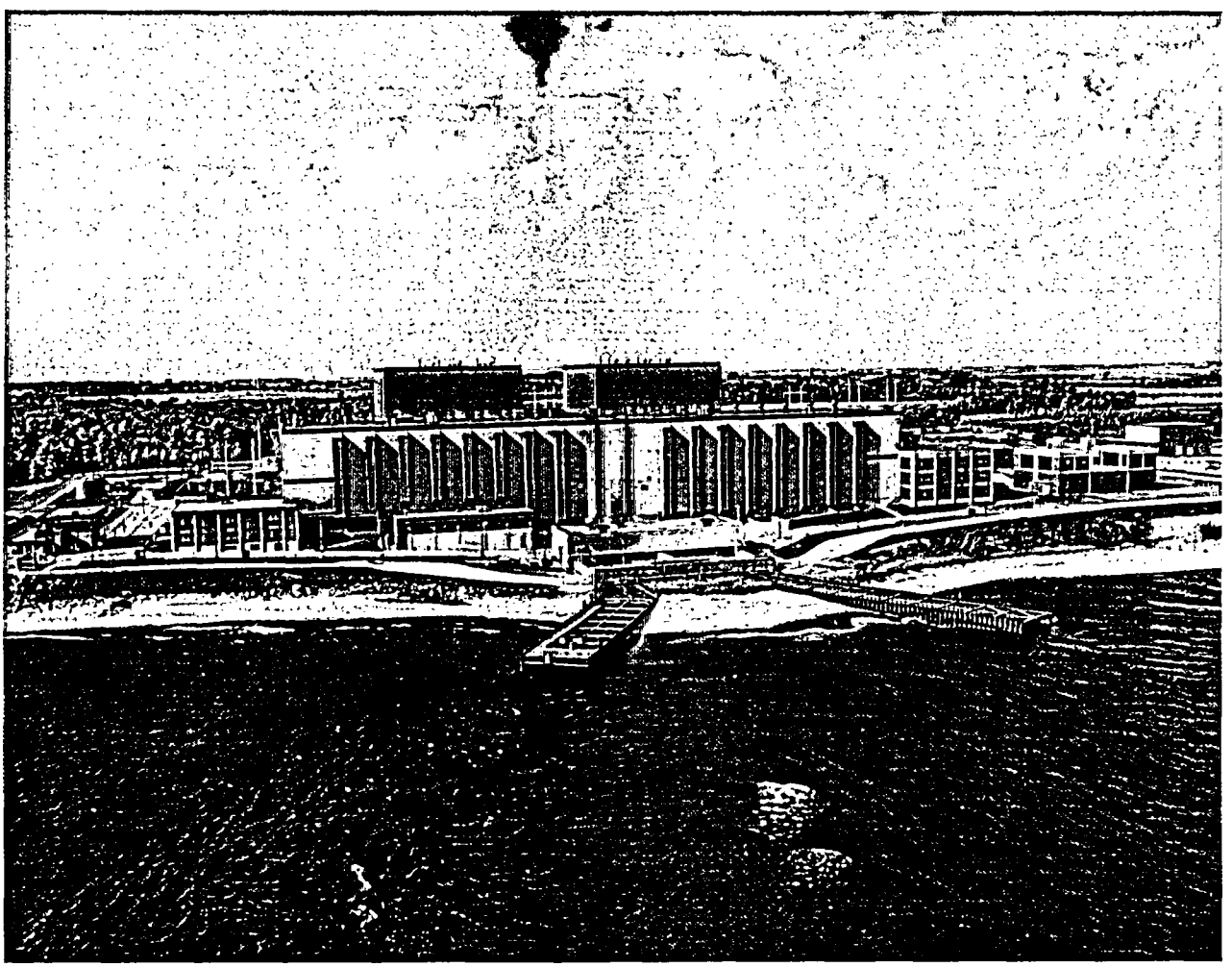
ANNUAL MONITORING REPORT 2004

NUCLEAR MANAGEMENT COMPANY, LLC
POINT BEACH NUCLEAR PLANT



January 1, 2004, through December 31, 2004
April 2005

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EXECUTIVE SUMMARY

This Annual Monitoring Report for the period of January 1, 2004, through December 31, 2004, 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. The report presents the results of effluent and environmental monitoring programs, solid waste shipments, non-radioactive chemical releases, and circulating water system operation.

During 2004, the following Curies (Ci) of radioactive material were released via the liquid and atmospheric pathways:

	Liquid	Atmospheric
Tritium (Ci)	608	60.5
Particulate (Ci)	0.023	0.000001
Noble Gas (Ci)	(-)	1.300

(-)Noble gases in the liquids are added to the atmospheric release totals.
Atmospheric particulate includes radioiodines in this table.

For the purpose of regulatory compliance with the effluent design objectives of Appendix I to 10 CFR 50, 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 millirad (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	0.0066 mrem	6 mrem
Organ dose	0.0066 mrem	20 mrem

ATMOSPHERIC RELEASES

Dose Category	Calculated Dose	Appendix I Dose
Organ dose	0.024 mrem	30 mrem
Noble gas beta air dose	0.00017 mrad	40 mrad
Noble gas gamma ray air dose	0.00041 mrad	20 mrad
Noble gas dose to the skin	0.00058 mrem	30 mrem
Noble gas dose to the whole body	0.00039 mrem	10 mrem

The results show that during 2004, the doses from PBNP effluents were a small percentage

(0.11% at the most) of the Appendix I design objectives and therefore operation of PBNP continues to be ALARA.

In addition to collecting and analyzing environmental samples, 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.

The 2004 Radiological Environmental Monitoring Program (REMP) collected 805 samples for radiological analyses and 116 sets of thermoluminescent dosimeters (TLDs) to measure ambient radiation in the vicinity of PBNP and the Independent Spent Fuel Storage Installation (ISFSI). Air monitoring from six different sites showed only background radioactivity from naturally occurring radionuclides. Terrestrial monitoring consisting of soil, vegetation, and milk found no influence from PBNP. Similarly, samples from the aquatic environment, consisting of lake and well water, fish, and algae, revealed no buildup of PBNP radionuclides released in liquid effluents. Therefore, these data show no plant effect on its environs.

As of December 2004, the ISFSI contained a total of 20 dry storage casks. Sixteen were the ventilated, vertical storage casks (VSC-24) from the previous years. During 2004, four new casks were transferred to the east side of the ISFSI. These were the 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 2004 confirms that the effluent control program at PBNP ensures that its operations minimally impact the environs.

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. 10 CFR 50.34a states that 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 PBNP 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.

Also operated at PBNP under the General License granted pursuant to 10 CFR 72.210 is an Independent Spent Fuel Storage Installation (ISFSI). The release of radioactive materials from the operation of the ISFSI must also comply with the limits of part 20 and the part 50 Appendix I design objectives. Per 10 CFR 72.44(d)(3), the results of radiological effluent monitoring are to be reported annually.* 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

* Holders of a Part 72 license are allowed to submit the report required by 72.44(d)(3) concurrent with the effluent report required by 10 CFR 50.36a (a)(2). (Reference: 64 FR 33178)

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.

2.0 RADIOACTIVE LIQUID RELEASES

The release path to the environment contributing to radioactive liquid releases is 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 2003 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)	0.0066	0.11 %
20 (any organ)	0.0066	0.03 %

2.2 2004 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.

2.3 2004 Isotopic Composition of Circulating Water Discharges

The isotopic composition of circulating water discharges during the current reporting period is presented in Table 2-3.

2.4 Subsoil Drain System Releases Tritium Summary

The quarterly and annual results of monitoring the subsoil drains are presented in Table 2-4. No tritium was observed in any of the drains during 2004.

2.5 Changes to the Waste Liquid Treatment System in 2004

There were no changes to the liquid waste treatment system in 2004.

Table 2-2
Summary of Circulating Water Discharge
January 1, 2004, through December 31, 2004

	Jan	Feb	Mar	Apr	May	Jun	Total Jan-Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total
Total Activity Released (Ci)														
Gamma Scan (+Fe-55)	1.45E-03	1.78E-03	1.52E-03	2.79E-03	3.68E-03	9.06E-03	2.03E-02	8.90E-04	3.65E-04	2.72E-04	2.55E-04	1.94E-04	3.97E-04	2.27E-02
Gross Alpha	5.63E-07	8.65E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E-06	7.46E-07	0.00E+00	0.00E+00	0.00E+00	2.95E-06	0.00E+00	5.12E-06
Tritium	1.97E+01	6.06E+01	4.73E+01	2.07E+01	9.32E+01	2.46E+01	2.66E+02	1.23E+01	4.54E+01	1.37E+01	7.74E+01	1.32E+02	6.11E+01	6.08E+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	2.76E+04	7.37E+04	1.04E+05	1.01E+05	1.41E+05	1.33E+05	5.80E+05	3.52E+04	4.58E+04	4.29E+04	3.92E+04	9.74E+04	4.97E+04	8.91E+05
Waste Water Effluent*	4.21E+06	3.78E+06	4.72E+06	3.75E+06	3.72E+06	4.18E+06	2.44E+07	4.05E+06	4.14E+06	4.12E+06	4.87E+06	5.07E+06	5.17E+06	5.18E+07
U1 SG Blowdown	2.66E+06	2.50E+06	2.67E+06	2.70E+05	0.00E+00	2.87E+06	1.10E+07	2.83E+06	2.38E+06	2.66E+06	2.59E+06	2.36E+06	2.61E+06	2.64E+07
U2 SG Blowdown	2.66E+06	2.51E+06	2.67E+06	2.59E+06	2.51E+06	2.51E+06	1.55E+07	2.68E+06	2.59E+06	2.27E+06	2.59E+06	2.38E+06	2.57E+06	3.05E+07
Total Gallons	9.55E+06	8.86E+06	1.02E+07	6.71E+06	6.37E+06	9.69E+06	5.14E+07	9.60E+06	9.15E+06	9.10E+06	1.01E+07	9.91E+06	1.04E+07	1.10E+08
Total cc	3.61E+10	3.35E+10	3.85E+10	2.54E+10	2.41E+10	3.67E+10	1.94E+11	3.63E+10	3.46E+10	3.44E+10	3.82E+10	3.75E+10	3.94E+10	4.15E+11
Vol of dilution water (cc)**	6.62E+13	6.20E+13	6.81E+13	5.95E+13	6.43E+13	1.01E+14	4.17E+14	1.15E+14	1.15E+14	1.10E+14	1.11E+14	9.61E+13	7.20E+13	1.04E+15
Avg diluted discharge conc (µCi/cc)														
Gamma Scan (+Fe-55)	2.33E-11	2.87E-11	2.24E-11	4.69E-11	5.72E-11	8.97E-11		7.74E-12	3.17E-12	2.47E-12	2.30E-12	2.01E-12	5.51E-12	
Gross Alpha	8.50E-15	1.40E-14	0.00E+00	0.00E+00	0.00E+00	0.00E+00		6.49E-15	0.00E+00	0.00E+00	0.00E+00	3.07E-14	0.00E+00	
Tritium	2.97E-07	9.79E-07	6.94E-07	3.48E-07	1.45E-06	2.43E-07		1.07E-07	3.95E-07	1.24E-07	6.96E-07	1.38E-06	8.49E-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 (µ l/cc)														
Tritium	2.11E-05	1.85E-05	1.33E-05	7.62E-06	4.19E-05	5.00E-06		5.04E-06	1.99E-05	6.26E-06	2.00E-05	2.01E-05	2.24E-05	
Gamma Scan (+Fe-55)	1.17E-09	8.84E-10	3.73E-10	1.55E-09	1.38E-09	2.43E-09		1.30E-10	1.83E-10	1.71E-10	3.17E-11	5.48E-11	9.25E-11	

* The Retention Pond was taken out of service in September 2002 and replaced with the waste water effluent filter system.
** Circulating water discharge from both units.

Note: The Dissolved noble gases detected in liquid effluents (e.g., Xe-133 and Xe-135) are added to the atmospheric release summaries.

Table 2-3
Isotopic Composition of Circulating Water Discharges (Cl)
January, 2004 through December 31, 2004

							Total							Total
Nuclide	Jan	Feb	Mar	Apr	May	Jun	Jan-Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan-Dec
H-3	1.97E+01	6.06E+01	4.73E+01	2.07E+01	9.32E+01	2.46E+01	2.66E+02	1.23E+01	4.54E+01	1.37E+01	7.74E+01	1.32E+02	6.11E+01	6.08E+02
F-18	2.26E-04	2.31E-04	7.66E-05	1.85E-04	0.00E+00	5.85E-05	7.78E-04	2.06E-04	0.00E+00	0.00E+00	1.48E-04	5.66E-05	1.13E-04	1.30E-03
Cr-51	3.49E-05	0.00E+00	0.00E+00	1.22E-05	1.26E-04	2.52E-04	4.25E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.25E-04
Mn-54	1.89E-05	2.02E-05	1.14E-05	1.16E-05	2.19E-05	1.86E-05	1.03E-04	1.19E-05	5.17E-06	0.00E+00	0.00E+00	1.74E-06	0.00E+00	1.21E-04
Fe-55	1.67E-04	4.47E-04	3.58E-04	3.56E-04	1.06E-03	8.08E-04	3.20E-03	4.40E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.07E-04	3.85E-03
Fe-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.83E-05	1.78E-05	5.61E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.61E-05
Co-57	0.00E+00	0.00E+00	8.63E-06	0.00E+00	1.56E-06	4.38E-07	1.06E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.06E-05
Co-58	5.56E-04	5.63E-04	3.60E-04	9.27E-04	8.18E-04	6.98E-04	3.92E-03	4.28E-05	1.76E-05	1.04E-04	5.95E-06	1.68E-05	1.27E-05	4.12E-03
Co-60	1.88E-04	2.20E-04	1.99E-04	1.89E-04	6.57E-04	2.15E-04	1.67E-03	1.66E-04	6.23E-05	1.32E-04	2.21E-05	4.10E-05	4.31E-05	2.13E-03
Zn-65	3.73E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.73E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.73E-06
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	1.27E-05	0.00E+00	1.27E-05
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
Nb-95	5.10E-05	2.95E-05	1.69E-05	3.13E-06	1.92E-05	5.37E-05	1.73E-04	0.00E+00	0.00E+00	7.10E-06	0.00E+00	2.56E-06	0.00E+00	1.83E-04
Nb-97	0.00E+00	0.00E+00	0.00E+00	2.39E-06	0.00E+00	3.98E-06	6.38E-06	0.00E+00	2.96E-06	0.00E+00	0.00E+00	3.53E-06	2.16E-06	1.50E-05
Zr-95	2.07E-05	0.00E+00	0.00E+00	0.00E+00	4.65E-06	2.72E-05	5.26E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.26E-05
Ag-110m	7.46E-05	8.24E-05	2.73E-05	1.72E-05	6.90E-05	1.85E-04	4.56E-04	9.02E-06	3.33E-05	2.85E-05	6.65E-06	7.12E-06	4.90E-06	5.45E-04
Sn-113	0.00E+00	4.53E-06	2.72E-06	0.00E+00	2.51E-05	0.00E+00	3.23E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.23E-05
Sn-117m	2.44E-05	3.20E-05	2.80E-05	3.85E-05	1.59E-04	9.03E-04	1.19E-03	0.00E+00	2.99E-05	0.00E+00	2.45E-05	4.09E-05	1.08E-05	1.29E-03
Sb-122	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
Sb-124	2.60E-05	4.16E-05	1.12E-04	3.02E-04	1.60E-04	1.10E-03	1.74E-03	0.00E+00	1.99E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.76E-03
Sb-125	5.90E-05	1.04E-04	3.21E-04	7.33E-04	5.00E-04	4.71E-03	6.43E-03	1.48E-05	1.91E-04	0.00E+00	4.82E-05	1.07E-05	0.00E+00	6.69E-03
I-131	0.00E+00	0.00E+00	2.50E-06	0.00E+00	0.00E+00	0.00E+00	2.50E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.50E-06
Te-132	0.00E+00	0.00E+00	0.00E+00	1.07E-05	0.00E+00	0.00E+00	1.07E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.07E-05
Cs-137	1.97E-06	4.89E-06	1.24E-06	1.04E-06	1.62E-05	3.99E-06	2.93E-05	0.00E+00	2.96E-06	0.00E+00	0.00E+00	0.00E+00	3.41E-06	3.57E-05

Note: The dissolved noble gases detected in liquid effluents (e.g., Xe-133, Xe-135, etc.) are added to the atmospheric release summaries.

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Table 2-4
Subsoil System Drains - Tritium Summary
January 1, 2004, through December 31, 2004

	S-1	S-3	S-7	S-8	S-9	S-10
1st Qtr						
H-3 (Ci)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Flow (gal)	1.77E+06	1.92E+05	4.18E+04	0.00E+00	0.00E+00	4.18E+05
2nd Qtr						
H-3 (Ci)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Flow (gal)	9.40E+05	2.64E+05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3rd Qtr						
H-3 (Ci)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Flow (gal)	2.23E+05	1.32E+05	1.08E+04	0.00E+00	0.00E+00	0.00E+00
4th Qtr						
H-3 (Ci)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Flow (gal)	1.79E+05	2.79E+05	0.00E+00	0.00E+00	0.00E+00	0.00E+00

2.6 Land Application of Sewage Sludge

The Wisconsin Department of Natural Resources has approved the disposal of PBNP sewage by land application on various Wisconsin Electric Power Company properties surrounding PBNP. This sewage sludge, which may contain trace amounts of radionuclides, are to be applied in accordance with methodologies approved by the NRC on January 13, 1988, pursuant to 10 CFR 20.302(a). The approved methodology requires analyses prior to every disposal. Based upon an investigation of the source of the radionuclides, a combination of engineering modifications and administrative controls has eliminated plant generated radiological inputs to the sewage. This was verified by sludge analyses using the environmental lower level of detection (LLD) criteria. No byproduct radionuclides were found in the sludge after the controls and modifications were completed. Sludge is routinely monitored and no radionuclides attributable to PBNP have been found.

There was no disposal of sewage by land application during 2004. All disposals were done at the Manitowoc Sewage Treatment Plant.

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, Drumming Area Vent Stack, Unit 1 Containment Purge Stack, and 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 maximum exposed individual (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, the locations of the exposure pathways (e.g., cow milk, vegetable gardens and residences), and usage factors (e.g., breathing rates, food consumption). In addition to the MEI doses, the energy deposited by beta particles and gamma rays in air 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 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 2004 are summarized in Table 3-2.

3.3 Isotopic Airborne Releases

The monthly isotopic airborne releases for 2004, from which the airborne doses were calculated, are presented in Table 3-3.

Table 3-1
Comparison of 2004 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	0.0238 mrem	7.93E-02
Noble gas	40 mrad (beta air)	0.000166 mrad	4.15E-04
Noble gas	20 mrad (gamma air)	0.000406mrad	2.03E-03
Noble gas	30 mrem/organ	0.000578 mrem	1.93E-03
Noble gas	10 mrem (whole body)	0.000386 mrem	3.86E-03

Table 3-2
Radioactive Airborne Effluent Release Summary
January 1, 2004, through December 31, 2004

							Total							
	Jan	Feb	Mar	Apr	May	Jun	J-Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Total NG from Liq (Ci)	3.53E-04	6.13E-03	1.70E-02	1.51E-03	4.11E-05	4.69E-04	2.55E-02	1.36E-04	8.52E-05	0.00E+00	4.31E-04	2.15E-03	1.12E-03	2.94E-02
Total Noble Gas (Ci)1	7.10E-02	1.15E-01	1.23E-01	1.21E-01	1.26E-01	7.77E-02	6.34E-01	8.10E-02	9.54E-02	9.71E-02	1.54E-01	8.43E-02	1.54E-01	1.30E+00
Total Radioiodines (Ci)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E-07	0.00E+00	1.85E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E-07
Total Particulates (Ci)2	0.00E+00	1.28E-10	1.17E-06	1.84E-08	1.39E-08	8.94E-12	1.20E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.20E-06
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	1.84E-08	1.39E-08	8.94E-12	3.23E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.23E-08
All Others (gamma) (Ci)	0.00E+00	1.28E-10	1.17E-06	0.00E+00	0.00E+00	0.00E+00	1.17E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.17E-06
Total Tritium (Ci)	3.87E+00	4.57E+00	3.79E+00	6.05E+00	6.45E+00	3.22E+00	2.79E+01	5.67E+00	3.61E+00	2.37E+00	6.94E+00	7.99E+00	6.02E+00	6.05E+01
Max Hourly Release (Ci/sec)	9.04E-08	1.09E-06	1.03E-07	6.03E-06	8.83E-07	2.03E-07	-	1.03E-07	1.43E-07	1.46E-07	1.41E-07	1.60E-07	8.21E-07	-

[1] Includes noble gas contribution from liquid releases.

[1] Total noble gas (airborne + liquid releases).
[2] Total Particulate is the sum of alpha, strontium, and others. It does not include radioiodines.

TABLE 3-3
Isotopic Composition of Airborne Releases
January 1, 2004 through December 31, 2004

	Jan	Feb	Mar	Apr	May	Jun	Semi-	Jul	Aug	Sep	Oct	Nov	Dec	Total
Nuclide	(Ci)	(Ci)	(Ci)	(Ci)	(Ci)	(Ci)	Annual	(Ci)	(Ci)	(Ci)	(Ci)	(Ci)	(Ci)	(Ci)
H-3	3.87E+00	4.57E+00	3.79E+00	6.05E+00	6.45E+00	3.22E+00	2.79E+01	5.67E+00	3.61E+00	2.37E+00	6.94E+00	7.99E+00	6.02E+00	6.05E+01
Ar-41	6.47E-02	8.51E-02	7.49E-02	4.55E-02	7.32E-02	6.28E-02	4.06E-01	6.28E-02	5.94E-02	5.01E-02	8.13E-02	6.93E-02	1.18E-01	8.47E-01
Kr-85m	0.00E+00	1.04E-04	0.00E+00	0.00E+00	1.98E-03	1.29E-04	2.21E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.17E-05	5.86E-04	2.84E-03
Kr-87	0.00E+00	2.58E-04	0.00E+00	0.00E+00	5.00E-03	3.34E-04	5.59E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.02E-04	1.58E-03	7.27E-03
Kr-88	0.00E+00	2.52E-04	0.00E+00	0.00E+00	5.51E-03	3.51E-04	6.11E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.95E-05	1.41E-03	7.62E-03
Xe-133	6.27E-03	2.66E-02	4.80E-02	7.48E-02	6.05E-04	9.42E-03	1.66E-01	1.76E-02	3.56E-02	4.65E-02	7.23E-02	1.37E-02	1.85E-02	3.70E-01
Xe-133m	0.00E+00	1.07E-04	2.53E-04	1.77E-04	0.00E+00	0.00E+00	5.37E-04	0.00E+00	0.00E+00	0.00E+00	4.24E-04	6.88E-06	0.00E+00	9.67E-04
Xe-135	4.51E-05	8.36E-04	2.54E-04	5.13E-05	1.08E-02	2.58E-03	1.46E-02	4.51E-04	4.30E-04	5.77E-04	2.43E-04	3.37E-04	3.08E-03	1.97E-02
Xe-135m	0.00E+00	3.72E-04	0.00E+00	0.00E+00	7.85E-03	5.92E-04	8.81E-03	1.36E-04	0.00E+00	0.00E+00	0.00E+00	1.91E-04	2.67E-03	1.18E-02
Xe-138	0.00E+00	1.24E-03	0.00E+00	0.00E+00	2.14E-02	1.50E-03	2.41E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.25E-04	7.90E-03	3.25E-02
F-18	0.00E+00	1.28E-10	1.17E-06	0.00E+00	0.00E+00	0.00E+00	1.17E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.17E-06
I-131	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E-07	0.00E+00	1.85E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E-07
Sr-90	0.00E+00	0.00E+00	0.00E+00	1.8381E-08	1.39E-08	8.94E-12	3.23E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.23E-08

Note: The Noble Gases listed above include the liquid contribution.

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 2004. No types C or D were 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

Type of Waste	Quantity	Activity
A. Spent resins, filter sludge, evaporator bottoms, etc.	18.12 m^3	64.64 Ci
	639.80 ft^3	
B. Dry compressible waste, contaminated equipment, etc	485.00 m^3	0.6500 Ci
	17131.50 ft^3	
C. Irradiated components, control rods, etc.	0.00 m^3	N/A Ci
	0.00 ft^3	
D. Other	0.00 m^3	N/A Ci
	0.00 ft^3	

4.2 Major Nuclide Composition (by Type of Waste)

The major radionuclide content of the 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.

Table 4-2
2004 Estimated Solid Waste Major Radionuclide Composition

TYPE A		TYPE B		TYPE C		TYPE D	
	Percent		Percent		Percent		Percent
Nuclide	Abundance	Nuclide	Abundance	Nuclide	Abundance	Nuclide	Abundance
Ni-63	50.41%	Co-60	32.41%				
Fe-55	20.20%	Ni-63	26.03%				
Co-58	14.30%	Fe-55	19.52%				
Co-60	10.43%	Co-58	11.04%				
H-3	2.42%	Cs-137	4.46%				
Sb-125	1.38%	Sb-125	1.55%				
Ni-59	0.30%	Nb-95	1.41%				
Cs-137	0.29%	Ag-110	1.26%				
Ag-110	0.11%	H-3	1.15%				
Tc-99	0.09%	C-14	0.28%				
Nb-95	0.02%	Pu-241	0.24%				
C-14	0.02%	Po-210	0.23%				
Sr-90	0.01%	Ni-59	0.15%				
		Sr-90	0.08%				
		Nb-94	0.07%				
		Pu-238	0.04%				
		Am-241	0.04%				
		Pu-239	0.02%				
		Cm-243	0.01%				

4.3 Solid Waste Disposition

There were 14 solid waste shipments from PBNP during 2004. The dates and destinations were:

Table 4-3
2004 PBNP Radioactive Waste Shipments

Date	Destination	Date	Destination
01/20/04	Erwin, TN		
01/27/04	Wampum, PA		
03/09/04	Wampum, PA		
03/31/04	Memphis, TN		
04/08/04	Oak Ridge, TN		
04/14/04	Memphis, TN		
04/21/04	Memphis, TN		
05/05/04	Memphis, TN		
05/11/04	Memphis, TN		
05/27/04	Oak Ridge, TN		
07/22/04	Wampum, PA		
08/18/04	Memphis, TN		
09/14/04	Wampum, PA		
12/20/04	Memphis, TN		

5.0 NONRADIOACTIVE CHEMICAL RELEASES

5.1 Scheduled Chemical Waste Releases

Scheduled chemical waste releases to the circulating water system from January 1, 2004, to June 30, 2004, included 6.32E+05 gallons of neutralized wastewater. The wastewater contained 7.71E+00 pounds of suspended solids and 5.26E+03 pounds of dissolved solids.

Scheduled chemical waste releases to the circulating water system from July 1, 2004, to December 31, 2004, included 5.85E+05 gallons of neutralized wastewater. The wastewater contained 3.01E+01 pounds of suspended solids and 5.61E+03 pounds 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, 2004, to June 30, 2004, included 2.44E+07 gallons of clarified wastewater. The wastewater contained 2.93E+03 pounds of suspended solids.

Miscellaneous chemical waste releases from the Wastewater Effluent (based on effluent analyses) to the circulating water for July 1, 2004, to December 31, 2004, included 2.74E+07 gallons of clarified wastewater. The wastewater contained 3.81E+03 pounds of suspended solids.

Miscellaneous chemical waste released directly to the circulating water, based on amount of chemicals used from January 1, 2004, to June 30, 2004, included 9.54E+04 pounds of sodium bisulfite and 2.46E+04 pounds of sodium hypochlorite.

Miscellaneous chemical waste released directly to the circulating water, based on amount of chemicals used from July 1, 2004, to December 31, 2004, included 1.38E+05 pounds of sodium bisulfite and 3.12E+04 pounds of sodium hypochlorite.

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 2004

	UNIT	JAN	FEB	MAR	APR	MAY	JUN
Average Volume Cooling	1	282.2	282.2	282.9	231.6	254.4	400.9
Water Discharge [million gal/day]**	2	282.2	282.2	297.9	492.3	466.1	491.9
Average Cooling Water	1	37	37	38	41	48	50
Intake Temperature [°F]	2	37	37	38	44	48	50
Average Cooling Water	1	69	69	70	56*	49*	64*
Discharge Temperature [°F]	2	72	72	71	64	66	70
Average Ambient Lake Temperature [°F]		39	41	44	50	54	55

*Unit 1 shutdown from Apr 3 - June 7, 2004.
** For days with cooling water discharge flow.

Table 6-1(continued)
Circulating Water System Operation for 2004

	UNIT	JUL	AUG	SEP	OCT	NOV	DEC
Average Volume Cooling	1	489.6	489.6	486.1	490.4	489.2	306.5
Water Discharge [million gal/day]**	2	489.6	489.6	486.1	457.4	357.1	306.2
Average Cooling Water	1	60	58	57	51	46	38
Intake Temperature [°F]	2	60	56	55	51	46	38
Average Cooling Water	1	80	76	74	71	66	68
Discharge Temperature [°F]	2	80	76	75	71	69	70
Average Ambient Lake Temperature [°F]		66	61	60	57	52	44

** 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 PBNP Offsite Dose Calculation Manual was revised during 2004.

Editorial changes to the ODCM consisted of redefining program responsibilities, correcting labels on a figure, clarifying alarm setpoint guidelines, and correcting a typo.

A complete copy is included with this AMR submittal.

7.2 Interlaboratory Comparison Program

Environmental, Inc, Midwest Laboratory, the analytical laboratory contracted to perform the radioanalyses of the PBNP environmental samples, participated in the interlaboratory comparison studies administered by Environmental Resources Associates during 2004. Environmental, Inc., Midwest Laboratory also participated in the Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP) and the Environmental Measurements Laboratory (EML) Quality Assessment Program. The results of these comparisons can be found in Appendix A of the AMR.

7.3 Special Circumstances

No special circumstances report regarding operation of the explosive gas monitor for the waste gas holdup system was needed during 2004.

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 this end, the REMP collects and analyzes air, water, milk, soil, vegetation, and fish samples for radionuclides and uses TLDs to determine the ambient radiation background. 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 Appendix A to 10 CFR 50, and Sections IV.B.2 and IV.B.3 of Appendix I to 10 CFR 50 for the operation of the plant. Therefore, the REMP collects samples from various environmental media in order to provide data on measurable levels of radiation and radioactive materials in the principal pathways of environmental exposure.

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, thermoluminescent dosimeters (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; where as analysis of fish and filamentous algae yield concentrations 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 PBNP to analyze the environmental samples is directed to report analysis results as measured by a detector, which can meet the required lower level of detection (LLD) as specified in Table 2-2 of the Environmental Manual for each sample. The report provided by the vendor (see the Appendix) contains values, which can be either negative, positive or zero plus/minus the two sigma counting uncertainty, which provides the 95% confidence level for the measured value.

The lower limit of detection (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 five percent 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, when applicable, the statistical parameters (i.e., average, standard deviation) presented in this report. Negative averages are reported as ND.

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 (e.g., nearby, downwind, or down stream) and at control locations (e.g., distant, upwind, or upstream). 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 is indicated in Fig. 9-3). The PBNP REMP sampling sites used to determine environmental impact around the ISFSI are 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 deviations from the scheduled sampling and frequency, which 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 in order to confirm the results from the PBNP REMP. As a courtesy to the State of Wisconsin, PBNP personnel also collect certain environmental samples (Table 9-6) for the State from sites, which are near PBNP sampling sites or are co-located. The results of the State monitoring program are available from the Radiation Protection Unit of the Wisconsin Department of Health and Family Services.

9.5 Program Modifications

No program modifications were made during 2004.

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, -TC	TLD	Quarterly
Vegetation	E-01, -02, -03, -04, -06, -08, -09, -20,	Gross Beta	3x/yr as available
		Gamma Isotopic Analysis	
Algae	E-05, -12	Gross Beta	3x/yr as available
		Gamma Isotopic Analysis	
Fish	E-13	Gross Beta	3x/yr as available
		Gamma Isotopic Analysis (Analysis of edible portions only)	
Well Water	E-10	Gross Beta, H-3	Quarterly
		Sr-89, 90, I-131	
		Gamma Isotopic Analysis (on total solids)	
Lake Water	E-01, -05, -06, -33	Gross Beta	Monthly / Quarterly composite of monthly collections
		I-131	Monthly
		Gamma Isotopic Analysis (on total solids)	Monthly
Milk	E-11, -40, -21	Sr-89, 90	Monthly
		I-131	
		Gamma Isotopic Analysis	
Air Filters	E-01, -02, -03, -04, -08, -20	Gross Beta	Weekly (particulate)
		I-131	Weekly (charcoal)
		Gamma Isotopic Analysis	Quarterly (on composite particulate filters)
Soil	E-01, -02, -03, -04, -06, -08, -09, -20,	Gross Beta	2x/yr
		Gamma Isotopic Analysis	
Shoreline Sediment	E-01, -05, -06, -12, -33,	Gross Beta	2x/yr
		Gamma Isotopic Analysis	
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-40	Local Dairy Farm, W side of Hwy 42, about 1.8 miles north of the Nuclear Rd intersection
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-TC	Transportation Control; Reserved for TLDs

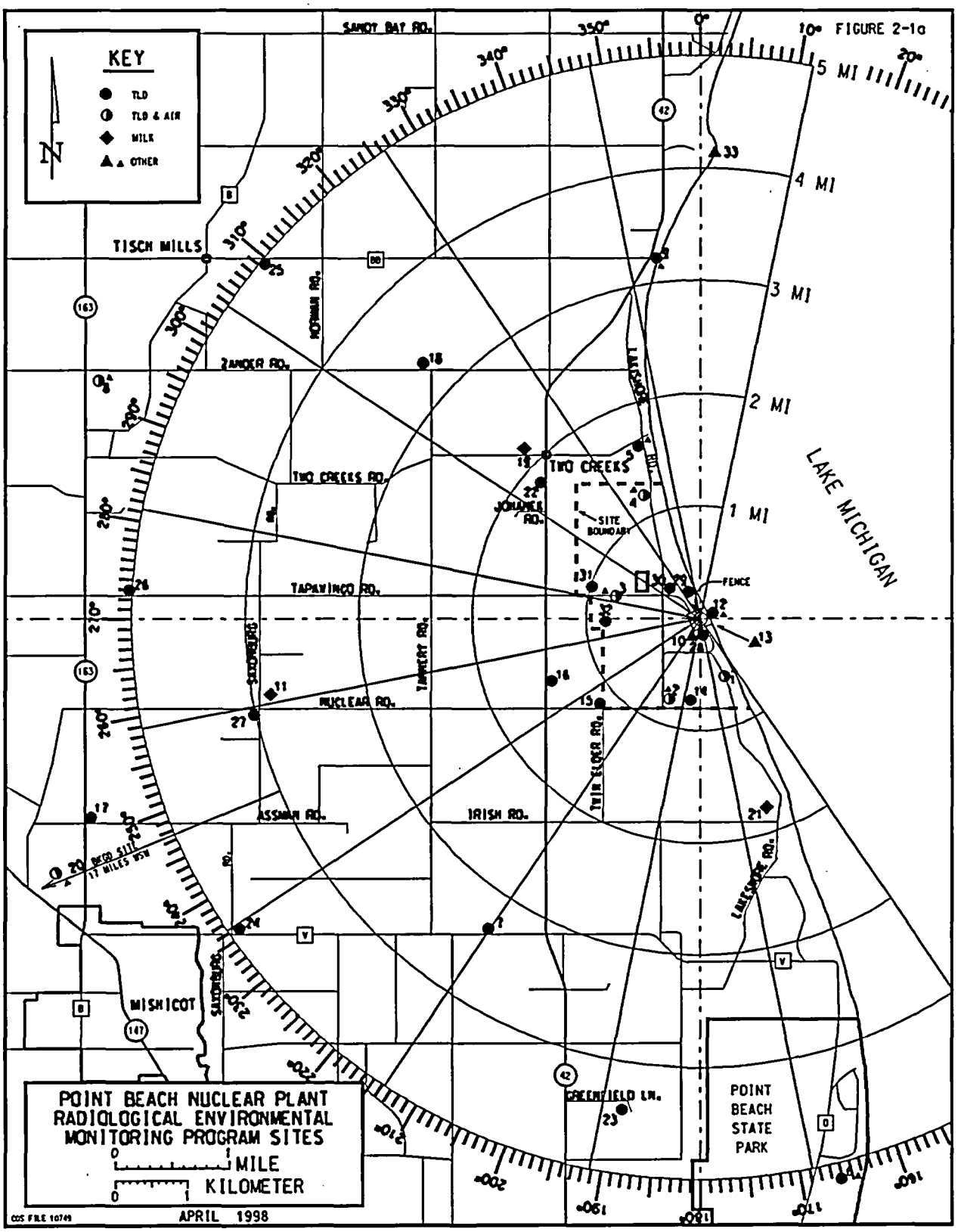


Figure 9-1
PBNP REMP Sampling Sites

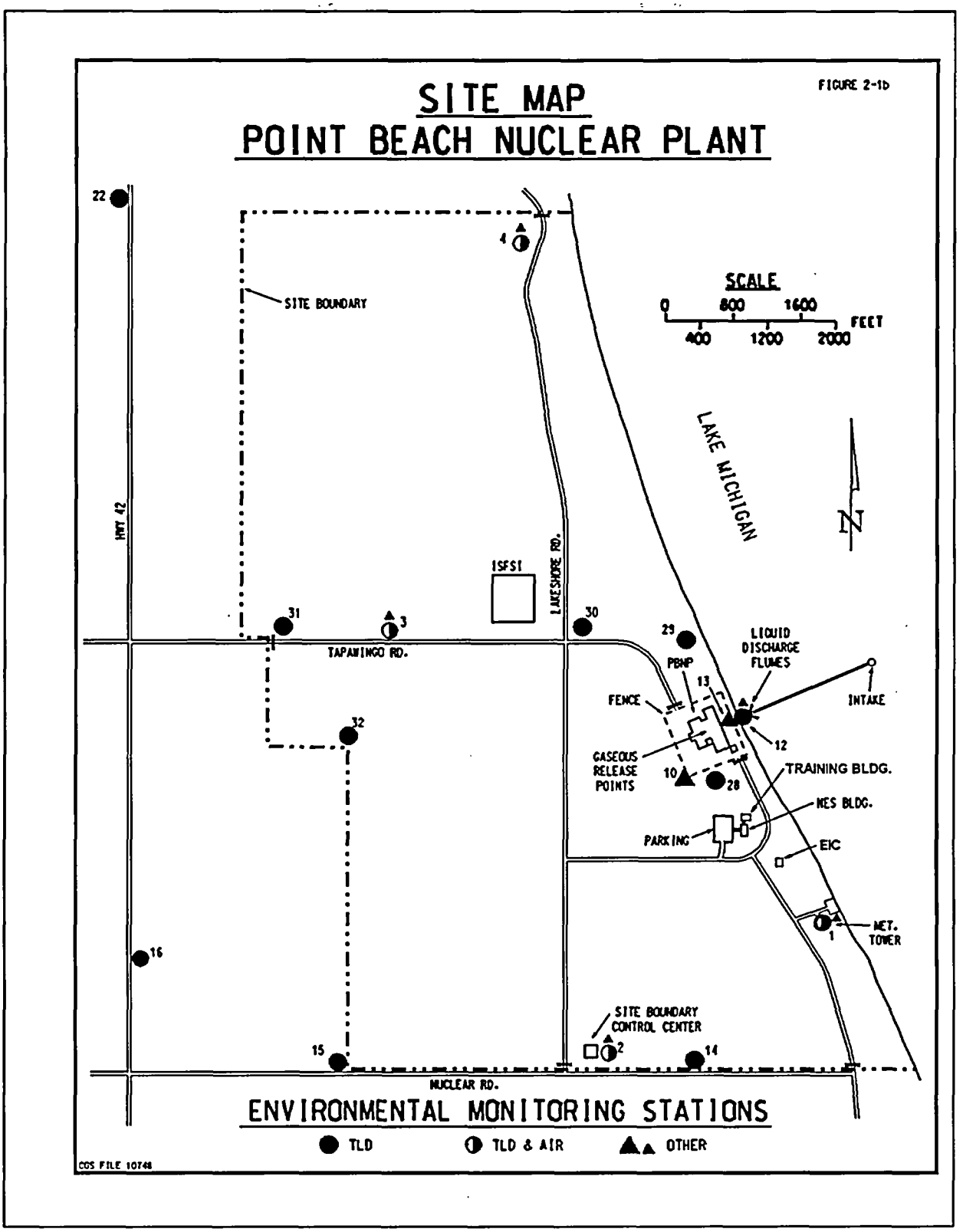


Figure 9-2
Map of REMP Sampling Sites Located Around PBNP

FIGURE 2-1C

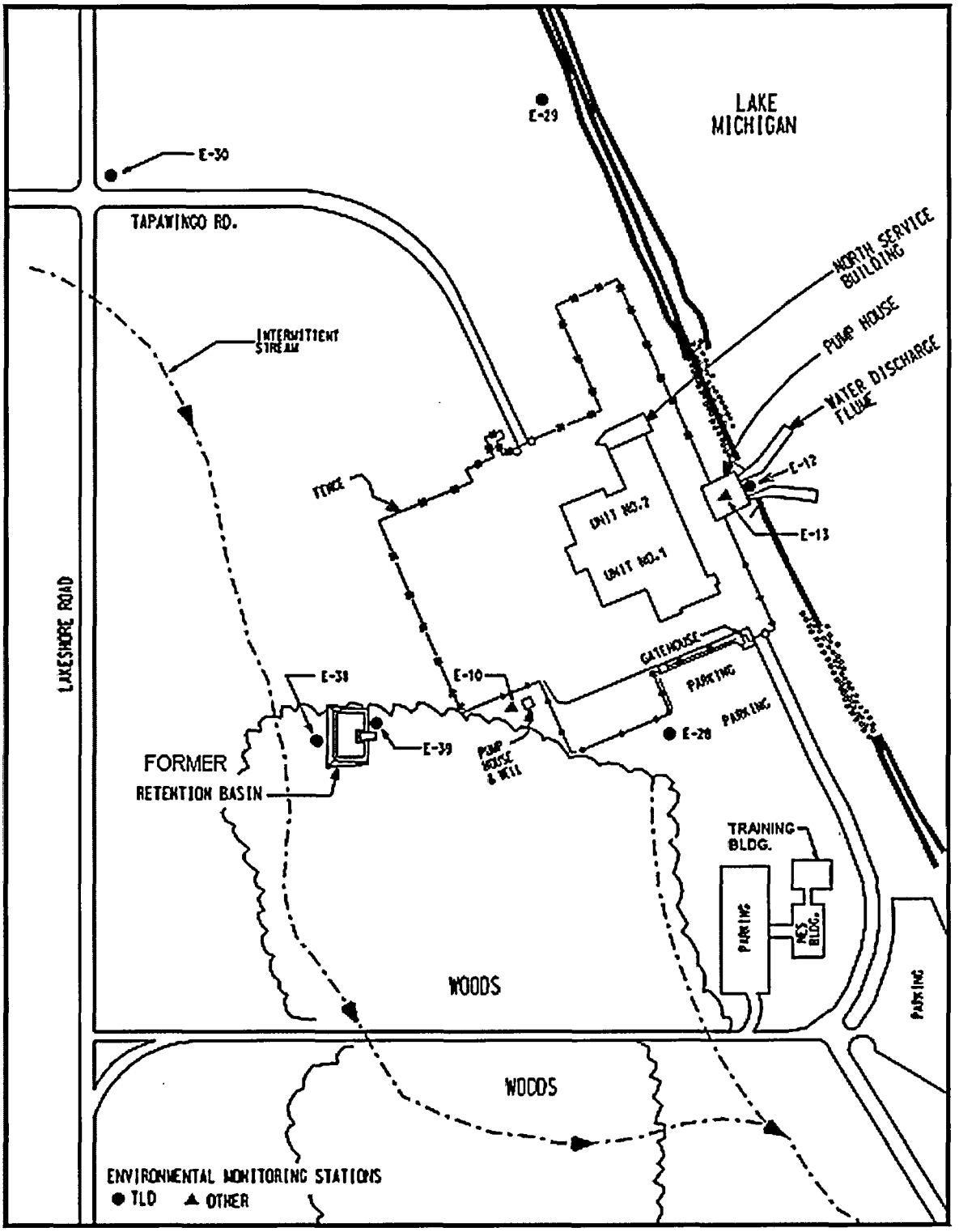


Figure 9-3
Enhanced Map Showing REMP Sampling Sites Closest to PBNP

Table 9-3
ISFSI Sampling Sites

Ambient Radiation Monitoring (TLD)	Soil, Vegetation, and Airborne Monitoring
E-03	E-02
E-28	E-03
E-30	E-04
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
LW	E-01, E-05, E-06, E-33	2/15/2004	Sample unavailable due to ice.	Ice conditions are not controlable. Samples missed due to environmental conditions are expected and is so noted in Section 2.2.6 of the Environmental Manual.
AP/AI	E-02 E-04	3/10/2004 7/28/2004	Sample unavailable due to loss of power to the pump The sampling volume could not be quantified.	Power loss at E-02 continues from 2002. Evaluations continue to determine the cause(s) so that corrections can be made. Power failure at E-04

Table 9-6
Sample Collections for State of Wisconsin

Sample Type	Location	Frequency
Lake Water	E-01	Weekly, Composited 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 2004.

9.7 Brief 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, any other nuclear power plant produced radionuclides, which are detected, also are noted. Naturally occurring radionuclides such as Ra-226, Bi-214, Pb-212, Tl-208, Ac-228, Be-7, and K-40 are frequently detected in soil, sediment, and vegetation but are not normally reported in this Annual Monitoring Report. All other radionuclides detected by gamma isotopic analysis are decay corrected to the time of collection.

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 surveying 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 and gamma isotopic analytical results for water are obtained by measurements on the solids remaining after evaporation of the unfiltered sample to dryness. Hence, the results are indicated as "on total solids" in Table 10-1.

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 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 filters are counted as soon as possible so the I-131 will undergo only minimal decay prior to analyses.

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 any dirt associated with roots by cutting the vegetation off above the soil line.

9.7.6 Environmental Radiation Exposure

Environmental radiation exposure measurements taken in 2004 were performed with thermoluminescent dosimeter (TLD) cards. The TLDs absorb the energy deposited in them by gamma rays. The TLD card is a small passive detector, which integrates exposure through the use of a crystalline phosphorus material, calcium sulfate containing dysprosium. Each TLD consists of a single Teflon sheet coated with calcium sulfate, which is read in four distinct areas to yield four values of exposure. This dosimeter design provides exposure information by averaging the four measured values. Prior to the third quarter of 2001, previous years' data were collected with TLDs that consisted of three lithium fluoride chips sealed in black plastic. The difference in material types can impact the amount of exposure measured. As seen in the 2001, the Environmental Inc. TLD cards typically produce a slightly higher measured exposure value, although within the uncertainty of that value recorded by the TLD chips.

The reported field exposure is the arithmetic average of the four exposure values obtained minus the 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.

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

Summary of 2004 REMP Results

Radiological environmental monitoring conducted at PBNP from January 1, 2004, through December 31, 2004, 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 in Table 10-1.

Table 10-1 contains the following information:

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

Table 10-2 contains the ISFSI fence TLD results.

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 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 complete 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 the Appendix.

Table 10-1
Summary of Radiological Environmental Monitoring Results for 2004

Sample	Description	N	LLD (a)	Average ± Standard Deviation (b)	High ± 2 sigma	Units
TLD	Environmental Radiation	112	1 mrem	1.10 ± 0.22	1.68 ± 0.1	mR/7days
	Control (E-20)	4	1 mrem	1.06 ± 0.14	1.19 ± 0.12	mR/7days
Air	Gross Beta	258	0.01	0.021 ± 0.008	0.045 ± 0.005	pCi/m3
	Control (E-20) Gross beta	52	0.01	0.022 ± 0.008	0.043 ± 0.004	pCi/m3
	I-131	258	0.030 (0.07)	0.0005 ± 0.0070	0.018 ± 0.007	pCi/m3
	Control (E-20) I-131	52	0.030 (0.07)	0.0007 ± 0.0075	0.017 ± 0.007	pCi/m3
	Cs-134	24	0.05	0.0003 ± 0.0003	0.0009 ± 0.0006	pCi/m3
	Cs-137	24	0.06	0.0002 ± 0.0004	0.0007 ± 0.0006	pCi/m3
	Other gamma emitters	24	0.1	0.0001 ± 0.0005	0.0014 ± 0.0009	pCi/m3
Milk	Sr-89	36	5	ND	-	pCi/L
	Sr-90	36	1	1.1 ± 0.4	2.1 ± 0.6	pCi/L
	I-131	36	0.5	ND	-	pCi/L
	Cs-134	36	5 (15)	0.6 ± 1.3	2.7 ± 2.3	pCi/L
	Cs-137	36	5 (15)	0.9 ± 1.7	5.5 ± 2.1	pCi/L
	Ba-La-140	36	5 (15)	ND	-	pCi/L
	Other gamma emitters	36	15	0.4 ± 1.2	2.8 ± 2.5	pCi/L
Well	Gross beta	3	4	7.0 ± 8.4	16.5 ± 2.2	pCi/L
Water	H-3	3	500 (3000)	36.3 ± 65	110.8 ± 88.9	pCi/L
	Sr-89	3	10	ND	-	pCi/L
	Sr-90	3	1 (2)	ND	-	pCi/L
	I-131	3	0.5 (2)	ND	-	pCi/L
	Mn-54	3	10 (15)	ND	-	pCi/L
	Fe-59	3	30	ND	-	pCi/L
	Co-58	3	15	ND	-	pCi/L
	Co-60	3	15	ND	-	pCi/L
	Zn-65	3	30	ND	-	pCi/L
	Zr-Nb-95	3	15	ND	-	pCi/L
	Cs-134	3	15	ND	-	pCi/L
	Cs-137	3	18	ND	-	pCi/L
	Ba-La-140	3	15	ND	-	pCi/L
	Other gamma emitters	3	30	ND	-	pCi/L
Algae	Gross beta	6	0.25	4.43 ± 1.14	5.15 ± 0.91	pCi/g
	Co-58	6	0.25	0.015 ± 0.014	0.021 ± 0.017	pCi/g
	Co-60	6	0.25	0.006 ± 0.013	0.027 ± 0.024	pCi/g
	Cs-134	6	0.25	ND	-	pCi/g
	Cs-137	6	0.25	0.018 ± 0.007	0.024 ± 0.016	pCi/g

(a) The required LLD per the PBNP REMP is enclosed in the parentheses.
(b) "ND" indicates that the sample result is Not Detectable, i.e., sample concentrations were statistically equivalent to zero.

Table 10-1 (continued)
Summary of Radiological Environmental Monitoring Results for 2004

Sample	Description	N	LLD (a)	Average ± Standard Deviation (b)	High ± 2 sigma	Units
Lake Water	Gross beta	44	4	2.8 ± 1.0	7.3 ± 0.8	pCi/L
	I-131	44	0.5 (2)	ND	-	pCi/L
	Mn-54	44	10 (15)	0.4 ± 1.5	3.9 ± 3.3	pCi/L
	Fe-59	44	30	ND	-	pCi/L
	Co-58	44	15	ND	-	pCi/L
	Co-60	44	15	0.3 ± 1.4	2.7 ± 2.3	pCi/L
	Zn-65	44	30	ND	-	pCi/L
	Zr-Nb-95	44	15	0.2 ± 1.6	3.2 ± 3	pCi/L
	Cs-134	44	10 (15)	0.1 ± 1.7	2.8 ± 2.4	pCi/L
	Cs-137	44	10 (18)	0.1 ± 1.2	1.8 ± 1.3	pCi/L
	Ba-La-140	44	15	ND	-	pCi/L
	Ru-103 (Other gamma)	44	30	ND	-	pCi/L
	Sr-89	16	5	ND	-	pCi/L
	Sr-90	16	1 (2)	0.61 ± 0.26	1.12 ± 0.62	pCi/L
	H-3	16	500 (3000)	187 ± 273	1186 ± 126	pCi/L
Fish	Gross beta	10	0.5	3.63 ± 0.99	5.77 ± 0.13	pCi/g
	Mn-54	10	0.13	0.004 ± 0.005	0.007 ± 0.005	pCi/g
	Fe-59	10	0.26	0.009 ± 0.022	0.032 ± 0.028	pCi/g
	Co-58	10	0.13	ND	-	pCi/g
	Co-60	10	0.13	ND	-	pCi/g
	Zn-65	10	0.26	ND	-	pCi/g
	Cs-134	10	0.13	ND	-	pCi/g
	Cs-137	10	0.15	0.044 ± 0.020	0.074 ± 0.026	pCi/g
	Other gamma emitters	10	0.5	ND	-	pCi/g
Shoreline Sediment	Gross beta	10	2	9.01 ± 1.94	12.15 ± 1.45	pCi/g
	Cs-137	10	0.15	0.022 ± 0.014	0.058 ± 0.021	pCi/g
Soil	Gross beta	16	2	24.31 ± 5.47	31.25 ± 2.89	pCi/g
	Cs-137	16	0.15	0.14 ± 0.1	0.43 ± 0.05	pCi/g
Vegetation	Gross beta	24	0.25	5.65 ± 1.22	8.25 ± 0.20	pCi/g
	I-131	24	0.06	0.000 ± 0.001	0.020 ± 0.009	pCi/g
	Cs-134	24	0.06	0.000 ± 0.007	0.010 ± 0.008	pCi/g
	Cs-137	24	0.08	0.005 ± 0.009	0.020 ± 0.014	pCi/g
	Other gamma emitters	24	0.06	0.003 ± 0.007	0.035 ± 0.017	pCi/g

(a) The required LLD per the PBNP REMP is enclosed in the parentheses.

(b) "ND" indicates that the sample result is Not Detectable, i.e., sample concentrations were statistically equal to zero.

Table 10-2
ISFSI Fence TLD Results for 2004

Fence Location	Average ± Standard Deviation
North	2.61 ± 0.16 mR/7 days
East	2.12 ± 0.11 mR/7 days
South	1.41 ± 0.06 mR/7 days
West	6.50 ± 0.39 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 of the indicator TLD cards is 1.10 mR/7-days and 1.06 mR/7-days at the control location. These results are not significantly different from each other nor from those observed from 1993 through 2003 (tabulated below in Table 11-1). A change in TLD types accounts for the increase in average TLD readings (i.e., prior to third quarter 2001 TLD chips were used versus the TLD cards – see section 9.7.6 for additional information). Therefore, the operation of the plant has had no effect on the ambient gamma radiation.

Table 11-1
Average Indicator TLD Results from 1993 – 2003

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

*St. Dev = Standard Deviation

The annual ISFSI fence TLD results listed in Table 11-2 show the anticipated slow trend upward due to the cask additions each year (one added in January, one in December 2002, one in December 2003, and four in 2004). The North and

West fence TLDs continue to record higher doses than the South and East fence TLDs (see Table 11-2) corresponding to the location of the storage units at the NW corner of the site. Compared to the background site (E-20), most of the indicator sites for the ISFSI (Table 11-3) show increases within the expected statistical variation. Compared to the results at the background site, E-20, only a minimal increase in ambient gamma radiation at or beyond the site boundary due to the operation of the ISFSI is indicated.

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

	Sampling Site			
	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

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

	E-03	E-28	E-30	E-31**	E-32**	E-20***
Pre-Operation*	0.93	0.87	0.81	0.93	0.98	0.88
1996	0.87	0.78	0.79	0.93	1.00	0.78
1997	0.91	0.89	0.84	0.89	0.97	0.79
1998	0.82	0.68	0.82	0.91	0.85	0.77
1999	0.88	0.83	0.80	0.90	0.99	0.78
2000	0.98	0.88	0.99	0.98	1.06	0.90
2001	1.31	0.95	1.02	1.10	1.04	1.03
2002	1.45	0.91	1.10	1.26	1.25	1.14
2003	1.29	0.82	1.02	1.20	1.15	0.99
2004	1.35	0.80	1.05	1.23	1.18	1.06

*Pre-Operation data is the averages of the years 2/92 through 3/95.
**Sites E-31 and E-32 are located at the Site Boundary to the West and South-West of the ISFSI, respectively.
***E-20 is located approximately 17 miles WSW of the ISFSI.

11.2 Milk

Except for Sr-90, the annual average radionuclide concentrations in milk continue to be statistically not different from zero. The few statistically positive, individual monthly results for Ba/La-140 (6 of 36), Cs-134 (5 of 36), and Cs-137 (8 of 36) are attributed to statistical variations in the analyses of radioactive materials because PBNP did not emit any of these radionuclides to the atmosphere in 2004. by. The Sr-90 concentrations result from the cycling of this radionuclide in the biosphere after the large-scale atmospheric weapons tests of the '50s, '60s, and '70s and the Chernobyl accident. Although these test also introduced Cs-137 into the environment, Cs-137 binds more strongly to soils and therefore less likely to get into cows and milk. Although minute amounts of Sr-90 were emitted by PBNP in 2004 (see Table 3-3), the 2004 Sr-90 average (1.1 ± 0.4 pCi/l) is identical to previous years: 1.1 ± 0.4 in 2003, 1.1 ± 0.7 in 2002, 1.2 ± 0.5 in 2001, 1.2 ± 0.6 in 2000, pCi/L, 1.0 ± 0.3 in 1999, 1.1 ± 0.5 in 1998, and 1.2 ± 0.5 in 1997. These results are common throughout the Great Lakes region and North America. Therefore, it is concluded that the milk data for 2004 show no radiological effects of the plant operation.

11.3 Air

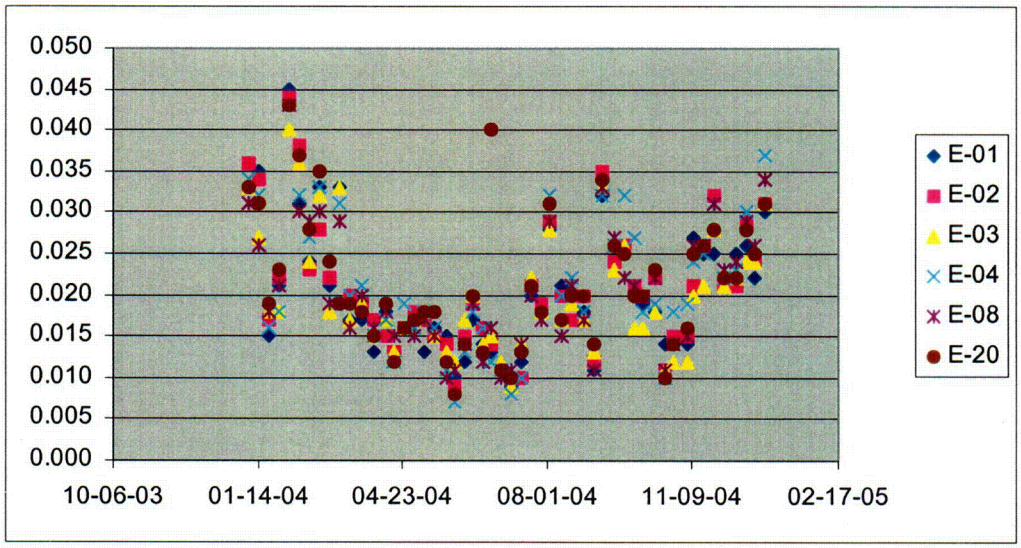
The average annual gross beta concentrations (plus/minus the one-sigma uncertainty) in weekly airborne particulates at the indicator and control locations were 0.021 ± 0.008 pCi/m^3 and 0.022 ± 0.008 pCi/m^3, respectively, and are similar to levels observed from 1993 through 2003 (Table 11-4).

Table 11-4
Average Gross Beta Measurements in Air

Year	Average (pCi/m^3)
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

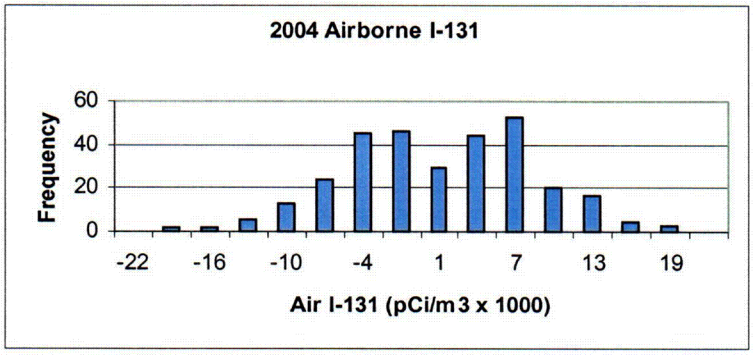
Examination of the gross beta concentration variation over the year reveals higher concentrations in the Fall and Winter as compared to the Spring and Summer (Figure 11-1). This annual pattern is found throughout the region and is indicative of the different air masses and environmental conditions during the year which contribute long-lived, naturally-occurring radionuclides.

Figure 11-1
2004 Airborne Gross Beta Concentration (pCi/m^3) vs. Time



Measured airborne I-131 concentrations continue exhibit small positive and negative values clustered around zero (Figure 11-2) with only 70 of the 310 individual analyses (23%) being statistically greater than zero. Although the

Figure 11-2
2004 Airborne I-131 Concentration Frequency



In Figure 11-2 x-axis number represents the upper bound of a range. For example, "1" indicates the range -1 to +1, -10 indicates the range -12 to -10, etc.

distribution is not as symmetrically distributed around zero as in previous years, this I-131 distribution is attributed to the statistical variation expected when making measurements of a sample with no I-131. Supporting this conclusion is that the 70 positive, non-zero values are distributed fairly uniformly throughout the year whereas PBNP emitted airborne I-131 only in May of 2004 when only six positive I-131 values were obtained. One of the six occurrences was at the background sampling site where no I-131 should be found. Therefore, it is concluded that the May release of airborne I-131 had no measurable impact on the environment

Gamma spectroscopic analysis of quarterly composites of air particulate filters yielded similar results for indicator and control locations. Neither the indicator nor control locations show results, which on average are significantly different than zero. Be-7, a naturally occurring radionuclide, was measured in quarterly composites of all samples with an average of 0.060 pCi/m^3. This is comparable to the average of 0.059 pCi/m^3 at the control site. Naturally occurring radionuclides are not required to be measured by the PBNP REMP, however, quantification of such nuclides serve as a means to monitor the internal consistency of the vendor's analytical program.

In summary, the air data for 2004 demonstrate the operation of PBNP did not have an impact on the surrounding environment.

11.4 Lake Water

For the suite of REMP-specified gamma emitting radionuclides, reported concentrations continue to occur as small negative and positive values scattered around zero, indicating no radiological impact from the operation of PBNP. Aliquots of the monthly samples are composted quarterly and analyzed for Sr-89/90 and for tritium. Sr-90 still persists in Lake Michigan from radioactive fallout. Tritium, in addition to being produced by water-cooled reactors such as PBNP, also is a naturally occurring radionuclide. The lake water samples collected and analyzed in 2004 for H-3 range from ND (non-detectable) to 1186 pCi/L (4^{th} quarter) at a site north of PBNP. Because typical H-3 values are in the range of 100-300 pCi/l, the individual months of Oct. - Dec. were analyzed for tritium and the following results obtained: Oct., 208 ± 68; Nov., 3208 ± 179; and Dec., 145 ± 95. The 3208 pCi/l value is 0.32% of the effluent limit of 10 CFR 20, Appendix B, Table 2. Based on PBNP liquid discharge records, we conclude that the November 2004 tritium concentration result from sampling soon after a liquid discharge. These results indicate a minimal impact upon the waters of Lake Michigan.

11.5 Algae

Filamentous algae attached to rocks along the Lake Michigan shoreline are known to concentrate radionuclides from the water with concentration factor over a thousand for certain radionuclides. Small, positive concentrations of Cs-137, and Co-58/60 were found. Typically, the only fission product observed is Cs-137 with averages over years 1995–2003 of 0.034, 0.050, 0.030, 0.027, 0.031, 0.027, 0.019, 0.019, and 0.010; all of which are less than the LLD (0.25 pCi/g). Likewise, no observations above the LLD were made in 2004, although small positive values for Cs-137 as well as Co-58/60 occurred. The occurrence of Cs-137 in the environment can also be attributed to the fallout of events from the past such as weapons testing and events like Chernobyl. Massive resuspension events due to wind stress redistribute Cs-137 throughout Lake Michigan and make the Cs-137 more available to the algae. These events are visible on satellite photographs of the Lake. In 1976 after a Chinese weapons test, Cs-137 concentrations in algae reached 1.2 pCi/g. The concentrations of the naturally occurring radionuclides Be-7 and K-40 in the algae continue to be 10 and 100 times higher, respectively, than Cs-137 and Co-58/60. Because PBNP released small amount of these latter radionuclides during the year, these results may be the result of plant activities. However, because the results are below the LLD, the results also could represent the expected distribution of analytical results around zero expected from the statistical nature of radioactive decay when the specific radionuclide is either not present or present in amount well below the LLD. If the cesium and cobalt concentrations result from PBNP effluents, then the algae data indicate only a minor effect in the vicinity of PBNP during 2004.

11.6 Fish

No specified fission/corrosion radionuclide concentrations in fish greater than the required LLD were found in 2004. Low levels of Mn-54, Fe-59, and Co-58 were found in 3 of 10 fish sampled during the year. Although PBNP released these radionuclides during the year, Zn-65 and Co-60 which PBNP also released were not found, it is unlikely that the Mn-54, Fe-59, and Co-58 few positive results represent analytical fluctuations due to the statistical nature of radioactivity. Statistically positive Cs-137 concentrations were found in 9 of the 10 fish. The highest Cs-137 value of 0.074 pCi/g is considerably less than the high of 2.8 pCi/g as seen in PBNP samples obtained in the mid-1970s during the Chinese weapons tests. The Cs-137 results are consistent with accumulation due to the recycling of atmospheric weapons testing fallout Cs-137 in Lake Michigan. The concentration of naturally occurring K-40 is about 50-100 times higher than the highest Cs-137 concentration. There is no indication of a plant effect.

11.7 Well Water

All of the isotopic well water results are less than the required LLD. Except for one tritium value, no specific radionuclides were detected. The one positive H-3 value is determined to be a false positive because of the impermeable geological stratum which separates the surface ground water from the aquifer from which the well water is obtained. The results indicate that PBNP effluents are not getting into the aquifer supplying drinking water to PBNP.

11.8 Soil

Cs-137 from weapons testing and the Chernobyl accident fallout continue to be present in soil samples at about 1% of the levels of naturally occurring K-40. As seen in the following table the average gross beta result is not significantly different from those values observed in the past. There is no indication of a plant effect.

Table 11-5
Average Gross Beta Concentrations in Soil

Year	Activity (pCi/g)
1993	23.6
1994	19.4
1995	18.0
1996	19.4
1997	22.8
1998	20.0
1999	23.1
2000	22.1
2001	23.5
2002	21.9
2003	22.5
2004	24.3

11.9 Shoreline Sediment

Shoreline sediment consists of beach 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 and its concentration (pCi/g) is at 1% or less of the naturally occurring concentrations of K-40. The Cs-137

concentrations of the shoreline sediment are about one-tenth of that found in soils. The shoreline sediment data indicate no radiological effects of the plant operation.

11.10 Vegetation

Although the naturally occurring radionuclides Be-7 and K-40 are found in all of the vegetation samples, the programmatically specified radionuclides are all below the required LLD. The Be-7 and K-40 concentrations are about 100 times higher than the Cs-137 concentrations which are found only in 3 of the 24 samples. None of the annual average concentrations are different from zero. The 2004 sampling results give no indication of a plant effect.

11.11 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 Point Beach Nuclear Plant site boundary was completed on August 11, 2004, to ensure that the milk sampling locations remain as conservative as practicable. No significant change in the use of pasturelands was noted. Therefore, the existing milk-sampling program continues to be acceptable.

12.0 REMP CONCLUSION

Based on the analytical results from the 805 environmental samples and from 116 sets of TLDs that comprised the PBNP REMP for 2004, PBNP effluents had no discernable, permanent effect on the surrounding environs. These results demonstrate that PBNP continues to have good controls on fuel integrity and on the waste processing. The control of effluents from PBNP continues to be acceptable pursuant to the ALARA criteria of 10 CFR 50.34a.

APPENDIX A

Environmental, Inc. Midwest Laboratory
Final Report for the Pont Beach Nuclear Plant
Reporting Period: January – December 2004

Environmental, Inc.
Midwest Laboratory
an Allegheny Technologies Co.

700 Landwehr Road • Northbrook, IL 60062-2310
(847) 564-0700 fax (847) 564-4517

FINAL REPORT
TO
WISCONSIN ELECTRIC POWER COMPANY
MILWAUKEE, WISCONSIN

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

PREPARED AND SUBMITTED
BY
ENVIRONMENTAL, INC., MIDWEST LABORATORY

Project Number: 8006

Reporting Period: January-December, 2004

Reviewed and
Approved by _____ Date 02-02-2005
B. Grob
Laboratory Manager

Distribution: K. Johansen

POINT BEACH NUCLEAR PLANT

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POINT BEACH NUCLEAR PLANT

1.0 INTRODUCTION

The following constitutes the current Monthly Progress Report for the Environmental Radiological Monitoring Program conducted at the Point Beach Nuclear Plant, Two Rivers, Wisconsin. Results of completed analyses are presented in the attached tables. Missing entries indicate analyses that are not completed. These results will appear in subsequent reports. 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.

Data obtained in the program are well within the ranges previously encountered in the program and to be expected in the environmental media sampled. None of the media sampled during the current month contained radioactivity attributable to the operation of Point Beach Nuclear Plant.

For all gamma isotopic analyses, the spectrum is computer scanned 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.

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

Dashes in the "Required LLD" column signify that LLD for specific isotope is not required by Point Beach Nuclear Power Plant.

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

POINT BEACH NUCLEAR PLANT

1.0 INTRODUCTION

The following constitutes the final 2004 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.

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.

POINT BEACH NUCLEAR PLANT

2.0 LISTING OF MISSED SAMPLES

Sample Type	Location	Expected Collection Date	Reason
LW	E-01, 05, 06, E-33	February '04	Samples not sent.
AP/AI	E-02	3/10/2004	Sampler not running.
AP/AI	E-04	7/28/2004	Power failure at sampler.

NOTE: Page 3 is intentionally left out.

POINT BEACH NUCLEAR PLANT

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
01-07-04	369	0.033 ± 0.003	-0.001 ± 0.004
01-15-04	355	0.035 ± 0.003	-0.002 ± 0.005
01-21-04	263	0.015 ± 0.003	-0.002 ± 0.005
01-28-04	298	0.021 ± 0.004	0.001 ± 0.005
02-04-04	307	0.045 ± 0.004	0.007 ± 0.006
02-11-04	319	0.031 ± 0.004	0.001 ± 0.005
02-19-04	372	0.024 ± 0.003	-0.010 ± 0.004
02-26-04	277	0.033 ± 0.004	-0.001 ± 0.007
03-03-04	325	0.021 ± 0.003	0.007 ± 0.005
03-10-04	321	0.033 ± 0.003	0.010 ± 0.006
03-18-04	369	0.017 ± 0.003	0.006 ± 0.005
03-26-04	370	0.017 ± 0.003	0.010 ± 0.004
04-03-04	371	0.013 ± 0.003	0.003 ± 0.005
1st Quarter Mean± s.d.		0.026 ± 0.010	0.002 ± 0.006
04-11-04	378	0.018 ± 0.003	0.006 ± 0.004
04-17-04	276	0.013 ± 0.004	0.001 ± 0.006
04-24-04	315	0.016 ± 0.003	-0.006 ± 0.005
05-01-04	329	0.017 ± 0.003	0.001 ± 0.005
05-08-04	326	0.013 ± 0.003	0.004 ± 0.005
05-15-04	322	0.016 ± 0.003	0.008 ± 0.005
05-23-04	372	0.015 ± 0.003	-0.002 ± 0.004
05-29-04	267	0.010 ± 0.003	0.001 ± 0.006
06-05-04	333	0.012 ± 0.002	-0.009 ± 0.004
06-11-04	282	0.017 ± 0.004	0.011 ± 0.007
06-17-04	270	0.014 ± 0.003	0.008 ± 0.006
06-23-04	278	0.013 ± 0.003	-0.005 ± 0.006
06-30-04	320	0.011 ± 0.003	-0.007 ± 0.005
2nd Quarter Mean± s.d.		0.014 ± 0.002	0.001 ± 0.006

Date Collected	Vol. (m^3)	Gross Beta	I-131
Required LLD		0.010	0.030
07-07-04	330	0.009 ± 0.002	-0.004 ± 0.004
07-14-04	326	0.012 ± 0.003	-0.006 ± 0.005
07-21-04	315	0.020 ± 0.003	0.008 ± 0.005
07-28-04	322	0.018 ± 0.003	-0.002 ± 0.005
08-03-04	264	0.028 ± 0.004	-0.007 ± 0.006
08-11-04	343	0.021 ± 0.003	0.005 ± 0.005
08-18-04	298	0.017 ± 0.003	-0.002 ± 0.006
08-26-04	342	0.018 ± 0.003	0.004 ± 0.005
09-02-04	300	0.011 ± 0.003	0.007 ± 0.006
09-08-04	255	0.032 ± 0.004	-0.002 ± 0.007
09-16-04	300	0.024 ± 0.003	0.006 ± 0.005
09-23-04	342	0.026 ± 0.004	0.006 ± 0.005
09-30-04	301	0.021 ± 0.003	-0.005 ± 0.006
3rd Quarter Mean± s.d.		0.020 ± 0.007	0.001 ± 0.005
10-06-04	260	0.019 ± 0.003	0.012 ± 0.006
10-14-04	341	0.018 ± 0.003	0.001 ± 0.005
10-21-04	296	0.014 ± 0.003	0.002 ± 0.006
10-27-04	259	0.015 ± 0.004	-0.009 ± 0.007
11-05-04	385	0.014 ± 0.002	0.001 ± 0.004
11-10-04	212	0.027 ± 0.005	-0.002 ± 0.008
11-17-04	298	0.025 ± 0.004	0.002 ± 0.005
11-24-04	299	0.025 ± 0.003	0.014 ± 0.005
12-01-04	299	0.022 ± 0.003	-0.011 ± 0.005
12-09-04	341	0.025 ± 0.003	-0.003 ± 0.005
12-16-04	302	0.026 ± 0.003	0.014 ± 0.006
12-22-04	257	0.022 ± 0.004	-0.012 ± 0.007
12-29-04	296	0.030 ± 0.003	0.013 ± 0.005
4th Quarter Mean± s.d.		0.022 ± 0.005	0.002 ± 0.009
Cumulative Average		0.020 ± 0.008	0.001 ± 0.007

POINT BEACH NUCLEAR PLANT

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
01-07-04	345	0.036 ± 0.003	0.005 ± 0.005
01-15-04	343	0.034 ± 0.003	0.005 ± 0.005
01-21-04	263	0.017 ± 0.003	0.005 ± 0.006
01-28-04	299	0.022 ± 0.004	-0.004 ± 0.006
02-05-04	345	0.044 ± 0.004	0.002 ± 0.005
02-11-04	259	0.038 ± 0.005	0.006 ± 0.007
02-19-04	346	0.023 ± 0.003	-0.004 ± 0.005
02-26-04	260	0.028 ± 0.004	0.001 ± 0.006
03-03-04	305	0.022 ± 0.003	0.006 ± 0.005
03-10-04		ND[a]	
03-18-04	345	0.020 ± 0.003	-0.008 ± 0.004
03-26-04	346	0.019 ± 0.003	-0.013 ± 0.005
04-03-04	346	0.017 ± 0.003	0.003 ± 0.005
1st Quarter Mean± s.d.		0.027 ± 0.009	0.000 ± 0.006
04-11-04	354	0.015 ± 0.003	-0.005 ± 0.004
04-17-04	258	0.013 ± 0.004	0.007 ± 0.006
04-24-04	294	0.016 ± 0.003	0.008 ± 0.005
05-01-04	307	0.018 ± 0.003	0.010 ± 0.005
05-08-04	305	0.017 ± 0.003	0.003 ± 0.005
05-15-04	301	0.015 ± 0.003	-0.001 ± 0.005
05-23-04	347	0.014 ± 0.003	0.008 ± 0.005
05-29-04	250	0.009 ± 0.003	0.006 ± 0.007
06-05-04	311	0.015 ± 0.003	0.006 ± 0.005
06-11-04	263	0.019 ± 0.004	0.009 ± 0.006
06-17-04	253	0.016 ± 0.003	0.001 ± 0.007
06-23-04	260	0.014 ± 0.003	0.011 ± 0.006
06-30-04	300	0.011 ± 0.003	-0.004 ± 0.006
2nd Quarter Mean± s.d.		0.015 ± 0.003	0.005 ± 0.005

Date Collected	Vol. (m^3)	Gross Beta	I-131
Required LLD		0.010	0.030
07-07-04	309	0.010 ± 0.002	0.002 ± 0.006
07-14-04	296	0.010 ± 0.003	0.007 ± 0.005
07-21-04	303	0.021 ± 0.004	0.002 ± 0.005
07-28-04	293	0.019 ± 0.003	0.005 ± 0.005
08-03-04	241	0.029 ± 0.004	0.007 ± 0.006
08-11-04	325	0.020 ± 0.003	0.011 ± 0.005
08-18-04	283	0.017 ± 0.003	0.007 ± 0.006
08-26-04	335	0.020 ± 0.003	0.002 ± 0.005
09-02-04	293	0.012 ± 0.003	-0.010 ± 0.005
09-08-04	251	0.035 ± 0.004	0.011 ± 0.006
09-16-04	294	0.024 ± 0.003	0.005 ± 0.006
09-23-04	336	0.026 ± 0.004	0.001 ± 0.005
09-30-04	294	0.021 ± 0.003	0.005 ± 0.006
3rd Quarter Mean± s.d.		0.020 ± 0.007	0.004 ± 0.005
10-06-04	256	0.020 ± 0.004	0.008 ± 0.006
10-14-04	333	0.022 ± 0.003	-0.003 ± 0.005
10-21-04	291	0.011 ± 0.003	0.005 ± 0.005
10-27-04	254	0.015 ± 0.004	0.008 ± 0.007
11-05-04	374	0.015 ± 0.002	-0.018 ± 0.004
11-10-04	214	0.021 ± 0.005	-0.005 ± 0.007
11-17-04	289	0.026 ± 0.004	-0.007 ± 0.006
11-24-04	294	0.032 ± 0.004	-0.005 ± 0.006
12-01-04	302	0.021 ± 0.003	-0.015 ± 0.006
12-09-04	346	0.021 ± 0.003	-0.001 ± 0.005
12-16-04	306	0.029 ± 0.003	0.004 ± 0.005
12-22-04	268	0.024 ± 0.004	-0.020 ± 0.008
12-29-04	301	0.031 ± 0.003	0.005 ± 0.006
4th Quarter Mean± s.d.		0.022 ± 0.006	-0.003 ± 0.009
Cumulative Average		0.021 ± 0.008	0.001 ± 0.007

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

POINT BEACH NUCLEAR PLANT

Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131.
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
01-07-04	346	0.033 ± 0.003	0.001 ± 0.005
01-15-04	343	0.027 ± 0.003	-0.001 ± 0.005
01-21-04	261	0.018 ± 0.003	0.006 ± 0.006
01-28-04	308	0.018 ± 0.003	0.006 ± 0.004
02-05-04	338	0.040 ± 0.004	0.007 ± 0.004
02-11-04	259	0.036 ± 0.004	-0.015 ± 0.007
02-19-04	347	0.024 ± 0.003	0.006 ± 0.005
02-26-04	260	0.032 ± 0.004	-0.004 ± 0.006
03-03-04	304	0.018 ± 0.003	0.004 ± 0.005
03-10-04	300	0.033 ± 0.003	-0.001 ± 0.005
03-18-04	345	0.017 ± 0.003	-0.012 ± 0.005
03-26-04	345	0.019 ± 0.003	0.006 ± 0.005
04-03-04	346	0.015 ± 0.003	-0.003 ± 0.005
1st Quarter Mean± s.d.		0.025 ± 0.009	0.000 ± 0.007
04-11-04	354	0.017 ± 0.003	-0.005 ± 0.004
04-17-04	258	0.013 ± 0.004	0.011 ± 0.007
04-24-04	293	0.016 ± 0.003	-0.003 ± 0.006
05-01-04	308	0.017 ± 0.003	0.003 ± 0.006
05-08-04	304	0.018 ± 0.003	0.002 ± 0.006
05-15-04	301	0.015 ± 0.003	-0.001 ± 0.006
05-23-04	347	0.013 ± 0.003	-0.003 ± 0.004
05-29-04	250	0.012 ± 0.004	0.003 ± 0.006
06-05-04	311	0.017 ± 0.003	-0.005 ± 0.005
06-11-04	263	0.020 ± 0.004	0.005 ± 0.006
06-17-04	253	0.014 ± 0.003	0.009 ± 0.006
06-23-04	260	0.015 ± 0.003	-0.007 ± 0.007
06-30-04	300	0.012 ± 0.003	0.005 ± 0.006
2nd Quarter Mean± s.d.		0.015 ± 0.002	0.001 ± 0.006
07-07-04	308	0.009 ± 0.002	0.001 ± 0.005
07-14-04	304	0.014 ± 0.003	0.016 ± 0.005
07-21-04	295	0.022 ± 0.004	-0.006 ± 0.006
07-28-04	352	0.018 ± 0.003	-0.012 ± 0.005
08-03-04	258	0.028 ± 0.004	0.003 ± 0.006
08-11-04	347	0.017 ± 0.003	0.001 ± 0.004
08-18-04	302	0.019 ± 0.003	-0.002 ± 0.006
08-26-04	345	0.017 ± 0.003	-0.001 ± 0.005
09-02-04	302	0.013 ± 0.003	0.001 ± 0.006
09-08-04	258	0.033 ± 0.004	0.003 ± 0.007
09-16-04	304	0.023 ± 0.003	0.005 ± 0.005
09-23-04	345	0.026 ± 0.004	-0.006 ± 0.005
09-30-04	304	0.016 ± 0.003	0.002 ± 0.005
3rd Quarter Mean± s.d.		0.020 ± 0.007	0.000 ± 0.007
10-06-04	263	0.016 ± 0.003	-0.006 ± 0.007
10-14-04	346	0.018 ± 0.003	-0.001 ± 0.004
10-21-04	297	0.011 ± 0.002	-0.006 ± 0.006
10-27-04	262	0.012 ± 0.003	0.002 ± 0.007
11-05-04	386	0.012 ± 0.002	-0.011 ± 0.004
11-10-04	220	0.020 ± 0.004	-0.021 ± 0.008
11-17-04	298	0.021 ± 0.004	0.008 ± 0.005
11-24-04	303	0.028 ± 0.003	-0.009 ± 0.005
12-01-04	303	0.021 ± 0.003	0.001 ± 0.006
12-09-04	344	0.022 ± 0.003	0.001 ± 0.005
12-16-04	306	0.024 ± 0.003	-0.004 ± 0.006
12-22-04	260	0.024 ± 0.004	0.015 ± 0.006
12-29-04	300	0.031 ± 0.004	-0.003 ± 0.006
4th Quarter Mean± s.d.		0.020 ± 0.006	-0.003 ± 0.008
Cumulative Average		0.020 ± 0.007	0.000 ± 0.007

POINT BEACH NUCLEAR PLANT

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
01-07-04	346	0.034 ± 0.003	-0.001 ± 0.005
01-15-04	344	0.032 ± 0.003	0.000 ± 0.005
01-21-04	260	0.016 ± 0.003	0.011 ± 0.005
01-28-04	308	0.018 ± 0.003	-0.005 ± 0.005
02-05-04	339	0.043 ± 0.004	0.004 ± 0.005
02-11-04	259	0.032 ± 0.004	0.006 ± 0.007
02-19-04	346	0.027 ± 0.003	0.010 ± 0.004
02-26-04	261	0.033 ± 0.004	0.001 ± 0.006
03-03-04	303	0.019 ± 0.003	0.005 ± 0.006
03-10-04	300	0.031 ± 0.003	0.002 ± 0.006
03-18-04	347	0.020 ± 0.003	-0.010 ± 0.005
03-26-04	343	0.021 ± 0.003	0.005 ± 0.005
04-03-04	346	0.015 ± 0.003	-0.008 ± 0.005
1st Quarter Mean± s.d.		0.026 ± 0.009	0.002 ± 0.006
04-11-04	354	0.017 ± 0.003	0.007 ± 0.004
04-17-04	258	0.012 ± 0.004	0.003 ± 0.006
04-24-04	294	0.019 ± 0.003	-0.009 ± 0.005
05-01-04	308	0.016 ± 0.003	0.006 ± 0.006
05-08-04	304	0.018 ± 0.003	0.001 ± 0.006
05-15-04	301	0.016 ± 0.003	0.002 ± 0.005
05-23-04	347	0.011 ± 0.003	-0.002 ± 0.004
05-29-04	250	0.007 ± 0.003	-0.012 ± 0.006
06-05-04	311	0.013 ± 0.003	-0.008 ± 0.006
06-11-04	263	0.018 ± 0.004	-0.009 ± 0.006
06-17-04	253	0.016 ± 0.003	0.009 ± 0.006
06-23-04	260	0.012 ± 0.003	-0.008 ± 0.005
06-30-04	300	0.011 ± 0.003	-0.005 ± 0.005
2nd Quarter Mean± s.d.		0.014 ± 0.004	-0.002 ± 0.007

Date Collected	Vol. (m^3)	Gross Beta	I-131
Required LLD		0.010	0.030
07-07-04	308	0.008 ± 0.002	0.001 ± 0.005
07-14-04	295	0.010 ± 0.003	-0.008 ± 0.006
07-21-04	306	0.020 ± 0.003	0.007 ± 0.005
07-28-04			ND[a]
08-03-04	236	0.032 ± 0.004	0.017 ± 0.007
08-11-04	319	0.020 ± 0.003	0.007 ± 0.006
08-18-04	286	0.022 ± 0.004	0.002 ± 0.007
08-26-04	328	0.018 ± 0.003	0.003 ± 0.006
09-02-04	287	0.011 ± 0.003	0.000 ± 0.006
09-08-04	245	0.032 ± 0.004	0.010 ± 0.006
09-16-04	289	0.026 ± 0.003	-0.003 ± 0.005
09-23-04	327	0.032 ± 0.004	0.006 ± 0.005
09-30-04	289	0.027 ± 0.004	0.005 ± 0.006
3rd Quarter Mean± s.d.		0.022 ± 0.009	0.004 ± 0.006
10-06-04	250	0.018 ± 0.003	-0.002 ± 0.007
10-14-04	328	0.019 ± 0.003	-0.002 ± 0.006
10-21-04	284	0.010 ± 0.003	-0.006 ± 0.006
10-27-04	249	0.018 ± 0.004	0.018 ± 0.007
11-05-04	366	0.019 ± 0.003	-0.001 ± 0.004
11-10-04	210	0.024 ± 0.005	-0.009 ± 0.008
11-17-04	302	0.025 ± 0.004	0.006 ± 0.005
11-24-04	307	0.031 ± 0.004	-0.011 ± 0.006
12-01-04	306	0.022 ± 0.003	-0.005 ± 0.005
12-09-04	339	0.023 ± 0.003	-0.007 ± 0.005
12-16-04	290	0.030 ± 0.004	-0.008 ± 0.006
12-22-04	248	0.026 ± 0.004	-0.002 ± 0.006
12-29-04	284	0.037 ± 0.004	0.001 ± 0.006
4th Quarter Mean± s.d.		0.023 ± 0.007	-0.002 ± 0.007
Cumulative Average		0.021 ± 0.008	0.000 ± 0.007

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

POINT BEACH NUCLEAR PLANT

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
01-07-04	344	0.031 ± 0.003	0.008 ± 0.005
01-15-04	356	0.026 ± 0.003	0.000 ± 0.004
01-21-04	266	0.018 ± 0.003	0.001 ± 0.006
01-28-04	309	0.021 ± 0.004	-0.004 ± 0.005
02-05-04	340	0.043 ± 0.004	-0.003 ± 0.005
02-11-04	260	0.030 ± 0.004	0.001 ± 0.007
02-19-04	346	0.029 ± 0.003	-0.002 ± 0.005
02-26-04	260	0.030 ± 0.004	0.016 ± 0.006
03-03-04	304	0.019 ± 0.003	-0.004 ± 0.005
03-10-04	300	0.029 ± 0.003	0.006 ± 0.006
03-18-04	347	0.016 ± 0.003	0.004 ± 0.005
03-26-04	343	0.020 ± 0.003	0.003 ± 0.005
04-03-04	346	0.016 ± 0.003	0.001 ± 0.004
1st Quarter Mean± s.d.		0.025 ± 0.008	0.002 ± 0.006
04-11-04	354	0.018 ± 0.003	-0.002 ± 0.004
04-17-04	258	0.015 ± 0.004	-0.011 ± 0.007
04-24-04	293	0.016 ± 0.003	0.008 ± 0.005
05-01-04	308	0.015 ± 0.003	-0.004 ± 0.005
05-08-04	305	0.017 ± 0.003	0.004 ± 0.005
05-15-04	301	0.015 ± 0.003	-0.009 ± 0.005
05-23-04	348	0.010 ± 0.003	0.013 ± 0.005
05-29-04	250	0.011 ± 0.003	-0.014 ± 0.007
06-05-04	311	0.014 ± 0.003	0.006 ± 0.005
06-11-04	264	0.019 ± 0.004	-0.004 ± 0.006
06-17-04	252	0.012 ± 0.003	0.003 ± 0.007
06-23-04	260	0.016 ± 0.003	0.003 ± 0.007
06-30-04	300	0.010 ± 0.003	-0.004 ± 0.006
2nd Quarter Mean± s.d.		0.014 ± 0.003	-0.001 ± 0.008
07-07-04	308	0.011 ± 0.003	0.003 ± 0.006
07-14-04	296	0.014 ± 0.003	0.006 ± 0.006
07-21-04	304	0.020 ± 0.003	0.000 ± 0.005
07-28-04	281	0.017 ± 0.003	0.001 ± 0.007
08-03-04	239	0.029 ± 0.004	0.001 ± 0.008
08-11-04	322	0.015 ± 0.003	-0.005 ± 0.005
08-18-04	280	0.021 ± 0.004	0.004 ± 0.006
08-26-04	322	0.017 ± 0.003	0.005 ± 0.005
09-02-04	286	0.011 ± 0.003	-0.002 ± 0.006
09-08-04	244	0.033 ± 0.004	-0.014 ± 0.006
09-16-04	295	0.027 ± 0.003	0.003 ± 0.006
09-23-04	328	0.022 ± 0.003	-0.007 ± 0.005
09-30-04	283	0.021 ± 0.003	-0.011 ± 0.006
3rd Quarter Mean± s.d.		0.020 ± 0.007	-0.001 ± 0.006
10-06-04	244	0.020 ± 0.004	-0.001 ± 0.007
10-14-04	325	0.022 ± 0.003	0.004 ± 0.006
10-21-04	274	0.011 ± 0.003	-0.005 ± 0.006
10-27-04	244	0.014 ± 0.004	-0.004 ± 0.008
11-05-04	359	0.015 ± 0.002	-0.001 ± 0.004
11-10-04	205	0.026 ± 0.005	0.007 ± 0.007
11-17-04	296	0.026 ± 0.004	-0.014 ± 0.006
11-24-04	300	0.031 ± 0.004	-0.001 ± 0.005
12-01-04	302	0.023 ± 0.003	-0.006 ± 0.005
12-09-04	340	0.024 ± 0.003	0.005 ± 0.005
12-16-04	303	0.029 ± 0.003	0.002 ± 0.006
12-22-04	259	0.026 ± 0.004	-0.004 ± 0.006
12-29-04	297	0.034 ± 0.004	0.002 ± 0.006
4th Quarter Mean± s.d.		0.023 ± 0.007	-0.001 ± 0.005
Cumulative Average		0.021 ± 0.007	0.000 ± 0.006

POINT BEACH NUCLEAR PLANT

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
01-07-04	348	0.033 ± 0.003	0.007 ± 0.005
01-15-04	330	0.031 ± 0.003	0.010 ± 0.006
01-21-04	251	0.019 ± 0.003	0.002 ± 0.006
01-28-04	301	0.023 ± 0.004	0.011 ± 0.005
02-04-04	306	0.043 ± 0.004	-0.006 ± 0.005
02-11-04	299	0.037 ± 0.004	-0.003 ± 0.006
02-19-04	348	0.028 ± 0.003	-0.003 ± 0.005
02-26-04	258	0.035 ± 0.005	0.017 ± 0.007
03-03-04	305	0.024 ± 0.003	-0.005 ± 0.005
03-10-04	299	0.019 ± 0.003	-0.011 ± 0.006
03-18-04	348	0.019 ± 0.003	0.006 ± 0.005
03-26-04	342	0.018 ± 0.003	0.004 ± 0.005
04-03-04	346	0.015 ± 0.003	-0.008 ± 0.005
1st Quarter Mean± s.d.		0.026 ± 0.009	0.002 ± 0.008
04-11-04	356	0.019 ± 0.003	-0.008 ± 0.004
04-17-04	256	0.012 ± 0.004	0.012 ± 0.006
04-24-04	297	0.016 ± 0.003	0.002 ± 0.006
05-01-04	304	0.017 ± 0.003	-0.004 ± 0.005
05-08-04	306	0.018 ± 0.003	-0.004 ± 0.006
05-15-04	300	0.018 ± 0.003	0.011 ± 0.005
05-23-04	348	0.012 ± 0.003	-0.004 ± 0.005
05-29-04	250	0.008 ± 0.003	-0.017 ± 0.006
06-05-04	312	0.014 ± 0.003	-0.003 ± 0.005
06-11-04	263	0.020 ± 0.004	-0.004 ± 0.005
06-17-04	252	0.013 ± 0.003	-0.004 ± 0.006
06-23-04	262	0.040 ± 0.005	-0.002 ± 0.007
06-30-04	299	0.011 ± 0.003	0.006 ± 0.006
2nd Quarter Mean± s.d.		0.017 ± 0.008	-0.001 ± 0.008

Date Collected	Vol. (m^3)	Gross Beta	I-131
Required LLD		0.010	0.030
07-07-04	306	0.010 ± 0.002	0.006 ± 0.005
07-14-04	299	0.013 ± 0.003	0.013 ± 0.005
07-21-04	303	0.021 ± 0.004	0.013 ± 0.006
07-28-04	304	0.018 ± 0.003	-0.007 ± 0.005
08-03-04	247	0.031 ± 0.004	-0.004 ± 0.008
08-11-04	348	0.017 ± 0.003	-0.004 ± 0.004
08-18-04	301	0.020 ± 0.003	0.006 ± 0.006
08-26-04	345	0.020 ± 0.003	0.012 ± 0.004
09-02-04	301	0.014 ± 0.003	0.011 ± 0.005
09-08-04	260	0.034 ± 0.004	-0.003 ± 0.006
09-16-04	305	0.026 ± 0.003	-0.007 ± 0.006
09-23-04	342	0.025 ± 0.003	0.001 ± 0.005
09-30-04	304	0.020 ± 0.003	-0.002 ± 0.007
3rd Quarter Mean± s.d.		0.021 ± 0.007	0.003 ± 0.008
10-06-04	263	0.020 ± 0.003	0.011 ± 0.006
10-14-04	345	0.023 ± 0.003	0.004 ± 0.004
10-21-04	302	0.010 ± 0.002	-0.006 ± 0.006
10-27-04	258	0.014 ± 0.004	-0.002 ± 0.007
11-05-04	390	0.016 ± 0.002	-0.009 ± 0.004
11-10-04	216	0.025 ± 0.005	-0.002 ± 0.008
11-17-04	300	0.026 ± 0.004	-0.006 ± 0.006
11-24-04	302	0.028 ± 0.003	0.009 ± 0.006
12-01-04	301	0.022 ± 0.003	0.003 ± 0.005
12-09-04	334	0.022 ± 0.003	0.002 ± 0.006
12-16-04	294	0.028 ± 0.004	-0.005 ± 0.006
12-22-04	262	0.025 ± 0.004	-0.001 ± 0.006
12-29-04	289	0.031 ± 0.004	0.003 ± 0.006
4th Quarter Mean± s.d.		0.022 ± 0.006	0.000 ± 0.006
Cumulative Average		0.022 ± 0.008	0.001 ± 0.007

POINT BEACH NUCLEAR PLANT

GAMMA EMITTERS IN QUARTERLY COMPOSITES OF

AIR PARTICULATE FILTERS

(Concentration pCi/m3)

Locatior	Lab Code Req. LLD	Be-7 -	Cs-134 (0.05)	Cs-137 (0.06)	Other Gammas[a] (0.10)	Volume
			1st Quarter			
E-01	EAP- 1707	0.041 ± 0.012	-0.0004 ± 0.0005	0.0001 ± 0.0004	-0.0002 ± 0.0006	4316
E-02	- 1708	0.048 ± 0.013	-0.0001 ± 0.0005	0.0005 ± 0.0005	0.0002 ± 0.0006	3802
E-03	- 1709	0.046 ± 0.011	0.0002 ± 0.0004	-0.0005 ± 0.0006	-0.0001 ± 0.0006	4102
E-04	- 1710	0.044 ± 0.010	-0.0001 ± 0.0006	-0.0003 ± 0.0005	-0.0001 ± 0.0006	4102
E-08	- 1711	0.050 ± 0.012	0.0005 ± 0.0006	-0.0001 ± 0.0005	0.0006 ± 0.0005	4121
E-20	- 1712	0.045 ± 0.012	0.0004 ± 0.0006	-0.0001 ± 0.0006	-0.0006 ± 0.0007	4081
E-01	EAP- 3925	0.074 ± 0.013	0.0001 ± 0.0006	-0.0001 ± 0.0006	0.0003 ± 0.0005	4068
E-02	- 3926	0.068 ± 0.016	0.0003 ± 0.0005	-0.0001 ± 0.0006	0.0004 ± 0.0005	3803
E-03	- 3927	0.068 ± 0.015	-0.0002 ± 0.0005	0.0005 ± 0.0006	0.0009 ± 0.0006	3802
E-04	- 3928	0.066 ± 0.014	-0.0001 ± 0.0008	0.0001 ± 0.0005	-0.0001 ± 0.0009	3803
E-08	- 3929	0.061 ± 0.015	0.0004 ± 0.0006	-0.0001 ± 0.0006	0.0001 ± 0.0006	3804
E-20	- 3930	0.073 ± 0.018	0.0007 ± 0.0005	-0.0002 ± 0.0006	0.0014 ± 0.0009	3805
E-01	EAP- 6270	0.074 ± 0.014	0.0003 ± 0.0005	0.0007 ± 0.0004	0.0002 ± 0.0006	4038
E-02	- 6271	0.082 ± 0.016	0.0004 ± 0.0007	0.0003 ± 0.0005	-0.0008 ± 0.0006	3853
E-03	- 6272	0.055 ± 0.012	0.0004 ± 0.0006	0.0007 ± 0.0006	0.0001 ± 0.0007	4024
E-04	- 6273	0.072 ± 0.016	0.0007 ± 0.0006	0.0006 ± 0.0006	0.0007 ± 0.0005	3515
E-08	- 6274	0.071 ± 0.014	0.0009 ± 0.0006	0.0002 ± 0.0006	-0.0009 ± 0.0007	3788
E-20	- 6275	0.061 ± 0.014	0.0004 ± 0.0006	0.0003 ± 0.0005	-0.0003 ± 0.0006	3965
E-01	EAP- 7840	0.063 ± 0.014	0.0001 ± 0.0006	-0.0004 ± 0.0007	-0.0005 ± 0.0006	3845
E-02	- 7841	0.048 ± 0.011	0.0005 ± 0.0006	0.0005 ± 0.0005	0.0001 ± 0.0006	3828
E-03	- 7842	0.052 ± 0.014	0.0005 ± 0.0006	0.0002 ± 0.0005	-0.0001 ± 0.0005	3888
E-04	- 7843	0.059 ± 0.017	0.0005 ± 0.0007	0.0004 ± 0.0006	0.0003 ± 0.0006	3763
E-08	- 7844	0.061 ± 0.012	-0.0005 ± 0.0007	0.0005 ± 0.0005	-0.0001 ± 0.0007	3748
E-20	- 7845	0.056 ± 0.015	0.0004 ± 0.0005	-0.0001 ± 0.0006	-0.0001 ± 0.0005	3856

[a] See Introduction

POINT BEACH NUCLEAR PLANT

RADIOACTIVITY IN MILK SAMPLES

(Monthly Collections)

Sample Description and Concentration (pCi/L)

E-11 Funk Dairy Farm

Collection Date	01-07-04	02-04-04	03-03-04	Required LLD
Lab Code	EMI-77	EMI-459	EMI-938	
Sr-89	0.2 ± 0.8	-0.5 ± 0.7	-0.1 ± 0.5	5.0
Sr-90	1.1 ± 0.3	1.2 ± 0.4	0.9 ± 0.3	1.0
I-131	0.07 ± 0.13	-0.03 ± 0.16	0.04 ± 0.19	0.5
K-40	1412 ± 118	1292 ± 107	1315 ± 126	
Cs-134	1.4 ± 2.7	-1.1 ± 2.3	-1.3 ± 2.9	5.0
Cs-137	1.4 ± 2.5	1.6 ± 2.4	-0.3 ± 2.8	5.0
Ba-La-140	-0.4 ± 1.7	0.0 ± 1.8	0.7 ± 2.3	5.0
Other Gammas[a]	-0.1 ± 2.8	0.7 ± 2.3	-1.4 ± 2.9	15.0

Collection Date	04-07-04	05-05-04	06-02-04	Required LLD
Lab Code	EMI-1502	EMI-2210	EMI-2710	
Sr-89	0.6 ± 0.6	-0.9 ± 0.9	-0.9 ± 0.7	5.0
Sr-90	0.9 ± 0.3	0.8 ± 0.4	1.4 ± 0.4	1.0
I-131	0.02 ± 0.16	-0.10 ± 0.17	-0.01 ± 0.14	0.5
K-40	1341 ± 119	1411 ± 116	1295 ± 117	
Cs-134	0.8 ± 2.3	1.2 ± 2.8	-0.4 ± 2.0	5.0
Cs-137	-0.1 ± 2.5	0.8 ± 2.7	3.0 ± 2.3	5.0
Ba-La-140	0.5 ± 2.1	-0.6 ± 2.3	1.6 ± 1.9	5.0
Other Gammas[a]	-0.2 ± 2.4	0.8 ± 2.7	-0.3 ± 2.3	15.0

[a] See Introduction.

POINT BEACH NUCLEAR PLANT

RADIOACTIVITY IN MILK SAMPLES

(Monthly Collections)

Sample Description and Concentration (pCi/L)

E-11 Funk Dairy Farm

Collection Date	07-07-04	08-04-04	09-01-04	Required LLD
Lab Code	EMI-3481	EMI-4284	EMI-4925	
Sr-89	0.5 ± 0.9	-0.5 ± 0.7	-0.2 ± 0.9	5.0
Sr-90	0.6 ± 0.4	1.1 ± 0.4	1.3 ± 0.4	1.0
I-131	0.09 ± 0.19	0.06 ± 0.13	-0.09 ± 0.16	0.5
K-40	1486 ± 115	1421 ± 89	1369 ± 116	
Cs-134	1.2 ± 2.1	0.3 ± 1.8	-1.3 ± 2.6	5.0
Cs-137	-0.4 ± 2.5	0.7 ± 1.7	2.2 ± 2.4	5.0
Ba-La-140	2.1 ± 1.9	0.5 ± 1.0	2.2 ± 1.6	5.0
Other Gammas[a]	0.4 ± 1.8	1.0 ± 1.8	-0.7 ± 2.3	15.0

Collection Date	10-06-04	11-03-04	12-01-04	Required LLD
Lab Code	EMI-5738	EMI-6517	EMI-7062,3	
Sr-89	0.3 ± 0.7	0.1 ± 0.6	-0.8 ± 0.6	5.0
Sr-90	1.6 ± 0.4	1.1 ± 0.4	1.1 ± 0.3	1.0
I-131	-0.09 ± 0.13	-0.27 ± 0.12	0.09 ± 0.13	0.5
K-40	1355 ± 118	1597 ± 97	1548 ± 91	
Cs-134	-0.3 ± 2.5	-0.1 ± 2.0	-1.2 ± 2.8	5.0
Cs-137	-1.9 ± 2.6	-1.9 ± 1.9	-1.0 ± 2.7	5.0
Ba-La-140	-1.5 ± 2.3	-2.1 ± 1.9	-1.6 ± 1.9	5.0
Other Gammas[a]	-1.4 ± 2.6	0.1 ± 1.7	1.7 ± 2.7	15.0

[a] See Introduction.

POINT BEACH NUCLEAR PLANT

RADIOACTIVITY IN MILK SAMPLES

(Monthly Collections)

Sample Description and Concentration (pCi/L)

E-40 Barta

Collection Date	01-07-04	02-04-04	03-03-04	Required LLD
Lab Code	EMI-78	EMI-460	EMI-939	
Sr-89	0.1 ± 1.0	-0.6 ± 0.8	-0.1 ± 0.6	5.0
Sr-90	1.8 ± 0.4	1.6 ± 0.4	1.2 ± 0.4	1.0
I-131	0.06 ± 0.14	-0.14 ± 0.16	0.07 ± 0.16	0.5
K-40	1400 ± 115	1328 ± 103	1344 ± 116	
Cs-134	-0.6 ± 2.6	1.6 ± 2.4	2.4 ± 2.2	5.0
Cs-137	2.3 ± 2.2	1.3 ± 2.5	0.8 ± 2.7	5.0
Ba-La-140	2.8 ± 1.9	0.5 ± 1.7	-2.2 ± 2.1	5.0
Other Gammas[a]	0.8 ± 2.1	0.8 ± 1.9	0.4 ± 2.2	15.0

Collection Date	04-07-04	05-05-04	06-02-04	Required LLD
Lab Code	EMI-1503	EMI-2211	EMI-2712	
Sr-89	0.3 ± 0.6	0.4 ± 0.8	-0.1 ± 0.7	5.0
Sr-90	0.7 ± 0.3	0.6 ± 0.3	1.5 ± 0.4	1.0
I-131	0.01 ± 0.16	-0.06 ± 0.19	-0.23 ± 0.17	0.5
K-40	1426 ± 117	1483 ± 114	1356 ± 120	
Cs-134	0.8 ± 2.4	-0.2 ± 2.5	2.7 ± 2.3	5.0
Cs-137	-1.0 ± 2.5	0.2 ± 2.2	-0.1 ± 2.1	5.0
Ba-La-140	0.4 ± 1.9	2.3 ± 2.2	1.8 ± 1.3	5.0
Other Gammas[a]	1.8 ± 2.5	-0.4 ± 1.9	-0.3 ± 2.5	15.0

[a] See Introduction.

POINT BEACH NUCLEAR PLANT

RADIOACTIVITY IN MILK SAMPLES

(Monthly Collections)

Sample Description and Concentration (pCi/L)

	E-40 Barta			
Collection Date	07-07-04	08-04-04	09-01-04	Required LLD
Lab Code	EMI-3483	EMI-4286,7	EMI-4928	
Sr-89	-0.6 ± 1.2	-0.5 ± 0.7	-1.0 ± 1.1	5.0
Sr-90	1.5 ± 0.5	1.6 ± 0.3	2.1 ± 0.6	1.0
I-131	0.14 ± 0.15	0.10 ± 0.15	0.10 ± 0.18	0.5
K-40	1349 ± 121	1420 ± 56	1382 ± 126	
Cs-134	-0.3 ± 2.2	0.4 ± 1.7	-1.0 ± 2.4	5.0
Cs-137	0.7 ± 2.2	1.2 ± 1.6	2.7 ± 2.4	5.0
Ba-La-140	-0.3 ± 1.7	-3.3 ± 1.5	-2.4 ± 2.7	5.0
Other Gammas[a]	1.2 ± 2.3	-0.2 ± 1.5	2.3 ± 2.8	15.0

Collection Date	10-06-04	11-03-04	12-01-04	Required LLD
Lab Code	EMI-5740	EMI-6519	EMI-7065	
Sr-89	-0.6 ± 0.8	-0.1 ± 0.6	-0.4 ± 0.6	5.0
Sr-90	1.6 ± 0.5	1.3 ± 0.4	1.4 ± 0.4	1.0
I-131	0.06 ± 0.15	-0.19 ± 0.16	0.00 ± 0.13	0.5
K-40	1277 ± 108	1372 ± 112	1426 ± 119	
Cs-134	2.6 ± 2.7	0.8 ± 2.2	-2.3 ± 2.6	5.0
Cs-137	1.7 ± 2.7	3.8 ± 2.0	1.2 ± 2.3	5.0
Ba-La-140	1.5 ± 2.3	2.9 ± 1.6	-1.2 ± 2.1	5.0
Other Gammas[a]	3.1 ± 2.2	1.6 ± 1.8	1.9 ± 2.2	15.0

[a] See Introduction.

POINT BEACH NUCLEAR PLANT

RADIOACTIVITY IN MILK SAMPLES

(Monthly Collections)

Sample Description and Concentration (pCi/L)

E-21 Strutz Dairy Farm

Collection Date	01-07-04	02-04-04	03-04-04	Required LLD
Lab Code	EMI-79,80	EMI-461	EMI-940	
Sr-89	0.1 ± 0.7	0.3 ± 0.6	0.1 ± 0.5	5.0
Sr-90	1.0 ± 0.2	0.6 ± 0.3	0.7 ± 0.3	1.0
I-131	0.06 ± 0.16	0.03 ± 0.15	-0.03 ± 0.14	0.5
K-40	1418 ± 85	1287 ± 110	1402 ± 130	
Cs-134	0.4 ± 2.6	2.4 ± 2.1	2.6 ± 2.5	5.0
Cs-137	-0.7 ± 2.3	0.2 ± 2.1	3.0 ± 2.5	5.0
Ba-La-140	-2.3 ± 1.8	0.3 ± 2.0	-3.4 ± 2.4	5.0
Other Gammas[a]	2.8 ± 2.5	0.5 ± 1.8	-0.4 ± 2.5	15.0

Collection Date	04-07-04	05-05-04	06-02-04	Required LLD
Lab Code	EMI-1504	EMI-2212	EMI-2711	
Sr-89	0.0 ± 0.7	0.1 ± 0.7	0.2 ± 0.5	5.0
Sr-90	1.4 ± 0.4	1.0 ± 0.4	0.4 ± 0.3	1.0
I-131	-0.04 ± 0.16	0.01 ± 0.18	-0.16 ± 0.17	0.5
K-40	1325 ± 101	1333 ± 118	1317 ± 109	
Cs-134	1.5 ± 2.5	2.1 ± 2.3	-0.9 ± 2.3	5.0
Cs-137	1.0 ± 2.0	0.4 ± 2.2	-1.0 ± 2.6	5.0
Ba-La-140	-0.6 ± 1.6	-1.2 ± 2.1	0.5 ± 1.9	5.0
Other Gammas[a]	-0.6 ± 1.6	1.4 ± 1.5	-1.5 ± 2.3	15.0

[a] See Introduction.

POINT BEACH NUCLEAR PLANT

RADIOACTIVITY IN MILK SAMPLES

(Monthly Collections)

Sample Description and Concentration (pCi/L)

E-21 Strutz Dairy Farm

Collection Date	07-07-04	08-04-04	09-01-04	Required LLD
Lab Code	EMI-3482	EMI-4285	EMI-4926,7	
Sr-89	-0.5 ± 1.0	-0.5 ± 0.6	-0.2 ± 0.8	5.0
Sr-90	0.9 ± 0.5	0.8 ± 0.3	1.8 ± 0.6	1.0
I-131	0.07 ± 0.15	0.09 ± 0.14	-0.12 ± 0.18	0.5
K-40	1397 ± 110	1318 ± 88	1301 ± 82	
Cs-134	1.0 ± 2.4	2.4 ± 1.8	-0.2 ± 2.6	5.0
Cs-137	2.4 ± 2.3	-1.1 ± 1.6	-0.2 ± 2.2	5.0
Ba-La-140	-2.7 ± 2.1	2.9 ± 1.3	-0.8 ± 1.9	5.0
Other Gammas[a]	0.9 ± 2.0	0.1 ± 1.9	1.0 ± 1.9	15.0

Collection Date	10-06-04	11-03-04	12-01-04	Required LLD
Lab Code	EMI-5739	EMI-6518	EMI-7064	
Sr-89	-0.1 ± 0.8	0.4 ± 0.6	0.1 ± 0.5	5.0
Sr-90	0.6 ± 0.4	0.6 ± 0.4	0.5 ± 0.3	1.0
I-131	0.13 ± 0.20	-0.28 ± 0.18	0.10 ± 0.14	0.5
K-40	1428 ± 111	1400 ± 101	1469 ± 117	
Cs-134	0.4 ± 2.3	1.5 ± 2.4	0.6 ± 2.9	5.0
Cs-137	3.2 ± 2.4	5.5 ± 2.1	1.0 ± 2.8	5.0
Ba-La-140	-2.9 ± 1.9	-0.9 ± 2.1	0.7 ± 2.3	5.0
Other Gammas[a]	0.3 ± 2.3	-0.5 ± 2.0	-2.9 ± 2.9	15.0

[a] See Introduction.

POINT BEACH NUCLEAR PLANT

RADIOACTIVITY IN WELL WATER SAMPLES, E-10

(Quarterly Collections)

	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Req. LLD
Collection Date	NS[b]	04-13-04	07-14-04	10-13-04	
Lab Code		EWW-1668	EWW-3858	EWW-6042[c]	
Gross Beta		3.5 ± 1.9	0.9 ± 1.5	16.5 ± 2.2	4.0
H-3		-9.4 ± 84.6	110.8 ± 88.9	7.6 ± 79.4	500
Sr-89		0.2 ± 0.5	0.1 ± 0.6	0.4 ± 0.5	5.0
Sr-90		-0.1 ± 0.3	0.2 ± 0.3	-0.2 ± 0.3	1.0
I-131		-0.05 ± 0.15	0.16 ± 0.24	-0.02 ± 0.20	0.5
Mn-54		-0.3 ± 1.9	0.3 ± 3.7	-0.7 ± 2.8	10
Fe-59		0.4 ± 4.0	-3.2 ± 4.9	4.3 ± 6.4	30
Co-58		-0.5 ± 2.0	-1.9 ± 3.9	-3.9 ± 3.6	10
Co-60		-2.9 ± 2.0	-1.8 ± 3.7	0.5 ± 4.4	10
Zn-65		-0.7 ± 3.9	-1.5 ± 6.9	0.7 ± 6.6	30
Zr-Nb-95		-4.3 ± 2.8	1.1 ± 3.6	-4.9 ± 3.5	15
Cs-134		-1.8 ± 2.5	-0.3 ± 4.1	-0.9 ± 3.3	10
Cs-137		-0.6 ± 2.6	-2.1 ± 3.5	0.6 ± 3.5	10
Ba-La-140		-2.5 ± 8.4	-19.8 ± 5.2	3.1 ± 3.2	15
Other Gammas[a]		0.9 ± 1.9	0.2 ± 3.1	0.7 ± 2.9	30

[a] Ru-103

[b] "NS"= No sample; sample not received.

[c] Gross beta repeated with a result of 15.9±3.8 pCi/L; sample had heavy total residue.

POINT BEACH

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

Lab Code	ELW-256	NS[b]	ELW-1135	ELW-1678	
Date Collected	01-15-04	-	03-23-04	04-13-04	Req. LLD
Gross beta	2.8 ± 0.7	-	3.1 ± 0.6	2.6 ± 0.6	4.0
I-131	-0.15 ± 0.15	-	-0.08 ± 0.14	0.01 ± 0.15	0.5
Be-7	-10.7 ± 19.7	-	11.9 ± 16.2	-28.7 ± 19.1	
Mn-54	1.4 ± 1.7	-	-0.3 ± 2.0	-0.7 ± 1.8	10
Fe-59	-4.1 ± 3.6	-	-2.0 ± 3.9	-2.5 ± 3.7	30
Co-58	0.2 ± 1.8	-	-0.1 ± 1.9	1.5 ± 1.6	10
Co-60	2.0 ± 1.4	-	-0.4 ± 1.7	-0.3 ± 2.0	10
Zn-65	-4.2 ± 4.5	-	0.5 ± 3.9	0.3 ± 4.3	30
Zr-Nb-95	-0.5 ± 1.9	-	0.1 ± 2.0	-0.6 ± 1.9	15
Cs-134	0.5 ± 1.8	-	0.8 ± 2.1	2.8 ± 2.4	10
Cs-137	-2.1 ± 2.2	-	1.2 ± 2.0	0.1 ± 2.2	10
Ba-La-140	0.4 ± 2.1	-	0.7 ± 2.2	0.5 ± 1.9	15
Other Gammas[a]	-1.9 ± 2.4	-	-2.0 ± 2.3	0.2 ± 2.2	30

Lab Code	ELW-2217	ELW-3034	ELW-3849,50	ELW-4579	
Date Collected	05-05-04	06-11-04	07-14-04	08-11-04	Req. LLD
Gross beta	2.9 ± 0.6	2.4 ± 0.5	2.3 ± 0.4	2.4 ± 0.5	4.0
I-131	0.13 ± 0.23	-0.28 ± 0.22	-0.41 ± 0.23	0.13 ± 0.18	0.5
Be-7	3.4 ± 11.9	4.7 ± 26.4	2.3 ± 16.6	-4.8 ± 18.8	
Mn-54	-0.3 ± 1.5	2.0 ± 3.3	0.5 ± 1.7	-0.9 ± 2.1	10
Fe-59	0.8 ± 2.3	-5.0 ± 6.3	1.2 ± 3.1	0.5 ± 3.8	30
Co-58	0.2 ± 1.2	2.3 ± 3.1	-2.1 ± 1.7	-2.3 ± 2.0	10
Co-60	0.1 ± 1.7	-2.1 ± 4.4	-0.1 ± 1.6	-0.1 ± 1.5	10
Zn-65	-0.1 ± 3.1	-0.3 ± 6.0	-4.2 ± 7.3	-3.0 ± 1.9	30
Zr-Nb-95	-1.5 ± 1.2	-2.9 ± 2.8	-0.4 ± 1.7	-0.4 ± 1.5	15
Cs-134	1.3 ± 1.5	1.5 ± 3.4	0.2 ± 1.8	0.6 ± 1.7	10
Cs-137	1.3 ± 1.5	-1.1 ± 3.3	-1.8 ± 1.8	-0.1 ± 2.4	10
Ba-La-140	-1.8 ± 1.7	-5.5 ± 4.3	-5.0 ± 2.0	-0.3 ± 2.3	15
Other Gammas[a]	-0.1 ± 1.4	0.3 ± 2.9	-1.3 ± 2.0	1.8 ± 1.9	30

Lab Code	ELW-5313	ELW-6038	ELW-6777	ELW-7242	
Date Collected	09-16-04	10-13-04	11-10-04	12-08-04	Req. LLD
Gross beta	2.6 ± 0.6	2.3 ± 0.6	2.3 ± 0.6	2.6 ± 0.6	4.0
I-131	-0.16 ± 0.17	0.07 ± 0.16	-0.16 ± 0.19	-0.22 ± 0.16	0.5
Be-7	45.4 ± 27.2	-5.7 ± 29.6	11.9 ± 25.9	-13.7 ± 19.7	
Mn-54	2.2 ± 3.9	1.9 ± 2.7	1.4 ± 3.7	-0.5 ± 2.1	10
Fe-59	-6.1 ± 6.6	-1.7 ± 6.9	10.5 ± 5.7	-1.4 ± 4.2	30
Co-58	1.6 ± 3.0	1.1 ± 3.4	-0.8 ± 3.5	1.5 ± 1.8	10
Co-60	4.6 ± 4.1	1.3 ± 4.4	-1.5 ± 3.7	0.6 ± 2.1	10
Zn-65	1.2 ± 7.0	-1.5 ± 5.9	-0.8 ± 8.9	-10.6 ± 4.6	30
Zr-Nb-95	1.8 ± 3.4	3.2 ± 3.0	2.9 ± 3.1	-0.2 ± 2.0	15
Cs-134	2.6 ± 3.2	0.8 ± 4.1	0.7 ± 4.1	-1.4 ± 2.5	10
Cs-137	0.2 ± 3.0	2.0 ± 3.6	-1.4 ± 3.4	0.1 ± 2.3	10
Ba-La-140	-13.3 ± 5.0	4.1 ± 3.5	-3.1 ± 4.7	-7.0 ± 2.3	15
Other Gammas[a]	-2.0 ± 3.4	-1.6 ± 3.6	1.3 ± 3.3	4.0 ± 2.2	30

[a] Ru-103

[b] "NS" = No sample; see Table 2.0, Listing of Missed Samples.

POINT BEACH

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

Lab Code	ELW-257	NS[b]	ELW-1136	ELW-1679	
Date Collected	01-15-04	-	03-23-04	04-13-04	Req. LLD
Gross beta	3.1 ± 0.6	-	3.0 ± 0.6	2.7 ± 0.5	4.0
I-131	-0.01 ± 0.16	-	-0.03 ± 0.15	0.23 ± 0.26	0.5
Be-7	-1.0 ± 17.1	-	-8.1 ± 17.8	-21.9 ± 26.4	
Mn-54	2.1 ± 1.6	-	1.0 ± 1.8	2.2 ± 2.8	10
Fe-59	-2.8 ± 3.4	-	2.0 ± 2.8	-4.2 ± 6.1	30
Co-58	0.9 ± 1.4	-	-0.1 ± 1.7	-1.1 ± 3.3	10
Co-60	0.3 ± 1.3	-	-0.8 ± 1.5	-1.2 ± 3.4	10
Zn-65	0.4 ± 2.9	-	0.9 ± 3.3	-5.1 ± 6.7	30
Zr-Nb-95	0.5 ± 2.0	-	1.8 ± 1.8	-1.2 ± 3.3	15
Cs-134	-0.7 ± 2.0	-	0.7 ± 1.9	-0.7 ± 3.8	10
Cs-137	1.7 ± 2.3	-	1.6 ± 1.9	-0.9 ± 3.4	10
Ba-La-140	-0.1 ± 2.0	-	-0.7 ± 2.5	-1.5 ± 3.9	15
Other gammas[a]	-1.2 ± 2.0	-	-1.8 ± 2.0	-2.5 ± 2.9	30

Lab Code	ELW-2218	ELW-3035	ELW-3851	ELW-4580	
Date Collected	05-05-04	06-11-04	07-14-04	08-11-04	Req. LLD
Gross beta	2.2 ± 0.5	2.9 ± 0.6	3.1 ± 0.6	2.0 ± 0.5	4.0
I-131	0.00 ± 0.22	0.01 ± 0.26	-0.09 ± 0.29	-0.05 ± 0.18	0.5
Be-7	-4.1 ± 14.1	-7.1 ± 23.0	-11.7 ± 15.1	-25.2 ± 27.3	
Mn-54	-0.1 ± 1.2	2.8 ± 3.4	-2.6 ± 1.9	0.9 ± 3.1	10
Fe-59	-0.7 ± 2.9	9.0 ± 5.9	4.3 ± 2.4	-6.6 ± 6.7	30
Co-58	0.8 ± 1.3	-2.5 ± 4.1	-1.7 ± 1.4	-3.6 ± 2.9	10
Co-60	0.2 ± 1.4	0.1 ± 4.5	0.8 ± 1.7	0.4 ± 3.8	10
Zn-65	-4.8 ± 3.2	-4.9 ± 8.3	-0.3 ± 3.2	1.0 ± 7.8	30
Zr-Nb-95	0.3 ± 3.1	-0.7 ± 3.8	2.0 ± 1.6	1.6 ± 3.5	15
Cs-134	1.0 ± 1.5	1.3 ± 3.4	0.7 ± 1.9	-2.5 ± 4.2	10
Cs-137	0.5 ± 1.6	1.5 ± 2.8	-0.5 ± 1.9	0.8 ± 3.1	10
Ba-La-140	-1.9 ± 1.6	6.1 ± 3.3	-3.6 ± 1.8	6.6 ± 3.6	15
Other Gammas[a]	-0.2 ± 1.6	1.4 ± 3.1	-0.5 ± 1.8	1.1 ± 3.1	30

Lab Code	ELW-5314	ELW-6039	ELW-6778	ELW-7243[c]	
Date Collected	09-16-04	10-13-04	11-10-04	12-08-04	Req. LLD
Gross beta	2.0 ± 0.5	2.6 ± 0.6	2.6 ± 0.6	7.3 ± 0.8	4.0
I-131	0.06 ± 0.18	0.08 ± 0.14	0.09 ± 0.17	0.03 ± 0.17	0.5
Be-7	9.0 ± 30.4	-6.2 ± 14.4	4.8 ± 19.3	16.8 ± 20.3	
Mn-54	1.2 ± 3.5	-0.3 ± 2.0	3.3 ± 3.1	0.3 ± 2.4	10
Fe-59	3.7 ± 6.7	1.2 ± 3.6	2.2 ± 5.3	-4.6 ± 4.4	30
Co-58	0.8 ± 3.2	-0.4 ± 2.1	0.4 ± 2.6	0.7 ± 2.2	10
Co-60	-0.9 ± 3.5	2.7 ± 2.3	-1.0 ± 2.0	-1.6 ± 2.2	10
Zn-65	-2.7 ± 8.9	-1.5 ± 3.3	3.0 ± 6.1	-6.3 ± 5.8	30
Zr-Nb-95	-0.5 ± 3.1	-0.4 ± 1.9	2.7 ± 2.4	-1.5 ± 2.5	15
Cs-134	2.7 ± 3.4	0.4 ± 2.3	1.2 ± 3.2	0.9 ± 2.6	10
Cs-137	1.3 ± 3.6	-1.0 ± 2.0	0.8 ± 3.4	-0.5 ± 2.7	10
Ba-La-140	2.7 ± 3.3	3.4 ± 2.4	3.5 ± 2.1	-0.8 ± 2.6	15
Other Gammas[a]	-1.4 ± 3.4	2.0 ± 1.7	0.3 ± 2.3	0.7 ± 2.5	30

[a] Ru-103
[b] "NS" = No sample; see Table 2.0, Listing of Missed Samples.
[c] Gross beta repeated with a result of 8.2±0.8 pCi/L.

POINT BEACH

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-258	NS[b]	ELW-1137	ELW-1680,1	
Date Collected	01-15-04	-	03-23-04	04-13-04	Req. LLD
Gross beta	2.6 ± 0.6	-	3.8 ± 0.6	2.7 ± 0.5	4.0
I-131	0.08 ± 0.18	-	-0.23 ± 0.14	-0.07 ± 0.22	0.5
Be-7	7.6 ± 15.2	-	20.8 ± 23.5	6.9 ± 18.1	
Mn-54	-0.1 ± 1.7	-	1.0 ± 2.7	-0.1 ± 2.2	10
Fe-59	-0.4 ± 3.3	-	2.4 ± 6.8	0.9 ± 3.3	30
Co-58	1.1 ± 1.5	-	-1.6 ± 3.5	-0.7 ± 1.6	10
Co-60	-0.2 ± 1.6	-	1.2 ± 3.9	-1.0 ± 2.3	10
Zn-65	0.5 ± 4.0	-	-1.3 ± 7.0	-6.9 ± 4.3	30
Zr-Nb-95	-1.5 ± 1.9	-	-0.7 ± 3.0	0.6 ± 2.2	15
Cs-134	1.2 ± 2.0	-	-2.2 ± 4.0	-2.0 ± 2.0	10
Cs-137	0.1 ± 1.7	-	1.5 ± 2.9	0.9 ± 2.1	10
Ba-La-140	0.3 ± 1.9	-	-4.1 ± 4.9	-4.5 ± 2.2	15
Other Gammas[a]	-4.6 ± 2.2	-	-3.6 ± 2.7	-1.2 ± 2.1	30

Lab Code	ELW-2219	ELW-3036	ELW-3852	ELW-4577	
Date Collected	05-05-04	06-11-04	07-14-04	08-12-04	Req. LLD
Gross beta	2.5 ± 0.6	1.9 ± 0.5	1.7 ± 0.5	2.6 ± 0.6	4.0
I-131	-0.17 ± 0.21	-0.14 ± 0.26	-0.11 ± 0.20	0.02 ± 0.15	0.5
Be-7	4.7 ± 18.6	-15.2 ± 29.3	3.3 ± 22.0	-10.4 ± 20.9	
Mn-54	-0.4 ± 2.1	1.7 ± 4.0	0.1 ± 2.8	1.1 ± 2.7	10
Fe-59	-4.0 ± 3.0	5.5 ± 5.8	-4.5 ± 6.0	-4.1 ± 4.9	30
Co-58	-0.6 ± 1.8	2.6 ± 3.6	1.7 ± 2.6	-0.4 ± 2.4	10
Co-60	0.2 ± 2.0	0.4 ± 3.1	2.8 ± 3.3	0.3 ± 3.1	10
Zn-65	-0.8 ± 4.1	-0.8 ± 7.2	-4.8 ± 5.2	-1.9 ± 6.5	30
Zr-Nb-95	-0.7 ± 1.8	1.2 ± 3.4	0.7 ± 2.6	0.9 ± 2.6	15
Cs-134	-0.2 ± 1.9	0.3 ± 4.1	1.8 ± 3.1	-2.3 ± 3.5	10
Cs-137	0.9 ± 2.2	-1.4 ± 3.5	-1.3 ± 2.7	-0.1 ± 3.7	10
Ba-La-140	-0.9 ± 2.4	-4.7 ± 4.9	-0.4 ± 3.0	-8.2 ± 3.2	15
Other Gammas[a]	0.2 ± 2.0	-2.9 ± 3.3	-1.1 ± 2.4	-0.1 ± 2.6	30

Lab Code	ELW-5315	ELW-6040	ELW-6779	ELW-7244	
Date Collected	09-16-04	10-13-04	11-10-04	12-08-04	Req. LLD
Gross beta	2.9 ± 0.6	1.9 ± 0.6	2.7 ± 0.6	2.2 ± 0.5	4.0
I-131	-0.03 ± 0.18	-0.23 ± 0.18	-0.09 ± 0.15	0.16 ± 0.17	0.5
Be-7	7.0 ± 19.6	9.5 ± 32.9	15.5 ± 24.4	-4.2 ± 19.0	
Mn-54	-0.4 ± 1.7	1.8 ± 3.3	-1.6 ± 2.8	0.7 ± 2.1	10
Fe-59	0.9 ± 3.4	4.6 ± 6.0	1.4 ± 6.7	1.2 ± 3.2	30
Co-58	-0.4 ± 2.0	-1.4 ± 3.6	-1.3 ± 3.2	-4.0 ± 2.5	10
Co-60	0.4 ± 2.8	1.1 ± 3.7	1.5 ± 3.4	-3.3 ± 2.1	10
Zn-65	-2.1 ± 4.6	-2.0 ± 7.4	-3.4 ± 6.6	-3.5 ± 4.3	30
Zr-Nb-95	2.2 ± 2.2	1.4 ± 3.9	1.7 ± 3.4	-1.7 ± 2.2	15
Cs-134	2.2 ± 2.2	-2.4 ± 4.6	-1.2 ± 3.6	0.2 ± 2.2	10
Cs-137	-2.3 ± 2.3	1.7 ± 3.5	1.4 ± 3.1	0.2 ± 2.1	10
Ba-La-140	-0.6 ± 2.6	-12.0 ± 3.6	-2.5 ± 5.0	3.8 ± 2.0	15
Other Gammas[a]	-0.2 ± 2.5	0.2 ± 3.6	-3.7 ± 2.9	1.7 ± 2.3	30

[a] Ru-103

[b] "NS" = No sample; see Table 2.0, Listing of Missed Samples.

POINT BEACH

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

Lab Code	ELW-259	NS[b]	ELW-1138	ELW-1682	
Date Collected	01-15-04	-	03-23-04	04-13-04	Req. LLD
Gross beta	3.5 ± 0.6	-	3.5 ± 0.6	2.6 ± 0.6	4.0
I-131	-0.02 ± 0.19	-	-0.07 ± 0.13	-0.13 ± 0.20	0.5
Be-7	-1.1 ± 19.0	-	7.8 ± 26.1	10.9 ± 18.3	
Mn-54	-0.8 ± 2.8	-	-2.0 ± 3.3	-2.2 ± 2.0	10
Fe-59	0.3 ± 4.5	-	-2.5 ± 6.8	0.3 ± 3.0	30
Co-58	0.2 ± 2.8	-	1.7 ± 3.5	0.2 ± 1.6	10
Co-60	-0.7 ± 2.6	-	0.4 ± 3.9	0.3 ± 1.6	10
Zn-65	-0.6 ± 4.8	-	2.0 ± 5.2	-3.5 ± 3.8	30
Zr-Nb-95	-2.1 ± 2.4	-	-1.6 ± 3.2	2.8 ± 1.7	15
Cs-134	-0.2 ± 3.3	-	0.6 ± 4.0	-2.6 ± 2.2	10
Cs-137	1.0 ± 3.2	-	-0.6 ± 2.9	-1.2 ± 2.0	10
Ba-La-140	-0.6 ± 4.4	-	1.3 ± 3.0	-0.3 ± 2.2	15
Other Gammas[a]	0.0 ± 2.4	-	-0.6 ± 3.7	-0.7 ± 1.9	30

Lab Code	ELW-2220	ELW-3037	ELW-3853	ELW-4578	
Date Collected	05-05-04	06-11-04	07-14-04	08-12-04	Req. LLD
Gross beta	3.4 ± 0.6	4.9 ± 0.7	1.8 ± 0.5	4.2 ± 0.6	4.0
I-131	-0.15 ± 0.20	0.13 ± 0.26	0.14 ± 0.21	0.26 ± 0.17	0.5
Be-7	-4.3 ± 12.1	-12.6 ± 30.0	-24.4 ± 22.8	-0.7 ± 17.7	
Mn-54	-0.8 ± 1.3	3.9 ± 3.3	2.6 ± 3.0	-2.4 ± 2.2	10
Fe-59	-1.3 ± 2.4	1.8 ± 2.8	4.5 ± 5.8	-0.3 ± 2.9	30
Co-58	0.8 ± 1.2	0.4 ± 2.8	-4.1 ± 3.0	-0.4 ± 1.7	10
Co-60	-0.1 ± 1.2	1.8 ± 2.9	2.4 ± 2.6	0.1 ± 2.0	10
Zn-65	-1.2 ± 2.3	0.7 ± 6.6	4.3 ± 5.1	-0.7 ± 4.3	30
Zr-Nb-95	0.7 ± 1.3	-0.2 ± 2.9	2.3 ± 2.9	0.1 ± 1.6	15
Cs-134	-1.6 ± 1.5	-2.0 ± 4.0	-1.0 ± 3.2	-3.1 ± 2.3	10
Cs-137	1.8 ± 1.3	1.5 ± 3.2	-1.1 ± 2.7	-0.3 ± 2.1	10
Ba-La-140	-1.3 ± 1.5	0.9 ± 4.6	-15.3 ± 4.2	-0.4 ± 1.9	15
Other Gammas[a]	-0.6 ± 1.5	-1.4 ± 3.4	-3.1 ± 2.9	-0.8 ± 2.3	30

Lab Code	ELW-5316, 7	ELW-6041	ELW-6780	ELW-7245	
Date Collected	09-16-04	10-13-04	11-10-04	12-08-04	Req. LLD
Gross beta	2.7 ± 0.4	1.6 ± 0.5	2.6 ± 0.6	5.1 ± 0.7	4.0
I-131	-0.13 ± 0.16	-0.13 ± 0.20	-0.16 ± 0.15	-0.11 ± 0.14	0.5
Be-7	4.1 ± 17.6	-3.9 ± 11.7	-7.4 ± 17.2	-18.7 ± 30.0	
Mn-54	-0.2 ± 1.9	-0.4 ± 1.4	-1.2 ± 2.0	1.4 ± 3.1	10
Fe-59	-2.2 ± 4.2	-0.1 ± 2.5	-5.6 ± 4.1	-0.4 ± 4.6	30
Co-58	-2.6 ± 2.8	-0.2 ± 1.2	-1.6 ± 2.0	-5.3 ± 3.1	10
Co-60	-0.3 ± 1.6	0.7 ± 1.2	0.6 ± 1.7	0.7 ± 3.2	10
Zn-65	-1.8 ± 4.5	-0.2 ± 2.6	-1.8 ± 4.9	-6.4 ± 6.1	30
Zr-Nb-95	1.8 ± 2.1	-1.5 ± 1.4	-3.0 ± 1.8	-1.3 ± 3.2	15
Cs-134	0.3 ± 1.9	-1.8 ± 1.5	-1.1 ± 2.1	3.9 ± 4.1	10
Cs-137	-0.4 ± 1.9	-0.6 ± 1.4	0.0 ± 2.2	0.6 ± 3.2	10
Ba-La-140	-2.9 ± 2.0	-6.1 ± 1.6	2.0 ± 2.3	-4.4 ± 3.8	15
Other Gammas[a]	-1.3 ± 1.9	-0.5 ± 1.3	-0.7 ± 2.0	-1.2 ± 3.1	30

[a] Ru-103
[b] "NS" = No sample; see Table 2.0, Listing of Missed Samples.

POINT BEACH

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.	2nd Qtr.	3rd Qtr.	4th Qtr.
Lab Code	ELW-1215	ELW-3178	ELW-5615	ELW-7594
H-3	118 ± 84	189 ± 86	102 ± 89	139 ± 89
Sr-89	-0.17 ± 0.53	-1.01 ± 0.78	-0.90 ± 1.14	0.60 ± 0.79
Sr-90	0.49 ± 0.32	1.09 ± 0.42	1.01 ± 0.62	0.48 ± 0.32

Location	E-05 (Two Creeks Park)			
Period	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Lab Code	ELW-1216	ELW-3179	ELW-5616	ELW-7595[a]
H-3	60 ± 82	217 ± 87	40 ± 86	1186 ± 126
Sr-89	-0.30 ± 0.56	0.46 ± 0.73	-0.34 ± 1.08	0.47 ± 0.84
Sr-90	0.55 ± 0.33	0.73 ± 0.34	0.74 ± 0.55	0.42 ± 0.35

Location	E-06 (Coast Guard Station)			
Period	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Lab Code	ELW-1217	ELW-3180	ELW-5617	ELW-7596
H-3	82 ± 83	253 ± 88	109 ± 89	56 ± 86
Sr-89	-0.12 ± 0.48	-0.26 ± 0.65	-1.04 ± 1.15	0.11 ± 0.85
Sr-90	0.49 ± 0.29	0.52 ± 0.33	1.12 ± 0.62	0.38 ± 0.37

Location	E-33 (Nature Conservancy)			
Period	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Lab Code	ELW-1218	ELW-3181	ELW-5618	ELW-7597
H-3	123 ± 84	146 ± 84	47 ± 86	118 ± 88
Sr-89	0.04 ± 0.52	0.50 ± 0.63	0.44 ± 0.97	-0.52 ± 0.79
Sr-90	0.40 ± 0.31	0.22 ± 0.29	0.51 ± 0.47	0.64 ± 0.33

[a] Tritium repeated with a result of 1144±127 pCi/L.

Note: pages 23 and 24 are intentionally left out.

POINT BEACH NUCLEAR PLANT

Fish, analyses for gross beta and gamma emitting isotopes.
Location: E-13
Collection: 3x / year Units: pCi/g wet

	Sample Description and Concentration				Required LLD
Collection Date	03-12-04	03-12-04	03-12-04	03-12-04	
Lab Code	EF-1021	EF-1022	EF-1023	EF-1024	
Type	Rainbow Trout	Brown Trout	Brown Trout	Brown Trout	
Ratio (wet/dry wt.)	1.80	2.80	1.96	2.10	
Gross Beta	3.31 ± 0.11	3.97 ± 0.11	3.36 ± 0.09	3.81 ± 0.10	0.5
K-40	3.03 ± 0.44	3.15 ± 0.68	3.16 ± 0.42	3.08 ± 0.44	
Mn-54	0.009 ± 0.010	0.009 ± 0.021	0.003 ± 0.010	-0.004 ± 0.007	0.13
Fe-59	0.004 ± 0.017	-0.003 ± 0.039	-0.005 ± 0.022	-0.009 ± 0.022	0.26
Co-58	0.004 ± 0.007	-0.007 ± 0.017	-0.001 ± 0.008	0.009 ± 0.008	0.13
Co-60	0.001 ± 0.009	-0.015 ± 0.020	0.007 ± 0.011	0.011 ± 0.012	0.13
Zn-65	0.003 ± 0.024	-0.035 ± 0.046	0.009 ± 0.022	0.001 ± 0.019	0.26
Ru-103	-0.004 ± 0.007	-0.018 ± 0.019	0.005 ± 0.008	-0.004 ± 0.008	0.5
Cs-134	0.001 ± 0.010	-0.007 ± 0.024	0.008 ± 0.011	0.001 ± 0.009	0.13
Cs-137	0.023 ± 0.013	0.017 ± 0.024	0.031 ± 0.013	0.074 ± 0.026	0.15
Collection Date	08-12-04	08-12-04	08-12-04	10-03-04	
Lab Code	EF-4512	EF-4513	EF-4514	EF-7209	
Type	Burbot	Burbot	Lake Trout	Lake Trout	
Ratio (wet/dry wt.)	4.37	5.09	2.14	2.79	
Gross Beta	2.62 ± 0.06	2.60 ± 0.08	2.80 ± 0.09	3.38 ± 0.12	0.5
K-40	2.00 ± 0.48	1.72 ± 0.51	2.54 ± 0.48	2.76 ± 0.24	
Mn-54	0.009 ± 0.011	0.002 ± 0.012	0.011 ± 0.013	0.007 ± 0.005	0.13
Fe-59	-0.014 ± 0.025	0.032 ± 0.028	0.058 ± 0.024	0.012 ± 0.010	0.26
Co-58	0.008 ± 0.010	-0.025 ± 0.014	-0.004 ± 0.014	0.007 ± 0.005	0.13
Co-60	0.007 ± 0.014	-0.001 ± 0.010	0.007 ± 0.013	0.001 ± 0.004	0.13
Zn-65	-0.004 ± 0.033	-0.028 ± 0.025	0.014 ± 0.027	-0.026 ± 0.014	0.26
Ru-103	-0.003 ± 0.009	0.006 ± 0.010	0.003 ± 0.011	-0.033 ± 0.005	0.5
Cs-134	-0.004 ± 0.013	-0.003 ± 0.013	0.009 ± 0.014	0.002 ± 0.005	0.13
Cs-137	0.071 ± 0.033	0.026 ± 0.018	0.052 ± 0.026	0.046 ± 0.014	0.15

POINT BEACH NUCLEAR PLANT

Fish, analyses for gross beta and gamma emitting isotopes.
Location: E-13
Collection: 3x / year Units: pCi/L

	Sample Description and Concentration (pCi/g wet)		Required LLD
Collection Date	09-29-04	09-29-04	
Lab Code	EF-7210	EF-7211,12	
Type	Lake Trout	Lake Trout	
Ratio (wet/dry wt.)	2.39	2.15	
Gross Beta	4.70 ± 0.12	5.77 ± 0.13	0.5
K-40	2.86 ± 0.25	2.92 ± 0.19	
Mn-54	0.000 ± 0.006	-0.002 ± 0.005	0.13
Fe-59	0.013 ± 0.012	0.002 ± 0.011	0.26
Co-58	0.005 ± 0.006	-0.001 ± 0.005	0.13
Co-60	0.002 ± 0.006	0.001 ± 0.006	0.13
Zn-65	-0.015 ± 0.015	-0.014 ± 0.014	0.26
Ru-103	0.037 ± 0.005	-0.005 ± 0.005	0.5
Cs-134	-0.003 ± 0.007	0.003 ± 0.006	0.13
Cs-137	0.056 ± 0.014	0.047 ± 0.011	0.15

NOTE: Page 27 is intentionally left out.

POINT BEACH NUCLEAR PLANT

RADIOACTIVITY IN SHORELINE SEDIMENT SAMPLES

(Semiannual Collections)

Sample Description and Concentration (pCi/g dry)

Collection Date	04-13-04	04-13-04	04-13-04	Required
Lab Code	ESS-1669	ESS-1670	ESS-1671	LLD
Location	E-01	E-05	E-06	
Gross Beta	9.92 ± 1.48	8.78 ± 1.90	7.86 ± 1.87	2.0
Be-7	0.027 ± 0.053	0.044 ± 0.062	0.123 ± 0.077	
K-40	3.83 ± 0.33	7.42 ± 0.42	5.95 ± 0.55	-
Cs-137	0.011 ± 0.008	0.026 ± 0.009	0.015 ± 0.013	0.15
Tl-208	0.033 ± 0.014	0.054 ± 0.016	0.075 ± 0.028	-
Pb-212	0.08 ± 0.018	0.14 ± 0.020	0.16 ± 0.024	-
Bi-214	0.08 ± 0.028	0.11 ± 0.028	0.13 ± 0.035	-
Ra-226	0.36 ± 0.144	0.28 ± 0.182	0.41 ± 0.233	-
Ac-228	0.06 ± 0.036	0.19 ± 0.071	0.25 ± 0.089	-

Collection Date	04-13-04	04-13-04		
Lab Code	ESS-1672	ESS-1673		
Location	E-12	E-33		
Gross Beta	5.88 ± 1.83	11.54 ± 2.15		2.0
Be-7	0.079 ± 0.052	0.060 ± 0.066		
K-40	4.62 ± 0.34	9.18 ± 0.67		-
Cs-137	0.021 ± 0.012	0.016 ± 0.012		0.15
Tl-208	0.048 ± 0.013	0.038 ± 0.021		-
Pb-212	0.14 ± 0.020	0.09 ± 0.020		-
Bi-214	0.16 ± 0.027	0.14 ± 0.045		-
Ra-226	0.32 ± 0.171	0.29 ± 0.158		-
Ac-228	0.15 ± 0.043	0.12 ± 0.053		-

POINT BEACH NUCLEAR PLANT

RADIOACTIVITY IN SHORELINE SEDIMENT SAMPLES

(Semiannual Collections)

Sample Description and Concentration (pCi/g dry)

Collection Date Lab Code	10-13-04 ESS-6043	10-13-04 ESS-6044	10-13-04 ESS-6045	Required LLD
Location	E-01	E-05	E-06	
Gross Beta	6.89 ± 1.96	9.88 ± 2.01	8.40 ± 1.90	2.0
Be-7	-0.007 ± 0.061	0.003 ± 0.060	-0.022 ± 0.044	
K-40	5.81 ± 0.47	7.85 ± 0.55	8.24 ± 0.53	-
Cs-137	0.007 ± 0.010	0.016 ± 0.009	0.030 ± 0.016	0.15
Tl-208	0.042 ± 0.019	0.046 ± 0.021	0.038 ± 0.020	-
Pb-212	0.12 ± 0.019	0.12 ± 0.018	0.12 ± 0.019	-
Bi-214	0.11 ± 0.026	0.16 ± 0.040	0.12 ± 0.028	-
Ra-226	0.33 ± 0.15	0.29 ± 0.17	0.12 ± 0.13	-
Ac-228	0.17 ± 0.066	0.09 ± 0.045	0.16 ± 0.060	-

Collection Date Lab Code	10-13-04 ESS-6046,7	10-13-04 ESS-6048		
Location	E-12	E-33		
Gross Beta	8.75 ± 1.27	12.15 ± 1.45		2.0
Be-7	0.046 ± 0.045	0.080 ± 0.065		
K-40	5.77 ± 0.29	10.14 ± 0.59		-
Cs-137	0.022 ± 0.008	0.058 ± 0.021		0.15
Tl-208	0.041 ± 0.010	0.045 ± 0.017		-
Pb-212	0.16 ± 0.030	0.10 ± 0.020		-
Bi-214	0.12 ± 0.018	0.14 ± 0.038		-
Ra-226	0.29 ± 0.11	0.28 ± 0.15		-
Ac-228	0.16 ± 0.035	0.14 ± 0.075		-

POINT BEACH NUCLEAR PLANT

RADIOACTIVITY IN SOIL SAMPLES

(Semiannual Collections)

Sample Description and Concentration (pCi/g dry)				
Collection Date	05-26-04	05-26-04	05-26-04	Required
Lab Code	ESO-2572	ESO-2573	ESO-2574	LLD
Location	E-01	E-02	E-03	
Gross Beta	25.59 ± 2.65	31.25 ± 2.89	18.76 ± 2.29	2.0
Be-7	-0.01 ± 0.09	-0.04 ± 0.09	0.15 ± 0.10	
K-40	15.64 ± 1.03	23.01 ± 0.95	11.03 ± 0.83	-
Cs-137	0.19 ± 0.04	0.12 ± 0.03	0.02 ± 0.02	0.15
Tl-208	0.16 ± 0.04	0.23 ± 0.04	0.09 ± 0.03	-
Pb-212	0.46 ± 0.04	0.70 ± 0.04	0.22 ± 0.03	-
Bi-214	0.38 ± 0.06	0.53 ± 0.05	0.18 ± 0.04	-
Ra-226	1.05 ± 0.33	1.20 ± 0.32	0.60 ± 0.29	-
Ac-228	0.68 ± 0.17	0.76 ± 0.11	0.32 ± 0.11	-
Collection Date	05-26-04	05-26-04	05-26-04	
Lab Code	ESO-2575	ESO-2576	ESO-2577	
Location	E-04	E-06	E-08	
Gross Beta	24.82 ± 2.63	16.92 ± 2.25	17.45 ± 2.32	2.0
Be-7	0.04 ± 0.10	0.05 ± 0.10	-0.06 ± 0.07	
K-40	17.25 ± 1.05	11.81 ± 0.77	11.62 ± 0.76	-
Cs-137	0.16 ± 0.04	0.10 ± 0.03	0.06 ± 0.02	0.15
Tl-208	0.16 ± 0.04	0.11 ± 0.03	0.10 ± 0.03	-
Pb-212	0.44 ± 0.04	0.36 ± 0.04	0.22 ± 0.03	-
Bi-214	0.34 ± 0.07	0.29 ± 0.05	0.22 ± 0.04	-
Ra-226	0.67 ± 0.30	0.55 ± 0.29	0.53 ± 0.22	-
Ac-228	0.45 ± 0.11	0.42 ± 0.10	0.32 ± 0.08	-
Collection Date	05-26-04	05-26-04		
Lab Code	ESO-2578,9	ESO-2580		
Location	E-09	E-20		
Gross Beta	28.40 ± 2.21	23.82 ± 2.78		2.0
Be-7	0.02 ± 0.13	0.09 ± 0.09		
K-40	19.17 ± 0.65	16.59 ± 0.88		-
Cs-137	0.18 ± 0.03	0.43 ± 0.05		0.15
Tl-208	0.19 ± 0.03	0.14 ± 0.03		-
Pb-212	0.53 ± 0.03	0.52 ± 0.11		-
Bi-214	0.44 ± 0.04	0.38 ± 0.06		-
Ra-226	1.01 ± 0.23	0.60 ± 0.30		-
Ac-228	0.55 ± 0.07	0.51 ± 0.10		-

POINT BEACH NUCLEAR PLANT

RADIOACTIVITY IN SOIL SAMPLES

(Semiannual Collections)

Sample Description and Concentration (pCi/g dry)				
Collection Date	10-29-04	10-29-04	10-29-04	Required
Lab Code	ESO-6580	ESO-6581	ESO-6582	LLD
Location	E-01	E-02	E-03	
Gross Beta	27.08 ± 2.73	28.47 ± 2.77	27.91 ± 2.78	2.0
Be-7	0.16 ± 0.10	0.16 ± 0.10	0.260 ± 0.10	
K-40	17.85 ± 0.94	21.95 ± 1.00	18.84 ± 0.91	-
Cs-137	0.15 ± 0.03	0.14 ± 0.04	0.16 ± 0.04	0.15
Tl-208	0.20 ± 0.04	0.21 ± 0.04	0.18 ± 0.03	-
Pb-212	0.80 ± 0.13	0.73 ± 0.12	0.64 ± 0.11	-
Bi-214	0.43 ± 0.08	0.52 ± 0.06	0.46 ± 0.06	-
Ra-226	1.27 ± 0.46	0.74 ± 0.34	0.86 ± 0.31	-
Ac-228	0.95 ± 0.14	0.74 ± 0.15	0.64 ± 0.14	-
Collection Date	10-29-04	10-29-04	10-29-04	
Lab Code	ESO-6583	ESO-6584	ESO-6585	
Location	E-04	E-06	E-08	
Gross Beta	28.22 ± 2.73	25.62 ± 2.67	10.91 ± 1.96	2.0
Be-7	0.180 ± 0.16	0.18 ± 0.13	0.037 ± 0.07	
K-40	19.54 ± 1.15	18.46 ± 1.13	9.25 ± 0.55	-
Cs-137	0.22 ± 0.07	0.14 ± 0.04	0.011 0.008	0.15
Tl-208	0.20 ± 0.04	0.21 ± 0.04	0.08 ± 0.02	-
Pb-212	0.61 ± 0.05	0.54 ± 0.04	0.27 ± 0.07	-
Bi-214	0.41 ± 0.06	0.47 ± 0.09	0.19 ± 0.04	-
Ra-226	1.15 ± 0.42	0.98 ± 0.32	0.35 ± 0.17	-
Ac-228	0.67 ± 0.16	0.63 ± 0.15	0.25 ± 0.06	-
Collection Date	10-29-04	10-29-04		
Lab Code	ESO-6586	ESO-6587		
Location	E-09	E-20		
Gross Beta	27.72 ± 2.69	26.05 ± 2.67		2.0
Be-7	-0.04 ± 0.10	0.41 ± 0.14		
K-40	20.36 ± 0.94	15.79 ± 1.04		-
Cs-137	0.05 ± 0.02	0.09 ± 0.04		0.15
Tl-208	0.23 ± 0.03	0.17 ± 0.04		-
Pb-212	0.80 ± 0.12	0.54 ± 0.04		-
Bi-214	0.55 ± 0.06	0.45 ± 0.07		-
Ra-226	1.30 ± 0.32	0.92 ± 0.31		-
Ac-228	0.93 ± 0.14	0.69 ± 0.19		-

POINT BEACH NUCLEAR PLANT

RADIOACTIVITY IN VEGETATION SAMPLES

(Tri-Annual Collections)

Sample Description and Concentration (pCi/g wet)

Location	E-01	E-02	E-03	
Collection Date	05-26-04	05-26-04	05-26-04	
Lab Code	EG-2564	EG-2565	EG-2566	Req. LLD
Ratio (wet/dry)	4.06	5.52	5.21	-
Gross Beta	5.52 ± 0.11	4.91 ± 0.10	6.28 ± 0.12	0.25
Be-7	1.64 ± 0.21	1.44 ± 0.27	0.71 ± 0.30	-
K-40	4.72 ± 0.44	4.79 ± 0.60	5.59 ± 0.63	-
I-131	-0.002 ± 0.008	0.012 ± 0.013	-0.012 ± 0.013	0.060
Cs-134	0.003 ± 0.008	-0.006 ± 0.016	-0.004 ± 0.014	0.060
Cs-137	0.000 ± 0.008	0.004 ± 0.013	0.005 ± 0.014	0.080
Other Gammas[a]	-0.006 ± 0.009	0.017 ± 0.014	0.001 ± 0.013	0.060

Location	E-04	E-06	E-08	
Collection Date	05-26-04	05-26-04	05-26-04	
Lab Code	EG-2567	EG-2568	EG-2569	Req. LLD
Ratio (wet/dry)	5.15	4.28	3.70	-
Gross Beta	5.10 ± 0.10	5.40 ± 0.11	6.02 ± 0.11	0.25
Be-7	0.91 ± 0.23	1.08 ± 0.32	1.58 ± 0.35	-
K-40	5.57 ± 0.67	6.09 ± 0.66	6.40 ± 0.87	-
I-131	-0.005 ± 0.010	-0.007 ± 0.017	0.014 ± 0.013	0.060
Cs-134	0.014 ± 0.016	0.005 ± 0.016	0.014 ± 0.019	0.060
Cs-137	0.008 ± 0.014	0.003 ± 0.019	0.002 ± 0.018	0.080
Other Gammas[a]	0.008 ± 0.016	-0.016 ± 0.017	0.002 ± 0.022	0.060

Location	E-09	E-20		
Collection Date	05-26-04	05-26-04		
Lab Code	EG-2570	EG-2571		Req. LLD
Ratio (wet/dry)	3.97	5.11		-
Gross Beta	6.55 ± 0.16	6.99 ± 0.14		0.25
Be-7	1.52 ± 0.32	1.43 ± 0.24		-
K-40	5.29 ± 0.49	6.12 ± 0.51		-
I-131	0.004 ± 0.012	-0.015 ± 0.009		0.060
Cs-134	-0.006 ± 0.011	-0.017 ± 0.013		0.060
Cs-137	0.010 ± 0.012	0.005 ± 0.011		0.080
Other Gammas[a]	-0.006 ± 0.010	0.000 ± 0.008		0.060

[a] See Introduction.

POINT BEACH NUCLEAR PLANT

RADIOACTIVITY IN VEGETATION SAMPLES
(Tri-Annual Collections)

Sample Description and Concentration (pCi/g wet)				
Location	E-01	E-02	E-03	
Collection Date	07-27-04	07-27-04	07-27-04	
Lab Code	EG-4113	EG-4114	EG-4115	Req. LLD
Ratio (wet/dry)	2.63	2.83	2.34	-
Gross Beta	6.04 ± 0.17	6.34 ± 0.17	7.66 ± 0.20	0.25
Be-7	0.88 ± 0.28	1.10 ± 0.32	0.96 ± 0.24	-
K-40	5.51 ± 0.67	5.05 ± 0.65	8.37 ± 0.89	-
I-131	0.001 ± 0.013	-0.003 ± 0.014	0.009 ± 0.014	0.060
Cs-134	0.005 ± 0.016	0.005 ± 0.019	0.001 ± 0.016	0.060
Cs-137	0.000 ± 0.014	-0.004 ± 0.016	-0.006 ± 0.017	0.080
Other Gammas[a]	0.003 ± 0.016	0.001 ± 0.013	-0.003 ± 0.017	0.060
Location	E-04	E-06	E-08	
Collection Date	07-27-04	07-27-04	07-27-04	
Lab Code	EG-4116	EG-4117	EG-4118	Req. LLD
Ratio (wet/dry)	2.54	2.66	2.33	-
Gross Beta	5.42 ± 0.13	8.25 ± 0.20	7.32 ± 0.18	0.25
Be-7	0.89 ± 0.25	1.30 ± 0.27	0.96 ± 0.29	-
K-40	3.81 ± 0.46	5.47 ± 0.49	4.90 ± 0.51	-
I-131	0.001 ± 0.011	-0.022 ± 0.008	0.015 ± 0.013	0.060
Cs-134	-0.004 ± 0.011	-0.001 ± 0.011	-0.002 ± 0.012	0.060
Cs-137	0.004 ± 0.011	0.007 ± 0.010	0.013 ± 0.012	0.080
Other Gammas[a]	0.003 ± 0.011	0.008 ± 0.009	-0.001 ± 0.013	0.060
Location	E-09	E-20		
Collection Date	07-27-04	07-27-04		
Lab Code	EG-4119	EG-4120		Req. LLD
Ratio (wet/dry)	2.78	2.85		-
Gross Beta	4.86 ± 0.11	5.60 ± 0.13		0.25
Be-7	0.75 ± 0.20	1.03 ± 0.32		-
K-40	4.45 ± 0.48	6.21 ± 0.74		-
I-131	0.001 ± 0.010	0.013 ± 0.016		0.060
Cs-134	0.010 ± 0.008	-0.009 ± 0.018		0.060
Cs-137	0.035 ± 0.017	0.012 ± 0.016		0.080
Other Gammas[a]	-0.003 ± 0.009	0.015 ± 0.015		0.060

[a] See Introduction.

POINT BEACH NUCLEAR PLANT

RADIOACTIVITY IN VEGETATION SAMPLES
(Tri-Annual Collections)

Sample Description and Concentration (pCi/g wet)				
Location	E-01	E-02	E-03	
Collection Date	10-29-04	10-29-04	10-29-04	
Lab Code	EG-6531	EG-6532	EG-6533	Req. LLD
Ratio (wet/dry)	5.09	4.8	4.52	-
Gross Beta	4.85 ± 0.20	5.22 ± 0.21	4.03 ± 0.15	0.25
Be-7	1.72 ± 0.23	1.42 ± 0.30	2.48 ± 0.34	-
K-40	3.70 ± 0.33	3.89 ± 0.61	4.02 ± 0.46	-
I-131	0.005 ± 0.007	-0.006 ± 0.008	-0.005 ± 0.013	0.060
Cs-134	0.004 ± 0.008	-0.002 ± 0.015	0.000 ± 0.012	0.060
Cs-137	-0.003 ± 0.008	-0.006 ± 0.013	0.009 ± 0.013	0.080
Other Gammas[a]	0.004 ± 0.007	0.008 ± 0.016	-0.001 ± 0.012	0.060
Location	E-04	E-06	E-08	
Collection Date	10-29-04	10-29-04	10-29-04	
Lab Code	EG-6534	EG-6535	EG-6536	Req. LLD
Ratio (wet/dry)	4.58	5.21	4.91	-
Gross Beta	3.58 ± 0.16	6.43 ± 0.18	3.23 ± 0.12	0.25
Be-7	2.42 ± 0.38	2.06 ± 0.38	1.70 ± 0.32	-
K-40	2.63 ± 0.30	5.90 ± 0.72	3.95 ± 0.62	-
I-131	0.005 ± 0.009	0.003 ± 0.012	-0.007 ± 0.014	0.060
Cs-134	0.003 ± 0.009	-0.007 ± 0.017	-0.001 ± 0.017	0.060
Cs-137	-0.004 ± 0.010	0.020 ± 0.014	0.002 ± 0.017	0.080
Other Gammas[a]	-0.002 ± 0.009	0.010 ± 0.013	0.012 ± 0.015	0.060
Location	E-09	E-20		
Collection Date	10-29-04	10-29-04		
Lab Code	EG-6537	EG-6538		Req. LLD
Ratio (wet/dry)	4.07	4.68		-
Gross Beta	5.33 ± 0.19	4.62 ± 0.18		0.25
Be-7	2.23 ± 0.24	2.13 ± 0.26		-
K-40	3.99 ± 0.35	3.58 ± 0.44		-
I-131	0.020 ± 0.009	-0.018 ± 0.009		0.060
Cs-134	0.002 ± 0.009	-0.004 ± 0.010		0.060
Cs-137	0.008 ± 0.009	0.001 ± 0.010		0.080
Other Gammas[a]	0.009 ± 0.008	0.002 ± 0.010		0.060

[a] See Introduction.

POINT BEACH NUCLEAR PLANT

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

Collection: Semiannual Units: pCi/g wet

Sample Description and Concentration			
Collection Date	06-05-04	06-05-04	Required
Lab Code	ESL-2857	ESL-2858	LLD
Location	E-05	E-12	
Ratio (wet wt./dry wt.)	4.61	3.37	
Gross Beta	4.69 ± 0.25	2.13 ± 0.26	0.25
Be-7	1.02 ± 0.29	0.87 ± 0.30	-
K-40	2.90 ± 0.50	1.23 ± 0.42	-
Co-58	0.037 ± 0.013	0.007 ± 0.015	0.25
Co-60	0.006 ± 0.013	0.008 ± 0.013	0.25
Cs-134	-0.009 ± 0.014	0.008 ± 0.022	0.25
Cs-137	0.024 ± 0.016	0.021 ± 0.021	0.25
Collection Date	08-04-04	08-04-04	Required
Lab Code	ESL-4288	ESL-4289	LLD
Location	E-05	E-12	
Ratio (wet wt./dry wt.)	1.74	1.91	
Gross Beta	5.15 ± 0.91	4.76 ± 0.66	0.25
Be-7	0.42 ± 0.14	0.49 ± 0.17	-
K-40	2.94 ± 0.63	2.08 ± 0.67	-
Co-58	0.020 ± 0.017	0.021 ± 0.017	0.25
Co-60	0.027 ± 0.024	-0.014 ± 0.025	0.25
Cs-134	0.007 ± 0.016	0.008 ± 0.017	0.25
Cs-137	0.007 ± 0.020	0.023 ± 0.023	0.25
Collection Date	10-06-04	10-06-04	Required
Lab Code	ESL-5741	ESL-5742	LLD
Location	E-05	E-12	
Ratio (wet wt./dry wt.)	4.25	2.17	
Gross Beta	4.82 ± 0.38	5.02 ± 0.67	0.25
Be-7	0.39 ± 0.13	0.09 ± 0.11	-
K-40	3.50 ± 0.53	3.10 ± 0.54	-
Co-58	0.009 ± 0.010	-0.004 ± 0.014	0.25
Co-60	0.005 ± 0.015	0.005 ± 0.017	0.25
Cs-134	0.001 ± 0.012	-0.009 ± 0.014	0.25
Cs-137	0.021 ± 0.015	0.009 ± 0.015	0.25

POINT BEACH NUCLEAR PLANT

AMBIENT GAMMA RADIATION (TLD)

1st. Quarter, 2004

	Date Annealed:	12-15-03	Days in the field	86
	Date Placed:	01-09-04	Days from Annealing	
	Date Removed:	04-04-04	to Readout:	114
	Date Read:	04-07-04		

Location	Days in Field	Total mR	Net mR	Net mR per 7 days
Indicator				
E-1	86	14.2 ± 0.9	9.5 ± 1.2	0.77 ± 0.10
E-2	86	17.1 ± 0.8	12.4 ± 1.1	1.01 ± 0.09
E-3	86	17.8 ± 1.2	13.1 ± 1.4	1.06 ± 0.12
E-4	86	15.3 ± 1.3	10.6 ± 1.5	0.86 ± 0.12
E-5	86	17.1 ± 0.9	12.4 ± 1.2	1.01 ± 0.10
E-6	86	15.6 ± 0.9	10.9 ± 1.2	0.89 ± 0.10
E-7	86	15.6 ± 0.8	10.9 ± 1.1	0.89 ± 0.09
E-8	86	15.3 ± 0.8	10.6 ± 1.1	0.86 ± 0.09
E-9	86	17.9 ± 0.3	13.2 ± 0.8	1.07 ± 0.07
E-12	86	13.6 ± 0.4	8.9 ± 0.9	0.72 ± 0.07
E-14	86	16.4 ± 0.5	11.7 ± 0.9	0.95 ± 0.07
E-15	86	17.0 ± 0.4	12.3 ± 0.9	1.00 ± 0.07
E-16	86	16.4 ± 0.4	11.7 ± 0.9	0.95 ± 0.07
E-17	86	16.9 ± 0.5	12.2 ± 0.9	0.99 ± 0.07
E-18	86	17.0 ± 0.8	12.3 ± 1.1	1.00 ± 0.09
E-22	86	16.7 ± 1.1	12.0 ± 1.3	0.97 ± 0.11
E-23	86	15.9 ± 0.4	11.2 ± 0.9	0.91 ± 0.07
E-24	86	16.3 ± 0.6	11.6 ± 1.0	0.94 ± 0.08
E-25	86	15.1 ± 0.2	10.4 ± 0.8	0.84 ± 0.06
E-26	86	14.1 ± 0.2	9.4 ± 0.8	0.76 ± 0.06
E-27	86	15.4 ± 0.2	10.7 ± 0.8	0.87 ± 0.06
E-28	86	13.5 ± 0.4	8.8 ± 0.9	0.71 ± 0.07
E-29	86	14.7 ± 0.7	10.0 ± 1.0	0.81 ± 0.08
E-30	86	15.2 ± 0.6	10.5 ± 1.0	0.85 ± 0.08
E-31	86	17.2 ± 0.6	12.5 ± 1.0	1.02 ± 0.08
E-32	86	15.9 ± 0.5	11.2 ± 0.9	0.91 ± 0.07
E-38	86	16.5 ± 1.3	11.8 ± 1.5	0.96 ± 0.12
E-39	86	14.7 ± 0.5	10.0 ± 0.9	0.81 ± 0.07
Control				
E-20	86	15.7 ± 0.8	11.0 ± 1.1	0.89 ± 0.09
Mean±s.d.		15.9 ± 1.2	11.1 ± 1.2	0.91 ± 0.09

	In-Transit Exposure	
Date Annealed	12-15-03	03-17-04
Date Read	01-30-04	04-07-04
	Total mR	
ITC-1	6.6 ± 0.6	3.1 ± 0.3
ITC-2	6.6 ± 0.2	2.6 ± 0.3

POINT BEACH NUCLEAR PLANT

AMBIENT GAMMA RADIATION (TLD)
2nd Quarter, 2004

	Date Annealed:	03-17-04	Days in the field	88
	Date Placed:	04-04-04	Days from Annealing	
	Date Removed:	07-01-04	to Readout:	112
	Date Read:	07-07-04		

Location	Days in Field	Total mR	Net mR	Net mR per 7 days
Indicator				
E-1	88	13.4 ± 1.1	10.7 ± 1.2	0.85 ± 0.09
E-2	88	17.9 ± 1.2	15.2 ± 1.3	1.21 ± 0.10
E-3	88	18.0 ± 1.3	15.3 ± 1.4	1.22 ± 0.11
E-4	88	15.0 ± 0.5	12.3 ± 0.7	0.98 ± 0.05
E-5	88	16.5 ± 0.6	13.8 ± 0.7	1.10 ± 0.06
E-6	88	14.1 ± 0.4	11.4 ± 0.6	0.90 ± 0.05
E-7	88	12.9 ± 0.2	10.2 ± 0.5	0.81 ± 0.04
E-8	88	14.1 ± 0.6	11.4 ± 0.7	0.90 ± 0.06
E-9	88	16.7 ± 1.3	14.0 ± 1.4	1.11 ± 0.11
E-12	88	11.6 ± 0.9	8.9 ± 1.0	0.71 ± 0.08
E-14	88	15.4 ± 0.7	12.7 ± 0.8	1.01 ± 0.07
E-15	88	19.8 ± 1.4	17.1 ± 1.5	1.36 ± 0.12
E-16	88	14.6 ± 0.3	11.9 ± 0.5	0.94 ± 0.04
E-17	88	15.0 ± 0.8	12.3 ± 0.9	0.98 ± 0.07
E-18	88	16.0 ± 0.4	13.3 ± 0.6	1.06 ± 0.05
E-22	88	16.2 ± 0.2	13.5 ± 0.5	1.07 ± 0.04
E-23	88	16.7 ± 0.4	14.0 ± 0.6	1.11 ± 0.05
E-24	88	15.4 ± 0.3	12.7 ± 0.5	1.01 ± 0.04
E-25	88	16.1 ± 0.3	13.4 ± 0.5	1.06 ± 0.04
E-26	88	13.0 ± 0.3	10.3 ± 0.5	0.82 ± 0.04
E-27	88	15.1 ± 0.5	12.4 ± 0.7	0.98 ± 0.05
E-28	88	12.3 ± 0.3	9.6 ± 0.5	0.76 ± 0.04
E-29	88	13.4 ± 0.6	10.7 ± 0.7	0.85 ± 0.06
E-30	88	14.8 ± 0.3	12.1 ± 0.5	0.96 ± 0.04
E-31	88	17.0 ± 1.2	14.3 ± 1.3	1.14 ± 0.10
E-32	88	16.3 ± 1.0	13.6 ± 1.1	1.08 ± 0.09
E-38	88	14.6 ± 0.4	11.9 ± 0.6	0.94 ± 0.05
E-39	88	12.9 ± 0.4	10.2 ± 0.6	0.81 ± 0.05
Control				
E-20	88	14.9 ± 1.3	12.2 ± 1.4	0.97 ± 0.11
Mean±s.d.		15.2 ± 1.9	12.4 ± 1.9	0.99 ± 0.14

In-Transit Exposure

Date Annealed	03-17-04	06-17-04
Date Read	04-07-04	07-07-04
	Total mR	
ITC-1	3.1 ± 0.3	2.6 ± 0.1
ITC-2	2.6 ± 0.3	2.6 ± 0.1

POINT BEACH NUCLEAR PLANT

AMBIENT GAMMA RADIATION (TLD)
3rd Quarter, 2004

	Date Annealed:	06-17-04	Days in the field	98
	Date Placed:	07-01-04	Days from Annealing	
	Date Removed:	10-07-04	to Readout:	113
	Date Read:	10-08-04		

Location	Days in Field	Total mR	Net mR	Net mR per 7 days
Indicator				
E-1	98	16.3 ± 1.2	13.6 ± 1.2	0.97 ± 0.09
E-2	98	19.9 ± 0.2	17.2 ± 0.4	1.23 ± 0.03
E-3	98	23.9 ± 1.7	21.2 ± 1.7	1.51 ± 0.12
E-4	98	18.7 ± 1.5	16.0 ± 1.5	1.14 ± 0.11
E-5	98	22.1 ± 1.2	19.4 ± 1.2	1.39 ± 0.09
E-6	98	18.1 ± 1.2	15.4 ± 1.2	1.10 ± 0.09
E-7	98	19.8 ± 0.8	17.1 ± 0.9	1.22 ± 0.06
E-8	98	18.2 ± 0.8	15.5 ± 0.9	1.11 ± 0.06
E-9	98	22.3 ± 0.6	19.6 ± 0.7	1.40 ± 0.05
E-12	98	14.7 ± 0.4	12.0 ± 0.5	0.86 ± 0.04
E-14	98	20.9 ± 0.6	18.2 ± 0.7	1.30 ± 0.05
E-15	98	23.3 ± 0.7	20.6 ± 0.8	1.47 ± 0.06
E-16	98	20.3 ± 0.3	17.6 ± 0.5	1.26 ± 0.03
E-17	98	21.8 ± 0.9	19.1 ± 1.0	1.36 ± 0.07
E-18	98	22.6 ± 1.0	19.9 ± 1.1	1.42 ± 0.08
E-22	98	21.3 ± 1.5	18.6 ± 1.5	1.33 ± 0.11
E-23	98	21.5 ± 0.7	18.8 ± 0.8	1.34 ± 0.06
E-24	98	20.4 ± 0.5	17.7 ± 0.6	1.26 ± 0.04
E-25	98	19.5 ± 0.2	16.8 ± 0.4	1.20 ± 0.03
E-26	98	17.1 ± 0.2	14.4 ± 0.4	1.03 ± 0.03
E-27	98	18.7 ± 0.3	16.0 ± 0.5	1.14 ± 0.03
E-28	98	14.5 ± 0.1	11.8 ± 0.4	0.84 ± 0.03
E-29	98	17.3 ± 0.9	14.6 ± 1.0	1.04 ± 0.07
E-30	98	18.4 ± 0.7	15.7 ± 0.8	1.12 ± 0.06
E-31	98	20.5 ± 0.3	17.8 ± 0.5	1.27 ± 0.03
E-32	98	21.6 ± 0.7	18.9 ± 0.8	1.35 ± 0.06
E-38	98	20.8 ± 1.7	18.1 ± 1.7	1.29 ± 0.12
E-39	98	15.1 ± 0.5	12.4 ± 0.6	0.89 ± 0.04
Control				
E-20	98	19.1 ± 0.9	16.4 ± 1.0	1.17 ± 0.07
Mean±s.d.		19.6 ± 2.5	16.9 ± 2.5	1.21 ± 0.18

	In-Transit Exposure	
Date Annealed	06-17-04	09-20-04
Date Read	07-07-04	10-08-04
	Total mR	
ITC-1	2.6 ± 0.1	2.8 ± 0.3
ITC-2	2.6 ± 0.1	2.8 ± 0.1

POINT BEACH NUCLEAR PLANT

AMBIENT GAMMA RADIATION (TLD)
4th Quarter, 2004

Date Annealed:	09-20-04	Days in the field	89	
Date Placed:	10-07-04	Days from Annealing		
Date Removed:	01-04-05	to Readout:	126	
Date Read:	01-24-05			

Location	Days in Field	Total mR	Net mR	Net mR per 7 days
Indicator				
E-1	89	18.1 ± 1.0	13.6 ± 1.2	1.07 ± 0.10
E-2	89	24.1 ± 1.5	19.6 ± 1.7	1.54 ± 0.13
E-3	89	25.0 ± 2.0	20.5 ± 2.1	1.61 ± 0.17
E-4	89	20.9 ± 0.5	16.4 ± 0.9	1.29 ± 0.07
E-5	89	22.9 ± 0.9	18.4 ± 1.1	1.45 ± 0.09
E-6	89	20.1 ± 0.6	15.6 ± 0.9	1.23 ± 0.07
E-7	89	18.4 ± 0.3	13.9 ± 0.8	1.09 ± 0.06
E-8	89	20.1 ± 1.0	15.6 ± 1.2	1.23 ± 0.10
E-9	89	22.9 ± 1.6	18.4 ± 1.7	1.45 ± 0.14
E-12	89	16.4 ± 1.2	11.9 ± 1.4	0.94 ± 0.11
E-14	89	21.6 ± 1.2	17.1 ± 1.4	1.34 ± 0.11
E-15	89	25.9 ± 1.1	21.4 ± 1.3	1.68 ± 0.10
E-16	89	20.1 ± 0.5	15.6 ± 0.9	1.23 ± 0.07
E-17	89	20.8 ± 1.3	16.3 ± 1.5	1.28 ± 0.12
E-18	89	21.8 ± 0.2	17.3 ± 0.7	1.36 ± 0.06
E-22	89	21.8 ± 0.6	17.3 ± 0.9	1.36 ± 0.07
E-23	89	22.9 ± 0.7	18.4 ± 1.0	1.45 ± 0.08
E-24	89	21.0 ± 0.5	16.5 ± 0.9	1.30 ± 0.07
E-25	89	22.1 ± 0.3	17.6 ± 0.8	1.38 ± 0.06
E-26	89	18.4 ± 0.3	13.9 ± 0.8	1.09 ± 0.06
E-27	89	20.6 ± 0.7	16.1 ± 1.0	1.27 ± 0.08
E-28	89	15.9 ± 0.3	11.4 ± 0.8	0.90 ± 0.06
E-29	89	19.0 ± 0.8	14.5 ± 1.1	1.14 ± 0.08
E-30	89	20.5 ± 0.3	16.0 ± 0.8	1.26 ± 0.06
E-31	89	23.3 ± 1.7	18.8 ± 1.8	1.48 ± 0.14
E-32	89	22.1 ± 1.4	17.6 ± 1.6	1.38 ± 0.12
E-38	89	19.9 ± 0.6	15.4 ± 0.9	1.21 ± 0.07
E-39	89	15.5 ± 0.5	11.0 ± 0.9	0.87 ± 0.07
Control				
E-20	89	19.6 ± 1.3	15.1 ± 1.5	1.19 ± 0.12
Mean±s.d.		20.7 ± 2.5	16.2 ± 2.5	1.28 ± 0.19

	In-Transit Exposure	
Date Annealed	09-20-04	12-15-04
Date Read	10-08-04	01-25-05
	Total mR	
ITC-1	2.8 ± 0.3	6.4 ± 0.6
ITC-2	2.8 ± 0.1	6.0 ± 0.2

Environmental, Inc.
Midwest Laboratory
an Allegheny Technologies Co.

700 Landwehr Road • Northbrook, IL 60062-2
(847) 564-0700 fax (847) 564-4517

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 through December, 2004

Appendix A

Interlaboratory Comparison Program Results

Environmental, Inc., Midwest Laboratory, formerly Teledyne Brown Engineering Environmental Services 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.

The results in Table A-2 list 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. request.

Table A-5 list results of 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. Data for previous years available upon request.

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

The results in Table A-7 were obtained through participation in the Environmental Measurement Laboratory Quality Assessment Program.

Attachment A lists acceptance criteria for "spiked" samples.

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	$\pm 1\sigma$ = (pCi/liter) = $169.85 \times (\text{known})^{0.0933}$ 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	6.0 pCi/liter 10% of known value
Uranium-238, Nickel-63[b] Technetium-99[b]	≤ 35 pCi/liter > 35 pCi/liter	6.0 pCi/liter 15% of known value
Iron-55[b]	50 to 100 pCi/liter > 100 pCi/liter	10 pCi/liter 10% of known value
Others[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].

Lab Code	Date	Analysis	Concentration (pCi/L) Laboratory Result[b]	ERA Result[c]	Control Limits
STW-1005	02/17/04	Sr-89	36.5 ± 6.5	44.9 ± 4.5	36.2 - 53.6
STW-1005	02/17/04	Sr-90	13.4 ± 0.8	11.6 ± 1.2	2.9 - 20.3
STW-1006	02/17/04	Ba-133	60.9 ± 2.8	63.2 ± 6.3	52.3 - 74.1
STW-1006	02/17/04	Co-60	95.2 ± 1.5	96.4 ± 9.6	87.7 - 105.0
STW-1006	02/17/04	Cs-134	71.2 ± 5.4	75.8 ± 7.6	67.1 - 84.5
STW-1006	02/17/04	Cs-137	157.0 ± 6.5	155.0 ± 15.5	142.0 - 168.0
STW-1006	02/17/04	Zn-65	103.0 ± 1.1	102.0 ± 10.2	84.4 - 120.0
STW-1007	02/17/04	Gr. Alpha	15.6 ± 1.2	16.6 ± 1.7	7.9 - 25.3
STW-1007	02/17/04	Gr. Beta	46.3 ± 4.4	41.5 ± 4.2	32.8 - 50.2
STW-1008	02/17/04	Ra-226	8.7 ± 0.2	9.3 ± 0.0	6.9 - 11.7
STW-1008	02/17/04	Ra-228	16.6 ± 0.4	18.2 ± 1.8	10.3 - 26.1
STW-1008	02/17/04	Uranium	34.2 ± 0.8	33.0 ± 3.3	27.8 - 38.2
STW-1015	05/18/04	Sr-89	39.7 ± 3.3	45.9 ± 5.0	37.2 - 54.6
STW-1015	05/18/04	Sr-90	12.4 ± 0.9	11.6 ± 5.0	2.9 - 20.3
STW-1016	05/18/04	Ba-133	96.9 ± 2.4	101.0 ± 10.1	83.5 - 118.0
STW-1016	05/18/04	Co-60	39.9 ± 0.5	41.6 ± 5.0	32.9 - 50.3
STW-1016	05/18/04	Cs-134	48.8 ± 0.8	50.5 ± 5.0	41.8 - 59.2
STW-1016	05/18/04	Cs-137	82.6 ± 2.3	82.5 ± 5.0	73.8 - 91.2
STW-1016	05/18/04	Zn-65	77.5 ± 1.5	75.2 ± 7.5	62.2 - 88.2
STW-1017	05/18/04	Gr. Alpha	32.4 ± 2.1	38.8 ± 9.7	22.0 - 55.6
STW-1017	05/18/04	Gr. Beta	63.4 ± 3.5	59.6 ± 10.0	42.3 - 76.9
STW-1018	05/18/04	I-131	25.2 ± 0.4	25.1 ± 3.0	19.9 - 30.3
STW-1019	05/18/04	Ra-226	16.0 ± 1.1	17.3 ± 2.6	12.8 - 21.8
STW-1019	05/18/04	Ra-228	12.6 ± 0.9	10.3 ± 2.6	5.8 - 14.8
STW-1019	05/18/04	Uranium	13.0 ± 0.0	12.7 ± 3.0	7.5 - 17.9
STW-1020	05/18/04	H-3	32043 ± 166	30900 ± 3090	25600 - 36200
STW-1028	08/17/04	Sr-89	16.1 ± 1.9	20.0 ± 2.0	11.3 - 28.7
STW-1028	08/17/04	Sr-90	13.4 ± 0.1	13.6 ± 1.4	4.9 - 22.3
STW-1029	08/17/04	Ba-133	30.2 ± 3.9	32.1 ± 3.2	23.4 - 40.8
STW-1029	08/17/04	Co-60	24.9 ± 1.9	24.0 ± 2.4	15.3 - 32.7
STW-1029	08/17/04	Cs-134	21.4 ± 3.4	21.6 ± 2.2	12.9 - 30.3
STW-1029	08/17/04	Cs-137	205.6 ± 4.3	193.0 ± 19.3	176.0 - 210.0
STW-1029	08/17/04	Zn-65	145.5 ± 3.0	143.0 ± 14.3	118.0 - 168.0
STW-1030	08/17/04	Gr. Alpha	47.7 ± 9.1	57.0 ± 5.7	32.3 - 81.7
STW-1030	08/17/04	Gr. Beta	28.1 ± 2.5	20.0 ± 2.0	11.3 - 28.7
STW-1030	08/17/04	Gr. Beta	28.1 ± 2.5	20.0 ± 2.0	11.3 - 28.7
STW-1031	08/17/04	Ra-226	6.9 ± 0.5	6.3 ± 0.6	4.6 - 7.9
STW-1031	08/17/04	Ra-228	13.1 ± 1.4	14.7 ± 1.5	8.3 - 21.1
STW-1031	08/17/04	Uranium	6.0 ± 0.1	6.2 ± 0.6	1.0 - 11.4

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

Lab Code	Date	Analysis	Concentration (pCi/L) Laboratory Result[b]	ERA Result[c]	Control Limits
STW-1037	11/15/04	Sr-89	42.2 ± 3.5	45.7 ± 5.0	37.0 - 51.5
STW-1037	11/15/04	Sr-90	37.3 ± 1.3	36.6 ± 5.0	27.9 - 45.3
STW-1038	11/15/04	Ba-133	75.5 ± 0.8	78.4 ± 7.8	64.8 - 92.0
STW-1038	11/15/04	Co-60	12.2 ± 0.7	11.7 ± 5.0	3.0 - 20.4
STW-1038	11/15/04	Cs-134	43.6 ± 0.5	42.9 ± 5.0	34.2 - 51.6
STW-1038	11/15/04	Cs-137	59.5 ± 2.9	60.1 ± 5.0	51.4 - 68.8
STW-1038	11/15/04	Zn-65	50.7 ± 3.2	50.9 ± 5.1	42.1 - 59.7
STW-1039	11/15/04	Gr. Alpha	23.9 ± 2.2	31.7 ± 7.9	18.0 - 45.4
STW-1039	11/15/04	Gr. Beta	35.8 ± 1.3	36.3 ± 5.0	27.6 - 45.0
STW-1040	11/15/04	I-131	22.4 ± 1.9	22.0 ± 5.0	16.9 - 27.3
STW-1041	11/15/04	Ra-226	9.8 ± 0.4	9.2 ± 1.4	6.8 - 11.6
STW-1041	11/15/04	Ra-228	8.6 ± 0.3	7.1 ± 1.8	7.0 - 10.2
STW-1041	11/15/04	Uranium	11.1 ± 0.3	11.4 ± 3.0	6.2 - 16.6
STW-1042	11/15/04	H-3	21218.0 ± 285.0	20700.0 ± 2070.0	17100.0 - 24300.0

[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.

TABLE A-2. Crosscheck program results; Thermoluminescent Dosimetry, (TLDs).

Lab Code	TLD Type	Date	Description	mR Known Value	mR Lab Result ± 2 sigma	Control Limits
Environmental, Inc.						
2003-1	CaSO4: Dy Cards	8/8/2003	Reader 1, 120	4.69	4.74 ± 0.54	3.28 - 6.10
2003-1	CaSO4: Dy Cards	8/8/2003	Reader 1, 150	3.00	3.02 ± 0.20	2.10 - 3.90
2003-1	CaSO4: Dy Cards	8/8/2003	Reader 1, 180	2.08	1.89 ± 0.45	1.46 - 2.70
2003-1	CaSO4: Dy Cards	8/8/2003	Reader 1, 180	2.08	2.11 ± 0.22	1.46 - 2.70
2003-1	CaSO4: Dy Cards	8/8/2003	Reader 1, 30	75.00	84.40 ± 4.87	52.50 - 97.50
2003-1	CaSO4: Dy Cards	8/8/2003	Reader 1, 60	18.75	19.11 ± 1.86	13.13 - 24.38
2003-1	CaSO4: Dy Cards	8/8/2003	Reader 1, 60	18.75	22.82 ± 5.41	13.13 - 24.38
2003-1	CaSO4: Dy Cards	8/8/2003	Reader 1, 90	8.33	9.05 ± 1.17	5.83 - 10.83
2003-1	CaSO4: Dy Cards	8/8/2003	Reader 1, 90	8.33	7.60 ± 1.08	5.83 - 10.83
Environmental, Inc.						
2003-2	CaSO4: Dy Cards	1/12/2004	Reader 1, 30	61.96	73.50 ± 2.58	43.37 - 80.55
2003-2	CaSO4: Dy Cards	1/12/2004	Reader 1, 60	15.49	19.70 ± 0.51	10.84 - 20.14
2003-2	CaSO4: Dy Cards	1/12/2004	Reader 1, 60	15.49	16.93 ± 1.37	10.84 - 20.14
2003-2	CaSO4: Dy Cards	1/12/2004	Reader 1, 90	6.88	8.06 ± 0.60	4.82 - 8.94
2003-2	CaSO4: Dy Cards	1/12/2004	Reader 1, 90	6.88	6.64 ± 0.58	4.82 - 8.94
2003-2	CaSO4: Dy Cards	1/12/2004	Reader 1, 120	3.87	4.39 ± 0.17	2.71 - 5.03
2003-2	CaSO4: Dy Cards	1/12/2004	Reader 1, 150	2.48	2.34 ± 0.18	1.74 - 3.22
2003-2	CaSO4: Dy Cards	1/12/2004	Reader 1, 150	2.48	2.51 ± 0.16	1.74 - 3.22
2003-2	CaSO4: Dy Cards	1/12/2004	Reader 1, 180	1.72	2.01 ± 0.13	1.20 - 2.24
Environmental, Inc.						
2004-1	CaSO4: Dy Cards	7/12/2004	Reader 1, 30 cr	55.23	61.07 ± 4.38	38.66 - 71.80
2004-1	CaSO4: Dy Cards	7/12/2004	Reader 1, 30 cr	55.23	62.82 ± 1.75	38.66 - 71.80
2004-1	CaSO4: Dy Cards	7/12/2004	Reader 1, 60 cr	13.81	14.10 ± 0.56	9.67 - 17.95
2004-1	CaSO4: Dy Cards	7/12/2004	Reader 1, 60 cr	13.81	14.03 ± 0.48	9.67 - 17.95
2004-1	CaSO4: Dy Cards	7/12/2004	Reader 1, 90 cr	6.14	5.97 ± 0.21	4.30 - 7.98
2004-1	CaSO4: Dy Cards	7/12/2004	Reader 1, 90 cr	6.14	6.26 ± 0.14	4.30 - 7.98
2004-1	CaSO4: Dy Cards	7/12/2004	Reader 1, 120 c	3.45	4.40 ± 0.63	2.42 - 4.49
2004-1	CaSO4: Dy Cards	7/12/2004	Reader 1, 150 c	2.21	2.34 ± 0.12	1.55 - 2.87
2004-1	CaSO4: Dy Cards	7/12/2004	Reader 1, 180 c	1.53	1.65 ± 0.02	1.07 - 1.99

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

Lab Code	Sample Type	Date	Analysis	Concentration (pCi/L)[a] Laboratory results 2s, n=1[b]	Known Activity	Control Limits[c]
SPVE-707	Vegetation	2/20/2004	I-131(G)	5.68 ± 0.15	4.93	2.96 - 6.90
SPCH-711	Charcoal	2/20/2004	I-131(G)	6.35 ± 0.11	6.94	-3.06 - 16.94
SPW-721	water	2/20/2004	Ni-63	161.00 ± 13.20	169.00	101.40 - 236.60
SPAP-733	Air Filter	2/25/2004	Gr. Beta	1.39 ± 0.02	1.48	-8.52 - 11.48
SPW-735	water	2/25/2004	Cs-134	41.59 ± 7.02	39.10	29.10 - 49.10
SPW-735	water	2/25/2004	Cs-137	64.11 ± 7.39	64.56	54.56 - 74.56
SPW-735	water	2/25/2004	I-131	36.55 ± 0.48	40.08	28.08 - 52.08
SPW-735	water	2/25/2004	I-131	41.97 ± 8.93	40.08	28.08 - 52.08
SPMI-737	Milk	2/25/2004	Cs-134	37.40 ± 5.40	39.10	29.10 - 49.10
SPMI-737	Milk	2/25/2004	Cs-137	69.13 ± 9.58	64.56	54.56 - 74.56
SPMI-737	Milk	2/25/2004	I-131	45.03 ± 0.53	40.08	28.08 - 52.08
SPMI-737	Milk	2/25/2004	I-131	44.43 ± 9.22	40.08	28.08 - 52.08
SPW-1109	water	3/18/2004	Fe-55	39.98 ± 1.72	39.98	23.99 - 55.97
SPW-1496	water	4/7/2004	H-3	80006.60 ± 776.00	83896.00	67116.80 - 100675.20
SPMI-1683	Milk	4/16/2004	Sr-90	42.80 ± 1.81	43.43	34.74 - 52.12
SPW-1683	water	4/16/2004	I-131	54.47 ± 0.73	66.60	53.28 - 79.92
SPW-1683	water	4/16/2004	I-131(G)	65.82 ± 8.86	66.60	56.60 - 76.60
SPMI-1685	Milk	4/16/2004	Cs-134	33.60 ± 4.24	37.29	27.29 - 47.29
SPMI-1685	Milk	4/16/2004	Cs-137	61.77 ± 7.59	64.36	54.36 - 74.36
SPMI-1685	Milk	4/16/2004	I-131	65.85 ± 0.79	66.60	53.28 - 79.92
SPMI-1685	Milk	4/16/2004	I-131(G)	75.56 ± 11.86	66.60	56.60 - 76.60
SPMI-1685	Milk	4/16/2004	Sr-90	42.56 ± 1.66	43.43	34.74 - 52.12
SPW-1686	water	4/16/2004	Cs-134	39.31 ± 4.35	37.29	27.29 - 47.29
SPW-1686	water	4/16/2004	Cs-137	67.73 ± 7.92	64.36	54.36 - 74.36
SPVE-1862	Vegetation	4/26/2004	I-131(G)	1.32 ± 0.03	1.12	0.67 - 1.57
SPCH-1886	Charcoal	4/26/2004	I-131(G)	2.90 ± 0.07	2.80	1.68 - 3.92
SPAP-1888	Air Filter	4/27/2004	Gr. Beta	1.35 ± 0.02	1.48	-8.52 - 11.48
SPF-1917	Fish	4/29/2004	Cs-134	1.44 ± 0.04	1.47	0.88 - 2.06
SPF-1917	Fish	4/29/2004	Cs-137	1.33 ± 0.06	1.29	0.77 - 1.81
SPW-3151	water	6/24/2004	Fe-55	33.85 ± 1.61	37.32	22.39 - 52.25
SPW-4232	water	8/4/2004	H-3	80225.00 ± 785.00	82360.00	65904.00 - 98856.00
SPAP-4234	Air Filter	8/4/2004	Gr. Beta	1.63 ± 0.02	1.46	-8.54 - 11.46
SPW-5712	water	10/6/2004	Cs-134	61.04 ± 2.51	63.61	53.61 - 73.61
SPW-5712	water	10/6/2004	Cs-137	62.01 ± 2.76	63.66	53.66 - 73.66
SPW-5712	water	10/6/2004	Sr-90	48.40 ± 2.00	42.94	34.35 - 51.53
SPMI-5714	Milk	10/6/2004	Sr-90	41.61 ± 1.57	42.94	34.35 - 51.53

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

Lab Code	Sample Type	Date	Analysis	Concentration (pCi/L) Laboratory results 2s, n=1[b]	Known Activity	Control Limits[c]
SPMI-7418	Milk	12/22/2004	Cs-134	59.09 ± 2.59	59.25	49.25 - 69.25
SPMI-7418	Milk	12/22/2004	Cs-137	65.45 ± 5.61	63.35	53.35 - 73.35
SPW-7420	water	12/22/2004	Cs-134	58.42 ± 1.99	59.25	49.25 - 69.25
SPW-7420	water	12/22/2004	Cs-137	64.26 ± 4.18	63.35	53.35 - 73.35
SPW-7420	water	12/22/2004	Sr-89	105.26 ± 4.21	103.47	82.78 - 124.16
SPW-7420	water	12/22/2004	Sr-90	48.24 ± 1.70	42.72	34.18 - 51.26
SPAP-7437	Air Filter	12/22/2004	Gr. Beta	1.65 ± 0.02	1.45	-8.55 - 11.45
SPF-7524	Fish	12/29/2004	Cs-134	1.11 ± 0.03	1.27	0.76 - 1.78
SPF-7524	Fish	12/29/2004	Cs-137	1.21 ± 0.05	1.19	0.71 - 1.67
SPW-7526	water	12/29/2004	H-3	78615.70 ± 773.70	80543.00	64434.40 - 96651.60
SPW-7532	water	12/29/2004	Fe-55	30894.00 ± 1484.00	32752.00	26201.60 - 39302.40
SPW-7540	water	12/29/2004	Tc-99	30.28 ± 1.11	32.98	20.98 - 44.98

[c] Control limits are based on Attachment A, Page A2 of this report.

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	Concentration (pCi/L)[a] Laboratory results (4.66σ) LLD	Activity[b]	Acceptance Criteria (4.66 σ)
SPCH-712	Charcoal	2/20/2004	I-131(G)	0.01		9.6
SPW-722	water	2/20/2004	Ni-63	131.80	-39.8 ± 79.000	20
SPAP-734	Air Filter	2/25/2004	Gr. Beta	0.00	-0.003 ± 0.001	3.2
SPW-736	water	2/25/2004	Cs-134	2.47		10
SPW-736	water	2/25/2004	Cs-137	1.91		10
SPW-736	water	2/25/2004	I-131	0.15	-0.031 ± 0.100	0.5
SPW-736	water	2/25/2004	I-131(G)	3.24		20
SPMI-738	Milk	2/25/2004	Cs-134	2.54		10
SPMI-738	Milk	2/25/2004	Cs-137	5.34		10
SPMI-738	Milk	2/25/2004	I-131	0.16	-0.071 ± 0.104	0.5
SPMI-738	Milk	2/25/2004	I-131(G)	5.36		20
SPW-1110	water	3/18/2004	Fe-55	0.77	0.17 ± 0.480	1000
SPW-1497	water	4/7/2004	H-3	152.30	81.4 ± 79.400	200
SPW-1684	water	4/16/2004	Cs-134	2.43		10
SPW-1684	water	4/16/2004	Cs-137	2.53		10
SPW-1684	water	4/16/2004	I-131	0.50	0.21 ± 0.260	0.5
SPW-1684	water	4/16/2004	I-131(G)	4.49		20
SPW-1684	water	4/16/2004	Sr-89	0.64	0.19 ± 0.520	5
SPW-1684	water	4/16/2004	Sr-90		0.13 ± 0.310	1
SPMI-1686	Milk	4/16/2004	Cs-134	5.00		10
SPMI-1686	Milk	4/16/2004	Cs-137	4.16		10
SPMI-1686	Milk	4/16/2004	I-131	0.45	0.13 ± 0.240	0.5
SPMI-1686	Milk	4/16/2004	I-131(G)	6.53		20
SPMI-1686	Milk	4/16/2004	Sr-89	0.71	0.11 ± 0.700	5
SPMI-1686c	Milk	4/16/2004	Sr-90	0.71	0.66 ± 0.400	1
SPVE-1863	Vegetation	4/26/2004	I-131(G)	0.00		20
SPCH-1887	Charcoal	4/26/2004	I-131(G)	0.02		9.6
SPAP-1889	Air Filter	4/27/2004	Gr. Beta	0.00	-0.003 ± 0.001	3.2
SPF-1918	Fish	4/29/2004	Cs-134	0.01		100
SPF-1918	Fish	4/29/2004	Cs-137	0.01		100
SPW-3152	water	6/24/2004	Fe-55	0.79	-0.07 ± 0.470	1000
SPW-4233	water	8/4/2004	H-3	154.23	102.67 ± 81.380	200
SPW-5711	water	10/6/2004	Co-60	4.26		10
SPW-5711	water	10/6/2004	Cs-134	6.02		10
SPW-5711	water	10/6/2004	Cs-137	5.28		10
SPW-5711	water	10/6/2004	Sr-90	0.61	-0.13 ± 0.270	1
SPMI-5713	Milk	10/6/2004	Cs-134	4.60		10
SPMI-5713	Milk	10/6/2004	Cs-137	5.81		10

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

Lab Code	Sample Type	Date	Analysis	Concentration (pCi/L)[a]		
				Laboratory results (4.66σ)		Acceptance
				LLD	Activity[b]	Criteria (4.66 σ)
SPMI-7419	Milk	12/22/2004	Cs-134	8.66		10
SPMI-7419	Milk	12/22/2004	Cs-137	5.61		10
SPMI-7419c	Milk	12/22/2004	Sr-90	0.82	1.67 ± 0.480	1
SPW-7421	water	12/22/2004	Sr-89	1.21	0.58 ± 0.940	5
SPW-7421	water	12/22/2004	Sr-90	0.82	0.26 ± 0.410	1
SPAP-7438	Air Filter	12/22/2004	Gr. Beta	0.00	-0.0002 ± 0.001	3.2
SPF-7525	Fish	12/29/2004	Cs-134	0.01		100
SPF-7525	Fish	12/29/2004	Cs-137	0.01		100
SPW-7526	water	12/29/2004	H-3	164.80	-47 ± 84.600	200
SPW-7533	water	12/29/2004	Fe-55	753.00	118.6 ± 465.800	1000
SPW-7540	water	12/29/2004	Tc-99	1.19	-0.036 ± 0.720	10

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

[b] The activity reported is the net activity result.

[c] Low levels of Sr-90 are still detected in the environment. A concentration of (1-5 pCi/L) in milk is not unusual.

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

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result
E-30, 31	1/5/2004	Gr. Beta	1.27 ± 0.06	1.26 ± 0.05	1.27 ± 0.04
E-30, 31	1/5/2004	K-40	1.33 ± 0.21	1.11 ± 0.20	1.22 ± 0.15
WW-58, 59	1/5/2004	Gr. Beta	4.20 ± 1.33	4.46 ± 1.34	4.33 ± 0.94
WW-58, 59	1/5/2004	K-40	2.30 ± 0.23	2.70 ± 0.27	2.50 ± 0.18
TD-7889, 7890	1/5/2004	H-3	16582.00 ± 366.00	16060.00 ± 360.00	16321.00 ± 256.69
MI-79, 80	1/7/2004	K-40	1451.50 ± 125.90	1383.60 ± 115.50	1417.55 ± 85.43
MI-79, 80	1/7/2004	Sr-90	0.90 ± 0.31	1.05 ± 0.34	0.97 ± 0.23
S-100, 101	1/13/2004	Cs-137	8.50 ± 0.23	8.52 ± 0.21	8.51 ± 0.16
SW-225, 226	1/13/2004	Gr. Alpha	2.62 ± 1.26	2.05 ± 1.16	2.34 ± 0.86
SW-225, 226	1/13/2004	Gr. Beta	6.37 ± 1.15	4.92 ± 1.06	5.65 ± 0.78
U-304, 305	1/16/2004	Gr. Beta	5.18 ± 1.38	7.04 ± 1.53	6.11 ± 1.03
SW-345, 346	1/27/2004	I-131	1.32 ± 0.24	1.56 ± 0.21	1.44 ± 0.16
SWT-423, 424	1/27/2004	Gr. Beta	2.34 ± 0.54	2.38 ± 0.52	2.36 ± 0.38
SWU-469, 470	1/27/2004	Gr. Beta	2.99 ± 0.57	3.09 ± 0.67	3.04 ± 0.44
TD-545, 546	2/2/2004	H-3	658.40 ± 104.60	712.30 ± 106.60	685.35 ± 74.67
MI-524, 525	2/4/2004	K-40	1240.00 ± 147.90	1265.60 ± 166.30	1252.80 ± 111.28
MI-567, 568	2/9/2004	K-40	1322.90 ± 105.50	1340.80 ± 112.80	1331.85 ± 77.22
MI-567, 568	2/9/2004	Sr-90	0.98 ± 0.48	0.79 ± 0.42	0.89 ± 0.32
MI-588, 589	2/11/2004	K-40	1185.70 ± 157.80	1337.70 ± 160.00	1261.70 ± 112.36
SWU-778, 779	2/24/2004	Gr. Beta	2.55 ± 0.54	2.53 ± 0.56	2.54 ± 0.39
LW-1014, 1015	3/1/2004	Gr. Beta	1.78 ± 0.56	2.06 ± 0.57	1.92 ± 0.40
SW-966, 967	3/9/2004	Gr. Alpha	2.70 ± 1.43	2.96 ± 1.63	2.83 ± 1.08
SW-966, 967	3/9/2004	Gr. Beta	8.06 ± 1.20	7.33 ± 1.21	7.69 ± 0.85
SW-966, 967	3/9/2004	H-3	182.04 ± 86.24	198.87 ± 86.97	190.45 ± 61.24
SW-1249, 1250	3/31/2004	Gr. Beta	4.71 ± 1.11	5.25 ± 1.10	4.98 ± 0.78
LW-1464, 1465	3/31/2004	Gr. Beta	2.13 ± 0.52	2.39 ± 0.53	2.26 ± 0.37
AP-1633, 1634	3/31/2004	Be-7	0.05 ± 0.02	0.05 ± 0.02	0.05 ± 0.01
AP-1714, 1715	3/31/2004	Be-7	0.04 ± 0.01	0.05 ± 0.01	0.05 ± 0.01
TD-1489, 1490	4/1/2004	H-3	681.00 ± 110.00	709.00 ± 111.00	695.00 ± 78.14
SWT-1299, 1300	4/2/2004	Gr. Beta	3.13 ± 0.57	3.64 ± 0.60	3.39 ± 0.41
DW-1420, 1421	4/2/2004	Gr. Beta	1.29 ± 0.83	1.62 ± 0.87	1.46 ± 0.60
DW-1510, 1511	4/2/2004	I-131	0.68 ± 0.27	0.62 ± 0.36	0.65 ± 0.23
BS-1537, 1538	4/6/2004	Gr. Beta	6.81 ± 1.20	6.76 ± 1.23	6.78 ± 0.86
WW-1654, 1655	4/13/2004	Gr. Beta	6.83 ± 1.17	5.60 ± 1.12	6.21 ± 0.81
LW-1680, 1681	4/13/2004	Gr. Beta	2.45 ± 0.64	2.93 ± 0.62	2.69 ± 0.45
MI-1735, 1736	4/14/2004	K-40	1384.90 ± 182.00	1408.20 ± 187.90	1396.55 ± 130.80
MI-1802, 1803	4/19/2004	K-40	1327.50 ± 109.10	1206.30 ± 113.30	1266.90 ± 78.64
MI-1802, 1803	4/19/2004	Sr-90	0.72 ± 0.40	0.77 ± 0.41	0.74 ± 0.28
U-1781, 1782	4/21/2004	Gr. Alpha	0.20 ± 1.90	-0.30 ± 2.40	-0.05 ± 1.53
SWT-1933, 1934	4/27/2004	Gr. Beta	2.60 ± 0.55	2.33 ± 0.52	2.46 ± 0.38
F-1912, 1913	4/29/2004	H-3	8875.00 ± 250.00	9119.00 ± 253.00	8997.00 ± 177.84
F-1912, 1913	4/29/2004	K-40	3406.90 ± 533.30	3550.60 ± 581.40	3478.75 ± 394.47
LW-1960, 1961	4/29/2004	Gr. Beta	2.23 ± 0.55	2.38 ± 0.57	2.31 ± 0.40

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

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result
BS-2083, 2084	5/3/2004	Be-7	1.10 ± 0.44	1.17 ± 0.20	1.14 ± 0.24
BS-2083, 2084	5/3/2004	Gr. Beta	28.44 ± 2.27	25.56 ± 2.04	27.00 ± 1.53
BS-2083, 2084	5/3/2004	K-40	6.75 ± 0.89	6.35 ± 0.53	6.55 ± 0.52
BS-2083, 2084	5/3/2004	Sr-90	0.12 ± 0.04	0.17 ± 0.05	0.15 ± 0.03
MI-2225, 2226	5/11/2004	K-40	1396.30 ± 124.20	1227.60 ± 125.40	1311.95 ± 88.25
SW-2267, 2268	5/11/2004	Gr. Alpha	2.95 ± 1.44	2.41 ± 1.37	2.68 ± 0.99
SW-2267, 2268	5/11/2004	Gr. Beta	6.80 ± 1.18	7.25 ± 1.21	7.03 ± 0.84
MI-2437, 2438	5/17/2004	K-40	1549.00 ± 123.40	1566.20 ± 118.60	1557.60 ± 85.58
MI-2437, 2438	5/17/2004	Sr-90	1.83 ± 0.44	1.99 ± 0.42	1.91 ± 0.30
F-2413, 2414	5/20/2004	K-40	2844.60 ± 550.40	2963.00 ± 532.30	2903.80 ± 382.85
SO-2578, 2579	5/26/2004	Cs-137	0.16 ± 0.02	0.21 ± 0.05	0.18 ± 0.03
SO-2578, 2579	5/26/2004	Gr. Beta	28.07 ± 3.24	28.73 ± 3.00	28.40 ± 2.21
SO-2578, 2579	5/26/2004	K-40	19.41 ± 0.78	18.93 ± 1.04	19.17 ± 0.65
SS-2603, 2604	5/26/2004	Cs-137	0.06 ± 0.02	0.06 ± 0.02	0.06 ± 0.02
SS-2603, 2604	5/26/2004	K-40	10.18 ± 0.63	10.43 ± 0.56	10.30 ± 0.42
G-2677, 2678	6/1/2004	Be-7	1.31 ± 0.25	1.25 ± 0.23	1.28 ± 0.17
G-2677, 2678	6/1/2004	Gr. Beta	5.73 ± 0.12	5.86 ± 0.12	5.79 ± 0.09
G-2677, 2678	6/1/2004	K-40	5.56 ± 0.49	5.78 ± 0.50	5.67 ± 0.35
G-2677, 2678	6/1/2004	Sr-90	0.01 ± 0.00	0.01 ± 0.01	0.01 ± 0.00
DW-2700, 2701	6/1/2004	Gr. Beta	1.82 ± 1.01	2.66 ± 0.94	2.24 ± 0.69
TD-2876, 2877	6/1/2004	H-3	13116.00 ± 324.00	12746.00 ± 320.00	12931.00 ± 227.69
MI-2724, 2725	6/3/2004	K-40	1509.00 ± 116.10	1489.20 ± 126.10	1499.10 ± 85.70
MI-2724, 2725	6/3/2004	Sr-90	1.64 ± 0.46	1.81 ± 0.44	1.73 ± 0.32
BS-2921, 2922	6/3/2004	K-40	8.32 ± 0.63	8.55 ± 0.62	8.44 ± 0.44
TD-2876, 2877	6/4/2004	H-3	13116.00 ± 324.00	12746.00 ± 320.00	12931.00 ± 227.69
BS-2897, 2898	6/4/2004	Gr. Beta	9.31 ± 1.43	8.82 ± 1.39	9.06 ± 1.00
SWU-3092, 3093	6/9/2004	Gr. Beta	1.95 ± 0.71	2.55 ± 0.76	2.25 ± 0.52
CF-2986, 2987	6/14/2004	Be-7	0.69 ± 0.12	0.84 ± 0.19	0.76 ± 0.11
CF-2986, 2987	6/14/2004	K-40	4.50 ± 0.32	3.82 ± 0.48	4.16 ± 0.29
MI-2977, 2978	6/15/2004	K-40	1486.70 ± 120.10	1291.60 ± 167.40	1389.15 ± 103.01
MI-3007, 3008	6/15/2004	K-40	1333.90 ± 121.30	1355.80 ± 176.50	1344.85 ± 107.08
W-3031, 3032	6/18/2004	H-3	642.00 ± 108.00	562.00 ± 105.00	602.00 ± 75.31
W-3071, 3072	6/21/2004	H-3	273.00 ± 94.00	203.00 ± 92.00	238.00 ± 65.76
SW-3145, 3146	6/22/2004	I-131	0.97 ± 0.20	1.43 ± 0.20	1.20 ± 0.14
DW-3278, 3279C	6/25/2004	I-131	0.67 ± 0.26	0.48 ± 0.25	0.57 ± 0.18
AP-3922, 3923	6/28/2004	Be-7	0.08 ± 0.01	0.07 ± 0.01	0.07 ± 0.01
AP-3637, 3638	6/29/2004	Be-7	0.08 ± 0.01	0.07 ± 0.01	0.07 ± 0.01
LW-3589, 3590	6/30/2004	Gr. Alpha	0.28 ± 0.55	1.29 ± 0.89	0.79 ± 0.53
LW-3589, 3590	6/30/2004	Gr. Beta	1.91 ± 0.64	2.86 ± 0.70	2.39 ± 0.48
LW-3589, 3590	6/30/2004	H-3	8369.20 ± 262.57	8226.01 ± 260.51	8297.61 ± 184.94
AP-3943, 3944	6/30/2004	Be-7	0.08 ± 0.02	0.09 ± 0.02	0.08 ± 0.01

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

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result
E-3377, 3378	7/1/2004	Gr. Beta	1.21 ± 0.06	1.35 ± 0.07	1.28 ± 0.05
E-3377, 3378	7/1/2004	K-40	1.08 ± 0.20	1.30 ± 0.22	1.19 ± 0.15
G-3377, 3378	7/1/2004	Be-7	1.10 ± 0.13	1.16 ± 0.16	1.13 ± 0.10
G-3377, 3378	7/1/2004	Gr. Beta	6.42 ± 0.19	6.28 ± 0.19	6.35 ± 0.13
G-3377, 3378	7/1/2004	K-40	5.26 ± 0.31	5.36 ± 0.28	5.31 ± 0.21
VE-3681, 3682	7/13/2004	K-40	2.65 ± 0.45	2.90 ± 0.61	2.77 ± 0.38
CF-3707, 3708	7/13/2004	Be-7	1.97 ± 0.44	2.11 ± 0.25	2.04 ± 0.25
CF-3707, 3708	7/13/2004	K-40	5.39 ± 0.44	4.98 ± 0.42	5.19 ± 0.30
SW-3773, 3774	7/14/2004	H-3	10697.20 ± 295.70	10689.60 ± 295.70	10693.40 ± 209.09
LW-3849, 3850	7/14/2004	Gr. Beta	2.21 ± 0.54	2.32 ± 0.65	2.27 ± 0.42
SWU-4307, 4308	7/14/2004	Gr. Beta	3.49 ± 0.57	3.68 ± 0.61	3.59 ± 0.42
MI-4051, 4052	7/28/2004	K-40	1190.70 ± 204.60	1357.00 ± 145.90	1273.85 ± 125.65
VE-4079, 4080	7/28/2004	K-40	4.90 ± 0.51	4.62 ± 0.61	4.76 ± 0.40
MI-4163, 4164	7/28/2004	K-40	1422.40 ± 186.50	1330.80 ± 181.00	1376.60 ± 129.95
MI-4163, 4164	7/28/2004	Sr-90	0.87 ± 0.32	1.00 ± 0.35	0.93 ± 0.24
WW-4387, 4388	8/3/2004	Gr. Beta	5.94 ± 0.76	6.28 ± 0.76	6.11 ± 0.54
MI-4286, 4287	8/4/2004	K-40	1435.20 ± 76.90	1404.70 ± 80.54	1419.95 ± 55.68
MI-4286, 4287	8/4/2004	Sr-90	1.88 ± 0.40	1.31 ± 0.35	1.59 ± 0.26
VE-4370, 4371	8/4/2004	H-3	0.54 ± 0.08	0.62 ± 0.08	0.58 ± 0.06
VE-4408, 4409	8/5/2004	K-40	2.03 ± 0.39	2.12 ± 0.32	2.08 ± 0.25
VE-4467, 4468	8/9/2004	K-40	6.28 ± 0.76	6.11 ± 0.75	6.20 ± 0.53
MI-4492, 4493	8/10/2004	K-40	1478.70 ± 116.70	1472.50 ± 105.10	1475.60 ± 78.53
MI-4492, 4493	8/10/2004	Sr-90	1.35 ± 0.40	1.08 ± 0.42	1.22 ± 0.29
MI-4518, 4519	8/11/2004	K-40	1197.30 ± 158.50	1350.20 ± 202.30	1273.75 ± 128.50
VE-4748, 4749	8/25/2004	Gr. Beta	2.31 ± 0.05	2.32 ± 0.05	2.31 ± 0.04
VE-4748, 4749	8/25/2004	K-40	1.70 ± 0.25	1.94 ± 0.31	1.82 ± 0.20
LW-4769, 4770	8/26/2004	Gr. Beta	2.00 ± 0.58	2.07 ± 0.58	2.04 ± 0.41
ME-4905, 4906	9/1/2004	Gr. Beta	3.06 ± 0.10	2.93 ± 0.10	3.00 ± 0.07
ME-4905, 4906	9/1/2004	K-40	2.33 ± 0.67	3.26 ± 0.58	2.80 ± 0.44
MI-4926, 4927	9/1/2004	K-40	1316.20 ± 115.40	1285.80 ± 117.30	1301.00 ± 82.27
MI-4926, 4927	9/1/2004	Sr-90	3.62 ± 0.52	2.07 ± 0.43	2.84 ± 0.34
VE-5027, 5028	9/2/2004	Gr. Beta	2.43 ± 0.07	2.39 ± 0.06	2.41 ± 0.05
VE-5027, 5028	9/2/2004	K-40	1.77 ± 0.20	1.94 ± 0.31	1.86 ± 0.18
SW-5003, 5004	9/7/2004	I-131	1.69 ± 0.23	1.50 ± 0.25	1.59 ± 0.17
MI-5050, 5051	9/7/2004	K-40	1559.40 ± 131.80	1560.70 ± 121.20	1560.05 ± 89.53
MI-5050, 5051	9/7/2004	Sr-90	2.26 ± 0.52	1.61 ± 0.47	1.94 ± 0.35
WW-5072, 5073	9/7/2004	Gr. Beta	4.31 ± 0.70	4.11 ± 0.69	4.21 ± 0.49
SW-5216, 5217	9/14/2004	Gr. Alpha	4.34 ± 1.71	4.30 ± 1.77	4.32 ± 1.23
SW-5216, 5217	9/14/2004	Gr. Beta	7.97 ± 1.24	8.58 ± 1.29	8.27 ± 0.89

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

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result
G-5237, 5238	9/15/2004	Be-7	1.18 ± 0.23	1.28 ± 0.24	1.23 ± 0.17
G-5237, 5238	9/15/2004	K-40	7.16 ± 0.58	7.56 ± 0.55	7.36 ± 0.40
LW-5316, 5317	9/16/2004	Gr. Beta	2.76 ± 0.58	2.64 ± 0.54	2.70 ± 0.40
SS-5450, 5451	9/24/2004	K-40	10.33 ± 0.66	10.10 ± 0.74	10.22 ± 0.50
AP-6308, 6309	9/27/2004	Be-7	0.08 ± 0.01	0.08 ± 0.01	0.08 ± 0.01
SWU-5495, 5496	9/28/2004	Gr. Beta	3.38 ± 1.78	4.41 ± 1.94	3.90 ± 1.32
AP-6070, 6071	9/28/2004	Be-7	0.08 ± 0.01	0.08 ± 0.01	0.08 ± 0.01
G-5516, 5517	9/29/2004	Be-7	1.81 ± 0.29	1.74 ± 0.30	1.77 ± 0.21
G-5516, 5517	9/29/2004	K-40	7.35 ± 0.70	7.43 ± 0.62	7.39 ± 0.47
AP-6258, 6259	9/29/2004	Be-7	0.07 ± 0.01	0.07 ± 0.01	0.07 ± 0.01
F-7211, 7212	9/29/2004	Cs-137	0.04 ± 0.01	0.05 ± 0.02	0.05 ± 0.01
F-7211, 7212	9/29/2004	K-40	2.76 ± 0.27	3.07 ± 0.26	2.92 ± 0.19
BS-5902, 5903	10/1/2004	Co-60	0.25 ± 0.05	0.26 ± 0.03	0.25 ± 0.03
BS-5902, 5903	10/1/2004	Co-60	2.53 ± 0.11	2.52 ± 0.06	2.52 ± 0.06
E-5654, 5655	10/4/2004	Gr. Beta	1.40 ± 0.06	1.32 ± 0.06	1.36 ± 0.04
E-5654, 5655	10/4/2004	K-40	1.32 ± 0.26	1.22 ± 0.24	1.27 ± 0.18
MI-5676, 5677	10/4/2004	K-40	1311.00 ± 122.00	1398.00 ± 125.00	1354.50 ± 87.33
SO-5756, 5757	10/4/2004	Gr. Alpha	7.12 ± 3.09	6.69 ± 2.92	6.91 ± 2.13
SO-5756, 5757	10/4/2004	Gr. Beta	19.66 ± 2.63	22.32 ± 2.65	20.99 ± 1.87
SO-5756, 5757	10/4/2004	K-40	16.45 ± 0.86	17.52 ± 0.78	16.99 ± 0.58
VE-6483, 6484	10/6/2004	K-40	9.35 ± 0.55	9.88 ± 0.23	9.61 ± 0.30
MI-5923, 5924	10/12/2004	K-40	1333.60 ± 183.50	1552.40 ± 179.20	1443.00 ± 128.24
SS-6046, 6047	10/13/2004	Cs-137	0.02 ± 0.01	0.02 ± 0.01	0.02 ± 0.01
SS-6046, 6047	10/13/2004	Gr. Beta	7.93 ± 1.72	9.57 ± 1.88	8.75 ± 1.27
SS-6046, 6047	10/13/2004	K-40	5.77 ± 0.42	5.77 ± 0.40	5.77 ± 0.29
DW-6208, 6209	10/15/2004	I-131	0.89 ± 0.26	0.65 ± 0.27	0.77 ± 0.19
BS-6694, 6695	10/19/2004	K-40	11.84 ± 0.67	12.75 ± 0.79	12.29 ± 0.52
VE-6354, 6355	10/25/2004	Gr. Beta	4.82 ± 0.14	4.76 ± 0.14	4.79 ± 0.10
VE-6354, 6355	10/25/2004	K-40	4.71 ± 0.54	4.82 ± 0.61	4.77 ± 0.41
DW-6462, 6463	10/27/2004	Gr. Beta	8.46 ± 1.27	8.22 ± 1.24	8.34 ± 0.89
LW-6377, 6378	10/28/2004	Gr. Beta	2.18 ± 0.54	2.33 ± 0.53	2.25 ± 0.38
SS-6504, 6505	10/29/2004	K-40	9.28 ± 0.61	8.51 ± 0.78	8.89 ± 0.50
LW-6762, 6763	10/31/2004	Gr. Beta	1.85 ± 0.66	1.69 ± 0.64	1.77 ± 0.46
BS-6576, 6577	11/1/2004	Gr. Beta	11.02 ± 1.54	13.77 ± 1.77	12.40 ± 1.17
BS-6576, 6577	11/1/2004	K-40	9.43 ± 0.71	8.84 ± 0.68	9.14 ± 0.49
SO-6715, 6716	11/2/2004	Cs-137	0.29 ± 0.04	0.33 ± 0.06	0.31 ± 0.04
SO-6715, 6716	11/2/2004	Gr. Alpha	10.94 ± 3.95	14.72 ± 4.16	12.83 ± 2.87
SO-6715, 6716	11/2/2004	Gr. Beta	21.33 ± 3.10	24.82 ± 3.10	23.07 ± 2.19
SO-6715, 6716	11/2/2004	K-40	10.42 ± 0.71	12.16 ± 1.06	11.29 ± 0.64
VE-6673, 6674	11/8/2004	Gr. Alpha	0.07 ± 0.04	0.14 ± 0.05	0.11 ± 0.03
VE-6673, 6674	11/8/2004	Gr. Beta	4.50 ± 0.12	4.48 ± 0.12	4.49 ± 0.09
VE-6673, 6674	11/8/2004	K-40	4.05 ± 0.49	4.65 ± 0.55	4.35 ± 0.37

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

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result
SO-6820, 6821	11/10/2004	K-40	14.41 ± 1.03	15.01 ± 1.09	14.71 ± 0.75
SO-6820, 6821	11/10/2004	Sr-90	0.04 ± 0.02	0.07 ± 0.02	0.06 ± 0.02
SWU-7160, 7161	11/30/2004	Gr. Beta	4.39 ± 1.98	3.09 ± 1.77	3.74 ± 1.33
MI-7062, 7063	12/1/2004	K-40	1456.00 ± 124.80	1640.50 ± 131.40	1548.25 ± 90.61
MI-7062, 7063	12/1/2004	Sr-90	1.13 ± 0.41	0.98 ± 0.43	1.06 ± 0.30
S-7281, 7282	12/5/2004	Cs-137	0.82 ± 0.15	1.16 ± 0.20	0.99 ± 0.12
VE-7343, 7344	12/13/2004	Gr. Beta	5.25 ± 0.14	5.08 ± 0.14	5.16 ± 0.10
VE-7343, 7344	12/13/2004	K-40	4.23 ± 0.71	4.33 ± 0.69	4.28 ± 0.49
MI-7317, 7318	12/14/2004	K-40	1702.80 ± 129.70	1536.80 ± 115.10	1619.80 ± 86.70
WW-7375, 7376	12/14/2004	Gr. Beta	14.13 ± 1.03	15.22 ± 1.06	14.68 ± 0.74
SWU-7507, 7508	12/14/2004	Gr. Beta	4.48 ± 0.66	5.31 ± 0.69	4.89 ± 0.48
DW-7563, 7564	12/27/2004	Gr. Beta	1.88 ± 0.51	2.34 ± 0.52	2.11 ± 0.37
P-7698, 7699	12/27/2004	H-3	246.01 ± 95.00	259.06 ± 95.51	252.53 ± 67.35
AP-7741, 7742	12/28/2004	Be-7	0.06 ± 0.02	0.05 ± 0.02	0.05 ± 0.01

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).

[b] 600 minute count time or longer, resulting in lower error.

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

Lab Code	Type	Date	Analysis	Concentration[b] Laboratory result	Known Activity	Control Limits[c]
STSO-1022	soil	05/01/04	Am-241	65.90 ± 4.50	66.97 ± 6.70	46.88 - 87.06
STSO-1022	soil	05/01/04	Co-57	388.90 ± 4.00	399.60 ± 40.00	279.72 - 519.48
STSO-1022	soil	05/01/04	Co-60	524.80 ± 7.10	518.00 ± 51.80	362.60 - 673.40
STSO-1022	soil	05/01/04	Cs-134	403.40 ± 4.60	414.40 ± 41.40	290.08 - 538.72
STSO-1022	soil	05/01/04	Cs-137	829.10 ± 7.60	836.20 ± 83.62	585.34 - 1088.00
STSO-1022	soil	05/01/04	K-40	620.60 ± 29.50	604.00 ± 60.40	422.80 - 785.20
STSO-1022	soil	05/01/04	Ni-63	254.80 ± 8.40	357.05 ± 35.70	249.94 - 464.17
STSO-1022[d,f]	soil	05/01/04	Tc-99	59.00 ± 6.00	117.66 ± 11.78	82.36 - 152.96
STSO-1022[d,f]	soil	05/01/04	U-233/4	24.70 ± 3.60	37.00 ± 3.70	25.90 - 48.40
STSO-1022[d,f]	soil	05/01/04	U-238	24.20 ± 3.50	38.85 ± 3.90	27.20 - 50.51
STSO-1022	soil	05/01/04	Zn-65	743.00 ± 13.10	699.30 ± 69.90	489.51 - 909.09
STAP-1023	Air Filter	05/01/04	Gr. Alpha	0.06 ± 0.02	0.40 ± 0.04	0.00 - 0.80
STAP-1023	Air Filter	05/01/04	Gr. Beta	1.37 ± 0.08	1.20 ± 0.12	0.60 - 1.80
STAP-1024	Air Filter	05/01/04	Am-241	0.08 ± 0.03	0.10 ± 0.01	0.07 - 0.13
STAP-1024	Air Filter	05/01/04	Co-57	2.07 ± 0.06	2.40 ± 0.24	1.68 - 3.12
STAP-1024	Air Filter	05/01/04	Co-60	2.11 ± 0.08	2.30 ± 0.23	1.61 - 2.99
STAP-1024[g]	Air Filter	05/01/04	Cs-134	1.78 ± 0.08	2.90 ± 0.29	2.03 - 3.77
STAP-1024	Air Filter	05/01/04	Cs-137	1.76 ± 0.08	2.00 ± 0.20	1.40 - 2.60
STAP-1024	Air Filter	05/01/04	Mn-54	2.84 ± 0.11	3.00 ± 0.30	2.10 - 3.90
STAP-1024	Air Filter	05/01/04	Pu-238	0.12 ± 0.01	0.13 ± 0.01	0.09 - 0.17
STAP-1024	Air Filter	05/01/04	Pu-239/40	0.08 ± 0.01	0.09 ± 0.01	0.06 - 0.12
STAP-1024	Air Filter	05/01/04	Sr-90	0.66 ± 0.19	0.80 ± 0.08	0.56 - 1.04
STAP-1024	Air Filter	05/01/04	U-233/4	0.23 ± 0.03	0.21 ± 0.02	0.15 - 0.27
STAP-1024	Air Filter	05/01/04	U-238	0.23 ± 0.03	0.22 ± 0.02	0.15 - 0.29
STAP-1024	Air Filter	05/01/04	Zn-65	3.90 ± 0.22	4.00 ± 0.40	2.80 - 5.20
STW-1026	water	05/01/04	Am-241	0.56 ± 0.07	0.60 ± 0.06	0.42 - 0.78
STW-1026	water	05/01/04	Co-57	184.10 ± 13.50	185.00 ± 18.50	129.50 - 240.50
STW-1026	water	05/01/04	Co-60	164.40 ± 11.70	163.00 ± 16.30	114.10 - 211.90
STW-1026	water	05/01/04	Cs-134	201.10 ± 14.00	208.00 ± 20.80	145.60 - 270.40
STW-1026	water	05/01/04	Cs-137	245.50 ± 15.80	250.00 ± 25.00	175.00 - 325.00
STW-1026	water	05/01/04	Fe-55	37.60 ± 25.30	33.00 ± 3.30	23.10 - 42.90
STW-1026	water	05/01/04	H-3	76.50 ± 5.40	83.00 ± 8.30	58.10 - 107.90
STW-1026	water	05/01/04	Mn-54	272.10 ± 17.50	267.00 ± 26.70	186.90 - 347.10
STW-1026	water	05/01/04	Ni-63	94.40 ± 3.20	100.00 ± 10.00	70.00 - 130.00
STW-1026	water	05/01/04	Pu-238	1.11 ± 0.09	1.20 ± 0.12	0.84 - 1.56
STW-1026	water	05/01/04	Pu-239/40	0.01 ± 0.01	0.00 ± 0.00	0.00 - 0.10
STW-1026	water	05/01/04	Sr-90	6.20 ± 1.10	7.00 ± 0.70	4.90 - 9.10
STW-1026	water	05/01/04	Tc-99	10.70 ± 1.00	10.00 ± 1.00	7.00 - 13.00

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

				Concentration[b]		
Lab Code	Type	Date	Analysis	Laboratory result	Known Activity	Control Limits[c]
STW-1026	water	05/01/04	U-233/4	0.14 ± 0.02	0.12 ± 0.01	0.08 - 0.16
STW-1026	water	05/01/04	U-238	0.94 ± 0.05	0.90 ± 0.09	0.63 - 1.17
STW-1026	water	05/01/04	Zn-65	219.60 ± 27.90	208.00 ± 20.80	145.60 - 270.40
STW-1027	water	05/01/04	Gr. Alpha	1.20 ± 0.10	1.20 ± 0.12	0.00 - 2.40
STW-1027	water	05/01/04	Gr. Beta	4.30 ± 0.10	4.10 ± 0.41	2.05 - 6.15

[a] Results obtained by Environmental, Inc. ,Midwest Laboratory as a participant in the Department of Energy's Mixed Analyte Performance Evaluation Program, Idaho Operations office, Idaho Falls, Idaho

[b] All results are in Bq/kg or Bq/L as requested by the Department of Energy.

[d] MAPEP results are presented as the known values and expected laboratory precision (1 sigma, 1 determination) and control limits as defined by the MAPEP.

[d] The cause of the deviation seems to be incomplete dissolution of the sample.

[e] A spiked soil sample was prepared. Known activity; 32.98 pCi/g; laboratory result 33.47 pCi/g.

[f] The sample was reanalyzed with the same results. Investigation is in progress.

[g] Based on the results of gamma emitting isotopes (Cs-137 and Co-60), the filter geometry appears to be biased by -10%. Addition of the summation peak at 1400 KeV results in a recalculation of 2.12 ± 0.15 Bq/sample.

TABLE A-7. Environmental Measurements Laboratory Quality Assessment Program (EML)

Lab Code	Type	Date	Concentration[a] Analysis	Laboratory results	EML Result[b]	Control Limits[c]
STW-1009	water	03/01/04	Am-241	1.21 ± 0.02	1.31	0.66 - 1.56
STW-1009	water	03/01/04	Co-60	152.30 ± 0.30	163.20	0.87 - 1.17
STW-1009	water	03/01/04	Cs-137	50.40 ± 0.90	51.95	0.90 - 1.25
STW-1009	water	03/01/04	H-3	263.50 ± 10.00	186.60	0.69 - 1.91
STW-1009	water	03/01/04	Pu-238	1.03 ± 0.04	1.10	0.68 - 1.33
STW-1009	water	03/01/04	Pu-239/40	2.90 ± 0.10	3.08	0.62 - 1.38
STW-1009	water	03/01/04	Sr-90	5.20 ± 0.30	4.76	0.73 - 1.65
STW-1009	water	03/01/04	Uranium	4.35 ± 0.21	4.62	0.40 - 1.45
STW-1010	water	03/01/04	Gr. Alpha	208.00 ± 20.70	326.00	0.55 - 1.31
STW-1010	water	03/01/04	Gr. Beta	1063.00 ± 27.00	1170.00	0.75 - 1.65
STSO-1011	Soil	03/01/04	Am-241	14.10 ± 4.30	13.00	0.52 - 2.41
STSO-1011	Soil	03/01/04	Cs-137	1292.00 ± 13.00	1323.00	0.74 - 1.40
STSO-1011	Soil	03/01/04	K-40	563.00 ± 83.00	539.00	0.70 - 1.59
STSO-1011	Soil	03/01/04	Pu-239/40	20.70 ± 1.10	22.82	0.62 - 1.99
STSO-1011	Soil	03/01/04	Sr-90	72.10 ± 5.80	51.00	0.58 - 2.96
STSO-1011	Soil	03/01/04	Uranium	139.10 ± 10.20	180.22	0.27 - 1.48
STVE-1012	Vegetation	03/01/04	Am-241	4.50 ± 0.20	4.93	0.58 - 2.86
STVE-1012	Vegetation	03/01/04	Co-60	14.10 ± 0.40	14.47	0.64 - 1.49
STVE-1012	Vegetation	03/01/04	Cs-137	573.90 ± 6.00	584.67	0.75 - 1.48
STVE-1012	Vegetation	03/01/04	K-40	709.00 ± 19.30	720.00	0.45 - 1.51
STVE-1012	Vegetation	03/01/04	Pu-239/40	6.60 ± 0.50	6.81	0.60 - 1.98
STVE-1012	Vegetation	03/01/04	Sr-90	766.50 ± 51.30	734.00	0.50 - 1.37
STAP-1013	Air Filter	03/01/04	Am-241	0.11 ± 0.01	0.10	0.62 - 1.93
STAP-1013	Air Filter	03/01/04	Co-60	30.90 ± 1.08	35.40	0.74 - 1.25
STAP-1013[d]	Air Filter	03/01/04	Cs-134	12.30 ± 1.30	18.20	0.70 - 1.21
STAP-1013	Air Filter	03/01/04	Cs-137	24.90 ± 0.60	26.40	0.72 - 1.32
STAP-1013	Air Filter	03/01/04	Pu-238	0.04 ± 0.01	0.04	0.61 - 1.55
STAP-1013	Air Filter	03/01/04	Pu-239/40	0.17 ± 0.02	0.16	0.67 - 1.58
STAP-1013	Air Filter	03/01/04	Sr-90	1.80 ± 0.20	1.76	0.62 - 2.26
STAP-1013	Air Filter	03/01/04	Uranium	0.17 ± 0.01	0.17	0.79 - 2.88
STAP-1014	Air Filter	03/01/04	Gr. Alpha	1.09 ± 0.06	1.20	0.82 - 1.58
STAP-1014	Air Filter	03/01/04	Gr. Beta	2.68 ± 0.05	2.85	0.75 - 1.94

[a] Results are reported in Bq/L with the following exceptions: Air Filters (Bq/Filter), Soil and Vegetation (Bq/kg).

[b] The EML result listed is the mean of replicate determinations for each nuclide ± the standard error of the mean.

[c] Control limits are reported by EML as the ratio of Reported Value / EML value.

[d] Probable effect of summation peaks and slight difference in filter geometry.

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 = 2s 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 4.66s uncertainty for a background sample.

3.0. Duplicate analyses

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:

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

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 number s 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

POINT BEACH NUCLEAR PLANT

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, BS, 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, 8, 9, 12	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	3x / year as available	GB, GS (in edible portions)
			SPECIAL COLLECTIONS AND ANALYSES	
Airborne Filters			4 per month 1 per quarter	Sr-89, Sr-90 Sr-89, Sr-90 (comp.)
Liquid			1 per month	GA, Sr-89, Sr-90
Subsoil Water			4 per quarter	GA, GB, H-3, GS
Miscellaneous Water Samples			4-5 per year	Sr-89, Sr-90

[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.