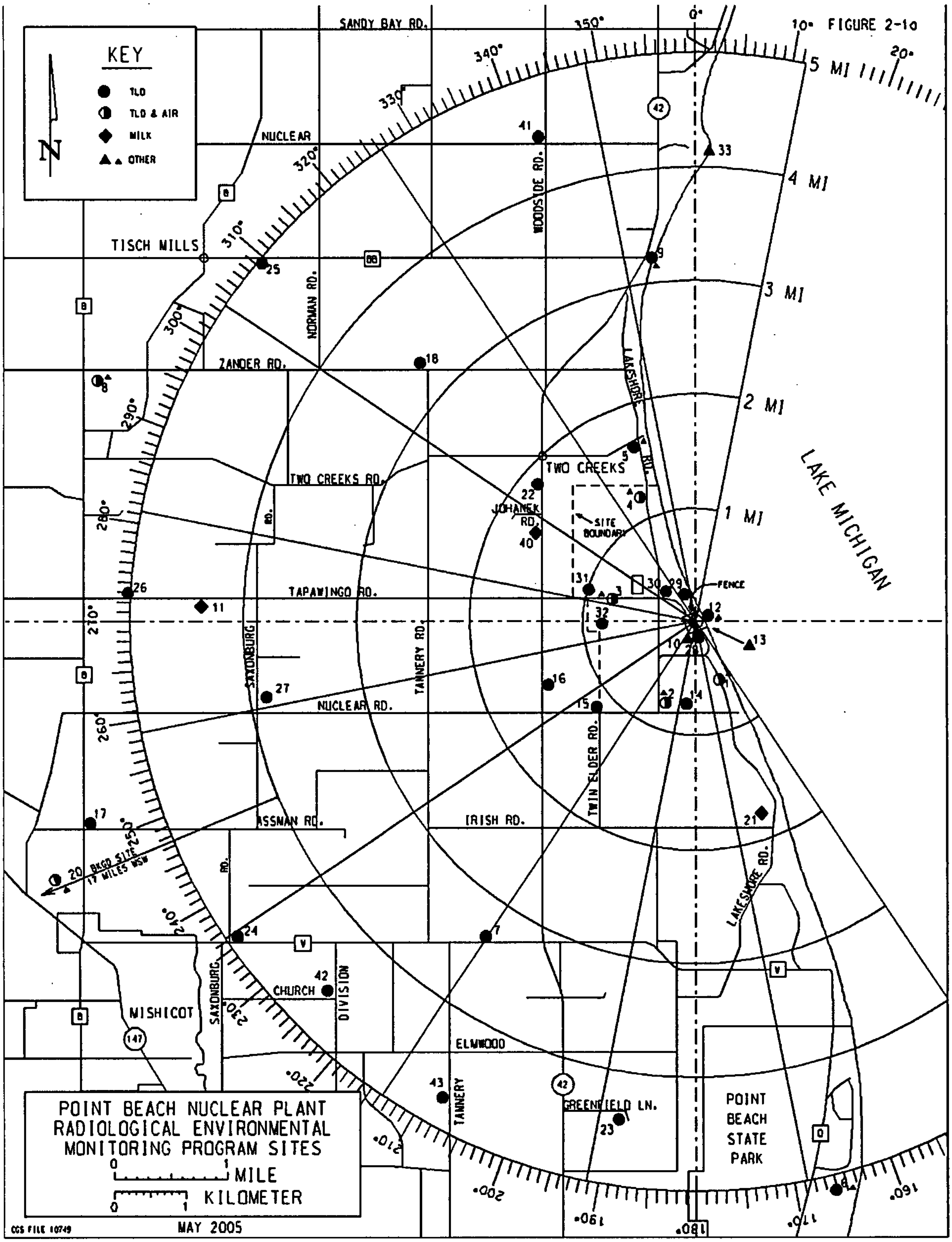


Figure 9-1
PBNP REMP Sampling Sites

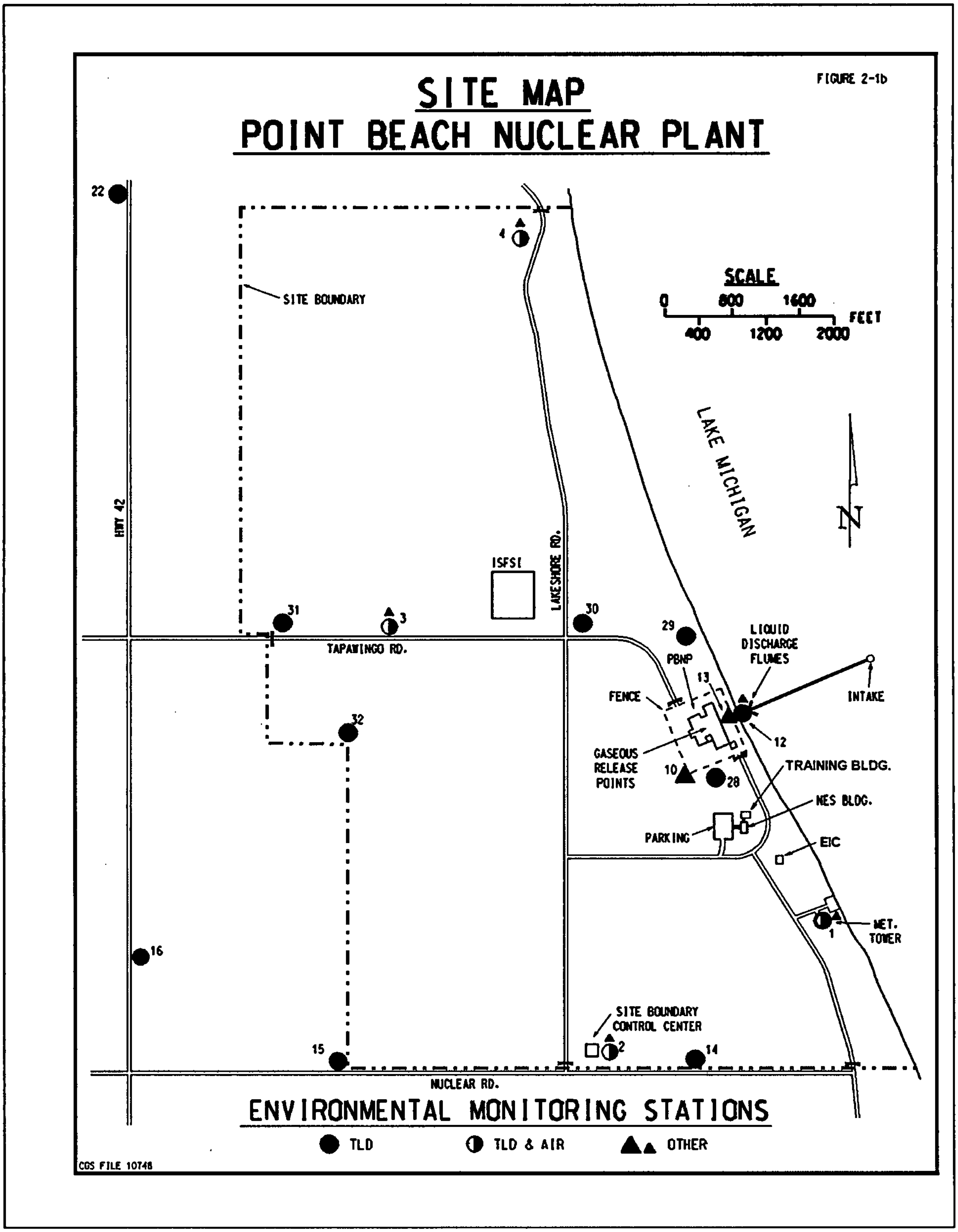


Figure 9-2
Map of REMP Sampling Sites Located Around PBNP

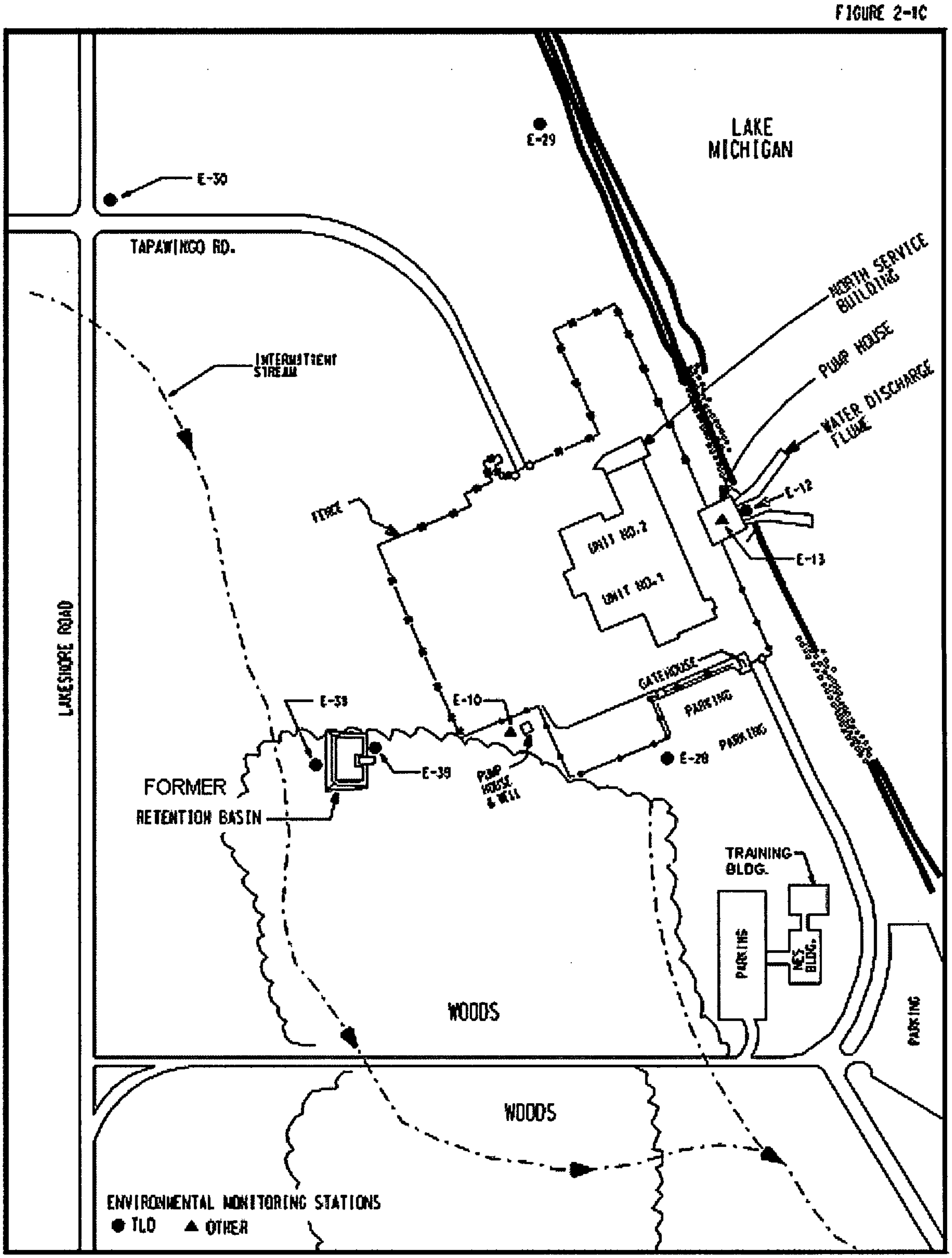


Figure 9-3
Enhanced Map Showing REMP Sampling Sites Closest to PBNP

Table 9-3
ISFSI Sampling Sites

Ambient Radiation Monitoring (TLD)	Soil, Vegetation and Airborne Monitoring
E-03	E-02
E-28	E-03
E-29	E-04
E-30	
E-31	
E-32	

Table 9-4
Minimum Acceptable Sample Size

Sample Type	Size
Vegetation	100-1000 grams
Lake Water	8 liters
Air Filters	250 m3 (volume of air)
Well Water	8 liters
Milk	8 liters
Algae	100-1000 grams
Fish (edible portions)	1000 grams
Soil	500-1000 grams
Shoreline Sediment	500-1000 grams

Table 9-5
Deviations from Scheduled Sampling and Frequency

Sample Type	Location	Collection Date	Reason for not conducting REMP as required	Plans for Preventing Recurrence
AP/AI	E-04 E-01 E-01	5/9/12 08/16/12 08/22/12	Power loss Power loss to sampler Power loss to sampler	In all three cases the power was lost to the sampler resulting in a low volume. Hence each sample was considered to lost.

Table 9-6
Sample Collections for State of Wisconsin

Sample Type	Location	Frequency
Lake Water	E-01	Monthly
Air Filters	E-07 E-08	Weekly
Fish	E-13	Quarterly, As Available
Precipitation	E-04 E-08	Twice a month, As Available
Milk	E-11 E-19	Monthly
Well Water	E-10	Twice per year

9.6 Analytical Parameters

The types of analyses and their frequencies are given in Table 9-1. The LLDs for the various analyses are found in the Section 10 (Table 10-1) with the summary of the REMP results. All environmental LLDs listed in Table 2-2 of the Environmental Manual (also in Table 10-1) were achieved during 2012.

9.7 Description of Analytical Parameters in Table 9-1

9.7.1 Gamma isotopic analysis

Gamma isotopic analysis consists of a computerized scan of the gamma ray spectrum from 80 keV to 2048 keV. Specifically included in the scan are Mn-54, Fe-59, Co-58, Co-60, Zr-95, Nb-95, Ru-103, Ru-106, I-131, Ba-La-140, Cs-134, Cs-137, Ce-141, and Ce-144. However, other detected nuclear power plant produced radionuclides also are noted. The above radionuclides detected by gamma isotopic analysis are decay corrected to the time of collection. Frequently detected, but not normally reported in the Annual Monitoring Report, are the naturally occurring radionuclides Ra-226, Bi-214, Pb-212, Tl-208, Ac-228, Be-7, and K-40.

9.7.2 Gross Beta Analysis

Gross beta analysis is a non-specific analysis that consists of measuring the total beta activity of the sample. No individual radionuclides are identifiable by this method. Gross beta analysis is a quick method of screening samples for the presence of elevated activity that may require additional, immediate analyses.

9.7.3 Water Samples

Water samples include both Lake Michigan and well water. The Lake Michigan samples are collected along the shoreline at two locations north and two locations south of PBNP. The well water is sampled from the on-site PBNP well. Gross beta measurements are made on the solids remaining after evaporation of the unfiltered sample to dryness. Gamma isotopic analyses are performed using 1-liter liquid samples. Strontium is determined by chemical separation and beta counting.

9.7.4 Air Samples

Particulate air filters are allowed to decay at least 72 hours before gross beta measurements are made in order for naturally occurring radionuclides to become a negligible part of the total activity. Gross beta measurements serve as a quick check for any unexpected activity that may require immediate investigation. Quarterly composites of the particulate air filters are analyzed for long-lived radionuclides such as Cs-134 and Cs-137. Charcoal cartridges for radioiodine are counted as soon as possible so the I-131 will undergo only minimal decay prior to analyses. The weekly charcoal cartridges are screened for I-131 by counting them all at the same time to achieve a lower LLD. If a positive result is obtained, each cartridge is counted individually.

In order to ensure that the air sampling pumps are operating satisfactorily, a gross leak check is performed weekly. The pumps are changed out annually for calibration and maintenance beyond what can be accomplished in the field.

9.7.5 Vegetation

Vegetation samples consist predominantly of green, growing plant material (grasses and weeds most likely to be eaten by cattle if they were present at the sampling site). Care is taken not to include dirt associated with roots by cutting the vegetation off above the soil line.

No special vegetation samples were obtained for C-14 analyses in 2012.

9.7.6 Environmental Radiation Exposure

The 2012 environmental radiation exposure measurements were made using TLD cards. The TLD card is a small passive detector, which integrates radiation exposure. Each TLD consists of a Teflon sheet coated with a crystalline, phosphorus material (calcium sulfate containing dysprosium) which absorbs the gamma ray energy deposited in them. Each TLD is read in four distinct areas to yield four exposure values which are averaged. Prior to the third quarter of 2001, exposure data was obtained using three lithium fluoride (LiF) TLD chips sealed in black plastic. The difference in material types can impact the amount of exposure measured. A comparison of the first quarters to the last two quarters in 2001, shows that the TLD cards typically produce a higher measured exposure value than the LiF chips (Table 9-7).

The reported field exposure is the arithmetic average of the measured exposure values at each location minus the exposure transportation control TLD (exposure received while the field TLD is in storage and transit). The gamma rays may originate from PBNP produced radionuclides or from naturally occurring radionuclides. The TLDs remain at the monitoring site for roughly three months prior to analyses and the results are reported as mrem per seven days. Because the TLDs are constantly bombarded by naturally occurring gamma radiation, even during shipment to and from PBNP, the amount of exposure during transportation is measured using transportation controls with each shipment of TLDs to and from the laboratory. The doses recorded on the transportation controls are subtracted from the monitoring TLDs in order to obtain the net *in situ* dose.

As documented in the 2011 AMR, the 2001 change from LiF chips to TLD cards resulted in an average readout increase of 14%.

9.7.7 ISFSI Ambient Radiation Exposure

Although the ISFSI fence TLDs are not considered part of the REMP because of their location directly on site, their results can be used indirectly to determine whether the operation of the ISFSI is having an impact on the ambient environmental radiation beyond the site boundary. Impacts are determined by comparison of fence TLD results to the results of the monitoring at PBNP site boundary and other selected locations.

10.0 RESULTS

10.1 Summary of 2011 REMP Results

Radiological environmental monitoring conducted at PBNP from January 1, 2012, through December 31, 2012, consisted of analysis of air filters, milk, lake water, well water, soil, fish, shoreline sediments, algae, and vegetation as well as TLDs. The results are summarized, averages and high values, in Table 10-1 which contains the following information:

Sample:	Type of the sample medium
Description:	Type of measurement
N:	Number of samples analyzed
LLD:	*a priori* lower limit of detection
Average:	Average value ± the standard deviation of N samples
High:	Highest measured value ± it's associated 2 sigma counting error
Units:	Units of measurement

For certain analyses, an LLD, which is lower than that required by REMP, is used because the lower value derives from the counting time required to obtain the LLDs for radionuclides that are more difficult to detect. For these analyses, both LLDs are listed with the technical specification required REMP LLD given in parentheses. The results are discussed in the narrative portion of this report (Section 11). Blank values have not been subtracted from the results presented in Table 10-1. A listing of all the individual results obtained from the contracted analytical laboratory and the laboratory's radioanalytical quality assurance results and Interlaboratory Crosscheck Program results are presented in Appendix 1.

In Table 10-1, no results are reported as less than LLD (<LLD). All results are reported to NextEra by the contracted radioanalytical laboratory "as measured" whether positive or negative (see Section 9-1). Based on these results, a radionuclide is considered detected if it meets the criterion that the measured value minus its 2σ counting error is greater than zero ($x-2\sigma > 0$). An "ND" entry in Table 10-1 means that for this radionuclide the criterion was not satisfied for any of the measurements. If one analysis fulfilled the criterion, then all of the reported results, both positive and negative, were used in calculating the average shown in Table 10-1.

The method of determining averages based on "as measured" results follows the recommendations made in NUREG-0475 (1978), "Radiological Environmental

Monitoring by NRC Licensees for Routine Operations of Nuclear Facilities Task Force Report," and in Health Physics Society Committee Report HPSR-1 (1980), "Upgrading Environmental Radiation Data" released as document EPA 520/1-80-012 and in more recent documents such as ANSI N42.23-1996, "Instrument Quality Assurance for Radioassay Laboratories;" ANSI N13.30-1996, "Performance Criteria for Radiobioassay;" DE91-013607, "Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance" and NUREG-1576, "Multi-Agency Radiological Laboratory Analytical Protocols Manual."

Table 10-2 contains the ISFSI fence TLD results.

Table 10-1
Summary of Radiological Environmental Monitoring Results for 2012

Sample	Description	N	LLD (a)	Average ± 1 Std. Deviation (b)	High ±2 sigma	Units
TLD	Environmental Radiation	124	1 mrem	1.17 ± 0.17	1.60 ± 0.14	mR/7days
	Control (E-20)	4	1 mrem	1.14 ± 0.07	1.18 ± 0.09	mR/7days
Air	Gross Beta	262	0.01	0.026 ± 0.010	0.060 ± 0.005	pCi/m3
	Control (E-20) Gross beta	53	0.01	0.026 ± 0.011	0.063 ± 0.004	pCi/m3
	I-131	262	0.030 (0.07)	ND	-	pCi/m3
	Control (E-20) I-131	53	0.030 (0.07)	ND	-	pCi/m3
	Cs-134	20	0.01(0.05)	ND	-	pCi/m3
	Control (E-20) Cs-134	4	0.01(0.05)	ND	-	pCi/m3
	Cs-137	20	0.01(0.06)	ND	-	pCi/m3
	Control (E-20) Cs-137	4	0.01(0.06)	ND	-	pCi/m3
	Other gamma emitters	20	0.1	0.0000 ± 0.0004	0.0006 ± 0.0004	pCi/m3
	Control (E-20) Other	4	0.1	0.0002 ± 0.0004	0.0006 ± 0.0004	pCi/m3
Milk	Sr-89	36	5	ND	-	pCi/L
	Sr-90	36	1	0.7 ± 0.4	1.7 ± 0.5	pCi/L
	I-131	36	0.5	ND	-	pCi/L
	Cs-134	36	5 (15)	ND	-	pCi/L
	Cs-137	36	5 (18)	0.4 ± 1.0	3.4 ± 1.9	pCi/L
	Ba-La-140	36	5 (15)	-0.1 ± 1.8	3.2 ± 2.1	pCi/L
	Other gamma emitters(Co-60)	36	15	0.2 ± 1.5	3.4 ± 2.3	pCi/L
Well Water	Gross beta	4	4	2.5 ± 0.3	2.8 ± 1.8	pCi/L
	H-3	4	200 (3000)	ND	-	pCi/L
	Sr-89	4	5(10)	ND	-	pCi/L
	Sr-90	4	1 (2)	ND	-	pCi/L
	I-131	4	0.5(2)	ND	-	pCi/L
	Mn-54	4	10 (15)	ND	-	pCi/L
	Fe-59	4	30	ND	-	pCi/L
	Co-58	4	10(15)	ND	-	pCi/L
	Co-60	4	10(15)	ND	-	pCi/L
	Zn-65	4	30	ND	-	pCi/L
	Zr-Nb-95	4	15	ND	-	pCi/L
	Cs-134	4	10(15)	ND	-	pCi/L
	Cs-137	4	10(18)	ND	-	pCi/L
	Ba-La-140	4	15	0.6 ± 1.3	1.9 ± 1.8	pCi/L
	Other gamma emitters(Ru-103)	4	30	0.4 ± 1.2	1.5 ± 1.4	pCi/L
Algae	Gross beta	6	0.25	5.30 ± 1.43	7.16 ± 0.28	pCi/g
	Co-58	6	0.25	0.003 ± 0.006	0.010 ± 0.006	pCi/g
	Co-60	6	0.25	0.002 ± 0.004	0.007 ± 0.006	pCi/g
	Cs-134	6	0.25	ND	-	pCi/g
	Cs-137	6	0.25	0.021 ± 0.011	0.035 ± 0.012	pCi/g

(a) When two LLD values are listed, the required LLD per the PBNP REMP is enclosed in the parentheses. Whenever possible, PBNP uses the lower value to obtain greater sensitivity.

(b) "ND" indicates that the sample result is Not Detectable, i.e., sample concentrations were statistically equivalent to zero and less than the MDA.

Table 10-1 (continued)
Summary of Radiological Environmental Monitoring Results for 2012

Sample	Description	N	LLD (a)	Average ± 1 Std. Deviation (b)	High ± 2 sigma	Units
Lake Water	Gross beta	48	4	2.2 ± 0.7	4.2 ± 0.8	pCi/L
	I-131	48	0.5 (2)	ND	-	pCi/L
	Mn-54	48	10 (15)	ND	-	pCi/L
	Fe-59	48	30	0.1 ± 1.8	4.6 ± 3.4	pCi/L
	Co-58	48	10(15)	-0.1 ± 0.9	1.4 ± 1.3	pCi/L
	Co-60	48	10(15)	0.2 ± 1.0	2.9 ± 1.7	pCi/L
	Zn-65	48	30	-0.7 ± 4.6	4.2 ± 3.2	pCi/L
	Zr-Nb-95	48	15	ND	-	pCi/L
	Cs-134	48	10 (15)	ND	-	pCi/L
	Cs-137	48	10 (18)	0.0 ± 0.9	3.4 ± 2.4	pCi/L
	Ba-La-140	48	15	-0.2 ± 2.1	5.0 ± 1.8	pCi/L
	Ru-103 (Other gamma)	48	30	-0.6 ± 0.8	1.4 ± 1.2	pCi/L
	Sr-89	16	5(10)	ND	-	pCi/L
	Sr-90	16	1 (2)	0.28 ± 0.10	0.48 ± 0.30	pCi/L
	H-3	16	200 (3000)	179 ± 346	1192 ± 126	pCi/L
Fish	Gross beta	14	0.5	3.57 ± 0.56	4.72 ± 0.13	pCi/g
	Mn-54	14	0.13	ND	-	pCi/g
	Fe-59	14	0.26	-0.004 ± 0.016	0.021 ± 0.015	pCi/g
	Co-58	14	0.13	0.001 ± 0.007	0.012 ± 0.007	pCi/g
	Co-60	14	0.13	0.000 ± 0.010	0.016 ± 0.009	pCi/g
	Zn-65	14	0.26	-0.011 ± 0.024	0.026 ± 0.016	pCi/g
	Cs-134	14	0.13	ND	-	pCi/g
	Cs-137	14	0.15	0.024 ± 0.020	0.074 ± 0.023	pCi/g
	Ru-103 (Other gamma)	14	0.5	0.002 ± 0.010	0.011 ± 0.006	pCi/g
Shoreline Sediment	Gross beta	10	2	10.20 ± 2.24	14.20 ± 0.89	pCi/g
	Cs-137	10	0.15	0.019 ± 0.005	0.030 ± 0.014	pCi/g
Soil	Gross beta	16	2	24.56 ± 6.52	36.27 ± 1.25	pCi/g
	Cs-137	16	0.15	0.15 ± 0.09	0.39 ± 0.04	pCi/g
Vegetation	Gross beta	24	0.25	6.92 ± 1.12	9.79 ± 0.14	pCi/g
	I-131	24	0.06	0.001 ± 0.010	0.022 ± 0.011	pCi/g
	Cs-134	24	0.06	ND	-	pCi/g
	Cs-137	24	0.08	0.004 ± 0.011	0.051 ± 0.022	pCi/g
	Other gamma emitters (Co-60)	24	0.25	0.001 ± 0.004	0.009 ± 0.006	pCi/g

(a) When two LLD values are listed, the required LLD per the PBNP REMP is enclosed in the parentheses. Whenever possible, PBNP uses the lower value to obtain greater sensitivity.
(b) "ND" indicates that the sample result is Not Detectable, i.e., sample concentrations were statistically equal to zero or <MDA.

Other gamma emitters typically refer to Co-60 if not specifically called out in the analyses. See explanation on page 1 of the Environmental Inc, report which is Appendix A

Table 10-2
ISFSI Fence TLD Results for 2012

Fence Location	Average	±	Standard Deviation	Units
North	2.59	±	0.27	mR/7 days
East	3.27	±	0.96	mR/7 days
South	1.40	±	0.19	mR/7 days
West	4.92	±	0.40	mR/7 days

11.0 DISCUSSION

11.1 TLD Cards

The ambient radiation was measured in the general area of the site boundary, at an outer ring four - five miles from the plant, at special interest areas, and at one control location, roughly 17 miles southwest of the plant. The average indicator TLD is 1.17 ± 0.17 mR/7-days compared to 1.14 ± 0.07 mR/7-days at the background location. These two values are not significantly different from each other. Neither are the indicator TLD values significantly different from those observed from 2001 through 2011 for the same type of TLD (tabulated below in Table 11-1). Prior to third quarter of 2001 TLD LiF chips were used versus the current TLD cards, see Section 9.7.6 for additional information).

Table 11-1
Average Indicator TLD Results from 1993 – 2012

Year	Average	±	St. Dev*	Units
1993	0.82	±	0.15	mR/7 days
1994	0.90	±	0.12	mR/7 days
1995	0.87	±	0.13	mR/7 days
1996	0.85	±	0.12	mR/7 days
1997	0.87	±	0.11	mR/7 days
1998	0.79	±	0.13	mR/7 days
1999	0.79	±	0.21	mR/7 days
2000	0.91	±	0.15	mR/7 days
2001	1.06	±	0.19	mR/7 days
2002	1.17	±	0.21	mR/7 days
2003	1.10	±	0.20	mR/7 days
2004	1.10	±	0.22	mR/7 days
2005	1.04	±	0.21	mR/7 days
2006	1.14	±	0.21	mR/7 days
2007	1.08	±	0.20	mR/7 days
2008	1.05	±	0.17	mR/7 days
2009	1.08	±	0.17	mR/7 days
2010	1.11	±	0.15	mR/7 days
2011	1.14	±	0.50	mR/7 days
2012	1.17	±	0.17	mR/7 days

*St. Dev = Standard Deviation

There were nine new dry fuel storage cask additions to the ISFSI in 2012 (2 in June, 5 in July, 2 in August). The west fence TLDs continue to record higher exposures. The north and east fence TLDs are statistically equal at the 95% confidence level (2.59± 0.55 *vs.* 3.27± 1.92). The south fence continues to record the lowest exposures (Table 11-2). Due to the placement and orientation of the new storage modules, the doses measured at the fence increased by roughly 20% to 90% from the second quarter to the fourth quarter with the biggest increase observed at the east fence: 2.62 mR/7-days to 4.51 mR/7-days.

Table 11-2
Average ISFSI Fence TLD Results (mR/7 days)

TLD FENCE LOCATION				
	North	East	South	West
1995	1.29	1.28	1.10	1.26
1996	2.12	1.39	1.10	1.68
1997	2.05	1.28	1.00	1.66
1998	2.08	1.37	1.02	1.86
1999	2.57	1.84	1.11	3.26
2000	2.72	2.28	1.25	5.05
2001	2.78	2.54	1.36	6.08
2002	2.79	2.74	1.42	6.46
2003	2.70	2.60	1.50	6.88
2004	2.61	2.12	1.41	6.50
2005	2.54	2.05	1.44	5.63
2006	2.73	2.35	1.38	5.80
2007	2.72	2.73	1.34	5.47
2008	2.64	2.37	1.36	5.36
2009	2.36	2.35	1.20	4.63
2010	2.64	3.02	1.41	5.05
2011	2.44	2.62	1.31	4.75
2012	2.59	3.27	1.40	4.92

There is no significant exposure impact on the TLD monitoring locations around the ISFSI (Table 11-3). The results continue to be higher at E-03 and E-31 which are west of the ISFSI corresponding to the higher exposure at the west fence. As expected, the values at E-03, being closer to the ISFSI, are higher than those at E-31 located at the site boundary (see Figs. 9-1 and 9-2 for locations). The results for the two locations nearest the site boundary (E-31, 1.21 ± 0.34; E-32, 1.39 ± 0.15) are higher than at the background site E-20 (1.11 ± 0.14) but comparable at the 95% confidence level, indicating a small, but not significant, increase in ambient gamma radiation at the site boundary due to the operation of the ISFSI.

Further data supporting this conclusion is the comparison of the TLD results at selected locations around the ISFSI before and after the storage of spent fuel at the ISFSI (Figure 11-1). As stated in Section 9.7.6, the TLD values increased by 14% in the second half of 2001 when the TLD monitoring devices were changed from LiF chips in the first half of the 2001 to calcium sulfate impregnated TLD cards. After that initial change, the measured radiation exposure, as measured by the TLD cards, has remained fairly constant with a slight increase with the addition of stored fuel at the ISFSI. The results from E-30 continue to be lower than the results from E-31 even though E-30 is closer to the ISFSI than E-31. Each year the variations in the TLD results appear to move in concert with each other and with the background site, E-20, which is 17 miles south west of the ISFSI.

Therefore, the TLD monitoring results indicate that there is little or no effect on the ambient gamma radiation from the operation of the plant. Data supporting this conclusion is the comparison of TLD results for the first half of 2001 with the last half of 2001. As previously mentioned, for the last two quarters of 2001, the LiF TLD chips were replaced with calcium sulfate impregnated Teflon TLD cards which resulted in a higher reported background exposure (Figure 11-1).

Figure 11-1 ISFSI AREA TLD RESULTS (1995 - 2012)

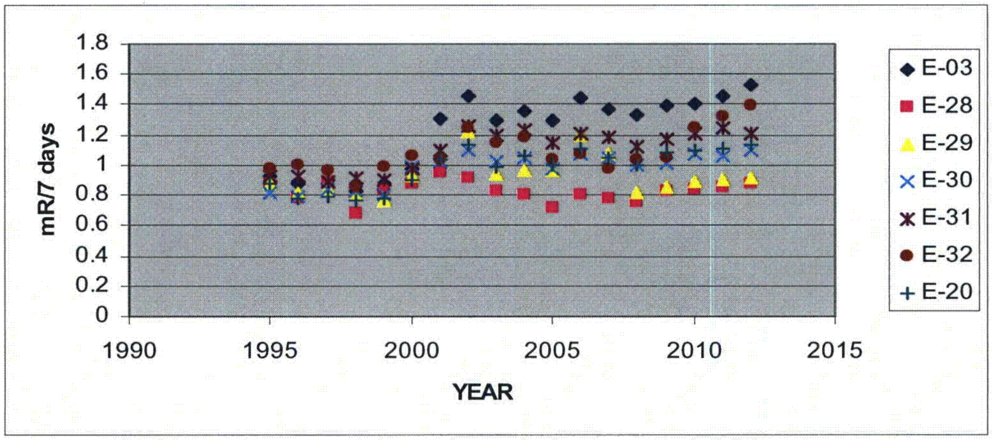


Table 11-3
Average TLD Results Surrounding the ISFSI (mR/7 days)

	Sampling Site						
	E-03	E-28	E-29	E-30	E-31**	E-32**	E-20***
Pre-Operation*	0.93	0.87	0.87	0.81	0.93	0.98	0.88
1996	0.87	0.78	0.81	0.79	0.93	1.00	0.78
1997	0.91	0.89	0.84	0.84	0.89	0.97	0.79
1998	0.82	0.68	0.80	0.82	0.91	0.85	0.77
1999	0.88	0.83	0.76	0.80	0.90	0.99	0.78
2000	0.98	0.88	0.92	0.99	0.98	1.06	0.90
2001	1.31	0.95	1.07	1.02	1.10	1.04	1.03
2002	1.45	0.91	1.22	1.10	1.26	1.25	1.14
2003	1.29	0.82	0.94	1.02	1.20	1.15	0.99
2004	1.35	0.80	0.96	1.05	1.23	1.18	1.06
2005	1.30	0.72	0.96	0.98	1.15	1.04	1.00
2006	1.44	0.80	1.19	1.07	1.21	1.07	1.11
2007	1.37	0.78	1.07	1.05	1.18	0.97	1.05
2008	1.33	0.75	0.81	1.00	1.12	1.03	1.00
2009	1.39	0.82	0.85	1.01	1.17	1.05	1.09
2010	1.41	0.84	0.89	1.07	1.21	1.24	1.10
2011	1.46	0.85	0.90	1.06	1.25	1.32	1.12
2012	1.54	0.87	0.91	1.10	1.21	1.39	1.14

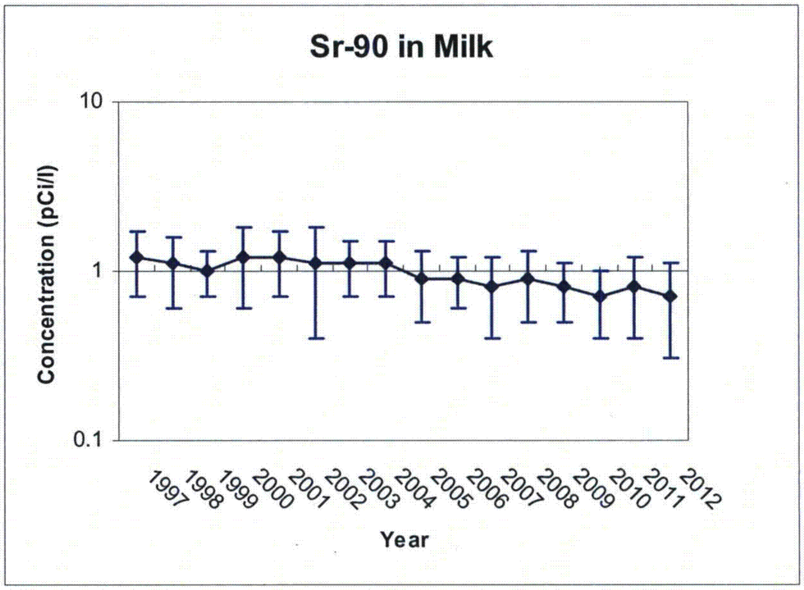
*Pre-Operational data are the averages of the years 1992 through 3rd quarter of 1995.
**Sites E-31 and E-32 are located at the Site Boundary to the West and South-West of the ISFSI.
***E-20 is located approximately 17 miles WSW of the ISFSI.

11.2 Milk

Naturally occurring potassium-40 (1431 ± 70 pCi/l) continues to be the most prevalent radionuclide measured in milk at concentrations roughly 1800 times higher than the only potential plant related radionuclide, Sr-90 (0.7 ± 0.8 pCi/l), detected in milk. The annual average Sr-90 concentrations in milk continue to be similar to previous years. None of the other required radionuclides in the milk analyses, I-131, Cs-134/137, Ba-La-140, and Co-60 were detected.

Though similar to previous years, the Strontium-90 results show a logarithmic decrease over time (Figure 11-2). The environmental half-life of Sr-90 calculated using the annual average Sr-90 concentrations in milk between 1997 and 2012 is 19.3 years. Because the radiological half-life is 28 years, the shorter environmental half-life indicates that environmental factors as well as radioactive decay are working to decrease the concentration of Sr-90 in milk. The calculated physical removal half-life is 59.3 years. This indicates that the radiological

Figure 11-2
Sr-90 Concentration in Milk



half-life dominates the decrease of Sr-90 in the milk samples obtained around PBNP. The Sr-90 in milk persists due to cycling in the biosphere after the atmospheric weapons tests of the '50s, '60s, and '70s and the Chernobyl accident in the late 1980s. Therefore, it is concluded that the milk data for 2012 show no radiological effects of the plant operation.

11.3 Air

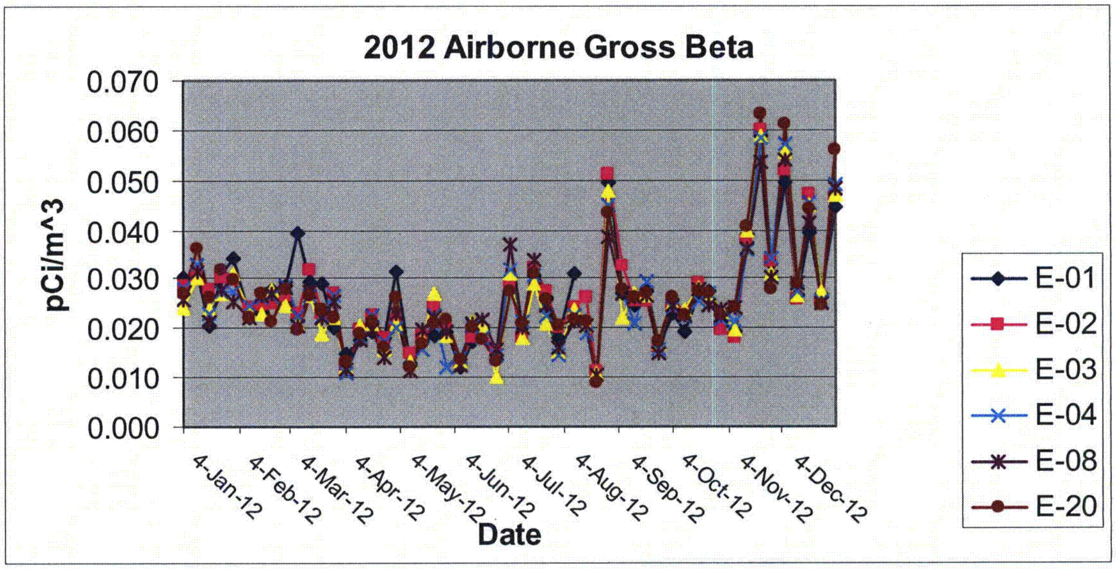
The average annual gross beta concentrations (plus/minus the two-sigma uncertainty) in weekly airborne particulates at the indicator and control locations were 0.026 ± 0.020 pCi/m^3 and 0.026 ± 0.022 pCi/m^3, respectively, and are similar to levels observed from 1993 through 2011 (Table 11-4).

Table 11-4
Average Gross Beta Measurements in Air

1993	0.022
1994	0.022
1995	0.021
1996	0.021
1997	0.021
1998	0.022
1999	0.024
2000	0.022
2001	0.023
2002	0.023
2003	0.023
2004	0.021
2005	0.024
2006	0.021
2007	0.025
2008	0.023
2009	0.025
2010	0.022
2011	0.026
2012	0.026

The 2012 weekly gross beta concentrations reveal higher winter values and lower summer values (Figure 11-3). This is a repeat of the patterns seen in 2006 - 2011. What appears as new during 2012 is greater week-to-week scatter in August and in November through December. The cause of the scatter is not known. However, the control and indicators are moving in concert. Therefore, a plant effect can be ruled out.

Figure 11-3



In 2005, the new method of evaluating airborne I-131 was instituted. Instead of counting each charcoal cartridge separately, all six cartridges for the week are counted as one sample in a predetermined geometry to screen the samples for I-131. If any airborne radioiodine is detected, each sample cartridge is counted individually. With no detectable I-131, the reported analytical result is the minimum detectable activity (MDA) conservatively calculated using the smallest of the six sample volumes. The reported MDAs ranged from 0.005 to 0.020 pCi/m^3. Because the analysis LLD is based on counting only one cartridge, the use of six cartridges or roughly six times the sample volume with the same count time as would be needed to achieve the desired LLD for only one sample, the actual LLD is about six times lower than the programmatic value given in Table 10-1. Similarly, the actual MDA is about one-sixth of that reported, or in the range of 0.001 to 0.003 pCi/m^3.

At each sampling location, the particulate filters are composited quarterly and analyzed for Cs-134, Cs-137 and any other (Co-60) detectable gamma emitters. As summarized in Table 10-1, only Co-60 had a positive indication. One of the two positive results occurred at E-01 in the first quarter when no airborne Co-60 was emitted. The second Co-60 detection was in the 4th quarter at E-20, the background site some 17 miles from PBNP. Co-60 was emitted in November. However, it was not detected at E-01, the location closest to PBNP. Based on the time and location of the positive Co-60 results it is concluded that these two events are false positives. No other gamma emitter that may be indicative of PBNP effluent was detected. By contrast, naturally occurring Beryllium-7 was found in all of the quarterly composites. Be-7 ($T_{1/2}$ = 53.3 days) is produced in the atmosphere by the interaction of cosmic rays with oxygen and nitrogen nuclei. Its half-life is long enough to allow for it to be detected in the quarterly composited filters.

In summary, the 2012 air data does not demonstrate an environmental impact from the operation of PBNP.

11.4 Lake Water

For the REMP-specified gamma emitting radionuclides listed in Table 10-1, reported concentrations continue to occur as small, negative and positive values scattered around zero, indicating no radiological impact from the operation of PBNP. Lake Michigan water samples are collected north (E-33 and E-05) and south (E-01 and E-06) of PBNP (see Figure 9-1).

There were 21, slightly positive indications of gamma emitters during 2012. None of the concentrations were equal to or greater than their MDC. Seven positive results occurred at the two locations 1.5 and 4.5 miles north of the plant. These locations are considered to be upstream based on the north to south current flow on the west shore of Lake Michigan and therefore are very unlikely to be an indication of PBNP effluent. Of the remaining fourteen occurrences, twelve are for radionuclides not discharged the months they had a positive indication in Lake Michigan. Ba-La-140, a short half-life radionuclide not discharged from PBNP during 2012 shows up most frequently (9 of the 21) as a small positive result. In each case, the highest measured concentration is about

100 times higher than the corresponding discharge concentration. Because the positive concentrations measured in the lake are higher than the discharge concentrations and because any discharges would be further diluted by mixing in the lake, the observed positive concentrations are considered to be false positives. Based on the results of the gamma scans of Lake Michigan water, there is no measureable impact on the lake from PBNP discharges.

Aliquots of the monthly samples are composited quarterly and analyzed for Sr-89/90 and for tritium. No Sr-89 was detected in any of the samples. There were nine lake water composites in which the Sr-90 concentration were slightly positive but below the MDC. Four of these occurrences were about five miles north of PBNP and "upstream" with respect to the average current direction in this area of the lake. Because PBNP discharged no Sr-90 during 2012, these results are considered to be either false positives or the indication of persisting low levels of Sr-90 in the lake which resulted from fallout from atmospheric weapons testing in the1950s and 1960s.

Tritium, in addition to being produced by water-cooled reactors such as PBNP, also is a naturally occurring radionuclide. The quarterly composite lake water samples collected and analyzed for H-3 in 2012, ranged from non-detectable to 1,192 pCi/l. This high occurred in the second quarter at a location about 5 miles north of the plant, E-33. Tritium analyses of the individual months in this quarter indicated that H-3 was non-detectable in April and May but that the June lake water sample had a tritium concentration of 3,975 ± 197 pCi/l. Similarly, a high of 904 ± 114 pCi/l occurred in the third quarter composite sample from a site about two miles north of the plant, E-05. Analyses of individual months found the August sample had a tritium concentration of 2184 ± 159, whereas H-3 was not detectable in July (39 ± 85) and slightly positive in September (372 ± 100 pCi/l). Both locations are considered to be up-current from PBNP based on the currents on the west side of Lake Michigan. As a check for the third quarter, the individual months at E-01 located a few hundred feet downstream (south) of the discharge were analyzed for H-3. All three H-3 results were not detectable ($x - 2\sigma < 0$).

Based on tritium and strontium analyses of Lake Michigan water, there is no measureable impact on the waters of Lake Michigan from PBNP discharges.

11.5 Algae

Filamentous algae attached to rocks along the Lake Michigan shoreline are known to concentrate radionuclides from the water. Samples were obtained at Two Creeks Park and at the PBNP discharge (locations 5 and 12 in Figure 9-1) in June, August, and October. Cs-137 was detected in all six samples. Four of the six samples had measureable Cs-137 concentrations which were above the MDC. The positive results occurred at the PBNP discharge and at E-05 north of the plant. Because PBNP did not discharge any Cs-137 until November, the positive results are attributable to the recycling of bomb fallout, from weapons testing in the '50s, 60's and other nuclear events such as Chernobyl, in the Lake Michigan environment.

PBNP discharged Co-60 and Co-58 every month in 2012. Two, small positive indications were found, Co-58 at 0.010 ± 0.006 pCi/g (MDA = 0.011) and Co-60 at 0.007 ± 0.006 pCi/l (MDA = 0.010) at site E-05 about two miles north of the PBNP discharge. No radio-cobalt was detected near the discharge. Because these results occurred at an "upstream" location and were below the minimum detectable concentration, these Co-60 results are considered to be false positives.

The Cs-137 results are well below the naturally occurring radionuclides Be-7 and K-40. The concentrations of these two radionuclides range from 0.48 ± 0.07 to 1.65 ± 0.17 pCi/g for Be-7 and from 2.99 ± 0.29 to 6.08 ± 0.33 pCi/g for K-40. The naturally occurring radionuclides K-40 and Be-7 were at concentrations about 100 times higher than Cs-137. K-40 is primordial isotope of potassium with a billion year half-life. By contrast Be-7 is produced by cosmic ray interactions with oxygen and nitrogen atoms in the atmosphere.

Based on the low concentrations of Cs-137, the algae monitoring results indicate no effect by PBNP upon the environs.

11.6 Fish

Seventeen fish were analyzed in 2012. Of the 17 fish, 12 of the fish were positive for Cs-137 with results greater than the MDC. The positive Cs-137 concentrations ranged from a low of 0.015 ± 0.012 pCi/g to a high of 0.074 ± 0.023 pCi/g (Table 10-1). As PBNP did not discharge any Cs-137 in the months prior to the detection of Cs-137, the Cs-137 is attributable to the recycling of this radionuclide in Lake Michigan. The majority of Cs-137 entered Lake Michigan as fallout from atmospheric weapons testing in the '50s and '60s with lesser amounts from events at Chernobyl and Fukushima.

Small amounts of Fe-59, Co-58, Co-60, Zn-65, and Ru-103 also were detected. The Fe-59, Zn-65, and Ru-103 two are not attributable to plant operations as PBNP did not release any Ru-103 during 2012 and PBNP did not release any Fe-59 and Zn-65 until November whereas Fe-59 and Zn-65 detection occurred in January and July respectively.

By comparison to the aforementioned radionuclides, the concentration of naturally occurring K-40 (2.06– 3.47 pCi/g) is about 10 times higher than the highest Cs-137 concentration.

Based on these results, it is concluded that there is only a slight indication of plant effluents in fish.

11.7 Well Water

No plant related radionuclides were detected in well water during 2012, as all results were less than the MDC and not significantly different from zero. The gross beta values result from naturally occurring radionuclides. Therefore, it is concluded that there is no evidence of PBNP effluents getting into the aquifer supplying drinking water to PBNP.

11.8 Soil

Cs-137 is present in the soils throughout North America and the world resulting from the atmospheric nuclear weapons testing in the 1950s, 1960s, and1970s and from the 1986 Chernobyl accident, and more recently, from the Fukushima event. Soil is an integrating sample media, in that it is a better indicator of long term buildup of Cs-137 as opposed to current deposition for local sources. Soil erosion, radioactive decay, and human activities modify the Cs-137 concentrations. Evidence for the latter are the typically higher Cs-137 concentrations found at E-06, where trees growing and incorporating Cs-137 during the time of atmospheric fallout are now being burned in camp fires thereby releasing the incorporated Cs-137 to the surrounding area. All 2012 samples had low levels of Cs-137 with the highest level (0.39 ± 0.04 pCi/g) being found at E-03 and the second highest (0.26 ± 0.03) occurring at E-06. The average results (0.12 ± 0.02 pCi/g) from the remaining indicator sites are comparable to the concentration (0.12 ± 0.05 pCi/g) at the background site some 17 miles away in the low χ/Q sector. This is expected for the source of Cs-137 being atmospheric fallout as discussed above. Therefore, there is no indication of a plant effect based on the comparison of indicator and background results. By comparison to naturally occurring radionuclides, the Cs-137 concentrations continue to be present in soil samples at well below levels of naturally occurring K-40 (5.74 ± 0.39 to 23.33 ± 1.52 pCi/g).

11.9 Shoreline Sediment

Shoreline sediment consists of sand and other sediments washed up on the Lake Michigan shore. As in soil samples, the only non-naturally occurring radionuclide found in these samples is Cs-137. All ten samples have Cs-137 concentrations statistically different from zero. The shoreline sediment Cs-137 concentrations continue to be about one-tenth of that found in soils. This is expected because Cs-137 in the geological media is bound to fine particles, such as clay, as opposed to the sand found on the beach. Lake Michigan sediments are a known reservoir of fallout Cs-137. Wave action suspends lake sediments depositing them on the beach. The fine particles deposited on the beach eventually are winnowed from the beach leaving the heavier sand; hence the lower Cs-137 concentrations in beach samples. In contrast to Cs-137, K-40, which is actually part of the minerals making up the clay and sand, is at a concentration about 300 times higher than the Cs-137 that is attached to particle surfaces. Therefore, it is not surprising that Cs-137 is present at concentrations 1% or less of the naturally occurring concentrations of K-40. The absence of any PBNP effluent nuclides, such as Co-58/60, other than Cs-137 indicates that the most likely source of the observed Cs-137 is the cycling of radionuclide in the Lake Michigan environment and not current PBNP discharges. Therefore, the shoreline sediment data indicate no radiological effects from current plant operation.

11.10 Vegetation

The naturally occurring radionuclides Be-7 and K-40 were found in all of the vegetation samples. The source of Be-7 is atmospheric deposition. It is continuously formed in the atmosphere by cosmic ray spallation of oxygen, carbon, and nitrogen atoms. (Spallation is a process whereby a cosmic ray breaks up the target atom's nucleus producing a radionuclide of lower mass.) Be-7 concentrations ranged from 0.17 ± 0.06 to 3.62 ± 0.32 pCi/g. The concentrations were lower in May than in July and September. This is consistent with the known temporal variability in Be-7 concentrations in air near the earth's surface. In contrast, K-40 is a primordial radionuclide which is incorporated into vegetation from the soil during the growing process. By not being dependent upon seasonal atmospheric variations and plant surface to capture deposition, the K-40 concentrations are more uniform, 3.22 ± 0.34 to 7.66 ± 0.21 pCi/g which is range that varies by about a factor of two whereas the Be-7 varies by a factor of roughly 20.

Cs-137 can be present in vegetation via both pathways. Fresh Cs-137 fallout is associated, like Be-7, with deposition on the plant surface. Old fallout from the '50s and '60s is now being incorporated into growing plants in the same manner as potassium because it is in the same chemical family as potassium. This fallout Cs-137 has been found in firewood ash at many locations in the United States that are far from any nuclear plants (S. Farber, "Cesium-137 in Wood Ash, Results of a Nationwide Survey," 5th Ann. Nat. Biofuels Conf., 10/21/1992).

In 2012 only three of the twenty-four vegetation samples had a positive indication for Cs-137 and only one of these (E-06, 0.051 ± 0.022, MDC = 0.021 pCi/g) was detected above the MDA. Typically, only the vegetation collected at monitoring site E-06, in the Point Beach State Park south of PBNP, has detectable levels of Cs-137. In 2012, Point Beach released airborne Cs-137 only in November. All of the positive indications occurred prior to that month. Therefore, it is unlikely that the three positive Cs-137 values resulted from PBNP releases.

The only other radionuclides having positive indications were I-131 and Co-60. PBNP released airborne I-131 in July and November and Co-60 only in November of 2012. The July radioiodine release included I-133 which was not detected in any samples. All the vegetation results were below their respective MDAs. Therefore the small, positive results for these two radionuclides which occurred between May and October are considered to be false positives.

Based on the 2012 vegetation sampling results, it is concluded that there little or no effect from PBNP effluents.

11.12 Land Use Census

In accordance with the requirements of Section 2.5 of the Environmental Manual, a visual verification of animals grazing in the vicinity of the PBNP site boundary was completed in 2012. No significant change in the use of pasturelands or grazing herds was noted. Therefore, the existing milk-sampling program continues to be acceptable. The nearest dairy lies in the SSE sector and it is one of the PBNP REMP milk sampling sites. This dairy leases land in the S and SSE sectors at the PBNP site boundary for growing feed corn. Also, the highest χ/Q (1.09E-06) and D/Q (6.23E-09) values occur in these sectors. Therefore, dose calculations to the maximum exposed hypothetical individual, assumed to reside at the site boundary in the S sector, continues to be conservative for the purpose of calculating doses via the grass-cow-milk and the other ingestion pathways.

12.0 REMP CONCLUSION

Based on the analytical results from the 828 environmental samples, and from 128 sets of TLDs that comprised the PBNP REMP for 2012, PBNP effluents had no discernable effect on the surrounding environs. The calculated effluent doses are below the 10 CFR 50, Appendix I dose objectives demonstrate that NextEra continues to have good controls on effluent releases. The control of effluents from PBNP continues to be acceptable pursuant to the ALARA criteria of 10 CFR 50.34a. Additionally, when the TLD results are factored in to the overall exposure, the resulting doses are lower than the ISFSI (10 CFR 72.104) and EPA (40 CFR 190) limits of 25 mrem whole body, 75 mrem thyroid, and 25 mrem any other organ.

Part D
GROUNDWATER MONITORING

13.0 PROGRAM DESCRIPTION

PBNP monitors groundwater for tritium as part of the Groundwater Protection Program (GWPP). During 2012, the sampling program consisted of beach drains, intermittent stream and bog locations, drinking water wells, façade wells, yard electrical manholes, ground water monitoring wells, and the subsurface drainage (SSD) system sump located in the U-2 façade.

In the late 1970s, the beach drains entering Lake Michigan were found to contain tritium. The beach drains are the discharge points for yard drainage system, which carries storm water runoff, and are known to be infiltrated by groundwater as observed by discharges even when no rain has occurred. In the 1980s, the source of H-3 for this pathway was postulated to be spent fuel pool leakage into the groundwater under the plant. Based on this observation, modifications were made to the pool, and the tritium concentrations decreased below the effluent LLDs. Beach drain effluents continue to be monitored and are accounted for in the monthly effluent quantification process. Because the beach drains are susceptible to groundwater in-leakage from other sources such as the area around the former retention pond which is known to contain H-3, the beach drains are monitored as part of the groundwater monitoring program.

Three intermittent stream locations and the Energy Information Center (EIC) well were added to the groundwater monitoring program in the late 1990s when it was discovered that tritium diffusion from the then operable, earthen retention pond was observable in the intermittent streams which transverse the site in a NW to SE direction. A fourth stream location closer to the plant was added in 2008. These streams pass on the east and west sides of the former retention pond and empty into Lake Michigan about half a mile south of the plant near the meteorological tower. The intermittent stream samples track H-3 in the surface groundwater.

The groundwater monitoring program also includes two bogs / ponds on site. One is located about 400 feet SSE of the former retention pond; the other, about 1500 feet N.

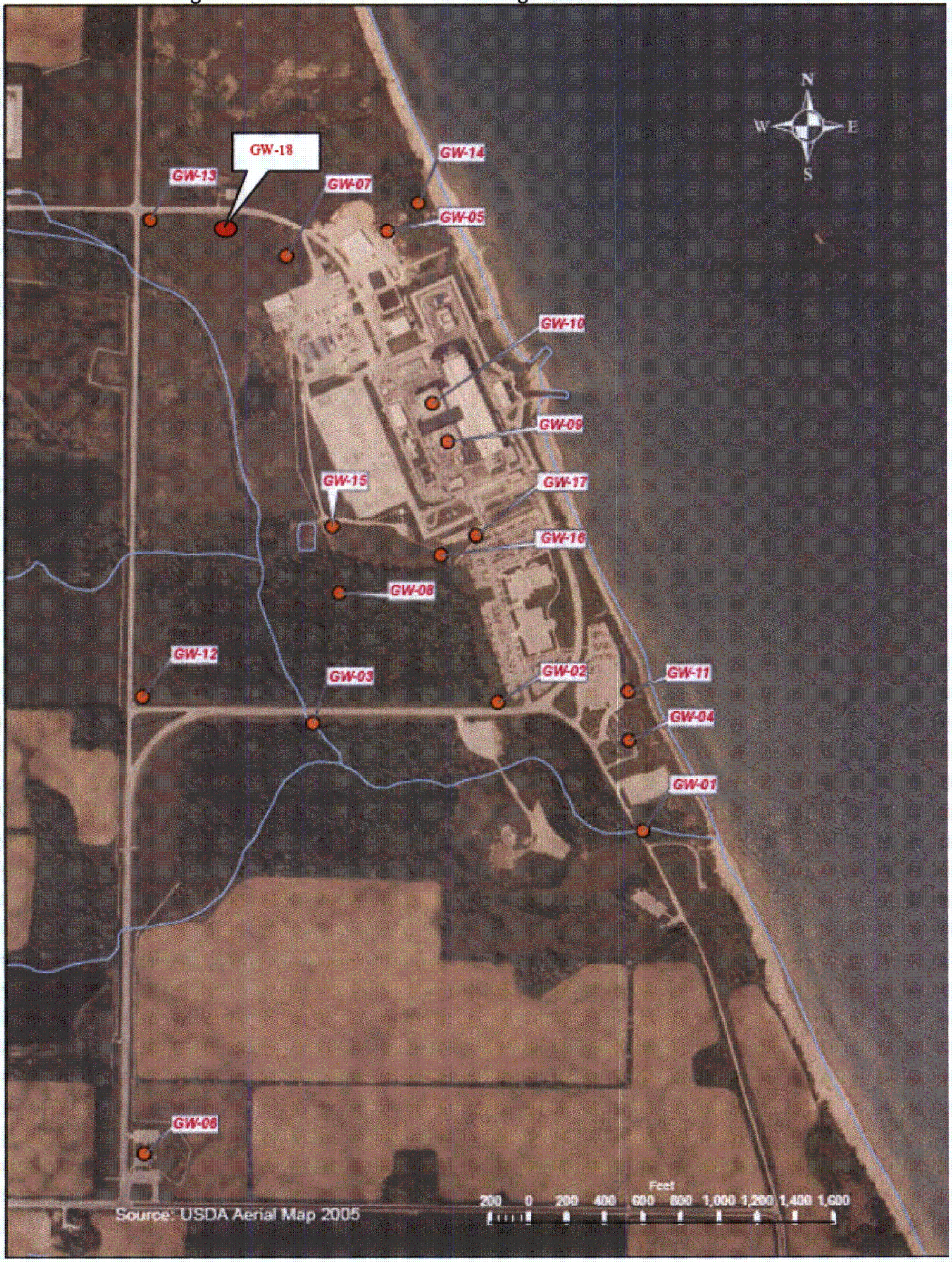
In addition to the main plant well, four other drinking water wells also are monitored. The Site Boundary Control Center well, located at the plant entrance, the Warehouse 6 well, on the north side of the plant, and the EIC well, located south of the plant. In 2012, a new building (Warehouse 7) was constructed for radwaste. The well for this building was added to the GWPP. These wells do not draw water from the top 20 - 30 feet of soil which is known to contain H-3. These wells monitor the deeper (200 - 600 feet), drinking water aquifer from which the main plant well draws its water. The two soil layers are separated by a gray, very dense till layer of low permeability identified by hydrological studies.

Manholes in the plant yard and for the subsurface drainage (SSD) system under the plant are available for obtaining ground water samples. The plant yard manholes for accessing electrical conduits are susceptible to ground water in-leakage. Therefore, a number of these were sampled. The SSD system was designed to lessen hydrostatic pressure on the foundation by controlling the flow of water under the plant and around the perimeter of the foundation walls. The SSD system flows to a sump in the Unit 2 facade. The sump was sampled monthly during 2012. Access to other parts of the SSD can be obtained vial manholes located in the facades, turbine building, and other locations. The SSD manholes were not sampled in 2012.

In the 1990s, two wells were sunk in each unit's façade to monitor the groundwater levels and look for evidence of concrete integrity as part of the ISI IWE Containment Inspection Program. These wells are stand pipes which are sampled periodically for chemical analyses. Beginning in 2007, samples for the GWPP also are being taken. These wells are sampled at least three times a year.

The groundwater sampling sites (other than the beach drains, SSDs and manholes) are shown in Figure 13.1.

Figure 13-1 Groundwater Monitoring Locations



14.0 RESULTS AND DISCUSSION

14.1 Streams and Bogs

The results from the surface groundwater monitoring associated with the former retention pond are presented in Table 14-1. For the most part, the creek results are barely above the detection level and less than the MDC. There are more positive and higher values for the East Creek and STP than for the West Creek and GW-01, the confluence of the two creeks south of the plant near Lake Michigan. GW-08, a bog SE of the former retention pond has a higher H-3 concentration than the bog at GW-07 which is north of the pond area.

Table 14-1 Intermittent Streams and Bogs
Tritium Concentration (pCi/l)

Month	GW-01(E-01)	GW-02	GW-03	GW-17	BOGS		MDC
	Creek Confluence	E. Creek	W. Creek	STP	GW-07	GW-08	
Jan	ND ±	243 ± 88	ND ±	177 ± 85			145
Feb	ND ±	224 ± 84	ND ±	171 ± 81			146
Mar	ND ±	204 ± 90	89 ± 85	210 ± 91			152
Apr	ND ±	179 ± 85	82 ± 80	167 ± 85			153
May	120 ± 87	ND ±	94 ± 85	116 ± 86	110 ± 80	297 ± 89	148
Jun	ND ±	111 ± 77	103 ± 77	109 ± 77			148
Jul	ND ±	136 ± 84	ND ±	ND ±			156
Aug	104 ± 96	135 ± 97	99 ± 96	97 ± 95			150
Sep	109 ± 86	179 ± 89	ND ±	311 ± 95			153
Oct	ND ±	193 ± 89	ND ±	152 ± 87			152
Nov	ND ±	122 ± 82	83 ± 80	181 ± 85			144
Dec	ND ±	97 ± 81	ND ±	ND ±			145

NF = no flow: Streams are sampled monthly; bogs, annually.
Values are presented as the measured value and the 95% confidence level counting error.
ND = measured value is less than the minimum detectable concentration. The LLD = 200 pCi/l.

The analyses of these surface water samples show low concentrations of H-3. Although small positive H-3 concentrations occur in samples from the confluence of the two creeks (GW-01) and from the West Creek (GW-03), all of these concentrations are below their associated MDCs. In contrast, results from GW-03 (south end of East Creek) and GW-17 (located at the north end of the East Creek) are more strongly positive and have at least six samples of their result above the MDC. The East Creek concentrations are generally lower than the 300 - 350 pCi/l found before the retention pond was remediated in 2002. It should be noted that the East Creek, in addition to being path of the west to east groundwater flow from the old retention pond, also is fed by yard runoff from the west side of the yard.

The bog (GW-08) SE of the former retention pond is higher than the bog at GW-07 north of the former retention pond. These results are in conformance with the west to east groundwater flow described in the Site Conceptual Model and the FSAR. The E-08 bog result is down from the 3000 pCi/l seen before the pond was remediated.

14.2 Beach Drains and SSD Sump

The 2012 results for the beach drains are presented in Table 14-2. [The drain data from left to right in the table are in the order of the drains from north to south.] S-1 collects yard drainage from the north part of the site yard; S-3, from the south part of the site yard. Note that S-1 no longer receives the output from the SSD sump located in the Unit 2 façade. Drains S-8 and S-9 carry water from the lake side yard drains whereas drains S-7 and S-10 are from the turbine building roof. S-11 is not connected to any yard drain system and mainly carries groundwater flow and runoff from a small lawn area south of the plant.

Table 14-2
2012 Beach Drain Average Tritium Concentration (pCi/l)

Month	S-1			S-7		S-8		S-9		S-10		S-3			S-11			MDC
Jan	248	±	85	NF	±	NF	±	NF	±	NF	±	381	±	91	NF	±		145
Feb	132	±	92	NF	±	NF	±	NF	±	NF	±	338	±	101	NF	±		142
Mar	157	±	83	NF	±	NF	±	NF	±	NF	±	533	±	100	269	±	88	143
Apr	246	±	92	NF	±	NF	±	NF	±	NF	±	239	±	91	ND	±		152
May	191	±	84	NF	±	NF	±	NF	±	NF	±	287	±	88	114	±	80	148
Jun	278	±	94	NF	±	NF	±	NF	±	NF	±	327	±	96	89	±	86	135
Jul	118	±	86	NF	±	NF	±	NF	±	NF	±	615	±	108	167	±	88	152
Aug	171	±	81	NF	±	NF	±	NF	±	NF	±	3367	±	181	138	±	80	146
Sep	126	±	85	NF	±	NF	±	NF	±	NF	±	395	±	97	126	±	85	149
Oct	111	±	100	NF	±	NF	±	NF	±	NF	±	268	±	92	ND	±		157
Nov	273	±	106	NF	±	NF	±	NF	±	NF	±	273	±	106	ND	±		183
Dec	185	±	83	NF	±	NF	±	NF	±	NF	±	301	±	89	110	±	80	149
Avg =	186	±	123						±			610	±	1751	145	±	120	
ND = not detected and ≤MDC								S-3 avg. without Aug.->				360	±	117				

NF = no sample due to no flow

Unlike 2011, there were no beach drain H-3 concentration peaks at >1000 pCi/l at S-1 and S-3 during January - March of 2012. There is a slightly higher value during March at S-3 but not as high as in 2011. This may be attributable because at that time it was believed that the S-1 peak to be caused by the discharge of the subsurface drainage system (SSD) into the yard drains emptying into Lake Michigan at S-1. While that may have been a contributing factor, it did not explain the concurrence with the S-3 peak. Based on the completed H-3 washout/recapture study, it is now concluded that recapture of airborne H-3 discharges by snow followed by snow melting is the result of the concurrent, elevated H-3 concentrations found at S-1 and S-3. During February and March snow was melted on site and discharged via the yard drains. The reason for the higher H-3 concentrations at S-3 for the remainder of the year also may be related to washout and recapture. The washout study results will be discussed in more detail later in this section.

The SSD sump is located in the Unit 2 façade and its contents are discharged via the wastewater effluent line. The monthly sump results are presented in Table 14-3.

Table 14-3
2012 Unit 2 Facade SSD Sump Monthly Tritium Concentration (pCi/l)

Month	Avg		2σ	MDC
Jan	479	±	100	147
Feb	534	±	96	142
Mar	366	±	93	142
Apr	470	±	107	143
May	327	±	96	154
Jun	511	±	101	147
Jul	527	±	100	142
Aug	470	±	104	158
Sep	735	±	114	157
Oct	369	±	109	183
Nov	620	±	101	139
Dec	748	±	105	139
Average	513	±	269	

14.3 Electrical Vaults and Other Manholes

Manholes for access to below ground electrical facilities are susceptible to groundwater in-leakage. The manholes east side of the plant, between the Turbine building and Lake Michigan have low H-3 concentrations (Table 14-4). These manholes, Z-066A and Z-067A through Z-066D AND Z-067D, run in parallel in the NE section of the yard beginning just north of the Unit 2 truck bay and run from the Unit 2 truck bay north to the EDG building. Z-068 is located just west of the EDG building. Based on being side-by-side, it is not unexpected that the each pair of manholes 66A/67A, etc. would have similar H-3 concentrations. It is interesting to note that the highest concentrations occur near the time that beach drains S-1 and S-2 also have their highest H-3 concentration.

Table 14-4
2012 East Yard Area Manhole Tritium Concentration(pCi/l)

MH	5/16/2012			10/25/2012		
Z-066A	208	±	87	102	±	100
Z-067A	137	±	84	141	±	101
Z-066B	119	±	83	ND	±	
Z-067B	83	±	81	ND	±	
Z-066C	127	±	83	ND	±	
Z-067C	289	±	91	171	±	102
Z-066D	321	±	92	186	±	88
Z-067D	206	±	87	230	±	90
Z-068	279	±	90	97	±	83
MDC	146			158		
ND = not detected						

14.4 Façade Wells

The four façade wells monitor the H-3 concentration under the plant footprint (Table 14-5). Each unit's façade has two wells used to monitor the groundwater for conditions which could impact containment integrity. Samples from these wells also are analyzed for H-3 (Table 14-5). In Unit 2 there is one well on each side of containment, approximately 180° apart. The Unit 1 façade wells are east of the containment in the SE (1Z-361A) and NE (1Z-361B) corners of the façade.

The 2012 results are similar to those obtained in previous years. The Unit 1 wells continue to have higher H-3 concentrations than the U2 wells with 1Z-361A, in the SE corner of the Unit 1 façade, having the highest H-3 concentrations. The 2012 high is comparable to the 1169 - 1331 pCi/l tritium concentrations of 2007 and 2008. Reanalysis confirmed the high 1Z-361A result. The origin of this peak is not known. Based on these results, the conclusion that H-3 is not evenly distributed under the plant remains valid.

Table 14-5
2012 Facade Well Water Tritium Concentration (pCi/l)

	UNIT 1		UNIT 2		
Date	1Z-361A	1Z-361B	2Z-361A	2Z-361B	MDC
27-Jan	154 ± 79	ND ±	ND ±	ND ±	142
7-Mar	282 ± 89	ND ±	123 ± 81	164 ± 83	142
7-Mar	190 ± 91	ND ±	ND ±	ND ±	155
30-Mar	257 ± 98	100 ± 91	ND ±	112 ± 92	143
4-May	212 ± 91	ND ±	ND ±	ND ±	154
1-Jun	158 ± 85	ND ±	ND ±	166 ± 86	147
11-Jul	404 ± 94	354 ± 92	ND ±	171 ± 84	142
1-Sep	1342 ± 135	345 ± 99	ND ±	ND ±	157
29-Sep	191 ± 103	166 ± 103	ND ±	ND ±	184
11-Nov	263 ± 88	ND ±	ND ±	ND ±	152
18-Nov	150 ± 86	158 ± 87	ND ±	ND ±	151
29-Dec	255 ± 85	160 ± 81	89 ± 77	ND ±	138

ND = not detected

14.5 Potable Water and Monitoring Wells

Outside of the protected area, ten wells, in addition to the main plant well (Section 11.7), are used for monitoring H-3 in groundwater: The wells that are monitored are four potable water wells, GW-04 (Energy Information Center [EIC]), GW-05 (Warehouse 6), GW-06 (Site Boundary Control Center), and GW-18 (Radwaste Facility) along with six H-3 groundwater monitoring wells, GW-11 through GW-16 (Figure 13-1). The fourth potable water well (GW-18) was installed at the new, radwaste facility in 2012 and added to the monitoring program in late May. The potable water wells monitor the deep, drinking water aquifer whereas the monitoring wells penetrate less than 30 feet to monitor the top soil layer. The potable water aquifer is separated from the shallow, surface water aquifer by a thick, impermeable clay layer. Two of the monitoring wells, GW-15 and GW-16, are in the apparent groundwater flow path from the former retention pond. The other four of the surface layer wells are located at the periphery of the area which may be affected by diffusion from the former retention pond. The potable water wells have no detectable H-3 (Table 14-6).

Table 14-6
2012 Potable Well Water Tritium Concentration (pCi/l)

Month	EIC WELL GW-04	Warehouse 6 Well GW-05	SBCC Well GW-06	EIC MDC	GW-05,06 MDC	WH 7 GW-18	GW-18 MDC
Jan	ND	ND	ND	145	146	NS	
Feb	ND			146			
Mar	ND			152			
Apr	ND	ND	ND	153	143	NS	
May	ND			155		ND	155
Jun	ND			148			
Jul	ND	ND	ND	156	147		
Aug	ND			150		ND	150
Sep	ND			153		ND	153
Oct	ND	ND	ND	152	151	ND	151
Nov	ND			144			
Dec	ND			145			

ND=Not Detected NS=No Sample

The two monitoring wells showing consistent, detectable H-3 (GW-15, GW-16) are in the flow path from the retention pond area to the lake (Table 14-7). The highest H-3 concentrations occur at GW-15, the well closest to the former retention pond.

Table 14-7
2012 Quarterly Monitoring Wells Tritium Concentration (pCi/l)

Q	MW-01 GW-11	MW-02 GW-12	MW-06 GW-13	MW-05 GW-14	MW-04 GW-15	MW-03 GW-16	**MDC**
1	ND ±	ND ±	ND ±	ND ±	263 ± 86	126 ± 79	144
2	149 ± 81	ND ±	105 ± 83	134 ± 81	251 ± 87	175 ± 83	152
3	ND ±	ND ±	ND ±	ND ±	202 ± 92	208 ± 92	157
4	ND ±	ND ±	ND ±	ND ±	236 ± 90	149 ± 86	158

ND= not statistically different from zero.

14.6 AC Condensate

The 2011 AMR discussed the recapture of H-3 via precipitation around the plant. It was demonstrated that H-3 concentrations are higher close to the plant. It also was shown that the condensate from AC units located on the roofs of buildings and within the plant contained high concentrations of H-3. Table 14-8 presents the H-3 concentrations for 2012 from various AC units with the H-3 concentration measured in the closest beach drain, S-3. External samples were obtained from building roofs with duplicates at the South Gate and S Service Building. Unlike previous years, the AC condensate and beach drain samples were taken within a day of each other.

Table 14-8
2012 AC Condensate and Beach Drain
Tritium Concentration (pCi/l)

Location	H-3 (pCi/l) 2σ	MDC (pCi/l)
NSB (4th floor)	557 ± 102	146
Turbine Bldg 66' (Control Rm AC)	998 ± 118	146
S Service Bldg Roof (1)	5510 ± 226	146
S Service Bldg Roof (2)	5822 ± 231	146
South Gate Roof (1)	473 ± 99	146
South Gate Roof (2)	395 ± 95	146
Turbine Bldg 8'	602 ± 104	146
Training Bldg Roof	185 ± 86	146
Beach Drain S-3	387 ± 95	146

These results show that the H-3 concentration is higher in the immediate vicinity of Units 1 and 2 (South Service Building and South Gate) than at the Training Building, which is some 800 feet south. The higher concentrations occur within the area of the yard drains feeding beach drain S-3 and support the conclusion that precipitation scavenging and roof drains can account for the H-3 concentrations found in the beach drains. Recapture of Turbine Building exhaust also would contribute to the H-3 seen in the beach drains.

14.7 Biota Tritium

Biota near the former retention pond and in its drainage path was analyzed for H-3 to determine whether this material could be used to define the impacted area around the pond. The results proved to be inconclusive. Although positive results were found, none of the results were statistically significant (Table 14-9).

Table 14-9
H-3 IN GRASS AND TREE TRANSPIRED WATER

Grass	**pCi/l**		**2σ**	**MDC**
East Creek (GW-02)	83	±	81	145
GW-17	124	±	82	145
Pond NE	126	±	83	145
Pond S	81	±	81	145
Tree	**pCi/l**		**2σ**	**MDC**
#1 branch 1	109	±	85	151
#1 branch 2	170	±	88	151
#2	158	±	87	151
#3	ND	±		73

The grass tritium was higher on the east side of the former retention pond conforming to the site groundwater flow pattern. The results for the East Creek are higher at the north end (GW-17) than at the south end (GW-02). This may be expected in that GW-17 is closer to the retention pond area and in a flow path directly east of the pond. Three of the four tree transpired water samples had positive indications for H-3. Of these, only the second sample from tree #1 was greater than the MDC.

Based on these results it is not possible to determine whether monitoring biota would provide conclusive evidence of groundwater tritium.

15.0 GROUNDWATER SUMMARY

Groundwater monitoring indicates that low levels of tritium continue to occur in the upper soil layer but not in the deep, drinking water aquifer. These results also indicate that the low levels of tritium are restricted to a small, well defined area close to the plant. Results from precipitation analyses show that airborne H-3 concentrations are higher close to the plant as compared to results at the site boundaries. The observed tritium concentrations in the yard manholes can be explained by the higher H-3 in precipitation close to the plant. In addition to tritium captured by precipitation, the beach drains also receive the H-3 captured in the AC condensate because the condensate drainage is connected to the yard drain system.

Tritium continues in the soil below the plant foundation as evidenced by results from the subsurface drainage system and from the façade wells.

Except for the monitoring wells downstream from the former retention pond, the monitoring well tritium concentrations are not different from zero. These results conform to the known west-to-east groundwater flow at the site. Therefore, the impact of the flow of tritiated groundwater from the vicinity of the former retention pond toward the lake on the S-3 tritium results as can not be discounted. The impact of this flow would be greater on beach drain S-3 than on S-1 because the eastward flow in the area of S-3 would be less impacted by plant structures than the drainage system feeding beach drain S-1.

In conclusion, the groundwater H-3 concentrations observed at PBNP are below the EPA drinking water standards prior to emptying into Lake Michigan where they will undergo further dilution. All analyses to date indicate that the drinking water contains no tritium. None of the H-3 in the upper soil layer is migrating off-site toward the surrounding population. This is based on the known west-to-east groundwater flow toward Lake Michigan and the negative results from the four wells (GW-11 through GW-14, Figure 13-1). Additionally, because no H-3 is detected in either the four on-site drinking water wells close to the power block or from the drinking water well at the site boundary, none of the H-3 observed in the upper soil layer has penetrated into the drinking water aquifer to endanger either on-site or off-site personnel.

APPENDIX 1

Environmental, Inc. Midwest Laboratory
Final Report for the Point Beach Nuclear Plant
and
Other Analyses
Reporting Period: January – December 2012

87 pages follow

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FINAL REPORT
TO
NextEra Energy

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM (REMP)
FOR
THE POINT BEACH NUCLEAR PLANT
TWO RIVERS, WISCONSIN

PREPARED AND SUBMITTED
BY
ENVIRONMENTAL INCORPORATED MIDWEST LABORATORY

Project Number: 8006

Reporting Period: January-December, 2012

Reviewed and Approved by ______________________ Date 03-26-2013
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Distribution: K. Johansen, 1 hardcopy, 1 e-mail

corrected copy received 4-1-13 4-1-13
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1.0 INTRODUCTION

The following constitutes the final 2012 Monthly Progress Report for the Environmental Radiological Monitoring Program conducted at the Point Beach Nuclear Plant, Two Rivers, Wisconsin. Results of analyses are presented in the attached tables. Data tables reflect sample analysis results for both Technical Specification requirements and Special Interest locations and samples are randomly selected within the Program monitoring area to provide additional data for cross-comparisons.

For gamma isotopic analyses, the spectrum covers an energy range from 80 to 2048 KeV. Specifically included are Mn-54, Fe-59, Co-58, Co-60, Zn-65, Zr-95, Nb-95, Ru-103, Ru-106, I-131, Ba-La-140, Cs-134, Cs-137, Ce-141, and Ce-144. Naturally occurring gamma-emitters, such as K-40 and Ra daughters, are frequently detected in soil and sediment samples. Specific isotopes listed are K-40, Tl-208, Pb-212, Bi-214, Ra-226 and Ac-228. Unless noted otherwise, the results reported under "Other Gammas" are for Co-60 and may be higher or lower for other radionuclides.

Duplicate analyses are reported in Appendix F unless otherwise noted.

All concentrations, except gross beta, are decay corrected to the time of collection.

All samples were collected within the scheduled period unless noted otherwise in the Listing of Missed Samples.

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2.0 LISTING OF MISSED SAMPLES

Sample Type	Location	Expected Collection Date	Reason
AP/AI	E-04	05-09-12	Loss of power to sampler.
AP/AI	E-01	08-16-12	Sampler turned off.
AP/AI	E-01	08-22-12	Equipment failure.

3.0 Data Tables

Table 1. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131.
Location: E-01, Meteorological Tower
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Vol. (m^3)	Gross Beta	I-131
Required LLD		0.010	0.030
01-04-12	327	0.030 ± 0.003	< 0.008
01-11-12	306	0.031 ± 0.003	< 0.011
01-18-12	311	0.021 ± 0.003	< 0.012
01-25-12	293	0.031 ± 0.004	< 0.005
02-01-12	306	0.034 ± 0.004	< 0.009
02-09-12	354	0.022 ± 0.003	< 0.009
02-16-12	312	0.023 ± 0.003	< 0.007
02-22-12	275	0.028 ± 0.004	< 0.011
03-01-12	352	0.028 ± 0.003	< 0.009
03-07-12	263	0.039 ± 0.004	< 0.011
03-14-12	284	0.029 ± 0.004	< 0.010
03-21-12	303	0.029 ± 0.004	< 0.008
03-28-12	309	0.020 ± 0.003	< 0.008
1st Quarter Mean ± s.d.		0.028 ± 0.005	< 0.009
04-04-12	274	0.015 ± 0.003	< 0.006
04-11-12	306	0.018 ± 0.003	< 0.005
04-18-12	302	0.019 ± 0.003	< 0.006
04-25-12	298	0.018 ± 0.003	< 0.009
05-02-12	311	0.031 ± 0.004	< 0.006
05-09-12	366	0.013 ± 0.003	< 0.007
05-16-12	307	0.017 ± 0.003	< 0.009
05-23-12	301	0.019 ± 0.003	< 0.010
05-30-12	302	0.019 ± 0.004	< 0.007
06-06-12	298	0.012 ± 0.003	< 0.011
06-13-12	300	0.017 ± 0.003	< 0.011
06-19-12	255	0.020 ± 0.004	< 0.009
06-27-12	350	0.014 ± 0.003	< 0.015
2nd Quarter Mean ± s.d.		0.018 ± 0.005	< 0.009

Date Collected	Vol. (m^3)	Gross Beta	I-131
Required LLD		0.010	0.030
07-05-12	341	0.028 ± 0.004	< 0.006
07-11-12	266	0.020 ± 0.004	< 0.006
07-18-12	298	0.031 ± 0.004	< 0.009
07-25-12	303	0.026 ± 0.004	< 0.014
08-01-12	308	0.018 ± 0.003	< 0.015
08-09-12	247	0.031 ± 0.004	< 0.015
08-16-12		ND[a]	
08-22-12		ND[a]	
08-29-12	248	0.050 ± 0.005	< 0.009
09-05-12	252	0.027 ± 0.004	< 0.008
09-12-12	288	0.024 ± 0.004	< 0.010
09-19-12	310	0.027 ± 0.004	< 0.011
09-26-12	301	0.016 ± 0.003	< 0.017
10-03-12	296	0.023 ± 0.003	< 0.010
3rd Quarter Mean ± s.d.		0.027 ± 0.009	< 0.011
10-10-12	322	0.019 ± 0.003	< 0.012
10-18-12	344	0.027 ± 0.003	< 0.007
10-24-12	264	0.027 ± 0.004	< 0.010
10-31-12	317	0.021 ± 0.003	< 0.012
11-07-12	309	0.019 ± 0.003	< 0.012
11-14-12	319	0.039 ± 0.004	< 0.006
11-22-12	349	0.059 ± 0.004	< 0.015
11-27-12	228	0.033 ± 0.005	< 0.020
12-05-12	341	0.049 ± 0.004	< 0.013
12-12-12	302	0.026 ± 0.004	< 0.016
12-19-12	303	0.040 ± 0.004	< 0.010
12-26-12	302	0.026 ± 0.004	< 0.012
01-02-13	309	0.044 ± 0.004	< 0.012
4th Quarter Mean ± s.d.		0.033 ± 0.012	< 0.012
Cumulative Average		0.027 ± 0.010	< 0.010

[a] "ND" = No data; see Table 2.0, Listing of Missed Samples.

Table 1. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131.
Location: E-02, Site Boundary Control Center
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Vol. (m^3)	Gross Beta	I-131
Required LLD		0.010	0.030
01-04-12	316	0.028 ± 0.003	< 0.008
01-11-12	303	0.031 ± 0.004	< 0.011
01-18-12	315	0.028 ± 0.003	< 0.012
01-25-12	301	0.030 ± 0.004	< 0.005
02-01-12	302	0.030 ± 0.004	< 0.009
02-09-12	349	0.024 ± 0.003	< 0.009
02-16-12	310	0.025 ± 0.003	< 0.007
02-22-12	268	0.025 ± 0.004	< 0.011
03-01-12	322	0.027 ± 0.003	< 0.010
03-07-12	261	0.023 ± 0.004	< 0.012
03-14-12	300	0.032 ± 0.004	< 0.010
03-21-12	294	0.023 ± 0.004	< 0.008
03-28-12	307	0.027 ± 0.003	< 0.008
1st Quarter Mean ± s.d.		0.027 ± 0.003	< 0.009
04-04-12	306	0.012 ± 0.003	< 0.006
04-11-12	306	0.020 ± 0.003	< 0.005
04-18-12	299	0.022 ± 0.003	< 0.006
04-25-12	299	0.018 ± 0.003	< 0.009
05-02-12	307	0.021 ± 0.004	< 0.006
05-09-12	307	0.015 ± 0.003	< 0.009
05-16-12	300	0.019 ± 0.003	< 0.010
05-23-12	307	0.024 ± 0.004	< 0.009
05-30-12	306	0.021 ± 0.004	< 0.006
06-06-12	299	0.013 ± 0.003	< 0.011
06-13-12	302	0.018 ± 0.004	< 0.011
06-19-12	259	0.019 ± 0.004	< 0.009
06-27-12	356	0.015 ± 0.003	< 0.015
2nd Quarter Mean ± s.d.		0.018 ± 0.004	< 0.009

Date Collected	Vol. (m^3)	Gross Beta	I-131
Required LLD		0.010	0.030
07-05-12	342	0.029 ± 0.004	< 0.006
07-11-12	264	0.018 ± 0.004	< 0.006
07-18-12	302	0.032 ± 0.004	< 0.009
07-25-12	298	0.027 ± 0.004	< 0.014
08-01-12	303	0.020 ± 0.003	< 0.016
08-09-12	348	0.024 ± 0.003	< 0.011
08-16-12	280	0.026 ± 0.004	< 0.012
08-22-12	247	0.011 ± 0.004	< 0.020
08-29-12	301	0.051 ± 0.005	< 0.007
09-05-12	299	0.033 ± 0.004	< 0.007
09-12-12	292	0.025 ± 0.004	< 0.010
09-19-12	308	0.025 ± 0.003	< 0.011
09-26-12	304	0.016 ± 0.003	< 0.017
10-03-12	304	0.024 ± 0.003	< 0.010
3rd Quarter Mean ± s.d.		0.026 ± 0.009	< 0.011
10-10-12	310	0.023 ± 0.004	< 0.013
10-18-12	349	0.029 ± 0.003	< 0.007
10-24-12	267	0.027 ± 0.004	< 0.010
10-31-12	315	0.020 ± 0.003	< 0.012
11-07-12	307	0.018 ± 0.003	< 0.012
11-14-12	314	0.038 ± 0.004	< 0.006
11-22-12	322	0.060 ± 0.005	< 0.016
11-27-12	227	0.033 ± 0.005	< 0.020
12-05-12	336	0.052 ± 0.004	< 0.013
12-12-12	305	0.026 ± 0.004	< 0.016
12-19-12	298	0.047 ± 0.004	< 0.010
12-26-12	296	0.025 ± 0.004	< 0.012
01-02-13	310	0.047 ± 0.004	< 0.012
4th Quarter Mean ± s.d.		0.034 ± 0.013	< 0.012
Cumulative Average		0.026 ± 0.010	< 0.010

POINT BEACH NUCLEAR PLANT

Table 1. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131. E
Location: E-03, West Boundary
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Vol. (m^3)	Gross Beta	I-131
Required LLD		0.010	0.030
01-04-12	318	0.024 ± 0.003	< 0.008
01-11-12	304	0.030 ± 0.003	< 0.011
01-18-12	320	0.024 ± 0.003	< 0.012
01-25-12	305	0.027 ± 0.003	< 0.005
02-01-12	300	0.031 ± 0.004	< 0.009
02-09-12	350	0.024 ± 0.003	< 0.009
02-16-12	307	0.023 ± 0.003	< 0.007
02-22-12	264	0.028 ± 0.004	< 0.011
03-01-12	347	0.024 ± 0.003	< 0.009
03-07-12	259	0.021 ± 0.004	< 0.012
03-14-12	292	0.027 ± 0.004	< 0.010
03-21-12	301	0.019 ± 0.003	< 0.008
03-28-12	307	0.022 ± 0.003	< 0.008
1st Quarter Mean ± s.d.		0.025 ± 0.003	< 0.009
04-04-12	310	0.012 ± 0.003	< 0.006
04-11-12	307	0.021 ± 0.003	< 0.005
04-18-12	299	0.021 ± 0.003	< 0.006
04-25-12	304	0.016 ± 0.003	< 0.008
05-02-12	310	0.021 ± 0.004	< 0.006
05-09-12	311	0.013 ± 0.003	< 0.009
05-16-12	299	0.018 ± 0.003	< 0.010
05-23-12	306	0.027 ± 0.004	< 0.009
05-30-12	304	0.018 ± 0.004	< 0.007
06-06-12	300	0.013 ± 0.003	< 0.011
06-13-12	294	0.021 ± 0.004	< 0.012
06-19-12	256	0.020 ± 0.004	< 0.009
06-27-12	348	0.010 ± 0.003	< 0.015
2nd Quarter Mean ± s.d.		0.018 ± 0.005	< 0.009

Date Collected	Vol. (m^3)	Gross Beta	I-131
Required LLD		0.010	0.030
07-05-12	342	0.031 ± 0.004	< 0.006
07-11-12	271	0.018 ± 0.004	< 0.006
07-18-12	302	0.029 ± 0.004	< 0.009
07-25-12	297	0.021 ± 0.003	< 0.014
08-01-12	305	0.015 ± 0.003	< 0.016
08-09-12	355	0.024 ± 0.003	< 0.011
08-16-12	298	0.021 ± 0.003	< 0.011
08-22-12	254	0.011 ± 0.004	< 0.019
08-29-12	221	0.048 ± 0.005	< 0.010
09-05-12	222	0.022 ± 0.004	< 0.009
09-12-12	286	0.027 ± 0.004	< 0.011
09-19-12	308	0.027 ± 0.004	< 0.011
09-26-12	304	0.017 ± 0.003	< 0.017
10-03-12	309	0.025 ± 0.003	< 0.010
3rd Quarter Mean ± s.d.		0.024 ± 0.009	< 0.011
10-10-12	287	0.024 ± 0.004	< 0.014
10-18-12	335	0.028 ± 0.003	< 0.008
10-24-12	265	0.027 ± 0.004	< 0.010
10-31-12	315	0.024 ± 0.004	< 0.012
11-07-12	307	0.020 ± 0.003	< 0.012
11-14-12	310	0.040 ± 0.004	< 0.006
11-22-12	345	0.059 ± 0.004	< 0.015
11-27-12	228	0.031 ± 0.005	< 0.020
12-05-12	342	0.056 ± 0.004	< 0.013
12-12-12	302	0.027 ± 0.004	< 0.016
12-19-12	305	0.045 ± 0.004	< 0.010
12-26-12	63	0.027 ± 0.012	< 0.057 [a]
01-02-13	305	0.047 ± 0.004	< 0.012
4th Quarter Mean ± s.d.		0.035 ± 0.013	< 0.016
Cumulative Average		0.025 ± 0.010	< 0.011

[a] Low volume due to power loss caused by storm.

Table 1. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131.
Location: E-04, North Boundary
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Vol. (m^3)	Gross Beta	I-131
Required LLD		0.010	0.030
01-04-12	326	0.028 ± 0.003	< 0.008
01-11-12	306	0.033 ± 0.004	< 0.011
01-18-12	319	0.023 ± 0.003	< 0.012
01-25-12	306	0.027 ± 0.003	< 0.005
02-01-12	328	0.027 ± 0.003	< 0.008
02-09-12	347	0.025 ± 0.003	< 0.009
02-16-12	307	0.026 ± 0.003	< 0.007
02-22-12	262	0.026 ± 0.004	< 0.011
03-01-12	344	0.029 ± 0.003	< 0.009
03-07-12	253	0.022 ± 0.004	< 0.012
03-14-12	286	0.027 ± 0.004	< 0.010
03-21-12	300	0.023 ± 0.003	< 0.008
03-28-12	306	0.027 ± 0.003	< 0.008
1st Quarter Mean ± s.d.		0.026 ± 0.003	< 0.009
04-04-12	311	0.011 ± 0.003	< 0.006
04-11-12	309	0.018 ± 0.003	< 0.005
04-18-12	301	0.023 ± 0.003	< 0.006
04-25-12	301	0.017 ± 0.003	< 0.008
05-02-12	313	0.020 ± 0.004	< 0.006
05-09-12		ND[a]	
05-16-12	291	0.016 ± 0.003	< 0.010
05-23-12	308	0.022 ± 0.004	< 0.009
05-30-12	209	0.012 ± 0.004	< 0.009
06-06-12	300	0.014 ± 0.003	< 0.011
06-13-12	303	0.020 ± 0.004	< 0.011
06-19-12	254	0.018 ± 0.004	< 0.009
06-27-12	358	0.014 ± 0.003	< 0.015
2nd Quarter Mean ± s.d.		0.017 ± 0.004	< 0.009

Date Collected	Vol. (m^3)	Gross Beta	I-131
Required LLD		0.010	0.030
07-05-12	346	0.032 ± 0.004	< 0.006
07-11-12	271	0.021 ± 0.004	< 0.006
07-18-12	291	0.031 ± 0.004	< 0.009
07-25-12	284	0.022 ± 0.004	< 0.015
08-01-12	242	0.015 ± 0.004	< 0.020
08-09-12	342	0.023 ± 0.003	< 0.011
08-16-12	299	0.019 ± 0.003	< 0.011
08-22-12	252	0.010 ± 0.004	< 0.020
08-29-12	325	0.045 ± 0.004	< 0.007
09-05-12	310	0.027 ± 0.004	< 0.007
09-12-12	310	0.021 ± 0.003	< 0.010
09-19-12	318	0.029 ± 0.004	< 0.011
09-26-12	321	0.016 ± 0.003	< 0.016
10-03-12	313	0.024 ± 0.003	< 0.010
3rd Quarter Mean ± s.d.		0.024 ± 0.009	< 0.011
10-10-12	317	0.022 ± 0.003	< 0.012
10-18-12	350	0.025 ± 0.003	< 0.007
10-24-12	269	0.027 ± 0.004	< 0.010
10-31-12	317	0.022 ± 0.003	< 0.012
11-07-12	312	0.021 ± 0.003	< 0.012
11-14-12	312	0.036 ± 0.004	< 0.006
11-22-12	350	0.058 ± 0.004	< 0.015
11-27-12	231	0.034 ± 0.005	< 0.020
12-05-12	345	0.057 ± 0.004	< 0.013
12-12-12	304	0.027 ± 0.004	< 0.016
12-19-12	308	0.045 ± 0.004	< 0.010
12-26-12	308	0.025 ± 0.003	< 0.012
01-02-13	311	0.049 ± 0.004	< 0.012
4th Quarter Mean ± s.d.		0.035 ± 0.013	< 0.012
Cumulative Average		0.026 ± 0.010	< 0.010

[a] "ND" = No data; see Table 2.0, Listing of Missed Samples.

Table 1. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131.
Location: E-08, G.J. Francar Residence
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Vol. (m^3)	Gross Beta	I-131
Required LLD		0.010	0.030
01-04-12	319	0.026 ± 0.003	< 0.008
01-11-12	298	0.031 ± 0.004	< 0.011
01-18-12	307	0.021 ± 0.003	< 0.012
01-25-12	293	0.028 ± 0.004	< 0.005
02-01-12	303	0.025 ± 0.003	< 0.009
02-09-12	348	0.022 ± 0.003	< 0.009
02-16-12	305	0.026 ± 0.003	< 0.007
02-22-12	263	0.027 ± 0.004	< 0.011
03-01-12	344	0.028 ± 0.003	< 0.009
03-07-12	256	0.021 ± 0.004	< 0.012
03-14-12	288	0.028 ± 0.004	< 0.010
03-21-12	299	0.022 ± 0.003	< 0.008
03-28-12	304	0.025 ± 0.003	< 0.008
1st Quarter Mean ± s.d.		0.025 ± 0.003	< 0.009
04-04-12	303	0.012 ± 0.003	< 0.006
04-11-12	302	0.018 ± 0.003	< 0.005
04-18-12	295	0.020 ± 0.003	< 0.006
04-25-12	304	0.014 ± 0.003	< 0.008
05-02-12	310	0.023 ± 0.004	< 0.006
05-09-12	302	0.011 ± 0.003	< 0.009
05-16-12	298	0.020 ± 0.003	< 0.010
05-23-12	309	0.022 ± 0.004	< 0.009
05-30-12	301	0.019 ± 0.004	< 0.007
06-06-12	299	0.013 ± 0.003	< 0.011
06-13-12	293	0.021 ± 0.004	< 0.012
06-19-12	243	0.022 ± 0.005	< 0.010
06-27-12	352	0.016 ± 0.003	< 0.015
2nd Quarter Mean ± s.d.		0.018 ± 0.004	< 0.009
07-05-12	344	0.037 ± 0.004	< 0.006
07-11-12	270	0.020 ± 0.004	< 0.006
07-18-12	289	0.034 ± 0.004	< 0.009
07-25-12	299	0.024 ± 0.004	< 0.014
08-01-12	308	0.016 ± 0.003	< 0.015
08-09-12	347	0.021 ± 0.003	< 0.011
08-16-12	303	0.021 ± 0.003	< 0.011
08-22-12	257	0.010 ± 0.003	< 0.019
08-29-12	304	0.038 ± 0.004	< 0.007
09-05-12	284	0.027 ± 0.004	< 0.007
09-12-12	299	0.026 ± 0.004	< 0.010
09-19-12	313	0.027 ± 0.004	< 0.011
09-26-12	307	0.015 ± 0.003	< 0.017
10-03-12	303	0.024 ± 0.003	< 0.010
3rd Quarter Mean ± s.d.		0.024 ± 0.008	< 0.011
10-10-12	313	0.023 ± 0.004	< 0.012
10-18-12	344	0.028 ± 0.003	< 0.007
10-24-12	261	0.025 ± 0.004	< 0.010
10-31-12	321	0.024 ± 0.003	< 0.012
11-07-12	309	0.024 ± 0.004	< 0.012
11-14-12	315	0.036 ± 0.004	< 0.006
11-22-12	353	0.054 ± 0.004	< 0.015
11-27-12	232	0.030 ± 0.005	< 0.020
12-05-12	338	0.054 ± 0.004	< 0.013
12-12-12	307	0.029 ± 0.004	< 0.016
12-19-12	307	0.041 ± 0.004	< 0.010
12-26-12	303	0.025 ± 0.003	< 0.012
01-02-13	317	0.048 ± 0.004	< 0.011
4th Quarter Mean ± s.d.		0.034 ± 0.012	< 0.012
Cumulative Average		0.025 ± 0.009	< 0.010
Indicator Locations Annual Mean ± s.d.		**0.026 ± 0.010**	**< 0.010**

POINT BEACH NUCLEAR PLANT

Table 1. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131.
Location: E-20, Silver Lake
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Vol. (m^3)	Gross Beta	I-131
Required LLD		0.010	0.030
01-04-12	320	0.027 ± 0.003	< 0.008
01-11-12	303	0.036 ± 0.004	< 0.015
01-18-12	316	0.026 ± 0.003	< 0.012
01-25-12	301	0.032 ± 0.004	< 0.005
02-01-12	304	0.030 ± 0.004	< 0.009
02-09-12	351	0.022 ± 0.003	< 0.009
02-16-12	287	0.027 ± 0.003	< 0.008
02-22-12	258	0.021 ± 0.003	< 0.012
03-01-12	344	0.028 ± 0.003	< 0.009
03-07-12	260	0.020 ± 0.003	< 0.012
03-14-12	296	0.027 ± 0.004	< 0.010
03-21-12	303	0.024 ± 0.003	< 0.008
03-28-12	311	0.022 ± 0.003	< 0.008
1st Quarter Mean ± s.d.		0.026 ± 0.005	< 0.010
04-04-12	304	0.013 ± 0.003	< 0.006
04-11-12	308	0.019 ± 0.003	< 0.005
04-18-12	303	0.021 ± 0.003	< 0.006
04-25-12	305	0.016 ± 0.003	< 0.008
05-02-12	307	0.026 ± 0.004	< 0.006
05-09-12	302	0.012 ± 0.003	< 0.009
05-16-12	302	0.017 ± 0.003	< 0.010
05-23-12	303	0.021 ± 0.004	< 0.010
05-30-12	302	0.022 ± 0.004	< 0.007
06-06-12	298	0.014 ± 0.003	< 0.011
06-13-12	295	0.020 ± 0.004	< 0.012
06-19-12	246	0.018 ± 0.004	< 0.009
06-27-12	356	0.013 ± 0.003	< 0.015
2nd Quarter Mean ± s.d.		0.018 ± 0.004	< 0.009

Date Collected	Vol. (m^3)	Gross Beta	I-131
Required LLD		0.010	0.030
07-05-12	310	0.027 ± 0.004	< 0.007
07-11-12	265	0.021 ± 0.004	< 0.006
07-18-12	282	0.031 ± 0.004	< 0.010
07-25-12	303	0.026 ± 0.004	< 0.014
08-01-12	301	0.020 ± 0.003	< 0.016
08-09-12	350	0.022 ± 0.003	< 0.011
08-16-12	301	0.021 ± 0.003	< 0.011
08-22-12	265	0.009 ± 0.003	< 0.019
08-29-12	309	0.043 ± 0.004	< 0.007
09-05-12	296	0.028 ± 0.004	< 0.007
09-12-12	301	0.026 ± 0.004	< 0.010
09-19-12	323	0.027 ± 0.003	< 0.011
09-26-12	313	0.017 ± 0.003	< 0.016
10-03-12	309	0.026 ± 0.003	< 0.010
3rd Quarter Mean ± s.d.		0.025 ± 0.008	< 0.011
10-10-12	323	0.022 ± 0.003	< 0.012
10-18-12	349	0.027 ± 0.003	< 0.007
10-24-12	270	0.027 ± 0.004	< 0.010
10-31-12	327	0.022 ± 0.003	< 0.011
11-07-12	314	0.024 ± 0.004	< 0.012
11-14-12	316	0.041 ± 0.004	< 0.006
11-22-12	374	0.063 ± 0.004	< 0.014
11-27-12	239	0.028 ± 0.004	< 0.019
12-05-12	349	0.061 ± 0.004	< 0.012
12-12-12	311	0.029 ± 0.004	< 0.016
12-19-12	309	0.044 ± 0.004	< 0.010
12-26-12	298	0.025 ± 0.003	< 0.012
01-02-13	320	0.056 ± 0.004	< 0.011
4th Quarter Mean ± s.d.		0.036 ± 0.015	< 0.012
Cumulative Average		0.026 ± 0.011	< 0.010
Control Annual Mean ± s.d.		0.026 ± 0.011	< 0.010

POINT BEACH NUCLEAR PLANT

Table 2. Gamma emitters in quarterly composites of air particulate filters

Units: pCi/m^3

Location	Lab Code	Be-7	Be-7	Cs-134	Cs-134	Cs-137	Cs-137	(Other) Co-60	(Other) (Co-60)	Volume
	Req. LLD	-	MDC	0.01	MDC	0.01	MDC	(0.10)	MDC	m^3
					1st Quarter					
E-01	EAP- 2103	0.080 ± 0.016	-	-0.0001 ± 0.0004	< 0.0004	0.0005 ± 0.0005	< 0.0006	0.0000 ± 0.0004	< 0.0004	3993
E-02	- 2105	0.072 ± 0.014	-	-0.0006 ± 0.0005	< 0.0007	0.0003 ± 0.0004	< 0.0006	0.0000 ± 0.0005	< 0.0006	3947
E-03	- 2106	0.064 ± 0.012	-	0.0001 ± 0.0003	< 0.0004	-0.0003 ± 0.0004	< 0.0005	0.0000 ± 0.0003	< 0.0003	3973
E-04	- 2107	0.072 ± 0.021	-	-0.0009 ± 0.0007	< 0.0011	0.0002 ± 0.0007	< 0.0014	-0.0003 ± 0.0008	< 0.0007	3991
E-08	- 2108	0.061 ± 0.014	-	0.0001 ± 0.0005	< 0.0005	0.0002 ± 0.0005	< 0.0005	-0.0005 ± 0.0005	< 0.0004	3924
E-20	- 2109	0.074 ± 0.017	-	-0.0004 ± 0.0004	< 0.0003	0.0003 ± 0.0005	< 0.0005	0.0003 ± 0.0005	< 0.0004	3953
					2nd Quarter					
E-01	EAP- 4369	0.092 ± 0.017	-	-0.0004 ± 0.0005	< 0.0005	-0.0002 ± 0.0005	< 0.0005	0.0006 ± 0.0004	< 0.0006	3970
E-02	- 4371	0.090 ± 0.015	-	0.0004 ± 0.0005	< 0.0009	-0.0002 ± 0.0005	< 0.0008	-0.0006 ± 0.0006	< 0.0004	3952
E-03	- 4372	0.087 ± 0.015	-	0.0001 ± 0.0004	< 0.0006	-0.0001 ± 0.0004	< 0.0005	0.0003 ± 0.0006	< 0.0005	3948
E-04	- 4373	0.104 ± 0.017	-	0.0002 ± 0.0004	< 0.0008	-0.0004 ± 0.0005	< 0.0007	-0.0001 ± 0.0005	< 0.0003	3557
E-08	- 4374	0.109 ± 0.020	-	0.0000 ± 0.0005	< 0.0007	0.0002 ± 0.0006	< 0.0009	0.0007 ± 0.0007	< 0.0007	3910
E-20	- 4375	0.095 ± 0.016	-	0.0004 ± 0.0005	< 0.0010	-0.0003 ± 0.0005	< 0.0008	0.0000 ± 0.0004	< 0.0004	3931
					3rd Quarter					
E-01	EAP- 6446	0.079 ± 0.013	-	0.0003 ± 0.0005	< 0.0008	0.0000 ± 0.0005	< 0.0005	-0.0001 ± 0.0005	< 0.0007	3457
E-02	- 6447	0.083 ± 0.011	-	-0.0001 ± 0.0002	< 0.0004	0.0002 ± 0.0004	< 0.0005	-0.0003 ± 0.0004	< 0.0003	4191
E-03	- 6448	0.071 ± 0.016	-	-0.0001 ± 0.0005	< 0.0006	-0.0005 ± 0.0005	< 0.0006	-0.0002 ± 0.0007	< 0.0008	4076
E-04	- 6449	0.071 ± 0.014	-	-0.0003 ± 0.0004	< 0.0006	0.0001 ± 0.0005	< 0.0009	0.0004 ± 0.0005	< 0.0007	4221
E-08	- 6450	0.070 ± 0.012	-	-0.0009 ± 0.0005	< 0.0002	-0.0001 ± 0.0005	< 0.0004	0.0002 ± 0.0004	< 0.0010	4227
E-20	- 6451	0.075 ± 0.015	-	0.0001 ± 0.0004	< 0.0006	-0.0001 ± 0.0006	< 0.0004	0.0006 ± 0.0004	< 0.0010	4229
					4th Quarter					
E-01	EAP- 8484	0.051 ± 0.012	-	-0.0001 ± 0.0004	< 0.0005	-0.0002 ± 0.0006	< 0.0004	0.0002 ± 0.0004	< 0.0007	4010
E-02	- 8485	0.063 ± 0.018	-	0.0003 ± 0.0005	< 0.0010	0.0000 ± 0.0005	< 0.0006	-0.0001 ± 0.0008	< 0.0011	3956
E-03	- 8486	0.050 ± 0.013	-	0.0000 ± 0.0003	< 0.0005	0.0000 ± 0.0004	< 0.0005	-0.0002 ± 0.0005	< 0.0003	3709
E-04	- 8487	0.051 ± 0.012	-	-0.0005 ± 0.0005	< 0.0007	-0.0002 ± 0.0005	< 0.0005	-0.0005 ± 0.0005	< 0.0003	4034
E-08	- 8488	0.050 ± 0.011	-	0.0003 ± 0.0003	< 0.0005	-0.0001 ± 0.0005	< 0.0005	0.0003 ± 0.0004	< 0.0004	4018
E-20	- 8489	0.050 ± 0.016	-	-0.0001 ± 0.0005	< 0.0007	0.0000 ± 0.0005	< 0.0007	-0.0002 ± 0.0006	< 0.0008	4098
Annual Mean±s.d.		**0.074 ± 0.017**		**-0.0001 ± 0.0004**	**< 0.0006**	**0.0000 ± 0.0002**	**< 0.0006**	**0.0000 ± 0.0004**	**< 0.0006**	

POINT BEACH NUCLEAR PLANT

Table 3. Radioactivity in milk samples

Collection: Monthly

Sample Description and Concentration (pCi/L)

E-11 Lambert Dairy Farm

Collection Date	01-11-12	MDC	02-08-12	MDC	03-14-12	MDC	Required LLD
Lab Code	EMI- 140		EMI- 705		EMI- 1233		
Sr-89	-0.3 ± 1.3	< 1.1	-0.4 ± 0.9	< 0.7	0.8 ± 1.1	< 1.0	5.0
Sr-90	1.7 ± 0.5	< 0.7	1.3 ± 0.4	< 0.5	0.8 ± 0.4	< 0.7	1.0
I-131	-0.07 ± 0.11	< 0.16	-0.09 ± 0.15	< 0.27	0.12 ± 0.15	< 0.26	0.5
K-40	1328 ± 115	-	1396 ± 114	-	1371 ± 87	-	
Cs-134	1.1 ± 2.0	< 3.4	0.3 ± 2.0	< 3.5	-0.1 ± 1.3	< 2.3	5.0
Cs-137	0.3 ± 2.3	< 3.1	0.3 ± 2.4	< 3.8	0.6 ± 1.8	< 2.9	5.0
Ba-La-140	3.2 ± 2.1	< 3.4	2.1 ± 2.2	< 4.1	1.6 ± 1.4	< 2.5	5.0
Other (Co-60)	-1.7 ± 2.3	< 1.9	0.7 ± 2.5	< 4.1	-0.5 ± 1.7	< 1.7	15.0

Collection Date	04-11-12		05-09-12		06-13-12		
Lab Code	EMI- 1839		EMI- 2692		EMI- 3627		
Sr-89	-0.1 ± 1.0	< 0.9	0.9 ± 1.0	< 0.8	0.1 ± 0.8	< 0.7	5.0
Sr-90	1.4 ± 0.4	< 0.5	1.2 ± 0.4	< 0.6	1.3 ± 0.4	< 0.5	1.0
I-131	0.07 ± 0.18	< 0.32	-0.20 ± 0.18	< 0.34	-0.42 ± 0.13	< 0.21	0.5
K-40	1562 ± 116	-	1409 ± 109	-	1445 ± 120	-	
Cs-134	-0.6 ± 2.1	< 2.9	-1.2 ± 2.1	< 3.1	-2.2 ± 2.2	< 2.8	5.0
Cs-137	0.1 ± 2.5	< 4.6	1.2 ± 2.1	< 3.8	0.6 ± 2.5	< 3.7	5.0
Ba-La-140	-1.2 ± 2.1	< 1.8	-3.5 ± 2.0	< 2.1	-3.2 ± 2.3	< 3.6	5.0
Other (Co-60)	-0.9 ± 2.4	< 3.4	-2.0 ± 2.2	< 2.2	-1.2 ± 2.2	< 2.5	15.0

POINT BEACH NUCLEAR PLANT

Table 3. Radioactivity in milk samples

Collection: Monthly

Sample Description and Concentration (pCi/L)

E-11 Lambert Dairy Farm

Collection Date	07-11-12	MDC	08-08-12	MDC	09-12-12	MDC	Required LLD
Lab Code	EMI- 4088		EMI- 4943		EMI- 5717		
Sr-89	-0.5 ± 0.7	< 0.7	-0.9 ± 0.8	< 0.7	-0.8 ± 0.7	< 0.7	5.0
Sr-90	0.9 ± 0.3	< 0.5	1.3 ± 0.3	< 0.5	1.1 ± 0.3	< 0.5	1.0
I-131	0.10 ± 0.11	< 0.16	0.02 ± 0.14	< 0.20	0.06 ± 0.15	< 0.27	0.5
K-40	1452 ± 108	-	1435 ± 114	-	1414 ± 99	-	
Cs-134	-0.9 ± 1.4	< 3.2	-0.9 ± 2.2	< 3.5	0.1 ± 1.6	< 3.0	5.0
Cs-137	-1.0 ± 1.9	< 2.8	0.5 ± 2.3	< 3.6	-0.3 ± 2.1	< 3.9	5.0
Ba-La-140	-0.5 ± 1.4	< 4.9	2.9 ± 1.5	< 3.0	-0.5 ± 1.5	< 4.0	5.0
Other (Co-60)	0.6 ± 1.6	< 2.3	1.5 ± 2.1	< 3.1	-2.0 ± 2.0	< 2.3	15.0

Collection Date	10-10-12		11-14-12		12-12-12		Required LLD
Lab Code	EMI- 6320		EMI- 7371		EMI- 8018		
Sr-89	-0.6 ± 0.8	< 0.7	0.3 ± 0.7	< 0.6	0.2 ± 0.8	< 0.7	5.0
Sr-90	1.1 ± 0.3	< 0.4	0.8 ± 0.3	< 0.5	1.0 ± 0.3	< 0.5	1.0
I-131	0.07 ± 0.13	< 0.22	0.10 ± 0.11	< 0.19	-0.05 ± 0.15	< 0.28	0.5
K-40	1333 ± 86	-	1601 ± 82	-	1500 ± 119	-	
Cs-134	0.5 ± 1.6	< 2.6	-1.1 ± 1.4	< 2.0	0.2 ± 1.9	< 2.5	5.0
Cs-137	-0.2 ± 1.9	< 3.5	-0.2 ± 1.5	< 2.1	0.7 ± 2.2	< 4.0	5.0
Ba-La-140	-0.5 ± 1.5	< 2.8	1.2 ± 1.3	< 4.8	1.1 ± 1.5	< 1.6	5.0
Other (Co-60)	0.8 ± 1.9	< 2.4	-0.8 ± 1.5	< 1.7	-0.5 ± 2.4	< 3.6	15.0

POINT BEACH NUCLEAR PLANT

Table 3. Radioactivity in milk samples

Collection: Monthly

Sample Description and Concentration (pCi/L)

E-21 Strutz Dairy Farm

Collection Date	01-11-12	MDC	02-08-12	MDC	03-14-12	MDC	Required LLD
Lab Code	EMI- 141		EMI- 706		EMI- 1234		
Sr-89	-0.5 ± 0.8	< 0.8	-0.3 ± 0.7	< 0.8	0.5 ± 0.7	< 0.7	5.0
Sr-90	0.6 ± 0.3	< 0.5	0.5 ± 0.3	< 0.5	0.2 ± 0.2	< 0.5	1.0
I-131	-0.03 ± 0.10	< 0.14	0.09 ± 0.15	< 0.26	-0.04 ± 0.15	< 0.28	0.5
K-40	1485 ± 119	-	1370 ± 112	-	1438 ± 106	-	
Cs-134	-1.2 ± 2.0	< 2.7	1.2 ± 1.6	< 3.1	0.2 ± 1.9	< 2.4	5.0
Cs-137	-0.3 ± 2.5	< 3.9	0.8 ± 2.2	< 3.9	1.2 ± 2.1	< 3.5	5.0
Ba-La-140	1.0 ± 2.1	< 3.5	2.5 ± 2.2	< 2.8	-0.5 ± 1.9	< 1.8	5.0
Other (Co-60)	3.4 ± 2.4	< 3.3	0.4 ± 2.1	< 3.3	-0.1 ± 2.2	< 3.7	15.0

Collection Date	04-11-12		05-09-12		06-13-12		
Lab Code	EMI- 1840		EMI- 2693		EMI- 3628		
Sr-89	0.5 ± 0.8	< 1.0	0.5 ± 0.8	< 1.0	-0.3 ± 0.6	< 0.7	5.0
Sr-90	0.2 ± 0.3	< 0.6	0.1 ± 0.3	< 0.6	0.3 ± 0.3	< 0.5	1.0
I-131	0.05 ± 0.18	< 0.33	-0.02 ± 0.21	< 0.37	0.04 ± 0.16	< 0.29	0.5
K-40	1335 ± 101	-	1423 ± 124		1457 ± 121		
Cs-134	-0.4 ± 1.5	< 3.1	-0.1 ± 2.5	< 4.0	0.1 ± 1.7	< 2.5	5.0
Cs-137	1.0 ± 1.9	< 3.3	0.9 ± 2.9	< 4.7	-0.4 ± 2.7	< 4.1	5.0
Ba-La-140	-0.1 ± 1.5	< 1.0	-2.7 ± 2.8	< 2.2	2.2 ± 1.3	< 2.9	5.0
Other (Co-60)	0.2 ± 1.6	< 2.9	-1.1 ± 3.0	< 5.5	-0.4 ± 2.5	< 2.7	15.0

POINT BEACH NUCLEAR PLANT

Table 3. Radioactivity in milk samples

Collection: Monthly

Sample Description and Concentration (pCi/L)

E-21 Strutz Dairy Farm

Collection Date	07-11-12	MDC	08-08-12	MDC	09-12-12	MDC	Required LLD
Lab Code	EMI- 4089		EMI- 4944		EMI- 5718		
Sr-89	-0.2 ± 0.6	< 0.8	-1.1 ± 0.7	< 0.8	-0.1 ± 0.6	< 0.8	5.0
Sr-90	0.4 ± 0.3	< 0.5	0.8 ± 0.3	< 0.5	0.3 ± 0.3	< 0.5	1.0
I-131	-0.01 ± 0.10	< 0.14	-0.03 ± 0.13	< 0.19	0.00 ± 0.16	< 0.29	0.5
K-40	1461 ± 121	-	1482 ± 110	-	1466 ± 98	-	
Cs-134	-0.7 ± 1.9	< 3.1	-0.7 ± 2.2	< 4.0	-0.1 ± 2.0	< 3.6	5.0
Cs-137	-2.0 ± 2.0	< 2.5	-0.5 ± 2.4	< 3.8	0.7 ± 1.9	< 2.6	5.0
Ba-La-140	0.7 ± 1.4	< 4.7	-0.5 ± 1.4	< 4.2	-1.1 ± 1.3	< 4.2	5.0
Other (Co-60)	-1.7 ± 2.3	< 3.2	-0.5 ± 2.4	< 3.4	1.3 ± 2.3	< 3.8	15.0

Collection Date	10-10-12		11-14-12		12-12-12		Required LLD
Lab Code	EMI- 6321		EMI- 7372		EMI- 8019		
Sr-89	-0.4 ± 0.6	< 0.8	0.7 ± 0.9	< 0.8	-0.1 ± 0.6	< 0.8	5.0
Sr-90	0.3 ± 0.3	< 0.5	0.5 ± 0.5	< 0.9	0.4 ± 0.3	< 0.5	1.0
I-131	0.00 ± 0.16	< 0.31	0.01 ± 0.10	< 0.19	0.09 ± 0.16	< 0.28	0.5
K-40	1430 ± 80	-	1448 ± 102		1421 ± 110	-	
Cs-134	-0.5 ± 1.1	< 2.0	-1.9 ± 1.9	< 2.5	0.6 ± 2.1	< 3.4	5.0
Cs-137	0.7 ± 1.5	< 2.2	2.3 ± 2.2	< 4.2	1.0 ± 2.1	< 3.7	5.0
Ba-La-140	2.0 ± 1.1	< 3.5	-1.8 ± 1.9	< 1.9	0.3 ± 1.5	< 2.1	5.0
Other (Co-60)	-2.4 ± 1.7	< 2.4	1.3 ± 1.6	< 2.3	2.2 ± 2.6	< 4.3	15.0

POINT BEACH NUCLEAR PLANT

Table 3. Radioactivity in milk samples

Collection: Monthly

Sample Description and Concentration (pCi/L)

	E-40 Barta						
Collection Date	01-11-12	MDC	02-08-12	MDC	03-14-12	MDC	Required LLD
Lab Code	EMI- 142		EMI- 707		EMI- 1235		
Sr-89	-0.1 ± 0.7	< 0.7	-0.3 ± 0.7	< 0.7	0.0 ± 0.7	< 0.7	5.0
Sr-90	0.7 ± 0.3	< 0.4	0.8 ± 0.3	< 0.4	0.7 ± 0.3	< 0.5	1.0
I-131	-0.07 ± 0.13	< 0.23	-0.07 ± 0.13	< 0.24	0.08 ± 0.17	< 0.30	0.5
K-40	1409 ± 102	-	1402 ± 110	-	1371 ± 108	-	
Cs-134	-0.7 ± 1.6	< 3.3	-0.3 ± 1.4	< 3.1	1.4 ± 1.5	< 2.9	5.0
Cs-137	-0.7 ± 2.3	< 3.4	3.4 ± 1.9	< 3.4	0.5 ± 2.1	< 2.9	5.0
Ba-La-140	-0.8 ± 1.4	< 2.8	-0.5 ± 1.5	< 2.4	-0.5 ± 1.6	< 2.0	5.0
Other (Co-60)	-0.8 ± 2.0	< 2.5	1.7 ± 2.0	< 3.2	1.6 ± 1.7	< 2.9	15.0
Collection Date	04-11-12		05-09-12		06-13-12		
Lab Code	EMI- 1841		EMI- 2694		EMI- 3629		
Sr-89	-0.2 ± 1.0	< 1.0	-0.8 ± 0.8	< 0.8	0.1 ± 0.6	< 0.6	5.0
Sr-90	0.5 ± 0.4	< 0.6	0.8 ± 0.3	< 0.5	0.4 ± 0.2	< 0.4	1.0
I-131	0.09 ± 0.23	< 0.40	-0.12 ± 0.24	< 0.44	-0.02 ± 0.19	< 0.34	0.5
K-40	1429 ± 106	-	1282 ± 104	-	1377 ± 110	-	
Cs-134	-0.2 ± 1.3	< 3.0	-0.2 ± 1.5	< 3.0	0.1 ± 1.5	< 3.4	5.0
Cs-137	1.1 ± 1.9	< 2.9	0.0 ± 2.2	< 4.6	1.0 ± 2.2	< 3.9	5.0
Ba-La-140	-2.1 ± 1.7	< 1.7	-0.2 ± 1.6	< 1.8	-3.7 ± 1.9	< 2.4	5.0
Other (Co-60)	1.2 ± 1.7	< 2.3	-0.7 ± 2.1	< 1.6	1.2 ± 2.1	< 3.0	15.0

POINT BEACH NUCLEAR PLANT

Table 3. Radioactivity in milk samples

Collection: Monthly

Sample Description and Concentration (pCi/L)

E-40 Barta

Collection Date	07-11-12	MDC	08-08-12	MDC	09-12-12	MDC	Required LLD
Lab Code	EMI- 4090		EMI- 4945		EMI- 5719		
Sr-89	-0.4 ± 0.7	< 0.7	-0.1 ± 0.9	< 0.7	-0.3 ± 0.6	< 0.6	5.0
Sr-90	0.7 ± 0.3	< 0.4	1.0 ± 0.3	< 0.5	0.8 ± 0.3	< 0.4	1.0
I-131	-0.04 ± 0.15	< 0.28	0.09 ± 0.11	< 0.16	0.05 ± 0.24	< 0.47	0.5
K-40	1470 ± 113	-	1523 ± 114	-	1580 ± 96	-	
Cs-134	-0.9 ± 1.7	< 2.9	0.4 ± 1.4	< 3.1	0.3 ± 1.7	< 3.1	5.0
Cs-137	-0.4 ± 2.3	< 2.8	2.5 ± 1.8	< 3.4	-0.1 ± 1.8	< 2.9	5.0
Ba-La-140	1.7 ± 1.6	< 4.6	-2.5 ± 1.5	< 3.7	1.1 ± 1.3	< 4.5	5.0
Other (Co-60)	2.2 ± 2.0	< 4.1	-0.5 ± 2.2	< 2.9	0.8 ± 1.7	< 3.3	15.0

Collection Date	10-10-12		11-14-12		12-12-12		Required LLD
Lab Code	EMI- 6322		EMI- 7373		EMI- 8020		
Sr-89	-0.3 ± 0.7	< 0.7	0.0 ± 0.6	< 0.6	0.0 ± 0.7	< 0.7	5.0
Sr-90	0.7 ± 0.3	< 0.4	0.6 ± 0.3	< 0.5	0.8 ± 0.3	< 0.5	1.0
I-131	0.09 ± 0.12	< 0.21	0.10 ± 0.12	< 0.20	0.03 ± 0.23	< 0.42	0.5
K-40	1479 ± 113	-	1386 ± 104	-	1358 ± 108	-	
Cs-134	-0.4 ± 2.1	< 3.5	-0.5 ± 1.6	< 2.4	-1.2 ± 1.5	< 2.7	5.0
Cs-137	-0.5 ± 2.2	< 2.8	-1.0 ± 2.1	< 3.8	1.2 ± 2.2	< 3.9	5.0
Ba-La-140	-0.9 ± 1.7	< 2.1	-0.2 ± 1.7	< 1.3	1.0 ± 1.4	< 2.5	5.0
Other (Co-60)	3.4 ± 2.3	< 3.3	-0.9 ± 2.2	< 2.4	0.6 ± 1.8	< 3.7	15.0

Sr-89 Annual Mean + s.d.	**-0.1 ± 0.5**
Sr-90 Annual Mean + s.d.	**0.7 ± 0.4**
I-131 Annual Mean + s.d.	**0.00 ± 0.10**
K-40 Annual Mean + s.d.	**1431 ± 70**
Cs-134 Annual Mean + s.d.	**-0.3 ± 0.8**
Cs-137 Annual Mean + s.d.	**0.4 ± 1.0**
Ba-La Annual Mean + s.d.	**-0.1 ± 1.8**
Co-60 Annual Mean + s.d.	**0.2 ± 1.5**

POINT BEACH NUCLEAR PLANT

Table 4. Radioactivity in Well Water Samples, E-10
Collection: Quarterly
Units: pCi/L

	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Req. LLD	Annual Mean ±s.d
Collection Date	01-12-12	04-12-12	07-12-12	10-16-12	Req.	
Lab Code	EWW- 175	EWW- 1851	EWW- 4125	EWW- 6705	LLD	
Gross Beta	2.8 ± 1.8	2.6 ± 1.1	2.0 ± 0.9	2.4 ± 0.8	4.0	**2.5 ± 0.3**
H-3	81.9 ± 92.3	40.4 ± 77.3	19.2 ± 78.5	-69.1 ± 67.2	500	**18.1 ± 63.7**
Sr-89	-0.2 ± 0.8	0.0 ± 0.4	0.3 ± 0.4	0.4 ± 0.4	5.0	**0.1 ± 0.3**
Sr-90	0.1 ± 0.4	-0.1 ± 0.2	0.0 ± 0.2	0.1 ± 0.2	1.0	**0.0 ± 0.1**
I-131	-0.01 ± 0.17	-0.13 ± 0.14	0.05 ± 0.16	0.10 ± 0.19	0.5	**0.00 ± 0.10**
Mn-54	-0.4 ± 1.3	-0.7 ± 2.0	1.5 ± 1.5	0.3 ± 1.4	10	**0.2 ± 1.0**
Fe-59	0.7 ± 2.1	0.8 ± 4.4	2.2 ± 2.6	-0.9 ± 3.1	30	**0.7 ± 1.3**
Co-58	-0.8 ± 1.2	1.0 ± 1.8	0.3 ± 1.3	0.2 ± 1.2	10	**0.2 ± 0.8**
Co-60	0.0 ± 1.4	2.0 ± 2.1	0.3 ± 1.7	0.2 ± 1.5	10	**0.6 ± 0.9**
Zn-65	-2.2 ± 2.6	0.3 ± 4.5	-0.5 ± 2.4	2.4 ± 3.6	30	**0.0 ± 1.9**
Zr-Nb-95	-0.6 ± 1.3	-2.3 ± 2.5	-4.2 ± 1.7	0.9 ± 1.5	15	**-1.5 ± 2.2**
Cs-134	0.9 ± 1.2	-1.8 ± 2.1	0.1 ± 1.5	-1.9 ± 1.2	10	**-0.7 ± 1.4**
Cs-137	0.8 ± 1.4	-3.5 ± 2.4	0.6 ± 2.0	0.1 ± 1.9	10	**-0.5 ± 2.0**
Ba-La-140	0.6 ± 1.6	-1.1 ± 1.9	0.9 ± 1.8	1.9 ± 1.8	15	**0.6 ± 1.3**
Other (Ru-103)	1.3 ± 1.1	-1.2 ± 2.3	1.5 ± 1.4	0.1 ± 1.6	30	**0.4 ± 1.2**

MDC Data

Collection Date	01-12-12	04-12-12	07-12-12	10-16-12	Req.
Lab Code	EWW- 175	EWW- 1851	EWW- 4125	EWW- 6705	LLD
Gross Beta	< 3.1	< 1.8	< 1.4	< 1.2	4.0
H-3	< 145.9	< 142.9	< 147.4	< 148.7	500
Sr-89	< 0.8	< 0.6	< 0.6	< 0.5	5.0
Sr-90	< 0.8	< 0.5	< 0.5	< 0.4	1.0
I-131	< 0.30	< 0.26	< 0.28	< 0.33	0.5
Mn-54	< 1.4	< 2.6	< 3.0	< 2.2	10
Fe-59	< 4.7	< 6.7	< 6.2	< 6.1	30
Co-58	< 1.8	< 3.5	< 1.9	< 1.9	10
Co-60	< 1.8	< 2.7	< 2.0	< 2.7	10
Zn-65	< 2.9	< 7.2	< 2.2	< 5.0	30
Zr-Nb-95	< 2.6	< 2.5	< 1.9	< 2.7	15
Cs-134	< 2.3	< 3.2	< 2.4	< 2.0	10
Cs-137	< 1.9	< 2.4	< 3.7	< 3.2	10
Ba-La-140	< 3.7	< 1.5	< 4.9	< 5.0	15
Other (Ru-103)	< 2.4	< 2.3	< 3.9	< 2.7	30

Table 5. Lake water, analyses for gross beta, iodine-131 and gamma emitting isotopes.
Location: E-01 (Meteorological Tower)
Collection: Monthly composites Units: pCi/L

		MDC		MDC		MDC		MDC	
Lab Code	ELW- 169		ELW- 770		ELW- 1309		ELW- 1855		
Date Collected	01-12-12		02-15-12		03-14-12		04-12-12		Req. LLD
Gross beta	1.1 ± 0.5	< 0.8	1.7 ± 0.8	< 1.3	2.2 ± 0.5	< 0.7	2.3 ± 0.7	< 1.2	4.0
I-131	-0.05 ± 0.13	< 0.24	-0.04 ± 0.14	< 0.29	0.12 ± 0.14	< 0.21	-0.02 ± 0.16	< 0.30	0.5
Be-7	-1.2 ± 10.4	< 19.5	11.0 ± 11.9	< 26.8	6.3 ± 10.5	< 23.5	13.0 ± 17.3	< 39.8	
Mn-54	0.4 ± 1.3	< 3.0	1.5 ± 1.6	< 2.8	-0.6 ± 1.2	< 2.1	-0.5 ± 2.1	< 2.7	10
Fe-59	1.8 ± 2.6	< 6.0	-1.0 ± 2.6	< 3.9	0.4 ± 2.7	< 4.0	-3.2 ± 3.8	< 4.5	30
Co-58	-1.3 ± 1.4	< 2.4	-2.2 ± 1.4	< 1.8	0.4 ± 1.2	< 2.1	0.7 ± 2.1	< 3.5	10
Co-60	2.1 ± 1.6	< 2.1	-0.2 ± 1.2	< 1.6	-0.9 ± 1.3	< 1.6	0.6 ± 2.2	< 3.8	10
Zn-65	-0.2 ± 2.9	< 3.3	-0.1 ± 2.9	< 2.2	-1.7 ± 2.8	< 3.9	1.0 ± 5.4	< 7.8	30
Zr-Nb-95	-0.6 ± 1.5	< 2.2	-0.7 ± 1.6	< 2.3	-0.3 ± 1.4	< 2.6	-1.1 ± 2.4	< 4.3	15
Cs-134	-0.8 ± 1.4	< 2.1	-0.4 ± 1.5	< 2.1	0.0 ± 1.2	< 2.5	-1.7 ± 2.4	< 3.7	10
Cs-137	0.3 ± 1.7	< 2.9	-0.1 ± 1.7	< 3.0	0.1 ± 1.6	< 2.5	0.3 ± 2.5	< 4.9	10
Ba-La-140	0.9 ± 1.7	< 7.9	-0.4 ± 1.6	< 6.1	0.1 ± 1.3	< 2.0	1.0 ± 2.7	< 5.4	15
Other (Ru-103)	-0.9 ± 1.3	< 3.2	-0.3 ± 1.3	< 2.8	-1.5 ± 1.3	< 2.3	-1.3 ± 2.2	< 3.1	30
Lab Code	ELW- 2873		ELW- 3671 [a]		ELW- 4121		ELW- 5233		
Date Collected	05-16-12		06-13-12		07-12-12		08-16-12		Req. LLD
Gross beta	2.0 ± 0.9	< 1.6	1.8 ± 0.6	< 0.8	1.6 ± 0.8	< 1.3	3.6 ± 0.7	< 0.9	4.0
I-131	-0.01 ± 0.15	< 0.27	0.17 ± 0.19	< 0.33	0.04 ± 0.16	< 0.28	0.03 ± 0.15	< 0.23	0.5
Be-7	11.1 ± 21.7	< 35.5	-7.8 ± 12.0	< 24.6	4.8 ± 14.0	< 33.2	4.2 ± 13.3	< 31.5	
Mn-54	2.3 ± 2.8	< 5.3	-0.3 ± 1.3	< 2.3	-1.0 ± 1.4	< 1.6	0.1 ± 1.9	< 2.9	10
Fe-59	1.8 ± 5.3	< 3.8	-2.1 ± 2.4	< 4.8	0.3 ± 2.6	< 4.8	3.2 ± 3.2	< 7.0	30
Co-58	0.8 ± 2.7	< 5.0	0.2 ± 1.4	< 2.3	-0.7 ± 1.6	< 2.6	0.9 ± 1.6	< 1.7	10
Co-60	0.1 ± 2.8	< 2.8	1.7 ± 1.4	< 2.2	0.3 ± 1.5	< 2.1	-0.5 ± 2.0	< 3.1	10
Zn-65	-29.9 ± 8.9	< 10.7	1.4 ± 2.7	< 4.2	-0.1 ± 2.6	< 4.1	-0.8 ± 2.6	< 3.6	30
Zr-Nb-95	-7.7 ± 3.7	< 6.7	-1.2 ± 1.4	< 2.7	-2.2 ± 1.5	< 2.5	-1.2 ± 1.9	< 3.1	15
Cs-134	-1.8 ± 3.1	< 5.9	-1.0 ± 1.1	< 1.8	-0.3 ± 1.2	< 2.2	-0.7 ± 1.5	< 2.6	10
Cs-137	-1.1 ± 3.0	< 5.2	0.1 ± 1.6	< 2.6	-0.4 ± 1.6	< 2.4	-0.4 ± 1.9	< 2.5	10
Ba-La-140	3.3 ± 3.2	< 3.9	-2.9 ± 1.4	< 2.7	0.3 ± 1.8	< 5.1	-2.0 ± 2.3	< 3.7	15
Other (Ru-103)	-1.1 ± 2.8	< 4.9	-0.8 ± 1.4	< 2.8	-0.6 ± 1.4	< 2.3	1.7 ± 1.7	< 3.5	30
Lab Code	ELW- 5766		ELW- 6701		ELW- 7419		ELW- 7862		
Date Collected	09-11-12		10-16-12		11-14-12		12-04-12		Req. LLD
Gross beta	1.8 ± 0.8	< 1.3	1.7 ± 0.6	< 0.9	1.5 ± 0.4	< 0.7	2.1 ± 0.7	< 0.9	4.0
I-131	0.13 ± 0.19	< 0.34	0.00 ± 0.23	< 0.47	0.02 ± 0.16	< 0.28	0.23 ± 0.26	< 0.48	0.5
Be-7	18.5 ± 11.4	< 39.1	20.1 ± 12.3	< 30.1	-1.8 ± 15.0	< 42.1	-3.1 ± 10.2	< 24.3	
Mn-54	-0.4 ± 1.4	< 1.8	-0.4 ± 1.6	< 1.9	0.8 ± 1.6	< 3.3	0.1 ± 1.3	< 1.5	10
Fe-59	4.3 ± 2.2	< 4.6	-1.7 ± 2.5	< 5.4	1.2 ± 3.0	< 5.6	-0.3 ± 2.3	< 5.3	30
Co-58	-0.9 ± 1.3	< 2.1	0.5 ± 1.3	< 1.4	-0.7 ± 1.8	< 2.4	0.4 ± 1.2	< 2.2	10
Co-60	1.4 ± 1.4	< 2.6	0.5 ± 1.5	< 2.5	-1.0 ± 1.7	< 1.9	0.3 ± 1.4	< 2.0	10
Zn-65	-1.1 ± 2.4	< 1.8	2.2 ± 3.1	< 3.4	2.4 ± 3.4	< 5.6	-0.9 ± 2.6	< 3.2	30
Zr-Nb-95	-2.7 ± 1.3	< 3.1	-1.0 ± 1.6	< 3.6	-2.2 ± 1.7	< 3.5	-0.3 ± 1.3	< 2.9	15
Cs-134	-0.7 ± 0.9	< 1.8	0.6 ± 1.3	< 2.7	0.5 ± 1.8	< 2.6	-0.6 ± 1.2	< 2.1	10
Cs-137	-0.4 ± 1.8	< 2.5	-1.5 ± 1.6	< 2.0	-1.1 ± 2.0	< 3.4	1.2 ± 1.3	< 2.6	10
Ba-La-140	3.2 ± 1.3	< 7.8	5.0 ± 1.8	< 6.7	1.8 ± 1.7	< 4.1	-2.9 ± 1.7	< 2.8	15
Other (Ru-103)	-2.3 ± 1.4	< 2.8	1.1 ± 1.4	< 4.0	-0.6 ± 1.6	< 3.7	-1.6 ± 1.2	< 2.7	30

[a] Tritium analysis requested on monthly sample; result = <153 pCi/L.

Table 5. Lake water, analyses for gross beta, iodine-131 and gamma emitting isotopes.
Location: E-05 (Two Creeks Park)
Collection: Monthly composites
Units: pCi/L

		MDC		MDC		MDC		MDC	
Lab Code	ELW- 170		ELW- 771		ELW- 1310		ELW- 1856		
Date Collected	01-12-12		02-15-12		03-16-12		04-12-12		Req. LLD
Gross beta	4.2 ± 0.8	< 0.9	2.5 ± 0.8	< 1.2	2.2 ± 0.5	< 0.6	1.8 ± 0.8	< 1.3	4.0
I-131	0.01 ± 0.14	< 0.14	0.12 ± 0.14	< 0.20	-0.13 ± 0.14	< 0.26	0.17 ± 0.18	< 0.32	0.5
Be-7	7.4 ± 11.9	< 28.6	9.4 ± 10.9	< 26.7	-2.6 ± 17.1	< 35.6	1.1 ± 16.4	< 36.7	
Mn-54	-0.9 ± 1.3	< 1.8	0.2 ± 1.3	< 2.2	-0.1 ± 1.6	< 2.6	0.1 ± 1.9	< 2.7	10
Fe-59	1.3 ± 2.3	< 6.0	0.4 ± 2.6	< 5.4	-0.7 ± 3.5	< 5.1	0.7 ± 3.5	< 5.4	30
Co-58	1.0 ± 1.4	< 2.5	0.4 ± 1.3	< 1.6	-0.3 ± 1.7	< 2.8	-0.8 ± 2.1	< 3.7	10
Co-60	-0.4 ± 1.9	< 3.4	-0.1 ± 1.5	< 1.8	1.3 ± 1.7	< 3.0	1.5 ± 2.2	< 3.1	10
Zn-65	-1.3 ± 2.4	< 1.7	-1.3 ± 2.4	< 1.9	1.1 ± 3.7	< 6.1	-4.3 ± 4.2	< 3.0	30
Zr-Nb-95	-1.0 ± 1.3	< 2.1	0.1 ± 1.4	< 2.9	-0.2 ± 1.4	< 1.5	-0.4 ± 2.2	< 3.6	15
Cs-134	-0.6 ± 1.2	< 2.3	-0.8 ± 1.1	< 1.3	0.3 ± 1.7	< 2.9	-0.2 ± 2.0	< 2.6	10
Cs-137	-1.0 ± 1.7	< 2.8	-0.3 ± 1.8	< 2.7	-2.0 ± 2.0	< 1.9	-1.9 ± 2.4	< 2.7	10
Ba-La-140	-0.3 ± 1.5	< 3.6	1.8 ± 1.3	< 3.6	-3.3 ± 1.8	< 1.3	1.2 ± 2.2	< 4.2	15
Other (Ru-103)	-0.9 ± 1.2	< 2.7	0.0 ± 1.1	< 2.7	0.6 ± 1.9	< 3.5	-1.0 ± 2.3	< 4.0	30
Lab Code	ELW- 2874		ELW- 3672 [a]		ELW- 4122		ELW- 5234		
Date Collected	05-16-12		06-13-12		07-12-12		08-16-12		Req. LLD
Gross beta	2.0 ± 1.0	< 1.8	2.9 ± 0.6	< 0.8	2.0 ± 0.7	< 1.2	2.3 ± 0.9	< 1.6	4.0
I-131	0.02 ± 0.17	< 0.30	0.01 ± 0.18	< 0.32	0.07 ± 0.11	< 0.16	-0.05 ± 0.17	< 0.26	0.5
Be-7	6.3 ± 15.8	< 29.0	-7.1 ± 12.8	< 24.4	-2.1 ± 11.6	< 22.0	-11.5 ± 11.1	< 22.2	
Mn-54	0.4 ± 1.9	< 3.0	0.6 ± 1.3	< 2.3	0.3 ± 1.5	< 2.9	0.4 ± 1.2	< 1.9	10
Fe-59	-0.8 ± 4.0	< 3.8	-2.4 ± 2.9	< 4.8	0.7 ± 2.9	< 7.1	-0.4 ± 3.0	< 5.2	30
Co-58	-0.6 ± 2.0	< 2.6	-1.2 ± 1.6	< 2.5	1.5 ± 1.6	< 2.9	0.1 ± 1.6	< 3.2	10
Co-60	-0.1 ± 2.1	< 3.7	-0.3 ± 1.6	< 2.4	1.1 ± 1.4	< 1.5	0.9 ± 1.4	< 3.0	10
Zn-65	0.3 ± 4.6	< 6.5	1.4 ± 2.9	< 4.6	2.2 ± 3.6	< 6.4	-1.4 ± 3.2	< 2.9	30
Zr-Nb-95	-2.7 ± 2.1	< 2.1	-1.3 ± 1.7	< 3.1	0.5 ± 1.6	< 3.7	1.8 ± 1.8	< 3.7	15
Cs-134	-1.2 ± 2.4	< 3.6	0.6 ± 1.4	< 2.8	-0.8 ± 1.6	< 2.8	-0.3 ± 1.3	< 2.2	10
Cs-137	-0.2 ± 2.2	< 3.6	0.2 ± 1.8	< 2.5	-0.8 ± 1.5	< 2.6	-0.2 ± 1.8	< 3.6	10
Ba-La-140	-1.1 ± 2.4	< 1.8	-2.1 ± 1.9	< 4.6	-2.0 ± 1.5	< 3.2	-3.2 ± 1.9	< 2.2	15
Other (Ru-103)	-0.9 ± 2.2	< 2.8	-0.3 ± 1.3	< 2.4	-0.3 ± 1.4	< 3.8	-0.8 ± 1.5	< 2.9	30
Lab Code	ELW- 5767		ELW- 6702		ELW- 7420		ELW- 7863		
Date Collected	09-11-12		10-16-12		11-14-12		12-04-12		Req. LLD
Gross beta	2.3 ± 0.7	< 1.1	3.2 ± 0.7	< 0.9	1.1 ± 0.4	< 0.6	2.2 ± 0.6	< 0.8	4.0
I-131	0.02 ± 0.19	< 0.35	0.05 ± 0.18	< 0.32	0.06 ± 0.15	< 0.26	-0.04 ± 0.18	< 0.33	0.5
Be-7	-8.5 ± 10.9	< 22.9	0.3 ± 11.8	< 29.0	-0.3 ± 15.0	< 30.7	12.1 ± 9.9	< 19.4	
Mn-54	1.2 ± 1.4	< 3.0	-1.2 ± 1.2	< 1.5	-0.8 ± 1.7	< 2.8	0.6 ± 1.2	< 1.7	10
Fe-59	0.6 ± 2.1	< 5.5	-0.9 ± 2.3	< 2.7	4.6 ± 3.4	< 7.2	2.9 ± 2.0	< 4.0	30
Co-58	0.2 ± 1.3	< 2.6	-0.8 ± 1.1	< 1.5	0.1 ± 1.8	< 3.6	0.6 ± 1.0	< 2.3	10
Co-60	-0.3 ± 1.5	< 1.4	-0.5 ± 1.4	< 1.8	0.1 ± 2.0	< 3.2	0.9 ± 1.3	< 2.5	10
Zn-65	-1.9 ± 2.5	< 3.4	-0.9 ± 2.7	< 2.2	0.1 ± 3.6	< 6.3	-2.2 ± 1.9	< 1.4	30
Zr-Nb-95	-1.3 ± 1.5	< 2.9	-0.8 ± 1.5	< 2.5	0.9 ± 1.8	< 4.2	-0.2 ± 1.2	< 2.4	15
Cs-134	-0.3 ± 1.5	< 2.3	0.7 ± 1.4	< 2.6	1.3 ± 1.9	< 1.9	0.1 ± 1.0	< 1.8	10
Cs-137	0.2 ± 1.6	< 3.0	0.8 ± 1.5	< 2.8	-0.2 ± 2.1	< 3.7	1.0 ± 1.3	< 2.3	10
Ba-La-140	0.7 ± 1.7	< 9.5	1.2 ± 1.6	< 6.4	0.1 ± 2.0	< 5.5	2.5 ± 1.1	< 3.6	15
Other (Ru-103)	-1.4 ± 1.2	< 3.1	-0.5 ± 1.3	< 2.5	-1.0 ± 1.7	< 4.9	-0.9 ± 1.1	< 2.4	30

[a] Tritium analysis requested on monthly sample; result = <153 pCi/L.

Table 5. Lake water, analyses for gross beta, iodine-131 and gamma emitting isotopes.
Location: E-06 (Coast Guard Station)
Collection: Monthly composites
Units: pCi/L

Lab Code	ELW- 171	MDC	ELW- 772	MDC	ELW- 1311	MDC	ELW- 1857	MDC	
Date Collected	01-12-12		02-15-12		03-14-12		04-12-12		Req. LLD
Gross beta	3.3 ± 0.7	< 0.9	3.6 ± 0.8	< 1.3	2.0 ± 0.5	< 0.6	2.0 ± 0.7	< 1.2	4.0
I-131	0.15 ± 0.19	< 0.33	0.14 ± 0.20	< 0.38	0.13 ± 0.16	< 0.22	0.11 ± 0.13	< 0.19	0.5
Be-7	-3.1 ± 12.8	< 30.3	2.0 ± 9.9	< 29.5	-0.7 ± 12.8	< 25.6	2.9 ± 15.5	< 36.8	
Mn-54	1.5 ± 1.7	< 3.5	-1.1 ± 1.5	< 1.9	-1.0 ± 1.3	< 1.6	1.1 ± 1.9	< 3.1	10
Fe-59	-2.2 ± 3.1	< 5.2	-2.1 ± 2.4	< 3.0	-0.8 ± 2.6	< 3.4	0.2 ± 4.2	< 7.5	30
Co-58	-1.0 ± 1.9	< 2.2	-0.5 ± 1.3	< 2.3	1.1 ± 1.6	< 2.2	-0.6 ± 2.0	< 2.9	10
Co-60	-0.6 ± 1.3	< 1.4	-1.1 ± 1.6	< 1.6	-0.8 ± 1.4	< 1.5	2.9 ± 1.7	< 3.1	10
Zn-65	4.2 ± 3.2	< 4.9	3.3 ± 2.9	< 5.3	-1.3 ± 3.1	< 4.0	1.0 ± 4.7	< 6.4	30
Zr-Nb-95	0.0 ± 1.8	< 3.0	0.4 ± 1.4	< 3.1	-1.3 ± 1.5	< 2.6	-0.2 ± 2.0	< 3.2	15
Cs-134	0.4 ± 1.5	< 2.6	-0.1 ± 1.3	< 2.3	-1.0 ± 1.1	< 1.7	0.2 ± 1.9	< 3.7	10
Cs-137	-0.1 ± 1.7	< 3.1	-1.0 ± 1.5	< 2.2	0.7 ± 1.6	< 2.7	-0.3 ± 2.2	< 3.0	10
Ba-La-140	1.1 ± 2.3	< 5.3	-3.6 ± 1.4	< 5.0	1.5 ± 1.6	< 1.5	2.5 ± 1.8	< 4.1	15
Other (Ru-103)	0.7 ± 1.4	< 2.8	-0.7 ± 1.2	< 2.4	0.0 ± 1.4	< 2.5	-0.6 ± 2.0	< 2.6	30
Lab Code	ELW- 2875		ELW- 3673		ELW- 4123		ELW- 5235		
Date Collected	05-16-12		06-13-12		07-12-12		08-16-12		Req. LLD
Gross beta	2.2 ± 0.9	< 1.6	2.2 ± 0.5	< 0.7	1.8 ± 0.8	< 1.3	3.5 ± 1.1	< 1.8	4.0
I-131	0.00 ± 0.14	< 0.24	0.10 ± 0.14	< 0.20	0.10 ± 0.13	< 0.22	0.17 ± 0.28	< 0.49	0.5
Be-7	3.0 ± 13.2	< 27.2	6.9 ± 11.7	< 23.8	-2.3 ± 11.8	< 28.4	-1.2 ± 16.4	< 31.3	
Mn-54	1.1 ± 1.6	< 3.2	0.3 ± 1.3	< 2.2	-1.1 ± 1.5	< 1.6	-0.5 ± 1.6	< 2.0	10
Fe-59	0.8 ± 2.8	< 4.8	0.5 ± 2.4	< 5.9	-0.4 ± 2.0	< 3.7	-1.5 ± 3.2	< 4.2	30
Co-58	1.4 ± 1.3	< 2.5	-0.1 ± 1.5	< 3.5	-2.1 ± 1.7	< 2.3	-1.9 ± 1.8	< 2.2	10
Co-60	0.2 ± 1.8	< 2.2	-0.5 ± 1.2	< 1.8	-0.2 ± 1.5	< 2.1	-1.2 ± 1.6	< 2.0	10
Zn-65	-1.3 ± 3.0	< 2.5	-0.8 ± 2.5	< 2.7	-0.4 ± 2.6	< 3.1	-1.5 ± 3.6	< 5.0	30
Zr-Nb-95	-0.3 ± 1.6	< 2.9	-1.0 ± 1.7	< 4.5	-2.3 ± 1.5	< 2.4	-0.4 ± 1.9	< 3.4	15
Cs-134	1.0 ± 1.7	< 2.8	-0.4 ± 1.3	< 2.1	-0.3 ± 1.3	< 2.8	-1.9 ± 1.9	< 3.6	10
Cs-137	0.4 ± 1.7	< 3.1	-0.1 ± 1.8	< 1.8	1.3 ± 1.8	< 2.9	0.0 ± 2.0	< 3.3	10
Ba-La-140	-1.3 ± 2.2	< 3.5	-2.5 ± 1.7	< 7.4	-0.5 ± 2.1	< 6.3	1.0 ± 2.1	< 2.7	15
Other (Ru-103)	-1.1 ± 1.4	< 1.7	-0.1 ± 1.4	< 4.2	0.5 ± 1.3	< 3.4	-0.4 ± 1.9	< 3.4	30
Lab Code	ELW- 5768		ELW- 6703		ELW- 7421		ELW- 7864		
Date Collected	09-11-12		10-16-12		11-14-12		12-04-12		Req. LLD
Gross beta	2.2 ± 0.8	< 1.3	3.5 ± 0.7	< 0.9	1.4 ± 0.4	< 0.6	2.6 ± 0.6	< 0.9	4.0
I-131	0.03 ± 0.21	< 0.37	0.13 ± 0.20	< 0.34	0.13 ± 0.20	< 0.39	0.00 ± 0.18	< 0.32	0.5
Be-7	-4.4 ± 12.7	< 35.6	0.3 ± 12.2	< 29.0	12.2 ± 14.5	< 30.1	1.2 ± 12.3	< 20.1	
Mn-54	0.3 ± 1.5	< 2.7	-0.2 ± 1.6	< 3.4	-0.6 ± 1.5	< 2.2	0.6 ± 1.3	< 2.4	10
Fe-59	0.8 ± 2.8	< 7.1	1.4 ± 2.1	< 3.4	-0.9 ± 3.1	< 3.5	-2.1 ± 2.8	< 4.4	30
Co-58	0.3 ± 1.5	< 3.1	-1.9 ± 1.4	< 2.2	0.2 ± 1.7	< 2.8	0.6 ± 1.2	< 1.9	10
Co-60	0.8 ± 1.4	< 2.9	0.1 ± 1.6	< 2.7	1.0 ± 1.6	< 3.0	0.3 ± 1.7	< 2.1	10
Zn-65	1.4 ± 2.7	< 3.8	-0.8 ± 3.1	< 2.5	0.9 ± 3.2	< 6.3	-0.4 ± 2.8	< 3.9	30
Zr-Nb-95	0.1 ± 1.6	< 3.0	0.5 ± 1.5	< 3.1	-3.2 ± 1.9	< 3.0	-0.5 ± 1.7	< 3.5	15
Cs-134	-0.1 ± 1.2	< 2.1	-0.2 ± 1.3	< 2.9	0.6 ± 1.5	< 2.9	0.3 ± 1.5	< 2.7	10
Cs-137	0.3 ± 1.7	< 2.8	0.7 ± 1.7	< 3.0	0.8 ± 2.0	< 3.4	-0.6 ± 1.7	< 2.0	10
Ba-La-140	2.3 ± 1.7	< 11.0	-2.6 ± 1.7	< 3.8	2.9 ± 1.7	< 4.0	1.8 ± 1.6	< 3.6	15
Other (Ru-103)	-0.8 ± 1.3	< 2.8	1.4 ± 1.2	< 3.2	-1.4 ± 1.5	< 2.3	-0.1 ± 1.3	< 3.3	30

Table 5. Lake water, analyses for gross beta, iodine-131 and gamma emitting isotopes.
Location: E-33 (Kewaunee)
Collection: Monthly composites   Units: pCi/L

		MDC		MDC		MDC		MDC	
Lab Code	ELW- 172		ELW- 773		ELW- 1312		ELW- 1858		
Date Collected	01-12-12		02-15-12		03-16-12		04-12-12		Req. LLD
Gross beta	2.4 ± 1.0	< 1.8	2.4 ± 0.8	< 1.3	1.1 ± 0.4	< 0.6	2.9 ± 0.8	< 1.3	4.0
I-131	-0.04 ± 0.14	< 0.26	0.13 ± 0.19	< 0.37	0.15 ± 0.16	< 0.27	0.08 ± 0.19	< 0.38	0.5
Be-7	13.7 ± 12.5	< 35.8	5.0 ± 10.9	< 24.6	9.4 ± 10.7	< 22.9	-13.5 ± 17.2	< 31.3	
Mn-54	0.7 ± 1.4	< 2.8	1.0 ± 1.3	< 2.6	0.6 ± 1.4	< 2.8	0.3 ± 1.6	< 2.7	10
Fe-59	-1.7 ± 3.1	< 6.4	0.4 ± 2.5	< 4.9	1.6 ± 2.4	< 4.4	-0.9 ± 4.2	< 7.0	30
Co-58	-0.1 ± 1.7	< 2.7	0.3 ± 1.3	< 2.1	-0.5 ± 1.3	< 2.2	0.7 ± 1.8	< 3.3	10
Co-60	1.2 ± 2.0	< 3.2	-0.5 ± 1.6	< 1.8	-0.1 ± 1.2	< 1.6	1.3 ± 2.1	< 2.1	10
Zn-65	-1.1 ± 3.5	< 4.2	-1.6 ± 2.5	< 3.3	-2.2 ± 2.6	< 2.4	2.8 ± 3.9	< 2.4	30
Zr-Nb-95	-5.9 ± 1.8	< 2.5	-1.7 ± 1.3	< 2.1	-1.4 ± 1.5	< 1.4	0.0 ± 1.9	< 3.2	15
Cs-134	-0.8 ± 1.3	< 2.0	-0.7 ± 1.0	< 1.9	-1.0 ± 1.1	< 2.2	0.8 ± 1.7	< 3.2	10
Cs-137	0.3 ± 1.9	< 2.8	0.3 ± 1.6	< 2.9	1.2 ± 1.6	< 3.1	-0.2 ± 2.1	< 3.1	10
Ba-La-140	-3.9 ± 1.5	< 4.0	-3.0 ± 1.5	< 3.3	-0.7 ± 1.6	< 1.7	-1.3 ± 2.5	< 2.4	15
Other (Ru-103)	-0.4 ± 1.6	< 3.4	-2.1 ± 1.3	< 2.6	-0.5 ± 1.1	< 2.1	-1.3 ± 2.0	< 2.4	30

Lab Code	ELW- 2876		ELW- 3674		ELW- 4124		ELW- 5236 [a]		
Date Collected	05-16-12		06-13-12		07-12-12		08-16-12		Req. LLD
Gross beta	1.7 ± 1.0	< 1.8	2.1 ± 0.6	< 0.8	1.5 ± 0.7	< 1.2	2.2 ± 1.0	< 1.8	4.0
I-131	-0.10 ± 0.21	< 0.39	0.12 ± 0.15	< 0.21	0.07 ± 0.13	< 0.23	0.14 ± 0.16	< 0.23	0.5
Be-7	5.9 ± 14.4	< 26.7	0.4 ± 8.7	< 20.9	-0.4 ± 10.9	< 28.8	11.7 ± 12.9	< 30.1	
Mn-54	-0.1 ± 2.1	< 3.5	0.9 ± 1.1	< 1.3	0.7 ± 1.3	< 2.1	0.3 ± 1.3	< 2.1	10
Fe-59	3.8 ± 3.1	< 4.9	0.3 ± 2.1	< 5.3	0.3 ± 2.3	< 3.7	-0.5 ± 2.3	< 4.9	30
Co-58	0.5 ± 2.0	< 2.7	-0.2 ± 1.1	< 1.9	0.7 ± 1.1	< 1.6	-0.2 ± 1.4	< 2.2	10
Co-60	1.3 ± 2.0	< 3.1	-0.7 ± 1.2	< 1.2	-1.1 ± 1.5	< 1.8	-0.1 ± 1.5	< 2.0	10
Zn-65	-0.5 ± 4.5	< 3.9	0.5 ± 1.9	< 3.8	0.0 ± 2.5	< 2.1	-1.6 ± 3.0	< 3.3	30
Zr-Nb-95	-0.6 ± 2.1	< 4.1	-1.7 ± 1.1	< 2.2	-0.2 ± 1.5	< 3.5	1.1 ± 1.5	< 3.1	15
Cs-134	0.1 ± 2.3	< 2.8	0.1 ± 0.9	< 1.7	-0.2 ± 1.1	< 2.2	-0.6 ± 1.3	< 3.0	10
Cs-137	-1.4 ± 2.2	< 2.5	0.6 ± 1.2	< 2.2	1.1 ± 1.4	< 2.7	0.1 ± 1.7	< 2.0	10
Ba-La-140	-3.2 ± 2.7	< 2.1	-1.5 ± 1.3	< 3.1	-1.2 ± 1.0	< 3.5	0.4 ± 1.9	< 5.2	15
Other (Ru-103)	-1.3 ± 2.1	< 3.9	0.6 ± 0.9	< 3.1	-0.6 ± 1.3	< 2.9	-0.7 ± 1.3	< 2.5	30

										All locations
Lab Code	ELW- 5769		ELW- 6704		ELW- 7422		ELW- 7865			**Annual**
Date Collected	09-11-12		10-16-12		11-14-12		12-05-12		Req. LLD	**Mean ± s.d.**
Gross beta	2.1 ± 0.8	< 1.2	1.5 ± 0.5	< 0.8	1.2 ± 0.4	< 0.6	2.2 ± 0.6	< 0.8	4.0	**2.2 ± 0.7**
I-131	0.13 ± 0.19	< 0.32	-0.14 ± 0.17	< 0.32	0.08 ± 0.14	< 0.25	0.05 ± 0.22	< 0.40	0.5	**0.06 ± 0.08**
Be-7	17.5 ± 12.8	< 37.6	-2.4 ± 10.0	< 17.4	6.3 ± 15.6	< 31.3	6.8 ± 14.3	< 32.4		**3.3 ± 7.6**
Mn-54	0.0 ± 1.4	< 1.7	0.0 ± 1.2	< 2.0	-0.1 ± 2.0	< 3.3	1.2 ± 1.6	< 2.9	10	**0.2 ± 0.8**
Fe-59	-2.3 ± 2.5	< 5.3	1.0 ± 2.0	< 4.1	-0.4 ± 3.9	< 7.8	-2.8 ± 3.2	< 4.1	30	**0.1 ± 1.8**
Co-58	1.5 ± 1.5	< 3.5	-1.0 ± 1.1	< 1.6	-0.3 ± 2.1	< 4.4	-0.7 ± 1.5	< 3.1	10	**-0.1 ± 0.9**
Co-60	-1.6 ± 1.5	< 1.4	0.2 ± 1.3	< 2.4	0.6 ± 2.1	< 2.5	2.0 ± 1.4	< 2.4	10	**0.2 ± 1.0**
Zn-65	0.2 ± 2.2	< 3.3	2.0 ± 2.4	< 3.6	0.1 ± 3.9	< 7.2	-1.4 ± 3.4	< 3.4	30	**-0.7 ± 4.6**
Zr-Nb-95	1.2 ± 1.4	< 4.6	-0.3 ± 1.4	< 3.4	0.8 ± 2.1	< 5.1	0.3 ± 1.4	< 2.9	15	**-0.9 ± 1.6**
Cs-134	0.8 ± 1.3	< 2.7	-0.7 ± 1.0	< 1.6	-1.7 ± 2.0	< 3.0	-1.9 ± 1.6	< 3.0	10	**-0.3 ± 0.8**
Cs-137	0.8 ± 1.7	< 3.5	1.3 ± 1.5	< 2.2	3.4 ± 2.4	< 4.3	0.1 ± 1.8	< 3.3	10	**0.0 ± 0.9**
Ba-La-140	-1.1 ± 1.3	< 9.5	-0.2 ± 1.6	< 6.6	1.6 ± 2.1	< 3.7	-1.5 ± 1.7	< 3.1	15	**-0.2 ± 2.1**
Other (Ru-103)	-0.7 ± 1.2	< 3.7	-2.0 ± 1.2	< 2.5	-1.7 ± 2.0	< 5.3	-1.0 ± 1.7	< 3.2	30	**-0.6 ± 0.8**

[a] Tritium requested on monthly sample; result = 406±99 pCi/L.

Table 6. Lake water, analyses for tritium, strontium-89 and strontium-90.
Collection: Quarterly composites of weekly grab samples
Units: pCi/L

Location	E-01 (Meteorological Tower)								
Period	1st Qtr.	**MDC**	2nd Qtr.	**MDC**	3rd Qtr.	**MDC**	4th Qtr.	**MDC**	
Lab Code	ELW- 1362		ELW- 3746		ELW- 5817 [b]		ELW- 7898		Req. LLDs
H-3	73 ± 79	< 143	29 ± 79	< 148	30 ± 75	< 148	-29 ± 72	< 149	500
Sr-89	-0.24 ± 0.67	< 0.79	-0.18 ± 0.74	< 0.90	-0.30 ± 0.62	< 0.78	-0.03 ± 0.52	< 0.64	5.0
Sr-90	0.33 ± 0.28	< 0.52	0.26 ± 0.26	< 0.49	0.25 ± 0.28	< 0.55	0.28 ± 0.22	< 0.40	1.0

Location	E-05 (Two Creeks Park)								
Period	1st Qtr.		2nd Qtr.		3rd Qtr.		4th Qtr.		
Lab Code	ELW- 1363		ELW- 3747		ELW- 5819		ELW- 7899		Req. LLDs
H-3	55 ± 78	< 143	117 ± 84	< 148	904 ± 114	[c] < 148	39 ± 76	< 149	500
Sr-89	0.53 ± 0.71	< 0.91	0.19 ± 0.92	< 1.13	0.89 ± 0.92	< 1.05	0.01 ± 0.60	< 0.72	5.0
Sr-90	0.08 ± 0.27	< 0.57	0.28 ± 0.30	< 0.59	0.16 ± 0.36	< 0.74	0.31 ± 0.24	< 0.44	1.0

Location	E-06 (Coast Guard Station)								
Period	1st Qtr.		2nd Qtr.		3rd Qtr.		4th Qtr.		
Lab Code	ELW- 1364		ELW- 3748		ELW- 5820		ELW- 7900		Req. LLDs
H-3	73 ± 79	< 143	31 ± 80	< 148	55 ± 77	< 148	8 ± 74	< 149	500
Sr-89	0.07 ± 0.62	< 0.75	-0.18 ± 0.87	< 1.00	0.56 ± 0.73	< 0.63	0.26 ± 0.57	< 0.72	5.0
Sr-90	0.20 ± 0.24	< 0.47	0.40 ± 0.29	< 0.53	0.40 ± 0.35	< 0.62	0.15 ± 0.23	< 0.46	1.0

Location	E-33 (Kewaunee)								
Period	1st Qtr.		2nd Qtr.		3rd Qtr.		4th Qtr.		
Lab Code	ELW- 1365		ELW- 3749		ELW- 5821		ELW- 7901		Req. LLDs
H-3	32 ± 77	< 143	1192 ± 126	[a] < 148	128 ± 87	< 153	124 ± 80	< 149	500
Sr-89	0.10 ± 0.58	< 0.71	0.68 ± 0.78	< 0.87	-0.05 ± 0.68	< 0.73	0.01 ± 0.70	< 0.89	5.0
Sr-90	0.25 ± 0.23	< 0.43	0.33 ± 0.24	< 0.43	0.48 ± 0.30	< 0.51	0.32 ± 0.29	< 0.55	1.0

[a] Tritium repeated with a result of 1261±127 pCi/L. Monthly results: April = 35±81 (<151), May = 49±82 (<151), June = 3975±197 pCi/L.

[b] Monthly tritium requested; results: July = 24±85 (<158), Aug = -7±82 (<158), Sept = 49±85 (<157) pCi/L.

[c] Tritium repeated with a result of 956±120 pCi/L. Monthly results: July = 39±85 (<158), Aug = 2184±159, Sept = 372±100 pCi/L.

Tritium Annual Mean ± s.d.	**179 ± 346**
Sr-89 Annual Mean ± s.d.	**0.15 ± 0.35**
Sr-90 Annual Mean ± s.d.	**0.28 ± 0.10**

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Table 7. Fish, analyses for gross beta and gamma emitting isotopes.
Location: E-13
Collection: 2x / year Units: pCi/g wet

	Sample Description and Concentration	MDC		MDC		MDC	Req. LLD
Collection Date	01-10-12		01-02-12		02-08-12		
Lab Code	EF- 266		EF- 709		EF- 708		
Type	Lake Trout		Drum		Whitefish		
Ratio (wet/dry wt.)	4.73		3.11		4.77		
Gross Beta	3.24 ± 0.07	< 0.024	4.12 ± 0.09	< 0.031	3.60 ± 0.07	< 0.022	0.5
K-40	2.35 ± 0.33	-	3.40 ± 0.42	-	3.47 ± 0.41	-	
Mn-54	-0.002 ± 0.008	< 0.008	-0.001 ± 0.008	< 0.014	-0.004 ± 0.009	< 0.013	0.13
Fe-59	-0.029 ± 0.017	< 0.037	0.021 ± 0.015	< 0.051	-0.015 ± 0.015	< 0.027	0.26
Co-58	0.012 ± 0.007	< 0.017	0.001 ± 0.008	< 0.019	0.006 ± 0.008	< 0.017	0.13
Co-60	-0.013 ± 0.010	< 0.011	0.004 ± 0.011	< 0.012	0.008 ± 0.009	< 0.014	0.13
Zn-65	-0.037 ± 0.022	< 0.014	0.010 ± 0.018	< 0.031	-0.005 ± 0.016	< 0.037	0.26
Cs-134	0.000 ± 0.009	< 0.014	-0.009 ± 0.008	< 0.013	0.006 ± 0.009	< 0.015	0.13
Cs-137	0.029 ± 0.013	< 0.009	0.011 ± 0.012	< 0.021	0.074 ± 0.023	< 0.019	0.15
Other (Ru-103)	0.011 ± 0.006	< 0.015	0.002 ± 0.007	< 0.041	-0.005 ± 0.007	< 0.012	0.5
Collection Date	03-02-12		03-14-12		05-31-12		
Lab Code	EF- 1495		EF- 1496		EF- 3255		
Type	Trout		Herring		Lake Trout		
Ratio (wet/dry wt.)	6.10		8.70		3.11		
Gross Beta	3.05 ± 0.06	< 0.021	3.50 ± 0.08	< 0.026	3.76 ± 0.08	< 0.030	0.5
K-40	2.31 ± 0.37	-	2.82 ± 0.38	-	3.39 ± 0.39	-	
Mn-54	-0.002 ± 0.009	< 0.017	0.006 ± 0.009	< 0.016	-0.004 ± 0.008	< 0.009	0.13
Fe-59	-0.020 ± 0.021	< 0.036	-0.005 ± 0.022	< 0.047	-0.016 ± 0.020	< 0.029	0.26
Co-58	-0.005 ± 0.010	< 0.019	-0.015 ± 0.011	< 0.016	0.001 ± 0.007	< 0.009	0.13
Co-60	-0.005 ± 0.013	< 0.020	-0.002 ± 0.011	< 0.015	0.008 ± 0.009	< 0.006	0.13
Zn-65	-0.001 ± 0.026	< 0.023	0.003 ± 0.023	< 0.028	-0.009 ± 0.020	< 0.010	0.26
Cs-134	0.000 ± 0.009	< 0.017	0.005 ± 0.009	< 0.013	0.001 ± 0.008	< 0.006	0.13
Cs-137	0.015 ± 0.012	< 0.021	-0.007 ± 0.013	< 0.019	0.042 ± 0.019	< 0.014	0.15
Other (Ru-103)	-0.001 ± 0.010	< 0.034	0.010 ± 0.008	< 0.020	-0.001 ± 0.007	< 0.015	0.5

Table 7. Fish, analyses for gross beta and gamma emitting isotopes.
Location: E-13
Collection: 2x / year   Units: pCi/g wet

	Sample Description and Concentration (pCi/g wet)	MDC		MDC		MDC	Req. LLD
Collection Date	05-31-12		05-31-12		07-25-12		
Lab Code	EF- 3256		EF- 3257		EF- 4519		
Type	Lake Trout		Brown Trout		Brown Trout		
Ratio (wet/dry wt.)	4.44		6.00		3.24		
Gross Beta	3.06 ± 0.06	< 0.019	3.16 ± 0.07	< 0.022	4.72 ± 0.13	< 0.044	0.5
K-40	2.59 ± 0.42	-	2.73 ± 0.43	-	3.02 ± 0.47	-	
Mn-54	0.001 ± 0.009	< 0.014	0.006 ± 0.010	< 0.021	0.007 ± 0.010	< 0.016	0.13
Fe-59	-0.012 ± 0.021	< 0.039	0.017 ± 0.020	< 0.057	0.006 ± 0.024	< 0.047	0.26
Co-58	-0.008 ± 0.009	< 0.011	0.003 ± 0.009	< 0.018	0.003 ± 0.010	< 0.011	0.13
Co-60	0.002 ± 0.011	< 0.015	0.009 ± 0.011	< 0.017	-0.009 ± 0.010	< 0.008	0.13
Zn-65	0.006 ± 0.022	< 0.036	-0.003 ± 0.020	< 0.041	-0.002 ± 0.027	< 0.038	0.26
Cs-134	-0.001 ± 0.010	< 0.015	0.004 ± 0.009	< 0.016	0.004 ± 0.010	< 0.018	0.13
Cs-137	0.021 ± 0.014	< 0.025	0.021 ± 0.012	< 0.018	0.021 ± 0.013	< 0.019	0.15
Other (Ru-103)	0.006 ± 0.010	< 0.024	-0.001 ± 0.007	< 0.025	0.011 ± 0.010	< 0.022	0.5
Collection Date	07-25-12		07-25-12		08-09-12		
Lab Code	EF- 4520		EF- 4521		EF- 5313		
Type	Sucker		Lake Trout		Brown Trout		
Ratio (wet/dry wt.)	5.00		5.44		3.81		
Gross Beta	3.28 ± 0.09	< 0.029	3.55 ± 0.11	< 0.038	4.12 ± 0.08	< 0.026	0.5
K-40	3.20 ± 0.42	-	2.90 ± 0.39	-	3.07 ± 0.42	-	
Mn-54	0.001 ± 0.007	< 0.010	0.005 ± 0.009	< 0.017	0.000 ± 0.010	< 0.023	0.13
Fe-59	-0.009 ± 0.022	< 0.023	-0.004 ± 0.020	< 0.023	-0.007 ± 0.020	< 0.065	0.26
Co-58	-0.003 ± 0.009	< 0.009	-0.001 ± 0.011	< 0.020	0.004 ± 0.010	< 0.031	0.13
Co-60	0.006 ± 0.007	< 0.008	-0.005 ± 0.009	< 0.009	0.009 ± 0.010	< 0.008	0.13
Zn-65	0.026 ± 0.016	< 0.017	-0.017 ± 0.021	< 0.026	-0.049 ± 0.025	< 0.025	0.26
Cs-134	-0.013 ± 0.010	< 0.012	-0.006 ± 0.009	< 0.013	-0.005 ± 0.008	< 0.014	0.13
Cs-137	0.004 ± 0.011	< 0.018	0.017 ± 0.013	< 0.024	0.047 ± 0.024	< 0.023	0.15
Other (Ru-103)	0.007 ± 0.008	< 0.011	-0.002 ± 0.008	< 0.019	-0.020 ± 0.010	< 0.037	0.5

Table 7. Fish, analyses for gross beta and gamma emitting isotopes.
Location: E-13
Collection: 2x / year Units: pCi/g wet

	Sample Description and Concentration (pCi/g wet)	MDC		MDC		MDC	Req. LLD
Collection Date	08-28-12		08-29-12		10-18-12		
Lab Code	EF- 5512		EF- 5513		EF- 6870		
Type	Brown Trout		Lake Trout		Smallmouth Bass		
Ratio (wet/dry wt.)	5.80		4.65		3.36		
Gross Beta	3.60 ± 0.07	< 0.020	2.49 ± 0.05	< 0.015	3.43 ± 0.07	< 0.036	0.5
K-40	2.85 ± 0.39	-	2.63 ± 0.41	-	2.06 ± 0.72	-	
Mn-54	0.001 ± 0.009	< 0.016	-0.003 ± 0.010	< 0.017	0.000 ± 0.021	< 0.039	0.13
Fe-59	-0.019 ± 0.018	< 0.030	0.017 ± 0.021	< 0.039	0.024 ± 0.040	< 0.057	0.26
Co-58	0.001 ± 0.008	< 0.015	0.007 ± 0.009	< 0.016	0.011 ± 0.019	< 0.050	0.13
Co-60	-0.011 ± 0.011	< 0.009	0.016 ± 0.009	< 0.013	-0.022 ± 0.024	< 0.037	0.13
Zn-65	-0.016 ± 0.018	< 0.015	-0.003 ± 0.023	< 0.017	-0.078 ± 0.048	< 0.030	0.26
Cs-134	-0.008 ± 0.007	< 0.014	-0.008 ± 0.010	< 0.010	-0.028 ± 0.023	< 0.035	0.13
Cs-137	0.042 ± 0.020	< 0.021	0.027 ± 0.015	< 0.026	0.005 ± 0.021	< 0.029	0.15
Other (Ru-103)	0.003 ± 0.008	< 0.025	0.007 ± 0.010	< 0.023	0.019 ± 0.022	< 0.087	0.5
Collection Date	10-16-12		10-19-12				
Lab Code	EF- 6871		EF- 6872		**Annual**		
Type	Lake Trout		Whitefish				
Ratio (wet/dry wt.)	4.32		3.75		**Mean ± s.d.**		
Gross Beta	3.47 ± 0.05	< 0.017	4.51 ± 0.06	< 0.022	**3.57 ± 0.56**		0.5
K-40	2.58 ± 0.31	-	3.19 ± 0.39	-	**2.91 ± 0.41**		
Mn-54	-0.005 ± 0.008	< 0.011	-0.001 ± 0.007	< 0.012	**0.000 ± 0.004**		0.13
Fe-59	-0.010 ± 0.012	< 0.028	-0.010 ± 0.017	< 0.022	**-0.004 ± 0.016**		0.26
Co-58	0.004 ± 0.006	< 0.020	0.006 ± 0.008	< 0.020	**0.001 ± 0.007**		0.13
Co-60	0.001 ± 0.007	< 0.012	-0.003 ± 0.011	< 0.015	**0.000 ± 0.010**		0.13
Zn-65	-0.006 ± 0.016	< 0.037	-0.008 ± 0.021	< 0.024	**-0.011 ± 0.024**		0.26
Cs-134	-0.002 ± 0.005	< 0.009	0.005 ± 0.008	< 0.016	**-0.003 ± 0.009**		0.13
Cs-137	0.037 ± 0.014	< 0.015	-0.001 ± 0.010	< 0.017	**0.024 ± 0.020**		0.15
Other (Ru-103)	-0.017 ± 0.006	< 0.015	0.011 ± 0.008	< 0.031	**0.002 ± 0.010**		0.5

Table 8. Radioactivity in shoreline sediment samples

Collection: Semiannual

Sample Description and Concentration (pCi/g dry)

		MDC		MDC		MDC	
Collection Date	4/12/2012		4/12/2012		4/12/2012		
Lab Code	ESS- 1859		ESS- 1860		ESS- 1861		LLD
Location	E-01		E-05		E-06		
Gross Beta	8.61 ± 0.98	< 1.24	8.47 ± 0.87	< 1.06	12.44 ± 1.01	< 1.18	2.0
Be-7	0.007 ± 0.046	< 0.09	0.055 ± 0.045	< 0.08	-0.013 ± 0.046	< 0.09	
K-40	7.24 ± 0.37	-	5.13 ± 0.34	-	7.96 ± 0.41	-	-
Cs-137	0.021 ± 0.011	< 0.010	0.013 ± 0.006	< 0.009	0.012 ± 0.007	< 0.009	0.15
Tl-208	0.040 ± 0.016	-	0.040 ± 0.015	-	0.044 ± 0.015	-	-
Pb-212	0.13 ± 0.043	-	0.13 ± 0.046	-	0.11 ± 0.027	-	-
Bi-214	0.10 ± 0.021	-	0.10 ± 0.022	-	0.09 ± 0.022	-	-
Ra-226	0.24 ± 0.14	-	0.29 ± 0.12	< 0.23	0.24 ± 0.14	-	-
Ac-228	0.15 ± 0.044	-	0.14 ± 0.050	-	0.17 ± 0.063	-	-

Collection Date	4/12/2012		4/12/2012		
Lab Code	ESS- 1862		ESS- 1863		
Location	E-12		E-33		
Gross Beta	7.63 ± 0.68	< 1.06	9.48 ± 0.97	< 1.21	2.0
Be-7	0.095 ± 0.045	< 0.09	0.028 ± 0.046	< 0.07	
K-40	4.88 ± 0.54	-	7.36 ± 0.38	-	-
Cs-137	0.021 ± 0.011	< 0.010	0.016 ± 0.009	< 0.008	0.15
Tl-208	0.047 ± 0.015	-	0.045 ± 0.015	-	-
Pb-212	0.13 ± 0.050	-	0.14 ± 0.053	-	-
Bi-214	0.09 ± 0.023	-	0.11 ± 0.022	-	-
Ra-226	0.19 ± 0.12	< 0.20	0.25 ± 0.13	-	-
Ac-228	0.12 ± 0.037	-	0.11 ± 0.043	-	-

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RADIOACTIVITY IN SHORELINE SEDIMENT SAMPLES

(Semiannual Collections)

Sample Description and Concentration (pCi/g dry)

		MDC		MDC		MDC	
Collection Date	10/16/2012		10/16/2012		10/16/2012		Req.
Lab Code	ESS- 6711		ESS- 6713		ESS- 6714		LLD
Location	E-01		E-05		E-06		
Gross Beta	14.20 ± 0.89	< 0.93	10.15 ± 0.90	< 1.05	12.07 ± 0.94	< 1.06	2.0
Be-7	0.028 ± 0.055	< 0.14	-0.02 ± 0.051	< 0.09	0.058 ± 0.052	< 0.15	
K-40	10.02 ± 0.51	-	6.98 ± 0.42	-	8.00 ± 0.46	-	-
Cs-137	0.018 ± 0.009	< 0.014	0.016 ± 0.008	< 0.012	0.024 ± 0.014	< 0.013	0.15
Tl-208	0.057 ± 0.019	-	0.034 ± 0.014	-	0.026 ± 0.009	< 0.018	-
Pb-212	0.15 ± 0.055	-	0.10 ± 0.040	< 0.081	0.16 ± 0.056	-	-
Bi-214	0.13 ± 0.025	-	0.12 ± 0.027	-	0.10 ± 0.025	-	-
Ra-226	0.43 ± 0.15	< 0.27	0.35 ± 0.13	< 0.25	0.15 ± 0.14	< 0.25	-
Ac-228	0.16 ± 0.046	-	0.14 ± 0.055	-	0.18 ± 0.075	-	-

Collection Date	10/16/2012		10/16/2012			
Lab Code	ESS- 6715		ESS- 6716			**Annual**
Location	E-12		E-33			**Mean ±s.d.**
Gross Beta	7.60 ± 0.79	< 0.92	11.36 ± 0.92	< 1.06	2.0	**10.20 ± 2.24**
Be-7	0.035 ± 0.053	< 0.16	0.45 ± 0.21	-		**0.073 ± 0.138**
K-40	4.91 ± 0.38	-	7.11 ± 7.11	-	-	**6.96 ± 1.62**
Cs-137	0.030 ± 0.014	< 0.011	0.019 ± 0.009	< 0.013	0.15	**0.019 ± 0.005**
Tl-208	0.047 ± 0.016	-	0.036 ± 0.037	-	-	**0.04 ± 0.01**
Pb-212	0.12 ± 0.019	-	0.14 ± 0.144	-	-	**0.13 ± 0.02**
Bi-214	0.12 ± 0.024	-	0.11 ± 0.106	-	-	**0.11 ± 0.01**
Ra-226	0.38 ± 0.14	< 0.26	0.32 ± 0.14	< 0.25	-	**0.28 ± 0.09**
Ac-228	0.16 ± 0.043	-	0.17 ± 0.052	-	-	**0.15 ± 0.02**

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Table 9. Radioactivity in soil samples

Collection: Semiannual

Sample Description and Concentration (pCi/g dry)

		MDC		MDC		MDC	
Collection Date	5/30/2012		5/30/2012		5/30/2012		Req.
Lab Code	ESO- 3301		ESO- 3302		ESO- 3303		LLD
Location	E-01		E-02		E-03		
Gross Beta	25.19 ± 1.15	< 1.12	32.30 ± 1.15	< 0.96	36.27 ± 1.25	< 1.07	2.0
Be-7	0.064 ± 0.090	< 0.22	-0.037 ± 0.11	< 0.24	0.12 ± 0.10	< 0.22	
K-40	10.67 ± 1.04	-	20.51 ± 0.94	-	18.73 ± 0.85	-	-
Cs-137	0.17 ± 0.031	< 0.020	0.16 ± 0.034	< 0.032	0.39 ± 0.044	< 0.027	0.15
Tl-208	0.16 ± 0.029	-	0.19 ± 0.034	-	0.19 ± 0.029	-	-
Pb-212	0.49 ± 0.093	-	0.53 ± 0.043	-	0.65 ± 0.11	-	-
Bi-214	0.27 ± 0.047	-	0.36 ± 0.052	-	0.39 ± 0.047	-	-
Ra-226	1.12 ± 0.28	-	1.35 ± 0.36	-	1.22 ± 0.32	-	-
Ac-228	0.44 ± 0.10	-	0.70 ± 0.10	-	0.81 ± 0.14	-	-
Collection Date	5/30/2012		5/30/2012		5/30/2012		
Lab Code	ESO- 3304		ESO- 3305		ESO- 3307		
Location	E-04		E-06		E-08		
Gross Beta	27.21 ± 1.07	< 0.92	10.95 ± 0.89	< 1.02	18.83 ± 1.05	< 1.09	2.0
Be-7	0.040 ± 0.081	< 0.21	-0.014 ± 0.054	< 0.092	0.11 ± 0.082	< 0.21	
K-40	16.88 ± 0.79	-	7.21 ± 0.45	-	12.05 ± 0.67	-	-
Cs-137	0.14 ± 0.028	< 0.024	0.024 ± 0.013	< 0.012	0.035 ± 0.021	<0.021	0.15
Tl-208	0.13 ± 0.026	-	0.068 ± 0.018	-	0.082 ± 0.029	-	-
Pb-212	0.31 ± 0.031	-	0.15 ± 0.022	-	0.22 ± 0.029	-	-
Bi-214	0.25 ± 0.044	-	0.094 ± 0.029	-	0.12 ± 0.036	-	-
Ra-226	1.01 ± 0.33	-	0.42 ± 0.14	< 0.27	0.52 ± 0.21	< 0.45	-
Ac-228	0.45 ± 0.10	-	0.23 ± 0.057	-	0.30 ± 0.076	-	-
Collection Date	5/30/2012		5/30/2012				
Lab Code	ESO- 3308		ESO- 3309				
Location	E-09		E-20				
Gross Beta	30.01 ± 1.12	< 0.96	25.13 ± 1.11	< 1.06			2.0
Be-7	-0.016 ± 0.099	< 0.21	0.089 ± 0.101	< 0.22			
K-40	19.18 ± 0.91	-	7.98 ± 0.93	-			-
Cs-137	0.14 ± 0.028	< 0.028	0.14 ± 0.040	< 0.039			0.15
Tl-208	0.17 ± 0.032	-	0.14 ± 0.038	-			-
Pb-212	0.48 ± 0.041	-	0.43 ± 0.057	-			-
Bi-214	0.51 ± 0.056	-	0.25 ± 0.053	-			-
Ra-226	1.66 ± 0.41	-	0.77 ± 0.31	-			-
Ac-228	0.57 ± 0.10	-	0.49 ± 0.11	-			-

Table 9. Radioactivity in soil samples

Collection: Semiannual

	Sample Description and Concentration (pCi/g dry)	MDC		MDC		MDC	
Collection Date	10/31/2012		10/31/2012		10/31/2012		Req.
Lab Code	ESO- 7135		ESO- 7136		ESO- 7137		LLD
Location	E-01		E-02		E-03		
Gross Beta	23.22 ± 1.10	< 1.09	27.15 ± 1.05	< 0.91	26.40 ± 1.12	< 1.05	2.0
Be-7	-0.057 ± 0.090	< 0.17	0.092 ± 0.078	< 0.20	0.043 ± 0.11	< 0.22	
K-40	12.40 ± 0.61	-	15.40 ± 0.67	-	16.10 ± 0.88	-	-
Cs-137	0.12 ± 0.031	< 0.026	0.054 ± 0.021	< 0.026	0.13 ± 0.032	< 0.024	0.15
Tl-208	0.13 ± 0.027	-	0.15 ± 0.028	-	0.17 ± 0.036	-	-
Pb-212	0.37 ± 0.030	-	0.42 ± 0.032	-	0.44 ± 0.060	-	-
Bi-214	0.33 ± 0.040	-	0.33 ± 0.039	-	0.36 ± 0.052	-	-
Ra-226	0.85 ± 0.27	-	0.96 ± 0.26	-	0.84 ± 0.32	-	-
Ac-228	0.44 ± 0.10	-	0.45 ± 0.073	-	0.68 ± 0.13	-	-
Collection Date	10/31/2012		10/31/2012		10/31/2012		
Lab Code	ESO- 7138		ESO- 7139		ESO- 7140		
Location	E-04		E-06		E-08		
Gross Beta	17.56 ± 0.93	< 0.91	15.51 ± 0.90	< 0.92	23.33 ± 1.06	< 1.02	2.0
Be-7	0.074 ± 0.076	< 0.18	0.061 ± 0.060	< 0.15	0.06 ± 0.076	< 0.16	
K-40	9.94 ± 0.61	-	8.02 ± 0.50	-	13.28 ± 0.69	-	-
Cs-137	0.19 ± 0.030	< 0.019	0.26 ± 0.027	< 0.017	0.15 ± 0.022	< 0.014	0.15
Tl-208	0.081 ± 0.084	-	0.086 ± 0.020	-	0.11 ± 0.028	-	-
Pb-212	0.35 ± 0.355	-	0.24 ± 0.033	-	0.29 ± 0.031	-	-
Bi-214	0.21 ± 0.207	-	0.14 ± 0.033	-	0.29 ± 0.044	-	-
Ra-226	0.47 ± 0.47	-	0.40 ± 0.17	< 0.32	0.50 ± 0.25	-	-
Ac-228	0.28 ± 0.29	-	0.24 ± 0.062	-	0.36 ± 0.083	-	-
Collection Date	10/31/2012		10/31/2012				
Lab Code	ESO- 7141		ESO- 7142		**Annual**		
Location	E-09		E-20		**Mean ± s.d.**		
Gross Beta	30.83 ± 1.13	< 1.00	23.01 ± 0.98	< 0.89	**24.56 ± 6.52**		2.0
Be-7	0.032 ± 0.11	< 0.26	0.057 ± 0.089	< 0.20	**0.044 ± 0.05**		
K-40	18.23 ± 0.79	-	12.93 ± 0.67	-	**13.72 ± 4.29**		-
Cs-137	0.13 ± 0.026	< 0.026	0.11 ± 0.032	< 0.022	**0.15 ± 0.09**		0.15
Tl-208	0.17 ± 0.033	-	0.13 ± 0.031	-	**0.13 ± 0.04**		-
Pb-212	0.50 ± 0.036	-	0.40 ± 0.040	-	**0.39 ± 0.13**		-
Bi-214	0.89 ± 0.065	-	0.44 ± 0.048	-	**0.33 ± 0.19**		-
Ra-226	0.81 ± 0.32	-	0.64 ± 0.26	-	**0.85 ± 0.36**		-
Ac-228	0.58 ± 0.095	-	0.53 ± 0.12	-	**0.47 ± 0.17**		-

Table 10. Radioactivity in vegetation samples
Collection: Tri-annual

Sample Description and Concentration (pCi/g wet)

		MDC		MDC		MDC	
Location	E-01		E-02		E-03		
Collection Date	5/23/2012		5/23/2012		5/23/2012		
Lab Code	EG- 3091		EG- 3092		EG- 3093		Req. LLD
Ratio (wet/dry)	4.00		4.44		3.81		-
Gross Beta	6.87 ± 0.13	< 0.041	8.56 ± 0.15	< 0.047	8.04 ± 0.15	< 0.052	0.25
Be-7	1.01 ± 0.17	-	0.22 ± 0.12	-	0.17 ± 0.06	< 0.13	-
K-40	4.82 ± 0.36	-	7.11 ± 0.46	-	7.10 ± 0.43	-	-
I-131	0.009 ± 0.007	< 0.028	-0.009 ± 0.007	< 0.017	-0.006 ± 0.006	< 0.013	0.060
Cs-134	0.004 ± 0.006	< 0.010	-0.003 ± 0.006	< 0.009	0.001 ± 0.006	< 0.009	0.060
Cs-137	0.000 ± 0.007	< 0.010	0.000 ± 0.008	< 0.012	-0.004 ± 0.007	< 0.011	0.080
Other (Co-60)	0.004 ± 0.006	< 0.010	0.009 ± 0.006	< 0.010	0.002 ± 0.007	< 0.010	0.060
Location	E-04		E-06		E-08		
Collection Date	5/23/2012		5/23/2012		5/23/2012		
Lab Code	EG- 3094		EG- 3096		EG- 3097		Req. LLD
Ratio (wet/dry)	4.07		3.55		4.14		-
Gross Beta	7.89 ± 0.16	< 0.048	7.85 ± 0.15	< 0.044	7.19 ± 0.14	< 0.044	0.25
Be-7	0.42 ± 0.14	-	1.14 ± 0.15	-	0.88 ± 0.13	-	-
K-40	6.49 ± 0.46	-	4.98 ± 0.33	-	6.03 ± 0.32	-	-
I-131	0.001 ± 0.008	< 0.030	0.001 ± 0.005	< 0.016	-0.003 ± 0.006	< 0.019	0.060
Cs-134	-0.002 ± 0.007	< 0.011	0.003 ± 0.006	< 0.009	0.001 ± 0.006	< 0.011	0.060
Cs-137	-0.001 ± 0.009	< 0.014	-0.001 ± 0.007	< 0.013	0.004 ± 0.007	< 0.010	0.080
Other (Co-60)	-0.003 ± 0.009	< 0.011	0.004 ± 0.006	< 0.009	0.001 ± 0.006	< 0.010	0.060
Location	E-09		E-20				
Collection Date	5/23/2012		5/23/2012				
Lab Code	EG- 3098		EG- 3099				Req. LLD
Ratio (wet/dry)	4.40		6.33				-
Gross Beta	7.03 ± 0.14	< 0.046	7.62 ± 0.14	< 0.042			0.25
Be-7	0.29 ± 0.12	-	0.35 ± 0.15	-			-
K-40	6.08 ± 0.42	-	6.51 ± 0.41	-			-
I-131	0.011 ± 0.007	< 0.025	-0.002 ± 0.007	< 0.023			0.060
Cs-134	0.002 ± 0.007	< 0.011	-0.001 ± 0.006	< 0.006			0.060
Cs-137	0.002 ± 0.009	< 0.013	0.001 ± 0.008	< 0.015			0.080
Other (Co-60)	0.005 ± 0.007	< 0.008	0.002 ± 0.008	< 0.015			0.060

Table 10. Radioactivity in vegetation samples
Collection: Tri-annual

Sample Description and Concentration (pCi/g wet)

		MDC		MDC		MDC	
Location	E-01		E-02		E-03		
Collection Date	7/24/2012		7/24/2012		7/24/2012		
Lab Code	EG- 4467		EG- 4468		EG- 4469		Req. LLD
Ratio (wet/dry)	4.34		3.08		3.02		-
Gross Beta	6.80 ± 0.21	< 0.078	7.75 ± 0.23	< 0.075	6.10 ± 0.22	< 0.087	0.25
Be-7	2.22 ± 0.26	-	1.46 ± 0.20	-	1.52 ± 0.15	-	-
K-40	3.89 ± 0.41	-	4.68 ± 0.38	-	6.81 ± 0.39	-	-
I-131	0.000 ± 0.011	< 0.034	-0.006 ± 0.006	< 0.018	-0.002 ± 0.005	< 0.017	0.060
Cs-134	-0.006 ± 0.010	< 0.013	0.004 ± 0.007	< 0.013	-0.002 ± 0.005	< 0.012	0.060
Cs-137	0.001 ± 0.009	< 0.013	-0.001 ± 0.008	< 0.016	-0.004 ± 0.007	< 0.008	0.080
Other (Co-60)	0.002 ± 0.009	< 0.014	0.003 ± 0.008	< 0.012	0.004 ± 0.006	< 0.010	0.060
Location	E-04		E-06		E-08		
Collection Date	7/24/2012		7/24/2012		7/24/2012		
Lab Code	EG- 4470		EG- 4471		EG- 4472		Req. LLD
Ratio (wet/dry)	4.58		2.64		2.71		-
Gross Beta	5.03 ± 0.16	< 0.063	3.71 ± 0.12	< 0.045	7.65 ± 0.24	< 0.085	0.25
Be-7	2.01 ± 0.24	-	1.36 ± 0.18	-	2.96 ± 0.30	-	-
K-40	4.89 ± 0.38	-	3.22 ± 0.34	-	5.48 ± 0.49	-	-
I-131	-0.011 ± 0.008	< 0.027	0.005 ± 0.009	< 0.022	0.019 ± 0.010	< 0.040	0.060
Cs-134	-0.006 ± 0.006	< 0.009	-0.008 ± 0.008	< 0.012	-0.008 ± 0.008	< 0.011	0.060
Cs-137	0.006 ± 0.008	< 0.012	0.006 ± 0.009	< 0.013	0.013 ± 0.011	< 0.018	0.080
Other (Co-60)	0.002 ± 0.007	< 0.008	-0.003 ± 0.007	< 0.010	0.007 ± 0.010	< 0.019	0.060
Location	E-09		E-20				
Collection Date	7/24/2012		7/24/2012				
Lab Code	EG- 4473		EG- 4474				Req. LLD
Ratio (wet/dry)	3.08		3.75				-
Gross Beta	7.64 ± 0.23	< 0.082	7.37 ± 0.23	< 0.084			0.25
Be-7	1.84 ± 0.26	-	1.38 ± 0.28	-			-
K-40	6.67 ± 0.56	-	7.56 ± 0.69	-			-
I-131	0.001 ± 0.009	< 0.037	0.022 ± 0.011	< 0.041			0.060
Cs-134	-0.001 ± 0.007	< 0.015	-0.004 ± 0.010	< 0.017			0.060
Cs-137	0.002 ± 0.010	< 0.016	0.009 ± 0.013	< 0.023			0.080
Other (Co-60)	-0.008 ± 0.011	< 0.022	0.003 ± 0.011	< 0.011			0.060

Table 10. Radioactivity in vegetation samples
Collection: Tri-annual

Sample Description and Concentration (pCi/g wet)

		MDC		MDC		MDC	
Location	E-01		E-02		E-03		
Collection Date	9/17/2012		9/17/2012		9/17/2012		
Lab Code	EG- 5916		EG- 5917		EG- 5918		Req. LLD
Ratio (wet/dry)	3.29		3.76		3.52		-
Gross Beta	5.75 ± 0.11	< 0.047	6.37 ± 0.15	< 0.061	9.79 ± 0.14	< 0.043	0.25
Be-7	3.00 ± 0.16	-	1.55 ± 0.24	-	1.32 ± 0.10	-	-
K-40	4.25 ± 0.23	-	5.09 ± 0.48	-	7.66 ± 0.21	-	-
I-131	0.005 ± 0.005	< 0.033	-0.013 ± 0.008	< 0.044	-0.013 ± 0.004	< 0.021	0.060
Cs-134	0.002 ± 0.004	< 0.008	-0.004 ± 0.007	< 0.012	-0.001 ± 0.004	< 0.007	0.060
Cs-137	0.000 ± 0.005	< 0.008	0.001 ± 0.010	< 0.020	-0.003 ± 0.004	< 0.006	0.080
Other (Co-60)	-0.003 ± 0.005	< 0.010	0.004 ± 0.010	< 0.017	0.000 ± 0.004	< 0.006	0.060
Location	E-04		E-06		E-08		
Collection Date	9/17/2012		9/17/2012		9/17/2012		
Lab Code	EG- 5919		EG- 5920		EG- 5921		Req. LLD
Ratio (wet/dry)	4.33		3.10		3.43		-
Gross Beta	6.57 ± 0.12	< 0.048	5.95 ± 0.19	< 0.096	6.12 ± 0.15	< 0.059	0.25
Be-7	1.51 ± 0.13	-	3.62 ± 0.32	-	3.02 ± 0.27	-	-
K-40	6.48 ± 0.30	-	4.78 ± 0.43	-	4.56 ± 0.38	-	-
I-131	-0.009 ± 0.005	< 0.022	0.018 ± 0.008	< 0.052	0.015 ± 0.008	< 0.044	0.060
Cs-134	0.002 ± 0.004	< 0.006	0.002 ± 0.007	< 0.014	0.000 ± 0.006	< 0.012	0.060
Cs-137	0.008 ± 0.005	< 0.010	0.051 ± 0.022	< 0.021	0.001 ± 0.008	< 0.013	0.080
Other (Co-60)	0.002 ± 0.006	< 0.009	0.003 ± 0.009	< 0.017	0.001 ± 0.008	< 0.008	0.060
Location	E-09		E-20				
Collection Date	9/17/2012		9/17/2012				
Lab Code	EG- 5922		EG- 5924				Req. LLD
Ratio (wet/dry)	2.80		5.04				-
Gross Beta	7.41 ± 0.16	< 0.067	7.31 ± 0.18	< 0.067			0.25
Be-7	2.58 ± 0.12	-	2.59 ± 0.25	-			-
K-40	5.07 ± 0.18	-	6.68 ± 0.47	-			-
I-131	-0.004 ± 0.003	< 0.025	-0.003 ± 0.008	< 0.050			0.060
Cs-134	-0.002 ± 0.003	< 0.005	0.005 ± 0.007	< 0.013			0.060
Cs-137	0.003 ± 0.004	< 0.008	0.001 ± 0.008	< 0.013			0.080
Other (Co-60)	0.003 ± 0.004	< 0.005	0.001 ± 0.009	< 0.013			0.060

Beta Annual Mean ± s.d.	**6.92 ± 1.12**
Be-7 Annual Mean ± s.d.	**1.60 ± 0.99**
K-40 Annual Mean ± s.d.	**5.70 ± 1.22**
I-131 Annual Mean ± s.d.	**0.001 ± 0.010**
Cs-134 Annual Mean ± s.d.	**-0.001 ± 0.004**
Cs-137 Annual Mean ± s.d.	**0.004 ± 0.011**
Co-60 Annual Mean ± s.d.	**0.001 ± 0.004**

POINT BEACH NUCLEAR PLANT

Table 11. Aquatic Vegetation, analyses for gross beta and gamma emitting isotopes.

Collection: Triannual
Units: pCi/g wet

Sample Description and Concentration

Collection Date	06-06-12	**MDC**	06-06-12	**MDC**	Req.	
Lab Code	ESL- 3460		ESL- 3461		LLD	
Location	E-05		E-12			
Ratio (wet wt./dry wt.)	4.56		2.67			
Gross Beta	4.49 ± 0.18	< 0.16	5.70 ± 0.23	< 0.20	0.25	
Be-7	1.65 ± 0.17	-	0.77 ± 0.15	-	-	
K-40	2.99 ± 0.29	-	3.91 ± 0.36	-	-	
Co-58	0.010 ± 0.006	< 0.011	0.004 ± 0.006	< 0.013	0.25	
Co-60	0.006 ± 0.007	< 0.011	0.001 ± 0.008	< 0.013	0.25	
Cs-134	-0.002 ± 0.005	< 0.011	-0.001 ± 0.005	< 0.010	0.25	
Cs-137	0.035 ± 0.012	< 0.013	0.017 ± 0.009	< 0.014	0.25	
Collection Date	08-07-12		08-07-12		Req.	
Lab Code	ESL- 4949		ESL- 4950		LLD	
Location	E-05		E-12			
Ratio (wet wt./dry wt.)	6.21		3.28			
Gross Beta	3.34 ± 0.15	< 0.14	4.56 ± 0.24	< 0.24	0.25	
Be-7	1.03 ± 0.21	-	0.87 ± 0.15	-	-	
K-40	2.58 ± 0.27	-	6.08 ± 0.33	-	-	
Co-58	-0.005 ± 0.006	< 0.009	0.001 ± 0.005	< 0.013	0.25	
Co-60	0.007 ± 0.006	< 0.010	0.000 ± 0.006	< 0.009	0.25	
Cs-134	0.003 ± 0.005	< 0.008	-0.004 ± 0.005	< 0.007	0.25	
Cs-137	0.009 ± 0.008	< 0.014	0.011 ± 0.007	< 0.013	0.25	
Collection Date	10-09-12		10-09-12		Req.	
Lab Code	ESL- 6316		ESL- 6317		LLD	**Annual**
Location	E-05		E-12			**Mean ± s.d.**
Ratio (wet wt./dry wt.)	2.49		2.82			
Gross Beta	7.16 ± 0.28	< 0.24	6.53 ± 0.22	< 0.18	0.25	**5.30 ± 1.43**
Be-7	0.48 ± 0.07	-	0.72 ± 0.12	-	-	**0.92 ± 0.40**
K-40	5.39 ± 0.14	-	3.91 ± 0.56	-	-	**4.14 ± 1.36**
Co-58	0.001 ± 0.002	< 0.006	0.009 ± 0.013	< 0.035	0.25	**0.003 ± 0.006**
Co-60	0.000 ± 0.003	< 0.004	-0.004 ± 0.015	< 0.022	0.25	**0.002 ± 0.004**
Cs-134	-0.002 ± 0.002	< 0.004	-0.004 ± 0.012	< 0.028	0.25	**-0.002 ± 0.002**
Cs-137	0.021 ± 0.005	< 0.006	0.034 ± 0.017	< 0.035	0.25	**0.021 ± 0.011**

POINT BEACH NUCLEAR PLANT

Table 12. Ambient Gamma Radiation [a]
LLD/7days: < 1mR/TLD

1st. Quarter, 2012

Date Annealed:	12-19-11	Days in the field	89
Date Placed:	01-06-12	Days from Annealing	
Date Removed:	04-04-12	to Readout:	109
Date Read:	04-06-12		

Location	Days in Field	Total mR	Net mR	mR/Stnd Qtr (91 days)	Net mR per 7 days
Indicator					
E-1	89	13.5 ± 0.5	10.8 ± 0.6	13.8 ± 0.5	0.85 ± 0.05
E-2	89	18.7 ± 0.4	16.0 ± 0.5	19.1 ± 0.4	1.25 ± 0.04
E-3	89	23.1 ± 1.8	20.4 ± 1.8	23.6 ± 1.8	1.60 ± 0.14
E-4	89	17.3 ± 1.5	14.6 ± 1.5	17.7 ± 1.5	1.14 ± 0.12
E-5	89	18.0 ± 1.3	15.3 ± 1.3	18.4 ± 1.3	1.20 ± 0.11
E-6	89	17.0 ± 0.8	14.3 ± 0.9	17.4 ± 0.8	1.12 ± 0.07
E-7	89	18.4 ± 0.5	15.7 ± 0.6	18.8 ± 0.5	1.23 ± 0.05
E-8	89	17.7 ± 1.0	15.0 ± 1.1	18.1 ± 1.1	1.18 ± 0.08
E-9	89	20.1 ± 0.3	17.4 ± 0.5	20.5 ± 0.3	1.36 ± 0.04
E-12	89	14.3 ± 0.4	11.6 ± 0.5	14.4 ± 0.5	0.91 ± 0.04
E-14	89	19.2 ± 0.6	16.5 ± 0.7	19.6 ± 0.6	1.29 ± 0.06
E-15	89	15.6 ± 0.3	12.9 ± 0.5	16.0 ± 0.3	1.01 ± 0.04
E-16	89	17.3 ± 0.3	14.6 ± 0.5	17.7 ± 0.3	1.14 ± 0.04
E-17	89	18.5 ± 0.6	15.8 ± 0.7	18.8 ± 0.6	1.24 ± 0.06
E-18	89	19.5 ± 1.1	16.8 ± 1.2	20.0 ± 1.2	1.32 ± 0.09
E-22	89	19.1 ± 1.2	16.4 ± 1.3	19.5 ± 1.2	1.29 ± 0.10
E-23	89	18.7 ± 0.4	16.0 ± 0.5	19.1 ± 0.5	1.25 ± 0.04
E-24	89	18.8 ± 0.7	16.1 ± 0.8	19.2 ± 0.7	1.26 ± 0.06
E-25	89	17.7 ± 0.5	15.0 ± 0.6	18.1 ± 0.5	1.18 ± 0.05
E-26	89	16.0 ± 0.4	13.3 ± 0.5	16.3 ± 0.4	1.04 ± 0.04
E-27	89	19.9 ± 0.3	17.2 ± 0.5	20.4 ± 0.3	1.35 ± 0.04
E-28	89	13.9 ± 0.4	11.2 ± 0.5	14.3 ± 0.4	0.88 ± 0.04
E-29	89	14.5 ± 0.7	11.8 ± 0.8	14.6 ± 0.7	0.92 ± 0.06
E-30	89	16.7 ± 0.9	14.0 ± 1.0	16.9 ± 0.9	1.10 ± 0.08
E-31	89	15.9 ± 0.2	13.2 ± 0.4	16.3 ± 0.2	1.03 ± 0.03
E-32	89	21.1 ± 0.7	18.4 ± 0.8	21.6 ± 0.7	1.44 ± 0.06
E-38	89	18.4 ± 1.5	15.7 ± 1.5	18.8 ± 1.5	1.23 ± 0.12
E-39	89	16.6 ± 0.8	13.9 ± 0.9	16.8 ± 0.8	1.09 ± 0.07
E-41	89	16.1 ± 0.7	13.4 ± 0.8	16.3 ± 0.7	1.05 ± 0.06
E-42	89	17.0 ± 0.9	14.3 ± 1.0	17.2 ± 0.9	1.12 ± 0.08
E-43	89	16.5 ± 0.7	13.8 ± 0.8	16.7 ± 0.7	1.08 ± 0.06
Control					
E-20	89	17.8 ± 1.0	15.1 ± 1.1	18.2 ± 1.0	1.18 ± 0.08
Mean±s.d.		17.6 ± 2.1	14.8 ± 2.1	17.9 ± 2.2	1.17 ± 0.16

In-Transit Exposure	Date Annealed	Date Read	ITC-1	ITC-2
	12-19-11	01-12-12	3.0 ± 0.2	2.9 ± 0.2
	03-21-12	04-09-12	2.6 ± 0.1	2.5 ± 0.2

[a] The $CaSO_4$:Dy dosimeter cards provide four separate readout areas. Values listed represent the mean and standard deviation of the average of the four readings.

POINT BEACH NUCLEAR PLANT

Table 12. Ambient Gamma Radiation [a]
LLD/7days: < 1mR/TLD

2nd Quarter, 2012

Date Annealed:	03-21-12	Days in the field	90
Date Placed:	04-04-12	Days from Annealing	
Date Removed:	07-03-12	to Readout:	112
Date Read:	07-11-12		

Location	Days in Field	Total mR	Net mR	mR/Stnd Qtr (91 days)	Net mR per 7 days
Indicator					
E-1	90	13.8 ± 0.5	10.6 ± 0.7	14.0 ± 0.5	0.82 ± 0.05
E-2	90	19.6 ± 0.8	16.4 ± 0.9	19.8 ± 0.8	1.27 ± 0.07
E-3	90	21.6 ± 1.2	18.4 ± 1.3	21.9 ± 1.2	1.43 ± 0.10
E-4	90	17.0 ± 0.5	13.8 ± 0.7	17.2 ± 0.5	1.07 ± 0.05
E-5	90	19.2 ± 0.5	16.0 ± 0.7	19.4 ± 0.5	1.24 ± 0.05
E-6	90	16.5 ± 0.2	13.3 ± 0.5	16.7 ± 0.3	1.03 ± 0.04
E-7	90	16.3 ± 0.4	13.1 ± 0.6	16.5 ± 0.4	1.02 ± 0.05
E-8	90	17.3 ± 0.8	14.1 ± 0.9	17.5 ± 0.8	1.09 ± 0.07
E-9	90	19.2 ± 0.7	16.0 ± 0.8	19.4 ± 0.7	1.24 ± 0.06
E-12	90	13.6 ± 1.0	10.4 ± 1.1	13.9 ± 1.0	0.81 ± 0.08
E-14	90	17.9 ± 1.3	14.7 ± 1.4	18.1 ± 1.3	1.14 ± 0.11
E-15	90	20.2 ± 1.1	17.0 ± 1.2	20.4 ± 1.1	1.32 ± 0.09
E-16	90	16.8 ± 0.3	13.6 ± 0.5	17.0 ± 0.3	1.06 ± 0.04
E-17	90	17.6 ± 1.1	14.4 ± 1.2	17.8 ± 1.1	1.12 ± 0.09
E-18	90	18.8 ± 0.2	15.6 ± 0.5	19.0 ± 0.3	1.21 ± 0.04
E-22	90	18.3 ± 0.5	15.1 ± 0.7	18.5 ± 0.5	1.17 ± 0.05
E-23	90	19.9 ± 0.6	16.7 ± 0.7	20.2 ± 0.6	1.30 ± 0.06
E-24	90	17.9 ± 0.1	14.7 ± 0.4	18.1 ± 0.1	1.14 ± 0.03
E-25	90	19.5 ± 0.6	16.3 ± 0.7	19.8 ± 0.6	1.27 ± 0.06
E-26	90	15.7 ± 0.9	12.5 ± 1.0	15.9 ± 0.9	0.97 ± 0.08
E-27	90	20.9 ± 0.8	17.7 ± 0.9	21.1 ± 0.8	1.37 ± 0.07
E-28	90	13.8 ± 0.4	10.6 ± 0.6	14.2 ± 0.4	0.82 ± 0.05
E-29	90	14.3 ± 0.7	11.1 ± 0.8	14.6 ± 0.7	0.86 ± 0.06
E-30	90	16.8 ± 0.5	13.6 ± 0.7	17.1 ± 0.5	1.06 ± 0.05
E-31	90	20.1 ± 1.5	16.9 ± 1.6	20.3 ± 1.5	1.31 ± 0.12
E-32	90	20.1 ± 0.4	16.9 ± 0.6	20.3 ± 0.4	1.31 ± 0.05
E-38	90	16.9 ± 0.4	13.7 ± 0.6	17.2 ± 0.4	1.06 ± 0.05
E-39	90	16.8 ± 0.7	13.6 ± 0.8	17.2 ± 0.7	1.06 ± 0.06
E-41	90	17.2 ± 0.6	14.0 ± 0.7	17.5 ± 0.6	1.09 ± 0.06
E-42	90	18.3 ± 0.5	15.1 ± 0.7	18.7 ± 0.5	1.17 ± 0.05
E-43	90	16.3 ± 0.5	13.1 ± 0.7	16.6 ± 0.5	1.02 ± 0.05
Control					
E-20	92	16.8 ± 0.7	13.6 ± 0.8	17.0 ± 0.7	1.03 ± 0.06
Mean±s.d.		17.7 ± 2.1	14.4 ± 2.1	17.9 ± 2.1	1.12 ± 0.16

In-Transit Exposure	Date Annealed	Date Read	ITC-1	ITC-2
	03-21-12	04-09-12	2.6 ± 0.1	2.5 ± 0.2
	06-12-12	07-11-12	4.0 ± 0.3	3.8 ± 0.2

[a] The $CaSO_4$:Dy dosimeter cards provide four separate readout areas. Values listed represent the mean and standard deviation of the average of the four readings.

POINT BEACH NUCLEAR PLANT

Table 12. Ambient Gamma Radiation [a]
LLD/7days: < 1mR/TLD

3rd Quarter, 2012

Date Annealed:	06-12-12	Days in the field	91
Date Placed:	07-03-12	Days from Annealing	
Date Removed:	10-02-12	to Readout:	118
Date Read:	10-08-12		

Location	Days in Field	Total mR	Net mR	mR/Stnd Qtr (91 days)	Net mR per 7 days
Indicator					
E-1	91	14.4 ± 0.4	10.8 ± 0.6	14.4 ± 0.4	0.83 ± 0.04
E-2	91	19.9 ± 0.4	16.3 ± 0.6	19.9 ± 0.4	1.25 ± 0.04
E-3	91	23.5 ± 2.2	19.9 ± 2.2	23.5 ± 2.2	1.53 ± 0.17
E-4	91	18.7 ± 0.9	15.1 ± 1.0	18.7 ± 0.9	1.16 ± 0.08
E-5	91	19.9 ± 1.1	16.3 ± 1.2	19.9 ± 1.1	1.25 ± 0.09
E-6	91	18.4 ± 0.8	14.8 ± 0.9	18.4 ± 0.8	1.13 ± 0.07
E-7	91	19.3 ± 0.9	15.7 ± 1.0	19.3 ± 0.9	1.20 ± 0.08
E-8	91	19.3 ± 1.4	15.7 ± 1.5	19.3 ± 1.4	1.20 ± 0.11
E-9	91	21.7 ± 0.2	18.1 ± 0.5	21.7 ± 0.2	1.39 ± 0.04
E-12	91	15.6 ± 0.5	12.0 ± 0.6	15.6 ± 0.5	0.92 ± 0.05
E-14	91	20.4 ± 0.5	16.8 ± 0.7	20.4 ± 0.5	1.29 ± 0.05
E-15	91	17.3 ± 0.3	13.7 ± 0.5	17.3 ± 0.3	1.05 ± 0.04
E-16	91	18.7 ± 0.3	15.1 ± 0.5	18.7 ± 0.3	1.16 ± 0.04
E-17	91	19.9 ± 0.6	16.3 ± 0.7	19.9 ± 0.6	1.25 ± 0.06
E-18	91	21.4 ± 0.9	17.8 ± 1.0	21.4 ± 0.9	1.37 ± 0.08
E-22	91	20.4 ± 1.2	16.8 ± 1.3	20.4 ± 1.2	1.29 ± 0.10
E-23	91	20.4 ± 0.4	16.8 ± 0.6	20.4 ± 0.4	1.29 ± 0.04
E-24	91	20.0 ± 0.7	16.4 ± 0.8	20.0 ± 0.7	1.26 ± 0.06
E-25	91	19.6 ± 0.4	16.0 ± 0.6	19.6 ± 0.4	1.23 ± 0.04
E-26	91	17.7 ± 0.4	14.1 ± 0.6	17.7 ± 0.4	1.08 ± 0.04
E-27	91	21.8 ± 0.5	18.2 ± 0.6	21.8 ± 0.5	1.40 ± 0.05
E-28	91	14.9 ± 0.5	11.3 ± 0.7	14.9 ± 0.5	0.87 ± 0.05
E-29	91	15.6 ± 0.9	12.0 ± 1.0	15.6 ± 0.9	0.92 ± 0.08
E-30	91	18.3 ± 0.8	14.7 ± 0.9	18.3 ± 0.8	1.13 ± 0.07
E-31	91	17.8 ± 0.4	14.2 ± 0.6	17.8 ± 0.4	1.09 ± 0.04
E-32	91	22.8 ± 0.9	19.2 ± 1.0	22.8 ± 0.9	1.47 ± 0.08
E-38	91	19.7 ± 1.4	16.1 ± 1.5	19.7 ± 1.4	1.23 ± 0.11
E-39	91	17.9 ± 0.7	14.3 ± 0.8	17.9 ± 0.7	1.10 ± 0.06
E-41	91	18.1 ± 0.6	14.5 ± 0.7	18.1 ± 0.6	1.11 ± 0.06
E-42	91	18.9 ± 0.3	15.3 ± 0.5	18.9 ± 0.3	1.17 ± 0.04
E-43	91	18.6 ± 0.8	15.0 ± 0.9	18.6 ± 0.8	1.15 ± 0.07
Control					
E-20	91	19.0 ± 1.1	15.4 ± 1.2	19.0 ± 1.1	1.18 ± 0.09
Mean±s.d.		19.1 ± 2.1	15.4 ± 2.1	19.1 ± 2.1	1.19 ± 0.15

In-Transit Exposure	Date Annealed	Date Read	ITC-1	ITC-2
	06-12-12	07-11-12	4.0 ± 0.3	3.8 ± 0.2
	09-10-12	09-10-12	3.4 ± 0.2	3.4 ± 0.1

[a] The $CaSO_4$:Dy dosimeter cards provide four separate readout areas. Values listed represent the mean and standard deviation of the average of the four readings.

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Table 12. Ambient Gamma Radiation [a]
LLD/7days: < 1mR/TLD

4th Quarter, 2012

Date Annealed:	09-10-12	Days in the field	92
Date Placed:	10-02-12	Days from Annealing to Readout:	120
Date Removed:	01-02-13		
Date Read:	01-08-13		

Location	Days in Field	Total mR	Net mR	mR/Stnd Qtr (91 days)	Net mR per 7 days
Indicator					
E-1	92	16.0 ± 0.9	12.0 ± 1.0	15.8 ± 0.9	0.91 ± 0.08
E-2	92	22.5 ± 1.1	18.5 ± 1.2	22.2 ± 1.1	1.40 ± 0.09
E-3	92	24.8 ± 1.5	20.8 ± 1.6	24.6 ± 1.5	1.58 ± 0.12
E-4	92	20.3 ± 1.5	16.3 ± 1.6	20.1 ± 1.4	1.24 ± 0.12
E-5	92	21.7 ± 0.5	17.7 ± 0.7	21.5 ± 0.5	1.34 ± 0.05
E-6	92	20.2 ± 1.5	16.2 ± 1.6	20.0 ± 1.4	1.23 ± 0.12
E-7	92	18.8 ± 0.3	14.8 ± 0.5	18.6 ± 0.3	1.12 ± 0.04
E-8	92	19.8 ± 0.9	15.8 ± 1.0	19.6 ± 0.9	1.20 ± 0.08
E-9	92	22.2 ± 0.9	18.2 ± 1.0	21.9 ± 0.9	1.38 ± 0.08
E-12	92	16.4 ± 1.0	12.4 ± 1.1	16.1 ± 0.9	0.94 ± 0.08
E-14	92	19.9 ± 0.6	15.9 ± 0.7	19.7 ± 0.6	1.21 ± 0.06
E-15	92	22.8 ± 0.7	18.8 ± 0.8	22.6 ± 0.7	1.43 ± 0.06
E-16	92	19.1 ± 0.5	15.1 ± 0.7	18.9 ± 0.5	1.15 ± 0.05
E-17	92	19.8 ± 1.3	15.8 ± 1.4	19.6 ± 1.2	1.20 ± 0.10
E-18	92	20.9 ± 0.4	16.9 ± 0.6	20.7 ± 0.4	1.28 ± 0.04
E-22	92	20.6 ± 0.7	16.6 ± 0.8	20.3 ± 0.7	1.26 ± 0.06
E-23	92	22.7 ± 0.4	18.7 ± 0.6	22.5 ± 0.3	1.42 ± 0.04
E-24	92	20.5 ± 0.2	16.5 ± 0.5	20.3 ± 0.2	1.25 ± 0.04
E-25	92	22.5 ± 0.2	18.5 ± 0.5	22.2 ± 0.2	1.40 ± 0.04
E-26	92	18.7 ± 1.2	14.7 ± 1.3	18.5 ± 1.2	1.11 ± 0.10
E-27	92	22.2 ± 0.8	18.2 ± 0.9	22.0 ± 0.8	1.38 ± 0.07
E-28	92	16.2 ± 1.0	12.2 ± 1.1	15.8 ± 1.0	0.92 ± 0.08
E-29	92	16.4 ± 0.6	12.4 ± 0.7	16.0 ± 0.6	0.94 ± 0.06
E-30	92	18.7 ± 0.7	14.7 ± 0.8	18.3 ± 0.7	1.11 ± 0.06
E-31	92	22.3 ± 1.5	18.3 ± 1.6	22.0 ± 1.5	1.39 ± 0.12
E-32	92	21.7 ± 0.3	17.7 ± 0.5	21.5 ± 0.3	1.34 ± 0.04
E-38	92	18.7 ± 0.2	14.7 ± 0.5	18.3 ± 0.2	1.11 ± 0.04
E-39	92	18.6 ± 0.7	14.6 ± 0.8	18.2 ± 0.7	1.11 ± 0.06
E-41	92	18.7 ± 0.7	14.7 ± 0.8	18.5 ± 0.7	1.11 ± 0.06
E-42	92	20.7 ± 0.7	16.7 ± 0.8	20.5 ± 0.7	1.27 ± 0.06
E-43	92	17.8 ± 0.7	13.8 ± 0.8	17.6 ± 0.7	1.05 ± 0.06
Control					
E-20	92	19.1 ± 1.3	15.1 ± 1.4	18.8 ± 1.3	1.15 ± 0.10
Mean±s.d.		20.0 ± 2.2	16.0 ± 2.2	19.8 ± 2.2	1.22 ± 0.16
In-Transit Exposure		Date Annealed	Date Read	ITC-1	ITC-2
		09-10-12	10-08-12	3.4 ± 0.2	3.4 ± 0.1
		10-08-12	01-08-13	4.7 ± 0.3	4.7 ± 0.2

[a] The $CaSO_4$:Dy dosimeter cards provide four separate readout areas. Values listed represent the mean and standard deviation of the average of the four readings.

Annual Indicator Mean±s.d.	18.6 ± 2.4	15.2 ± 2.2	18.7 ± 2.3	1.2 ± 0.2
Annual Control Mean±s.d.	18.2 ± 1.1	14.8 ± 0.8	18.3 ± 0.9	1.1 ± 0.1
Annual Indicator/Control Mean±s.d.	18.6 ± 2.4	15.2 ± 2.2	18.7 ± 2.3	1.2 ± 0.2

Table 13. Groundwater Tritium Monitoring Program
(Monthly Collections)
Units = pCi/L

Intermittent Streams

Sample ID	GW-01				GW-02		
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
01-26-12	EWW- 409	22 ± 77	< 145	01-26-12	EWW- 410	243 ± 88	< 145
03-01-12	EWW- 1081	37 ± 74	< 146	03-01-12	EWW- 1083	224 ± 84	< 146
03-28-12	EWW- 1537	29 ± 82	< 152	03-28-12	EWW- 1538	204 ± 90	< 152
04-25-12	EWW- 2322	18 ± 77	< 153	04-25-12	EWW- 2323	179 ± 85	< 153
05-31-12	EWW- 3378	120 ± 87	< 155	05-31-12	EWW- 3379	46 ± 83	< 155
06-27-12	EWW- 3889	44 ± 74	< 148	06-27-12	EWW- 3890	111 ± 77	< 148
07-24-12	EWW- 4490	64 ± 81	< 156	07-24-12	EWW- 4491	136 ± 84	< 156
08-29-12	EWW- 5439	104 ± 96	< 150	08-29-12	EWW- 5440	135 ± 97	< 150
09-19-12	EWW- 5958	109 ± 86	< 153	09-19-12	EWW- 5959	179 ± 89	< 153
10-31-12	EWW- 7129	26 ± 81	< 152	10-31-12	EWW- 7130	193 ± 89	< 152
11-27-12	EWW- 7625	63 ± 79	< 144	11-27-12	EWW- 7626	122 ± 82	< 144
12-19-12	EWW- 8189	16 ± 77	< 145	12-19-12	EWW- 8190	97 ± 81	< 145
Mean ± s.d.		57 ± 39		Mean ± s.d.		165 ± 59	

Sample ID	GW-03				GW-17		
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
01-26-12	EWW- 411	24 ± 77	< 145	01-26-12	EWW- 413	177 ± 85	< 145
03-01-12	EWW- 1084	61 ± 76	< 146	03-01-12	EWW- 1086	171 ± 81	< 146
03-28-12	EWW- 1539	89 ± 85	< 152	03-28-12	EWW- 1541	210 ± 91	< 152
04-25-12	EWW- 2324	82 ± 80	< 153	04-25-12	EWW- 2326	167 ± 85	< 153
05-31-12	EWW- 3380	94 ± 85	< 155	05-31-12	EWW- 3382	116 ± 86	< 152
06-27-12	EWW- 3891	103 ± 77	< 148	06-27-12	EWW- 3893	109 ± 77	< 148
07-24-12	EWW- 4492	30 ± 79	< 156	07-24-12	EWW- 4494	68 ± 81	< 156
08-29-12	EWW- 5441	99 ± 96	< 150	08-29-12	EWW- 5443	97 ± 95	< 150
09-19-12	EWW-.5960	74 ± 84	< 153	09-19-12	EWW- 5962	311 ± 95	< 153
10-31-12	EWW- 7131	-14 ± 79	< 152	10-31-12	EWW- 7134	152 ± 87	< 152
11-27-12	EWW- 7627	83 ± 80	< 144	11-27-12	EWW- 7629	181 ± 85	< 144
12-19-12	EWW- 8191	42 ± 78	< 145	12-19-12	EWW- 8193	63 ± 79	< 145
Mean ± s.d.		66 ± 37		Mean ± s.d.		160 ± 66	

Wells

Sample ID	GW-04 (EIC Well)				GW-11 (MW-1) [Quarterly]		
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
01-26-12	EWW- 412	-20 ± 75	< 145	01-26-12	EWW- 533	24 ± 74	< 146
03-01-12	EWW- 1085	13 ± 73	< 146	05-21-12	EWW- 3688	37 ± 79	< 147
03-28-12	EWW- 1540	-7 ± 80	< 152	06-20-12	EWW- 4786	149 ± 81	< 152
04-25-12	EWW- 2325	-28 ± 74	< 153	09-18-12	EWW- 5951	1 ± 82	< 157
05-31-12	EWW- 3381	70 ± 84	< 155	10-23-12	EWW- 6916	-1 ± 78	< 158
06-27-12	EWW- 3892	5 ± 71	< 148				
07-24-12	EWW- 4493	-26 ± 76	< 156				
08-29-12	EWW- 5442	-47 ± 89	< 150				
09-19-12	EWW- 5961	8 ± 81	< 153				
10-31-12	EWW- 7132	9 ± 80	< 152				
11-27-12	EWW- 7628	69 ± 79	< 144				
12-19-12	EWW- 8192	-105 ± 71	< 145				
Mean ± s.d.		4 ± 37		Mean ± s.d.		42 ± 62	

Table 13. Groundwater Tritium Monitoring Program
(Quarterly Collections)
Units = pCi/L

Wells (cont.)

Sample ID	GW-12 (MW-2)				GW-13 (MW-6)		
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
01-26-12	EWW-534	-42 ± 70	< 146	01-26-12	EWW-536	36 ± 75	< 146
05-21-12	EWW-3689	-35 ± 75	< 147	05-21-12	EWW-3690	105 ± 83	< 147
06-20-12	EWW-4787	-12 ± 72	< 152	06-20-12	EWW-4788	43 ± 76	< 152
09-18-12	EWW-5952	-64 ± 79	< 157	09-18-12	EWW-5953	32 ± 84	< 157
10-23-12	EWW-6917	-6 ± 78	< 158	10-23-12	EWW-6918	-33 ± 77	< 158
Mean ± s.d.		-32 ± 23		Mean ± s.d.		37 ± 49	

Sample ID	GW-14 (MW-5)				GW-15A (MW-4)		
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
01-26-12	EWW-537	71 ± 76	< 146	01-26-12	EWW-538	263 ± 86	< 146
05-21-12	EWW-3691	80 ± 81	< 147	05-21-12	EWW-3692	203 ± 87	< 147
06-20-12	EWW-4789	134 ± 81	< 152	06-20-12	EWW-4790	251 ± 87	< 152
09-18-12	EWW-5954	51 ± 85	< 157	09-18-12	EWW-5955	202 ± 92	< 157
10-23-12	EWW-6919	26 ± 80	< 158	10-23-12	EWW-6920	236 ± 90	< 158
Mean ± s.d.		72 ± 40		Mean ± s.d.		231 ± 28	

Sample ID	GW-15B (MW-4)				GW-16A (MW-3)		
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
09-18-12	EWW-5956	244 ± 94	< 157	01-26-12	EWW-539	126 ± 79	< 146
				05-21-12	EWW-3693	152 ± 85	< 147
				06-20-12	EWW-4792	175 ± 83	< 152
				09-18-12	EWW-5957	208 ± 92	< 157
				10-23-12	EWW-6921	149 ± 86	< 158
				Mean ± s.d.		162 ± 31	

Sample ID	GW-16B (MW-3)		
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
06-20-12	EWW-4793	207 ± 84	< 152
10-23-12	EWW-6923	253 ± 91	< 158
Mean ± s.d.		230 ± 33	

Table 13. Groundwater Tritium Monitoring Program
(Monthly Collections)
Units = pCi/L

Beach Drains

Sample ID	S-1			S-3			
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
01-05-12	EW- 97	248 ± 85	< 145	01-05-12	EW- 98	381 ± 91	< 145
02-09-12	EW- 744	132 ± 92	< 142	02-09-12	EW- 746	338 ± 101	< 142
03-07-12	EW- 1176	157 ± 83	< 143	03-07-12	EW- 1177	533 ± 100	< 143
04-05-12	EW- 1702	246 ± 92	< 152	04-05-12	EW- 1703	239 ± 91	< 152
05-10-12	EW- 2735	191 ± 84	< 148	05-10-12	EW- 2736	287 ± 88	< 148
06-05-12	EW- 3462	278 ± 94	< 135	06-05-12	EW- 3463	327 ± 96	< 135
07-05-12	EW- 4032	118 ± 86	< 152	07-05-12	EW- 4033	615 ± 108	< 152
08-07-12	EW- 4946	171 ± 81	< 146	08-07-12 [a]	EW- 4947	3367 ± 181	< 146
09-04-12	EW- 5520	126 ± 85	< 149	09-04-12	EW- 5521	395 ± 97	< 149
10-09-12	EW- 6318	111 ± 100	< 157	10-15-12	EW- 6709	268 ± 92	< 151
11-07-12	EW- 7287	273 ± 106	< 183	11-07-12	EW- 7288	273 ± 106	< 183
12-04-12	EW- 7867	185 ± 83	< 149	12-04-12	EW- 7868	301 ± 89	< 149
Mean ± s.d.		186 ± 61		Mean ± s.d.		610 ± 875	

[a] Tritium reanalyzed with a result of 3345±179 pCi/L.

Table 13. Groundwater Tritium Monitoring Program
(Monthly Collections)
Units = pCi/L

Beach Drains

Sample ID	S-7				S-8		
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
01-05-12		NS[a]		01-05-12		NS[a]	
02-09-12		NS[a]		02-09-12		NS[a]	
03-07-12		NS[a]		03-07-12		NS[a]	
04-05-12		NS[a]		04-05-12		NS[a]	
05-10-12		NS[a]		05-10-12		NS[a]	
06-05-12		NS[a]		06-05-12		NS[a]	
07-05-12		NS[a]		07-05-12		NS[a]	
08-07-12		NS[a]		08-07-12		NS[a]	
09-04-12		NS[a]		09-04-12		NS[a]	
10-15-12		NS[a]		10-15-12		NS[a]	
11-07-12		NS[a]		11-07-12		NS[a]	
12-04-12		NS[a]		12-04-12		NS[a]	
Mean ± s.d.				Mean ± s.d.			

Sample ID	S-9				S-10		
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
01-05-12		NS[a]		01-05-12		NS[a]	
02-09-12		NS[a]		02-09-12		NS[a]	
03-07-12		NS[a]		03-07-12		NS[a]	
04-05-12		NS[a]		04-05-12		NS[a]	
05-10-12		NS[a]		05-10-12		NS[a]	
06-05-12		NS[a]		06-05-12		NS[a]	
07-05-12		NS[a]		07-05-12		NS[a]	
08-07-12		NS[a]		08-07-12		NS[a]	
09-04-12		NS[a]		09-04-12		NS[a]	
10-15-12		NS[a]		10-15-12		NS[a]	
11-07-12		NS[a]		11-07-12		NS[a]	
12-04-12		NS[a]		12-04-12		NS[a]	
Mean ± s.d.				Mean ± s.d.			

Sample ID	S-11		
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
01-05-12		NS[a]	
02-09-12		NS[a]	
03-07-12	EW- 1178	269 ± 88	< 143
04-05-12	EW- 1704	78 ± 84	< 152
05-10-12	EW- 2737	114 ± 80	< 148
06-05-12	EW- 3464	89 ± 86	< 135
07-05-12	EW- 4035	167 ± 88	< 152
08-07-12	EW- 4948	138 ± 80	< 146
09-04-12	EW- 5522	126 ± 85	< 149
10-15-12	EW- 6710	56 ± 82	< 151
11-07-12	EW- 7289	1 ± 96	< 183
12-04-12	EW- 7869	110 ± 80	< 149
Mean ± s.d.		115 ± 76	

[a] "NS" = no sample; not sent.

POINT BEACH NUCLEAR PLANT

Table 13. Groundwater Tritium Monitoring Program

Units = pCi/L

Sample ID **U2 Façade Subsurface Drain Sump**

Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
01-03-12	EW- 103	479 ± 100	< 147				
02-06-12	EW- 781	534 ± 96	< 142				
03-13-12	EW- 1452	366 ± 93	< 142				
04-02-12	EW- 2251	470 ± 107	< 143				
05-07-12	EW- 2893	327 ± 96	< 154				
06-04-12	EW- 3683	511 ± 101	< 147				
07-12-12	EW- 4961	527 ± 100	< 142				
08-20-12	EW- 5942	470 ± 104	< 158				
09-03-12	EW- 5943	735 ± 114	< 157				
11-04-12	EW- 7286	369 ± 109	< 183				
11-24-12	EW- 8384	620 ± 101	< 139				
12-13-12	EW- 8385	748 ± 105	< 139				
Mean ± s.d.		474 ± 192					

POINT BEACH NUCLEAR PLANT

Table 13. Groundwater Tritium Monitoring Program

Units = pCi/L

Manholes

Sample ID	MH Z-065A			MH Z-065B			
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
05-16-12		NS[a]		05-16-12		NS[a]	
Mean ± s.d.				Mean ± s.d.			

Sample ID	MH Z-065C			MH Z-065D			
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
05-16-12		NS[a]		05-16-12		NS[a]	
Mean ± s.d.				Mean ± s.d.			

Sample ID	MH Z-066A			MH Z-066B			
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
05-17-12	EW- 3105	208 ± 87	< 145	05-16-12	EW- 3106	119 ± 83	< 146
10-25-12	EW- 7207	102 ± 100	< 183	10-25-12	EW- 7208	24 ± 97	< 183
Mean ± s.d.		155 ± 75		Mean ± s.d.		71 ± 67	

Sample ID	MH Z-066C			MH Z-066D			
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
05-16-12	EW- 3107	127 ± 83	< 146	05-16-12	EW- 3108	321 ± 92	< 146
10-25-12	EW- 7209	84 ± 99	< 183	10-23-12	EW- 6926	186 ± 88	< 158
Mean ± s.d.		106 ± 30		Mean ± s.d.		253 ± 95	

Sample ID	MH Z-067A			MH Z-067B			
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
05-17-12	EW- 3109	137 ± 84	< 145	05-16-12	EW- 3110	83 ± 81	< 146
10-25-12	EW- 7210	141 ± 101	< 183	10-25-12	EW- 7211	40 ± 98	< 183
Mean ± s.d.		139 ± 3		Mean ± s.d.		62 ± 31	

[a] "NS" = No sample; not sent.

Manholes (cont.)

Sample ID	MH Z-067C				MH Z-067D		
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
05-16-12	EW- 3111	289 ± 91	< 146	05-16-12	EW- 3112	206 ± 87	< 146
10-25-12	EW- 7212	171 ± 102	< 183	10-23-12	EW- 6927	230 ± 90	< 158
Mean ± s.d.		230 ± 84		Mean ± s.d.		218 ± 17	

Sample ID	MH Z-068				MH-1		
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
05-16-12	EW- 3113	279 ± 90	< 146	05-16-12		NS[a]	
10-23-12	EW- 6928	97 ± 83	< 158	10-23-12	EW- 6924	72 ± 82	< 158
Mean ± s.d.		188 ± 129		Mean ± s.d.			

Sample ID	MH-4				MH-6		
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
05-16-12		NS[a]		05-16-12		NS[a]	
Mean ± s.d.				Mean ± s.d.			

Sample ID	MH-7				MH-8		
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
05-16-12		NS[a]		05-16-12		NS[a]	
Mean ± s.d.				Mean ± s.d.			

Sample ID	MH-16				MH-2		
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
05-16-12		NS[a]		05-16-12		NS[a]	
				10-22-12	EW- 6925	122 ± 85	< 158
Mean ± s.d.				Mean ± s.d.			

Sample ID	MH-5A				MH-9		
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
05-16-12		NS[a]		05-16-12		NS[a]	
Mean ± s.d.				Mean ± s.d.			

[a] "NS" = No sample; not sent.

POINT BEACH NUCLEAR PLANT

Table 13. Groundwater Tritium Monitoring Program
(Quarterly Collections)
Units = pCi/L

Quarterly Wells

Sample ID	GW-05 (WH 6 Well)			GW-06 (SBCC Well)			
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
01-12-12	EWW- 176	37 ± 90	< 146	01-12-12	EWW- 177	27 ± 90	< 146
04-12-12	EWW- 1852	24 ± 76	< 143	04-12-12	EWW- 1853	22 ± 76	< 143
07-12-12	EWW- 4126	11 ± 78	< 147	07-12-12	EWW- 4127	32 ± 79	< 147
10-16-12	EWW- 6706	1 ± 80	< 151	10-16-12	EWW- 6707	-32 ± 78	< 151
Mean ± s.d.		18 ± 16		Mean ± s.d.		12 ± 29	

Sample ID	GW-18 (WH 7 Well)						
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
05-31-12	EWW- 3383	63 ± 83	< 152	10-16-12	EWW- 6708	5 ± 80	< 151
08-29-12	EWW- 5444	-44 ± 89	< 150	12-19-12	EWW- 8194	70 ± 80	< 145
09-19-12	EWW- 5963	-84 ± 76	< 153				
				Mean ± s.d.		2 ± 67	

Façade Wells

Sample ID	GW-09 1Z-361A			GW-09 1Z-361B			
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
01-27-12	EWW- 782	154 ± 79	< 142	01-27-12	EWW- 783	54 ± 74	< 142
03-07-12 [a]	EWW- 1448	282 ± 89	< 142	03-07-12 [a]	EWW- 1449	63 ± 78	< 142
03-07-12 [b]	EWW- 2884	190 ± 91	< 155	03-07-12 [b]	EWW- 2885	19 ± 83	< 155
03-30-12	EWW- 2258	257 ± 98	< 143	03-30-12	EWW- 2259	100 ± 91	< 143
05-04-12	EWW- 2888	212 ± 91	< 154	05-04-12	EWW- 2890	48 ± 83	< 154
06-01-12	EWW- 3684	158 ± 85	< 147	06-01-12	EWW- 3685	41 ± 79	< 147
07-11-12	EWW- 4957	404 ± 94	< 142	07-11-12	EWW- 4958	354 ± 92	< 142
09-01-12 [c]	EWW- 5947	1342 ± 135	< 157	09-01-12	EWW- 5948	345 ± 99	< 157
09-29-12	EWW- 7203	191 ± 103	< 184	09-29-12	EWW- 7204	166 ± 103	< 184
11-11-12	EWW- 7395	263 ± 88	< 152	11-11-12	EWW- 7396	57 ± 78	< 152
11-18-12	EWW- 7983	150 ± 86	< 151	11-18-12	EWW- 7984	158 ± 87	< 151
12-29-12	EWW- 8386	255 ± 85	< 138	12-29-12	EWW- 8387	160 ± 81	< 138
Mean ± s.d.		354 ± 378		Mean ± s.d.		132 ± 130	

Sample ID	GW-10 2Z-361A			GW-10 2Z-361B			
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
01-27-12	EWW- 784	18 ± 72	< 142	01-27-12	EWW- 785	64 ± 74	< 142
01-27-12 (b)	EWW- 1068	-22 ± 72	< 147	03-07-12 [a]	EWW- 1451	164 ± 83	< 142
03-07-12 [a]	EWW- 1450	123 ± 81	< 142	03-07-12 [b]	EWW- 2887	17 ± 82	< 155
03-07-12 [b]	EWW- 2886	-15 ± 81	< 155	03-30-12	EWW- 2261	112 ± 92	< 143
03-30-12	EWW- 2260	54 ± 89	< 143	05-04-12	EWW- 2892	-36 ± 79	< 154
05-04-12	EWW- 2891	69 ± 84	< 154	06-01-12	EWW- 3687	166 ± 86	< 147
06-01-12	EWW- 3686	21 ± 78	< 147	07-11-12	EWW- 4960	171 ± 84	< 142
07-11-12	EWW- 4959	-2 ± 75	< 142	09-01-12	EWW- 5950	12 ± 83	< 157
09-01-12	EWW- 5949	16 ± 83	< 157	09-29-12	EWW- 7206	-54 ± 95	< 184
09-29-12	EWW- 7205	-4 ± 96	< 184	11-11-12	EWW- 7398	42 ± 78	< 152
11-11-12	EWW- 7397	-40 ± 73	< 152	11-18-12	EWW- 7986	57 ± 82	< 151
11-18-12	EWW- 7985	51 ± 82	< 151	12-29-12	EWW- 8389	33 ± 74	< 138
12-29-12	EWW- 8388	89 ± 77	< 138				
Mean ± s.d.		29 ± 49		Mean ± s.d.		84 ± 81	
03-30-12	EWW- 2895	160 ± 89	< 155	(1Z361AL)			

(Annual Collections)
Units = pCi/L

Bogs

Sample ID	GW-07 (North Bog)			GW-08 EIC Bog			
Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)	Collection Date	Lab Code	Tritium (pCi/L)	MDC (pCi/L)
05-10-12	EWW- 2733	110 ± 80	< 148	05-10-12	EWW- 2734	297 ± 89	< 148

[a] Received 03-22-12.

[b] Received 05-18-12.

[c] Tritium repeated with a result of 1444 ± 136 pCi/L.

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APPENDIX A

INTERLABORATORY COMPARISON PROGRAM RESULTS

NOTE: Environmental Inc., Midwest Laboratory participates in intercomparison studies administered by Environmental Resources Associates, and serves as a replacement for studies conducted previously by the U.S. EPA Environmental Monitoring Systems Laboratory, Las Vegas, Nevada. Results are reported in Appendix A. TLD Intercomparison results, in-house spikes, blanks, duplicates and mixed analyte performance evaluation program results are also reported. Appendix A is updated four times a year; the complete Appendix is included in March, June, September and December monthly progress reports only.

January, 2012 through December, 2012

APPENDIX B

DATA REPORTING CONVENTIONS

Data Reporting Conventions

1.0. All activities, except gross alpha and gross beta, are decay corrected to collection time or the end of the collection period.

2.0. Single Measurements

Each single measurement is reported as follows: $x \pm s$

where: x = value of the measurement;

$s = 2\sigma$ counting uncertainty (corresponding to the 95% confidence level).

In cases where the activity is less than the lower limit of detection L, it is reported as: < L, where L = the lower limit of detection based on 4.66σ uncertainty for a background sample.

3.0. Duplicate analyses

If duplicate analyses are reported, the convention is as follows. :

3.1 Individual results: For two analysis results; $x_1 \pm s_1$ and $x_2 \pm s_2$

Reported result: $x \pm s$; where $x = (1/2)(x_1 + x_2)$ and $s = (1/2)\sqrt{s_1^2 + s_2^2}$

3.2. Individual results: $< L_1$, $< L_2$ Reported result: < L, where L = lower of L_1 and L_2

3.3. Individual results: $x \pm s$, < L Reported result: $x \pm s$ if $x \geq L$; < L otherwise.

4.0. Computation of Averages and Standard Deviations

4.1 Averages and standard deviations listed in the tables are computed from all of the individual measurements over the period averaged; for example, an annual standard deviation would not be the average of quarterly standard deviations. The average $\bar{x}$ and standard deviation "s" of a set of n numbers $x_1, x_2 \ldots x_n$ are defined as follows:

$$\bar{x} = \frac{1}{n} \sum x \qquad s = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}}$$

4.2 Values below the highest lower limit of detection are not included in the average.

4.3 If all values in the averaging group are less than the highest LLD, the highest LLD is reported.

4.4 If all but one of the values are less than the highest LLD, the single value x and associated two sigma error is reported.

4.5 In rounding off, the following rules are followed:

4.5.1. If the number following those to be retained is less than 5, the number is dropped, and the retained numbers are kept unchanged. As an example, 11.443 is rounded off to 11.44.

4.5.2. If the number following those to be retained is equal to or greater than 5, the number is dropped and the last retained number is raised by 1. As an example, 11.445 is rounded off to 11.45.

APPENDIX C

Sampling Program and Locations

Sample Type	Locations No.	Locations Codes (and Type)[a]	Collection Type (and Frequency)[b]	Analysis (and Frequency)[b]
Airborne Filters	6	E-1-4, 8, 20	Weekly	GB, GS, on QC for each location
Airborne Iodine	6	E-1-4, 8, 20	Weekly	I-131
Ambient Radiation (TLD's)	22	E-1-9, 12, 14-18, 20, 22-32, 34-36, 38,39	Quarterly	Ambient Gamma
Lake Water	5	E-1, 5, 6, 33	Monthly	GB, GS, I-131 on MC H-3, Sr-89-90 on QC
Well Water	1	E-10	Quarterly	GB, GS, H-3, Sr-89-90, I-131
Vegetation	8	E-1-4, 6, 9, 20	3x / year as available	GB, GS
Shoreline Silt	5	E-1, 5, 6, 12, 33	2x / year	GB, GS
Soil	8	E-1-4, 6, 8, 9, 20	2x / year	GB, GS
Milk	3	E-11, 40, 21	Monthly	GS, I-131, Sr-89-90
Algae	2	E-5, 12	3x / year as available	GB, GS
Fish	1	E-13	2x / year as available	GB, GS (in edible portions)

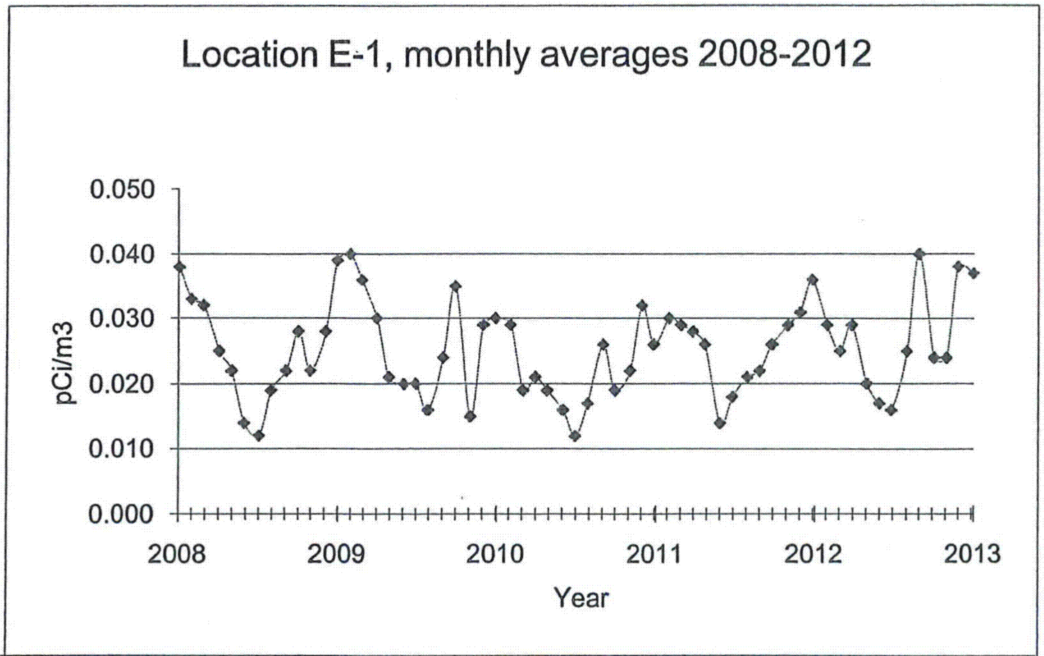
[a] Locations codes are defined in Table 2. Control Stations are indicated by (C). All other stations are indicators.

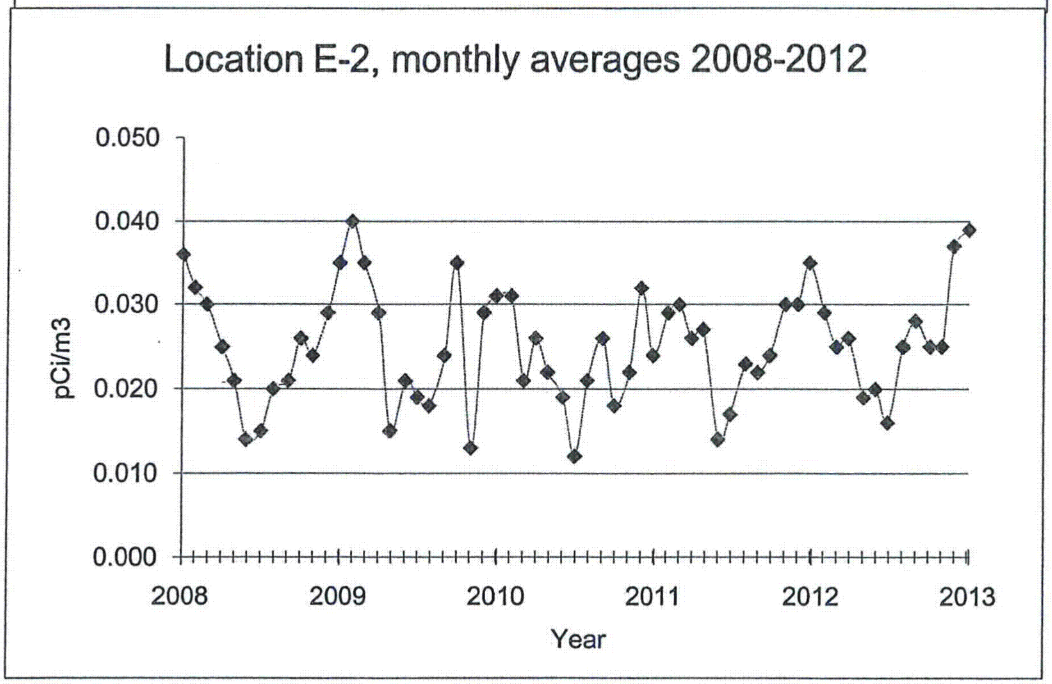
[b] Analysis type is coded as follows: GB = gross beta, GA = gross alpha, GS = gamma spectroscopy, H-3 = tritium, Sr-89 = strontium-89, Sr-90 = strontium-90, I-131 = iodine-131. Analysis frequency is coded as follows: MC = monthly composite, QC = quarterly composite.

APPENDIX D

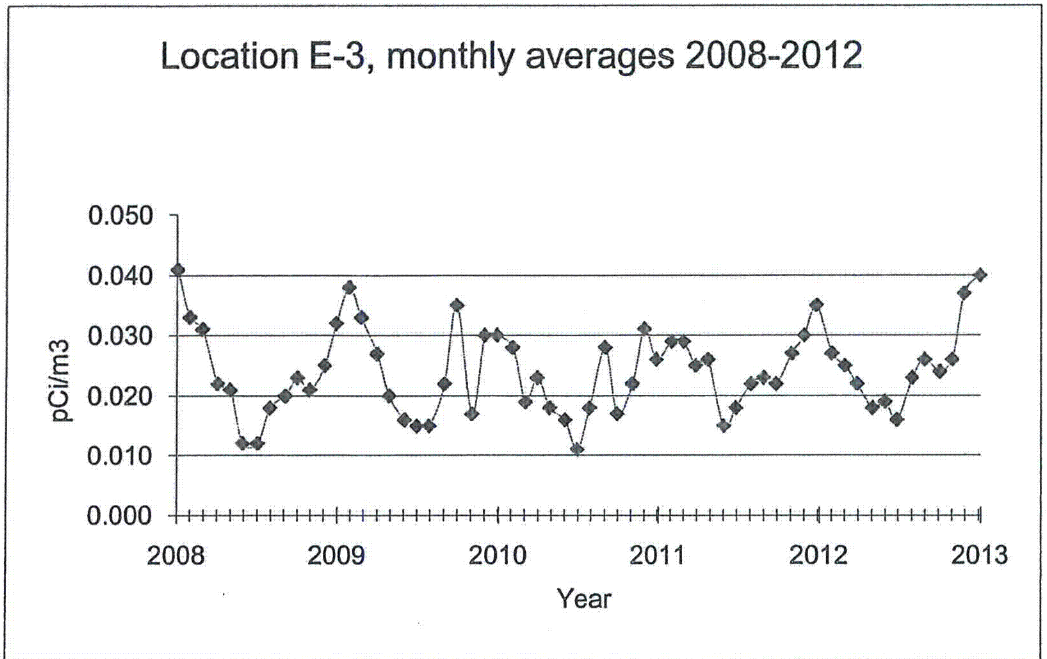
Graphs of Data Trends

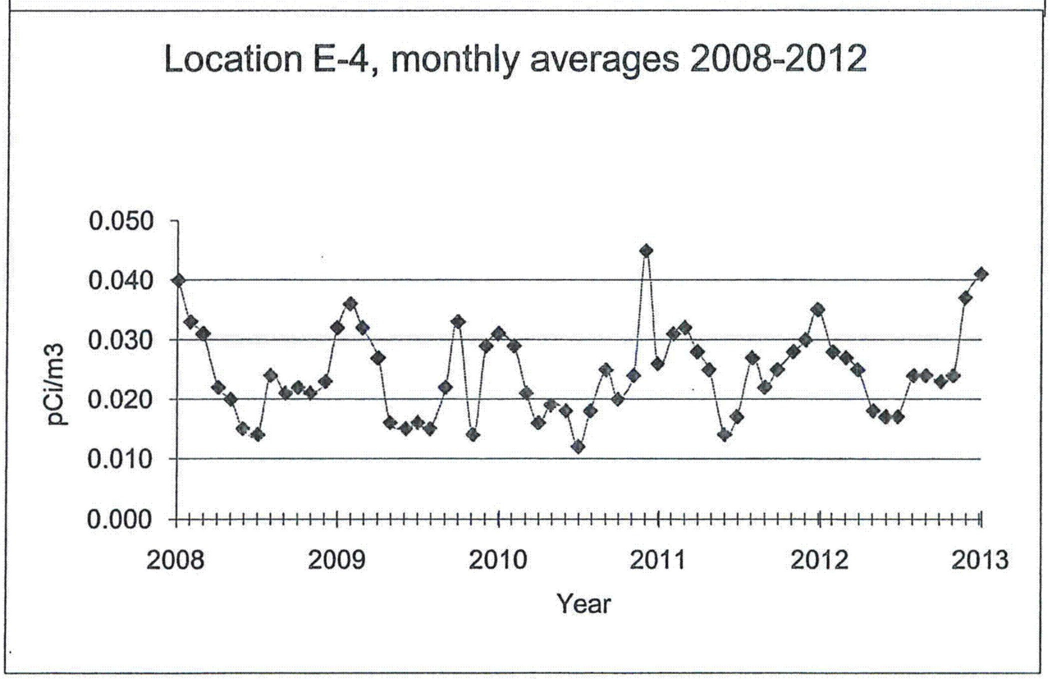
Air Particulates - Gross Beta



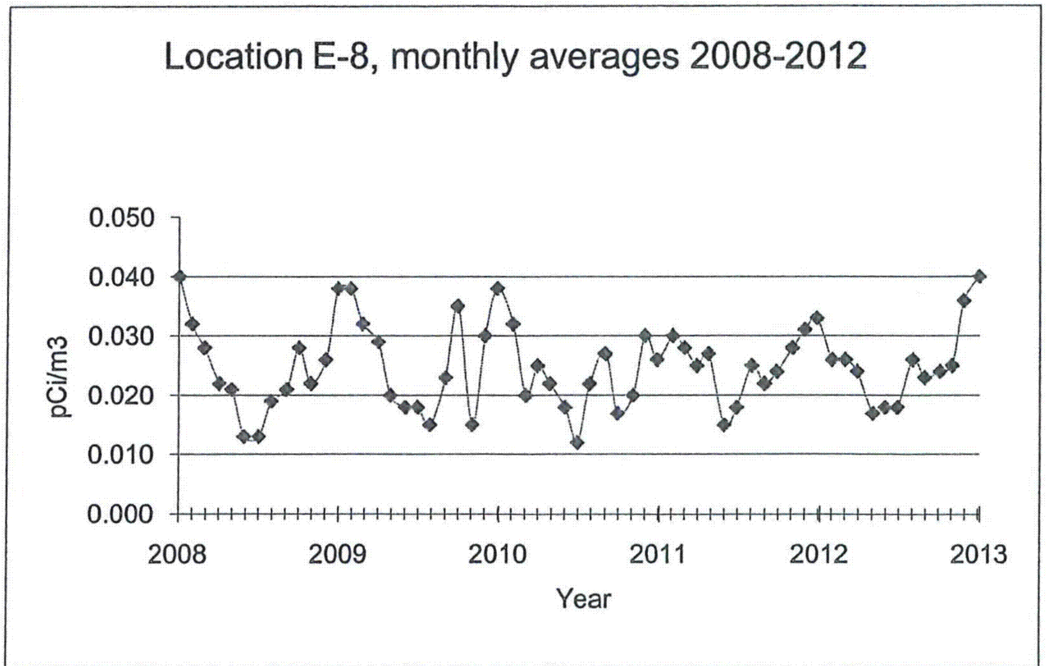


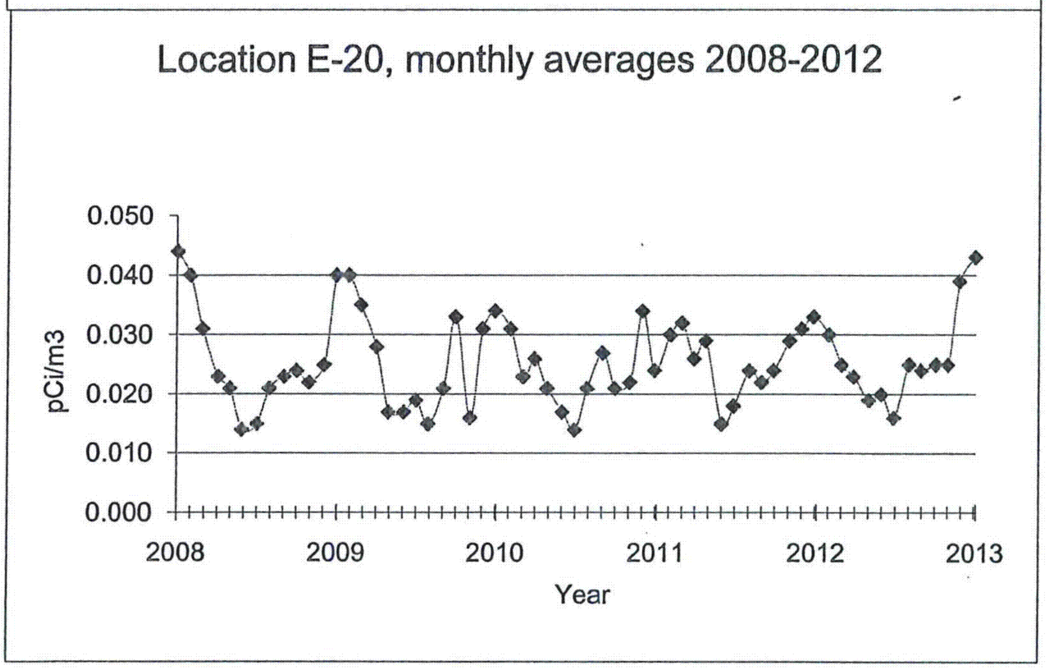
Air Particulates - Gross Beta





Air Particulates - Gross Beta





APPENDIX E

Supplemental Analyses

POINT BEACH NUCLEAR PLANT

Supplemental Analyses

Units: = pCi\L

Gamma isotopic analysis

Location	GW-04		GW-15		GW-16	
Collection Date	05-31-12		05-23-12		05-23-12	
Lab Code	EWW- 3381	MDC	EWW- 3692	MDC	EWW- 3693	MDC
Be-7	8.4 ± 12.3	< 24.1	-1.4 ± 13.4	< 32.0	2.3 ± 13.0	< 36.7
Mn-54	1.0 ± 1.5	< 1.6	-0.9 ± 1.6	< 2.3	1.2 ± 1.6	< 3.4
Fe-59	2.2 ± 2.3	< 4.7	-9.5 ± 3.2	< 10.2	1.3 ± 3.1	< 6.4
Co-58	1.3 ± 1.6	< 2.6	-1.6 ± 1.5	< 3.6	-1.1 ± 1.5	< 1.7
Co-60	0.9 ± 1.7	< 1.2	3.6 ± 1.8	< 2.6	0.7 ± 1.7	< 1.4
Zn-65	1.6 ± 3.1	< 5.8	1.8 ± 3.2	< 4.5	2.9 ± 3.3	< 2.5
Zr-Nb-95	1.1 ± 1.6	< 3.1	1.4 ± 1.6	< 4.6	1.5 ± 1.6	< 5.6
Cs-134	-0.8 ± 1.3	< 2.3	0.0 ± 1.5	< 2.6	0.9 ± 1.5	< 2.4
Cs-137	0.6 ± 1.7	< 2.9	-2.3 ± 1.8	< 2.3	0.1 ± 1.8	< 3.4
Ba-La-140	2.6 ± 1.9	< 4.6	-8.0 ± 1.9	< 7.5	2.3 ± 1.9	< 11.9

Location	GW-15		S-3	
Collection Date	05-23-12		08-07-12	
Lab Code	EWW- 3710		EWW- 4947	
H-3				
Be-7	13.2 ± 12.1	< 42.2	-4.7 ± 10.0	< 17.1
Mn-54	0.6 ± 1.5	< 2.7	1.4 ± 1.3	< 2.1
Fe-59	-0.6 ± 3.1	< 6.4	-0.9 ± 2.5	< 5.7
Co-58	-1.7 ± 1.4	< 3.4	-0.1 ± 1.2	< 1.7
Co-60	1.2 ± 1.7	< 2.8	0.9 ± 1.3	< 2.3
Zn-65	4.7 ± 2.7	< 5.1	-1.1 ± 2.6	< 3.0
Zr-Nb-95	-2.0 ± 1.5	< 7.4	-2.3 ± 1.5	< 3.6
Cs-134	-0.4 ± 1.4	< 2.4	0.4 ± 1.1	< 2.2
Cs-137	-1.2 ± 1.6	< 2.5	0.8 ± 1.4	< 2.6
Ba-La-140	-15.4 ± 1.6	< 21.4	-3.1 ± 1.4	< 4.8

POINT BEACH NUCLEAR PLANT

Supplemental Analyses

Units: = pCi\L

Tritium analysis

Location	So. Mausoleum Sump		No. Mausoleum Sump		So. Mausoleum Sump	
Collection Date	05-08-12		05-08-12		06-20-12	
Lab Code	EW- 2894	MDC	EW- 5320	MDC	EW- 5322	MDC
H-3	199 ± 91	< 154	6310 ± 250	< 156	256 ± 105	< 155
Location	No. Mausoleum Sump		So. Mausoleum Sump		No. Mausoleum Sump	
Collection Date	06-20-12		07-20-12		07-20-12	
Lab Code	EW- 5321	MDC	EW- 5307	MDC	EW- 5306	MDC
H-3	7824 ± 273	< 155	224 ± 90	< 151	6286 ± 242	< 151
Location	So. Mausoleum Sump		No. Mausoleum Sump		So. Mausoleum Sump Airborne	
Collection Date	08-09-12		08-09-12		06-20-12	
Lab Code	EW- 5309	MDC	EW- 5308	MDC	EW- 5311	MDC
H-3	225 ± 90	< 150	6784 ± 250	< 150	48 ± 82	< 151
Location	No. Mausoleum Sump Airborne		Tree #1/Branch #1		Tree #1/Branch #2	
Collection Date	06-20-12		09-05-12		09-05-12	
Lab Code	EW- 5310	MDC	EW- 5709	MDC	EW- 5710	MDC
H-3	314 ± 95	< 151	109 ± 85	< 151	170 ± 88	< 151
Location	Tree #2		Tree #3			
Collection Date	09-05-12		09-05-12			
Lab Code	EW- 5711	MDC	EW- 5712	MDC		
H-3	158 ± 87	< 151	-12 ± 44	< 73		

APPENDIX F

Special Analyses

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Dr. Kjell Johansen
NextEra Energy
Point Beach Nuclear Plant
6610 Nuclear Road
Two Rivers, Wisconsin 54241

LABORATORY REPORT NO.:	8006-100-1023
DATE:	06-13-2012
SAMPLES RECEIVED:	05-25-2012
PURCHASE ORDER NO.:	

Below are the results of the analyses for tritium on four grass samples.

Sample Location	Collection Date	Lab Code	Concentration / MDC (pCi/L) H-3
GW-02-East Creek	05-23-12	EG-3100	83 ± 81 / < 145
GW-17-SE Corner STP	05-23-12	EG-3101	124 ± 82 / < 145
Retention Pond-North & East	05-23-12	EG-3102	126 ± 83 / < 145
Retention Pond Trees-South	05-23-12	EG-3103	81 ± 81 / < 145

The error given is the probable counting error at the 95% confidence level. The less than (<) value, is based on 4.66 sigma counting error for the background sample.

E-mail: kjell.johansen@NextERAEnergy.com

Sincerely,

Bronia Grob,
Laboratory Manager

APPROVED BY:
Tony Coorlim,
Quality Assurance

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phone (847) 564-0700 • fax (847) 564-4517

Dr. Kjell Johansen
NextEra Energy
Point Beach Nuclear Plant
6610 Nuclear Road
Two Rivers, Wisconsin 54241

LABORATORY REPORT NO.: 8006-100-1023A
DATE: 06-13-2012
SAMPLES RECEIVED: 05-25-2012
PURCHASE ORDER NO.:

Below are the results of the analyses for tritium on four grass samples.

Sample Location	Collection Date	Lab Code	Concentration / MDC (pCi/g wet) H-3
GW-02-East Creek	05-23-12	EG-3100	0.068 ± 0.066 / < 0.120
GW-17-SE Corner STP	05-23-12	EG-3101	0.097 ± 0.064 / < 0.113
Retention Pond-North & East	05-23-12	EG-3102	0.101 ± 0.067 / < 0.117
Retention Pond Trees-South	05-23-12	EG-3103	0.053 ± 0.053 / < 0.096

The error given is the probable counting error at the 95% confidence level. The less than (<) value, is based on 4.66 sigma counting error for the background sample.

E-mail: kjell.johansen@NextERAEnergy.com

Sincerely,

Bronia Grob,
Laboratory Manager

APPROVED BY:

Tony Coorlim,
Quality Assurance

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Dr. Kjell Johansen
NextEraEnergy
Point Beach Nuclear Plant
6610 Nuclear Road
Two Rivers, Wisconsin 54241

DATE: 08-23-2012
SAMPLES RECEIVED: 08-21-2012
PURCHASE ORDER NO.:

Below are the results of the analyses for tritium in eight water samples collected August 15, 2012.

Sample Description	Lab Code	Concentration / MDC (pCi/L) H-3
NSB-AC	EW-5217	557 ± 102 / < 146
Control Room AC	EW-5218	998 ± 118 / < 146
SSB-AC-1	EW-5519	5,510 ± 226 / < 146
SSB-AC-2	EW-5520	5,822 ± 231 / < 146
SG AC-1	EW-5221	473 ± 99 / < 146
SG AC-2	EW-5222	395 ± 95 / < 146
TB AC	EW-5223	185 ± 86 / < 146
TurbBldg AC 8'	EW-5224	602 ± 104 / 146
S-3 South of U1 Discharge	ESW-5225[a]	387 ± 95 / < 146

[a] Collected August 16, 2012.
The results will be included in the monthly progress report.
The error given is the probable counting error at the 95% confidence level. The less than (<) value, is based on 4.66 sigma counting error for the background sample.

Sincerely,

Bronia Grob,
Laboratory Manager

E-mail: Kjell_Johansen@nexteraenergy.com

APPROVED BY

Tony Coorlim,
Quality Assurance

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Mr. Richard Welty
Radiation Protection Mgr.
Point Beach Nuclear Plant
NextEraEnergy
6610 Nuclear Road
Two Rivers, WI 54241

LABORATORY REPORT NO.: 8006-100-1016
DATE: 04-13-12
SAMPLES RECEIVED: 04-06-12
PURCHASE ORDER NO.:

Below are the results of the readout of supplemental TLDs deployed during the first quarter, 2012.

Period:	1st Quarter, 2012
Date Annealed:	12/19/11
Date Placed:	01/05/12
Date Removed:	04/05/12
Date Read:	04/09/12
Days in the Field:	91
Days from Annealing to Readout:	112
In-transit exposure:	3.47 ± 0.30

Location	Total mR	Net mR	Net mR Std Qtr	Net mR per 7 days
SGSF-North	14.8 ± 0.8	11.3 ± 0.8	11.3 ± 0.8	0.87 ± 0.06
SGSF-East	15.2 ± 0.4	11.7 ± 0.5	11.7 ± 0.5	0.90 ± 0.04
SGSF-South	17.4 ± 0.2	13.9 ± 0.4	13.9 ± 0.4	1.07 ± 0.03
SGSF-West	16.5 ± 0.6	13.0 ± 0.7	13.0 ± 0.7	1.00 ± 0.05
ISFSI-North	35.3 ± 1.1	31.8 ± 1.1	31.8 ± 1.1	2.45 ± 0.09
ISFSI-East	34.8 ± 0.9	31.3 ± 1.0	31.3 ± 1.0	2.41 ± 0.08
ISFSI-South	19.8 ± 0.7	16.4 ± 0.7	16.4 ± 0.7	1.26 ± 0.06
ISFSI-West	65.8 ± 2.7	62.3 ± 2.7	62.3 ± 2.7	4.79 ± 0.21
Control	16.3 ± 0.8	12.9 ± 0.8	12.9 ± 0.8	0.99 ± 0.06

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Quality Assurance

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Mr. Richard Welty
Radiation Protection Mgr.
Point Beach Nuclear Plant
NextEraEnergy
6610 Nuclear Road
Two Rivers, WI 54241

LABORATORY REPORT NO.: 8006-100-1028
DATE: 07-23-12
SAMPLES RECEIVED: 07-06-12
PURCHASE ORDER NO.:

Below are the results of the readout of supplemental TLDs deployed during the second quarter, 2012.

Period:	2nd Quarter, 2012
Date Annealed:	03/21/12
Date Placed:	04/05/12
Date Removed:	07/02/12
Date Read:	07/09/12
Days in the Field:	88
Days from Annealing to Readout:	110
In-transit exposure:	3.29 ± 0.17

Location	Total mR	Net mR	Net mR Std Qtr	Net mR per 7 days
SGSF-North	16.1 ± 1.3	12.8 ± 1.3	13.2 ± 1.4	1.02 ± 0.10
SGSF-East	16.2 ± 0.6	12.9 ± 0.6	13.3 ± 0.7	1.03 ± 0.05
SGSF-South	16.8 ± 0.6	13.6 ± 0.7	14.0 ± 0.7	1.08 ± 0.05
SGSF-West	18.3 ± 0.7	15.0 ± 0.8	15.5 ± 0.8	1.19 ± 0.06
ISFSI-North	34.3 ± 1.9	31.0 ± 1.9	32.0 ± 2.0	2.46 ± 0.15
ISFSI-East	36.2 ± 1.0	32.9 ± 1.0	34.1 ± 1.0	2.62 ± 0.08
ISFSI-South	20.5 ± 1.0	17.3 ± 1.0	17.8 ± 1.1	1.37 ± 0.08
ISFSI-West	62.7 ± 2.3	59.4 ± 2.3	61.5 ± 2.4	4.73 ± 0.19
Control	17.9 ± 0.7	14.6 ± 0.7	15.1 ± 0.7	1.17 ± 0.06

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Mr. Richard Welty	LABORATORY REPORT NO.: 8006-100-1036
Radiation Protection Mgr.	DATE: 10-26-12
Point Beach Nuclear Plant	SAMPLES RECEIVED: 10-05-12
NextEraEnergy	PURCHASE ORDER NO.:
6610 Nuclear Road	
Two Rivers, WI 54241	

Below are the results of the readout of supplemental TLDs deployed during the third quarter, 2012.

Period:	3rd Quarter, 2012
Date Annealed:	06/12/12
Date Placed:	07/02/12
Date Removed:	10/02/12
Date Read:	10/09/12
Days in the Field:	92
Days from Annealing to Readout:	119
In-transit exposure:	3.78 ± 0.28

Location	Total mR	Net mR	Net mR Std Qtr	Net mR per 7 days
SGSF-North	15.5 ± 0.7	11.7 ± 0.7	11.6 ± 0.7	0.89 ± 0.06
SGSF-East	15.4 ± 1.1	11.7 ± 1.1	11.5 ± 1.1	0.89 ± 0.08
SGSF-South	17.8 ± 0.4	14.0 ± 0.5	13.9 ± 0.5	1.07 ± 0.04
SGSF-West	16.9 ± 0.5	13.1 ± 0.6	13.0 ± 0.6	1.00 ± 0.05
ISFSI-North	35.9 ± 1.5	32.2 ± 1.5	31.8 ± 1.5	2.45 ± 0.12
ISFSI-East	50.4 ± 2.0	46.6 ± 2.1	46.1 ± 2.0	3.55 ± 0.16
ISFSI-South	20.6 ± 1.0	16.9 ± 1.0	16.7 ± 1.0	1.28 ± 0.08
ISFSI-West	65.0 ± 3.8	61.2 ± 3.8	60.6 ± 3.8	4.66 ± 0.29
Control	17.3 ± 0.8	13.5 ± 0.9	13.4 ± 0.9	1.03 ± 0.07

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Mr. Richard Welty	LABORATORY REPORT NO.: 8006-100-1048
Radiation Protection Mgr.	DATE: 01-24-13
Point Beach Nuclear Plant	SAMPLES RECEIVED: 01-04-13
NextEraEnergy	PURCHASE ORDER NO.:
6610 Nuclear Road	
Two Rivers, WI 54241	

Below are the results of the readout of supplemental TLDs deployed during the fourth quarter, 2012.

Period:	4th Quarter, 2012
Date Annealed:	09/10/12
Date Placed:	10/02/12
Date Removed:	01/03/13
Date Read:	01/08/13
Days in the Field:	93
Days from Annealing to Readout:	120
In-transit exposure:	4.24 ± 0.34

Location	Total mR	Net mR	Net mR Std Qtr	Net mR per 7 days
SGSF-North	19.4 ± 1.0	15.2 ± 1.0	14.9 ± 1.0	1.14 ± 0.08
SGSF-East	20.6 ± 0.4	16.3 ± 0.6	16.0 ± 0.5	1.23 ± 0.04
SGSF-South	21.5 ± 0.9	17.2 ± 1.0	16.8 ± 1.0	1.30 ± 0.07
SGSF-West	22.7 ± 1.1	18.5 ± 1.2	18.1 ± 1.2	1.39 ± 0.09
ISFSI-North	44.0 ± 2.7	39.8 ± 2.7	38.9 ± 2.6	3.00 ± 0.20
ISFSI-East	64.2 ± 1.6	60.0 ± 1.7	58.7 ± 1.6	4.51 ± 0.13
ISFSI-South	26.5 ± 1.3	22.3 ± 1.3	21.8 ± 1.3	1.68 ± 0.10
ISFSI-West	77.4 ± 3.3	73.2 ± 3.3	71.6 ± 3.3	5.51 ± 0.25
Control	21.5 ± 1.9	17.3 ± 1.9	16.9 ± 1.9	1.30 ± 0.14

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APPENDIX A

INTERLABORATORY COMPARISON PROGRAM RESULTS

NOTE: Environmental Inc., Midwest Laboratory participates in intercomparison studies administered by Environmental Resources Associates, and serves as a replacement for studies conducted previously by the U.S. EPA Environmental Monitoring Systems Laboratory, Las Vegas, Nevada. Results are reported in Appendix A. TLD Intercomparison results, in-house spikes, blanks, duplicates and mixed analyte performance evaluation program results are also reported. Appendix A is updated four times a year; the complete Appendix is included in March, June, September and December monthly progress reports only.

January, 2012 through December, 2012

Appendix A

Interlaboratory Comparison Program Results

Environmental, Inc., Midwest Laboratory has participated in interlaboratory comparison (crosscheck) programs since the formulation of it's quality control program in December 1971. These programs are operated by agencies which supply environmental type samples containing concentrations of radionuclides known to the issuing agency but not to participant laboratories. The purpose of such a program is to provide an independent check on a laboratory's analytical procedures and to alert it of any possible problems.

Participant laboratories measure the concentration of specified radionuclides and report them to the issuing agency. Several months later, the agency reports the known values to the participant laboratories and specifies control limits. Results consistently higher or lower than the known values or outside the control limits indicate a need to check the instruments or procedures used.

Results in Table A-1 were obtained through participation in the environmental sample crosscheck program administered by Environmental Resources Associates, serving as a replacement for studies conducted previously by the U.S. EPA Environmental Monitoring Systems Laboratory, Las Vegas, Nevada.

Table A-2 lists results for thermoluminescent dosimeters (TLDs), via International Intercomparison of Environmental Dosimeters, when available, and internal laboratory testing.

Table A-3 lists results of the analyses on in-house "spiked" samples for the past twelve months. All samples are prepared using NIST traceable sources. Data for previous years available upon request.

Table A-4 lists results of the analyses on in-house "blank" samples for the past twelve months. Data for previous years available upon request.

Table A-5 lists REMP specific analytical results from the in-house "duplicate" program for the past twelve months. Acceptance is based on the difference of the results being less than the sum of the errors. Complete analytical data for duplicate analyses is available upon request.

The results in Table A-6 were obtained through participation in the Mixed Analyte Performance Evaluation Program.

Results in Table A-7 were obtained through participation in the environmental sample crosscheck program administered by Environmental Resources Associates, serving as a replacement for studies conducted previously by the Environmental Measurement Laboratory Quality Assessment Program (EML).

Attachment A lists the laboratory precision at the 1 sigma level for various analyses. The acceptance criteria in Table A-3 is set at ± 2 sigma.

Out-of-limit results are explained directly below the result.

Attachment A

ACCEPTANCE CRITERIA FOR "SPIKED" SAMPLES

LABORATORY PRECISION: ONE STANDARD DEVIATION VALUES FOR VARIOUS ANALYSES[a]

Analysis	Level	One standard deviation for single determination
Gamma Emitters	5 to 100 pCi/liter or kg > 100 pCi/liter or kg	5.0 pCi/liter 5% of known value
Strontium-89[b]	5 to 50 pCi/liter or kg > 50 pCi/liter or kg	5.0 pCi/liter 10% of known value
Strontium-90[b]	2 to 30 pCi/liter or kg > 30 pCi/liter or kg	5.0 pCi/liter 10% of known value
Potassium-40	≥ 0.1 g/liter or kg	5% of known value
Gross alpha	≤ 20 pCi/liter > 20 pCi/liter	5.0 pCi/liter 25% of known value
Gross beta	≤ 100 pCi/liter > 100 pCi/liter	5.0 pCi/liter 5% of known value
Tritium	≤ 4,000 pCi/liter > 4,000 pCi/liter	$\pm 1\sigma = 169.85 \times (\text{known})^{0.0933}$ 10% of known value
Radium-226,-228	≥ 0.1 pCi/liter	15% of known value
Plutonium	≥ 0.1 pCi/liter, gram, or sample	10% of known value
Iodine-131, Iodine-129[b]	≤ 55 pCi/liter > 55 pCi/liter	6 pCi/liter 10% of known value
Uranium-238, Nickel-63[b] Technetium-99[b]	≤ 35 pCi/liter > 35 pCi/liter	6 pCi/liter 15% of known value
Iron-55[b]	50 to 100 pCi/liter > 100 pCi/liter	10 pCi/liter 10% of known value
Other Analyses [b]	---	20% of known value

[a] From EPA publication, "Environmental Radioactivity Laboratory Intercomparison Studies Program, Fiscal Year, 1981-1982, EPA-600/4-81-004.

[b] Laboratory limit.

TABLE A-1. Interlaboratory Comparison Crosscheck program, Environmental Resource Associates (ERA)[a].

			Concentration (pCi/L)			
Lab Code	Date	Analysis	Laboratory Result [b]	ERA Result [c]	Control Limits	Acceptance
ERW-1783	04/09/12	Sr-89	62.2 ± 6.0	58.5	46.9 - 66.3	Pass
ERW-1783	04/09/12	Sr-90	33.7 ± 2.1	37.4	27.4 - 43.1	Pass
ERW-1786	04/09/12	Ba-133	75.7 ± 4.1	82.3	69.1 - 90.5	Pass
ERW-1786	04/09/12	Co-60	71.9 ± 4.0	72.9	65.6 - 82.6	Pass
ERW-1786	04/09/12	Cs-134	70.0 ± 4.3	74.2	60.6 - 81.6	Pass
ERW-1786	04/09/12	Cs-137	151.5 ± 6.1	155.0	140.0 - 172.0	Pass
ERW-1786	04/09/12	Zn-65	108.3 ± 89.0	105.0	94.5 - 125.0	Pass
ERW-1789	04/09/12	Gr. Alpha	55.0 ± 2.4	62.9	33.0 - 78.0	Pass
ERW-1789 [d]	04/09/12	Gr. Beta	38.3 ± 1.3	44.2	29.6 - 51.5	Pass
ERW-1795	04/09/12	Ra-226	6.4 ± 0.4	5.7	4.3 - 6.9	Pass
ERW-1795	04/09/12	Ra-228	5.4 ± 1.2	4.6	2.7 - 6.3	Pass
ERW-1795	04/09/12	Uranium	56.2 ± 2.6	61.5	50.0 - 68.2	Pass
ERW-1798	04/09/12	H-3	16023 ± 355	15800	13800 - 17400	Pass
ERW-6283	10/05/12	Sr-89	41.5 ± 4.1	39.1	29.7 - 46.1	Pass
ERW-6283	10/05/12	Sr-90	19.7 ± 1.6	20.1	14.4 - 23.8	Pass
ERW-6286	10/05/12	Ba-133	82.7 ± 4.4	84.8	71.3 - 93.3	Pass
ERW-6286	10/05/12	Co-60	77.2 ± 3.7	78.3	70.5 - 88.5	Pass
ERW-6286	10/05/12	Cs-134	74.4 ± 1.5	76.6	62.6 - 84.3	Pass
ERW-6286	10/05/12	Cs-137	183.0 ± 6.2	183.0	165.0 - 203.0	Pass
ERW-6286	10/05/12	Zn-65	211.0 ± 9.9	204.0	184.0 - 240.0	Pass
ERW-6288	10/05/12	Gr. Alpha	47.0 ± 2.3	58.6	30.6 - 72.9	Pass
ERW-6288	10/05/12	Gr. Beta	33.4 ± 1.2	39.2	26.0 - 46.7	Pass
ERW-6290	10/05/12	I-131	23.3 ± 1.0	24.8	20.6 - 29.4	Pass
ERW-6295 [e]	10/05/12	Ra-226	16.5 ± 0.7	15.0	11.2 - 17.2	Pass
ERW-6295 [e]	10/05/12	Ra-228	4.9 ± 1.1	4.6	2.7 - 6.2	Pass
ERW-6295	10/05/12	Uranium	61.2 ± 1.8	62.5	50.8 - 69.3	Pass

[a] Results obtained by Environmental, Inc., Midwest Laboratory as a participant in the crosscheck program for proficiency testing in drinking water conducted by Environmental Resources Associates (ERA).

[b] Unless otherwise indicated, the laboratory result is given as the mean ± standard deviation for three determinations.

[c] Results are presented as the known values, expected laboratory precision (1 sigma, 1 determination) and control limits as provided by ERA.

[d] Result of reanalysis. Sample dilution problem suspected. A new dilution was prepared and the sample reanalyzed. Original analysis results, 76.2 ± 1.8 pCi/L.

[e] Results of reanalyses, original submission (pCi/L): Ra-226, 17.52 ± 0.69 Ra-228, 7.44 ± 1.1.49.
A new test was ordered from Environmental Resources Associates, results will be updated for first quarter, 2013.

TABLE A-2. Thermoluminescent Dosimetry, (TLD, $CaSO_4$: Dy Cards).

Lab Code	Date	Description	Known Value (mR)	Lab Result ± 2 sigma (mR)	Control Limits (mR)	Acceptance
Environmental, Inc.						
2012-1	2/7/2012	30 cm.	74.87	87.22 ± 2.86	52.41 - 97.33	Pass
2012-1	2/7/2012	40 cm.	42.12	53.70 ± 4.53	29.48 - 54.76	Pass
2012-1	2/7/2012	50 cm.	26.95	33.04 ± 1.96	18.87 - 35.04	Pass
2012-1	2/7/2012	70 cm.	13.75	13.26 ± 1.15	9.63 - 17.88	Pass
2012-1	2/7/2012	75 cm.	11.98	13.38 ± 1.68	8.39 - 15.57	Pass
2012-1	2/7/2012	80 cm.	10.53	11.27 ± 0.95	7.37 - 13.69	Pass
2012-1	2/7/2012	90 cm.	8.32	7.79 ± 0.83	5.82 - 10.82	Pass
2012-1	2/7/2012	100 cm.	6.74	5.91 ± 0.25	4.72 - 8.76	Pass
2012-1	2/7/2012	110 cm.	5.57	4.63 ± 0.83	3.90 - 7.24	Pass
2012-1	2/7/2012	120 cm.	4.68	3.96 ± 1.68	3.28 - 6.08	Pass
2012-1	2/7/2012	150 cm.	2.99	2.41 ± 0.08	2.09 - 3.89	Pass
2012-1	2/7/2012	180 cm.	2.08	2.02 ± 0.25	1.46 - 2.70	Pass
Environmental, Inc.						
2012-2	9/11/2012	40 cm.	33.75	43.74 ± 1.31	23.63 - 43.88	Pass
2012-2	9/11/2012	50 cm.	21.6	25.37 ± 0.82	15.12 - 28.08	Pass
2012-2	9/11/2012	60 cm.	15	16.63 ± 0.45	10.50 - 19.50	Pass
2012-2	9/11/2012	70 cm.	11.02	10.58 ± 0.20	7.71 - 14.33	Pass
2012-2	9/11/2012	80 cm.	8.44	8.55 ± 1.18	5.91 - 10.97	Pass
2012-2	9/11/2012	90 cm.	6.67	5.75 ± 0.33	4.67 - 8.67	Pass
2012-2	9/11/2012	100 cm.	5.4	4.44 ± 0.22	3.78 - 7.02	Pass
2012-2	9/11/2012	110 cm.	4.46	3.85 ± 0.05	3.12 - 5.80	Pass
2012-2	9/11/2012	120 cm.	3.75	3.03 ± 0.71	2.63 - 4.88	Pass
2012-2	9/11/2012	150 cm.	2.4	1.82 ± 0.10	1.68 - 3.12	Pass
2012-2	9/11/2012	180 cm.	1.67	1.19 ± 0.34	1.17 - 2.17	Pass

TABLE A-3. In-House "Spiked" Samples

Lab Code [b]	Date	Analysis	Concentration (pCi/L)[a] Laboratory results 2s, n=1 [c]	Known Activity	Control Limits [d]	Acceptance
SPW-41824	2/15/2012	Ra-228	24.85 ± 2.14	28.75	20.13 - 37.38	Pass
W-22712	2/27/2012	Gr. Alpha	14.59 ± 0.34	20.00	10.00 - 30.00	Pass
W-22712	2/27/2012	Gr. Alpha	43.57 ± 0.40	41.70	20.85 - 62.55	Pass
SPAP-1032	3/5/2012	Cs-134	7.06 ± 1.71	5.26	0.00 - 15.26	Pass
SPAP-1032	3/5/2012	Cs-137	102.63 ± 3.13	104.24	93.82 - 114.66	Pass
SPAP-1034	3/5/2012	Gr. Beta	44.30 ± 0.11	46.88	28.13 - 65.63	Pass
SPW-1036	3/5/2012	Cs-134	43.23 ± 3.84	39.42	29.42 - 49.42	Pass
SPW-1036	3/5/2012	Cs-137	57.44 ± 4.60	52.12	42.12 - 62.12	Pass
SPW-1036	3/5/2012	Sr-90	60.51 ± 1.93	61.52	49.22 - 73.82	Pass
SPMI-1038	3/5/2012	Cs-134	37.79 ± 4.06	39.42	29.42 - 49.42	Pass
SPMI-1038	3/5/2012	Cs-137	54.75 ± 5.09	52.12	42.12 - 62.12	Pass
SPW-1045	3/5/2012	H-3	68022 ± 746	69048	55238 - 82858	Pass
SPW-1047	3/5/2012	Ni-63	217.10 ± 3.64	206.64	144.65 - 268.63	Pass
SPW-1049	3/5/2012	C-14	3858.90 ± 12.79	4738.80	2843.28 - 6634.32	Pass
W-31412	3/14/2012	Ra-226	13.13 ± 0.36	16.70	11.69 - 21.71	Pass
SPW-1520	3/23/2012	U-238	45.67 ± 2.02	41.70	29.19 - 54.21	Pass
SPW-41825	4/10/2012	Ra-228	28.48 ± 2.51	28.35	19.85 - 36.86	Pass
WW-1547	4/16/2012	Ba-133	18.99 ± 4.67	26.70	16.70 - 36.70	Pass
WW-1547	4/16/2012	Cs-134	9.28 ± 2.82	8.68	0.00 - 18.68	Pass
WW-1547	4/16/2012	Cs-137	27.77 ± 4.49	29.70	19.70 - 39.70	Pass
W-51712	5/17/2012	Ra-226	17.29 ± 0.43	16.70	11.69 - 21.71	Pass
W-61112	6/11/2012	Gr. Alpha	22.16 ± 0.45	20.00	10.00 - 30.00	Pass
W-61112	6/11/2012	Gr. Beta	43.57 ± 0.40	45.20	35.20 - 55.20	Pass
SPAP-4418	7/25/2012	Gr. Beta	43.74 ± 0.11	46.50	27.90 - 65.10	Pass
SPAP-4420	7/25/2012	Cs-134	4.54 ± 0.73	4.60	2.76 - 6.44	Pass
SPAP-4420	7/25/2012	Cs-137	104.70 ± 2.77	103.30	92.97 - 113.63	Pass
SPMI-4422	7/25/2012	Co-60	31.43 ± 2.12	31.62	21.62 - 41.62	Pass
SPMI-4422	7/25/2012	Cs-134	16.50 ± 1.17	16.15	6.15 - 26.15	Pass
SPMI-4422	7/25/2012	Cs-137	29.60 ± 2.61	26.64	16.64 - 36.64	Pass
SPMI-4422	7/25/2012	Sr-90	31.60 ± 1.35	30.47	24.38 - 36.56	Pass
SPW-4424	7/25/2012	Co-60	38.52 ± 1.76	37.95	27.95 - 47.95	Pass
SPW-4424	7/25/2012	Cs-137	33.23 ± 2.27	32.01	22.01 - 42.01	Pass
SPW-4424	7/25/2012	Sr-90	36.56 ± 1.58	40.60	32.48 - 48.72	Pass
SPF-4426	7/25/2012	Cs-134	947.50 ± 42.50	1025.00	922.50 - 1127.50	Pass
SPF-4426	7/25/2012	Cs-137	2692.00 ± 62.40	2480.00	2232.00 - 2728.00	Pass
SPW-4428	7/25/2012	C-14	4325.70 ± 15.80	4738.80	2843.28 - 6634.32	Pass
SPW-4430	7/25/2012	H-3	70119.40 ± 773.40	67570.00	54056.00 - 81084.00	Pass
SPW-4432	7/25/2012	Ni-63	187.20 ± 3.85	206.80	144.76 - 268.84	Pass
W-81712	8/17/2012	Ra-226	14.94 ± 0.40	16.70	11.69 - 21.71	Pass
SPW-5407	8/29/2012	U-238	42.95 ± 0.11	41.70	29.19 - 54.21	Pass
SPW-18022	9/10/2012	Ra-228	29.03 ± 2.80	28.21	19.75 - 36.67	Pass

TABLE A-3. In-House "Spiked" Samples

Lab Code [b]	Date	Analysis	Concentration (pCi/L)[a] Laboratory results 2s, n=1 [c]	Known Activity	Control Limits [d]	Acceptance
W-91012	9/10/2012	Gr. Alpha	19.95 ± 0.42	20.00	10.00 - 30.00	Pass
W-91012	9/10/2012	Gr. Beta	43.47 ± 0.40	45.20	35.20 - 55.20	Pass
W-100312	10/3/2012	Gr. Alpha	19.95 ± 0.41	20.00	10.00 - 30.00	Pass
W-100312	10/3/2012	Gr. Beta	44.21 ± 0.40	45.20	35.20 - 55.20	Pass
W-101812	10/18/2012	Ra-226	18.80 ± 0.43	16.70	11.69 - 21.71	Pass
ESO-7235	12/6/2012	Sr-90	138.79 ± 2.67	161.05	128.84 - 193.26	Pass
SPW-7753	12/6/2012	U-238	45.55 ± 5.05	41.70	29.19 - 54.21	Pass
SPW-18023	12/18/2012	Ra-228	31.59 ± 2.99	25.98	18.19 - 33.77	Pass

[a] Liquid sample results are reported in pCi/Liter, air filters(pCi/filter), charcoal (pCi/m^3), and solid samples (pCi/g).

[b] Laboratory codes : W (Water), MI (milk), AP (air filter), SO (soil), VE (vegetation), CH (charcoal canister), F (fish), U (urine).

[c] Results are based on single determinations.

[d] Control limits are established from the precision values listed in Attachment A of this report, adjusted to ± 2σ.

NOTE: For fish, Jello is used for the Spike matrix. For Vegetation, cabbage is used for the Spike matrix.

TABLE A-4. In-House "Blank" Samples

Lab Code	Sample Type	Date	Analysis[b]	Concentration (pCi/L)[a] Laboratory results (4.66σ) LLD	Activity[c]	Acceptance Criteria (4.66 σ)
SPW-41814	Water	2/15/2012	Ra-228	0.65	0.49 ± 0.36	2
W-22712	Water	2/27/2012	Gr. Alpha	0.42	-0.04 ± 0.29	1
W-22712	Water	2/27/2012	Gr. Beta	0.74	-0.54 ± 0.50	3.2
SPAP-1031	Air Filter	3/5/2012	Cs-134	1.89	-	100
SPAP-1031	Air Filter	3/5/2012	Cs-137	1.16	-	100
SPAP-1033	Air Filter	3/5/2012	Gr. Beta	0.003	0.013 ± 0.003	0.01
SPW-1035	Water	3/5/2012	Cs-134	2.40	-	10
SPW-1035	Water	3/5/2012	Cs-137	2.88	-	10
SPW-1035	Water	3/5/2012	I-131(G)	2.35	-	20
SPW-1035	Water	3/5/2012	Sr-90	0.60	-0.11 ± 0.26	1
SPMI-1037	Milk	3/5/2012	Cs-134	2.85	-	10
SPMI-1037	Milk	3/5/2012	Cs-137	3.73	-	10
SPMI-1037	Milk	3/5/2012	I-131(G)	3.24	-	20
SPW-1044	Water	3/5/2012	H-3	146.10	37.10 ± 74.40	200
SPW-1046	Water	3/5/2012	Ni-63	19.07	8.30 ± 11.79	20
SPW-1048	Water	3/5/2012	C-14	5.70	2.99 ± 3.04	200
SPW-1166	water	3/9/2012	C-14	6.79	1.11	200
W-31412	Water	3/14/2012	Ra-226	0.034	0.043 ± 0.027	1
SPW-1521	Water	3/23/2012	U-238	0.10	0.09 ± 0.11	1
W-51712	Water	4/24/2012	Ra-226	0.04	0.04 ± 0.03	1
W-61112	Water	6/11/2012	Gr. Alpha	0.47	-0.14 ± 0.32	1
W-61112	Water	6/11/2012	Gr. Beta	0.71	0.29 ± 0.51	3.2
SPW-41815	Water	7/7/2011	Ra-228	0.77	0.52 ± 0.42	2
SPAP-4417	Air Filter	7/25/2012	Gr. Beta	0.001	0.021 ± 0.003	0.01
SPMI-4421	Milk	7/25/2012	Co-60	4.29	-	10
SPMI-4421	Milk	7/25/2012	Cs-134	3.58	-	10
SPMI-4421	Milk	7/25/2012	Cs-137	4.60	-	10
SPMI-4421	Milk	7/25/2012	Sr-90	0.45	0.53 ± 0.27	1
SPW-4423	Water	7/25/2012	Co-60	1.88	-	10
SPW-4423	Water	7/25/2012	Cs-134	2.38	-	10
SPW-4423	Water	7/25/2012	Cs-137	2.80	-	10
SPW-4423	water	7/25/2012	Sr-90	0.45	0.08 ± 0.22	1
SPF-4425	Fish	7/25/2012	Co-60	6.74	-	100
SPF-4425	Fish	7/25/2012	Cs-134	7.47	-	100
SPF-4425	Fish	7/25/2012	Cs-137	9.62	-	100
SPW-4427	Water	7/25/2012	C-14	10.93	3.54 ± 5.84	200
SPW-4431	Water	7/25/2012	Ni-63	19.00	5.50 ± 11.70	20
W-81712	Water	8/17/2012	Ra-226	0.038	0.035 ± 0.030	1
SPW-5408	Water	8/29/2012	U-238	0.039	0.015 ± 0.057	1

TABLE A-4. In-House "Blank" Samples

Lab Code	Sample Type	Date	Analysis[b]	Concentration (pCi/L)[a] Laboratory results (4.66σ) LLD	Activity[c]	Acceptance Criteria (4.66 σ)
SPW-18032	Water	9/10/2012	Ra-228	0.78	0.85 ± 0.46	2
W-91012	Water	9/10/2012	Gr. Alpha	0.42	0.027 ± 0.29	1
W-91012	Water	9/10/2012	Gr. Beta	0.75	-0.13 ± 0.52	3.2
W-100312	Water	10/3/2012	Gr. Beta	0.77	-0.32 ± 0.53	3.2
W-100312	Water	10/3/2012	Gr. Beta	0.43	0.06 ± 0.30	3.2
W-101812	Water	10/18/2012	Ra-226	0.04	0.04 ± 0.03	1
SPW-7754	Water	12/6/2012	U-238	0.10	0.02 ± 0.08	1
SPW-18033	Water	12/18/2012	Ra-228	0.98	0.43 ± 0.50	2

[a] Liquid sample results are reported in pCi/Liter, air filters(pCi/filter), charcoal (pCi/charcoal canister), and solid samples (pCi/kg).

[b] I-131(G); Iodine-131 as analyzed by gamma spectroscopy.

[c] Activity reported is a net activity result. For gamma spectroscopic analysis, activity detected below the LLD value is not reported.

TABLE A-5. In-House "Duplicate" Samples

			Concentration (pCi/L)[a]			
Lab Code	Date	Analysis	First Result	Second Result	Averaged Result	Acceptance
CF-20, 21	1/3/2012	Gr. Beta	14.50 ± 0.29	15.02 ± 0.30	14.76 ± 0.21	Pass
CF-20, 21	1/3/2012	K-40	12.88 ± 0.55	12.40 ± 0.53	12.64 ± 0.38	Pass
CF-20, 21	1/3/2012	Sr-90	0.01 ± 0.01	0.01 ± 0.01	0.01 ± 0.00	Pass
P-9133, 9134	1/3/2012	H-3	108.86 ± 83.03	206.60 ± 86.38	157.73 ± 59.91	Pass
U-302, 303	1/17/2012	Beta (-K40)	6.84 ± 2.91	5.24 ± 2.56	6.04 ± 1.94	Pass
S-386, 387	1/23/2012	Ac-228	0.77 ± 0.11	0.79 ± 0.14	0.78 ± 0.09	Pass
S-386, 387	1/23/2012	Bi-214	0.80 ± 0.07	0.73 ± 0.11	0.77 ± 0.07	Pass
S-386, 387	1/23/2012	Pb-214	0.74 ± 0.06	0.75 ± 0.11	0.75 ± 0.06	Pass
S-386, 387	1/23/2012	Tl-208	0.21 ± 0.02	0.21 ± 0.04	0.21 ± 0.02	Pass
S-386, 387	1/23/2012	U-235	0.05 ± 0.02	0.12 ± 0.05	0.09 ± 0.03	Pass
WW-619, 620	1/31/2012	H-3	257.20 ± 86.00	305.80 ± 88.30	281.50 ± 61.63	Pass
MI-702, 703	2/6/2012	K-40	1337.00 ± 123.00	1460.40 ± 102.00	1398.70 ± 79.90	Pass
WW-892, 893	2/17/2012	Gr. Beta	3.46 ± 0.56	3.77 ± 0.59	3.61 ± 0.41	Pass
S-850, 851	2/22/2012	Cs-134	0.14 ± 0.02	0.13 ± 0.02	0.14 ± 0.01	Pass
S-850, 851	2/22/2012	Cs-137	0.21 ± 0.03	0.22 ± 0.03	0.22 ± 0.02	Pass
W-1251, 1252	3/6/2012	Gr. Alpha	1.20 ± 0.62	1.27 ± 0.92	1.24 ± 0.55	Pass
W-1251, 1252	3/6/2012	Gr. Beta	16.86 ± 1.43	15.14 ± 1.34	16.00 ± 0.98	Pass
W-1251, 1252	3/6/2012	H-3	5235.52 ± 230.91	4893.24 ± 224.55	5064.38 ± 161.05	Pass
W-1251, 1252	3/6/2012	Tc-99	19.67 ± 3.60	14.46 ± 3.51	17.07 ± 2.51	Pass
AP-1209, 1210	3/8/2012	Be-7	0.24 ± 0.12	0.20 ± 0.11	0.22 ± 0.08	Pass
XWW-1564, 1565	3/14/2012	H-3	308.00 ± 88.00	293.00 ± 87.00	300.50 ± 61.87	Pass
SG-1438, 1439	3/19/2012	Ac-228	6.01 ± 0.30	6.23 ± 0.31	6.12 ± 0.22	Pass
SG-1438, 1439	3/19/2012	Pb-214	4.69 ± 0.49	5.20 ± 0.54	4.95 ± 0.36	Pass
WW-1585, 1586	3/19/2012	H-3	3124.50 ± 176.96	2982.38 ± 173.62	3053.44 ± 123.96	Pass
AP-2103, 2104	3/28/2012	Be-7	0.080 ± 0.016	0.076 ± 0.013	0.078 ± 0.010	Pass
AP-2166, 2167	3/28/2012	Be-7	0.061 ± 0.020	0.071 ± 0.016	0.066 ± 0.013	Pass
AP-1632, 1633	3/29/2012	Be-7	0.26 ± 0.12	0.24 ± 0.12	0.25 ± 0.08	Pass
E-1653, 1654	4/2/2012	Gr. Beta	1.53 ± 0.05	1.55 ± 0.04	1.54 ± 0.03	Pass
E-1653, 1654	4/2/2012	K-40	1.34 ± 0.13	1.36 ± 0.14	1.35 ± 0.10	Pass
SG-1677, 1678	4/2/2012	Ac-228	6.63 ± 0.37	6.49 ± 0.33	6.56 ± 0.25	Pass
SG-1677, 1678	4/2/2012	Pb-214	4.77 ± 0.16	5.07 ± 0.14	4.92 ± 0.11	Pass
SWU-1719, 1720	4/3/2012	Gr. Beta	1.16 ± 0.41	1.53 ± 0.44	1.35 ± 0.30	Pass
W-1698, 1699	4/5/2012	Gr. Beta	10.86 ± 1.49	9.42 ± 1.32	10.14 ± 1.00	Pass
W-1698, 1699	4/5/2012	Ra-226	0.41 ± 0.15	0.67 ± 0.18	0.54 ± 0.12	Pass
W-1698, 1699	4/5/2012	Ra-228	1.46 ± 0.76	1.48 ± 0.74	1.47 ± 0.53	Pass
SG-1761, 1762	4/10/2012	Ac-228	16.26 ± 0.53	16.55 ± 0.44	16.41 ± 0.34	Pass
SG-1761, 1762	4/10/2012	Pb-214	14.16 ± 1.44	15.40 ± 1.56	14.78 ± 1.06	Pass
AP-2019, 2020	4/12/2012	Be-7	0.17 ± 0.10	0.17 ± 0.08	0.17 ± 0.07	Pass
DW-2272, 2273	4/20/2012	I-131	0.52 ± 0.24	0.49 ± 0.27	0.51 ± 0.18	Pass
DW-2356, 2357	4/24/2012	Gr. Beta	12.82 ± 2.01	9.47 ± 1.74	11.14 ± 1.33	Pass

TABLE A-5. In-House "Duplicate" Samples

			Concentration (pCi/L)[a]			
Lab Code	Date	Analysis	First Result	Second Result	Averaged Result	Acceptance
G-2403, 2404	5/1/2012	Be-7	1.77 ± 0.21	1.55 ± 0.33	1.66 ± 0.20	Pass
G-2403, 2404	5/1/2012	K-40	6.38 ± 0.50	6.93 ± 0.72	6.66 ± 0.44	Pass
BS-2445, 2446	5/1/2012	Gr. Beta	8.92 ± 1.52	9.29 ± 1.63	9.11 ± 1.11	Pass
BS-2445, 2446	5/1/2012	K-40	5.86 ± 0.38	6.22 ± 0.48	6.04 ± 0.31	Pass
SWU-2550, 2551	5/1/2012	Gr. Beta	2.07 ± 0.65	1.59 ± 0.62	1.83 ± 0.45	Pass
WW-2614, 2615	5/1/2012	Gr. Beta	2.03 ± 1.04	2.36 ± 1.14	2.20 ± 0.77	Pass
WW-2614, 2615	5/1/2012	H-3	750.60 ± 106.20	653.20 ± 102.30	701.90 ± 73.73	Pass
BS-2656, 2657	5/2/2012	Cs-137	0.13 ± 0.07	0.07 ± 0.04	0.10 ± 0.04	Pass
BS-2656, 2657	5/2/2012	K-40	10.15 ± 0.97	11.13 ± 0.90	10.64 ± 0.66	Pass
SO-2635, 2636	5/3/2012	Cs-137	0.046 ± 0.024	0.050 ± 0.027	0.048 ± 0.018	Pass
SO-2635, 2636	5/3/2012	K-40	13.20 ± 0.74	14.01 ± 0.67	13.61 ± 0.50	Pass
MI-2677, 2678	5/7/2012	K-40	1415.30 ± 131.40	1348.10 ± 109.00	1381.70 ± 85.36	Pass
VE-2719, 2720	5/7/2012	K-40	4.15 ± 0.36	4.19 ± 0.38	4.17 ± 0.26	Pass
SWU-3221, 3222	5/8/2012	Gr. Beta	1.67 ± 0.47	1.39 ± 0.45	1.53 ± 0.33	Pass
SWU-3221, 3222	5/8/2012	H-3	236.90 ± 101.90	281.90 ± 103.70	259.40 ± 72.69	Pass
WW-3073, 3074	5/14/2012	H-3	339.12 ± 145.45	337.23 ± 98.19	338.18 ± 87.74	Pass
AP-2968, 2969	5/17/2012	Be-7	0.25 ± 0.12	0.21 ± 0.09	0.23 ± 0.07	Pass
F-3031, 3032	5/22/2012	H-3	11291.00 ± 372.80	11167.00 ± 315.00	11229.00 ± 244.03	Pass
F-3031, 3032	5/22/2012	K-40	3528.90 ± 372.80	3677.20 ± 392.40	3603.05 ± 270.63	Pass
G-3094, 3095	5/23/2012	Gr. Beta	7.89 ± 0.16	8.01 ± 0.16	7.95 ± 0.11	Pass
F-3412, 3413	5/23/2012	Gr. Beta	3.46 ± 0.10	3.33 ± 0.10	3.40 ± 0.07	Pass
F-3412, 3413	5/23/2012	K-40	2.40 ± 0.38	2.55 ± 0.43	2.48 ± 0.29	Pass
MI-3067, 3068	5/24/2012	K-40	1267.20 ± 105.00	1305.70 ± 109.80	1286.45 ± 75.96	Pass
SO-3305, 3306	5/30/2012	Cs-137	0.024 ± 0.013	0.030 ± 0.015	0.027 ± 0.010	Pass
SO-3305, 3306	5/30/2012	Gr. Beta	10.95 ± 0.89	10.86 ± 0.89	10.91 ± 0.63	Pass
SO-3305, 3306	5/30/2012	Tl-208	0.068 ± 0.018	0.062 ± 0.017	0.065 ± 0.012	Pass
LW-3454, 3455	5/31/2012	Gr. Beta	2.12 ± 0.86	2.27 ± 0.77	2.20 ± 0.58	Pass
BS-3697, 3698	6/14/2012	Be-7	2.05 ± 0.19	2.27 ± 0.38	2.16 ± 0.21	Pass
BS-3697, 3698	6/14/2012	Cs-137	2.32 ± 0.39	2.26 ± 0.66	2.29 ± 0.38	Pass
BS-3697, 3698	6/14/2012	K-40	6.67 ± 0.28	6.64 ± 0.42	6.66 ± 0.25	Pass
VE-3798, 3799	6/20/2012	K-40	5.93 ± 0.38	6.03 ± 0.37	5.98 ± 0.26	Pass
WW-4790, 4791	6/20/2012	H-3	251.33 ± 86.51	372.48 ± 92.27	311.90 ± 63.24	Pass
DW-30103, 30104	6/27/2012	Ra-226	0.30 ± 0.08	0.42 ± 0.09	0.36 ± 0.06	Pass
DW-30103, 30104	6/27/2012	Ra-228	0.76 ± 0.54	0.78 ± 0.54	0.77 ± 0.38	Pass
LW-3970, 3971	6/28/2012	Gr. Beta	1.49 ± 1.06	0.72 ± 0.53	1.11 ± 0.59	Pass
DW-3949, 3950	6/29/2012	I-131	0.54 ± 0.26	0.25 ± 0.26	0.40 ± 0.18	Pass
SG-4075, 4076	7/2/2012	Ac-228	0.33 ± 0.09	0.34 ± 0.06	0.34 ± 0.05	Pass
SG-4075, 4076	7/2/2012	K-40	6.71 ± 0.58	7.20 ± 0.32	6.96 ± 0.33	Pass
SG-4075, 4076	7/2/2012	Pb-214	0.46 ± 0.05	0.49 ± 0.03	0.48 ± 0.03	Pass
AP-4390, 4391	7/3/2012	Be-7	0.09 ± 0.02	0.09 ± 0.01	0.09 ± 0.01	Pass
AP-4390, 4391	7/3/2012	Be-7	0.11 ± 0.02	0.10 ± 0.01	0.11 ± 0.01	Pass
AP-4012, 4013	7/5/2012	Be-7	0.27 ± 0.09	0.29 ± 0.16	0.28 ± 0.09	Pass
SW-4033, 4034	7/5/2012	H-3	614.99 ± 107.99	512.31 ± 103.83	563.65 ± 74.91	Pass

TABLE A-5. In-House "Duplicate" Samples

			Concentration (pCi/L)[a]			
Lab Code	Date	Analysis	First Result	Second Result	Averaged Result	Acceptance
VE-4054, 4055	7/9/2012	K-40	7.28 ± 0.56	7.42 ± 0.63	7.35 ± 0.42	Pass
VE-4222, 4223	7/13/2012	Be-7	0.16 ± 0.08	0.22 ± 0.09	0.19 ± 0.06	Pass
VE-4222, 4223	7/13/2012	K-40	7.20 ± 0.30	6.60 ± 0.30	6.90 ± 0.21	Pass
DW-30113, 30114	7/13/2012	Ra-228	1.93 ± 0.66	1.03 ± 0.53	1.48 ± 0.42	Pass
DW-30115, 30116	7/13/2012	Gr. Alpha	7.46 ± 1.21	7.02 ± 1.14	7.24 ± 0.83	Pass
DW-30124, 30125	7/13/2012	Ra-226	1.16 ± 0.15	0.90 ± 0.12	1.03 ± 0.10	Pass
DW-30124, 30125	7/13/2012	Ra-228	1.38 ± 0.56	1.72 ± 0.60	1.55 ± 0.41	Pass
DW-30126, 30127	7/13/2012	Gr. Alpha	6.23 ± 1.16	6.75 ± 1.29	6.49 ± 0.87	Pass
AP-4433, 4434	7/19/2012	Be-7	0.17 ± 0.09	0.21 ± 0.10	0.19 ± 0.07	Pass
SG-4475, 4476	7/19/2012	Gr. Alpha	17.03 ± 4.17	15.56 ± 3.96	16.30 ± 2.88	Pass
SG-4475, 4476	7/19/2012	Gr. Beta	13.23 ± 2.61	14.36 ± 2.47	13.80 ± 1.80	Pass
WW-4685, 4686	7/24/2012	H-3	289.00 ± 99.00	375.00 ± 103.00	332.00 ± 71.43	Pass
AP-4706, 4707	7/26/2012	Be-7	0.28 ± 0.14	0.24 ± 0.14	0.26 ± 0.10	Pass
SO-4748, 4749	7/26/2012	Gr. Beta	20.45 ± 1.04	19.22 ± 0.94	19.84 ± 0.70	Pass
SO-4748, 4749	7/26/2012	Gr. Beta	20.45 ± 1.04	19.22 ± 0.94	19.84 ± 0.70	Pass
SO-4748, 4749	7/26/2012	U-233/4	0.11 ± 0.02	0.10 ± 0.01	0.11 ± 0.01	Pass
SO-4748, 4749	7/26/2012	U-238	0.12 ± 0.02	0.11 ± 0.01	0.12 ± 0.01	Pass
VE-4832, 4833	8/1/2012	K-40	4.06 ± 0.22	4.08 ± 0.24	4.07 ± 0.16	Pass
DW-30149, 30150	8/1/2012	Ra-226	2.69 ± 0.22	2.79 ± 0.22	2.74 ± 0.16	Pass
DW-30149, 30150	8/1/2012	Ra-228	2.77 ± 0.75	1.61 ± 0.57	2.19 ± 0.47	Pass
SG-4916, 4917	8/3/2012	Ac-228	11.03 ± 0.33	11.08 ± 0.44	11.06 ± 0.28	Pass
SG-4916, 4917	8/3/2012	K-40	6.39 ± 0.80	6.98 ± 0.88	6.69 ± 0.59	Pass
F-5313, 5314	8/9/2012	Cs-137	0.05 ± 0.02	0.05 ± 0.02	0.05 ± 0.01	Pass
F-5313, 5314	8/9/2012	Gr. Beta	4.12 ± 0.08	4.10 ± 0.08	4.11 ± 0.06	Pass
F-5313, 5314	8/9/2012	K-40	3.07 ± 0.42	3.14 ± 0.40	3.11 ± 0.29	Pass
VE-5166, 5167	8/15/2012	K-40	4.26 ± 0.28	3.66 ± 0.47	3.96 ± 0.27	Pass
VE-5376, 5377	8/22/2012	Gr. Beta	7.72 ± 0.17	7.61 ± 0.16	7.67 ± 0.12	Pass
VE-5334, 5335	8/27/2012	K-40	1.65 ± 0.17	1.72 ± 0.15	1.68 ± 0.12	Pass
VE-5481, 5482	8/28/2012	Be-7	2.52 ± 0.19	2.65 ± 0.21	2.59 ± 0.14	Pass
VE-5481, 5482	8/28/2012	K-40	5.05 ± 0.37	4.79 ± 0.39	4.92 ± 0.27	Pass
VE-5481, 5482	8/28/2012	Sr-90	0.01 ± 0.00	0.01 ± 0.01	0.01 ± 0.00	Pass
DW-30164, 30165	8/30/2012	Ra-226	1.33 ± 0.15	1.59 ± 0.17	1.46 ± 0.11	Pass
DW-30164, 30165	8/30/2012	Ra-228	2.76 ± 0.66	1.54 ± 0.56	2.15 ± 0.43	Pass
VE-5166, 5167	9/4/2012	K-40	2.05 ± 0.32	2.53 ± 0.36	2.29 ± 0.24	Pass
ME-5607, 5608	9/4/2012	Gr. Beta	2.92 ± 0.08	2.89 ± 0.08	2.90 ± 0.06	Pass
ME-5607, 5608	9/4/2012	K-40	2.06 ± 0.32	2.53 ± 0.36	2.29 ± 0.24	Pass
SW-5901, 5902	9/17/2012	H-3	10909.00 ± 311.00	10817.00 ± 310.00	10863.00 ± 219.56	Pass
BS-6048, 6049	9/24/2012	K-40	1.24 ± 0.20	1.18 ± 0.21	1.21 ± 0.14	Pass
AP-6482, 6483	9/27/2012	Be-7	0.09 ± 0.02	0.09 ± 0.03	0.09 ± 0.02	Pass

TABLE A-5. In-House "Duplicate" Samples

			Concentration (pCi/L)[a]			
Lab Code	Date	Analysis	First Result	Second Result	Averaged Result	Acceptance
G-6090, 6091	10/1/2012	Be-7	3.74 ± 0.33	3.54 ± 0.30	3.64 ± 0.22	Pass
G-6090, 6091	10/1/2012	Gr. Beta	10.81 ± 0.34	10.72 ± 0.33	10.77 ± 0.24	Pass
G-6090, 6091	10/1/2012	K-40	5.99 ± 0.47	5.45 ± 0.44	5.72 ± 0.32	Pass
SO-6111, 6112	10/1/2012	Cs-137	0.06 ± 0.03	0.04 ± 0.02	0.05 ± 0.02	Pass
SO-6111, 6112	10/1/2012	K-40	19.66 ± 0.84	20.09 ± 0.80	19.88 ± 0.58	Pass
W-6795, 6796	10/1/2012	H-3	215.20 ± 88.00	292.80 ± 91.60	254.00 ± 63.51	Pass
AP-6461, 6462	10/2/2012	Be-7	0.07 ± 0.01	0.07 ± 0.02	0.07 ± 0.01	Pass
WW-6279, 6280	10/3/2012	Gr. Beta	1.54 ± 0.68	1.67 ± 0.75	1.61 ± 0.51	Pass
W-6346, 6347	10/3/2012	Ra-226	0.30 ± 0.10	0.36 ± 0.10	0.33 ± 0.07	Pass
VE-6503, 6504	10/9/2012	K-40	5.23 ± 0.83	6.00 ± 0.45	5.04 ± 0.27	Pass
WW-6606, 6607	10/10/2012	Gr. Beta	3.18 ± 1.31	2.42 ± 1.27	2.80 ± 0.91	Pass
WW-6606, 6607	10/10/2012	H-3	273.10 ± 85.70	219.80 ± 83.10	246.45 ± 59.69	Pass
WW-7237, 7238	10/12/2012	H-3	175.44 ± 99.84	180.75 ± 100.03	178.10 ± 70.66	Pass
F-6627, 6628	10/15/2012	K-40	3.05 ± 0.39	3.23 ± 0.37	3.14 ± 0.27	Pass
VE-6669, 6670	10/16/2012	Be-7	0.48 ± 0.26	0.50 ± 0.13	0.49 ± 0.15	Pass
VE-6669, 6670	10/16/2012	K-40	4.06 ± 0.28	3.68 ± 0.26	3.87 ± 0.19	Pass
SS-6711, 6712	10/16/2012	Ac-228	0.16 ± 0.05	0.17 ± 0.06	0.17 ± 0.04	Pass
SS-6711, 6712	10/16/2012	Bi-214	0.13 ± 0.03	0.16 ± 0.03	0.14 ± 0.02	Pass
SS-6711, 6712	10/16/2012	Gr. Beta	14.20 ± 0.89	12.67 ± 0.88	13.44 ± 0.63	Pass
SS-6711, 6712	10/16/2012	Pb-212	0.15 ± 0.06	0.13 ± 0.02	0.14 ± 0.03	Pass
SS-6711, 6712	10/16/2012	Tl-208	0.06 ± 0.02	0.04 ± 0.02	0.05 ± 0.01	Pass
WW-7258, 7259	10/22/2012	H-3	214.69 ± 85.42	314.60 ± 90.25	264.65 ± 62.13	Pass
WW-7655, 7656	10/25/2012	H-3	159.00 ± 86.10	159.00 ± 86.10	159.00 ± 60.88	Pass
WW-7747, 7748	10/25/2012	H-3	156.50 ± 84.70	170.20 ± 85.30	163.35 ± 60.10	Pass
MI-6963, 6964	10/28/2012	K-40	1384.60 ± 111.70	1421.60 ± 107.60	1403.10 ± 77.55	Pass
MI-7174, 7175	11/5/2012	K-40	1283.60 ± 97.45	1293.20 ± 91.37	1288.40 ± 66.79	Pass
SG-7221, 7222	11/9/2012	Pb-214	31.49 ± 0.70	30.11 ± 0.80	30.80 ± 0.53	Pass
DW-30216, 30217	11/9/2012	Gr. Alpha	2.23 ± 0.86	2.31 ± 0.92	2.27 ± 0.63	Pass
DW-30216, 30217	11/9/2012	Ra-226	0.72 ± 0.12	0.82 ± 0.14	0.77 ± 0.09	Pass
DW-30216, 30217	11/9/2012	Ra-228	0.92 ± 0.52	1.26 ± 0.53	1.09 ± 0.37	Pass
MI-7363, 7364	11/13/2012	K-40	1304.40 ± 103.30	1496.10 ± 121.30	1400.25 ± 79.66	Pass
CF-7384, 7385	11/13/2012	K-40	11.75 ± 0.52	10.94 ± 0.59	11.35 ± 0.39	Pass
VE-7489, 7490	11/16/2012	K-40	2.22 ± 0.23	1.91 ± 0.22	2.06 ± 0.16	Pass
AP-7531, 7532	11/21/2012	Be-7	0.19 ± 0.10	0.29 ± 0.17	0.24 ± 0.10	Pass
BS-7573, 7574	11/24/2012	K-40	7.21 ± 0.41	7.57 ± 0.39	7.39 ± 0.28	Pass
LW-7865, 7866	12/5/2012	Gr. Beta	2.16 ± 0.56	1.64 ± 0.62	1.90 ± 0.42	Pass
SG-8095, 8096	12/19/2012	Ac-228	25.15 ± 0.73	25.47 ± 0.54	25.31 ± 0.45	Pass
SG-8095, 8096	12/19/2012	Gamma	26.98 ± 2.72	28.68 ± 2.89	27.83 ± 1.98	Pass

Note: Duplicate analyses are performed on every twentieth sample received in-house. Results are not listed for those analyses with activities that measure below the LLD.

[a] Results are reported in units of pCi/L, except for air filters (pCi/Filter), food products, vegetation, soil, sediment (pCi/g).

TABLE A-1. Interlaboratory Comparison Crosscheck program, Environmental Resource Associates (ERA)[a].

		Concentration (pCi/L)				
Lab Code	Date	Analysis	Laboratory Result [b]	ERA Result [c]	Control Limits	Acceptance
ERW-1783	04/09/12	Sr-89	62.2 ± 6.0	58.5	46.9 - 66.3	Pass
ERW-1783	04/09/12	Sr-90	33.7 ± 2.1	37.4	27.4 - 43.1	Pass
ERW-1786	04/09/12	Ba-133	75.7 ± 4.1	82.3	69.1 - 90.5	Pass
ERW-1786	04/09/12	Co-60	71.9 ± 4.0	72.9	65.6 - 82.6	Pass
ERW-1786	04/09/12	Cs-134	70.0 ± 4.3	74.2	60.6 - 81.6	Pass
ERW-1786	04/09/12	Cs-137	151.5 ± 6.1	155.0	140.0 - 172.0	Pass
ERW-1786	04/09/12	Zn-65	108.3 ± 89.0	105.0	94.5 - 125.0	Pass
ERW-1789	04/09/12	Gr. Alpha	55.0 ± 2.4	62.9	33.0 - 78.0	Pass
ERW-1789 [d]	04/09/12	Gr. Beta	76.2 ± 1.8	44.2	29.6 - 51.5	Fail
ERW-1795	04/09/12	Ra-226	6.4 ± 0.4	5.7	4.3 - 6.9	Pass
ERW-1795	04/09/12	Ra-228	5.4 ± 1.2	4.6	2.7 - 6.3	Pass
ERW-1795	04/09/12	Uranium	56.2 ± 2.6	61.5	50.0 - 68.2	Pass
ERW-1798	04/09/12	H-3	16023 ± 355	15800	13800 - 17400	Pass
ERW-6283	10/05/12	Sr-89	41.5 ± 4.1	39.1	29.7 - 46.1	Pass
ERW-6283	10/05/12	Sr-90	19.7 ± 1.6	20.1	14.4 - 23.8	Pass
ERW-6286	10/05/12	Ba-133	82.7 ± 4.4	84.8	71.3 - 93.3	Pass
ERW-6286	10/05/12	Co-60	77.2 ± 3.7	78.3	70.5 - 88.5	Pass
ERW-6286	10/05/12	Cs-134	74.4 ± 1.5	76.6	62.6 - 84.3	Pass
ERW-6286	10/05/12	Cs-137	183.0 ± 6.2	183.0	165.0 - 203.0	Pass
ERW-6286	10/05/12	Zn-65	211.0 ± 9.9	204.0	184.0 - 240.0	Pass
ERW-6288	10/05/12	Gr. Alpha	47.0 ± 2.3	58.6	30.6 - 72.9	Pass
ERW-6288	10/05/12	Gr. Beta	33.4 ± 1.2	39.2	26.0 - 46.7	Pass
ERW-6290	10/05/12	I-131	23.3 ± 1.0	24.8	20.6 - 29.4	Pass
ERW-6295 [e]	10/05/12	Ra-226	17.5 ± 0.7	15.0	11.2 - 17.2	Fail
ERW-6295 [e]	10/05/12	Ra-228	7.4 ± 1.5	4.6	2.7 - 6.2	Fail
ERW-6295	10/05/12	Uranium	61.2 ± 1.8	62.5	50.8 - 69.3	Pass

[a] Results obtained by Environmental, Inc., Midwest Laboratory as a participant in the crosscheck program for proficiency testing in drinking water conducted by Environmental Resources Associates (ERA).

[b] Unless otherwise indicated, the laboratory result is given as the mean ± standard deviation for three determinations.

[c] Results are presented as the known values, expected laboratory precision (1 sigma, 1 determination) and control limits as provided by ERA.

[d] Result of reanalysis: 38.3 ± 1.3 pCi/L. Sample dilution problem suspected. A new dilution was prepared.

[e] Results of reanalyses, original submission (pCi/L): Ra-226, 16.5 ± 0.7 Ra-228, 4.9 ± 1.1
A new test was ordered from Environmental Resources Associates, results will be updated for first quarter, 2013.

TABLE A-6. Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP).

				Concentration [a]		
Lab Code [b]	Date	Analysis	Laboratory result	Known Activity	Control Limits [c]	Acceptance
STW-1670	02/01/12	I-129	9.31 ± 0.31	12.29	8.60 - 15.98	Pass
STSO-1766 [d]	02/01/12	Am-241	88.50 ± 8.30	159.00	111.00 - 207.00	Fail
STSO-1766	02/01/12	Co-57	1352.10 ± 4.00	1179.00	825.00 - 1533.00	Pass
STSO-1766	02/01/12	Co-60	1.70 ± 0.70	1.56	1.00 - 2.00	Pass
STSO-1766	02/01/12	Cs-134	842.20 ± 4.30	828.00	580.00 - 1076.00	Pass
STSO-1766	02/01/12	Cs-137	0.40 ± 0.90	0.00	0.00 - 1.00	Pass
STSO-1766	02/01/12	K-40	1729.60 ± 22.20	1491.00	1044.00 - 1938.00	Pass
STSO-1766	02/01/12	Mn-54	647.60 ± 4.20	558.00	391.00 - 725.00	Pass
STSO-1766	02/01/12	Ni-63	781.50 ± 9.70	862.00	603.00 - 1121.00	Pass
STSO-1766	02/01/12	Pu-238	142.40 ± 9.70	136.00	97.00 - 177.00	Pass
STSO-1766	02/01/12	Pu-239/40	66.10 ± 6.40	65.80	46.10 - 85.50	Pass
STSO-1766	02/01/12	Sr-90	383.20 ± 15.30	392.00	274.00 - 510.00	Pass
STSO-1766	02/01/12	Tc-99	289.60 ± 10.90	374.00	262.00 - 486.00	Pass
STSO-1766	02/01/12	U-233/4	63.20 ± 5.40	68.10	47.70 - 88.50	Pass
STSO-1766	02/01/12	U-238	310.80 ± 12.10	329.00	230.00 - 428.00	Pass
STSO-1766	02/01/12	Zn-65	766.70 ± 6.70	642.00	449.00 - 835.00	Pass
STAP-1772	02/01/12	Am-241	0.062 ± 0.02	0.073	0.051 - 0.10	Pass
STAP-1772	02/01/12	Co-57	0.010 ± 0.01	0.00	0.000 - 1.00	Pass
STAP-1772	02/01/12	Co-60	2.40 ± 0.08	2.18	1.53 - 2.84	Pass
STAP-1772	02/01/12	Cs-134	2.33 ± 0.13	2.38	1.67 - 3.09	Pass
STAP-1772	02/01/12	Cs-137	2.07 ± 0.10	1.79	1.25 - 2.33	Pass
STAP-1772	02/01/12	Mn-54	3.77 ± 0.14	3.24	2.27 - 4.21	Pass
STAP-1772	02/01/12	Pu-238	0.003 ± 0.004	0.002	0.000 - 0.10	Pass
STAP-1772	02/01/12	Pu-239/40	0.098 ± 0.017	0.097	0.07 - 0.13	Pass
STAP-1772	02/01/12	Sr-90	-0.010 ± 0.060	0.000	-0.10 - 0.13	Pass
STAP-1772 [e]	02/01/12	U-233/4	0.016 ± 0.006	0.019	0.013 - 0.024	Pass
STAP-1772	02/01/12	U-238	0.11 ± 0.02	0.12	0.09 - 0.16	Pass
STAP-1772	02/01/12	Zn-65	3.67 ± 0.20	2.99	2.09 - 3.89	Pass
STAP-1773	02/01/12	Gr. Alpha	0.51 ± 0.05	1.20	0.40 - 2.00	Pass
STAP-1773	02/01/12	Gr. Beta	2.75 ± 0.10	2.40	1.20 - 3.60	Pass
STVE-1776	02/01/12	Co-57	14.57 ± 0.28	12.00	8.40 - 15.60	Pass
STVE-1776	02/01/12	Co-60	6.45 ± 0.23	6.05	4.24 - 7.87	Pass
STVE-1776	02/01/12	Cs-134	8.39 ± 0.29	8.43	5.90 - 10.96	Pass
STVE-1776	02/01/12	Cs-137	0.01 ± 0.09	0.00	0.00 - 0.10	Pass
STVE-1776	02/01/12	Mn-54	0.03 ± 0.08	0.00	0.00 - 0.10	Pass
STVE-1776	02/01/12	Zn-65	10.31 ± 0.67	8.90	6.23 - 11.57	Pass
STW-1960	02/01/12	Gr. Alpha	1.68 ± 0.09	2.14	0.64 - 3.64	Pass
STW-1960	02/01/12	Gr. Beta	6.33 ± 0.10	6.36	3.18 - 9.54	Pass

TABLE A-6. Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP).

				Concentration [a]		
Lab Code [b]	Date	Analysis	Laboratory result	Known Activity	Control Limits [c]	Acceptance
STW-1964	02/01/12	Am-241	1.28 ± 0.12	1.63	1.14 - 2.12	Pass
STW-1964	02/01/12	Co-57	33.30 ± 0.40	32.90	23.00 - 42.80	Pass
STW-1964	02/01/12	Co-60	23.20 ± 0.40	23.72	16.60 - 30.84	Pass
STW-1964	02/01/12	Cs-134	0.30 ± 3.00	0.00	0.00 - 1.00	Pass
STW-1964	02/01/12	Cs-137	40.10 ± 0.60	39.90	27.90 - 51.90	Pass
STW-1964 [1]	02/01/12	Fe-55	65.10 ± 9.50	81.90	57.30 - 106.50	Pass
STW-1964	02/01/12	H-3	460.00 ± 12.10	437.00	306.00 - 568.00	Pass
STW-1964	02/01/12	K-40	153.00 ± 4.20	142.00	99.00 - 185.00	Pass
STW-1964	02/01/12	Mn-54	32.70 ± 0.60	31.80	22.30 - 41.30	Pass
STW-1964	02/01/12	Ni-63	49.80 ± 2.90	60.00	42.00 - 78.00	Pass
STW-1964	02/01/12	Pu-238	0.58 ± 0.06	0.63	0.44 - 0.82	Pass
STW-1964	02/01/12	Pu-239/40	1.30 ± 0.15	1.34	0.94 - 1.74	Pass
STW-1964	02/01/12	Sr-90	0.10 ± 0.20	0.00	0.00 - 1.00	Pass
STW-1964	02/01/12	Tc-99	23.70 ± 0.80	27.90	19.50 - 36.30	Pass
STW-1964	02/01/12	U-233/4	0.40 ± 0.05	0.39	0.27 - 0.51	Pass
STW-1964	02/01/12	U-238	2.67 ± 0.13	2.76	1.93 - 3.59	Pass
STW-1964	02/01/12	Zn-65	0.01 ± 0.20	0.00	0.00 - 1.00	Pass
STW-5391	08/01/12	I-129	5.73 ± 0.28	6.82	4.77 - 8.87	Pass
STSO-5392	08/01/12	Am-241	129.30 ± 12.70	111.00	78.00 - 144.00	Pass
STSO-5392	08/01/12	Ni-63	376.20 ± 20.60	406.00	284.00 - 528.00	Pass
STSO-5392	08/01/12	Pu-238	118.70 ± 9.30	105.80	74.10 - 137.50	Pass
STSO-5392	08/01/12	Pu-239/40	140.70 ± 9.90	134.00	94.00 - 174.00	Pass
STSO-5392	08/01/12	Sr-90	483.52 ± 16.47	508.00	356.00 - 660.00	Pass
STSO-5392	08/01/12	Tc-99	432.50 ± 23.10	469.00	328.00 - 610.00	Pass
STSO-5394	08/01/12	Co-57	1528.00 ± 4.10	1316.00	921.00 - 1711.00	Pass
STSO-5394	08/01/12	Co-60	592.00 ± 3.20	531.00	372.00 - 690.00	Pass
STSO-5394	08/01/12	Cs-134	933.60 ± 5.82	939.00	657.00 - 1221.00	Pass
STSO-5394	08/01/12	Cs-137	1319.80 ± 5.50	1150.00	805.00 - 1495.00	Pass
STSO-5394	08/01/12	K-40	737.30 ± 17.70	632.00	442.00 - 822.00	Pass
STSO-5394	08/01/12	Mn-54	1083.20 ± 5.20	920.00	644.00 - 1196.00	Pass
STSO-5394	08/01/12	U-233/4	55.80 ± 4.20	60.30	42.20 - 78.40	Pass
STSO-5394	08/01/12	U-238	231.20 ± 8.60	263.00	184.00 - 342.00	Pass
STSO-5394	08/01/12	Zn-65	696.10 ± 7.00	606.00	424.00 - 788.00	Pass

TABLE A-6. Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP).

			Concentration [a]			
Lab Code [b]	Date	Analysis	Laboratory result	Known Activity	Control Limits [c]	Acceptance
STVE-5395 [g]	08/01/12	Co-57	7.44 ± 0.17	5.66	3.96 - 7.36	Fail
STVE-5395	08/01/12	Co-60	5.90 ± 0.15	5.12	3.58 - 6.66	Pass
STVE-5395	08/01/12	Cs-134	7.40 ± 0.31	6.51	4.56 - 8.46	Pass
STVE-5395	08/01/12	Cs-137	5.45 ± 0.18	4.38	3.07 - 5.69	Pass
STVE-5395	08/01/12	Mn-54	4.06 ± 0.21	3.27	2.29 - 4.25	Pass
STAP-5398	08/01/12	Gr. Alpha	0.41 ± 0.05	0.97	0.29 - 1.65	Pass
STAP-5398	08/01/12	Gr. Beta	2.11 ± 0.09	1.92	0.96 - 2.88	Pass
STAP-5401 [h]	08/01/12	Am-241	0.12 ± 0.02	0.08	0.05 - 0.10	Fail
STAP-5403	08/01/12	Co-57	1.96 ± 0.05	1.91	1.34 - 2.48	Pass
STAP-5403	08/01/12	Co-60	1.76 ± 0.07	1.73	1.21 - 2.25	Pass
STAP-5403	08/01/12	Cs-134	2.74 ± 0.18	2.74	1.92 - 3.56	Pass
STAP-5403	08/01/12	Cs-137	0.00 ± 0.03	0.00	-0.01 - 0.01	Pass
STAP-5403	08/01/12	Mn-54	2.52 ± 0.10	2.36	1.65 - 3.07	Pass
STAP-5403	08/01/12	Pu-238	0.050 ± 0.015	0.063	0.044 - 0.081	Pass
STAP-5403	08/01/12	Pu-239/40	0.001 ± 0.004	0.00081	0.000 - 0.010	Pass
STAP-5403 [i]	08/01/12	U-233/4	0.009 ± 0.011	0.014	0.010 - 0.018	Fail
STAP-5403	08/01/12	U-238	0.08 ± 0.02	0.10	0.070 - 0.130	Pass
STAP-5403	08/01/12	Zn-65	0.01 ± 0.06	0.00	-0.010 - 0.010	Pass
STW-5445	08/01/12	Fe-55	79.80 ± 4.10	89.30	62.50 - 116.10	Pass
STW-5445	08/01/12	Ni-63	74.30 ± 3.40	66.30	46.40 - 86.20	Pass
STW-5445	08/01/12	U-233/4	0.46 ± 0.05	0.45	0.32 - 0.59	Pass
STW-5445	08/01/12	U-238	3.14 ± 0.14	3.33	2.33 - 4.33	Pass
STW-5445 [j]	08/01/12	Am-241	0.64 ± 0.04	1.06	0.74 - 1.38	Fail

[a] Results are reported in units of Bq/kg (soil), Bq/L (water) or Bq/total sample (filters, vegetation).

[b] Laboratory codes as follows: STW (water), STAP (air filter), STSO (soil), STVE (vegetation).

[c] MAPEP results are presented as the known values and expected laboratory precision (1 sigma, 1 determination) and control limits as defined by the MAPEP. A known value of "zero" indicates an analysis was included in the testing series as a "false positive". MAPEP does not provide control limits.

[d] Investigation was inconclusive, there was not enough sample for reanalysis. ERA results (A-7) for the same matrix were acceptable.

[e] No errors found in calculation or procedure, original analysis result; 0.010 ± 0.010 Bq/filter.

[f] Reanalysis results were within limits, but low. ERA results (A-7) for the same matrix were acceptable. The efficiency factor was recalculated for the second round of MAPEP testing. Original analysis results 55.8 ± 12.6 Bq/L.

[g] Result of reanalysis; 6.74 ± 0.15 Bq/sample. Gamma emitters for the vegetation matrix exhibited a high bias, only Co-57 exceeded acceptance limits. Recounted using a geometry more closely matched to the MAPEP sample size.

[h] Result of reanalysis; 0.070 ± 0.013 Bq/filter.

[i] Result of reanalysis; 0.013 ± 0.005 pCi/filter. A larger sample size was used to reduce the counting error.

[j] Result of reanalysis 1.07 ± 0.06 pCi/L. The analyses of the MAPEP sample matrix resulted in recovery factors greater than 100%. A correction was made using recovery based on analysis of blank samples. A new tracer solution is on order, future samples for MAPEP testing will include batch spike and blank samples.

TABLE A-7. Interlaboratory Comparison Crosscheck program, Environmental Resource Associates (ERA)[a].

Lab Code [b]	Concentration (pCi/L) [b] Date	Analysis	Laboratory Result [c]	ERA Result [d]	Control Limits	Acceptance
ERAP-1393	03/19/12	Co-60	917.5 ± 7.0	880.0	681.0 - 1100.0	Pass
ERAP-1393	03/19/12	Cs-134	586.6 ± 7.4	656.0	417.0 - 814.0	Pass
ERAP-1393	03/19/12	Cs-137	1255.9 ± 9.4	1130.0	849.0 - 1480.0	Pass
ERAP-1393	03/19/12	Mn-54	< 3.4	0.0	-	Pass
ERAP-1393	03/19/12	Zn-65	1085.2 ± 18.0	897.0	642.0 - 1240.0	Pass
ERAP-1394	03/19/12	Am-241	86.9 ± 2.9	68.8	42.4 - 93.1	Pass
ERAP-1394	03/19/12	Pu-238	70.2 ± 3.6	63.2	43.3 - 83.1	Pass
ERAP-1394	03/19/12	Pu-239/40	66.0 ± 1.0	63.0	45.6 - 82.4	Pass
ERAP-1394	03/19/12	Sr-90	112.5 ± 15.4	89.6	43.8 - 134.0	Pass
ERAP-1394	03/19/12	U-233/4	43.4 ± 0.8	47.5	29.4 - 71.6	Pass
ERAP-1394	03/19/12	U-238	44.0 ± 1.2	47.1	30.4 - 65.1	Pass
ERAP-1394	03/19/12	Uranium	89.1 ± 2.2	96.7	53.5 - 147.0	Pass
ERAP-1396	03/19/12	Gr. Alpha	81.1 ± 1.5	77.8	26.1 - 121.0	Pass
ERAP-1396	03/19/12	Gr. Beta	68.4 ± 0.7	52.5	33.2 - 76.5	Pass
ERSO-1397	03/19/12	Ac-228	1303.4 ± 89.3	1570.0	1010.0 - 2180.0	Pass
ERSO-1397	03/19/12	Am-241	856.0 ± 123.7	938.0	549.0 - 1220.0	Pass
ERSO-1397	03/19/12	Bi-212	1379.2 ± 247.2	1550.0	413.0 - 2280.0	Pass
ERSO-1397	03/19/12	Bi-214	965.2 ± 38.4	1100.0	665.0 - 1590.0	Pass
ERSO-1397	03/19/12	Co-60	3693.6 ± 32.1	3500.0	2370.0 - 4820.0	Pass
ERSO-1397	03/19/12	Cs-134	2257.3 ± 45.4	2180.0	1420.0 - 2620.0	Pass
ERSO-1397	03/19/12	Cs-137	9444.5 ± 58.4	8770.0	6720.0 - 11300.0	Pass
ERSO-1397	03/19/12	K-40	11277.0 ± 275.1	11600.0	8470.0 - 15600.0	Pass
ERSO-1397	03/19/12	Mn-54	< 21.0	0.0	-	Pass
ERSO-1397	03/19/12	Pb-212	1208.4 ± 26.3	1510.0	992.0 - 2110.0	Pass
ERSO-1397	03/19/12	Pb-214	1041.6 ± 46.9	1110.0	647.0 - 1650.0	Pass
ERSO-1397	03/19/12	Pu-238	921.0 ± 112.6	984.0	592.0 - 1360.0	Pass
ERSO-1397	03/19/12	Pu-239/40	1028.0 ± 112.6	879.0	575.0 - 1210.0	Pass
ERSO-1397	03/19/12	Sr-90	8128.0 ± 329.0	8800.0	3360.0 - 13900.0	Pass
ERSO-1397	03/19/12	Th-234	2711.3 ± 253.6	2000.0	632.0 - 3760.0	Pass
ERSO-1397	03/19/12	U-233/4	1859.3 ± 126.6	1960.0	1200.0 - 2510.0	Pass
ERSO-1397	03/19/12	U-238	2003.3 ± 130.3	2000.0	1240.0 - 2540.0	Pass
ERSO-1397	03/19/12	Uranium	3939.5 ± 283.8	4030.0	2190.0 - 5320.0	Pass
ERSO-1397	03/19/12	Zn-65	4200.4 ± 65.9	3650.0	2910.0 - 4850.0	Pass

TABLE A-7. Interlaboratory Comparison Crosscheck program, Environmental Resource Associates (ERA)[a].

Lab Code [b]	Date	Analysis	Concentration (pCi/L) [b] Laboratory Result [c]	ERA Result [d]	Control Limits	Acceptance
ERVE-1400	03/19/12	Am-241	4194.8 ± 199.5	4540.0	2780.0 - 6040.0	Pass
ERVE-1400	03/19/12	Cm-244	1471.2 ± 113.1	1590.0	779.0 - 2480.0	Pass
ERVE-1400	03/19/12	Co-60	2347.8 ± 47.9	2210.0	1520.0 - 3090.0	Pass
ERVE-1400	03/19/12	Cs-134	2847.5 ± 64.0	2920.0	1880.0 - 3790.0	Pass
ERVE-1400	03/19/12	Cs-137	1503.5 ± 52.5	1340.0	972.0 - 1860.0	Pass
ERVE-1400	03/19/12	K-40	34105.7 ± 745.3	28600.0	20700.0 - 40100.0	Pass
ERVE-1400	03/19/12	Mn-54	< 26.8	0.0	-	Pass
ERVE-1400	03/19/12	Pu-238	2509.0 ± 213.6	2350.0	1400.0 - 3220.0	Pass
ERVE-1400	03/19/12	Pu-239/40	2690.4 ± 208.9	2570.0	1580.0 - 3540.0	Pass
ERVE-1400	03/19/12	Sr-90	7881.5 ± 470.8	8520.0	4860.0 - 11300.0	Pass
ERVE-1400	03/19/12	U-233/4	3149.6 ± 165.2	3610.0	2370.0 - 4640.0	Pass
ERVE-1400	03/19/12	U-238	3203.6 ± 166.5	3580.0	2390.0 - 4550.0	Pass
ERVE-1400	03/19/12	Uranium	6463.7 ± 363.2	7350.0	4980.0 - 9150.0	Pass
ERVE-1400	03/19/12	Zn-65	2701.9 ± 105.5	2310.0	1670.0 - 3240.0	Pass
ERW-1403	03/19/12	Am-241	119.9 ± 3.2	135.0	91.0 - 181.0	Pass
ERW-1403	03/19/12	Fe-55	713.7 ± 127.4	863.0	514.0 - 1170.0	Pass
ERW-1403	03/19/12	Pu-238	131.9 ± 6.4	135.0	99.9 - 168.0	Pass
ERW-1403	03/19/12	Pu-239/40	108.9 ± 10.2	112.0	86.9 - 141.0	Pass
ERW-1403	03/19/12	U-233/4	93.1 ± 7.9	105.0	78.9 - 135.0	Pass
ERW-1403	03/19/12	U-238	96.9 ± 5.5	104.0	79.3 - 128.0	Pass
ERW-1403	03/19/12	Uranium	190.0 ± 13.8	214.0	157.0 - 277.0	Pass
ERW-1405	03/19/12	Co-60	858.7 ± 5.6	875.0	760.0 - 1020.0	Pass
ERW-1405	03/19/12	Cs-134	560.4 ± 4.4	609.0	447.0 - 700.0	Pass
ERW-1405	03/19/12	Cs-137	1239.9 ± 7.4	1250.0	1060.0 - 1500.0	Pass
ERW-1405	03/19/12	Mn-54	< 7.4	0.0	-	Pass
ERW-1405	03/19/12	Sr-90	944.3 ± 26.2	989.0	644.0 - 1310.0	Pass
ERW-1405	03/19/12	Zn-65	786.9 ± 20.6	749.0	624.0 - 945.0	Pass
ERW-1406	03/19/12	Gr. Alpha	85.9 ± 3.0	103.0	36.6 - 160.0	Pass
ERW-1406	03/19/12	Gr. Beta	45.7 ± 1.6	43.7	25.0 - 64.7	Pass
ERW-1409	03/19/12	H-3	9045.0 ± 284.0	9150.0	6130.0 - 13000.0	Pass

[a] Results obtained by Environmental, Inc., Midwest Laboratory as a participant in the crosscheck program for proficiency testing administered by Environmental Resources Associates, serving as a replacement for studies conducted previously by the Environmental Measurements Laboratory Quality Assessment Program (EML).

[b] Laboratory codes as follows: STW (water), STAP (air filter), STSO (soil), STVE (vegetation). Results are reported in units of pCi/L, except for air filters (pCi/Filter), vegetation and soil (pCi/kg).

[c] Unless otherwise indicated, the laboratory result is given as the mean ± standard deviation for three determinations.

[d] Results are presented as the known values, expected laboratory precision (1 sigma, 1 determination) and control limits as provided by ERA. A known value of "zero" indicates an analysis was included in the testing series as a "false positive". Control limits are not provided.