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U.S. Nuclear Regulatory Commission
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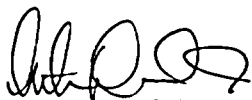
Zion Nuclear Power Station, Units 1 and 2
Facility Operating License Nos. DPR-39 and DPR-48
NRC Docket Nos. 50-295 and 50-304

Subject: Submittal of Zion Nuclear Power Station, Unit 1 and 2 2004 Annual
Radiological Environmental Operating Report.

In accordance with Technical Specification 5.7.2, "Annual Radiological Environmental Operating Report" Zion Station is submitting the 2004 Annual Radiological Environmental Operating Report for Unit 1 and 2. Technical Specification 5.7.2 requires submittal of an Annual Radiological Environmental Operating Report before May 15 of each year. The attachment to this letter is the Annual Radiological Environmental Operating Report.

If you have any questions about this report, please contact Mr. Ron Schuster at 847-746-2084 extension 2700.

Respectfully,



Artice Daniels Jr.
Decommissioning Plant Manager
Zion Nuclear Station

Attachment:

2004 Annual Radiological Environmental Operating Report

cc:

Regional Administrator – NRC Region III

IE25

ZION STATION
ANNUAL RADIOLOGICAL
ENVIRONMENTAL OPERATING
REPORT

2004

APRIL 2005

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INTRODUCTION

Units 1 and 2 of the Zion Station, located in Zion, Illinois adjacent to Lake Michigan, are 1100 MWe (3520 MWt) Westinghouse pressurized water reactors. The plant permanently ceased operation in February of 1998 and has been permanently defueled.

The station was designed to keep releases to the environment at levels below those specified in the regulations. Historical data has been established that Zion, as a fully operational facility, did not contribute appreciable doses to the surrounding public. Sampling results for 2004 showed zero releases above background for a variety of monitored pathways, e.g. water, vegetation, air samples and TLDs.

Liquid effluents from Zion Station are released to Lake Michigan in controlled batches after radioassay of each batch and continuously through a monitored pathway. There are no routine noble gas releases. Due to decay, iodine is no longer present. The only noble gas that remains is Kr85 captured in the spent fuel assemblies stored in the fuel pool in the fuel building (FB). A new ventilation system for the FB has been installed to monitor possible releases. The results of effluent analyses are summarized on a monthly basis and reported to the Nuclear Regulatory Commission as required per Technical Specifications. Airborne concentrations of noble gases, I-131, and particulate radioactivity in offsite areas are calculated using effluent and meteorological data.

Environmental monitoring was conducted by sampling at indicator and control (background) locations in the vicinity of the Zion Station to measure changes in radiation or radioactivity levels that may be attributable to the station. If significant changes attributable to Zion Station are measured, these changes are correlated with effluent releases.

SUMMARY

Gaseous and liquid effluents for the period contributed to only a small fraction of the Zion Station Technical Specification limits. Calculations of environmental concentrations based on effluent and meteorological data for the period indicate that consumption by the public of radionuclides attributable to the Zion Station does not exceed regulatory limits. Radiation exposure from radionuclides released to the atmosphere represented the critical pathway for the period with a maximum individual total body dose estimated to be $4.17\text{E-}05$ mrem for the year, where a shielding and occupancy factor of 0.7 is assumed. The assessment of radiation doses is performed in accordance with the Exelon Offsite Dose Calculation Manual (ODCM). The results of analysis confirm that the station is operating in compliance with 10CFR50 Appendix I, 10CFR20 and 40CFR190.

1.0 EFFLUENTS

1.1 Gaseous Effluents to the Atmosphere

Measured concentrations and isotopic composition of noble gases, radioiodine, and particulate radioactivity released to the atmosphere during the year, are listed in Table 1.1-1. A total of 0.00E+00 microcuries of fission and activation gases was released with a maximum average release rate of 0.00E+00 $\mu\text{Ci/sec}$ during any one quarter period.

A total of 0.00E+00 microcuries of I-131 was released during the year with a maximum average quarterly release rate of 0.00E+00 $\mu\text{Ci/sec}$.

A total of 8.87E-01 microcuries of beta-gamma emitters was released as airborne particulate matter with a maximum average quarterly release rate of 5.64E-08 $\mu\text{Ci/sec}$, quarterly only. Alpha-emitting radionuclides were not measurable. Also, 0.00E+00 curies of tritium were released with a maximum average quarterly release rate of 0.00E+00 $\mu\text{Ci/sec}$.

1.2 Liquids Released to Lake Michigan

A total of 2.95E+05 liters of radioactive liquid wastes containing 4.970E+03 microcuries (excluding tritium, noble gases and alpha) was discharged from the station after dilution with a total of 4.39E+10 liters of water. These wastes were released at a maximum quarterly average concentration of 3.62E-10 $\mu\text{Ci/ml}$. A total of 4.07E-02 curies of tritium was released. Alpha activity released totaled 6.03 μCi for the year. Monthly release estimates and principal radionuclides in liquid effluents are given in Table 1.2-1.

2.0 SOLID RADIOACTIVE WASTE

There were no solid radioactive waste shipments. For more detail, refer to Zion Station 2004 Effluent Report.

3.0 DOSE TO MAN

3.1 Gaseous Effluent Pathways

Table 3.1-1 summarizes the doses resulting from releases of airborne radioactivity via the different exposure pathways.

3.1.1 Noble Gases

3.1.1.1 Gamma Dose Rates

Offsite Gamma air and whole (total) body dose rates are shown in Table 3.1-1 and were calculated based on measured release rates, isotopic composition of the noble gases, and meteorological data for the period. Based on measured effluents and average meteorological data, the maximum total body dose to an individual would be 4.17E-05 mrem (child) for the year (Table 3.1-1), with an occupancy or shielding factor of 0.7 included, and based on measured effluents and concurrent meteorological data would be 2.97E-06 mrem (Table 3.4-1). The maximum gamma air dose was 0.00E+00 mrad based on measured effluents and average meteorological data (Table 3.1-1), and 0.00E+00 mrad based on measured effluents and concurrent meteorological data (Table 3.4-1).

3.1.1.2 Beta Air and Skin Dose Rates

The range of beta particles in air is relatively small (on the order of a few meters or less); consequently, plumes of gaseous effluents may be considered "infinite" for purpose of calculating the dose from beta radiation incident on the skin. However, the actual dose to sensitive skin tissues is difficult to calculate due to the effect of the beta particle energies, thickness of inert skin and clothing covering sensitive tissues. For purposes of this report the skin is taken to have a thickness of 7.0 mg/cm² and an occupancy factor of 1.0 is used. The skin dose from beta and gamma radiation for the year was 0.00E+00 mrem based on measured effluents and average meteorological data (Table 3.1-1), and 3.49E-06 mrem based on measured effluents and concurrent meteorological data (Table 3.4-1).

The maximum offsite beta air dose for the year was 0.00E+00 mrad based on measured effluents and average meteorological data (Table 3.1-1), and 0.00E+00 mrad based on measured effluents and concurrent meteorological data (Table 3.4-1).

3.1.2 Radioactive Iodine

The human thyroid exhibits a significant capacity to concentrate ingested or inhaled iodine. The radioiodine, I-131, released during routine operation of the station, may be made available to man resulting in a dose to the thyroid. The principal pathway of interest for this radionuclide is ingestion of radioiodine in milk. As Zion Station is not operational and I-131 has decayed away, the maximum offsite concentration is estimated to be zero, as expected.

3.1.2.1 Dose to Thyroid

The hypothetical thyroid dose to a maximum exposed individual living near the station via ingestion of milk was calculated. As Zion Station is not operational and I-131 has decayed away, the maximum offsite concentration is estimated to be zero, as expected.

3.2 Liquid Effluent Pathways

The three principal pathways through the aquatic environment for potential doses to man from liquid waste are ingestion of potable water, eating aquatic foods, and exposure while on the shoreline. Not all of these pathways are significant or applicable at a given time but a reasonable approximation of the dose can be made by adjusting the dose formula for season of the year or type and degree of use of the aquatic environment. NRC developed equations* were used to calculate the doses to the whole body, lower GI tracts, thyroid, bone, skin; specific parameters for use in the equations are given in the Exelon Offsite Dose Calculation Manual. The maximum whole body dose (total body) for the year was 1.90E-02 mrem (adult) and no organ dose exceeded 3.00E-02 (teenage liver) mrem (Table 3.2-1).

3.3 Assessment of Dose to Member of Public

During the period January to December, 2003, Zion Station did not exceed the below limits as shown in Table 3.1-1 and Table 3.2-1 (based on yearly average meteorological data), and Figure 3.1-1 (based on concurrent meteorological data):

- The RETS limits on dose or dose commitment to an individual due to radioactive materials in liquid effluents from each reactor unit (3 mrem to the whole body or 10 mrem to any organ during any calendar year).
- The RETS limits on air dose in noble gases released in gaseous effluents to a member of the public from each reactor unit (10 mrad for gamma radiation or 20 mrad for beta radiation during any calendar year).
- The RETS limits on dose to a member of the public due to iodine-131, iodine-133, tritium, and radionuclides in particulate form with half-lives greater than eight days in gaseous effluents released from each reactor unit (15 mrem to any organ during any calendar year).
- The 10CFR20 limit on Total Effective Dose Equivalent to individual members of the public (100 mrem).

4.0 SITE METEOROLOGY

A summary of the site meteorological measurements taken during each calendar quarter of the year is given in Appendix II. The data are presented as cumulative joint frequency

*Nuclear Regulatory Commission, Regulatory Guide 1.109 (Rev. 1)

distributions of the wind direction for the 250' level and wind speed class by atmospheric stability class determined from the temperature difference between the 250' and 35' levels. Data recovery for these measurements was 99.4% during 2004 (Table 3.4-1).

5.0 ENVIRONMENTAL MONITORING

Table 5.0-1 provides an outline of the Radiological Environmental Monitoring Program (REMP) as required in current Technical Specifications. Tables 5.0-1 and 5.0-2 provide program sampling locations, sample collection frequencies and analyses for all samples. Figures 5.0-1 and 5.0-2 show current sampling locations. Tables 5.0-3 to 5.0-6 summarize data for the year. A detailed listing of all data is presented in Appendix III.

Specific findings for various environmental media are discussed below.

5.1 Gamma Radiation

External radiation dose was measured using CaF_2 thermoluminescent dosimeters (TLDs). Each location normally consists of 2 TLD sets. The quarterly average external radiation dose for the year was 18.3 mR at the indicator locations. There are no control locations at Zion. TLD locations are shown in Figure 5.0-1.

Quarterly external radiation dose at indicator air sampling locations averaged 17.2 mR and was similar to the levels measured in 1985 (14.7 mR), 1986 (15.5 mR), 1987 (15.2 mR), 1988 (14.3 mR), 1989 (14.1 mR), 1990 (14.8 mR), and similar to those in 1991 (12.5 mR), 1992 (11.6 mR), 1993 (12.5 mR), 1994 (12.5 mR), 1995 (12.7 mR), 1996 (13.1 mR), 1997 (12.6 mR), 1998 (14.3 mR), 1999 (13.7 mR), 2000 (13.6 mR), 2001 (17.4 mR), 2002 (16.5 mR) and 2003 (19.2 mR). These differences are not statistically significant.

5.2 Airborne I-131 and Particulate Radioactivity

Locations of the air samplers are shown in Figure 5.0-1.

Gross beta concentrations ranged from 0.009 to 0.046 pCi/m^3 and averaged 0.021 pCi/m^3 and were similar to those in 1985 (0.02 pCi/m^3), 1986 (0.023 pCi/m^3 , except for the period from May 13 through June 10 when it was influenced by the nuclear reactor accident at Chernobyl), 1987 (0.020 pCi/m^3), 1988 (0.025 pCi/m^3), 1989 (0.022 pCi/m^3), 1990 (0.018 pCi/m^3), 1991 (0.018 pCi/m^3), 1992 (0.019 pCi/m^3), 1993 (0.020 pCi/m^3), 1994 (0.019 pCi/m^3), 1995 (0.018 pCi/m^3), 1996 (0.020 pCi/m^3), 1997 (0.021 pCi/m^3), 1998 (0.022 pCi/m^3), 1999 (0.024 pCi/m^3), 2000 (0.025 pCi/m^3), 2001 (0.027 pCi/m^3), 2002 (0.025 pCi/m^3) and 2003 (0.024 pCi/m^3).

No activity attributable to station operation was detected in any sample.

5.3 Aquatic Radioactivity

Water samples were collected weekly from four public water works that draw water from Lake Michigan. Monthly composites of the samples were analyzed for gross beta and gamma emitters and quarterly composites for tritium. Gross beta, gamma emitters and tritium were in all cases below the lower limits of detection for the program. Similar results were obtained in 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002 and 2003.

Fish samples were collected from the vicinity of the station, and the edible portions analyzed for gamma emitters. Concentrations of radioactivity in these samples were below the lower limits of detection for the program. Similar results were obtained in 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002 and 2003.

Sediment samples were collected near site of Illinois Beach State Park and analyzed for gamma emitters. Gamma radioactivity was below the limit of detection.

Fish, water and sediment locations are shown in Figure 5.0-2.

5.4 Sample Collections

All samples were collected as scheduled except those listed in the Listing of Missed Samples, Appendix III.

5.5 Program Modifications

There were no changes to the program in 2004.

6.0 ANALYTICAL PROCEDURES

Procedures used during the period covered in this report remained unchanged. A summary of the procedures used for analyzing radioactivity in environmental samples is given in Appendix VII of the report for the period January - December 1993.

7.0 NEAREST RESIDENCE CENSUS

A census of the nearest residences within a 6.2-mile radius was conducted by J. Rieter on August 30, 2004.

Results of the nearest residence census are presented page 26 of Appendix III.

8.0 INTERLABORATORY COMPARISON PROGRAM RESULTS

Environmental Incorporated's Interlaboratory Comparison Program Results are presented in Appendix IV.

9.0 ERRATA DATA

There is no errata data for 2004.

ZION

APPENDIX I

DATA TABLES AND FIGURES

**Zion Station
2004
Stack Effluent Totals**

Total Micro Curies

	Jan	Feb	Mar	1st Qtr	Apr	May	Jun	2nd	Jul	Aug	Sep	3rd	Oct	Nov	Dec	4th	Total
Alpha	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Beta	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
H-3	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Partic																	
Mn-54	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Co-58	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Co-60	<LLD	<LLD	<LLD	<LLD	8.21E-01	6.64E-02	<LLD	8.87E-01	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	8.87E-01
Zn-65	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-89	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Mo-99	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-141	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Noble Gas																	
Kr-85	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85m	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-87	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-88	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133m	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-138	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD

Table I.1-1

2004 AER Water Worksheet

Total microCuries

	Jan	Feb	Mar	1st Qtr	Apr	May	Jun	2nd Qtr	Jul	Aug	Sep	3rd Qtr	Oct	Nov	Dec	4th Qtr	Total
Alpha	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	1.36E-01	5.89E-00	6.03E+00	6.03
Beta	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
H-3	<LLD	7.31E+03	<LLD	7.31E+03	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	7.60E+02	3.26E+04	3.34E+04	4.07E+04
Partic.																	
Mn-54	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-55	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Co-58	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Co-60	<LLD	4.23E+02	<LLD	4.23E+02	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	7.65E+01	1.59E+03	1.67E+03	2.09E+03
Zn-65	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Mo-99	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sb-125	<LLD	2.06E+01	<LLD	2.06E+01	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	1.99E+00	1.01E+02	1.03E+02	1.23E+02
Cs-134	<LLD	3.85E+00	<LLD	3.85E+00	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	2.73E+00	2.73	6.58
Cs-137	<LLD	5.71E+02	<LLD	5.71E+02	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	5.30E+01	2.13E+03	2.18E+03	2.75E+03
Ce-141	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	<LLD	3.48E+00	<LLD	3.48E+00	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	3.29E-01	1.42E+01	1.45E+01	18
Ar-41	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-87	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-88	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-131m	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133m	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135m	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD

Table 1.2-1

ZION

Table 2.0-1 has been deliberately deleted. For details on solid waste disposal, see the Zion 2004 Effluent Report.

Table 3.1-1

RETDAS v3.6.3 <ZIO>

VSSI

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

GASEOUS DOSE SUMMARY

Report for: 2004
Unit Range - From: 1 To: 2

=== I&P DOSE LIMIT ANALYSIS ===== ANNUAL 2004 =====

Annual - Limit	Age Group	Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
2004 - Admin. Any Organ	ADULT	GILLI	4.73E-05	1.13E+01	4.21E-04
2004 - Admin. Total Body	CHILD	TBODY	4.17E-05	1.05E+01	3.97E-04

2004 - T.Spc. Any Organ ADULT GILLI 4.73E-05 1.50E+01 3.16E-04

Receptor: 5 Composite Crit. Receptor - IP

Distance: 0.00 (meters) Compass Point: NA

Critical Pathway: Ground Plane Deposition (GPD)

Major Contributors (0% or greater to total)

Nuclide Percentage

CO-60 1.00E+02

2004 - T.Spc. Total Body CHILD TBODY 4.17E-05 1.50E+01 2.78E-04

Receptor: 5 Composite Crit. Receptor - IP

Distance: 0.00 (meters) Compass Point: NA

Critical Pathway: Ground Plane Deposition (GPD)

Major Contributors (0% or greater to total)

Nuclide Percentage

CO-60 1.00E+02

Table 3.1-1 (continued)

RETDAS v3.6.3 <ZIO>

VSSI

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

GASEOUS DOSE SUMMARY

Report for: 2004
Unit Range - From: 1 To: 2

```

=== NG DOSE LIMIT ANALYSIS ===== ANNUAL 2004 =====
Annual - Limit                               Dose      Limit      Max % of
                                           (mrad)    (mrad)    Limit
-----
2004 - Admin. Gamma                        0.00E+00  1.50E+01  0.00E+00
2004 - Admin. Beta                        0.00E+00  1.50E+01  0.00E+00

2004 - T.Spc. Gamma                      0.00E+00  1.50E+01  0.00E+00
Receptor: 5      Composite Crit. Receptor - IP
Distance:      0.00 (meters)      Compass Point: NA
Nuclide        Percentage
-----

2004 - T.Spc. Beta                      0.00E+00  1.50E+01  0.00E+00
Receptor: 5      Composite Crit. Receptor - IP
Distance:      0.00 (meters)      Compass Point: NA
Nuclide        Percentage
-----

```

Table 3.2-1

RETDAS v3.6.3 <ZIO>

VSSI

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

LIQUID DOSE SUMMARY

Report for: 2004

Unit Range - From: 1 To: 2

Liquid Receptor

=== PERIOD DOSE BY ORGAN AND AGE GROUP (mrem) === ANNUAL 2004 ===

Agegrp	Bone	Liver	Thyroid	Kidney	Lung	GI-LLI	Skin	TB
ADULT	2.13E-02	2.88E-02	2.18E-07	9.78E-03	3.25E-03	7.69E-04	0.00E+00	1.89E-02
TEEN	2.27E-02	3.00E-02	1.60E-07	1.02E-02	3.97E-03	5.74E-04	0.00E+00	1.05E-02
CHILD	2.86E-02	2.72E-02	2.19E-07	8.86E-03	3.19E-03	2.23E-04	0.00E+00	4.05E-03
INFANT	4.07E-05	3.58E-05	1.50E-07	9.60E-06	3.98E-06	1.47E-06	0.00E+00	3.98E-06

=== SITE DOSE LIMIT ANALYSIS === ANNUAL 2004 ===

Annual - Limit	Age Group	Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
2004 - Admin. Any Organ	TEEN	LIVER	3.00E-02	7.50E+00	4.00E-01
2004 - Admin. Total Body	ADULT	TBODY	1.89E-02	2.25E+00	8.41E-01

2004 - T.Spc. Any Organ TEEN LIVER 3.00E-02 1.00E+01 3.00E-01

Critical Pathway: Fresh Water Fish - Sport (FFSP)

Major Contributors (0% or greater to total)

Nuclide	Percentage
---------	------------

H-3	5.33E-04
CO-60	3.64E-02
CS-134	3.15E-01
CS-137	9.96E+01

2004 - T.Spc. Total Body ADULT TBODY 1.89E-02 3.00E+00 6.31E-01

Critical Pathway: Fresh Water Fish - Sport (FFSP)

Major Contributors (0% or greater to total)

Nuclide	Percentage
---------	------------

H-3	1.15E-03
CO-60	1.27E-01
SR-90	2.47E-02
CS-134	4.03E-01
CS-137	9.94E+01

Table 3.3-1

ZION STATION

10CFR20 Compliance Assessment

1. 10CFR 20.1301 (a) (1) Compliance

Total Effective Dose Equivalent,	<u>mrem/year</u>	<u>4.89E-2</u>
10 CFR 20.1301 (a) (1) limit	<u>mrem/yr</u>	<u>100</u>
% of the limit		<u>0.0489</u>

2. Compliance Summary 10CFR20

	1 st Qtr.	2 nd Qtr.	3 rd Qtr.	4 th Qtr	% of Limit
TEDE In mRem	1.02e-2	8.9E-5	0.0	3.88e-2	0.0489%

Table 3.4-1

Zion Station - Unit 1

MAXIMUM DOSES RESULTING FROM AIRBORNE RELEASES

2004

TYPE OF DOSE	FIRST QUARTER	SECOND QUARTER	THIRD QUARTER	FOURTH QUARTER	ANNUAL
GAMMA AIR (mrad)	0.000E+00(N)	0.000E+00(N)	0.000E+00(N)	0.000E+00(N)	0.000E+00(N)
BETA AIR (mrad)	0.000E+00(N)	0.000E+00(N)	0.000E+00(N)	0.000E+00(N)	0.000E+00(N)
WHOLE BODY (mrem)	0.000E+00(N)	1.490E-06(W)	0.000E+00(N)	0.000E+00(N)	1.490E-06(W)
SKIN (mrem)	0.000E+00(N)	1.750E-06(W)	0.000E+00(N)	0.000E+00(N)	1.750E-06(W)
ORGAN (mrem)	0.000E+00(N)	1.700E-06(ENE)	0.000E+00(N)	0.000E+00(N)	1.700E-06(ENE)
CRITICAL PERSON	Adult	Teenager	Adult	Adult	Teenager
CRITICAL ORGAN	Bone	Lung	Bone	Bone	Lung

COMPLIANCE STATUS

TYPE OF DOSE	10 CFR 50 APP. I		10 CFR 50 APP. I	
	QUARTERLY OBJECTIVE	% OF APP. I	YEARLY OBJECTIVE	% OF APP. I
GAMMA AIR (mrad)	5.0	0.00	10.0	0.00
BETA AIR (mrad)	10.0	0.00	20.0	0.00
WHOLE BODY (mrem)	2.5	0.00	5.0	0.00
SKIN (mrem)	7.5	0.00	15.0	0.00
ORGAN (mrem)	7.5	0.00	15.0	0.00
CRITICAL PERSON		Teenager		Teenager
CRITICAL ORGAN		Lung		Lung

Calculation used release data from the following:
Unit 1 - Ground

Date of calculation: 3/30/2005

Table 3.4-1 (continued)

Zion Station - Unit 2

MAXIMUM DOSES RESULTING FROM AIRBORNE RELEASES

2004

TYPE OF DOSE	FIRST QUARTER	SECOND QUARTER	THIRD QUARTER	FOURTH QUARTER	ANNUAL
GAMMA AIR (mrad)	0.000E+00(N)	0.000E+00(N)	0.000E+00(N)	0.000E+00(N)	0.000E+00(N)
BETA AIR (mrad)	0.000E+00(N)	0.000E+00(N)	0.000E+00(N)	0.000E+00(N)	0.000E+00(N)
WHOLE BODY (mrem)	0.000E+00(N)	1.480E-06(W)	0.000E+00(N)	0.000E+00(N)	1.480E-06(W)
SKIN (mrem)	0.000E+00(N)	1.740E-06(W)	0.000E+00(N)	0.000E+00(N)	1.740E-06(W)
ORGAN (mrem)	0.000E+00(N)	1.690E-06(ENE)	0.000E+00(N)	0.000E+00(N)	1.690E-06(ENE)
CRITICAL PERSON	Adult	Teenager	Adult	Adult	Teenager
CRITICAL ORGAN	Bone	Lung	Bone	Bone	Lung

COMPLIANCE STATUS

TYPE OF DOSE	10 CFR 50 APP. I		10 CFR 50 APP. I	
	QUARTERLY OBJECTIVE	% OF APP. I	YEARLY OBJECTIVE	% OF APP. I
GAMMA AIR (mrad)	5.0	0.00	10.0	0.00
BETA AIR (mrad)	10.0	0.00	20.0	0.00
WHOLE BODY (mrem)	2.5	0.00	5.0	0.00
SKIN (mrem)	7.5	0.00	15.0	0.00
ORGAN (mrem)	7.5	0.00	15.0	0.00
CRITICAL PERSON		Teenager		Teenager
CRITICAL ORGAN		Lung		Lung

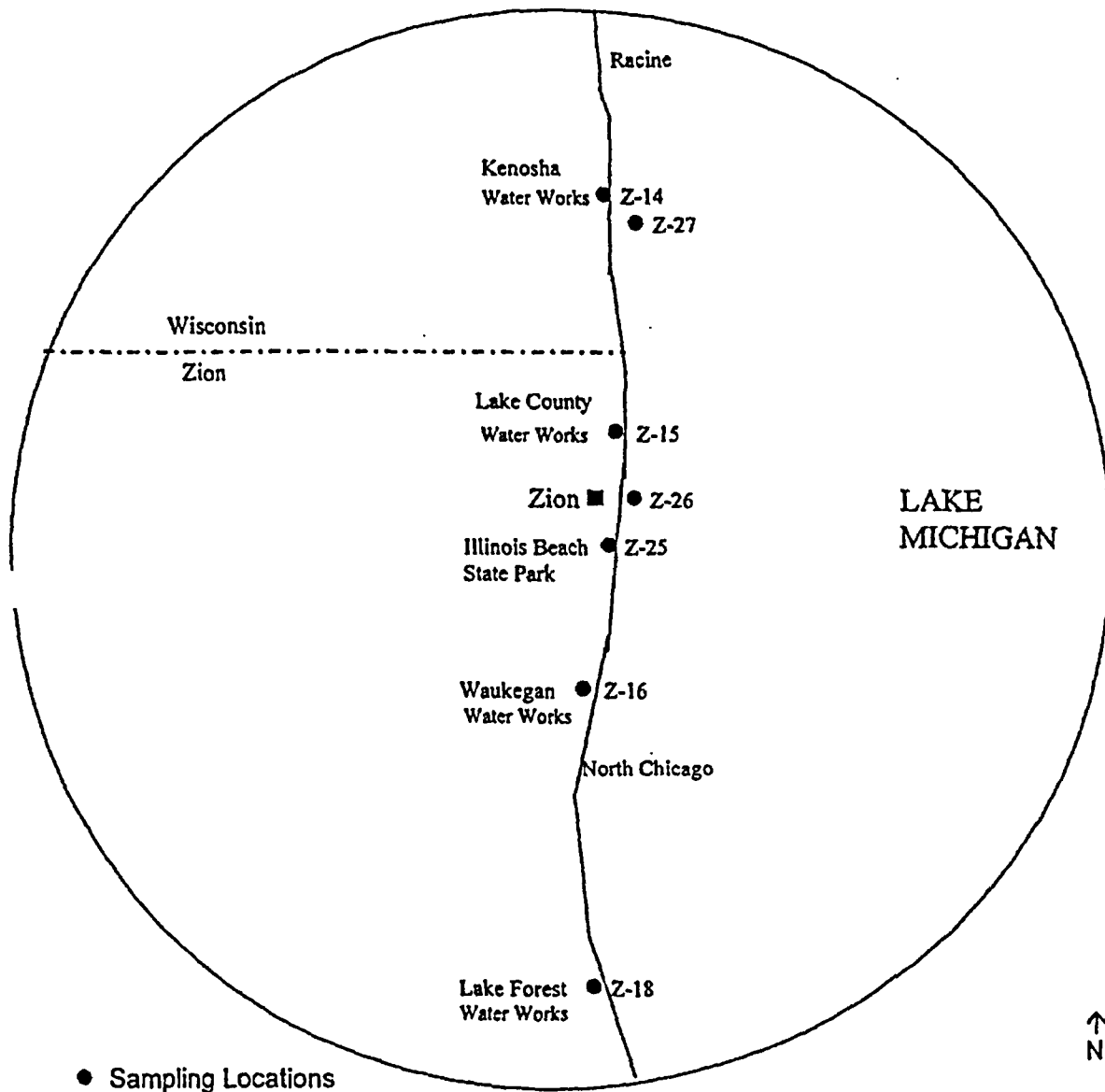
Calculation used release data from the following:
Unit 2 - Ground

Data Recovery
(priority parameters)

99.4%

Date of calculation: 3/30/2005

Figure 5.0-2



Fish, Water and Sediment Locations

- Z-14 Kenosha Water Works
- Z-15 Lake County Water Works
- Z-16 Waukegan Water Works
- Z-18 Lake Forest Water Works
- Z-25 Illinois Beach State Park
- Z-26 Lake Michigan at Discharge
- Z-27 Lake Michigan 10 mi. North (C)

TABLE 5.0-1

Zion Station Radiological Environmental Monitoring Locations	Air Sampling TLD Fish Public Water Sediments
Z-01 Onsite No. 1 Southside	✓
Z-02 Onsite No. 2 Westside	✓
Z-03 Onsite No. 3 Northside	✓
Z-14 Kenosha Water Works	✓
Z-15 Lake County Water Works	✓
Z-16 Waukegan Water Works	✓
Z-18 Lake Forest Water Works	✓
Z-26 Lake Michigan Nearsite at Station	✓
Z-25 Lake Michigan, Illinois Beach State Park	✓
Z-27 Lake Michigan Farsite	✓

CENSUS

Dairy

Residence

Livestock

TABLE 5.0-2

ZION STATION

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM, SAMPLING LOCATIONS

1. AIR SAMPLERS

<u>Site Code</u> ^a	<u>Location</u>	<u>Distance</u> <u>(miles)</u>	<u>Direction</u>	<u>Sector</u>
Z-01	Onsite No. 1 Southside	0.3	S	J
Z-02	Onsite No. 2 Westside	0.2	W	N
Z-03	Onsite No. 3 Northside	0.2	NNW	R

<u>Site Code</u> ^a	<u>Location</u>	<u>Distance</u> <u>(miles)</u>	<u>Direction</u>	<u>Sector</u>
2. <u>TLDs</u>				
a. Z-01	Onsite No. 1 Southside	0.3	S	J
Z-02	Onsite No. 2 Westside	0.2	W	N
Z-03	Onsite No. 3 Northside	0.2	NNW	R

b. Special TLD Locations

<u>Site Code</u>	<u>Distance</u> <u>(miles)</u>	<u>Direction</u>	<u>Sector</u>
Inner Ring			
Z-101-1,2	0.2	N	A
Z-102-1,2	0.2	NNE	B
Z-103-1,2 ^d	0.2	NE	C
Z-104-1,2	0.1	ENE	D
Z-105-1,2	0.1	E	E
Z-106-1,2 ^d	0.1	ESE	F
Z-107-1,2	0.1	SE	G
Z-108-1,2 ^d	0.1	SSE	H
Z-110-1,2	0.2	SSW	K
Z-111-1,2	0.3	SW	L
Z-112-1,2	0.7	WSW	M
Z-113-1,2	0.6	W	N
Z-114-1,2	0.6	WNW	P
Z-115-1,2	0.4	NW	Q
		Q	

3. PUBLIC WATER SUPPLY

<u>Site Code</u> ^a	<u>Location</u>	<u>Distance</u> <u>(miles)</u>	<u>Direction</u>	<u>Sector</u>
Z-14 (C)	Kenosha Water Works	10.0	N	A
Z-15	Lake County Water Works	1.4	NNW	R
Z-16	Waukegan Water Works	6.1	S	J
Z-18 (C)	Lake Forest Water Works	12.9	SJ	

^a Control (background) locations are denoted by a "C" after site code. All other locations are indicators.

TABLE 5.0-2 (continued)

ZION STATION

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM, SAMPLING LOCATIONS

4. FISH

<u>Site Code</u> ^a	<u>Location</u>	<u>Distance</u> <u>(miles)</u>	<u>Direction</u>	<u>Sector</u>
Z-26	Lake Michigan Nearsite	At Station		
Z-27(C)	Lake Michigan Farsite	10.0 mi.	N	A

5. SHORELINE SEDIMENTS

<u>Site Code</u> ^a	<u>Location</u>	<u>Distance</u> <u>(miles)</u>	<u>Direction</u>	<u>Sector</u>
Z-25	Lake Michigan, Illinois Beach State Park	0.2	S	J

^a Control (background) locations are denoted by a "C" after site code. All other locations are indicators.

TABLE 5.0-2 (continued)

ZION STATION
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM, SAMPLE COLLECTION AND ANALYSES

Sample Media	Location		Collection Frequency	Type of Analysis	Frequency of Analysis	
	Code ^a	Site				
1. Airborne Particulates	Onsite, Nearfield and Control		Filter exchange weekly	Gross Beta Gamma Isot.	Weekly Quarterly Composite (or if weekly gross beta in a sample exceeds 5X the average concentration of preceding calendar quarter).	
	Z-01	Onsite No. 1 South side				
	Z-02	Onsite No. 2 West side				
	Z-03	Onsite No. 3 North side				
2. Air Sampling Train	Z-01	Onsite No. 1 South side	-	Test and Maintenance	Weekly	
	Z-02	Onsite No. 2 West side				
	Z-03	Onsite No. 3 North side				
3. TLDs	a.	Z-01	Onsite No. 1 South side		Gamma	Quarterly
		Z-02	Onsite No. 2 West side			
		Z-03	Onsite No. 3 North side			
		(two TLDs per location)				
	b.	Z-101-1,2	Inner Ring			
		102-1,2				
		103-1,2				
		104-1,2				
		105-1,2				
		106-1,2				
		107-1,2				
		108-1,2				
		110-1,2				
		111-1,2				
		112-1,2				
		113-1,2				
		114-1,2				
		115-1,2				
		4. Public Water	Z-14 (C)			
Z-15	Lake County Water Works					
Z-16	Waukegan Water Works					
Z-18 (C)	Lake Forest Water Works					
5. Fish (at least two species)	Z-26	Lake Michigan Nearsite	Two times/year	Gamma Isot.	Two times/year on edible portions only.	
	Z-27	Lake Michigan Farsite				
6. Sediments	Z-25	Lake Michigan Illinois Beach State Park	Semiannually	Gamma Isot.	Semiannually	
7. Land Use Census						
Nearest Residence	In all sectors up to 6.2 miles.		-	-	Annually during grazing season.	

^a Control (background) locations are denoted by a "C" in this column. All other location are indicators.

Table 5.0-3

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM QUARTERLY SUMMARY

Name of Facility Zion Generating Station Docket No. 50-295, 50-304
 Location of Facility Lake, Illinois Reporting Period 1st Quarter 2004
 (County, State)

Sample Type (Units)	Type and Number of Analyses	LLD	Indicator Locations Mean ^a Range	Location with Highest Quarterly Mean	Highest Mean ^a Range	Control Locations Mean ^a Range	Number of Non-routine Results
Air Particulates (pCi/m ³)	Gross Beta 39	0.01	0.026 (39/39) (0.013-0.046)	Z-03, Zion Onsite No. 3 Northside, 0.25 mi. NNW, Sector R	0.028 (13/13) (0.016-0.045)	None	0
	Gamma Spec. 3	0.01	<LLD			None	0
	Cs-134	0.01	<LLD			None	0
	Cs-137	0.01-0.04	<LLD			None	0
	Other Gammas						
Public Water (pCi/L)	Gross Beta 12	4	<LLD	-	-	<LLD	0
	Gamma Spec. 12			-	-		
	Cs-134	10	<LLD	-	-	<LLD	0
	Cs-137	18	<LLD	-	-	<LLD	0
	Other ODCM-Required Gammas	15-30	<LLD	-	-	<LLD	0
	Tritium 4	200	<LLD	-	-	<LLD	0
Gamma Background (TLDs) (mR/Qt.)	Gamma Dose 34	9.7	15.8 (34/34) (14.0-18.0)	Z-01-1 ^b , 0.2 mi. S, Sector J	18.0 (1/1)	None	0

^a Mean and range based on detectable measurements only. Fractions indicated in parentheses.

^b Locations Z-01-1, 101-2, 105-1 and 115-1 had identical results of 18.0 mR. Only Z-01-1 is detailed in this summary.

Table 5.0-4

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM QUARTERLY SUMMARY

Name of Facility Zion Generating StationDocket No. 50-295, 50-304Location of Facility Lake, Illinois
(County, State)Reporting Period 2nd Quarter 2004

Sample Type (Units)	Type and Number of Analyses	LLD	Indicator Locations Mean ^a Range	Location with Highest Quarterly Mean	Highest Mean ^a Range	Control Locations Mean ^a Range	Number of Non-routine Results
Air Particulates (pCi/m ³)	Gross Beta 39	0.01	0.016 (34/39) (0.010-0.029)	Z-01 ^b , Onsite No. 1, Southside 0.2 mi S, Sector J	0.017 (12/13) (0.010-0.026)	None	0
	Gamma Spec. 3						
	Cs-134	0.01	<LLD				
	Cs-137	0.01	<LLD				
	Other Gammas	0.01-0.04	<LLD				
Fish (pCi/g wet)	Gamma Spec. 3						
	Cs-134	0.10	<LLD				
	Cs-137	0.10	<LLD				
	Other ODCM-Required Gammas	0.13-0.26	<LLD				
	Other Gammas	0.20-0.30	<LLD				
Bottom Sediments (pCi/g dry)	Gamma Spec. 1						
	Cs-134	0.15	<LLD				
	Cs-137	0.18	<LLD				
	Other Gammas	0.10-0.60	<LLD				
Public Water (pCi/L)	Gross Beta 12	4	<LLD				
	Gamma Spec. 12						
	Cs-134	15	<LLD				
	Cs-137	18	<LLD				
	Other ODCM-Required Gammas	15-30	<LLD				
	Tritium 4	200	<LLD				
Gamma Background (TLDs) (mR/Qtr.)	Gamma Dose 34	9.7	19.9 (34/34) (18.0-23.0)	Z-112-1 0.7 mi. WSW, Sector M	23.0 (1/1)	None	0

^a Mean and range based on detectable measurements only. Fractions indicated in parentheses.^b Locations Z-01 and Z-03 had identical means of 0.017 pCi/m³. Only Z-01 is detailed in this summary.

Table 5.0-5

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM QUARTERLY SUMMARY

Name of Facility Zion Generating StationDocket No. 50-295, 50-304Location of Facility Lake, IllinoisReporting Period 3rd Quarter 2004

(County, State)

Sample Type (Units)	Type and Number of Analyses	LLD	Indicator Locations Mean ^a Range	Location with Highest Quarterly Mean	Highest Mean ^a Range	Control Locations Mean ^a Range	Number of Non-routine Results
Air Particulates (pCi/m ³)	Gross Beta 39	0.01	0.020 (38/39) (0.010-0.032)	Z-01 Onsite No. 1 Southside 0.2 mi. S, Sector J	0.022 (13/13) (0.014-0.032)	None	0
	Gamma Spec. 3						
	Cs-134	0.01	<LLD	-	-	None	0
	Cs-137	0.01	<LLD	-	-	None	0
	Other Gammas	0.01-0.04	<LLD	-	-	None	0
Public Water (pCi/L)	Gross Beta 12	4	<LLD	-	-	<LLD	0
	Gamma Spec. 12						
	Cs-134	10	<LLD	-	-	<LLD	0
	Cs-137	18	<LLD	-	-	<LLD	0
	Other ODCM-Required Gammas	15-30	<LLD	-	-	<LLD	0
	Tritium 4	200	<LLD	-	-	<LLD	0
Gamma Background (TLDs) (mR/Qtr.)	Gamma Dose 34	9.7	15.1 (34/34) (13.0-18.0)	Z-112-1, 0.7 mi. WSW, Sector M	18.0 (1/1)	None	0

^a Mean and range based on detectable measurements only. Fractions indicated in parentheses.^b Locations Z-112-1 and Z-115-1 had identical results of 18.0 mR. Only Z-112-1 is detailed in this summary.

Table 5.0-6

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM QUARTERLY SUMMARY

Name of Facility Zion Generating Station
 Location of Facility Lake, Illinois
 (County, State)

Docket No. 50-295, 50-304
 Reporting Period 4th Quarter 2004

Sample Type (Units)	Type and Number of Analyses	LLD	Indicator Locations Mean ^a Range	Location with Highest Quarterly Mean	Highest Mean ^a Range	Control Locations Mean ^a Range	Number of Non-routine Results
Air Particulates (pCi/m ³)	Gross Beta 39	0.01	0.024 (39/39) (0.011-0.040)	Z-01, Zion Onsite No. 1 Southside 0.2 mi. S, Sector J	0.025 (13/13) (0.015-0.035)	None	0
	Gamma Spec. 3						
	Cs-134	0.01	<LLD	-	-	None	0
	Cs-137	0.01	<LLD	-	-	None	0
	Other Gammas	0.01-0.04	<LLD	-	-	None	0
Fish (pCi/g wet)	Gamma Spec. 3						
	Cs-134	0.10	<LLD	-	-	<LLD	0
	Cs-137	0.10	<LLD	-	-	<LLD	0
	Other ODCM-Required Gammas	0.13-0.26	<LLD	-	-	<LLD	0
	Other Gammas	0.20-0.30	<LLD	-	-	<LLD	0
Bottom Sediments	Gamma Spec 1						
	Cs-134	0.15	<LLD	-	-	None	0
	Cs-137	0.18	<LLD	-	-	None	0
	Other Gammas	0.10-0.60	<LLD	-	-	None	0
Public Water (pCi/L)	Gross Beta 12	4	<LLD	-	-	<LLD	0
	Gamma Spec. 12						
	Cs-134	15	<LLD	-	-	<LLD	0
	Cs-137	18	<LLD	-	-	<LLD	0
	Other ODCM-Required Gammas	15-30	<LLD	-	-	<LLD	0
	Tritium 4	200	<LLD	-	-	<LLD	0
Gamma Background (TLDs) (mR/Qtr.)	Gamma Dose 34	9.7	22.5 (34/34) (20.0-26.0)	Z-102-1 ^b 0.2 mi. NNE, Sector B	26.0 (1/1)	None	0

^a Mean and range based on detectable measurements only. Fractions indicated in parentheses.

^b Locations Z-102-1, Z-112-1, Z-115-1 and 115-2 had identical means of 26 mR. Only Z-102-1 is detailed in this summary.

ZION

APPENDIX II

METEOROLOGICAL DATA

Zion Nuclear Station

Period of Record: January - March 2004
 Stability Class - Extremely Unstable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	7	2	2	0	11
NNE	0	0	5	7	0	0	12
NE	0	5	3	0	0	0	8
ENE	0	1	0	0	0	0	1
E	0	2	0	0	0	0	2
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	1	0	1	0	0	2
SSW	0	0	1	3	0	0	4
SW	0	0	3	1	0	0	4
WSW	0	1	5	0	0	0	6
W	0	2	5	5	0	0	12
WNW	0	1	5	2	1	0	9
NW	0	0	3	1	0	0	4
NNW	0	0	4	2	0	0	6
Variable	0	0	0	0	0	0	0
Total	0	13	41	24	3	0	81

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: January - March 2004
 Stability Class - Moderately Unstable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	1	1	3	0	0	5
NNE	0	0	3	1	0	0	4
NE	0	3	2	0	0	0	5
ENE	0	2	3	0	0	0	5
E	0	0	0	0	0	0	0
ESE	0	1	0	0	0	0	1
SE	0	0	0	0	0	0	0
SSE	0	0	0	1	0	0	1
S	0	0	0	0	0	0	0
SSW	0	0	1	1	0	0	2
SW	0	1	3	0	0	0	4
WSW	0	1	1	3	0	0	5
W	0	1	5	2	2	0	10
WNW	0	4	5	3	0	0	12
NW	0	0	4	1	0	0	5
NNW	0	0	1	1	0	0	2
Variable	0	0	0	0	0	0	0
Total	0	14	29	16	2	0	61

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: January - March 2004
 Stability Class - Slightly Unstable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	2	6	1	0	9
NNE	0	1	1	2	0	0	4
NE	0	3	3	0	0	0	6
ENE	0	3	2	0	0	0	5
E	0	0	0	0	0	0	0
ESE	0	1	1	0	0	0	2
SE	0	0	0	0	0	0	0
SSE	0	0	3	3	1	0	7
S	0	1	0	1	0	0	2
SSW	0	0	5	2	0	0	7
SW	0	0	2	6	0	0	8
WSW	0	1	5	5	0	0	11
W	0	3	9	4	5	0	21
WNW	0	1	4	3	0	0	8
NW	0	3	7	0	0	0	10
NNW	1	0	0	0	0	0	1
Variable	0	0	0	0	0	0	0
Total	1	17	44	32	7	0	101

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: January - March 2004
 Stability Class - Neutral - 250Ft-33Ft Delta-T (F)
 Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	14	36	16	13	0	79
NNE	2	14	17	6	0	0	39
NE	2	6	14	15	2	0	39
ENE	2	11	14	19	14	2	62
E	1	9	7	25	11	0	53
ESE	0	6	11	7	1	0	25
SE	2	10	21	9	0	0	42
SSE	0	14	42	25	2	0	83
S	1	11	8	5	0	0	25
SSW	2	4	36	17	0	0	59
SW	3	16	31	24	1	0	75
WSW	1	13	35	14	6	1	70
W	1	30	43	19	8	0	101
WNW	1	28	61	22	4	0	116
NW	0	20	66	11	1	0	98
NNW	1	17	26	15	0	0	59
Variable	0	0	0	0	0	0	0
Total	19	223	468	249	63	3	1025

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: January - March 2004
 Stability Class - Slightly Stable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	6	6	4	0	0	0	16
NNE	3	10	2	0	0	0	15
NE	3	5	6	4	0	0	18
ENE	1	13	2	0	0	0	16
E	2	13	2	0	0	0	17
ESE	2	6	0	0	0	0	8
SE	0	6	5	1	0	0	12
SSE	1	9	21	11	3	0	45
S	3	17	19	4	0	0	43
SSW	4	23	16	4	1	0	48
SW	11	24	18	10	0	0	63
WSW	4	29	50	8	0	0	91
W	10	47	50	6	0	0	113
WNW	9	32	25	1	0	0	67
NW	4	37	10	0	0	0	51
NNW	8	13	6	0	0	0	27
Variable	0	0	0	0	0	0	0
Total	71	290	236	49	4	0	650

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: January - March 2004
 Stability Class - Moderately Stable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	1	0	0	0	0	2
NNE	3	2	0	0	0	0	5
NE	1	1	0	0	0	0	2
ENE	0	2	0	0	0	0	2
E	0	2	0	0	0	0	2
ESE	2	0	0	0	0	0	2
SE	3	4	1	0	0	0	8
SSE	2	10	11	0	0	0	23
S	7	10	8	0	0	0	25
SSW	8	8	0	0	0	0	16
SW	11	4	2	0	0	0	17
WSW	7	4	0	0	0	0	11
W	6	9	0	0	0	0	15
WNW	4	7	0	0	0	0	11
NW	3	4	0	0	0	0	7
NNW	0	2	0	0	0	0	2
Variable	0	0	0	0	0	0	0
Total	58	70	22	0	0	0	150

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: January - March 2004
 Stability Class - Extremely Stable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	0	0	0	0	0	1
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	1	0	1	0	0	0	2
SSE	2	5	4	0	0	0	11
S	6	19	1	0	0	0	26
SSW	2	1	1	0	0	0	4
SW	1	4	0	0	0	0	5
WSW	0	6	0	0	0	0	6
W	0	3	0	0	0	0	3
WNW	1	6	0	0	0	0	7
NW	1	1	0	0	0	0	2
NNW	0	1	0	0	0	0	1
Variable	0	0	0	0	0	0	0
Total	15	46	7	0	0	0	68

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: January - March 2004
 Stability Class - Extremely Unstable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	3	9	1	3	16
NNE	0	0	0	8	2	0	10
NE	0	3	2	0	0	0	5
ENE	0	1	0	0	0	0	1
E	0	2	0	0	0	0	2
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	1	0	1
SSW	0	0	1	0	3	0	4
SW	0	0	0	3	0	1	4
WSW	0	0	2	6	0	0	8
W	0	0	2	4	5	1	12
WNW	0	0	1	5	2	1	9
NW	0	0	0	4	0	0	4
NNW	0	1	0	3	1	0	5
Variable	0	0	0	0	0	0	0
Total	0	7	11	42	15	6	81

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 1
 Hours of missing stability measurements in all stability classes: 4

Zion Nuclear Station

Period of Record: January - March 2004
 Stability Class - Moderately Unstable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	4	1	0	5
NNE	0	0	2	1	0	0	3
NE	0	0	4	0	0	0	4
ENE	0	1	1	3	0	0	5
E	0	1	0	0	0	0	1
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	1	0	1
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	1	1	0	2
SW	0	1	0	3	3	0	7
WSW	0	1	0	2	0	0	3
W	0	1	1	3	3	2	10
WNW	0	2	1	5	3	0	11
NW	0	0	2	3	0	0	5
NNW	0	1	0	2	1	0	4
Variable	0	0	0	0	0	0	0
Total	0	8	11	27	13	2	61

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 4

Zion Nuclear Station

Period of Record: January - March 2004
 Stability Class - Slightly Unstable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	1	5	4	1	11
NNE	0	0	1	2	0	0	3
NE	0	2	2	0	0	0	4
ENE	0	3	0	2	0	0	5
E	0	0	0	0	0	0	0
ESE	0	1	1	0	0	0	2
SE	0	0	0	1	1	0	2
SSE	0	0	0	2	2	1	5
S	0	0	1	0	1	0	2
SSW	0	0	3	3	2	0	8
SW	0	0	0	2	3	3	8
WSW	0	1	2	8	3	4	18
W	1	2	3	3	2	4	15
WNW	0	1	1	4	4	0	10
NW	0	1	3	3	0	0	7
NNW	0	0	0	1	0	0	1
Variable	0	0	0	0	0	0	0
Total	1	11	18	36	22	13	101

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 1
 Hours of missing stability measurements in all stability classes: 4

Zion Nuclear Station

Period of Record: January - March 2004
 Stability Class - Neutral - 250Ft-33Ft Delta-T (F)
 Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	3	17	25	21	15	81
NNE	0	1	13	11	14	3	42
NE	1	7	4	14	4	5	35
ENE	0	9	9	14	20	16	68
E	1	8	3	4	9	19	44
ESE	0	4	7	3	9	1	24
SE	0	1	18	37	24	0	80
SSE	1	4	15	20	7	0	47
S	0	6	6	4	8	1	25
SSW	0	3	6	35	18	4	66
SW	1	10	10	28	21	9	79
WSW	0	6	11	32	12	14	75
W	0	6	27	26	19	14	92
WNW	0	5	31	52	31	10	129
NW	0	2	19	55	16	7	99
NNW	0	1	16	15	10	2	44
Variable	0	0	0	0	0	0	0
Total	4	76	212	375	243	120	1030

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 11
 Hours of missing stability measurements in all stability classes: 4

Zion Nuclear Station

Period of Record: January - March 2004
 Stability Class - Slightly Stable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	4	5	6	1	0	16
NNE	3	2	3	1	0	0	9
NE	2	3	3	4	2	1	15
ENE	0	1	6	2	2	3	14
E	0	8	12	8	0	0	28
ESE	3	1	3	3	0	0	10
SE	0	4	4	6	14	3	31
SSE	1	0	10	9	13	11	44
S	0	2	10	20	7	0	39
SSW	1	3	14	19	7	3	47
SW	1	2	15	22	21	2	63
WSW	3	3	14	52	24	4	100
W	1	4	24	51	16	4	100
WNW	1	11	16	24	14	0	66
NW	0	7	14	25	3	0	49
NNW	0	5	9	14	0	0	28
Variable	0	0	0	0	0	0	0
Total	16	60	162	266	124	31	659

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 4

Zion Nuclear Station

Period of Record: January - March 2004
 Stability Class - Moderately Stable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	2	2	1	0	0	5
NNE	0	0	0	0	0	0	0
NE	0	0	1	0	0	0	1
ENE	0	1	2	0	0	0	3
E	0	3	5	1	0	0	9
ESE	0	1	2	0	1	0	4
SE	0	3	2	1	2	0	8
SSE	0	5	10	4	4	4	27
S	2	4	7	5	3	0	21
SSW	0	2	14	5	2	0	23
SW	1	5	7	4	0	0	17
WSW	1	2	2	2	0	0	7
W	1	1	4	4	0	0	10
WNW	1	3	7	2	0	0	13
NW	0	2	2	3	0	0	7
NNW	0	0	3	1	0	0	4
Variable	0	0	0	0	0	0	0
Total	6	34	70	33	12	4	159

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 6
 Hours of missing stability measurements in all stability classes: 4

Zion Nuclear Station

Period of Record: January - March 2004
 Stability Class - Extremely Stable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	2	3	0	0	0	5
NNE	1	1	0	0	0	0	2
NE	2	2	0	0	0	0	4
ENE	0	0	1	0	0	0	1
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	3	3	5	0	11
S	0	2	9	11	2	1	25
SSW	0	1	6	1	0	1	9
SW	0	0	1	5	1	0	7
WSW	0	0	2	0	0	0	2
W	0	0	2	0	0	0	2
WNW	0	1	0	0	0	0	1
NW	0	0	0	0	0	0	0
NNW	0	1	0	0	0	0	1
Variable	0	0	0	0	0	0	0
Total	3	10	27	20	8	2	70

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 4

Zion Nuclear Station

Period of Record: April - June 2004

Stability Class - Extremely Unstable - 250Ft-33Ft Delta-T (F)

Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	6	7	0	0	13
NNE	0	8	43	42	0	0	93
NE	0	10	16	4	0	0	30
ENE	0	3	0	0	0	0	3
E	1	8	6	1	0	0	16
ESE	0	7	7	0	0	0	14
SE	0	3	10	0	0	0	13
SSE	0	3	4	0	0	0	7
S	0	0	0	0	0	0	0
SSW	0	0	0	6	6	0	12
SW	0	0	12	9	1	0	22
WSW	1	2	22	6	1	0	32
W	0	3	10	5	1	0	19
WNW	0	2	5	1	0	0	8
NW	0	1	4	3	0	0	8
NNW	0	0	3	1	0	0	4
Variable	0	0	0	0	0	0	0
Total	2	50	148	85	9	0	294

Hours of calm in this stability class: 0

Hours of missing wind measurements in this stability class: 0

Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: April - June 2004

Stability Class - Moderately Unstable - 250Ft-33Ft Delta-T (F)

Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	4	1	0	0	5
NNE	0	1	3	1	0	0	5
NE	1	7	2	0	0	0	10
ENE	0	3	1	0	0	0	4
E	0	1	0	0	0	0	1
ESE	0	3	1	0	0	0	4
SE	0	0	1	0	0	0	1
SSE	0	1	0	0	0	0	1
S	0	0	0	0	0	0	0
SSW	0	1	1	1	0	0	3
SW	0	1	2	2	0	0	5
WSW	0	0	3	1	0	0	4
W	0	3	2	2	0	0	7
WNW	0	2	2	1	0	0	5
NW	0	0	2	0	0	0	2
NNW	0	0	1	0	0	0	1
Variable	0	0	0	0	0	0	0
Total	1	23	25	9	0	0	58

Hours of calm in this stability class: 0

Hours of missing wind measurements in this stability class: 0

Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: April - June 2004
 Stability Class - Slightly Unstable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	1	6	6	0	0	13
NNE	0	13	8	6	0	0	27
NE	0	6	2	0	0	0	8
ENE	1	5	1	0	0	0	7
E	1	2	0	0	0	0	3
ESE	1	7	3	1	0	0	12
SE	0	2	1	0	0	0	3
SSE	0	5	5	1	0	0	11
S	0	0	0	0	0	0	0
SSW	0	0	3	1	2	0	6
SW	0	0	0	8	0	0	8
WSW	0	1	7	3	0	0	11
W	0	1	4	1	1	0	7
WNW	0	0	4	0	0	0	4
NW	1	1	0	1	1	0	4
NNW	0	0	2	0	0	0	2
Variable	0	0	0	0	0	0	0
Total	4	44	46	28	4	0	126

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: April - June 2004
 Stability Class - Neutral - 250Ft-33Ft Delta-T (F)
 Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	23	51	58	2	0	134
NNE	5	45	31	15	0	0	96
NE	4	23	4	5	0	0	36
ENE	3	14	2	1	0	0	20
E	5	14	1	1	0	0	21
ESE	2	8	6	0	0	0	16
SE	0	14	4	0	0	0	18
SSE	1	10	30	2	0	0	43
S	0	5	5	2	0	0	12
SSW	2	6	9	5	6	1	29
SW	1	1	19	11	7	0	39
WSW	1	9	14	5	1	0	30
W	0	14	11	2	0	0	27
WNW	2	7	13	3	0	0	25
NW	0	8	12	1	1	0	22
NNW	0	8	10	3	4	0	25
Variable	0	0	0	0	0	0	0
Total	26	209	222	114	21	1	593

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: April - June 2004
 Stability Class - Slightly Stable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	7	35	30	4	0	0	76
NNE	8	32	21	2	0	0	63
NE	11	30	3	0	0	0	44
ENE	4	6	3	1	0	0	14
E	7	9	10	0	0	0	26
ESE	14	13	12	1	0	0	40
SE	4	12	6	0	0	0	22
SSE	4	15	29	2	1	0	51
S	4	44	18	1	0	0	67
SSW	5	23	11	3	4	0	46
SW	8	26	22	5	7	0	68
WSW	8	16	12	1	0	0	37
W	4	20	6	0	0	0	30
WNW	7	20	5	0	0	0	32
NW	7	14	1	0	0	0	22
NNW	10	10	6	0	0	0	26
Variable	0	0	0	0	0	0	0
Total	112	325	195	20	12	0	664

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: April - June 2004
 Stability Class - Moderately Stable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	8	4	0	0	0	13
NNE	1	8	3	0	0	0	12
NE	3	2	0	0	0	0	5
ENE	4	3	3	0	0	0	10
E	2	0	0	0	0	0	2
ESE	1	1	1	1	0	0	4
SE	4	4	2	0	0	0	10
SSE	6	13	13	0	0	0	32
S	7	34	6	1	0	0	48
SSW	5	10	2	0	0	0	17
SW	9	11	0	0	0	0	20
WSW	12	14	0	0	0	0	26
W	11	9	0	0	0	0	20
WNW	4	8	0	0	0	0	12
NW	6	5	0	0	0	0	11
NNW	2	8	0	0	0	0	10
Variable	0	0	0	0	0	0	0
Total	78	138	34	2	0	0	252

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: April - June 2004
 Stability Class - Extremely Stable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	2	0	0	0	0	2
NNE	1	0	1	0	0	0	2
NE	1	3	0	0	0	0	4
ENE	0	1	0	0	0	0	1
E	0	1	0	0	0	0	1
ESE	1	2	0	0	0	0	3
SE	1	0	0	0	0	0	1
SSE	3	8	23	0	0	0	34
S	8	21	9	0	0	0	38
SSW	9	4	0	0	0	0	13
SW	6	6	0	0	0	0	12
WSW	15	10	0	0	0	0	25
W	14	10	0	0	0	0	24
WNW	4	12	0	0	0	0	16
NW	3	0	0	0	0	0	3
NNW	3	0	0	0	0	0	3
Variable	0	0	0	0	0	0	0
Total	69	80	33	0	0	0	182

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: April - June 2004

Stability Class - Extremely Unstable - 250Ft-33Ft Delta-T (F)
Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	7	17	23	1	48
NNE	0	3	28	29	11	2	73
NE	0	2	13	0	2	0	17
ENE	0	2	1	0	0	0	3
E	0	5	4	4	0	0	13
ESE	0	5	4	2	0	0	11
SE	0	3	13	5	0	0	21
SSE	0	0	1	1	1	0	3
S	0	0	0	0	0	1	1
SSW	0	0	0	1	5	7	13
SW	0	0	2	11	3	6	22
WSW	0	1	3	22	3	2	31
W	0	0	4	6	1	5	16
WNW	0	1	0	6	1	0	8
NW	0	1	0	3	3	0	7
NNW	0	0	1	1	1	0	3
Variable	0	0	0	0	0	0	0
Total	0	23	81	108	54	24	290

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 4
Hours of missing stability measurements in all stability classes: 4

Zion Nuclear Station

Period of Record: April - June 2004

Stability Class - Moderately Unstable - 250Ft-33Ft Delta-T (F)

Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	1	4	1	0	6
NNE	0	4	1	2	0	0	7
NE	0	4	1	1	0	0	6
ENE	1	2	1	0	1	0	5
E	0	1	0	0	0	0	1
ESE	0	2	1	0	0	0	3
SE	0	0	2	0	0	0	2
SSE	0	0	1	0	0	0	1
S	0	0	0	0	0	0	0
SSW	0	1	0	1	2	0	4
SW	0	0	1	2	1	0	4
WSW	0	0	1	1	1	1	4
W	0	0	2	2	0	2	6
WNW	0	1	1	2	1	0	5
NW	0	0	1	1	0	0	2
NNW	0	0	0	1	0	0	1
Variable	0	0	0	0	0	0	0
Total	1	15	14	17	7	3	57

Hours of calm in this stability class: 0

Hours of missing wind measurements in this stability class: 1

Hours of missing stability measurements in all stability classes: 4

Zion Nuclear Station

Period of Record: April - June 2004

Stability Class - Slightly Unstable - 250Ft-33Ft Delta-T (F)

Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	2	4	10	9	3	28
NNE	0	4	9	3	0	0	16
NE	0	2	4	1	0	0	7
ENE	0	4	0	0	0	0	4
E	1	2	2	0	0	0	5
ESE	0	3	2	1	1	0	7
SE	0	2	4	2	0	0	8
SSE	0	1	5	3	0	0	9
S	0	0	0	0	0	0	0
SSW	0	0	0	3	2	3	8
SW	0	0	0	0	2	6	8
WSW	0	0	2	6	3	0	11
W	0	0	1	2	0	2	5
WNW	0	1	2	2	0	0	5
NW	0	0	1	0	0	2	3
NNW	0	0	0	2	0	0	2
Variable	0	0	0	0	0	0	0
Total	1	21	36	35	17	16	126

Hours of calm in this stability class: 0

Hours of missing wind measurements in this stability class: 0

Hours of missing stability measurements in all stability classes: 4

Zion Nuclear Station

Period of Record: April - June 2004
 Stability Class - Neutral - 250Ft-33Ft Delta-T (F)
 Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	11	31	40	63	30	176
NNE	0	13	15	20	5	0	53
NE	3	12	12	4	3	0	34
ENE	1	5	4	2	0	0	12
E	1	8	14	2	2	0	27
ESE	1	5	9	0	3	1	19
SE	0	3	16	4	0	0	23
SSE	3	5	14	16	4	0	42
S	0	2	5	0	3	0	10
SSW	0	2	5	7	7	8	29
SW	0	1	3	19	9	9	41
WSW	0	2	8	10	2	3	25
W	0	2	8	7	7	0	24
WNW	0	1	8	16	5	1	31
NW	0	0	9	7	0	3	19
NNW	0	3	5	7	3	5	23
Variable	0	0	0	0	0	0	0
Total	10	75	166	161	116	60	588

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 6
 Hours of missing stability measurements in all stability classes: 4

Zion Nuclear Station

Period of Record: April - June 2004

Stability Class - Slightly Stable - 250Ft-33Ft Delta-T (F)

Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	6	21	35	14	1	78
NNE	1	11	22	27	2	2	65
NE	1	11	22	1	0	0	35
ENE	0	9	2	3	1	1	16
E	1	12	3	6	6	4	32
ESE	1	11	11	7	11	6	47
SE	1	9	9	6	6	2	33
SSE	1	3	7	34	16	1	62
S	1	0	16	17	6	0	40
SSW	1	1	13	18	8	10	51
SW	0	2	12	28	5	6	53
WSW	0	3	9	18	7	0	37
W	0	6	15	12	1	0	34
WNW	0	4	14	13	3	0	34
NW	0	2	10	4	0	0	16
NNW	0	7	9	7	1	0	24
Variable	0	0	0	0	0	0	0
Total	9	97	195	236	87	33	657

Hours of calm in this stability class: 0

Hours of missing wind measurements in this stability class: 12

Hours of missing stability measurements in all stability classes: 4

Zion Nuclear Station

Period of Record: April - June 2004

Stability Class - Moderately Stable - 250Ft-33Ft Delta-T (F)

Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	3	6	9	1	0	19
NNE	3	7	8	7	0	0	25
NE	1	0	7	1	0	0	9
ENE	2	4	3	0	0	0	9
E	0	2	1	1	1	0	5
ESE	1	1	2	1	0	2	7
SE	0	2	7	5	2	0	16
SSE	0	7	9	10	6	0	32
S	1	0	17	18	6	1	43
SSW	1	0	8	11	1	0	21
SW	0	1	6	7	1	0	15
WSW	0	1	2	18	0	0	21
W	1	1	4	6	0	0	12
WNW	0	0	1	6	1	0	8
NW	0	2	2	3	0	0	7
NNW	0	1	2	1	0	0	4
Variable	0	0	0	0	0	0	0
Total	10	32	85	104	19	3	253

Hours of calm in this stability class: 0

Hours of missing wind measurements in this stability class: 1

Hours of missing stability measurements in all stability classes: 4

Zion Nuclear Station

Period of Record: April - June 2004

Stability Class - Extremely Stable - 250Ft-33Ft Delta-T (F)

Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	3	3	0	0	0	0	6
NNE	1	4	0	0	0	0	5
NE	0	0	2	0	0	0	2
ENE	0	3	1	0	0	0	4
E	2	0	1	0	0	0	3
ESE	0	0	0	0	0	0	0
SE	0	2	4	0	2	0	8
SSE	1	2	1	5	4	1	14
S	0	1	6	23	15	0	45
SSW	1	2	7	6	2	0	18
SW	1	2	6	10	0	0	19
WSW	0	3	4	4	2	0	13
W	0	1	4	8	1	0	14
WNW	0	1	6	5	0	0	12
NW	0	2	2	6	0	0	10
NNW	1	3	5	2	0	0	11
Variable	0	0	0	0	0	0	0
Total	10	29	49	69	26	1	184

Hours of calm in this stability class: 0

Hours of missing wind measurements in this stability class: 1

Hours of missing stability measurements in all stability classes: 4

Zion Nuclear Station

Period of Record: July - September 2004

Stability Class - Extremely Unstable - 250Ft-33Ft Delta-T (F)

Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	2	6	3	0	0	11
NNE	0	6	29	0	0	0	35
NE	0	14	8	0	0	0	22
ENE	0	6	0	0	0	0	6
E	0	3	0	0	0	0	3
ESE	0	6	1	0	0	0	7
SE	0	5	6	0	0	0	11
SSE	0	0	1	0	0	0	1
S	0	0	1	0	0	0	1
SSW	0	1	1	0	0	0	2
SW	0	0	11	0	0	0	11
WSW	0	3	2	3	0	0	8
W	0	6	14	1	0	0	21
WNW	0	3	3	0	0	0	6
NW	0	4	2	0	0	0	6
NNW	0	0	2	0	0	0	2
Variable	0	0	0	0	0	0	0
Total	0	59	87	7	0	0	153

Hours of calm in this stability class: 0

Hours of missing wind measurements in this stability class: 0

Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: July - September 2004
 Stability Class - Moderately Unstable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	4	1	0	0	5
NNE	0	0	5	0	0	0	5
NE	0	5	6	0	0	0	11
ENE	0	3	1	0	0	0	4
E	0	2	0	0	0	0	2
ESE	0	1	0	0	0	0	1
SE	0	2	3	0	0	0	5
SSE	0	0	2	0	0	0	2
S	0	0	1	0	0	0	1
SSW	0	0	3	1	0	0	4
SW	0	2	6	2	0	0	10
WSW	0	1	4	0	0	0	5
W	0	3	2	0	0	0	5
WNW	0	0	0	0	0	0	0
NW	0	1	0	0	0	0	1
NNW	0	0	1	0	0	0	1
Variable	0	0	0	0	0	0	0
Total	0	20	38	4	0	0	62

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: July - September 2004
 Stability Class - Slightly Unstable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	1	1	3	0	5
NNE	0	8	7	0	0	0	15
NE	0	12	3	0	0	0	15
ENE	0	8	1	0	0	0	9
E	0	7	0	0	0	0	7
ESE	0	6	3	0	0	0	9
SE	0	5	9	0	0	0	14
SSE	0	4	5	0	0	0	9
S	0	1	0	0	0	0	1
SSW	0	5	2	1	0	0	8
SW	0	4	10	2	0	0	16
WSW	0	3	9	3	0	0	15
W	1	1	2	0	0	0	4
WNW	0	5	1	0	0	0	6
NW	0	1	1	0	0	0	2
NNW	0	1	0	0	0	0	1
Variable	0	0	0	0	0	0	0
Total	1	71	54	7	3	0	136

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: July - September 2004
 Stability Class - Neutral - 250Ft-33Ft Delta-T (F)
 Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	2	13	54	27	3	0	99
NNE	1	39	42	6	0	0	88
NE	3	39	9	10	0	0	61
ENE	0	10	2	1	0	0	13
E	4	11	0	0	0	0	15
ESE	0	26	4	0	0	0	30
SE	1	27	16	0	0	0	44
SSE	0	37	58	5	0	0	100
S	1	26	13	2	0	0	42
SSW	4	19	9	2	0	0	34
SW	0	13	9	5	0	0	27
WSW	1	14	17	3	0	0	35
W	1	26	30	0	0	0	57
WNW	0	12	13	0	0	0	25
NW	5	6	7	0	0	0	18
NNW	0	10	10	0	0	0	20
Variable	0	0	0	0	0	0	0
Total	23	328	293	61	3	0	708

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: July - September 2004
 Stability Class - Slightly Stable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	5	30	12	1	0	0	48
NNE	8	21	15	5	0	0	49
NE	4	4	2	0	0	0	10
ENE	7	2	3	1	0	0	13
E	2	5	0	0	0	0	7
ESE	6	16	1	0	0	0	23
SE	4	27	12	1	0	0	44
SSE	5	26	29	6	0	0	66
S	21	76	14	0	0	0	111
SSW	15	57	3	0	0	0	75
SW	5	17	2	0	0	0	24
WSW	10	25	5	0	0	0	40
W	3	35	7	0	0	0	45
WNW	6	18	1	0	0	0	25
NW	5	26	2	0	0	0	33
NNW	3	18	2	0	0	0	23
Variable	0	0	0	0	0	0	0
Total	109	403	110	14	0	0	636

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: July - September 2004
 Stability Class - Moderately Stable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	2	4	0	0	0	0	6
NNE	3	0	0	0	0	0	3
NE	1	0	0	0	0	0	1
ENE	0	0	0	0	0	0	0
E	0	1	0	0	0	0	1
ESE	0	0	0	0	0	0	0
SE	1	2	0	0	0	0	3
SSE	2	1	1	0	0	0	4
S	15	39	0	0	0	0	54
SSW	31	24	0	0	0	0	55
SW	23	7	0	0	0	0	30
WSW	21	6	0	0	0	0	27
W	16	12	0	0	0	0	28
WNW	7	13	0	0	0	0	20
NW	4	16	0	0	0	0	20
NNW	8	6	0	0	0	0	14
Variable	0	0	0	0	0	0	0
Total	134	131	1	0	0	0	266

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: July - September 2004
 Stability Class - Extremely Stable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	1	1	0	0	0	0	2
S	4	6	0	0	0	0	10
SSW	12	7	0	0	0	0	19
SW	23	6	0	0	0	0	29
WSW	22	16	0	0	0	0	38
W	27	44	0	0	0	0	71
WNW	16	14	0	0	0	0	30
NW	4	5	0	0	0	0	9
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	109	99	0	0	0	0	208

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: July - September 2004

Stability Class - Extremely Unstable - 250Ft-33Ft Delta-T (F)

Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	5	9	0	0	14
NNE	0	2	26	6	2	0	36
NE	0	4	9	6	0	0	19
ENE	0	3	0	0	0	0	3
E	0	4	2	0	0	0	6
ESE	0	1	5	0	0	0	6
SE	0	1	7	4	0	0	12
SSE	0	0	0	0	0	0	0
S	0	0	0	1	0	0	1
SSW	0	0	1	2	0	0	3
SW	0	0	2	6	3	0	11
WSW	0	2	1	2	4	0	9
W	0	4	7	10	0	0	21
WNW	0	1	4	1	0	0	6
NW	0	0	4	2	0	0	6
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	22	73	49	9	0	153

Hours of calm in this stability class: 0

Hours of missing wind measurements in this stability class: 0

Hours of missing stability measurements in all stability classes: 12

Zion Nuclear Station

Period of Record: July - September 2004
 Stability Class - Moderately Unstable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	1	3	1	0	5
NNE	0	1	3	1	3	0	8
NE	0	1	6	1	0	0	8
ENE	0	2	2	1	0	0	5
E	0	0	1	0	0	0	1
ESE	0	0	0	0	0	0	0
SE	0	1	3	2	0	0	6
SSE	0	1	0	1	0	0	2
S	0	0	0	1	1	0	2
SSW	0	0	1	2	0	0	3
SW	0	0	3	5	2	0	10
WSW	0	1	1	3	1	0	6
W	0	0	2	1	1	0	4
WNW	0	0	0	0	0	0	0
NW	0	0	1	1	0	0	2
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	7	24	22	9	0	62

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 12

Zion Nuclear Station

Period of Record: July - September 2004
 Stability Class - Slightly Unstable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	1	4	5
NNE	0	1	18	0	1	0	20
NE	0	1	10	0	1	0	12
ENE	1	3	3	0	0	0	7
E	0	5	1	0	0	0	6
ESE	0	3	2	3	0	0	8
SE	0	4	9	9	0	0	22
SSE	0	0	0	3	0	0	3
S	0	0	1	0	1	0	2
SSW	0	0	6	1	0	0	7
SW	0	0	6	4	7	0	17
WSW	0	0	5	5	5	0	15
W	0	1	0	2	0	0	3
WNW	0	3	3	1	0	0	7
NW	0	0	1	0	0	0	1
NNW	0	0	1	0	0	0	1
Variable	0	0	0	0	0	0	0
Total	1	21	66	28	16	4	136

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 12

Zion Nuclear Station

Period of Record: July - September 2004
 Stability Class - Neutral - 250Ft-33Ft Delta-T (F)
 Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	5	12	44	31	18	111
NNE	1	20	36	22	8	0	87
NE	1	10	19	2	12	3	47
ENE	0	4	4	1	1	1	11
E	3	5	4	0	0	0	12
ESE	1	12	13	3	0	0	29
SE	2	14	35	30	4	0	85
SSE	0	5	35	21	5	1	67
S	0	5	12	7	2	2	28
SSW	0	6	17	10	2	1	36
SW	0	4	14	10	5	0	33
WSW	0	4	7	23	6	1	41
W	1	3	21	27	5	0	57
WNW	0	4	8	13	0	0	25
NW	1	2	7	6	0	0	16
NNW	1	2	7	11	1	0	22
Variable	0	0	0	0	0	0	0
Total	12	105	251	230	82	27	707

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 1
 Hours of missing stability measurements in all stability classes: 12

Zion Nuclear Station

Period of Record: July - September 2004
 Stability Class - Slightly Stable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	3	20	21	5	1	51
NNE	1	7	19	16	8	4	55
NE	3	6	2	0	2	0	13
ENE	1	6	1	3	2	0	13
E	2	3	4	3	0	0	12
ESE	2	10	9	8	2	0	31
SE	1	7	15	17	11	0	51
SSE	1	11	34	38	25	0	109
S	0	7	14	26	6	0	53
SSW	1	7	31	32	1	0	72
SW	1	2	23	9	0	0	35
WSW	2	5	14	16	0	0	37
W	0	1	14	32	0	0	47
WNW	0	3	4	15	1	0	23
NW	0	3	8	12	2	0	25
NNW	0	3	9	10	1	0	23
Variable	0	0	0	0	0	0	0
Total	16	84	221	258	66	5	650

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 2
 Hours of missing stability measurements in all stability classes: 12

Zion Nuclear Station

Period of Record: July - September 2004
 Stability Class - Moderately Stable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	1	4	7	0	0	0	12
NNE	0	5	10	0	0	0	15
NE	2	0	2	1	0	0	5
ENE	1	1	0	0	0	0	2
E	1	4	1	0	1	0	7
ESE	2	3	1	1	0	0	7
SE	1	4	9	6	0	0	20
SSE	0	8	11	21	2	0	42
S	0	4	21	17	1	0	43
SSW	0	4	9	20	0	0	33
SW	2	2	7	5	0	0	16
WSW	1	2	8	9	0	0	20
W	0	3	7	9	0	0	19
WNW	1	1	5	3	0	0	10
NW	0	0	3	3	0	0	6
NNW	0	1	7	8	0	0	16
Variable	0	0	0	0	0	0	0
Total	12	46	108	103	4	0	273

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 3
 Hours of missing stability measurements in all stability classes: 12

Zion Nuclear Station

Period of Record: July - September 2004
 Stability Class - Extremely Stable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	2	5	3	2	0	0	12
NNE	1	10	1	0	0	0	12
NE	2	5	1	0	0	0	8
ENE	1	2	0	1	0	0	4
E	1	2	0	0	0	0	3
ESE	0	4	0	0	0	0	4
SE	0	3	0	0	0	0	3
SSE	2	3	1	3	2	0	11
S	1	3	6	7	0	0	17
SSW	0	6	21	10	0	0	37
SW	0	8	6	8	0	0	22
WSW	0	5	15	7	3	0	30
W	0	2	4	12	7	0	25
WNW	0	4	2	5	0	0	11
NW	1	4	1	2	0	0	8
NNW	0	0	2	0	0	0	2
Variable	0	0	0	0	0	0	0
Total	11	66	63	57	12	0	209

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 12

Zion Nuclear Station

Period of Record: October - December 2004
 Stability Class - Extremely Unstable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	3	1	0	0	0	4
E	0	2	0	0	0	0	2
ESE	0	0	0	0	0	0	0
SE	0	0	1	0	0	0	1
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	1	0	0	0	1
SW	0	0	4	1	0	0	5
WSW	0	0	2	0	0	0	2
W	0	0	3	0	0	0	3
WNW	0	0	1	0	0	0	1
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	5	13	1	0	0	19

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: October - December 2004
 Stability Class - Moderately Unstable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	1	0	0	0	1
ENE	0	1	1	0	0	0	2
E	0	0	2	0	0	0	2
ESE	0	1	0	0	0	0	1
SE	0	1	0	0	0	0	1
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	1	2	0	0	3
WSW	0	0	3	2	0	0	5
W	0	0	5	0	0	0	5
WNW	0	0	0	0	0	0	0
NW	0	0	1	2	0	0	3
NNW	0	0	0	1	0	0	1
Variable	0	0	0	0	0	0	0
Total	0	3	14	7	0	0	24

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: October - December 2004
 Stability Class - Slightly Unstable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	0	0	0
NNE	0	1	6	0	0	0	7
NE	0	0	3	2	0	0	5
ENE	0	0	0	1	0	0	1
E	0	1	4	3	0	0	8
ESE	0	2	1	0	0	0	3
SE	0	0	0	0	0	0	0
SSE	0	1	1	0	0	0	2
S	0	0	2	0	0	0	2
SSW	0	0	2	1	0	0	3
SW	0	1	2	2	0	0	5
WSW	0	0	2	1	0	0	3
W	0	1	9	2	0	0	12
WNW	0	0	9	1	0	0	10
NW	0	1	2	7	0	0	10
NNW	0	0	2	0	0	0	2
Variable	0	0	0	0	0	0	0
Total	0	8	45	20	0	0	73

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: October - December 2004
 Stability Class - Neutral - 250Ft-33Ft Delta-T (F)
 Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	23	36	12	3	0	74
NNE	2	26	37	14	1	0	80
NE	1	25	27	10	6	0	69
ENE	1	8	24	22	5	0	60
E	1	8	26	22	0	0	57
ESE	2	15	21	16	8	0	62
SE	0	10	6	4	0	0	20
SSE	1	14	29	30	5	0	79
S	2	23	37	10	0	0	72
SSW	4	45	48	10	2	0	109
SW	2	42	45	37	1	1	128
WSW	4	29	32	26	2	0	93
W	4	26	58	22	1	0	111
WNW	7	34	56	24	3	0	124
NW	10	31	60	22	0	0	123
NNW	5	9	52	17	0	0	83
Variable	0	0	0	0	0	0	0
Total	46	368	594	298	37	1	1344

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: October - December 2004

Stability Class - Slightly Stable - 250Ft-33Ft Delta-T (F)

Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	3	8	2	0	0	0	13
NNE	1	2	0	1	0	0	4
NE	1	4	2	1	1	0	9
ENE	2	3	9	0	0	0	14
E	1	4	5	0	0	0	10
ESE	2	3	3	0	0	0	8
SE	7	7	0	0	0	0	14
SSE	4	13	6	5	2	0	30
S	4	23	16	0	0	0	43
SSW	5	34	19	4	0	0	62
SW	5	24	44	11	0	0	84
WSW	8	15	37	0	0	0	60
W	12	29	14	1	0	0	56
WNW	14	23	10	0	0	0	47
NW	14	32	6	0	0	0	52
NNW	4	23	9	0	0	0	36
Variable	0	0	0	0	0	0	0
Total	87	247	182	23	3	0	542

Hours of calm in this stability class: 0

Hours of missing wind measurements in this stability class: 0

Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: October - December 2004

Stability Class - Moderately Stable - 250Ft-33Ft Delta-T (F)

Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	2	1	0	0	0	3
NNE	0	1	0	0	0	0	1
NE	2	0	0	0	0	0	2
ENE	1	1	0	0	0	0	2
E	0	0	0	0	0	0	0
ESE	1	0	0	0	0	0	1
SE	0	1	0	0	0	0	1
SSE	1	1	1	0	1	0	4
S	1	9	1	0	0	0	11
SSW	7	11	0	0	0	0	18
SW	6	5	1	0	0	0	12
WSW	1	4	0	0	0	0	5
W	7	9	0	0	0	0	16
WNW	4	16	0	0	0	0	20
NW	7	5	0	0	0	0	12
NNW	2	6	0	0	0	0	8
Variable	0	0	0	0	0	0	0
Total	40	71	4	0	1	0	116

Hours of calm in this stability class: 0

Hours of missing wind measurements in this stability class: 0

Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: October - December 2004
 Stability Class - Extremely Stable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 35 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	2	1	0	0	0	0	3
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	2	1	0	0	0	3
SSW	4	4	0	0	0	0	8
SW	3	11	0	0	0	0	14
WSW	5	5	0	0	0	0	10
W	1	4	0	0	0	0	5
WNW	5	13	0	0	0	0	18
NW	2	3	0	0	0	0	5
NNW	5	0	0	0	0	0	5
Variable	0	0	0	0	0	0	0
Total	27	43	1	0	0	0	71

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 0

Zion Nuclear Station

Period of Record: October - December 2004

Stability Class - Extremely Unstable - 250Ft-33Ft Delta-T (F)
Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	4	0	0	0	4
E	0	0	2	0	0	0	2
ESE	0	0	0	0	0	0	0
SE	0	0	0	1	0	0	1
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	2	0	1	0	3
SW	0	0	1	2	0	0	3
WSW	0	0	0	2	0	0	2
W	0	0	1	3	0	0	4
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	0	10	8	1	0	19

Hours of calm in this stability class: 0

Hours of missing wind measurements in this stability class: 0

Hours of missing stability measurements in all stability classes: 18

Zion Nuclear Station

Period of Record: October - December 2004

Stability Class - Moderately Unstable - 250Ft-33Ft Delta-T (F)
Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	0	0	0
NNE	0	0	1	0	0	0	1
NE	0	1	0	0	0	0	1
ENE	0	0	1	0	0	0	1
E	0	1	1	1	0	0	3
ESE	0	0	0	0	0	0	0
SE	0	0	1	0	0	0	1
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	1	0	1
SW	0	0	1	1	1	0	3
WSW	0	0	0	2	1	2	5
W	0	0	1	3	0	0	4
WNW	0	0	0	0	1	0	1
NW	0	0	0	1	2	0	3
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	2	6	8	6	2	24

Hours of calm in this stability class: 0

Hours of missing wind measurements in this stability class: 0

Hours of missing stability measurements in all stability classes: 18

Zion Nuclear Station

Period of Record: October - December 2004

Stability Class - Slightly Unstable - 250Ft-33Ft Delta-T (F)
Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	0	0	0	0	0	0
NNE	0	0	4	5	0	0	9
NE	0	0	1	0	2	0	3
ENE	0	1	0	0	1	0	2
E	0	0	3	1	4	0	8
ESE	0	0	1	1	0	0	2
SE	0	0	1	0	0	0	1
SSE	0	0	1	0	0	0	1
S	0	0	0	2	0	0	2
SSW	0	0	0	2	1	0	3
SW	0	0	2	1	2	0	5
WSW	0	0	0	3	0	2	5
W	0	0	6	4	0	1	11
WNW	0	0	1	7	3	1	12
NW	0	0	2	2	5	0	9
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	0	1	22	28	18	4	73

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 18

Zion Nuclear Station

Period of Record: October - December 2004
 Stability Class - Neutral - 250Ft-33Ft Delta-T (F)
 Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	1	17	31	13	7	69
NNE	0	13	18	37	15	11	94
NE	0	2	19	24	3	7	55
ENE	1	1	11	21	18	12	64
E	0	0	16	20	14	9	59
ESE	0	5	15	11	8	9	48
SE	1	7	14	17	19	2	60
SSE	1	3	15	22	9	6	56
S	0	3	24	36	14	5	82
SSW	0	7	37	44	21	6	115
SW	0	9	35	36	31	7	118
WSW	2	9	22	22	24	11	90
W	2	11	18	37	38	13	119
WNW	2	10	30	54	15	19	130
NW	4	8	19	61	35	4	131
NNW	0	3	9	25	11	6	54
Variable	0	0	0	0	0	0	0
Total	13	92	319	498	288	134	1344

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 18

Zion Nuclear Station

Period of Record: October - December 2004
 Stability Class - Slightly Stable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	1	5	11	0	0	17
NNE	0	2	2	4	1	2	11
NE	0	2	1	5	0	0	8
ENE	0	1	2	11	1	0	15
E	0	2	2	2	2	0	8
ESE	0	4	6	2	2	0	14
SE	0	4	7	1	0	1	13
SSE	1	5	10	12	5	6	39
S	1	4	15	16	8	1	45
SSW	0	1	17	22	18	1	59
SW	0	4	15	43	20	3	85
WSW	2	4	10	27	10	0	53
W	0	5	11	22	9	0	47
WNW	1	1	10	16	2	0	30
NW	1	6	21	22	4	0	54
NNW	0	7	27	9	2	0	45
Variable	0	0	0	0	0	0	0
Total	6	53	161	225	84	14	543

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 18

Zion Nuclear Station

Period of Record: October - December 2004
 Stability Class - Moderately Stable - 250Ft-33Ft Delta-T (F)
 Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	6	3	3	0	0	12
NNE	0	2	1	2	0	0	5
NE	1	0	2	0	0	0	3
ENE	0	1	2	1	0	0	4
E	0	1	1	0	0	0	2
ESE	2	1	0	0	0	0	3
SE	1	2	3	0	0	0	6
SSE	0	1	2	1	0	2	6
S	0	0	5	6	2	0	13
SSW	0	1	1	9	0	0	11
SW	0	0	2	4	2	0	8
WSW	0	0	2	5	0	0	7
W	1	2	0	1	0	0	4
WNW	0	0	2	10	0	0	12
NW	0	0	2	5	0	0	7
NNW	0	4	7	2	0	0	13
Variable	0	0	0	0	0	0	0
Total	5	21	35	49	4	2	116

Hours of calm in this stability class: 0
 Hours of missing wind measurements in this stability class: 0
 Hours of missing stability measurements in all stability classes: 18

Zion Nuclear Station

Period of Record: October - December 2004

Stability Class - Extremely Stable - 250Ft-33Ft Delta-T (F)

Winds Measured at 250 Feet

Wind Direction	Wind Speed (in mph)						Total
	1-3	4-7	8-12	13-18	19-24	> 24	
N	0	2	2	0	0	0	4
NNE	0	2	2	0	0	0	4
NE	0	2	1	1	0	0	4
ENE	1	5	1	0	0	0	7
E	0	2	1	0	0	0	3
ESE	0	1	0	0	0	0	1
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	1	5	1	0	1	8
SSW	0	0	4	7	1	0	12
SW	0	0	3	9	1	0	13
WSW	0	1	0	2	2	0	5
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	3	2	0	0	0	5
NNW	0	2	2	1	0	0	5
Variable	0	0	0	0	0	0	0
Total	1	21	23	21	4	1	71

Hours of calm in this stability class: 0

Hours of missing wind measurements in this stability class: 0

Hours of missing stability measurements in all stability classes: 18

ZION

APPENDIX III

2004 REMP SAMPLE RESULTS

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LIST OF TABLES

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1.0 INTRODUCTION

The following constitutes the 2004 Progress Report for the Radiological Environmental Monitoring Program conducted at the Zion Nuclear Power Station, Zion, Illinois. Results of completed analyses are presented in the attached tables.

Data obtained in the program are well within the ranges previously encountered in the program and to be expected in the environmental media sampled.

For all gamma isotopic analyses, 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, I-131, Ba-140, La-140, Cs-134 and Cs-137. Naturally occurring gamma-emitters, such as K-40 and Ra daughters, are frequently detected but not listed here. The data is reported in the format of $x \pm 2s; 2TPU$, where "x" is the significant result, "s" is the one standard deviation counting uncertainty, and TPU is the total propagated uncertainty at the one sigma confidence level.

Locations denoted by a "(C)" after site code refer to control locations.

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

TLD data is provided by Exelon Generation Company.

Deviations from Scheduled Sampling and Corrective Actions Taken

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

Unusual Environmental Measurements

None for 2004

Sample Type	Location Code	Collection Date	Comments
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2.0 LISTING OF MISSED SAMPLES

Sample Type	Location Code	Expected Collection Date	Reason
PW	Z-18	05-19-04	Unable to collect sample; "raw water" tap disconnected due to construction.
PW	Z-18	09-29-04	No sample; plant shut down due to construction.
PW	Z-16	11-24-04	No sample due to maintenance work at location.

3.0 LISTING OF SAMPLE ANOMALIES

Sample Type	Location Code	Collection Date	Reason
A	Z-02	09-01-04	Low reading of 162.9 due to power outage possibly from storms in area.
A	Z-03	09-01-04	Low reading of 162.9 due to power outage possibly from storms in area.
A	Z-02	11-03-04	No apparent reason for low reading of 160.5 hours; possibly due to storms in area.
A	Z-03	11-03-04	No apparent reason for low reading of 160.4 hours; possibly due to storms in area.

ZION

4.0 2004 ANALYSES DATA TABLES

ZION

Table 1. Airborne Particulates
Collection: Airborne Particulates - Continuous; weekly exchange

ODCM-
Required LLDs: 0.01 pCi/m³ for Gross Beta
Units: 10⁻² pCi/m³

Z-01 Onsite No. 1, Southside					
Date Collected	Volume (m ³)	Gross Beta	Date Collected	Volume (m ³)	Gross Beta
01-07-04	327	3.3 ± 0.4 ; 0.7	07-07-04	284	1.4 ± 0.3 ; 0.4
01-14-04	285	3.5 ± 0.4 ; 0.8	07-14-04	285	1.4 ± 0.3 ; 0.4
01-21-04	285	1.9 ± 0.3 ; 0.5	07-21-04	285	2.2 ± 0.3 ; 0.5
01-28-04	285	2.1 ± 0.4 ; 0.5	07-28-04	286	2.1 ± 0.4 ; 0.5
02-04-04	284	4.6 ± 0.4 ; 0.9	08-04-04	285	3.2 ± 0.4 ; 0.7
02-11-04	286	3.7 ± 0.4 ; 0.8	08-11-04	285	2.1 ± 0.4 ; 0.5
02-18-04	284	2.6 ± 0.4 ; 0.6	08-18-04	285	1.8 ± 0.3 ; 0.4
02-25-04	285	2.6 ± 0.4 ; 0.6	08-25-04	284	2.6 ± 0.3 ; 0.6
03-03-04	285	1.9 ± 0.3 ; 0.5	09-01-04	285	1.4 ± 0.3 ; 0.4
03-10-04	285	2.2 ± 0.4 ; 0.6	09-08-04	284	3.1 ± 0.4 ; 0.7
03-17-04	285	1.9 ± 0.3 ; 0.5	09-15-04	285	2.7 ± 0.4 ; 0.6
03-24-04	289	1.5 ± 0.3 ; 0.4	09-22-04	295	2.7 ± 0.4 ; 0.6
03-31-04	286	1.5 ± 0.3 ; 0.4	09-29-04	279	2.5 ± 0.3 ; 0.6
1st Qtr. Mean±s.d.		2.6±1.0	3rd Qtr. Mean±s.d.		2.2±0.6
04-07-04	283	2.4 ± 0.4 ; 0.6	10-06-04	285	2.2 ± 0.3 ; 0.5
04-14-04	291	1.5 ± 0.3 ; 0.4	10-13-04	285	2.4 ± 0.3 ; 0.5
04-21-04	283	2.6 ± 0.3 ; 0.6	10-20-04	283	1.5 ± 0.3 ; 0.4
04-28-04	284	1.5 ± 0.3 ; 0.4	10-27-04	286	2.1 ± 0.3 ; 0.5
05-05-04	285	1.6 ± 0.3 ; 0.4	11-03-04	287	1.6 ± 0.3 ; 0.4
05-12-04	283	2.5 ± 0.3 ; 0.6	11-10-04	285	2.7 ± 0.4 ; 0.6
05-19-04	287	1.1 ± 0.3 ; 0.4	11-17-04	284	2.5 ± 0.3 ; 0.5
05-26-04	285	0.9 ± 0.3 ; 0.3	11-24-04	285	2.9 ± 0.4 ; 0.6
06-02-04	284	1.0 ± 0.3 ; 0.3	12-01-04	285	1.7 ± 0.4 ; 0.5
06-09-04	285	1.7 ± 0.3 ; 0.4	12-08-04	285	2.9 ± 0.4 ; 0.7
06-16-04	284	1.0 ± 0.3 ; 0.3	12-15-04	285	3.5 ± 0.4 ; 0.8
06-23-04	288	1.5 ± 0.3 ; 0.4	12-22-04	284	2.7 ± 0.4 ; 0.6
06-30-04	284	1.3 ± 0.3 ; 0.4	12-29-04	287	3.5 ± 0.4 ; 0.7
2nd Qtr. Mean±s.d.		1.6±0.6	4th Qtr. Mean±s.d.		2.5±0.6

ZION

Table 1. Airborne Particulates
Collection: Airborne Particulates - Continuous; weekly exchange

ODCM-
Required LLDs: 0.01 pCi/m³ for Gross Beta

Units: 10⁻² pCi/m³

Z-02 Onsite No. 2, Westside					
Date Collected	Volume (m ³)	Gross Beta	Date Collected	Volume (m ³)	Gross Beta
01-07-04	327	3.1 ± 0.4 ; 0.7	07-07-04	284	1.1 ± 0.3 ; 0.4
01-14-04	285	3.2 ± 0.4 ; 0.7	07-14-04	285	0.9 ± 0.2 ; 0.3
01-21-04	284	1.7 ± 0.3 ; 0.4	07-21-04	285	1.4 ± 0.3 ; 0.4
01-28-04	284	1.4 ± 0.3 ; 0.4	07-28-04	286	1.1 ± 0.3 ; 0.4
02-04-04	286	2.9 ± 0.4 ; 0.6	08-04-04	285	2.3 ± 0.3 ; 0.5
02-11-04	290	3.7 ± 0.4 ; 0.8	08-11-04	285	1.3 ± 0.3 ; 0.4
02-18-04	284	4.1 ± 0.4 ; 0.9	08-18-04	285	1.6 ± 0.3 ; 0.4
02-25-04	285	2.8 ± 0.4 ; 0.6	08-25-04	284	1.7 ± 0.3 ; 0.4
03-03-04	285	1.9 ± 0.3 ; 0.5	09-01-04	276 ^a	1.1 ± 0.3 ; 0.3
03-10-04	285	3.4 ± 0.4 ; 0.8	09-08-04	285	2.6 ± 0.3 ; 0.6
03-17-04	285	2.0 ± 0.4 ; 0.5	09-15-04	285	1.6 ± 0.3 ; 0.4
03-24-04	284	1.3 ± 0.3 ; 0.4	09-22-04	290	2.2 ± 0.4 ; 0.5
03-31-04	286	1.3 ± 0.3 ; 0.4	09-29-04	280	1.9 ± 0.3 ; 0.5
1st Qtr. Mean±s.d.		2.5±1.0	3rd Qtr. Mean±s.d.		1.6±0.5
04-07-04	283	1.6 ± 0.3 ; 0.4	10-06-04	285	1.3 ± 0.3 ; 0.4
04-14-04	287	1.2 ± 0.3 ; 0.4	10-13-04	285	2.1 ± 0.3 ; 0.5
04-21-04	283	2.1 ± 0.3 ; 0.5	10-20-04	283	1.2 ± 0.3 ; 0.4
04-28-04	284	1.5 ± 0.3 ; 0.4	10-27-04	282	2.3 ± 0.3 ; 0.5
05-05-04	285	1.4 ± 0.3 ; 0.4	11-03-04	268 ^b	2.1 ± 0.3 ; 0.5
05-12-04	280	2.0 ± 0.3 ; 0.5	11-10-04	281	2.4 ± 0.4 ; 0.6
05-19-04	287	0.9 ± 0.3 ; 0.3	11-17-04	280	2.8 ± 0.3 ; 0.6
05-26-04	285	0.9 ± 0.3 ; 0.3	11-24-04	281	3.3 ± 0.4 ; 0.7
06-02-04	285	1.0 ± 0.3 ; 0.3	12-01-04	281	1.5 ± 0.4 ; 0.4
06-09-04	284	1.6 ± 0.3 ; 0.4	12-08-04	280	2.5 ± 0.4 ; 0.6
06-16-04	284	0.9 ± 0.3 ; 0.3	12-15-04	280	3.6 ± 0.4 ; 0.8
06-23-04	287	0.9 ± 0.3 ; 0.3	12-22-04	280	2.1 ± 0.4 ; 0.5
06-30-04	285	1.2 ± 0.3 ; 0.3	12-29-04	282	3.8 ± 0.4 ; 0.8
2nd Qtr. Mean±s.d.		1.3±0.4	4th Qtr. Mean±s.d.		2.4±0.8

^a Volume low; meter reading of 162.9 hours possibly due to storms in area.

^b Volume low; meter reading of 160.5 hours possibly due to storms in area.

ZION

Table 1. Airborne Particulates
Collection: Airborne Particulates - Continuous; weekly exchange

ODCM-
Required LLDs: 0.01 pCi/m³ for Gross Beta
Units: 10⁻² pCi/m³

Z-03 Onsite No. 3, Northside					
Date Collected	Volume (m ³)	Gross Beta	Date Collected	Volume (m ³)	Gross Beta
01-07-04	327	3.8 ± 0.4 ; 0.8	07-07-04	284	1.5 ± 0.3 ; 0.4
01-14-04	285	3.6 ± 0.4 ; 0.8	07-14-04	285	1.0 ± 0.3 ; 0.3
01-21-04	285	2.4 ± 0.3 ; 0.5	07-21-04	285	2.0 ± 0.3 ; 0.5
01-28-04	284	2.4 ± 0.4 ; 0.6	07-28-04	286	2.1 ± 0.4 ; 0.5
02-04-04	286	3.7 ± 0.4 ; 0.8	08-04-04	285	3.2 ± 0.4 ; 0.7
02-11-04	280	3.5 ± 0.4 ; 0.7	08-11-04	285	1.9 ± 0.3 ; 0.5
02-18-04	285	4.5 ± 0.5 ; 0.9	08-18-04	285	2.3 ± 0.3 ; 0.5
02-25-04	285	2.6 ± 0.4 ; 0.6	08-25-04	284	2.0 ± 0.3 ; 0.5
03-03-04	285	1.8 ± 0.3 ; 0.5	09-01-04	276 ^a	1.2 ± 0.3 ; 0.4
03-10-04	285	3.0 ± 0.4 ; 0.7	09-08-04	285	3.2 ± 0.4 ; 0.7
03-17-04	285	2.1 ± 0.4 ; 0.5	09-15-04	285	2.2 ± 0.4 ; 0.5
03-24-04	284	1.9 ± 0.3 ; 0.5	09-22-04	290	2.2 ± 0.4 ; 0.5
03-31-04	287	1.6 ± 0.3 ; 0.4	09-29-04	280	2.7 ± 0.3 ; 0.6
1st Qtr. Mean±s.d.		2.8±0.9	3rd Qtr. Mean±s.d.		2.1±0.7
04-07-04	282	2.9 ± 0.4 ; 0.7	10-06-04	285	1.9 ± 0.3 ; 0.5
04-14-04	287	1.5 ± 0.3 ; 0.4	10-13-04	285	2.2 ± 0.3 ; 0.5
04-21-04	283	2.6 ± 0.3 ; 0.6	10-20-04	283	1.1 ± 0.3 ; 0.4
04-28-04	284	1.7 ± 0.3 ; 0.5	10-27-04	287	2.4 ± 0.3 ; 0.5
05-05-04	285	1.6 ± 0.3 ; 0.5	11-03-04	272 ^b	2.0 ± 0.3 ; 0.5
05-12-04	280	2.3 ± 0.3 ; 0.5	11-10-04	285	2.0 ± 0.3 ; 0.5
05-19-04	286	1.0 ± 0.3 ; 0.4	11-17-04	284	2.5 ± 0.3 ; 0.5
05-26-04	285	1.0 ± 0.3 ; 0.4	11-24-04	285	3.0 ± 0.4 ; 0.6
06-02-04	285	1.1 ± 0.3 ; 0.3	12-01-04	286	1.6 ± 0.4 ; 0.5
06-09-04	280	2.0 ± 0.3 ; 0.5	12-08-04	285	2.7 ± 0.4 ; 0.6
06-16-04	280	1.2 ± 0.3 ; 0.4	12-15-04	285	3.4 ± 0.4 ; 0.7
06-23-04	282	1.3 ± 0.3 ; 0.4	12-22-04	284	2.5 ± 0.4 ; 0.6
06-30-04	280	1.5 ± 0.3 ; 0.4	12-29-04	287	4.0 ± 0.4 ; 0.8
2nd Qtr. Mean±s.d.		1.7±0.6	4th Qtr. Mean±s.d.		2.4±0.7

^a Volume low; meter reading of 162.9 hours possibly due to storms in area.

^b Volume low; meter reading of 160.4 hours possibly due to storms in area.

ZION

Table 2. Airborne Particulates

Collection: Quarterly composites of weekly collections
 ODCM-
 Required LLDs: Cs-134 = 0.01, Cs-137 = 0.01 pCi/m³
 Other LLDs: Mn-54 = 0.01; Fe-59 = 0.015; Co-58, Co-60 = 0.01; Zn-65 = 0.04; Zr/Nb-95 = 0.01;
 Ba/La-140 = 0.025 pCi/m³
 Units: 10⁻⁴ pCi/m³

Sample Description and Concentration

<u>Z-01 Onsite No. 1, Southside</u>				
2004 Collection Period	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Lab Code	ZAP-1988	ZAP-4339	ZAP-6557	ZAP-7846,7
Volume	3,759	3,715	3,714	3,713
Mn-54	-6.5 ± 5.8 ; 5.9	-2.1 ± 4.3 ; 4.3	0.9 ± 5.7 ; 5.7	3.9 ± 3.6 ; 3.7
Fe-59	9.8 ± 11.2 ; 11.3	3.7 ± 10.1 ; 10.1	-8.4 ± 11.8 ; 11.9	0.6 ± 7.6 ; 7.6
Co-58	7.2 ± 5.0 ; 5.2	0.3 ± 5.0 ; 5.0	-11.4 ± 6.7 ; 7.0	-3.6 ± 3.7 ; 3.8
Co-60	-3.0 ± 6.2 ; 6.2	2.6 ± 5.0 ; 5.0	0.1 ± 4.2 ; 4.2	2.9 ± 4.2 ; 4.2
Zn-65	10.2 ± 13.1 ; 13.3	-23.6 ± 14.9 ; 15.4	-14.6 ± 13.0 ; 13.2	9.2 ± 8.6 ; 8.8
Nb/Zr-95	1.2 ± 4.9 ; 4.9	-12.1 ± 5.2 ; 5.7	-11.3 ± 6.3 ; 6.6	1.8 ± 3.7 ; 3.7
Cs-134	2.8 ± 5.7 ; 5.7	-2.2 ± 6.7 ; 6.7	0.6 ± 6.4 ; 6.4	1.6 ± 4.9 ; 4.9
Cs-137	3.6 ± 6.4 ; 6.4	-1.1 ± 6.4 ; 6.4	4.1 ± 4.2 ; 4.3	-0.8 ± 4.5 ; 4.5
Ba/La-140	-9.4 ± 7.2 ; 7.4	-18.2 ± 5.7 ; 6.5	-1.6 ± 5.4 ; 5.4	41.1 ± 5.2 ; 9.0
<u>Z-02 Onsite No. 2, Westside</u>				
2004 Collection Period	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Lab Code	ZAP-1989,90	ZAP-4340	ZAP-6558	ZAP-7848
Volume	3,758	3,706	3,701	3,655
Mn-54	2.8 ± 4.7 ; 4.8	-5.3 ± 4.9 ; 5.0	-4.0 ± 6.0 ; 6.0	-3.1 ± 5.7 ; 5.7
Fe-59	-5.4 ± 6.3 ; 6.3	-9.2 ± 7.5 ; 7.7	-10.9 ± 11.6 ; 11.7	-29.6 ± 13.2 ; 14.2
Co-58	2.1 ± 3.6 ; 3.6	2.5 ± 4.1 ; 4.1	-2.6 ± 5.7 ; 5.7	1.8 ± 4.9 ; 4.9
Co-60	4.5 ± 4.5 ; 4.5	5.8 ± 4.0 ; 4.1	1.0 ± 4.5 ; 4.5	7.3 ± 6.5 ; 6.6
Zn-65	-1.6 ± 8.7 ; 8.7	1.3 ± 9.9 ; 9.9	4.1 ± 12.1 ; 12.1	4.9 ± 10.6 ; 10.6
Nb/Zr-95	-1.3 ± 4.2 ; 4.2	0.9 ± 4.6 ; 4.6	1.2 ± 5.3 ; 5.3	-14.6 ± 5.6 ; 6.2
Cs-134	2.9 ± 3.6 ; 3.7	4.1 ± 5.0 ; 5.1	4.0 ± 6.6 ; 6.6	-2.7 ± 6.5 ; 6.5
Cs-137	0.4 ± 4.2 ; 4.2	-2.3 ± 5.3 ; 5.3	-2.4 ± 6.2 ; 6.2	-2.2 ± 5.0 ; 5.1
Ba/La-140	-1.0 ± 3.7 ; 3.7	-3.4 ± 5.8 ; 5.8	18.0 ± 6.2 ; 6.9	-26.9 ± 8.6 ; 9.8

ZION

Table 2. Airborne Particulates

Collection: Quarterly composites of weekly collections
 ODCM-
 Required LLDs: Cs-134 = 0.01, Cs-137 = 0.01 pCi/m³
 Other LLDs: Mn-54 = 0.01; Fe-59 = 0.015; Co-58, Co-60 = 0.01; Zn-65 = 0.04; Zr/Nb-95 = 0.01;
 Ba/La-140 = 0.025 pCi/m³
 Units: 10⁻⁴ pCi/m³

Sample Description and Concentration

<u>Z-03 Onsite No. 3, Northside</u>				
2004 Collection Period	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Lab Code	ZAP-1991	ZAP-4341	ZAP-6559	ZAP-7849
Volume	3,749	3,706	3,701	3,700
Mn-54	2.4 ± 6.4 ; 6.4	-2.0 ± 6.5 ; 6.5	3.4 ± 3.6 ; 3.6	-0.9 ± 6.5 ; 6.5
Fe-59	2.2 ± 8.4 ; 8.4	8.1 ± 8.8 ; 8.9	-14.5 ± 9.6 ; 9.9	17.2 ± 9.1 ; 9.6
Co-58	0.8 ± 5.6 ; 5.6	-2.0 ± 6.0 ; 6.0	-3.3 ± 5.1 ; 5.2	0.3 ± 4.6 ; 4.6
Co-60	0.3 ± 5.9 ; 5.9	0.2 ± 8.9 ; 8.9	5.4 ± 5.9 ; 6.0	6.2 ± 4.5 ; 4.6
Zn-65	-4.0 ± 10.1 ; 10.1	8.3 ± 14.7 ; 14.8	3.2 ± 10.0 ; 10.0	-12.1 ± 11.9 ; 12.1
Nb/Zr-95	5.4 ± 5.3 ; 5.4	9.2 ± 4.9 ; 5.1	-1.7 ± 6.3 ; 6.3	-0.4 ± 6.1 ; 6.1
Cs-134	-1.4 ± 6.5 ; 6.5	5.9 ± 7.3 ; 7.4	3.7 ± 4.7 ; 4.7	4.1 ± 6.0 ; 6.1
Cs-137	5.6 ± 4.6 ; 4.7	0.2 ± 7.3 ; 7.3	2.8 ± 5.5 ; 5.5	1.8 ± 4.8 ; 4.8
Ba/La-140	22.9 ± 3.7 ; 5.5	-13.9 ± 8.4 ; 8.8	19.7 ± 3.0 ; 4.6	-35.4 ± 6.2 ; 8.8

ZION

Table 4. Fish, Edible Portions

Collection: Semiannually

ODCM-

Required LLDs: Mn-54 = 0.13, Fe-59 = 0.26, Co-58 = 0.13, Co-60 = 0.13, Zn-65 = 0.26, Cs-134 = 0.1, Cs-137 = 0.1 pCi/g wet weight

Other LLDs: Zr/Nb-95 = 0.20, Ba/La-140 = 0.30 pCi/g wet weight

Units: 10^{-2} pCi/g wet weight

Sample Description and Concentration

Z-26 (C) Lake Michigan Nearsite

Date Collected	05-12-04	10-13-04
Lab Code	ZF-2297	ZF-5936
Type	Lake Trout	Bass/Trout
Mn-54	-1.1 ± 1.9 ; 1.9	-1.4 ± 1.2 ; 1.2
Fe-59	4.9 ± 3.0 ; 3.1	5.1 ± 2.3 ; 2.4
Co-58	-1.4 ± 1.4 ; 1.4	-0.3 ± 1.1 ; 1.1
Co-60	-1.5 ± 2.6 ; 2.6	0.4 ± 1.1 ; 1.1
Zn-65	-2.5 ± 3.8 ; 3.8	0.3 ± 2.6 ; 2.6
Nb/Zr-95	0.5 ± 1.4 ; 1.4	-1.1 ± 1.2 ; 1.2
Cs-134	-0.1 ± 1.9 ; 1.9	0.9 ± 1.4 ; 1.4
Cs-137	1.2 ± 1.7 ; 1.7	1.4 ± 1.4 ; 1.4
Ba/La-140	4.4 ± 1.4 ; 1.5	4.3 ± 1.0 ; 1.2

ZION

Table 4. Fish, Edible Portions

Collection: Semiannually

ODCM-

Required LLDs: Mn-54 = 0.13, Fe-59 = 0.26, Co-58 = 0.13, Co-60 = 0.13, Zn-65 = 0.26, Cs-134 = 0.1, Cs-137 = 0.1 pCi/g wet weight

Other LLDs: Zr/Nb-95 = 0.20, Ba/La-140 = 0.30 pCi/g wet weight

Units: 10^{-2} pCi/g wet weight

Sample Description and Concentration

Z-27 (C) Lake Michigan Farsite

Date Collected	05-26-04	05-26-04	10-13-04	10-13-04
Lab Code	ZF-2522	ZF-2523	ZF-6342	ZF-6343
Type	White Sucker	Smallmouth Bass	Lake Trout	Burbot
Mn-54	0.1 ± 1.1 ; 1.1	-0.1 ± 0.8 ; 0.8	0.1 ± 1.1 ; 1.1	0.4 ± 0.9 ; 0.9
Fe-59	0.2 ± 2.7 ; 2.7	1.0 ± 1.7 ; 1.7	-0.4 ± 1.8 ; 1.8	-2.7 ± 1.9 ; 2.0
Co-58	1.1 ± 1.0 ; 1.1	1.4 ± 0.7 ; 0.7	-0.4 ± 1.1 ; 1.1	-0.8 ± 1.0 ; 1.0
Co-60	-0.2 ± 1.1 ; 1.1	0.2 ± 0.9 ; 0.9	1.0 ± 1.2 ; 1.2	0.4 ± 0.9 ; 0.9
Zn-65	1.7 ± 3.1 ; 3.1	-2.2 ± 2.5 ; 2.5	0.5 ± 2.6 ; 2.6	2.1 ± 2.3 ; 2.3
Nb/Zr-95	1.0 ± 1.0 ; 1.0	-0.9 ± 0.8 ; 0.8	-1.0 ± 0.8 ; 0.8	-1.5 ± 0.8 ; 0.8
Cs-134	0.4 ± 1.5 ; 1.5	-0.5 ± 1.0 ; 1.0	0.3 ± 0.9 ; 0.9	0.6 ± 1.1 ; 1.1
Cs-137	0.1 ± 1.4 ; 1.4	2.1 ± 1.0 ; 1.0	6.6 ± 1.9 ; 2.1	4.5 ± 1.9 ; 2.0
Ba/La-140	0.7 ± 1.7 ; 1.7	-7.3 ± 0.9 ; 1.3	-0.4 ± 1.1 ; 1.1	-12.7 ± 0.9 ; 1.9

ZION

Table 5. Bottom Sediments

Collection: Semiannually

ODCM-

Required LLDs: 0.15 pCi/g for Cs-134 and 0.18 for Cs-137

Other LLDs: Mn-54 = 0.15; Fe-59 = 0.60; Co-58, Co-60 = 0.10; Zn-65 = 0.60; Zr/Nb-95 = 0.20;
Ba/La = 0.60 pCi/g dry weight

Units: 10^{-2} pCi/g dry weight

Sample Description and Concentration

Z-25 Lake Michigan, Illinois Beach State Park

Date
Collected

05-05-04

10-06-04

Lab Code

ZBS-2072

ZBS-5709

Mn-54 0.1 ± 1.0 ; 1.0

0.1 ± 0.8 ; 0.8

Fe-59 5.3 ± 2.8 ; 2.9

0.4 ± 1.6 ; 1.6

Co-58 -0.2 ± 1.0 ; 1.0

-1.0 ± 0.6 ; 0.7

Co-60 0.4 ± 1.6 ; 1.6

0.2 ± 0.9 ; 0.9

Zn-65 -1.3 ± 2.9 ; 2.9

-0.3 ± 1.8 ; 1.8

Nb/Zr-95 -1.8 ± 1.2 ; 1.2

-0.6 ± 0.8 ; 0.8

Cs-134 0.6 ± 1.4 ; 1.4

0.7 ± 0.9 ; 0.9

Cs-137 0.5 ± 1.3 ; 1.3

0.5 ± 0.8 ; 0.8

Ba/La-140 0.5 ± 0.9 ; 0.9

-1.9 ± 0.6 ; 0.6

ZION

Table 9.	Public Water
Collection:	Monthly composites of weekly collections
ODCM- Required LLDs:	Gross Beta = 4; Mn-54 = 15; Fe-59 = 30; Co-58, Co-60 = 15; Zn-65, Zr/Nb-95 = 30; Cs-134 = 15; Cs-137 = 18; Ba/La-140 = 15 pCi/L
Units:	pCi/L

Sample Description and Concentration

Z-14 (C) Kenosha Water Works

2004 Collection Period	January	February	March
Lab Code	ZPW-396	ZPW-760	ZPW-1304
Gross Beta	2.1 ± 1.3 ; 1.3	3.0 ± 0.9 ; 1.0	1.7 ± 0.9 ; 0.9
Mn-54	0.9 ± 3.1 ; 3.1	0.1 ± 1.8 ; 1.8	2.3 ± 3.5 ; 3.6
Fe-59	0.8 ± 4.5 ; 4.5	4.7 ± 3.2 ; 3.3	2.4 ± 4.6 ; 4.6
Co-58	-1.4 ± 2.5 ; 2.5	-0.3 ± 1.5 ; 1.5	-0.4 ± 3.2 ; 3.2
Co-60	4.4 ± 3.5 ; 3.6	0.2 ± 1.8 ; 1.8	-1.0 ± 3.5 ; 3.5
Zn-65	1.6 ± 4.8 ; 4.9	2.3 ± 4.7 ; 4.7	-1.5 ± 6.9 ; 6.9
Nb/Zr-95	-2.1 ± 2.8 ; 2.8	1.2 ± 2.1 ; 2.1	-0.1 ± 3.6 ; 3.6
Cs-134	2.1 ± 3.7 ; 3.7	-0.6 ± 2.3 ; 2.3	0.5 ± 3.1 ; 3.1
Cs-137	0.7 ± 3.1 ; 3.1	-0.9 ± 2.2 ; 2.2	-1.1 ± 2.7 ; 2.7
Ba/La-140	-4.5 ± 4.1 ; 4.1	-1.7 ± 2.4 ; 2.4	-6.3 ± 4.3 ; 4.4
2004 Collection Period	April	May	June
Lab Code	ZPW-1905	ZPW-2772	ZPW-3455
Gross Beta	1.9 ± 0.9 ; 0.9	2.3 ± 0.9 ; 1.0	1.9 ± 0.9 ; 1.0
Mn-54	1.5 ± 1.8 ; 1.8	-0.5 ± 2.0 ; 2.0	-1.5 ± 1.7 ; 1.7
Fe-59	-2.6 ± 3.4 ; 3.4	2.4 ± 3.6 ; 3.7	0.9 ± 3.2 ; 3.2
Co-58	-1.8 ± 1.9 ; 1.9	1.6 ± 1.6 ; 1.6	-1.9 ± 1.9 ; 1.9
Co-60	0.2 ± 1.9 ; 1.9	1.4 ± 2.0 ; 2.0	1.6 ± 2.3 ; 2.3
Zn-65	-1.7 ± 4.0 ; 4.0	0.4 ± 3.8 ; 3.8	-1.1 ± 3.6 ; 3.6
Nb/Zr-95	0.1 ± 2.0 ; 2.0	-0.6 ± 1.8 ; 1.8	-0.0 ± 1.7 ; 1.7
Cs-134	-1.8 ± 2.3 ; 2.4	0.2 ± 2.3 ; 2.3	-0.2 ± 2.3 ; 2.3
Cs-137	-0.2 ± 2.2 ; 2.2	0.9 ± 2.4 ; 2.4	0.6 ± 2.2 ; 2.2
Ba/La-140	0.1 ± 1.8 ; 1.8	0.4 ± 2.0 ; 2.0	0.4 ± 2.3 ; 2.3

ZION

Table 9.	Public Water
Collection:	Monthly composites of weekly collections
ODCM-	Gross Beta = 4; Mn-54 = 15; Fe-59 = 30; Co-58, Co-60 = 15; Zn-65, Zr/Nb-95 = 30;
Required LLDs:	Cs-134 = 15; Cs-137 = 18; Ba/La-140 = 15 pCi/L
Units:	pCi/L

Sample Description and Concentration

Z-14 (C) Kenosha Water Works

2004 Collection Period	July	August	September
Lab Code	ZPW-4439	ZPW-5088	ZPW-5874
Gross Beta	2.3 ± 0.9 ; 1.0	2.2 ± 0.9 ; 1.0	1.6 ± 0.9 ; 0.9
Mn-54	0.1 ± 1.8 ; 1.8	0.4 ± 3.1 ; 3.1	-0.8 ± 3.2 ; 3.2
Fe-59	0.4 ± 3.4 ; 3.4	-1.9 ± 4.8 ; 4.8	-2.2 ± 6.1 ; 6.1
Co-58	0.1 ± 1.9 ; 1.9	1.1 ± 2.7 ; 2.7	-0.4 ± 3.3 ; 3.3
Co-60	-0.9 ± 1.7 ; 1.7	2.5 ± 3.5 ; 3.5	1.6 ± 4.0 ; 4.0
Zn-65	0.4 ± 3.8 ; 3.8	-3.2 ± 4.4 ; 4.4	-4.2 ± 7.3 ; 7.3
Nb/Zr-95	0.7 ± 1.9 ; 1.9	-1.7 ± 2.8 ; 2.8	-1.3 ± 3.8 ; 3.8
Cs-134	-0.1 ± 1.7 ; 1.7	3.0 ± 2.7 ; 2.8	0.3 ± 3.5 ; 3.5
Cs-137	-2.6 ± 2.1 ; 2.1	1.0 ± 3.2 ; 3.2	-0.2 ± 3.0 ; 3.0
Ba/La-140	-1.3 ± 2.2 ; 2.2	0.8 ± 3.4 ; 3.4	1.1 ± 4.7 ; 4.7
2004 Collection Period	October	November	December
Lab Code	ZPW-6344	ZPW-7192	ZPW-7480
Gross Beta	1.9 ± 0.8 ; 0.9	0.7 ± 0.8 ; 0.9	2.1 ± 0.9 ; 1.0
Mn-54	-2.4 ± 1.9 ; 1.9	2.0 ± 2.1 ; 2.1	1.1 ± 1.8 ; 1.8
Fe-59	-2.0 ± 3.6 ; 3.6	1.2 ± 3.2 ; 3.2	0.3 ± 4.3 ; 4.3
Co-58	0.2 ± 1.5 ; 1.5	-1.3 ± 2.3 ; 2.3	1.2 ± 2.0 ; 2.0
Co-60	1.6 ± 1.6 ; 1.6	0.8 ± 1.8 ; 1.8	2.0 ± 1.9 ; 1.9
Zn-65	-2.6 ± 3.6 ; 3.6	-1.3 ± 5.4 ; 5.4	-11.1 ± 5.2 ; 5.5
Nb/Zr-95	-0.9 ± 1.7 ; 1.7	-0.3 ± 2.0 ; 2.0	-1.0 ± 2.2 ; 2.2
Cs-134	1.9 ± 1.7 ; 1.7	0.8 ± 2.4 ; 2.4	-1.9 ± 2.6 ; 2.6
Cs-137	-0.5 ± 2.1 ; 2.1	1.4 ± 2.3 ; 2.3	0.7 ± 2.3 ; 2.3
Ba/La-140	2.7 ± 1.8 ; 1.8	2.3 ± 2.1 ; 2.1	1.1 ± 1.6 ; 1.6

ZION

Table 9. Public Water
 Collection: Monthly composites of weekly collections
 ODCM- Gross Beta = 4; Mn-54 = 15; Fe-59 = 30; Co-58, Co-60 = 15; Zn-65, Zr/Nb-95 = 30;
 Required LLDs: Cs-134 = 15; Cs-137 = 18; Ba/La-140 = 15 pCi/L
 Units: pCi/L

Sample Description and Concentration			
<u>Z-15 Lake County Water Works</u>			
2004 Collection Period	January	February	March
Lab Code	ZPW-397	ZPW-761	ZPW-1305
Gross Beta	2.8 ± 0.9 ; 1.0	1.8 ± 0.9 ; 0.9	3.5 ± 1.0 ; 1.1
Mn-54	-2.0 ± 1.6 ; 1.6	1.7 ± 2.7 ; 2.7	-1.7 ± 3.4 ; 3.5
Fe-59	-1.1 ± 3.0 ; 3.0	0.6 ± 5.8 ; 5.8	-1.4 ± 5.3 ; 5.3
Co-58	0.3 ± 1.5 ; 1.5	1.7 ± 3.2 ; 3.2	2.0 ± 3.4 ; 3.4
Co-60	0.2 ± 1.6 ; 1.6	0.3 ± 3.5 ; 3.5	0.7 ± 3.6 ; 3.6
Zn-65	1.3 ± 2.4 ; 2.4	1.0 ± 6.3 ; 6.3	-6.1 ± 7.0 ; 7.0
Nb/Zr-95	0.1 ± 1.7 ; 1.7	2.1 ± 2.9 ; 2.9	-1.7 ± 3.2 ; 3.2
Cs-134	-0.5 ± 2.0 ; 2.0	1.0 ± 4.3 ; 4.3	-2.5 ± 3.7 ; 3.7
Cs-137	-0.5 ± 2.1 ; 2.1	-0.3 ± 2.7 ; 2.7	-0.6 ± 3.7 ; 3.7
Ba/La-140	-0.2 ± 1.9 ; 1.9	0.5 ± 4.3 ; 4.3	-3.2 ± 4.4 ; 4.4
2004 Collection Period	April	May	June
Lab Code	ZPW-1906	ZPW-2773	ZPW-3456
Gross Beta	1.9 ± 0.9 ; 1.0	2.8 ± 1.0 ; 1.1	0.4 ± 1.1 ; 1.1
Mn-54	0.6 ± 3.2 ; 3.2	0.3 ± 2.4 ; 2.4	0.2 ± 1.5 ; 1.5
Fe-59	-1.3 ± 5.2 ; 5.2	-3.6 ± 4.9 ; 5.0	-1.8 ± 2.5 ; 2.5
Co-58	1.8 ± 2.9 ; 2.9	-3.1 ± 2.6 ; 2.6	0.5 ± 1.1 ; 1.1
Co-60	5.1 ± 4.1 ; 4.2	0.2 ± 2.9 ; 2.9	-1.1 ± 1.4 ; 1.4
Zn-65	-7.4 ± 6.5 ; 6.6	1.2 ± 4.7 ; 4.7	0.4 ± 2.7 ; 2.7
Nb/Zr-95	0.4 ± 3.6 ; 3.6	0.1 ± 3.0 ; 3.0	-2.4 ± 1.3 ; 1.4
Cs-134	-1.0 ± 3.7 ; 3.7	0.7 ± 3.1 ; 3.1	1.4 ± 1.3 ; 1.3
Cs-137	1.4 ± 3.7 ; 3.7	1.8 ± 2.9 ; 2.9	0.3 ± 1.3 ; 1.3
Ba/La-140	-5.9 ± 5.5 ; 5.6	-1.1 ± 2.5 ; 2.5	0.1 ± 1.6 ; 1.6

ZION

Table 9.	Public Water
Collection:	Monthly composites of weekly collections
ODCM-	Gross Beta = 4; Mn-54 = 15; Fe-59 = 30; Co-58, Co-60 = 15; Zn-65, Zr/Nb-95 = 30;
Required LLDs:	Cs-134 = 15; Cs-137 = 18; Ba/La-140 = 15 pCi/L
Units:	pCi/L

Sample Description and Concentration

Z-15 Lake County Water Works

2004 Collection Period	July	August	September
Lab Code	ZPW-4440	ZPW-5089	ZPW-5875,6
Gross Beta	1.6 ± 0.9 ; 0.9	1.6 ± 0.9 ; 0.9	2.0 ± 0.6 ; 0.6
Mn-54	-0.3 ± 3.2 ; 3.2	2.2 ± 1.7 ; 1.7	2.0 ± 2.0 ; 2.1
Fe-59	-1.7 ± 6.2 ; 6.2	-0.1 ± 3.5 ; 3.5	-1.9 ± 2.7 ; 2.7
Co-58	-1.5 ± 2.8 ; 2.8	-0.3 ± 1.9 ; 1.9	0.1 ± 1.9 ; 1.9
Co-60	-1.3 ± 3.4 ; 3.4	-0.2 ± 1.9 ; 1.9	-0.1 ± 1.9 ; 1.9
Zn-65	2.7 ± 6.4 ; 6.4	-3.6 ± 4.3 ; 4.4	3.2 ± 3.7 ; 3.7
Nb/Zr-95	-0.4 ± 2.9 ; 2.9	-2.1 ± 1.8 ; 1.8	0.8 ± 1.8 ; 1.8
Cs-134	3.9 ± 3.8 ; 3.8	0.5 ± 2.2 ; 2.2	1.2 ± 2.5 ; 2.5
Cs-137	0.6 ± 3.0 ; 3.0	-1.2 ± 2.0 ; 2.0	0.8 ± 2.0 ; 2.0
Ba/La-140	-0.4 ± 4.1 ; 4.1	1.9 ± 2.2 ; 2.2	1.0 ± 2.1 ; 2.1
2004 Collection Period	October	November	December
Lab Code	ZPW-6345	ZPW-7193	ZPW-7481
Gross Beta	1.8 ± 0.9 ; 0.9	1.5 ± 0.9 ; 0.9	2.0 ± 0.9 ; 1.0
Mn-54	0.5 ± 1.7 ; 1.7	0.1 ± 2.0 ; 2.0	-1.0 ± 3.4 ; 3.4
Fe-59	2.7 ± 3.9 ; 3.9	-8.5 ± 4.6 ; 4.8	2.9 ± 5.2 ; 5.2
Co-58	0.6 ± 1.8 ; 1.8	2.1 ± 2.0 ; 2.0	1.3 ± 3.5 ; 3.5
Co-60	0.2 ± 1.8 ; 1.8	0.1 ± 2.3 ; 2.3	2.2 ± 3.1 ; 3.2
Zn-65	5.9 ± 3.2 ; 3.3	-5.5 ± 5.0 ; 5.1	2.7 ± 6.2 ; 6.2
Nb/Zr-95	-2.2 ± 2.2 ; 2.3	1.2 ± 2.0 ; 2.0	-3.6 ± 3.6 ; 3.6
Cs-134	-2.1 ± 2.2 ; 2.2	2.5 ± 2.1 ; 2.1	-1.2 ± 3.3 ; 3.3
Cs-137	-1.6 ± 2.5 ; 2.5	0.7 ± 2.1 ; 2.1	-0.5 ± 3.1 ; 3.1
Ba/La-140	-1.4 ± 2.0 ; 2.1	1.0 ± 1.6 ; 1.6	-4.8 ± 4.4 ; 4.5

ZION

Table 9.	Public Water
Collection:	Monthly composites of weekly collections
ODCM-	Gross Beta = 4; Mn-54 = 15; Fe-59 = 30; Co-58, Co-60 = 15; Zn-65, Zr/Nb-95 = 30;
Required LLDs:	Cs-134 = 15; Cs-137 = 18; Ba/La-140 = 15 pCi/L
Units:	pCi/L

Sample Description and Concentration

Z-16 Waukegan Water Works

2004 Collection Period	January	February	March
Lab Code	ZPW-398	ZPW-762	ZPW-1306
Gross Beta	2.7 ± 0.9 ; 1.0	3.3 ± 1.0 ; 1.1	3.7 ± 1.0 ; 1.1
Mn-54	-0.4 ± 1.7 ; 1.7	-1.0 ± 1.9 ; 1.9	0.2 ± 2.9 ; 2.9
Fe-59	-4.1 ± 2.8 ; 2.8	0.5 ± 3.3 ; 3.3	2.4 ± 4.9 ; 4.9
Co-58	1.3 ± 1.4 ; 1.4	-2.0 ± 2.0 ; 2.0	0.5 ± 2.8 ; 2.8
Co-60	-0.4 ± 1.7 ; 1.7	0.6 ± 2.2 ; 2.2	0.5 ± 2.4 ; 2.4
Zn-65	-0.2 ± 3.5 ; 3.5	3.7 ± 3.3 ; 3.4	-0.8 ± 5.6 ; 5.6
Nb/Zr-95	0.1 ± 1.8 ; 1.8	-0.8 ± 1.9 ; 1.9	-0.1 ± 2.5 ; 2.5
Cs-134	0.3 ± 1.6 ; 1.6	-0.7 ± 1.7 ; 1.7	1.3 ± 3.3 ; 3.3
Cs-137	-0.7 ± 1.6 ; 1.6	-0.8 ± 1.8 ; 1.8	-1.6 ± 3.1 ; 3.1
Ba/La-140	-2.6 ± 2.1 ; 2.2	-1.6 ± 1.6 ; 1.7	1.3 ± 3.1 ; 3.1
2004 Collection Period	April	May	June
Lab Code	ZPW-1907	ZPW-2774	ZPW-3457
Gross Beta	2.7 ± 0.9 ; 1.0	2.7 ± 0.9 ; 1.0	3.3 ± 1.1 ; 1.2
Mn-54	-0.1 ± 1.7 ; 1.7	-1.0 ± 1.6 ; 1.6	-0.4 ± 1.7 ; 1.7
Fe-59	2.4 ± 3.7 ; 3.7	0.4 ± 3.3 ; 3.3	4.2 ± 3.6 ; 3.6
Co-58	1.5 ± 2.0 ; 2.0	-0.4 ± 1.7 ; 1.7	-0.1 ± 1.2 ; 1.2
Co-60	-0.2 ± 2.1 ; 2.1	-0.6 ± 1.1 ; 1.1	0.5 ± 1.7 ; 1.7
Zn-65	-1.9 ± 4.3 ; 4.3	1.0 ± 4.5 ; 4.5	0.7 ± 2.6 ; 2.6
Nb/Zr-95	-0.2 ± 2.1 ; 2.1	1.0 ± 1.6 ; 1.6	-2.8 ± 2.0 ; 2.0
Cs-134	1.0 ± 2.3 ; 2.3	-0.6 ± 2.2 ; 2.2	0.2 ± 2.0 ; 2.0
Cs-137	-1.7 ± 2.0 ; 2.0	1.1 ± 1.9 ; 1.9	-0.8 ± 2.3 ; 2.3
Ba/La-140	-0.2 ± 2.6 ; 2.6	-0.6 ± 2.2 ; 2.2	2.2 ± 1.6 ; 1.6

ZION

Table 9.	Public Water
Collection:	Monthly composites of weekly collections
ODCM-	Gross Beta = 4; Mn-54 = 15; Fe-59 = 30; Co-58, Co-60 = 15; Zn-65, Zr/Nb-95 = 30;
Required LLDs:	Cs-134 = 15; Cs-137 = 18; Ba/La-140 = 15 pCi/L
Units:	pCi/L

Sample Description and Concentration

<u>Z-16 Waukegan Water Works</u>			
2004 Collection Period	July	August	September
Lab Code	ZPW-4441	ZPW-5090	ZPW-5877
Gross Beta	2.5 ± 0.9 ; 0.9	2.6 ± 1.0 ; 1.0	1.8 ± 0.9 ; 1.0
Mn-54	-0.4 ± 2.5 ; 2.5	-1.1 ± 2.1 ; 2.1	0.8 ± 1.9 ; 1.9
Fe-59	2.4 ± 4.8 ; 4.8	1.2 ± 2.8 ; 2.8	-0.3 ± 4.4 ; 4.4
Co-58	0.3 ± 2.8 ; 2.8	0.6 ± 1.6 ; 1.6	0.5 ± 1.8 ; 1.8
Co-60	-0.5 ± 3.4 ; 3.4	-0.1 ± 1.8 ; 1.8	-1.2 ± 2.1 ; 2.1
Zn-65	4.2 ± 5.3 ; 5.3	-1.8 ± 3.8 ; 3.8	-1.5 ± 4.6 ; 4.6
Nb/Zr-95	1.8 ± 2.6 ; 2.6	-2.4 ± 1.7 ; 1.8	0.3 ± 2.0 ; 2.0
Cs-134	-1.7 ± 2.9 ; 2.9	-0.2 ± 2.1 ; 2.1	0.9 ± 2.4 ; 2.4
Cs-137	0.9 ± 2.9 ; 2.9	-1.0 ± 2.3 ; 2.3	0.2 ± 2.5 ; 2.5
Ba/La-140	-3.3 ± 3.1 ; 3.1	3.8 ± 2.1 ; 2.2	-1.4 ± 1.8 ; 1.8
2004 Collection Period	October	November	December
Lab Code	ZPW-6346	ZPW-7194*	ZPW-7482
Gross Beta	0.9 ± 0.8 ; 0.8	2.1 ± 0.9 ; 1.0	2.2 ± 0.9 ; 1.0
Mn-54	-2.5 ± 2.6 ; 2.6	-0.7 ± 2.3 ; 2.3	0.7 ± 2.3 ; 2.3
Fe-59	0.4 ± 3.8 ; 3.8	0.4 ± 4.5 ; 4.5	1.7 ± 3.5 ; 3.6
Co-58	1.6 ± 3.1 ; 3.1	1.6 ± 2.3 ; 2.4	-1.3 ± 1.9 ; 1.9
Co-60	-0.2 ± 3.5 ; 3.5	0.3 ± 2.5 ; 2.5	1.4 ± 1.9 ; 1.9
Zn-65	2.6 ± 6.0 ; 6.0	-1.7 ± 4.3 ; 4.3	-2.8 ± 4.5 ; 4.5
Nb/Zr-95	-1.1 ± 2.8 ; 2.8	1.9 ± 2.0 ; 2.0	-0.8 ± 2.2 ; 2.2
Cs-134	1.3 ± 3.3 ; 3.3	-0.1 ± 2.6 ; 2.6	-1.0 ± 2.4 ; 2.5
Cs-137	0.4 ± 3.0 ; 3.0	-0.6 ± 2.2 ; 2.2	-0.5 ± 2.4 ; 2.4
Ba/La-140	2.8 ± 2.6 ; 2.6	-7.1 ± 2.5 ; 2.7	-1.5 ± 2.2 ; 2.2

* Results reflect 3 collections for month; sample not available on 11-24-04 due to maintenance work.

ZION

Table 9.	Public Water
Collection:	Monthly composites of weekly collections
ODCM-	Gross Beta = 4; Mn-54 = 15; Fe-59 = 30; Co-58, Co-60 = 15; Zn-65, Zr/Nb-95 = 30;
Required LLDs:	Cs-134 = 15; Cs-137 = 18; Ba/La-140 = 15 pCi/L
Units:	pCi/L

Sample Description and Concentration

Z-18 (C) Lake Forest Water Works

2004 Collection Period	January	February	March
Lab Code	ZPW-399	ZPW-763	ZPW-1307
Gross Beta	2.2 ± 0.9 ; 0.9	2.0 ± 0.9 ; 0.9	2.5 ± 0.9 ; 1.0
Mn-54	-0.7 ± 2.9 ; 2.9	0.9 ± 4.2 ; 4.2	2.4 ± 2.9 ; 2.9
Fe-59	-2.1 ± 5.9 ; 5.9	-1.9 ± 6.2 ; 6.2	3.8 ± 5.0 ; 5.1
Co-58	1.1 ± 3.2 ; 3.2	0.4 ± 3.1 ; 3.1	1.3 ± 2.8 ; 2.8
Co-60	-0.3 ± 3.0 ; 3.0	-1.6 ± 3.5 ; 3.5	2.7 ± 3.0 ; 3.0
Zn-65	-1.4 ± 6.5 ; 6.5	3.4 ± 7.2 ; 7.2	-0.5 ± 5.7 ; 5.7
Nb/Zr-95	1.1 ± 2.9 ; 2.9	-1.6 ± 3.2 ; 3.2	0.4 ± 3.0 ; 3.0
Cs-134	4.2 ± 3.2 ; 3.3	-1.4 ± 3.5 ; 3.5	0.8 ± 3.2 ; 3.2
Cs-137	0.6 ± 2.9 ; 2.9	1.5 ± 3.7 ; 3.7	0.1 ± 2.8 ; 2.8
Ba/La-140	3.0 ± 3.1 ; 3.1	1.2 ± 3.0 ; 3.0	-0.1 ± 3.3 ; 3.3
2004 Collection Period	April	May	June
Lab Code	ZPW-1908	ZPW-2775*	ZPW-3458
Gross Beta	2.6 ± 0.9 ; 1.0	1.9 ± 0.9 ; 0.9	1.8 ± 1.0 ; 1.0
Mn-54	-2.1 ± 2.3 ; 2.3	1.3 ± 2.4 ; 2.4	0.3 ± 1.8 ; 1.8
Fe-59	-2.9 ± 3.3 ; 3.4	-3.5 ± 3.9 ; 3.9	-0.8 ± 3.5 ; 3.5
Co-58	0.5 ± 2.0 ; 2.0	-0.6 ± 1.7 ; 1.7	-0.4 ± 2.1 ; 2.1
Co-60	0.2 ± 2.2 ; 2.2	0.4 ± 2.1 ; 2.1	-0.9 ± 2.0 ; 2.0
Zn-65	-3.7 ± 4.7 ; 4.7	0.5 ± 4.5 ; 4.5	-1.3 ± 4.2 ; 4.2
Nb/Zr-95	0.4 ± 1.7 ; 1.7	-1.4 ± 2.1 ; 2.1	-1.0 ± 1.8 ; 1.8
Cs-134	-0.4 ± 2.0 ; 2.0	0.9 ± 2.2 ; 2.2	1.5 ± 1.9 ; 1.9
Cs-137	1.0 ± 2.4 ; 2.5	-0.1 ± 2.2 ; 2.2	-0.6 ± 1.9 ; 1.9
Ba/La-140	1.4 ± 2.0 ; 2.0	-1.8 ± 3.0 ; 3.0	-4.8 ± 2.6 ; 2.7

* Results reflect 3 samples for month; water unavailable due to construction.

ZION

Table 9.	Public Water
Collection:	Monthly composites of weekly collections
ODCM-	Gross Beta = 4; Mn-54 = 15; Fe-59 = 30; Co-58, Co-60 = 15; Zn-65, Zr/Nb-95 = 30;
Required LLDs:	Cs-134 = 15; Cs-137 = 18; Ba/La-140 = 15 pCi/L
Units:	pCi/L

Sample Description and Concentration

Z-18 (C) Lake Forest Water Works

2004 Collection Period	July	August	September
Lab Code	ZPW-4442	ZPW-5091	ZPW-5878*
Gross Beta	2.3 ± 0.9 ; 1.0	2.3 ± 0.9 ; 0.9	2.5 ± 0.9 ; 1.0
Mn-54	-1.4 ± 1.9 ; 1.9	0.9 ± 2.7 ; 2.7	1.8 ± 3.5 ; 3.5
Fe-59	-3.9 ± 3.5 ; 3.5	-3.7 ± 4.4 ; 4.4	-0.8 ± 7.0 ; 7.0
Co-58	0.2 ± 1.5 ; 1.5	-4.7 ± 3.1 ; 3.2	-3.9 ± 3.1 ; 3.2
Co-60	-1.0 ± 1.8 ; 1.8	0.7 ± 3.0 ; 3.0	-1.1 ± 3.8 ; 3.8
Zn-65	-0.8 ± 3.6 ; 3.6	0.4 ± 4.3 ; 4.3	2.1 ± 6.1 ; 6.1
Nb/Zr-95	-0.3 ± 1.9 ; 1.9	0.5 ± 3.0 ; 3.0	0.5 ± 3.0 ; 3.0
Cs-134	-0.9 ± 2.1 ; 2.1	-0.6 ± 3.3 ; 3.3	-2.5 ± 4.7 ; 4.7
Cs-137	0.8 ± 1.9 ; 1.9	2.3 ± 3.0 ; 3.1	-0.2 ± 3.1 ; 3.1
Ba/La-140	-0.8 ± 1.9 ; 1.9	0.8 ± 3.4 ; 3.4	4.1 ± 4.1 ; 4.1
2004 Collection Period	October	November	December
Lab Code	ZPW-6347	ZPW-7195	ZPW-7483
Gross Beta	1.6 ± 0.9 ; 0.9	2.3 ± 0.9 ; 1.0	1.9 ± 0.9 ; 0.9
Mn-54	0.6 ± 2.2 ; 2.2	2.4 ± 3.1 ; 3.2	-0.2 ± 1.7 ; 1.7
Fe-59	-0.6 ± 3.5 ; 3.5	-5.0 ± 6.1 ; 6.1	1.5 ± 3.8 ; 3.8
Co-58	-0.4 ± 1.8 ; 1.8	-1.2 ± 3.0 ; 3.0	0.8 ± 1.6 ; 1.6
Co-60	0.6 ± 1.9 ; 1.9	4.1 ± 2.6 ; 2.6	0.1 ± 2.1 ; 2.1
Zn-65	-4.2 ± 4.1 ; 4.1	-1.4 ± 6.9 ; 6.9	-0.9 ± 4.6 ; 4.6
Nb/Zr-95	-1.1 ± 1.8 ; 1.8	2.1 ± 3.2 ; 3.2	-0.4 ± 1.9 ; 1.9
Cs-134	0.4 ± 1.8 ; 1.8	-0.9 ± 3.6 ; 3.6	-0.5 ± 2.3 ; 2.3
Cs-137	0.2 ± 1.9 ; 1.9	0.1 ± 2.8 ; 2.8	0.2 ± 2.3 ; 2.3
Ba/La-140	-2.7 ± 2.2 ; 2.2	7.9 ± 4.2 ; 4.4	-1.1 ± 1.9 ; 2.0

* Results reflect 3 samples for month; water unavailable due to construction.

ZION

Table 9. Public Water
Collection: Quarterly composites of weekly collections

Required LLD: 200 pCi/L
Units: pCi/L

2004 Collection Period	<u>Sample Description and Concentration</u>	
	Lab Code	Tritium
<u>Z-14 (C) Kenosha Water Works</u>		
1st Quarter	ZPW - 1286	91 ± 80;81
2nd Quarter	ZPW - 3551	110 ± 85;86
3rd Quarter	ZPW - 5792	127 ± 89;90
4th Quarter	ZPW - 7680	73 ± 88;89
<u>Z-15 Lake County Water Works</u>		
1st Quarter	ZPW - 1287	136 ± 82;84
2nd Quarter	ZPW - 3552	83 ± 83;84
3rd Quarter	ZPW - 5793	64 ± 86;86
4th Quarter	ZPW - 7681	70 ± 88;89
<u>Z-16 Waukegan Water Works</u>		
1st Quarter	ZPW - 1288	70 ± 79;80
2nd Quarter	ZPW - 3553	27 ± 81;81
3rd Quarter	ZPW - 5794	126 ± 89;90
4th Quarter	ZPW - 7682	53 ± 87;88
<u>Z-18 (C) Lake Forest Water Works</u>		
1st Quarter	ZPW - 1289	80 ± 79;80
2nd Quarter	ZPW - 3554	56 ± 82;82
3rd Quarter	ZPW - 5795	137 ± 89;91
4th Quarter	ZPW - 7683	53 ± 87;88

ZION

5.0 NEAREST RESIDENCES CENSUS

ZION

NEAREST RESIDENCE CENSUS, 2004

Nearest resident of the Zion Station within a 6.2 mile radius.

<u>Sector</u>	<u>Direction</u>	<u>Distance</u>
A	N	2.5 miles
J	S	None
K	SSW	1.9 miles
L	SW	1.1 miles
M	WSW	1.0 miles
N	W	1.1 miles
P	WNW	1.0 miles
Q	NW	1.0 miles
R	NNW	1.3 miles

Census conducted by J. Rieter on August 30, 2004

ZION

6.0 TLD DATA*

* TLD Data provided by Exelon Nuclear.

Exelon Nuclear
Environmental Site Report for Zion

Gamma Radiation Measured in mR by TLDs

Site	Description	Quarter 1 2004	Quarter 2 2004	Quarter 3 2004	Quarter 4 2004
I. INDICATOR LOCATIONS					
a. Air Samplers					
Z-01-1	ONSITE NO. 1	18.0	20.0	16.0	21.0
Z-01-2	ONSITE NO. 1	17.0	21.0	15.0	21.0
Z-02-1	ONSITE NO. 2	14.0	19.0	13.0	20.0
Z-02-2	ONSITE NO. 2	14.0	17.0	13.0	20.0
Z-03-1	ONSITE NO. 3	15.0	18.0	14.0	20.0
Z-03-2	ONSITE NO. 3	14.0	18.0	14.0	21.0
Air Sampler Mean \pm S. D.		15.3 \pm 1.8	18.8 \pm 1.5	14.2 \pm 1.2	20.5 \pm 0.5
Annual Air Sampler Mean \pm S.D.					17.2 \pm 2.9
b. Inner Ring (100 Series)					
Z-101-1		17.0	18.0	14.0	20.0
Z-101-2		18.0	18.0	14.0	21.0
Z-102-1		16.0	19.0	17.0	26.0
Z-102-2		16.0	22.0	15.0	24.0
Z-103-1		16.0	22.0	15.0	21.0
Z-103-2		15.0	19.0	15.0	21.0
Z-104-1		15.0	18.0	14.0	22.0
Z-104-2		15.0	21.0	16.0	22.0
Z-105-1		18.0	20.0	14.0	21.0
Z-105-2		15.0	21.0	16.0	22.0
Z-106-1		15.0	20.0	13.0	23.0
Z-106-2		17.0	18.0	13.0	22.0
Z-107-1		16.0	18.0	16.0	25.0
Z-107-2		15.0	21.0	14.0	22.0
Z-108-1		15.0	20.0	16.0	21.0
Z-108-2		16.0	20.0	14.0	21.0
Z-110-1		15.0	22.0	14.0	22.0
Z-110-2		16.0	20.0	14.0	21.0
Z-111-1		15.0	19.0	15.0	24.0
Z-111-2		15.0	21.0	16.0	24.0
Z-112-1		17.0	23.0	18.0	26.0
Z-112-2		16.0	19.0	16.0	25.0
Z-113-1		15.0	20.0	17.0	24.0
Z-113-2		15.0	21.0	14.0	21.0
Z-114-1		15.0	22.0	17.0	25.0
Z-114-2		16.0	20.0	16.0	25.0
Z-115-1		18.0	22.0	18.0	26.0
Z-115-2		17.0	20.0	16.0	26.0
Inner Ring Mean \pm S.D.		15.9 \pm 1.0	20.1 \pm 1.5	15.3 \pm 1.4	23.0 \pm 2.0
Annual Inner Ring Mean \pm S.D.					18.6 \pm 3.5
INDICATOR LOCATION MEAN \pm S.D.		15.8 \pm 1.2	19.9 \pm 1.5	15.1 \pm 1.4	22.5 \pm 2.0
Annual INDICATOR MEAN \pm S.D.					18.3 \pm 3.4

ZION

7.0 GRAPHS OF DATA TRENDS

Air Particulates - Gross Beta

Z-01 Onsite No. 1, Southside

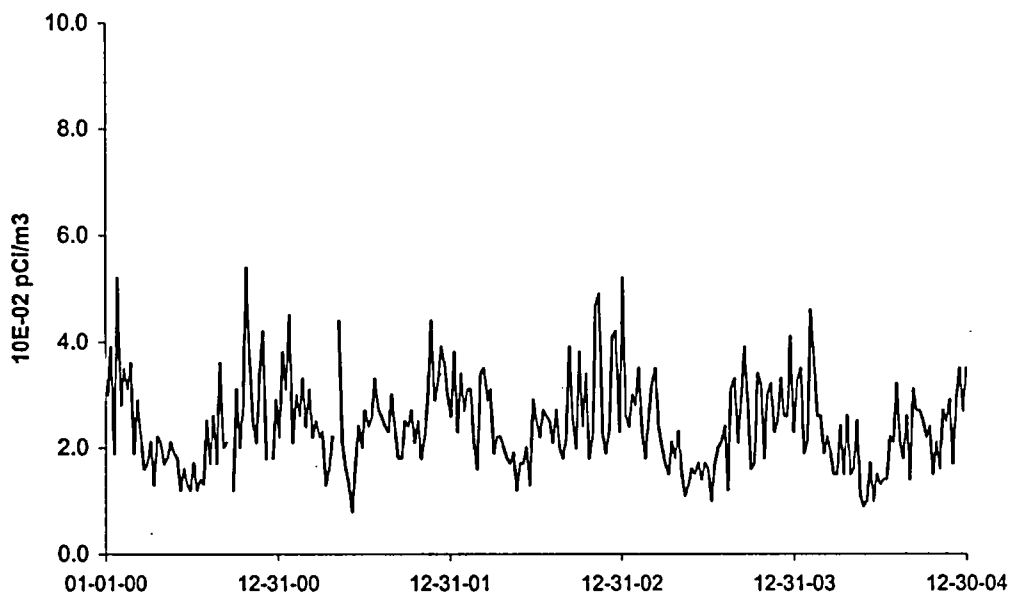


Figure 1. Continuous collection with weekly exchange of particulate filter.

Z-02 Onsite No. 2, Westside

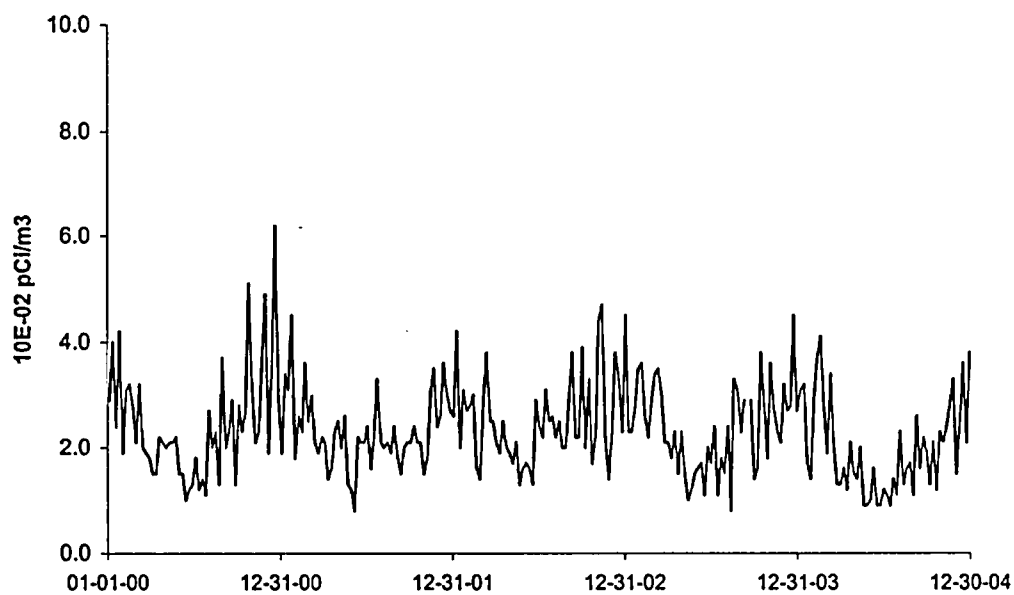
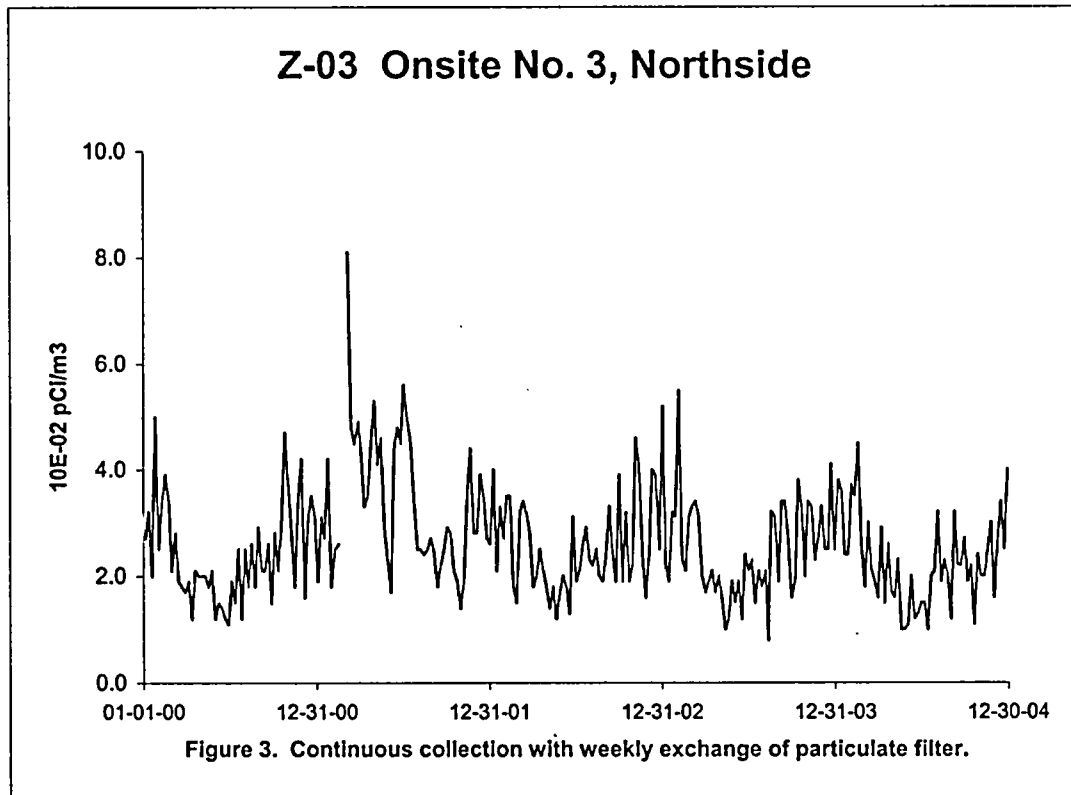


Figure 2. Continuous collection with weekly exchange of particulate filter.

Air Particulates - Gross Beta



Public Water-Gross Beta

Z-14 Kenosha Water Works

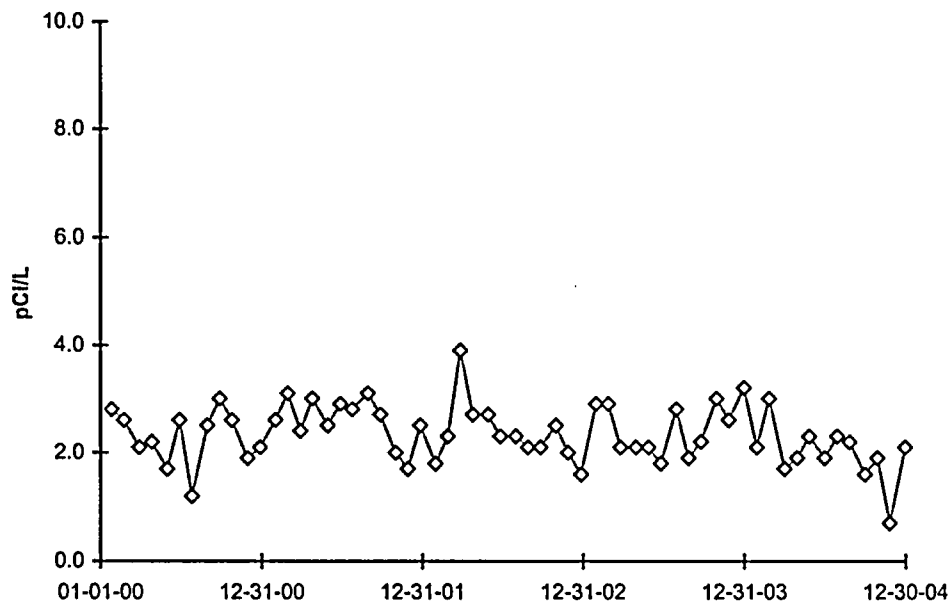


Figure 4. Monthly composite of weekly collection.

Z-15 Lake County Water Works

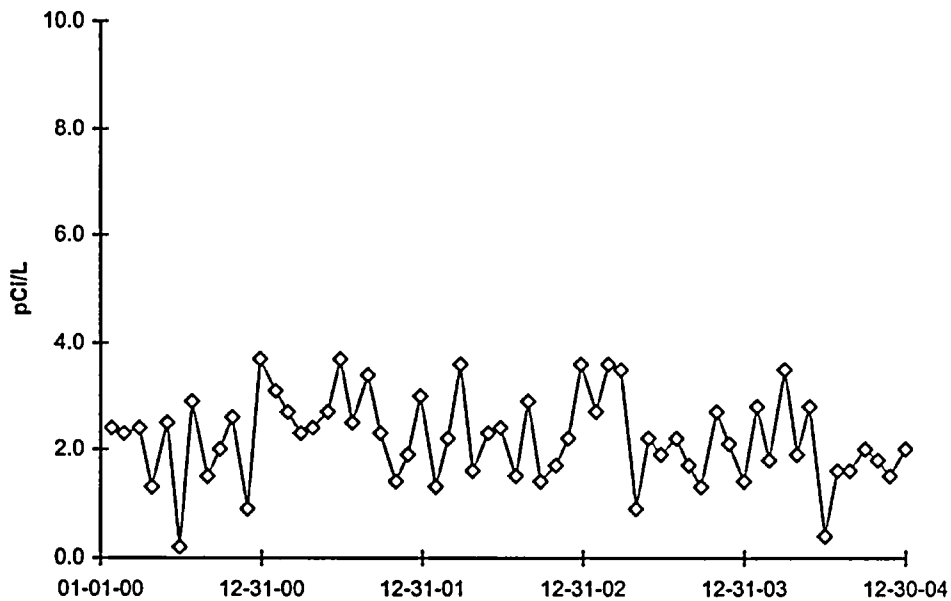


Figure 5. Monthly composite of weekly collection.

Public Water-Gross Beta

Z-16 Waukegan Water Works

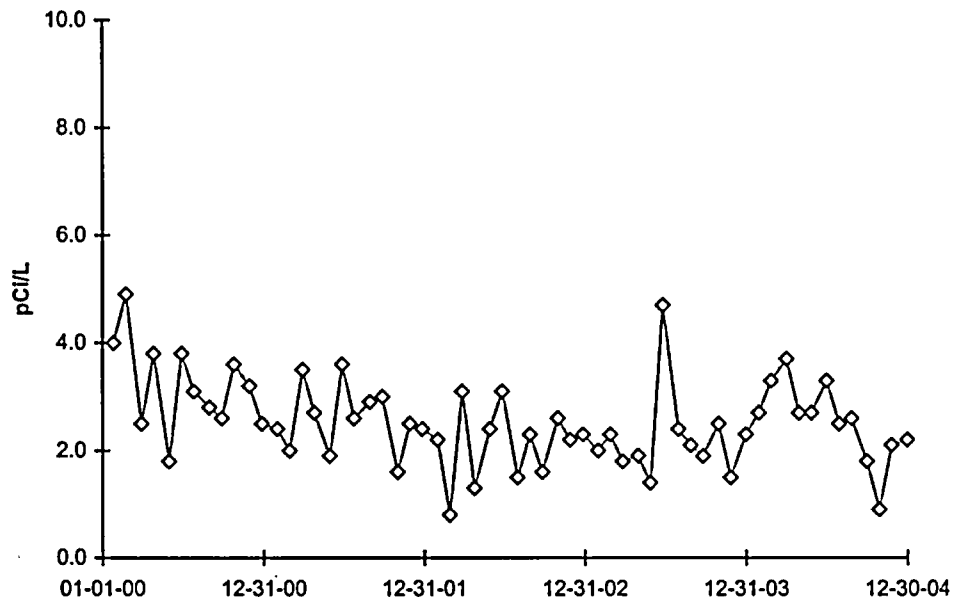


Figure 6. Monthly composite of weekly collection.

Z-18 Lake Forest Water Works

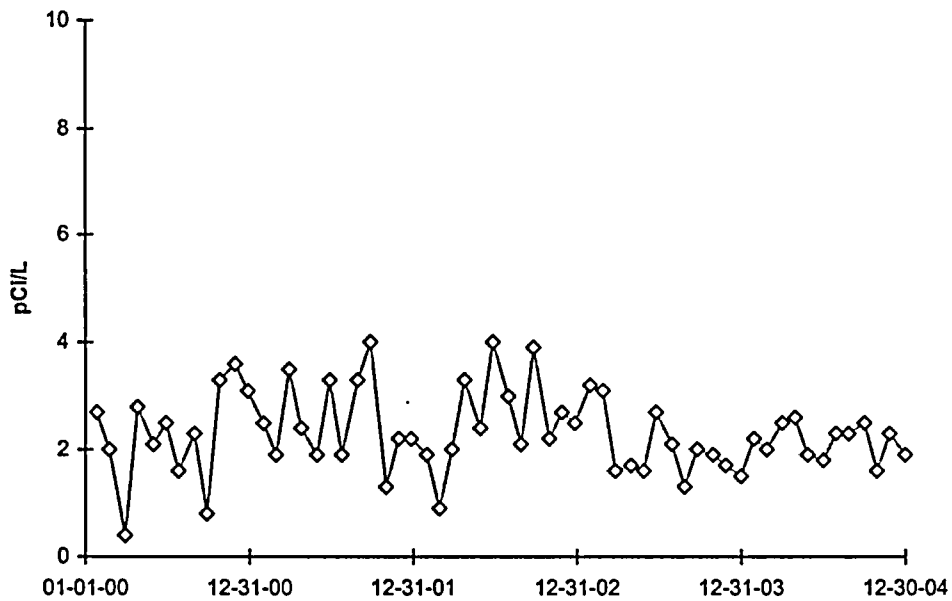


Figure 7. Monthly composite of weekly collection.

Public Water-Tritium

Z-14 (C) Kenosha Water Works

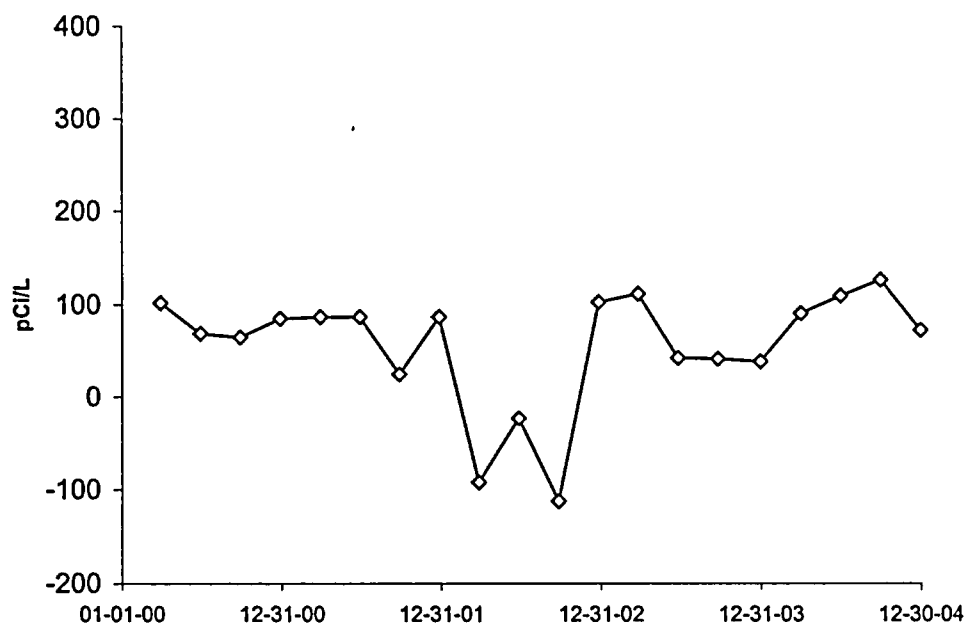


Figure 8. Quarterly composites of weekly collections.

Z-15 Lake County Water Works

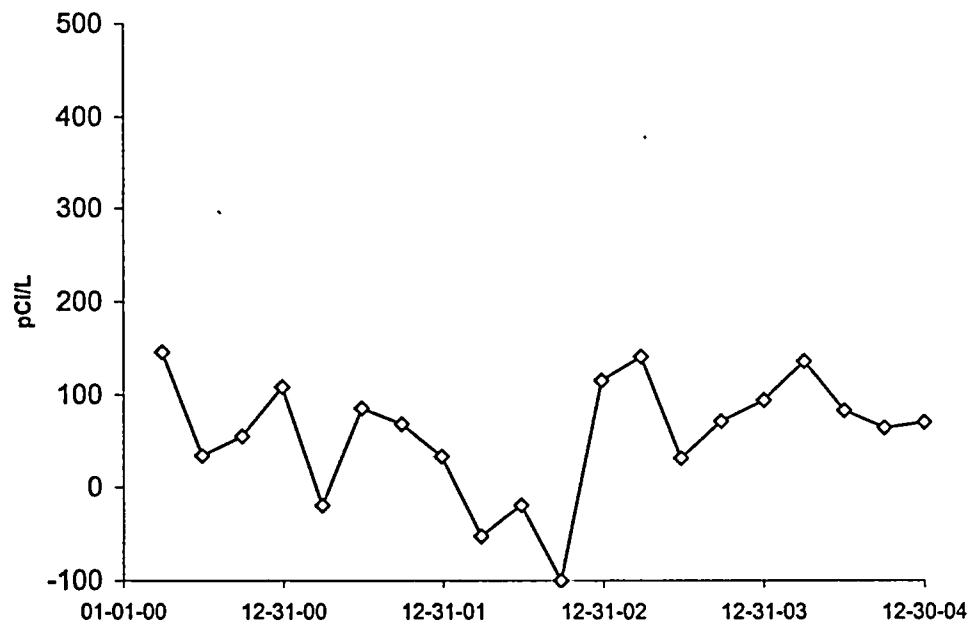


Figure 9. Quarterly composites of weekly collections.

Public Water-Tritium

Z-16 Waukegan Water Works

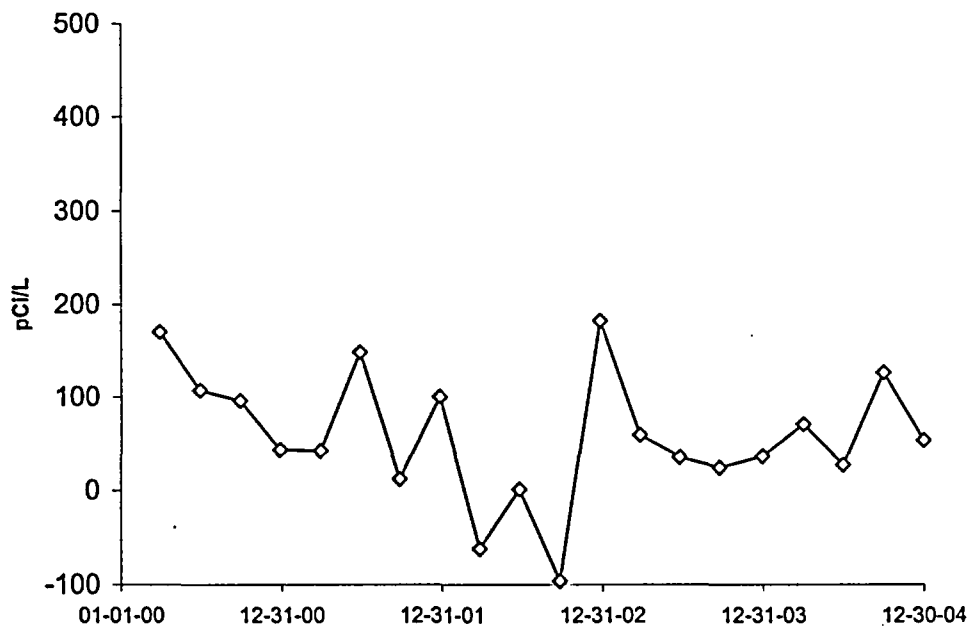


Figure 10. Quarterly composites of weekly collections.

Z-18 (C) Lake Forest Water Works

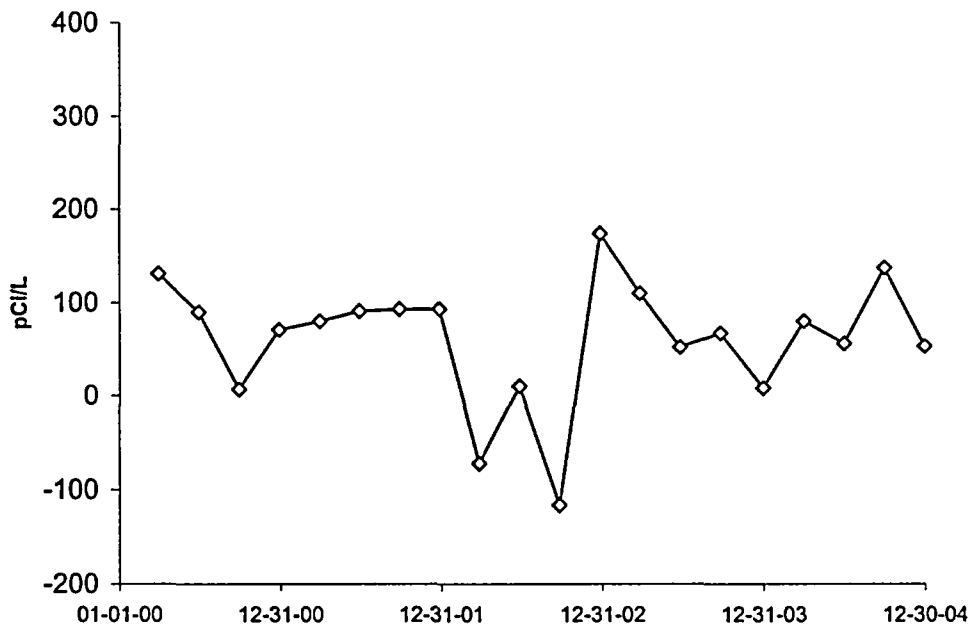
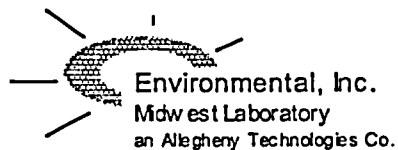


Figure 11. Quarterly composites of weekly collections.

ZION

APPENDIX IV

INTERLABORATORY COMPARISON PROGRAM RESULTS



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APPENDIX IV

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 IV

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 its 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 IV-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 IV-2 list results for thermoluminescent dosimeters (TLDs), via International Intercomparison of Environmental Dosimeters, when available, and internal laboratory testing.

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

Table IV-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 IV-6 were obtained through participation in the Mixed Analyte Performance Evaluation Program.

The results in Table IV-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	± 1σ = (pCi/liter) = 169.85 x (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 IV-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 IV-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 IV-2. Crosscheck program results; Thermoluminescent Dosimetry, (TLDs).

Lab Code	TLD Type	Date	Description	Known Value	mR		Control Limits
					Lab Result	± 2 sigma	
<u>Environmental, Inc.</u>							
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
<u>Environmental, Inc.</u>							
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
<u>Environmental, Inc.</u>							
2004-1	CaSO4: Dy Cards	7/12/2004	Reader 1, 30 cm	55.23	61.07 ± 4.38		38.66 - 71.80
2004-1	CaSO4: Dy Cards	7/12/2004	Reader 1, 30 cm	55.23	62.82 ± 1.75		38.66 - 71.80
2004-1	CaSO4: Dy Cards	7/12/2004	Reader 1, 60 cm	13.81	14.10 ± 0.56		9.67 - 17.95
2004-1	CaSO4: Dy Cards	7/12/2004	Reader 1, 60 cm	13.81	14.03 ± 0.48		9.67 - 17.95
2004-1	CaSO4: Dy Cards	7/12/2004	Reader 1, 90 cm	6.14	5.97 ± 0.21		4.30 - 7.98
2004-1	CaSO4: Dy Cards	7/12/2004	Reader 1, 90 cm	6.14	6.26 ± 0.14		4.30 - 7.98
2004-1	CaSO4: Dy Cards	7/12/2004	Reader 1, 120 cm	3.45	4.40 ± 0.63		2.42 - 4.49
2004-1	CaSO4: Dy Cards	7/12/2004	Reader 1, 150 cm	2.21	2.34 ± 0.12		1.55 - 2.87
2004-1	CaSO4: Dy Cards	7/12/2004	Reader 1, 180 cm	1.53	1.65 ± 0.02		1.07 - 1.99

TABLE IV-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	0.00 - 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	0.00 - 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	0.00 - 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	82380.00	65904.00 - 98856.00
SPAP-4234	Air Filter	8/4/2004	Gr. Beta	1.63 ± 0.02	1.46	0.00 - 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 IV-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	0.00 - 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

^a Liquid sample results are reported in pCi/Liter, air filters (pCi/m³), charcoal (pCi/m³), and solid samples (pCi/g).

^b Results are based on single determinations.

^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 IV-4. In-House "Blank" Samples

Lab Code	Sample Type	Date	Analysis	Concentration (pCi/L) ^a		
				Laboratory results (4.66σ)		Acceptance Criteria (4.66 σ)
				LLD	Activity ^b	
SPCH-712	Charcoal	2/20/2004	I-131(G)	2.24		9.6
SPW-722	Water	2/20/2004	Ni-63	2.64	-0.78 ± 1.58	20
SPAP-734	Air Filter	2/25/2004	Gr. Beta	0.96	-1.02 ± 0.42	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 ± 0.10	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 ± 0.10	0.5
SPMI-738	Milk	2/25/2004	I-131(G)	5.36		20
SPW-1110	Water	3/18/2004	Fe-55	772.70	168.4 ± 480.90	1000
SPW-1497	Water	4/7/2004	H-3	152.30	81.4 ± 79.40	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 ± 0.26	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 ± 0.52	5
SPW-1684	Water	4/16/2004	Sr-90	0.64	0.13 ± 0.31	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 ± 0.24	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 ± 0.70	5
SPMI-1686	Milk	4/16/2004	Sr-90	0.71	0.66 ± 0.40	1
SPVE-1863	Vegetation	4/26/2004	I-131(G)	3.55		20
SPCH-1887	Charcoal	4/26/2004	I-131(G)	7.04		9.6
SPAP-1889	Air Filter	4/27/2004	Gr. Beta	0.74	-0.96 ± 0.35	3.2
SPF-1918	Fish	4/29/2004	Cs-134	7.13		100
SPF-1918	Fish	4/29/2004	Cs-137	6.59		100
SPW-3152	Water	6/24/2004	Fe-55	790.30	-70.0 ± 474.50	1000
SPW-4233	Water	8/4/2004	H-3	154.23	102.67 ± 81.38	200
SPAP-4235	Air Filter	8/4/2004	Gr. Beta	0.96	-0.99 ± 0.38	3.2
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 ± 0.27	1

TABLE IV-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-5713	Milk	10/6/2004	Cs-134	4.60		10
SPMI-5713	Milk	10/6/2004	Cs-137	5.81		10
SPMI-5713	Milk	10/6/2004	I-131(G)	6.07		20
SPMI-5713	Milk	10/6/2004	Sr-90	0.68	1.4 ± 0.45	1
SPMI-7419	Milk	12/22/2004	Cs-134	8.66		10
SPMI-7419	Milk	12/22/2004	Cs-137	5.61		10
SPMI-7419	Milk	12/22/2004	Sr-90	0.82	1.67 ± 0.48	1
SPW-7421	Water	12/22/2004	Sr-89	1.21	0.58 ± 0.94	5
SPW-7421	Water	12/22/2004	Sr-90	0.82	0.26 ± 0.41	1
SPAP-7438	Air Filter	12/22/2004	Gr. Beta	0.93	-0.78 ± 0.40	3.2
SPF-7525	Fish	12/29/2004	Cs-134	8.27		100
SPF-7525	Fish	12/29/2004	Cs-137	10.60		100
SPW-7526	Water	12/29/2004	H-3	164.80	-47.0 ± 84.60	200
SPW-7533	Water	12/29/2004	Fe-55	753.00	118.6 ± 465.80	1000
SPW-7535	Water	12/29/2004	Ni-63	13.10	4.3 ± 8.10	20
SPW-7540	Water	12/29/2004	Tc-99	1.19	-0.036 ± 0.72	10

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

^b Activity reported is a net activity result. For gamma spectroscopic analysis, activity detected below the LLD value is not reported.

^c I-131(G); Iodine-131 as analyzed by gamma spectroscopy.

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

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

Lab Code	Date	Analysis	Concentration (pCi/L) ^a		Averaged Result
			First Result	Second 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 IV-5. In-House "Duplicate" Samples

Lab Code	Date	Analysis	Concentration (pCi/L) ^a		Averaged Result
			First Result	Second 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 ^b	6/22/2004	I-131	0.97 ± 0.20	1.43 ± 0.20	1.20 ± 0.14
DW-3278, 3279	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 IV-5. In-House "Duplicate" Samples

Lab Code	Date	Analysis	Concentration (pCi/L) ^a		Averaged Result
			First Result	Second Result	
E-3327, 3328	7/1/2004	Gr. Beta	1.21 ± 0.08	1.35 ± 0.07	1.28 ± 0.05
E-3327, 3328	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 IV-5. In-House "Duplicate" Samples

Lab Code	Date	Analysis	Concentration (pCi/L) ^a		Averaged Result
			First Result	Second 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 IV-5. In-House "Duplicate" Samples

Lab Code	Date	Analysis	Concentration (pCi/L) ^a		Averaged Result
			First Result	Second 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 IV-6. Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP)^a.

Lab Code	Type	Date	Analysis	Laboratory result	Concentration ^b	
					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,1}	soil	05/01/04	Tc-99	59.00 ± 6.00	117.66 ± 11.78	82.36 - 152.96
STSO-1022 ^{d,1}	soil	05/01/04	U-233/4	24.70 ± 3.60	37.00 ± 3.70	25.90 - 48.40
STSO-1022 ^{d,1}	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 ^e	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 IV-6. Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP)^a.

Lab Code	Type	Date	Analysis	Laboratory result	Concentration ^b	
					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.

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

^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 IV-7. Environmental Measurements Laboratory Quality Assessment Program (EML)

Lab Code	Type	Date	Analysis	Concentration ^a		
				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.