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DOMINION ENERGY KEWAUNEE, INC.
KEWAUNEE POWER STATION
2013 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

Enclosed is the 2013 Annual Radiological Environmental Operating Report for the Kewaunee Power Station (KPS). This report was prepared by ATI Environmental Inc. and satisfies the requirements of KPS Technical Specification 5.6.1.

The results of the 2013 Land Use Census, submitted in accordance with the KPS Radiological Environmental Monitoring Manual, Section 2.2.2/2.3.2, are also included in this report.

If you have questions or require additional information, please feel free to contact Mr. Richard Repshas at 920-388-8217.

Very truly yours,

Jeffrey T. Stafford
Director Safety and Licensing, Kewaunee Power Station

Commitments made by this letter: NONE

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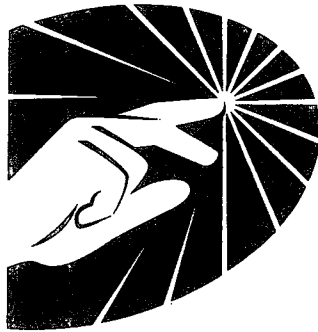
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**2013
Annual
Radiological
Environmental
Operating
Report**

Kewaunee Power Station

Dominion Energy Kewaunee, Inc.



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**2013
Annual
Radiological
Environmental
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Report**

Kewaunee Power Station

Part I

*Summary and
Interpretation*

Dominion Energy Kewaunee, Inc.



ANNUAL RADIOLOGICAL ENVIRONMENTAL
OPERATING REPORT

TO

DOMINION NUCLEAR

RADIOLOGICAL MONITORING PROGRAM FOR
THE KEWAUNEE POWER STATION
KEWAUNEE, WISCONSIN

PART I - SUMMARY AND INTERPRETATION

January 1 to December 31, 2013

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5/1/14

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PREFACE

The staff of ATI Environmental, Inc., Midwest Laboratory were responsible for the acquisition of data presented in this report. Assistance in sample collection was provided by Kewaunee Power Station personnel. The report was prepared by staff members of ATI Environmental, Inc., Midwest Laboratory.

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1.0 INTRODUCTION

The Kewaunee Power Station is a 598 megawatt pressurized water reactor located on the Wisconsin shore of Lake Michigan in Kewaunee County. The Plant became critical on March 7, 1974. Initial power generation was achieved on April 8, 1974, and the Plant was declared commercial on June 16, 1974.

On February 25, 2013, Dominion Energy Kewaunee submitted a certification of intent to cease power operations to the Nuclear Regulatory Committee. Power Operation of the Kewaunee Power Station ceased on May 7, 2013. The fuel was permanently removed from the reactor and placed in the spent fuel pool for storage on May 14, 2013.

This report summarizes the environmental operation data collected during the period January - December 2013.

Dominion Energy Kewaunee, operator and owner of the Kewaunee Power Station, assumes responsibility for the environmental program at the Plant. Any questions should be directed to Mr. J. Michael Hale, Radiation Protection / Chemistry Manager, at (920) 388-8103.

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2.0 SUMMARY

Results of sample analyses during the period January - December 2013 are summarized in Table 4.5. Radionuclide concentrations measured at indicator locations are compared with levels measured at control locations and in preoperational studies. In no instance were REMP threshold reporting levels exceeded.

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3.0 RADIOLOGICAL SURVEILLANCE PROGRAM

Following is a description of the Radiological Surveillance Program and its execution.

3.1 METHODOLOGY

The sampling locations are shown in Figure 4-1. Table 4.1 describes the locations, lists for each direction and distance from the reactor, and defines which are indicators and control locations.

The sampling program monitors the air, terrestrial, and aquatic environments. The types of samples collected at each location and the frequency of collections are presented in Table 4.2, using sample codes defined in Table 4.3. The collections and analyses that comprise the program are described below. Finally, the execution of the program in the current reporting year is discussed.

3.1.1 The Air Program

Airborne Particulates

Airborne particulates are collected on 47 mm diameter, 1 μ m porosity glass fiber filters, at a volumetric rate of approx. one cubic foot per minute. The filters are collected weekly from six locations (K-1f, K-2, K-8, K-31, K-41 and K-43), and dispatched by mail to ATI Environmental, Inc. for radiometric analysis. The particulate filters are counted for gross beta activity, a minimum of three days after the date of collection, to allow for the decay of naturally-occurring short-lived radionuclides.

Quarterly composites from each sampling location are analyzed for gamma-emitting isotopes on a high-purity germanium (HPGe) detector.

Airborne Iodine

Charcoal traps are located at locations K-1f, K-2, K-8, K-31, K-41 and K-43. The traps are changed weekly and analyzed for iodine-131 immediately after arrival at the laboratory.

Ambient Gamma Radiation – TLDs

Ambient gamma radiation is monitored at the six air sampling locations (K-1f, K-2, K-8, K-31, K-41 and K-43), at three milk sampling locations (K-3, K-5, and K-39), and from five additional sites (K-15, located 9.25 miles northwest of the plant; K-17, located 4.25 miles west of the plant; K-25, located 1.9 miles southwest of the plant; K-27, located 1.5 miles northwest of the plant and K-30, located 1.0 miles north of the plant) by thermoluminescent dosimetry (TLD). Two TLD cards, each having four main readout areas containing CaSO₄:Dy phosphor, are placed at each location (eight TLDs at each location). One card is exchanged quarterly, the other card is exchanged annually and read only on an emergency basis.

Dosimeters have also been placed at eight additional locations (K-1L through K-1S), to monitor an Independent Spent Fuel Storage Installation (ISFSI). They are replaced and measured quarterly.

Precipitation

Monthly composites of precipitation samples are collected at K-11 and analyzed for tritium.

3.1.2 The Terrestrial Program

Milk

Milk samples are collected from three herds grazing within three miles of the reactor site (K-34, K-38 and K-44); from four herds that graze between 3-7 miles of the reactor site (K-3, K-5, K-35, and K-39); and one from a dairy in Green Bay (K-42), 28.1 miles from the reactor site.

The samples are collected twice per month during the grazing period (May through October) and monthly for the rest of the year. The samples are analyzed for iodine-131, strontium-89 and strontium-90, calcium, stable potassium and gamma-emitting isotopes.

Well Water

One gallon of water is collected quarterly from the four off-site well locations K-10, K-11, K-13 and K-38 and from two on-site wells located at K-1g and K-1h.

Gamma spectroscopic analysis, tritium and gross beta on the total residue are performed for each water sample. The concentration of potassium-40 is calculated from total potassium. Samples of water from the two on-site wells (K-1g and K-1h) are analyzed for gross alpha. Water samples from K-1g are also tested for strontium-89 and strontium-90.

Domestic Meat

Domestic meat is collected annually (if available) during the third quarter, from three locations in the vicinity of the plant (K-24, K-29, and K-32). The flesh is separated from the bone and analyzed for gross alpha, gross beta and gamma emitting isotopes.

Eggs

Eggs are collected quarterly from locations K-24 and K-32. Samples are analyzed for gross beta, strontium-89, strontium-90 and gamma-emitting isotopes.

Vegetables

Annually, during the third quarter, five varieties of vegetables are collected from location K-26. Samples may also be obtained from other local sources to supplement the program. In addition, two varieties of grain or leafy vegetables are collected annually from farmland owned by Dominion Energy Kewaunee (K-23a and K-23b) and rented to a private individual for growing crops. The samples are analyzed for gross beta, strontium-89, strontium-90 and gamma emitting isotopes.

Grass and Cattle Feed

Grass is collected during the second, third and fourth quarters from two on-site locations (K-1b and K-1f) and from the dairy farm locations (K-3, K-5, K-34, K-35, K-38 and K-39). Cattle feed is collected during the first quarter from the same farms. The samples are analyzed for gross beta, strontium-89, strontium-90 and gamma emitting isotopes.

Soil

Soil samples are collected twice a year on-site at K-1f and from the dairy farm locations (K-3, K-5, K-34, K-35, K-38 and K-39). The samples are analyzed for gross alpha, gross beta, strontium-89, strontium-90 and gamma emitting isotopes.

3.1.3 The Aquatic Program

Surface Water

One-gallon water samples are taken monthly from three locations on Lake Michigan: 1) at the point where the condenser water is discharged into Lake Michigan (K-1d); 2) Two Creeks Park (K-14) located 2.6 miles south of the reactor site; and 3) at the main pumping station located approximately equidistant from Kewaunee and Green Bay, which pumps water from the Rostok water intake (K-9) located 11.5 miles NNE of the reactor site. Both raw and tap water are collected at K-9. One-gallon water samples are taken monthly from three creeks that pass through the site (K-1a, K-1b, and K-1e). Samples from North and Middle Creeks (K-1a, K-1b) are collected near the mouth of each creek. Samples from the South Creek (K-1e) are collected about ten feet downstream from the point where the outflow from the two drain pipes meets. Additionally, the drainage pond (K-1k), located approximately 0.6 miles southwest of the plant, is included in the sampling program. Water samples at K-14 are collected and analyzed in duplicate.

The water is analyzed for gamma emitting isotopes, gross beta activity in total residue, dissolved and suspended solids, and potassium-40. The concentration of potassium-40 is calculated from the total potassium concentration. In addition, quarterly composites of monthly grab samples are analyzed for tritium, strontium-89 and strontium-90.

Fish

Fish samples are collected during the second, third and fourth quarters at location K-1d. The flesh is separated from the bones, gamma scanned and analyzed for gross beta activity. Ashed bone samples are analyzed for gross beta, strontium-89 and strontium-90.

Aquatic Slime

Periphyton (slime) or aquatic vegetation is collected during the second and third quarters from three Lake Michigan locations (K-1d, K-9 and K-14), from three creek locations (K-1a, K-1b and K-1e) and from the drainage pond (K-1k), if available. The samples are analyzed for gross beta activity. If the quantity is sufficient, analyses for gamma-emitting isotopes and strontium-89 and strontium-90 activities are performed.

Bottom Sediment

Bottom sediments are collected in May and November from five locations (K-1c, K-1d, K-1j, K-9 and K-14). The samples are analyzed for gross beta, strontium-89, strontium-90 and gamma emitting isotopes.

3.1.4 Program Execution

Program execution is summarized in Table 4.4. The program was executed for the year 2013 as described in the preceding sections, with the following exceptions:

Air Particulates / Air Iodine

A partial air particulate / air iodine sample (303 m³) was collected at location K-1f, for the week ending 11/19/13. A planned power outage for maintenance on 11/14/13 resulted in a reduced run-time of 4.25 hours. (CR 533125)

A partial air particulate / air iodine sample (274 m³) was collected at location K-8, for the week ending 08/13/13. A power interruption due to severe weather on 08/07/13 resulted in a reduced run-time of 18.1 hours. (CR 523183)

Thermoluminescent Dosimetry

The fourth quarter and annual TLDs from location K-17 could not be collected. The sampling site was buried under snow from plowing. If the TLDs are salvageable, the readings will be reported with the first quarter 2014 data.

Milk

Milk from location K-44 was no longer available for the February, 2013 collection. The farm has discontinued dairy operations. (CR 504725)

Domestic Meat

There was no poultry available from location K-29 in 2013.

Surface Water

Surface water location K-1a could not be sampled for the March, 2013 collection. The creek was frozen.

Surface water from location K-1k could not be sampled from January through April, August, September and December, 2013. The pond was frozen or inaccessible for collection.

3.1.5 Program Modifications

Milk sampling at the Schleis farm (K-44) was dropped in February, 2013. The farm has discontinued dairy operations.

Rev. 20, 10/15/2013, of the Radiological Environmental Monitoring Manual (REMM) updates Tables 2.21-A, 2.21-B and 2.21-C to delete milk sampling location K-44. A copy of the REMM is included with the Annual Radioactive Effluent Release Report.

3.2 RESULTS AND DISCUSSION

Results for the reporting period January to December, 2013 are presented in summary form in Table 4.5. For each type of analysis, of each sampled medium, the table shows the annual mean and range for all indicator and control locations. The location with the highest annual mean and the results for this location are also given.

The discussion of the results has been divided into three broad categories: the air, terrestrial, and aquatic environments. Within each category, samples will be discussed in the order listed in Table 4.4. Any discussion of previous environmental data for the Kewaunee Power Station refers to data collected by Environmental Inc., Midwest Laboratory.

Results of all measurements made in 2013 are not included in this section, although references to these results will be made in the discussion. A complete tabulation of results is provided in Part II of the 2013 annual report on the Radiological Monitoring Program for the Kewaunee Power Station.

3.2.1 Atmospheric Nuclear Detonations and Nuclear Accidents

There were no atmospheric nuclear tests or accidents reported in 2013. The Chernobyl and Fukushima Daiichi nuclear accidents occurred on April 26, 1986 and March 11, 2011, respectively, the last reported atmospheric nuclear test was conducted by the People's Republic of China on October 16, 1980. Contributions from these events have resulted in the presence of long-lived radioisotopes of cesium and strontium still detectable in the environment.

3.2.2 The Air Environment

Airborne Particulates

The annual gross beta concentration in air particulates averaged 0.024 pCi/m³ at indicator locations and 0.025 pCi/m³ at the control locations, similar to the means observed from 2002 (and prior to) through 2010, and slightly lower than means observed for 2011 and 2012. There is no indication of a plant effect, the average readings were evenly distributed between indicator and control locations. New sampler pumps were installed in the third quarter of 2010. The slight increases in beta activity may be due to a change in the calculated volume. Results are tabulated below.

<u>Year</u>	<u>Average (Indicators)</u>	<u>Average (Controls)</u>
<u>Concentration (pCi/m³)</u>		
2002	0.023	0.023
2003	0.022	0.022
2004	0.019	0.020
2005	0.023	0.023
2006	0.021	0.021
2007	0.022	0.021
2008	0.022	0.022
2009	0.023	0.023
2010	0.023	0.022
2011	0.029	0.029
2012	0.029	0.030
2013	0.024	0.025

Average annual gross beta concentrations in airborne particulates.

Airborne Particulates (continued)

Variation in the gross beta activity throughout the year is not unusual. Typically, higher beta averages occur during the months of January and December, and the first and fourth quarters, as noted in data from 2002 through 2013.

Gamma spectroscopic analysis of quarterly composites of air particulate filters yielded similar results for indicator and control locations. Beryllium-7, produced continuously in the upper atmosphere by cosmic radiation, was detected in all samples, with an average activity of 0.068 pCi/m³. All other gamma-emitting isotopes were below their respective LLD limits.

Airborne Iodine

Levels of airborne iodine-131 were below the lower limit of detection (LLD) of 0.030 pCi/m³ at all locations. There was no indication of a plant effect on the local air environment.

Ambient Gamma Radiation – TLDs

Ambient gamma radiation was monitored by TLDs at fourteen locations, eight indicators and six controls. Quarterly TLDs at the indicator locations measured a mean dose equivalent of (16.2 mR/91 days), in close agreement with the control locations (15.5 mR/91 days). The readings are similar to the averages obtained from 2002 (and prior to) through 2012.

For eight TLDs monitoring the Independent Spent Fuel Storage Installation, (K-1L through K-1S), measurements averaged 13.8 mR/91 days.

No plant effect on ambient gamma radiation was indicated. These values are lower than the United States average value of 19.5 mR/91 days due to natural background radiation (National Council on Radiation Protection and Measurements, 1975). The highest annual mean was 18.9 mR/91 days, measured at indicator location K-27.

<u>Year</u>	<u>Average (Indicators)</u>	<u>Average (Controls)</u>
<u>Dose rate (mR/91 days)</u>		
2002	16.1	15.1
2003	14.1	13.7
2004	14.8	14.0
2005	15.7	14.3
2006	16.4	15.0
2007	16.2	15.2
2008	15.6	14.2
2009	15.2	13.9
2010	15.2	14.3
2011	15.0	14.5
2012	16.1	15.3
2013	16.2	15.5

Ambient gamma radiation as measured by thermoluminescent dosimetry.
Average quarterly dose rates.

Precipitation

Precipitation was monitored for tritium at indicator location, K-11. The concentration was below the LLD level of 184 pCi/L in all samples.

3.2.3 The Terrestrial Environment

Milk

Of 131 samples tested for iodine-131 in milk, all measured below an LLD level of 0.5 pCi/L.

Strontium-89 concentrations measured below an LLD level of 1.3 pCi/L in all samples. Measurable levels of strontium-90 above an LLD level of 0.8 pCi/L were detected in thirty of eighty-five samples tested. Mean values were identical for indicator and control locations (1.0 pCi/L) and are similar to or less than averages seen from 1990 through 2012.

For gamma emitting isotopes, concentrations measured below the required limits of 15 pCi/L for barium-lanthanum-140 and 10 pCi/L for cesium-134 and cesium-137. Potassium-40 results were almost identical at both the indicator and control locations (1381 and 1445 pCi/L, respectively), and are comparable to levels observed from 1990 through 2012.

Detection of strontium, iodine and potassium activity is consistent with findings of the National Center for Radiological Health (1968). Most radiocontaminants in cattlefeed do not find their way into milk, exceptions are radioisotopes of potassium, cesium, strontium, barium, and iodine. Due to chemical similarities between strontium and calcium, and cesium and potassium, organisms tend to deposit strontium-89 and strontium-90 in bone and cesium-137 in the soft tissue and muscle. Consequently, ratios of strontium-90 activity to the weight of calcium in milk and cesium-137 activity to the weight of potassium in milk were monitored in order to detect potential environmental accumulation of these radionuclides. Measured concentrations of calcium and stable potassium are in agreement with previously determined values and averaged 1.07 and 1.72 g/L, respectively.

There was no indication of any effect due to the operation of the Kewaunee Power Station.

Well Water

One of eight samples for gross alpha analysis, from on-site well K-1h, measured above an LLD of 3.8 pCi/L, at 4.3 pCi/L. Gross beta activity above a detection limit of 3.4 pCi/L, was measured in five of the twenty indicator samples tested. Concentrations ranged from 3.5 to 6.6 pCi/L, and averaged 4.9 pCi/L. The gross alpha and beta activities detected in the ground water are most likely contributions from naturally-occurring daughters of radium and thorium.

Levels of strontium-89 and strontium-90 were measured for the on-site well (K-1g). The concentrations measured below LLD values of 0.9 and 0.6 pCi/L, respectively.

Samples were tested for tritium and gamma emitting isotopes. All tritium concentrations measured below a detection level of 150 pCi/L. Gamma-emitting isotopes measured below respective LLDs.

Potassium-40 averages were generally in proportion to gross beta measurements and in agreement with previously measured values. No plant effect was indicated.

Domestic Meat

In domestic meat samples, gross alpha measured 0.061 and 0.040 pCi/g for indicator and control locations, respectively, while the gross beta concentrations measured 2.97 pCi/g and 2.68 pCi/g. Gamma-spectroscopic analyses showed that most beta activity was due to naturally occurring potassium-40 (2.99 pCi/g and 2.40 pCi/g respectively). All other gamma-emitting isotopes measured below detection limits.

Eggs

In samples of eggs tested, the gross beta concentrations averaged 1.59 pCi/g at the indicator location and 1.30 pCi/g for the control location, similar to observed concentrations of naturally-occurring potassium-40 (1.37 and 1.23 pCi/g respectively). Other gamma-emitting isotopes were below their respective LLDs.

Levels of strontium-89 measured less than 0.012 pCi/g in all samples. A low level of strontium-90 was detected in one of the four control samples tested, at a concentration of 0.008 pCi/g. The trace radiostrontium in the environment is still attributed to nuclear testing from previous decades.

Vegetables and Grain

In vegetables, gross beta concentrations averaged 4.69 pCi/g at two indicator locations and 3.09 pCi/g for the control location K-26, due primarily to potassium-40 and beryllium-7 activity. All other gamma emitting isotopes measured below detection levels. No strontium-89 was detected above 0.009 pCi/g. Strontium-90 was found in one indicator and one control sample tested, at concentrations of 0.008 pCi/g and 0.005 pCi/g, respectively.

In two samples of wheat and clover collected from location K-23, the gross beta concentrations averaged 5.43 pCi/g, due primarily to activity from potassium-40 and beryllium-7.

Strontium-89 and strontium-90 measured below respective LLDs of 0.052 pCi/g and 0.016 pCi/g.

Grass and Cattle Feed

In grass, mean gross beta measured 9.21 and 8.28 pCi/g at indicator and control locations, respectively. In all cases the activity was predominantly due to naturally occurring potassium-40 and beryllium-7. Other gamma-emitting isotopes were below respective LLDs. Strontium-89 and strontium-90 both tested below detection limits of 0.066 pCi/g and 0.026 pCi/g, respectively.

For cattlefeed, gross beta concentrations were similar for indicator and control locations (9.18 pCi/g and 8.27 pCi/g, respectively), and reflected potassium-40 / beryllium-7 levels observed (7.90 and 7.30 pCi/g, respectively). No strontium-89 activity was detected. Strontium-90 was found in two of the eight indicator samples tested and averaged 0.027 pCi/g.

With the exception of the naturally-occurring beryllium and potassium, gamma-emitting isotopes were below detection levels.

Soil

Gross alpha concentrations in soil averaged 7.46 pCi/g dry at five indicator locations and 8.95 pCi/g dry at the two control locations. Mean gross beta levels measured at indicator and control locations averaged 26.53 and 25.75 pCi/g, respectively, primarily due to potassium-40 activity. Strontium-89 was below an LLD level of 0.11 pCi/g dry in all samples. A low level of strontium-90 activity was detected in two of the ten indicator samples, at a mean concentration of 0.045 pCi/g and one control sample at 0.039 pCi/g. Trace radiostrontium in the environment can still be attributed to nuclear testing from previous decades.

Soil (continued)

Cesium-137 was detected in thirteen of fourteen soil samples, similar at both indicator and control locations (0.10 and 0.14 pCi/g, respectively). Potassium-40 was detected in all samples and averaged 18.24 and 20.99 pCi/g for indicator and control locations, respectively. All other gamma-emitting isotopes were below respective LLD's. The levels of detected activities are similar to those observed from 1990 through 2012. The data suggests no evidence of a plant effect.

3.2.4 The Aquatic Environment

Surface Water

Gross beta activity in surface water measured higher at the indicator locations (5.7 pCi/L) than at the control locations (1.5 pCi/L). A similar pattern of activity has been observed since 1978. In 2013, the highest activities measured were sampled from the K-1a creek. The average activity was 16.6 pCi/L, with a range of 2.8 to 72.2 pCi/L, due primarily to potassium-40 activity. The potassium-40 concentrations averaged 11.6 pCi/L and ranged from 1.6 to 51.9 pCi/L.

Year	Average (Indicators)	Average (Controls)
Gross Beta (pCi/L)		
2002	5.7	2.2
2003	7.3	2.4
2004	6.2	2.3
2005	5.2	1.7
2006	5.5	1.8
2007	5.7	1.8
2008	4.7	1.5
2009	4.7	1.5
2010	4.7	1.4
2011	5.0	1.5
2012	6.1	1.4
2013	5.7	1.5

Average annual gross beta concentrations in surface water.

These differences in activity are due in part to the indicator location (K-1k), a pond formed by drainage of surrounding fields to the southwest. The control sample is Lake Michigan water, which varies very little in gross beta concentration during the year, while indicator samples include the two creek locations (K-1a and K-1e) which are much higher in gross beta concentration and exhibit large month-to-month variations. The K-1a creek draws its water from the surrounding fields which are heavily fertilized; and the K-1e creek draws its water mainly from the Sewage Treatment Plant. In general, gross beta concentrations were high when potassium-40 levels were high and low when potassium-40 levels were low, indicating that fluctuations in beta concentration were due to variations in potassium-40 concentrations and not to plant operations. The fact that similar fluctuations at these locations were observed in pre-operational studies conducted prior to 1974 supports this assessment.

In nine of twenty-seven indicator samples tested, (quarterly composites of monthly samples), positive tritium activity was detected, above LLD, at an average concentration of 395 pCi/L, ranging from 176 to 1782 pCi/L. The highest activities observed were from measurements taken at the discharge location, K-1d, most likely due to scheduled releases.

All analyses for strontium-89 measured below an LLD of 2.6 pCi/L. One sample, from the K-1k pond, measured 0.9 pCi/L for strontium-90. All other samples were less than an LLD of 0.8 pCi/L. Gamma-emitting isotopes measured below their respective LLDs in all samples.

Fish

In fish, gross beta concentrations averaged 3.10 pCi/g in muscle and 3.11 pCi/g in bone fractions. In muscle, the gross beta concentration was primarily due to potassium-40 activity.

Excluding potassium-40, gamma-emitting isotopes measured below their respective LLDs in all samples.

Strontium-89 concentrations in the bone were below an LLD of 0.23 pCi/g. Strontium-90 was detected in two of three samples and averaged 0.27 pCi/g.

Periphyton (Slime) or Aquatic Vegetation

In periphyton (slime) and aquatic vegetation samples, mean gross beta concentrations for indicator and control locations measured 5.40 and 6.87 pCi/g, respectively, due primarily to combined potassium-40 and beryllium-7 activity (3.74 and 5.88 pCi/g, respectively).

Trace cobalt-60 activity was detected in four of twelve indicator samples tested with an average concentration of 0.022 pCi/g wet. Cesium-137 was measured in two of twelve indicator samples, also at a level of 0.022 pCi/g wet. Other gamma-emitting isotopes, with the exception of naturally-occurring beryllium-7 and potassium-40, were below their respective LLDs.

No strontium-89 or strontium-90 activity was measured above detection levels of 0.15 and 0.040 pCi/g wet, respectively.

Bottom Sediments

In bottom sediment samples, the mean gross beta concentrations measured 12.78 pCi/g at the indicator locations versus 17.24 pCi/g at the control location.

Cs-134 measured below the LLD level of 0.019 pCi/g for all samples tested. Low levels of cesium-137 were observed in both indicator and control samples and measured 0.025 and 0.050 pCi/g dry, respectively. On average, cesium-137 measurements are lower than or similar to levels observed from 1979 through 2012. Other gamma-emitting isotopes, with the exception of naturally-occurring potassium-40, were below their respective LLDs.

Both strontium-89 and strontium-90 concentrations measured below detection limits (0.081 and 0.036 pCi/g, respectively) in all samples tested.

3.3 LAND USE CENSUS

The Land Use Census satisfies the requirements of the KPS Radiological Environmental Monitoring Manual. Section 2.2.2 states:

"A land use census shall be conducted and shall identify within a distance of 8 km (5 mi.) the location, in each of the 10 meteorological sectors, of the nearest milk animal, the nearest residence and the nearest garden of greater than 50m² (500 ft²) producing broad leaf vegetation." (Figure 4-1)

The 2013 Land Use Census was completed to identify the presence of the nearest milk animals, gardens and farm crops surrounding the Kewaunee Power Station. The Land Use Census was completed on September 5, 2013. The census is conducted annually during the growing season per Health Physics Procedure RP-KW-001-014.

For the 2013 census, map locations were verified for distance and direction. Greater accuracy in measurement resulted in minor distance and directional changes. Results of the 2013 census are summarized in Table 4.6. Changes from the 2012 census are listed by sector. In summary, the highest D/Q locations for nearest garden, nearest residence and nearest milk animal did not change from the 2012 census.

3.4 LABORATORY PROCEDURES

Analytical Procedures used by Environmental, Inc. are on file and are available for inspection. Procedures are based on those prescribed by the Health and Safety Laboratory of the U.S. Dep't of Energy, Edition 28, 1997, U.S. Environmental Protection Agency for Measurement of Radioactivity in Drinking Water, 1980, and the U.S. Environmental Protection Agency, EERF, Radiochemical Procedures Manual, 1984.

Environmental, Inc., Midwest Laboratory has a comprehensive quality control/quality assurance program designed to assure the reliability of data obtained. Details of the QA Program are presented elsewhere (Environmental, Inc., Midwest Laboratory, 2012). The QA Program includes participation in Interlaboratory Comparison (crosscheck) Programs. Results obtained are presented in Appendix A.

4.0 FIGURES AND TABLES

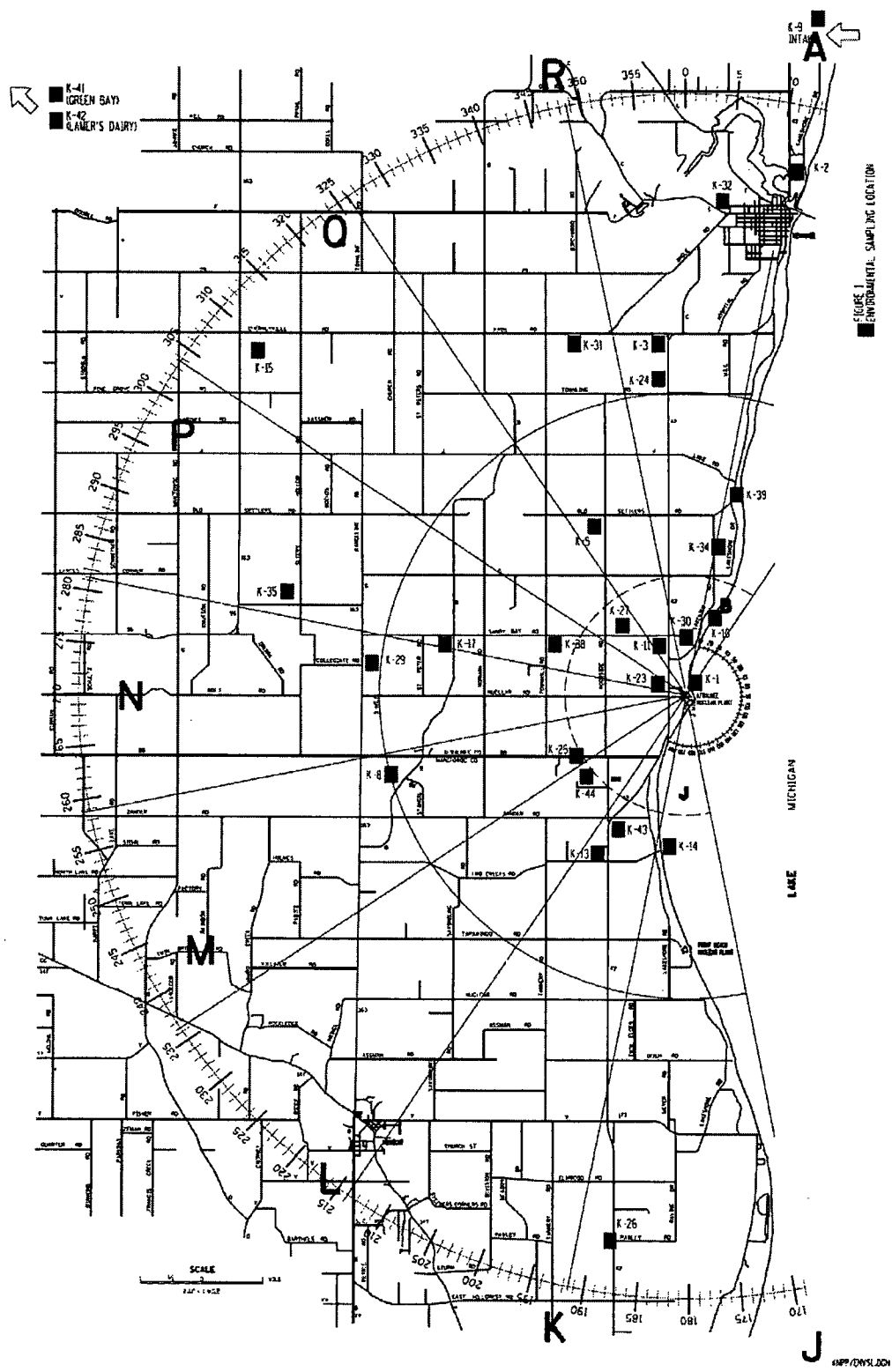


Figure 4-1. Sampling locations, Kewaunee Power Station.

NOTES:

1. LOCATIONS OF MONITORING WELLS SURVEYED BY STS ON JUNE 21, 2007.
2. LOCATIONS OF WATER SUPPLY WELLS ARE ESTIMATED.

LEGEND:

- 6' HIGH FENCE
- SUPPLY WELL
- ◆ MONITORING WELL

LOCATION	NORTHING	EASTING	ELEVATION
WB-0706 GROUND	193850.5	264468.1	605.828
WB-0708 TPVC	193863	264468	605.822
WB-0702 GROUND	193922.1	264479.6	607.897
WB-0703 TPVC	193921.5	264497	627.286
WB-0703 TPVC	194162.5	264426	602.830
WB-0703 GROUND	194161.4	264428	603.817
WB-0704 GROUND	194208.2	264256	604.516
WB-0704 TPVC	194208.3	264256	604.502
WB-0705 TPVC	193884.4	264497	604.812
WB-0705 GROUND	193884.4	264497	605.329
WB-0705 GROUND	193996.2	264482	605.403
WB-0705 TPVC	193996.2	264482	605.937
WB-0707 GROUND	193989	264482	604.053
WB-0707 TPVC	193989.6	264481	605.573
WB-0708 GROUND	193481.3	264433	606.679
WB-0708 TPVC	193481	264432	605.965
WB-0709 GROUND	193448.5	264423	604.195
WB-0709 TPVC	193448	264423	605.653
WB-0710 GROUND	193429.7	264420	604.465
WB-0710 TPVC	193429.2	264420	605.872
WB-0710 GROUND	193421.1	264417	605.849
WB-0710 TPVC	193420.8	264417	605.923
WB-0712 GROUND	193412.4	26438.9	605.562
WB-0712 TPVC	193412	26438.6	604.851
WB-0715 GROUND	193296.2	264432	605.720
WB-0715 TPVC	193295.4	264432	605.429
WB-0717 GROUND	193305.4	264420	605.418
WB-0717 TPVC	193305.7	264420	604.917

NOTE: COORDINATES ARE IN NAD 83 WISCONSIN STATE PLANE CENTRAL.

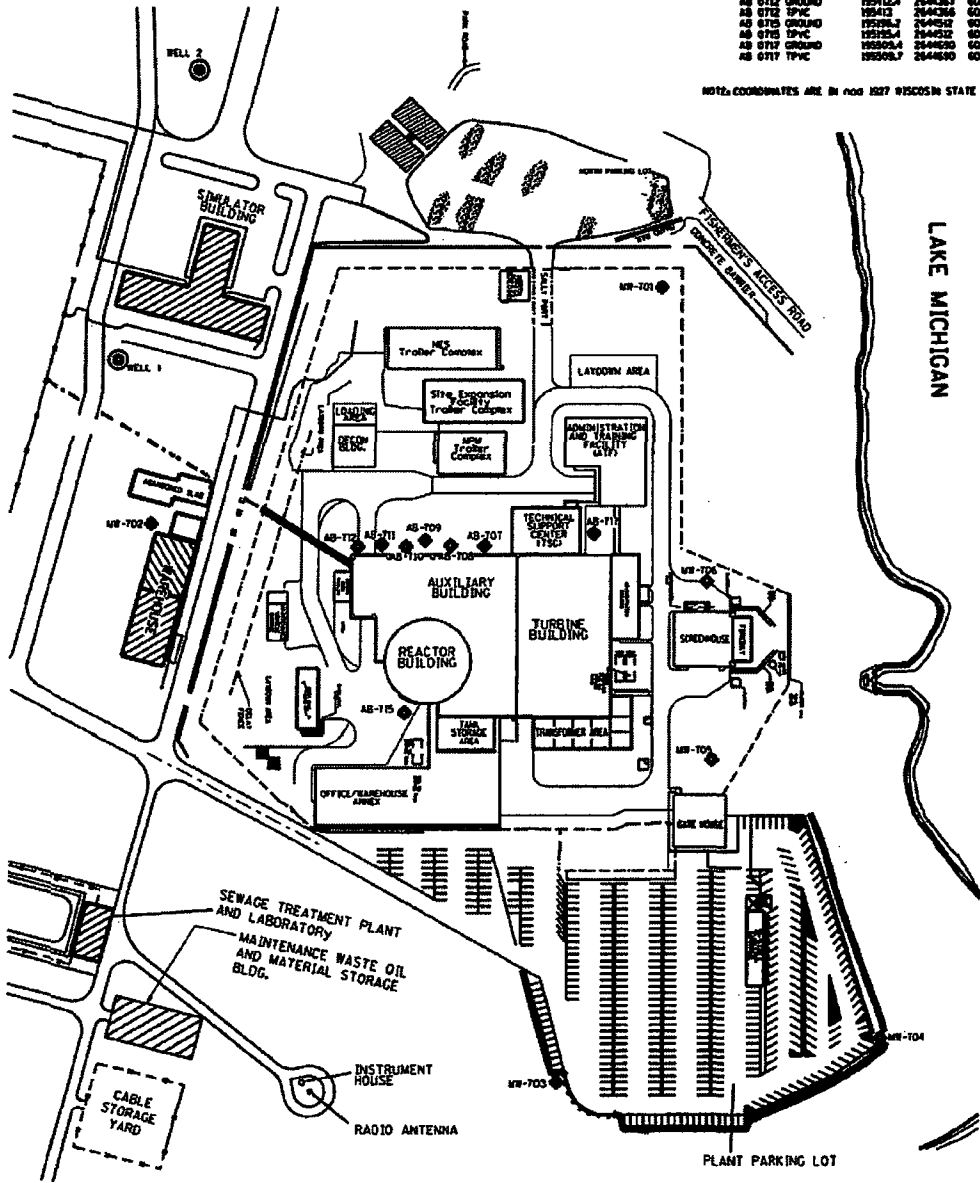


Figure 4-2. Ground Monitoring Wells, Kewaunee Power Station.

Table 4.1. Sampling locations, Kewaunee Power Station.

Code	Type ^a	Distance (miles) ^b and Sector	Location
K-1	I		Onsite
K-1a	I	0.62 N	North Creek
K-1b	I	0.12 N	Middle Creek
K-1c	I	0.10 N	500' north of condenser discharge
K-1d	I	0.10 E	Condenser discharge
K-1e	I	0.12 S	South Creek
K-1f	I	0.12 S	Meteorological Tower
K-1g	I	0.06 W	South Well
K-1h	I	0.12 NW	North Well
K-1j	I	0.10 S	500' south of condenser discharge
K-1k	I	0.60 SW	Drainage Pond, south of plant
K-1l	I	0.13 N	ISFSI Southeast
K-1m	I	0.15 N	ISFSI East
K-1n	I	0.16 N	ISFSI Northwest
K-1o	I	0.16 N	ISFSI North
K-1p	I	0.17 N	ISFSI Northwest
K-1q	I	0.16 N	ISFSI West
K-1r	I	0.13 N	ISFSI West
K-1s	I	0.12 N	ISFSI Southwest
K-2	C	8.91 NNE	WPS Operations Building in Kewaunee
K-3	C	5.9 N	Lyle and John Siegmund Farm, N2815 Hy 42, Kewaunee
K-5	I	3.2 NNW	Ed Papham Farm, E4160 Old Settlers Rd, Kewaunee
K-8	C	4.85 WSW	St. Isadore the Farmer Church, 18424 Tisch Mills Rd, Tisch Mills
K-9	C	11.5 NNE	Green Bay Municipal Pumping Station, six miles east of Green Bay (sample source is Lake Michigan from Rostok Intake two miles north of Kewaunee.
K-10	I	1.35 NNE	Turner Farm, Kewaunee site
K-11	I	0.96 NW	Harlan Ihlenfeld Farm, N879 Hy 42, Kewaunee
K-13	C	3.0 SSW	Rand's General Store, Two Creeks
K-14	I	2.6 S	Two Creeks Park, 2.6 miles south of site
K-15	C	9.25 NW	Gas Substation, 1.5 miles north of Stangelville
K-17	I	4.0 W	Jansky's Farm, N885 Tk B, Kewaunee
K-23a	I	0.5 W	0.5 miles west of plant, Kewaunee site
K-23b	I	0.6 N	0.6 miles north of plant, Kewaunee site
K-24	I	5.4 N	Fictum Farm, N2653 Hy 42, Kewaunee
K-25	I	1.9 SW	Wotachek Farm, 3968 E. Cty Tk BB, Two Rivers
K-26	C	9.1 SSW	Sandy's Vegetable Stand (8.0 miles south of "BB")
K-27	I	1.53 NW	Schleis Farm, E4298 Sandy Bay Rd, Kewaunee
K-29	I	5.34 W	Kunesh Farm, E3873 Cty Tk G, Kewaunee
K-30	I	0.8 N	End of site boundary
K-31	C	6.35 NNW	E. Krok Substation, Krok Road
K-32	C	7.8 N	Piggly Wiggly, 931 Marquette Dr., Kewaunee
K-34	I	2.7 N	Leon and Vicki Struck, N1549 Lakeshore Dr., Kewaunee
K-35	C	6.71 mi. WNW	Duane Ducat, N1215 Sleepy Hollow Rd., Kewaunee
K-36	I		Fiala's Fish market, 216 Milwaukee, Kewaunee
K-38	I	2.45 mi. WNW	Dave Sinkula Farm, N890 Town Hall Road, Kewaunee
K-39	I	3.46 mi. N	Francis Wojta, N1859 Lakeshore Dr., Kewaunee
K-41	C	22 NW	KPS-EOF, 3060 Voyager Dr., Green Bay
K-42	C	28.1 NW	Lamers Dairy Products obtained from Green Bay Markets
K-43	I	2.71 SSW	Gary Maigatter Property, 17333 Hwy 42, Two Rivers
K-44	I	2.63 SW	Gerald Schleis Property, 4728 Schleis Rd., Two Rivers

^a I = indicator; C = control^b Distances are measured from reactor stack.

Table 4.2. Type and frequency of collection.

Location	Weekly	Monthly	Quarterly	Semiannually	Annually
K-1a		SW		SL ^f	
K-1b		SW	GR ^a	SL ^f	
K-1c				BS ^b	
K-1d		SW	FI ^a	SL ^f BS ^b	
K-1e		SW		SL ^f	
K-1f	AP ^g , AI		GR ^a	TLD	SO
K-1g, K-1h				WW	
K-1j					BS ^b
K-1k		SW		SL ^f	
K-1l through K-1s				TLD	
K-2	AP ^g , AI			TLD	
K-3, K-5		MI ^c	GR ^a	TLD	SO
K-8	AP ^g , AI			TLD	CF ^d
K-9		SW ⁱ		SL ^f	BS ^b
K-10, K-13				WW	
K-11		PR		WW	
K-14		SW ^h		SL ^f	BS ^b
K-15, K-17				TLD	
K-23a, b					GRN / GLV ^e
K-24			EG		DM
K-25				TLD	
K-26					VE / GLV ^e
K-27				TLD	
K-29					DM
K-30				TLD	
K-31	AP ^g , AI			TLD	
K-32			EG		DM
K-34, K-35		MI ^c	GR ^a	SO	CF ^d
K-38		MI ^c	GR ^a	WW	SO
K-39		MI ^c	GR ^a	TLD	SO
K-41	AP ^g , AI			TLD	CF ^d
K-42		MI ^c			
K-43	AP ^g , AI			TLD	
K-44 ⁱ		MI ^c			

^a Three times a year, second, third and fourth quarters.

^b Collected in May and November.

^c Monthly from November through April; semimonthly May through October.

^d First quarter (January, February, March) only.

^e Alternate, if milk is not available.

^f Second and third quarters.

^g The frequency may be increased dependent on the dust loading.

^h Two samples are collected, North (K-14a) and South (K-14b) of Two Creeks Road.

ⁱ Two samples, raw and treated.

^j Location dropped, dairy herd was sold in February, 2013.

Table 4.3. Sample Codes:

Code	Description	Code	Description
AI	Airborne Iodine	GR	Grass
AP	Airborne particulates	MI	Milk
BS	Bottom sediments	PR	Precipitation
CF	Cattlefeed	SL	Slime
DM	Domestic Meat	SO	Soil
EG	Eggs	SW	Surface water
FI	Fish	TLD	Thermoluminescent Dosimeter
GLV	Green Leafy Vegetables	VE	Vegetables
GRN	Grain	WW	Well water

Table 4.4. Sampling Summary, January – December, 2013.

Sample Type	Collection Type and Frequency ^a	Number of Locations	Number of Samples Collected	Number of Samples Missed
<u>Air Environment</u>				
Airborne particulates	C/W	6	312	0
Airborne iodine	C/W	6	312	0
TLD's	C/Q	22	87	1
Precipitation	C/M	1	12	0
<u>Terrestrial Environment</u>				
Milk (May-Oct)	G/SM	8	84	0
(Nov-Apr)	G/M	8	43	1
Well water	G/Q	6	24	0
Domestic meat	G/A	3	2	1
Eggs	G/Q	2	8	0
Vegetables - 5 varieties	G/A	4	10	0
Grain - clover	G/A	1	2	0
Grass	G/TA	8	24	0
Cattle feed	G/A	6	12	0
Soil	G/SA	7	14	0
<u>Aquatic Environment</u>				
Surface water	G/M	7	100	8
Fish	G/TA	1	3	0
Algae	G/SA	7	14	0
Bottom sediments	G/SA	5	10	0

^a Type of collection is coded as follows: C = continuous; G = grab.

Frequency is coded as follows: W = weekly; BW = bi-weekly; SM = semimonthly; M = monthly;

Q = quarterly; SA = semiannually; TA = three times per year; A = annually.

Table 4.5 Environmental Radiation Monitoring Program Summary.

Name of Facility Kewaunee Power Station Docket No. 50-305
 Location of Facility Kewaunee County, Wisconsin Reporting Period January-December, 2013
 (County, State)

Sample Type (Units)	Type and Number of Analyses ^a	LLD ^b	Indicator Locations Mean (F) ^c Range ^c	Location with Highest Annual Mean		Control Locations Mean (F) ^c Range ^c	Number Non-Routine Results ^e
				Location ^d	Mean (F) ^c Range ^c		
TLDS (Quarterly) (mR/91days)	Gamma 55	3.0	16.2 (31/31) (11.9-22.1)	K-27, Schlies Farm 1.53 NW	18.9 (4/4) (15.7-22.1)	15.5 (24/24) (11.6-20.2)	0
TLDS, Quarterly (Protected Area) (mR/91days)	Gamma 32	3.0	13.8 (32/32) (10.5-17.1)	K-1M, ISFSI E 0.15 N	16.2 (4/4) (15.4-17.1)	none	0
Airborne Particulates (pCi/m ³)	GB 312	0.005	0.024 (103/104) (0.007-0.066)	K-8, St. Mary's Church 4.85 WSW	0.025 (52/51) (0.012-0.064)	0.025 (206/208) (0.006-0.064)	0
	GS 24	0.020	0.063 (8/8) (0.037-0.078)	K-41, KPS-EOF 22 NW	0.074 (4/4) (0.048-0.090)	0.070 (16/16) (0.048-0.096)	0
	Nb-95	0.0017	< LLD	-	-	< LLD	0
	Zr-Nb-95	0.0023	< LLD	-	-	< LLD	0
	Ru-103	0.0017	< LLD	-	-	< LLD	0
	Ru-106	0.0082	< LLD	-	-	< LLD	0
	Cs-134	0.0011	< LLD	-	-	< LLD	0
	Cs-137	0.0009	< LLD	-	-	< LLD	0
	Ce-141	0.0028	< LLD	-	-	< LLD	0
Ce-144	0.0063	< LLD	-	-	< LLD	0	
Airborne Iodine (pCi/m ³)	I-131 312	0.03	< LLD	-	-	< LLD	0
Precipitation (pCi/L)	H-3 12	184	< LLD	-	-	none	0
Milk (pCi/L)	I-131 127	0.5	< LLD	-	-	< LLD	0
	Sr-89 85	1.3	< LLD	-	-	< LLD	0
	Sr-90 85	0.8	1.0 (20/49) (0.8-1.2)	K-38, Sinkula Farm 2.45 mi. WNW	1.1 (8/12) (0.9-1.2)	1.0 (10/36) (0.8-1.4)	0
	GS 127	50	1381 (73/73) (1260-1571)	K-35, Ducat 6.71 mi. WNW	1486 (18/18) (1394-1540)	1445 (54/54) (1304-1540)	0
	Cs-134	6.9	< LLD	-	-	< LLD	0
	Cs-137	7.2	< LLD	-	-	< LLD	0
	Ba-La-140	8.1	< LLD	-	-	< LLD	0
	(g/L)	K-stable 85	1.00	1.69 (49/49) (1.54-1.92)	K-35, Ducat 6.71 mi. WNW	1.81 (12/12) (1.77-1.87)	1.76 (36/36) (1.59-1.87)
(g/L)	Ca 85	0.40	1.07 (49/49) (0.83-1.44)	K-44, Schlies Farm, 2.63 SW	1.17 (1/1)	1.05 (36/36) (0.84-1.30)	0

Table 4.5 Environmental Radiation Monitoring Program Summary.

Name of Facility Kewaunee Power Station
 Location of Facility Kewaunee County, Wisconsin
 (County, State)

Docket No. 50-305
 Reporting Period January-December, 2013

Sample Type (Units)	Type and Number of Analyses ^a	LLD ^b	Indicator Locations Mean (F) ^c Range ^c	Location with Highest Annual Mean		Control Locations Mean (F) ^c Range ^c	Number Non-Routine Results ^d
				Location ^o	Mean (F) ^c Range ^c		
Well Water (pCi/L)	GA 8	3.8	4.3 (1/8)	K-1h, North Well 0.12 NW	4.3 (1/4)	None	0
	GB 24	3.4	4.9 (5/20) (3.5-6.6)	K-1h, North Well 0.12 NW	5.1 (3/4) (3.5-6.6)	< LLD	0
	H-3 24	150	< LLD	-	-	< LLD	0
	K-40 24	0.30	1.74 (17/20) (0.25-3.10)	K-1g, South Well 0.06 W	2.75 (4/4) (2.50-3.10)	1.01 (4/4) (0.93-1.07)	0
	Sr-89 4	0.9	< LLD	-	-	None	0
	Sr-90 4	0.6	< LLD	-	-	None	0
	GS 24						
	Mn-54	5.3	< LLD	-	-	< LLD	0
	Fe-59	11.6	< LLD	-	-	< LLD	0
	Co-58	3.6	< LLD	-	-	< LLD	0
	Co-60	3.0	< LLD	-	-	< LLD	0
	Zn-65	8.2	< LLD	-	-	< LLD	0
	Zr-Nb-95	5.8	< LLD	-	-	< LLD	0
	Cs-134	2.7	< LLD	-	-	< LLD	0
	Cs-137	3.6	< LLD	-	-	< LLD	0
Ba-La-140	12.3	< LLD	-	-	< LLD	0	
Domestic Meat (pCi/gwet)	GA 2	0.010	0.051 (2/2) (0.040-0.061)	K-24, Fictum Farm 5.4 mi. N	0.061 (1/1)	0.040 (1/1)	0
	GB 2	0.10	2.97 (1/1)	K-24, Fictum Farm 5.4 mi. N	2.97 (1/1)	2.68 (1/1)	0
	GS 2						
	Be-7	0.16	< LLD	-	-	< LLD	0
	K-40	0.50	2.99 (1/1)	K-24, Fictum Farm 5.45 mi. N	2.40 (1/1)	2.40 (1/1)	0
	Nb-95	0.027	< LLD	-	-	< LLD	0
	Zr-95	0.027	< LLD	-	-	< LLD	0
	Ru-103	0.021	< LLD	-	-	< LLD	0
	Ru-106	0.15	< LLD	-	-	< LLD	0
	Cs-134	0.015	< LLD	-	-	< LLD	0
	Cs-137	0.021	< LLD	-	-	< LLD	0
	Ce-141	0.031	< LLD	-	-	< LLD	0
	Ce-144	0.15	< LLD	-	-	< LLD	0
Eggs (pCi/gwet)	GB 8	0.012	1.59 (4/4) (1.51-1.67)	K-24, Fictum Farm 5.45 mi. N	1.59 (4/4) (1.51-1.67)	1.30 (4/4) (0.95-1.48)	0
	Sr-89 8	0.012	< LLD	-	-	< LLD	0
	Sr-90 8	0.005	< LLD	K-32, Grocery 11.5 mi. N	0.008 (1/4)	0.008 (1/4)	0
	GS 8						
	Be-7	0.079	< LLD	-	-	< LLD	0
	K-40	0.50	1.37 (4/4) (1.09-1.52)	K-24, Fictum Farm 5.45 mi. N	1.37 (4/4) (1.09-1.52)	1.23 (4/4) (1.08-1.38)	0
	Nb-95	0.015	< LLD	-	-	< LLD	0
	Zr-95	0.016	< LLD	-	-	< LLD	0
	Ru-103	0.016	< LLD	-	-	< LLD	0
	Ru-106	0.057	< LLD	-	-	< LLD	0
	Cs-134	0.006	< LLD	-	-	< LLD	0
	Cs-137	0.006	< LLD	-	-	< LLD	0
	Ce-141	0.038	< LLD	-	-	< LLD	0
	Ce-144	0.046	< LLD	-	-	< LLD	0

Table 4.5 Environmental Radiation Monitoring Program Summary.

Name of Facility Kewaunee Power Station
 Location of Facility Kewaunee County, Wisconsin
 (County, State)

Docket No. 50-305
 Reporting Period January-December, 2013

Sample Type (Units)	Type and Number of Analyses ^a	LLD ^b	Indicator Locations Mean (F) ^c Range ^c	Location with Highest Annual Mean		Control Locations Mean (F) ^c Range ^c	Number Non-Routine Results ^e
				Location ^d	Mean (F) ^c Range ^c		
Vegetables (pCi/gwet)	GB 10	0.010	4.69 (2/2) (2.38-6.99)	K-24, Fictum Farm 5.45 mi. N	6.99 (1/1)	3.09 (8/8) (1.89-4.82)	0
	Sr-89 10	0.009	< LLD	-	-	< LLD	0
	Sr-90 10	0.003	0.008 (1/2)	K-24, Fictum Farm 5.45 mi. N	0.008 (1/1)	0.005 (1/8)	0
	GS 10						
	Be-7	0.16	< LLD	-	-	< LLD	0
	K-40	0.50	5.35 (2/2) (1.84-7.02)	K-24, Fictum Farm 5.45 mi. N	7.02 (1/1)	2.46 (8/8) (1.62-4.07)	0
	Nb-95	0.013	< LLD	-	-	< LLD	0
	Zr-95	0.017	< LLD	-	-	< LLD	0
	Ru-103	0.016	< LLD	-	-	< LLD	0
	Ru-106	0.11	< LLD	-	-	< LLD	0
	Cs-134	0.011	< LLD	-	-	< LLD	0
	Cs-137	0.011	< LLD	-	-	< LLD	0
	Ce-141	0.032	< LLD	-	-	< LLD	0
	Ce-144	0.088	< LLD	-	-	< LLD	0
Grain - (Oats, Clover) (pCi/gwet)	GB 2	0.010	5.43 (2/2) (4.32-6.54)	K-23, Kewaunee Site, 0.5 mi. W	5.43 (2/2) (4.32-6.54)	None	0
	Sr-89 2	0.052	< LLD	-	-	None	0
	Sr-90 2	0.016	< LLD	-	-	None	0
	GS 2						
	Be-7	0.050	0.79 (2/2) (0.59-0.98)	K-23, Kewaunee Site, 0.5 mi. W	0.79 (2/2) (0.59-0.98)	None	0
	K-40	0.50	3.83 (2/2) (3.70-3.95)	K-23, Kewaunee Site, 0.5 mi. W	3.83 (2/2) (3.70-3.95)	None	0
	Nb-95	0.017	< LLD	-	-	None	0
	Zr-95	0.018	< LLD	-	-	None	0
	Ru-103	0.016	< LLD	-	-	None	0
	Ru-106	0.12	< LLD	-	-	None	0
	Cs-134	0.013	< LLD	-	-	None	0
	Cs-137	0.016	< LLD	-	-	None	0
	Ce-141	0.018	< LLD	-	-	None	0
	Ce-144	0.11	< LLD	-	-	None	0
Cattlefeed (pCi/gwet)	GB 12	0.10	9.18 (8/8) (5.62-18.94)	K-39, Wojta Farm 3.46 mi. N	12.61 (2/2) (6.28-18.94)	8.27 (4/4) (4.10-11.97)	0
	Sr-89 12	0.054	< LLD	-	-	< LLD	0
	Sr-90 12	0.016	0.027 (2/8) (0.024-0.029)	K-38, Sinkula Farm 2.45 mi. WNW	0.029 (1/2)	< LLD	0
	GS 12						
	Be-7	0.15	0.38 (4/8) (0.22-0.75)	K-38, Sinkula Farm 2.45 mi. WNW	0.75 (1/2)	0.27 (3/4) (0.21-0.33)	0
	K-40	0.10	7.52 (8/8) (4.13-15.25)	K-39, Wojta Farm 3.46 mi. N	9.69 (2/2) (4.13-15.25)	7.03 (4/4) (2.99-10.46)	0

Name of Facility Kewaunee Power Station
 Location of Facility Kewaunee County, Wisconsin
 (County, State)

Docket No. 50-305
 Reporting Period January-December, 2013

Sample Type (Units)	Type and Number of Analyses ^a	LLD ^b	Indicator Locations Mean (F) ^c Range ^c	Location with Highest Annual Mean		Control Locations Mean (F) ^c Range ^c	Number Non-Routine Results ^e
				Location ^d	Mean (F) ^c Range ^c		
Cattlefeed (continued)	Nb-95	0.019	< LLD	-	-	< LLD	0
	Zr-95	0.027	< LLD	-	-	< LLD	0
	Ru-103	0.020	< LLD	-	-	< LLD	0
	Ru-106	0.12	< LLD	-	-	< LLD	0
	Cs-134	0.019	< LLD	-	-	< LLD	0
	Cs-137	0.015	< LLD	-	-	< LLD	0
	Ce-141	0.029	< LLD	-	-	< LLD	0
	Ce-144	0.14	< LLD	-	-	< LLD	0
Grass (pCi/gwet)	GB 24	0.10	9.21 (18/18) (6.62-18.99)	K-38, Sinkula Farm 2.45 mi. WNW	11.91 (3/3) (8.25-18.99)	8.28 (6/6) (6.30-9.73)	0
	Sr-89 24	0.066	< LLD	-	-	< LLD	0
	Sr-90 24	0.026	< LLD	-	-	< LLD	0
	GS 24						
	Be-7		1.78 (18/18) (0.51-5.90)	K-1b, Middle Creek 0.12 N	3.31 (3/3) (0.77-5.90)	0.97 (6/6) (0.27-1.56)	0
	K-40	0.50	7.38 (18/18) (5.47-15.54)	K-38, Sinkula Farm 2.45 mi. WNW	9.64 (3/3) (5.75-15.54)	6.66 (6/6) (5.60-8.52)	0
	Nb-95	0.010	< LLD	-	-	< LLD	0
	Zr-95	0.014	< LLD	-	-	< LLD	0
	Ru-103	0.012	< LLD	-	-	< LLD	0
	Ru-106	0.10	< LLD	-	-	< LLD	0
	Cs-134	0.009	< LLD	-	-	< LLD	0
	Cs-137	0.010	< LLD	-	-	< LLD	0
	Ce-141	0.013	< LLD	-	-	< LLD	0
	Ce-144	0.067	< LLD	-	-	< LLD	0
	Soil (pCi/gdry)	GA 14	4.6	7.46 (10/10) (4.49-9.43)	K-3, Siegmund Farm 5.9 N	10.43 (2/2) (6.55-14.30)	8.95 (4/4) (6.28-14.30)
GB 14		2.0	26.53 (10/10) (20.26-30.08)	K-39, Wojta Farm 3.46 mi. N	29.68 (2/2) (29.27-30.08)	25.75 (4/4) (17.62-33.30)	0
Sr-89 14		0.11	< LLD	-	-	< LLD	0
Sr-90 14		0.038	0.045 (2/10) (0.040-0.049)	K-5, Papham Farm 3.2 NNW	0.049 (1/2)	0.039 (1/4)	0
GS 14							
Be-7		0.48	< LLD	-	-	< LLD	0
K-40		1.4	18.24 (10/10) (13.05-21.59)	K-39, Wojta Farm 3.46 mi. N	20.99 (2/2) (20.43-21.55)	18.03 (4/4) (15.85-19.87)	0
Nb-95		0.097	< LLD	-	-	< LLD	0
Zr-95		0.078	< LLD	-	-	< LLD	0
Ru-103		0.071	< LLD	-	-	< LLD	0
Ru-106		0.26	< LLD	-	-	< LLD	0
Cs-134		0.025	< LLD	-	-	< LLD	0
Cs-137		0.026	0.10 (9/10) (0.053-0.13)	K-3, Siegmund Farm 5.9 N	0.16 (2/2) (0.14-0.17)	0.14 (4/4) (0.10-0.17)	0
Ce-141		0.13	< LLD	-	-	< LLD	0
Ce-144		0.20	< LLD	-	-	< LLD	0

Table 4.5 Environmental Radiation Monitoring Program Summary.

Name of Facility Kewaunee Power Station Docket No. 50-305
 Location of Facility Kewaunee County, Wisconsin Reporting Period January-December, 2013
 (County, State)

Sample Type (Units)	Type and Number of Analyses ^a	LLD ^b	Indicator Locations Mean (F) ^c Range ^c	Location with Highest Annual Mean		Control Locations Mean (F) ^c Range ^c	Number Non-Routine Results ^a
				Location ^d	Mean (F) ^c Range ^c		
Surface Water (pCi/L)	GB (TR) 100	0.7	5.7 (76/76) (0.7-72.2)	K-1a, North Creek 0.62 N	16.6 (11/11) (2.8-72.2)	1.5 (22/24) (0.7-2.3)	0
	GS 100						
	Mn-54 15		< LLD	-	-	< LLD	0
	Fe-59 30		< LLD	-	-	< LLD	0
	Co-58 15		< LLD	-	-	< LLD	0
	Co-60 15		< LLD	-	-	< LLD	0
	Zn-65 30		< LLD	-	-	< LLD	0
	Zr-Nb-95 15		< LLD	-	-	< LLD	0
	Cs-134 10		< LLD	-	-	< LLD	0
	Cs-137 10		< LLD	-	-	< LLD	0
	Ba-La-140 15		< LLD	-	-	< LLD	0
H-3 35	153	395 (9/27) (171-1782)	K-1d, Cond. Discharge 0.10 mi. E	624 (4/4) (183-1782)	< LLD	0	
Sr-89 35	2.6	< LLD	-	-	< LLD	0	
Sr-90 35	0.8	0.9 (1/27)	K-1k, Drainage Pond 0.60 SW	0.9 (1/3)	< LLD	0	
K-40 100	0.87	3.8 (76/76) (1.1-51.9)	K-1a, North Creek 0.62 N	11.6 (11/11) (1.6-51.9)	1.2 (24/24) (1.1-1.4)	0	
Fish (Muscle) (pCi/gwet)	GB 3	0.5	3.10 (3/3) (2.35-3.97)	K-1d, Cond. Discharge 0.10 mi. E	3.10 (3/3) (2.35-3.97)	None	0
	GS 3						
	K-40 3	0.5	2.59 (3/3) (1.83-3.27)	K-1d, Cond. Discharge 0.10 mi. E	2.59 (3/3) (1.83-3.27)	None	0
	Mn-54 0.021		< LLD	-	-	None	0
	Fe-59 0.059		< LLD	-	-	None	0
	Co-58 0.018		< LLD	-	-	None	0
	Co-60 0.015		< LLD	-	-	None	0
	Cs-134 0.015		< LLD	-	-	None	0
Cs-137 0.021		0.027 (1/3)	K-1d, Cond. Discharge 0.10 mi. E	0.027 (1/3)	None	0	
Fish (Bones) (pCi/gwet)	GB 3	0.5	3.11 (3/3) (2.03-5.20)	K-1d, Cond. Discharge 0.10 mi. E	3.11 (3/3) (2.03-5.20)	None	0
	Sr-89 3	0.23	< LLD	-	-	None	0
	Sr-90 3	0.07	0.27 (2/3) (0.13-0.40)	K-1d, Cond. Discharge 0.10 mi. E	0.27 (2/3) (0.13-0.40)	None	0

Table 4.5 Environmental Radiation Monitoring Program Summary.

Name of Facility Kewaunee Power Station
 Location of Facility Kewaunee County, Wisconsin
 (County, State)

Docket No. 50-305
 Reporting Period January-December, 2013

Sample Type (Units)	Type and Number of Analyses ^a		LLD ^b	Indicator Locations Mean (F) ^c Range ^c	Location with Highest Annual Mean		Control Locations Mean (F) ^c Range ^c	Number Non-Routine Results ^e
					Location ^d	Mean (F) ^c Range ^c		
Periphyton (Algae) (pCi/gwet)	GB	14	0.10	5.40 (12/12)	K-1b, Middle Creek 0.12 N	6.98 (2/2) (4.49-9.47)	6.87 (2/2) (6.70-7.03)	0
	Sr-89	14	0.147	< LLD	-	-	< LLD	0
		Sr-90		14	0.040	< LLD	-	-
	GS	14	0.5	0.70 (10/12)	K-14, Two Creeks Park 2.6 S	0.92 (2/2) (0.58-1.25)	0.74 (2/2) (0.51-0.97)	0
	K-40	14	0.013	3.04 (12/12)	K-9, Rostok Intake 2.0 N	5.14 (2/2) (4.48-5.79)	5.14 (2/2) (4.48-5.79)	0
	Mn-54	14	0.013	< LLD	-	-	< LLD	0
	Co-58	14	0.014	< LLD	-	-	< LLD	0
	Co-60	14	0.014	0.022 (4/12)	K-1e, South Creek 0.12 S	0.027 (1/2)	< LLD	0
				(0.016-0.027)				
	Nb-95	14	0.028	< LLD	-	-	< LLD	0
	Zr-95	14	0.025	< LLD	-	-	< LLD	0
	Ru-103	14	0.022	< LLD	-	-	< LLD	0
	Ru-106	14	0.12	< LLD	-	-	< LLD	0
Cs-134	14	0.013	< LLD	-	-	< LLD	0	
Cs-137	14	0.013	0.022 (2/12)	K-1d, Cond. Discharge 0.10 mi. E	0.027 (1/2)	< LLD	0	
			(0.017-0.027)					< LLD
Ce-141	14	0.051	< LLD	-	-	< LLD	0	
Ce-144	14	0.10	< LLD	-	-	< LLD	0	
Bottom Sediments (pCi/gdry)	GB	10	1.0	12.78 (8/8)	K-1c, Cond. Discharge 0.10 N	17.25 (2/2) (13.38-21.11)	17.24 (2/2) (15.84-18.63)	0
	Sr-89	10	0.081	< LLD	-	-	< LLD	0
		Sr-90		10	0.036	< LLD	-	-
	GS	10	0.5	7.55 (8/8)	K-9, Rostok Intake 2.0 N	9.17 (2/2) (8.91-9.43)	9.17 (2/2) (8.91-9.43)	0
	Co-58	10	0.027	< LLD	-	-	< LLD	0
	Co-60	10	0.024	< LLD	-	-	< LLD	0
Cs-134	10	0.019	< LLD	-	-	< LLD	0	
Cs-137	10	0.014	0.025 (5/8)	K-9, Rostok Intake 2.0 N	0.050 (2/2) (0.048-0.052)	0.050 (2/2) (0.048-0.052)	0	
			(0.018-0.030)					

^a GA = gross alpha, GB = gross beta, GS = gamma spectroscopy, TR = total residue.

^b LLD = nominal lower limit of detection based on a 4.66 sigma counting error for background sample.

^c Mean and range are based on detectable measurements only (i.e., >LLD) Fraction of detectable measurements at specified locations is indicated in parentheses (F).

^d Locations are specified by station code (Table 4.1) and distance (miles) and direction relative to reactor site.

^e Non-routine results are those which exceed ten times the control station value. If no control station value is available, the result is considered non-routine if it exceeds ten times the preoperational value for the location.

Table 4.6 Land Use Census

The following table lists an inventory of residence, gardens ≥ 500 ft² and milk animals found nearest to the plant in each of the 10 meteorological sectors within a five mile radius of the Kewaunee Power Station. (Figure 4-1)

Sector	Township No.	Residence	Garden	Milk Animals	Distance From Plant (miles)	Location ID
A	1			X	4.62	
A	12		X		3.71	
A	24	X			1.12	
B	18			X	2.70	K-34
B	24	X			1.01	
B	18		X		2.12	
R	23			X	2.16	
R	23		X		2.16	
R	26	X			0.96	K-11
Q	23	X			1.27	
Q	23		X	X	1.53	K-27
P	27		X	X	2.45	K-38
P	26	X			1.35	
N	26		X		1.03	
N	28			X	2.37	
N	35	X			0.94	
M	3		X		2.47	
M	35	X			1.38	
M	4			X	2.89	
L	35	X			1.00	
L	2		X		1.00	
L	4			X	3.26	
K	15			X	3.40	
K	36	X			0.91	
K	36		X		0.91	
J	11	X		(Note 2)	2.72	
J	11		X	(Note 2)	2.72	

Note 1. Bold Type denotes change from previous census.

Note 2. There were no milk animals located in Sector J within five miles of the Kewaunee Power Station.

Land Use Census (continued)

The following is a sector by sector listing of those changes between the 2012 and 2013 census.

Sector A	Township 24	New nearest resident (summer/weekends), Kennick. 1.12 miles.
Sector A	Township 12	New nearest garden location, B. Schad, 3.71 miles.
Sector A	Township 1	New nearest milk animal location, J. Wakker. 4.62 miles.
Sector B	Township 24	Nearest resident, name changed to Shane Rusch, 1.01 miles.
Sector B	Township 18	New nearest garden location. W. Zemke, 2.12 miles.
Sector J	Township 11	New nearest resident and garden location. J. Knorr, 2.72 miles.
Sector K	Township 36	New nearest resident and garden location. K. Krofta, 0.91 miles.
Sector K	Township 15	Nearest milk animal location. Distance revised to 3.40 miles.
Sector L	Township 35	New nearest resident and garden location. D. Smith. 1.00 miles.
Sector L	Township 4	New nearest milk animal location. N. Smidel. 3.26 miles.
Sector M	Township 35	Nearest resident, name changed to M. Peterson, 1.38 miles.
Sector M	Township 3	New nearest garden location. P. Tulachka, 2.47 miles.
Sector M	Township 4	New nearest milk animal location. W. Hlinak. 2.89 miles.
Sector N	Township 35	Nearest resident location. Distance revised to 0.94 miles.
Sector N	Township 26	Nearest garden location. Distance revised to 1.03 miles.
Sector N	Township 26	Nearest milk animal location. Distance revised to 2.37 miles.
Sector P	Township 27	New nearest resident location, B. Reed. 1.35 miles.
Sector Q	Township 23	Nearest resident location. Distance revised to 1.27 miles.
Sector Q	Township 23	Nearest garden location. Distance revised to 1.53 miles.
Sector Q	Township 23	Nearest milk animal location. Distance revised to 1.53 miles.
Sector R	Township 23	New nearest garden location. T. Augustian, 2.16 miles.
Sector R	Township 23	Nearest milk animal location. Distance revised to 2.16 miles.

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APPENDIX A

INTERLABORATORY COMPARISON PROGRAM RESULTS

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

January through December, 2013

Appendix A

Interlaboratory Comparison Program Results

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

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

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

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

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

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

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

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

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

Attachment A

ACCEPTANCE CRITERIA FOR "SPIKED" SAMPLES

LABORATORY PRECISION: ONE STANDARD DEVIATION VALUES FOR VARIOUS ANALYSES^a

Analysis	Level	One standard deviation for single determination
Gamma Emitters	5 to 100 pCi/liter or kg > 100 pCi/liter or kg	5.0 pCi/liter 5% of known value
Strontium-89 ^b	5 to 50 pCi/liter or kg > 50 pCi/liter or kg	5.0 pCi/liter 10% of known value
Strontium-90 ^b	2 to 30 pCi/liter or kg > 30 pCi/liter or kg	5.0 pCi/liter 10% of known value
Potassium-40	≥ 0.1 g/liter or kg	5% of known value
Gross alpha	≤ 20 pCi/liter > 20 pCi/liter	5.0 pCi/liter 25% of known value
Gross beta	≤ 100 pCi/liter > 100 pCi/liter	5.0 pCi/liter 5% of known value
Tritium	≤ 4,000 pCi/liter > 4,000 pCi/liter	± 1σ = 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 pCi/liter 10% of known value
Uranium-238, Nickel-63 ^b Technetium-99 ^b	≤ 35 pCi/liter > 35 pCi/liter	6 pCi/liter 15% of known value
Iron-55 ^b	50 to 100 pCi/liter > 100 pCi/liter	10 pCi/liter 10% of known value
Other Analyses ^b	---	20% of known value

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

^b Laboratory limit.

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

Lab Code	Date	Analysis	Concentration (pCi/L)			Acceptance
			Laboratory Result ^b	ERA Result ^c	Control Limits	
ERW-76	01/07/13	Ra-226	10.04 ± 0.55	9.91	7.42 - 11.60	Pass
ERW-76	01/07/13	Ra-228	6.11 ± 1.29	5.22	3.14 - 6.96	Pass
ERW-76	01/07/13	Uranium	5.90 ± 0.58	5.96	4.47 - 7.13	Pass
ERW-1593	04/08/13	Sr-89	43.60 ± 4.32	41.30	31.60 - 48.40	Pass
ERW-1593	04/08/13	Sr-90	23.20 ± 1.70	23.90	17.20 - 28.00	Pass
ERW-1596	04/08/13	Ba-133	74.80 ± 4.00	82.10	69.00 - 90.30	Pass
ERW-1596	04/08/13	Co-60	65.50 ± 3.42	65.90	59.30 - 75.00	Pass
ERW-1596	04/08/13	Cs-134	41.10 ± 3.47	42.80	34.20 - 47.10	Pass
ERW-1596	04/08/13	Cs-137	42.30 ± 4.03	41.70	37.00 - 48.80	Pass
ERW-1596	04/08/13	Zn-65	200.3 ± 10.1	189.0	170.0 - 222.0	Pass
ERW-1598	04/08/13	Gr. Alpha	34.30 ± 1.98	40.80	21.10 - 51.90	Pass
ERW-1598	04/08/13	Gr. Beta	18.70 ± 0.98	21.60	13.00 - 29.70	Pass
ERW-1600	04/08/13	I-131	23.00 ± 1.10	23.80	19.70 - 28.30	Pass
ERW-1600	04/08/13	I-131(G)	23.48 ± 9.44	23.80	19.70 - 28.30	Pass
ERW-1605	04/08/13	Ra-226	16.30 ± 0.70	15.40	11.50 - 17.70	Pass
ERW-1605	04/08/13	Ra-228	5.32 ± 1.30	4.36	2.54 - 5.98	Pass
ERW-1605	04/08/13	Uranium	57.30 ± 4.20	61.20	49.80 - 67.90	Pass
ERW-1606	04/08/13	H-3	4041 ± 194	4050	3450 - 4460	Pass
ERW-6009	10/07/13	Sr-89	22.00 ± 2.80	21.90	14.40 ± 28.20	Pass
ERW-6009	10/07/13	Sr-90	17.10 ± 2.55	18.10	12.80 ± 21.50	Pass
ERW-6012	10/07/13	Ba-133	48.20 ± 4.29	54.20	44.70 ± 59.90	Pass
ERW-6012	10/07/13	Co-60	100.8 ± 4.7	102.0	91.80 ± 114.00	Pass
ERW-6012	10/07/13	Cs-134	87.30 ± 4.35	86.70	71.10 ± 95.40	Pass
ERW-6012	10/07/13	Cs-137	199.6 ± 7.4	206.0	185.0 - 228.0	Pass
ERW-6012	10/07/13	Zn-65	356.2 ± 13.2	333.0	300.0 - 389.0	Pass
ERW-6015	10/07/13	Gr. Alpha	30.70 ± 11.90	42.80	22.20 ± 54.30	Pass
ERW-6015	10/07/13	Gr. Beta	25.70 ± 6.48	32.20	20.80 ± 39.90	Pass
ERW-6019	10/07/13	I-131	22.50 ± 1.01	23.60	19.60 ± 28.00	Pass
ERW-6022	10/07/13	Ra-226	12.70 ± 1.62	12.10	9.04 ± 14.00	Pass
ERW-6022 ^d	10/07/13	Ra-228	5.70 ± 0.56	4.02	2.30 ± 5.59	Fail
ERW-6022	10/07/13	Uranium	6.59 ± 0.38	6.24	4.70 ± 7.44	Pass
ERW-6024	10/07/13	H-3	18397 ± 695	17700	15500 - 19500	Pass

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

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

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

^d The reported result was obtained in the first cycle of counting. It can be positively biased due to extra beta counts contributed by Pb-214 and Bi-214 daughters of Rn-222. Result of second cycle of counting 4.47 pCi/L.

TABLE A-2. Thermoluminescent Dosimetry, (TLD, CaSO₄: Dy Cards).

Lab Code	Date	Description	Known Value	mR		Control Limits	Acceptance
				Lab Result	± 2 sigma		
<u>Environmental, Inc.</u>							
2013-1	5/6/2013	40 cm.	34.26	39.92 \pm 2.67		23.98 - 44.54	Pass
2013-1	5/6/2013	50 cm.	21.93	25.44 \pm 3.31		15.35 - 28.51	Pass
2013-1	5/6/2013	60 cm.	15.23	15.88 \pm 1.12		10.66 - 19.80	Pass
2013-1	5/6/2013	70 cm.	11.19	10.89 \pm 0.66		7.83 - 14.55	Pass
2013-1	5/6/2013	80 cm.	8.57	9.21 \pm 0.41		6.00 - 11.14	Pass
2013-1	5/6/2013	90 cm.	6.77	6.52 \pm 0.34		4.74 - 8.80	Pass
2013-1	5/6/2013	100 cm.	5.48	5.02 \pm 0.53		3.84 - 7.12	Pass
2013-1	5/6/2013	110 cm.	4.53	4.51 \pm 0.34		3.17 - 5.89	Pass
2013-1	5/6/2013	120 cm.	3.81	4.28 \pm 0.35		2.67 - 4.95	Pass
2013-1	5/6/2013	135 cm.	3.01	2.64 \pm 0.18		2.11 - 3.91	Pass
2013-1	5/6/2013	150 cm.	2.44	2.10 \pm 0.25		1.71 - 3.17	Pass
2013-1	5/6/2013	180 cm.	1.69	1.78 \pm 0.33		1.18 - 2.20	Pass

Environmental, Inc.

2013-2	11/18/2013	50 cm.	19.93	22.75 \pm 3.67		13.95 - 25.91	Pass
2013-2	11/18/2013	60 cm.	13.84	15.75 \pm 1.94		9.69 - 17.99	Pass
2013-2	11/18/2013	70 cm.	10.17	11.24 \pm 0.88		7.12 - 13.22	Pass
2013-2	11/18/2013	75 cm.	8.86	9.18 \pm 1.23		6.20 - 11.52	Pass
2013-2	11/18/2013	80 cm.	7.79	7.81 \pm 1.10		5.45 - 10.13	Pass
2013-2	11/18/2013	90 cm.	6.15	5.98 \pm 0.90		4.31 - 8.00	Pass
2013-2	11/18/2013	100 cm.	4.98	5.13 \pm 0.73		3.49 - 6.47	Pass
2013-2	11/18/2013	110 cm.	4.12	3.87 \pm 0.32		2.88 - 5.36	Pass
2013-2	11/18/2013	120 cm.	3.46	3.11 \pm 0.39		2.42 - 4.50	Pass
2013-2	11/18/2013	135 cm.	2.73	2.71 \pm 0.83		1.91 - 3.55	Pass
2013-2	11/18/2013	150 cm.	2.21	2.11 \pm 0.63		1.55 - 2.87	Pass
2013-2	11/18/2013	180 cm.	1.54	1.81 \pm 0.10		1.08 - 2.00	Pass

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

Lab Code ^b	Date	Analysis	Concentration (pCi/L) ^a			Acceptance
			Laboratory results 2s, n=1 ^c	Known Activity	Control Limits ^d	
SPW-66	1/9/2013	Tc-99	1009 ± 5	1078	754.9 - 1402.0	Pass
SPW-1891	1/18/2013	Ra-228	35.60 ± 2.75	30.85	21.60 - 40.11	Pass
SPSO-12313S	1/23/2013	Tc-99	103.5 ± 2.2	107.8	75.46 - 140.14	Pass
SPMI-264	1/25/2013	Cs-134	110.9 ± 6.7	107.5	96.73 - 118.23	Pass
SPMI-264	1/25/2013	Cs-137	82.84 ± 7.47	77.48	67.48 - 87.48	Pass
SPMI-264	1/25/2013	Sr-90	38.19 ± 1.49	40.11	32.09 - 48.13	Pass
SPW-266	1/25/2013	Co-60	46.89 ± 4.68	44.48	34.48 - 54.48	Pass
SPW-266	1/25/2013	Cs-134	105.9 ± 8.0	107.5	96.73 - 118.23	Pass
SPW-266	1/25/2013	Cs-137	42.17 ± 5.65	39.49	29.49 - 49.49	Pass
SPW-266	1/25/2013	Sr-90	39.84 ± 1.65	40.11	32.09 - 48.13	Pass
SPAP-376	2/1/2013	Gr. Beta	44.20 ± 0.11	45.68	27.41 - 63.95	Pass
SPAP-378	2/1/2013	Cs-134	3.71 ± 0.65	3.87	2.32 - 5.42	Pass
SPAP-378	2/1/2013	Cs-137	97.47 ± 2.50	102.9	92.61 - 113.19	Pass
SPW-391	2/1/2013	H-3	63719 ± 703	65626	52501 - 78751	Pass
SPW-380	2/10/2013	Ni-63	217.0 ± 3.7	205.3	143.7 - 266.9	Pass
W-30413	3/4/2013	Gr. Alpha	19.77 ± 0.40	20.00	10.00 - 30.00	Pass
W-30413	3/4/2013	Gr. Beta	30.48 ± 0.34	30.90	20.90 - 40.90	Pass
W-30713	3/7/2013	Ra-226	18.06 ± 0.51	16.70	11.69 - 21.71	Pass
W-42713	4/27/2013	Gr. Alpha	20.67 ± 0.40	20.00	10.00 - 30.00	Pass
W-42713	4/27/2013	Gr. Beta	28.44 ± 0.32	30.90	20.90 - 40.90	Pass
WW-2870	5/7/2013	Co-60	166.1 ± 7.4	161.6	145.4 - 177.8	Pass
WW-2870	5/7/2013	Cs-137	161.2 ± 9.3	149.0	134.1 - 163.9	Pass
WW-2870	5/7/2013	H-3	6853 ± 250	6735	5388 - 8082	Pass
W-53113	5/31/2013	Ra-226	16.83 ± 0.41	16.70	11.69 - 21.71	Pass
SPAP-3332	6/19/2013	Am-241	4.60 ± 0.14	4.00	2.40 - 5.60	Pass
SPAP-3334	6/19/2013	Th-230	4.36 ± 0.34	4.00	2.40 - 5.60	Pass
SPW-3458	6/24/2013	C-14	3825 ± 13	4736	2842 - 6630	Pass
SPAP-3529	6/27/2013	Cs-134	3.49 ± 1.26	3.30	1.98 - 4.62	Pass
SPAP-3529	6/27/2013	Cs-137	102.0 ± 2.9	101.1	90.99 - 111.21	Pass
SPAP-3531	6/27/2013	Gr. Beta	45.64 ± 0.11	45.42	27.25 - 63.59	Pass
SPF-3533	6/27/2013	Cs-134	1.31 ± 0.14	1.50	0.90 - 2.10	Pass
SPF-3533	6/27/2013	Cs-137	2.77 ± 0.27	2.43	1.46 - 3.40	Pass
SPW-3535	6/27/2013	Ni-63	204.3 ± 3.5	204.8	143.4 - 266.2	Pass
SPW-3537	6/27/2013	Tc-99	104.5 ± 1.7	107.8	75.46 - 140.14	Pass
SPW-3539	6/27/2013	Fe-55	97015 ± 860	90677	72542 - 108812	Pass
SPW-1893	6/28/2013	Ra-228	30.16 ± 2.73	30.85	21.60 - 40.11	Pass

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

Lab Code ^b	Date	Analysis	Concentration (pCi/L) ^a			Acceptance
			Laboratory results 2s, n=1 ^c	Known Activity	Control Limits ^d	
SPW-72913S	7/29/2013	Tc-99	126.6 ± 2.2	107.8	75.46 ± 140.14	Pass
SPW-4373	7/31/2013	Cs-134	91.71 ± 6.02	90.94	80.94 ± 100.94	Pass
SPW-4373	7/31/2013	Cs-137	83.05 ± 7.20	76.57	66.57 ± 86.57	Pass
SPW-4373	7/31/2013	Sr-90	39.28 ± 1.77	39.64	31.71 ± 47.57	Pass
SPW-4374	7/31/2013	Sr-90	42.17 ± 1.71	39.64	31.71 ± 47.57	Pass
SPMI-4376	7/31/2013	Cs-134	82.22 - 7.23	90.94	80.94 ± 100.94	Pass
SPMI-4376	7/31/2013	Cs-137	83.31 - 8.29	76.57	66.57 ± 86.57	Pass
SPMI-4376A	7/31/2013	Sr-90	35.00 ± 1.63	39.64	31.71 ± 47.57	Pass
W-73113	7/31/2013	Ra-226	17.61 ± 0.41	16.70	11.69 ± 21.71	Pass
SPS-4514	8/5/2013	Sr-90	78.63 ± 2.95	79.28	63.42 ± 95.14	Pass
W-82013	8/20/2013	Gr. Alpha	21.53 ± 0.45	20.00	10.00 ± 30.00	Pass
W-82013	8/20/2013	Gr. Beta	28.03 ± 0.32	30.90	20.90 ± 40.90	Pass
SPW-1894	8/28/2013	Ra-228	32.49 ± 3.00	30.85	21.60 ± 40.11	Pass
W-90913	9/9/2013	Gr. Alpha	19.08 ± 0.51	20.10	10.05 ± 30.15	Pass
W-90913	9/9/2013	Gr. Beta	32.12 ± 0.35	32.10	22.10 ± 42.10	Pass
WW-5623	10/3/2013	Co-60	157.0 ± 7.0	155.3	139.8 - 170.8	Pass
WW-5623	10/3/2013	Cs-137	156.0 ± 8.8	148.1	133.3 - 162.9	Pass
WW-5623	10/3/2013	H-3	6590 ± 245	6322	5058 - 7586	Pass
WW-5750	10/3/2013	Co-60	87.00 ± 7.80	77.40	77.00 ± 97.00	Pass
WW-5750	10/3/2013	Cs-137	82.30 ± 7.80	78.80	68.80 ± 88.80	Pass
WW-5750	10/3/2013	H-3	6181 ± 238	6322	5058 - 7586	Pass
W-102813	10/28/2013	Ra-226	15.69 ± 0.37	16.70	11.69 ± 21.71	Pass
SPW-1898	12/17/2013	Ra-228	28.15 ± 2.37	30.85	21.60 ± 40.11	Pass
W-122313	12/23/2013	Gr. Alpha	20.96 ± 0.47	20.10	10.05 ± 30.15	Pass
W-122313	12/23/2013	Gr. Beta	31.00 ± 0.34	32.10	22.10 ± 42.10	Pass

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

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

^c Results are based on single determinations.

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

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

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

Lab Code	Sample Type	Date	Analysis ^b	Concentration (pCi/L) ^a		Acceptance Criteria (4.66 σ)
				Laboratory results (4.66 σ)		
				LLD	Activity ^c	
SPW-67	Water	1/9/2013	Tc-99	1.10	0.69 ± 0.68	10
SPW-190	Water	1/18/2013	Ra-228	0.74	0.66 ± 0.43	2
SPW-1901	Water	1/18/2013	Ra-228	0.74	0.66 ± 0.43	2
SPMI-263	Milk	1/25/2013	Sr-90	0.64	0.31 ± 0.34	1
SPMI-263	Milk	1/25/2013	Sr-90	0.64	0.31 ± 0.34	1
SPW-265	Water	1/25/2013	Co-60	2.86	2.10 ± 1.72	10
SPW-265	Water	1/25/2013	Cs-134	2.98	2.25 ± 1.57	10
SPW-265	Water	1/25/2013	Cs-137	2.71	0.44 ± 1.61	10
SPW-266	Water	1/25/2013	Sr-90	0.72	-0.12 ± 0.32	1
SPAP-375	Air Filter	2/1/2013	Gr. Beta	0.003	0.016 ± 0.003	0.010
SPAP-377	Air Filter	2/1/2013	Co-60	2.31	-0.34 ± 1.75	100
SPAP-377	Air Filter	2/1/2013	Cs-134	2.72	1.22 ± 1.62	100
SPAP-377	Air Filter	2/1/2013	Cs-137	1.50	-0.52 ± 1.80	100
SPW-391	Water	2/1/2013	H-3	92.04	-29.44 ± 69.24	200
SPW-379	Water	2/10/2013	Ni-63	2.11	0.91 ± 1.30	20
W-30413	Water	3/4/2013	Gr. Alpha	0.35	0.08 ± 0.26	1
W-30413	Water	3/4/2013	Gr. Beta	0.73	0.10 ± 0.51	3.2
W-30713	Water	3/7/2013	Ra-226	0.031	0.032 ± 0.024	1
W-42713	Water	4/27/2013	Gr. Alpha	0.45	-0.14 ± 0.30	1
W-42713	Water	4/27/2013	Gr. Beta	0.72	-0.23 ± 0.50	3.2
W-53113	Water	5/31/2013	Ra-226	0.03	0.01 ± 0.02	1
SPW-3335	Water	6/19/2013	Th-230	0.01	0.01 ± 0.01	1
SPW-3459	Water	6/24/2013	C-14	10.89	10.44 ± 6.82	200
SPAP-3528	Air Filter	6/27/2013	Cs-134	2.10	-0.98 ± 1.11	100
SPAP-3528	Air Filter	6/27/2013	Cs-137	2.71	-0.24 ± 1.36	100
SPAP-3530	Air Filter	6/27/2013	Gr. Beta	0.004	0.018 ± 0.003	0.010
SPF-3532	Fish	6/27/2013	Cs-134	8.38	-1.39 ± 5.69	100
SPF-3532	Fish	6/27/2013	Cs-137	8.37	-1.88 ± 6.41	100
SPW-3534	Water	6/27/2013	Ni-63	2.47	-1.04 ± 1.48	20
SPW-3536	Water	6/27/2013	Tc-99	1.15	-1.11 ± 0.68	10
SPW-3538	water	6/27/2013	Fe-55	170.27	-17.50 ± 102.70	1000
SPW-1903	Water	6/28/2013	Ra-228	0.85	-0.02 ± 0.39	2

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

Lab Code	Sample Type	Date	Analysis ^o	Concentration (pCi/L) ^a		
				Laboratory results (4.66σ)		Acceptance Criteria (4.66 σ)
				LLD	Activity ^c	
SPW-72913B	Water	7/29/2013	Tc-99	1.44	-0.33 ± 0.87	10
SPW-4372	Water	7/31/2013	Co-60	1.41	-1.42 ± 3.00	10
SPW-4372	Water	7/31/2013	Cs-134	3.68	-2.66 ± 3.46	10
SPW-4372	Water	7/31/2013	Cs-137	3.53	0.29 ± 3.31	10
SPMI-4375	Milk	7/31/2013	Co-60	3.92	2.65 ± 2.26	10
SPMI-4375	Milk	7/31/2013	Cs-134	4.67	0.68 ± 2.54	10
SPMI-4375	Milk	7/31/2013	Cs-137	4.79	1.30 ± 2.68	10
SPMI-4375	Milk	7/31/2013	Sr-90	0.57	0.32 ± 0.30	1
W-73113	Water	7/31/2013	Ra-226	0.02	0.04 ± 0.02	1
SPS-4515	Powder	8/5/2013	Sr-90	0.09	-0.01 ± 0.04	1
W-82013	Water	8/20/2013	Gr. Alpha	0.42	-0.15 ± 0.28	1
W-82013	Water	8/20/2013	Gr. Beta	0.74	-0.24 ± 0.51	3.2
SPW-1904	Water	8/28/2013	Ra-228	0.96	0.85 ± 0.56	2
CHW-90913	Water	9/9/2013	Gr. Alpha	0.25	0.20 ± 0.29	1
CHW-90913	Water	9/9/2013	Gr. Beta	0.49	-0.18 ± 0.53	3.2
CHW-102013	Water	10/20/2013	Gr. Alpha	0.29	0.24 ± 0.33	1
CHW-102013	Water	10/20/2013	Gr. Beta	0.54	-0.32 ± 0.54	3.2
W-102813	Water	10/28/2013	Ra-226	0.02	0.02 ± 0.01	1
SPW-1908	Water	12/17/2013	Ra-228	0.69	0.55 ± 0.39	2
CHW-122313	Water	12/23/2013	Gr. Alpha	0.25	-0.09 ± 0.26	1
CHW-122313	Water	12/23/2013	Gr. Beta	0.48	0.05 ± 0.53	3.2
CHW-122713	Water	12/27/2013	Gr. Alpha	0.28	0.04 ± 0.31	1
CHW-122713	Water	12/27/2013	Gr. Beta	0.49	-0.33 ± 0.53	3.2

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

^b I-131(G); iodine-131 as analyzed by gamma spectroscopy.

^c Activity reported is a net activity result.

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

Lab Code	Date	Analysis	Concentration (pCi/L) ^a			Acceptance
			First Result	Second Result	Averaged Result	
CF-41, 42	1/2/2013	Gr. Beta	8.45 ± 0.37	7.90 ± 0.35	8.17 ± 0.26	Pass
CF-41, 42	1/2/2013	Sr-90	0.030 ± 0.015	0.029 ± 0.014	0.030 ± 0.010	Pass
SWT-8243, 8244	1/2/2013	Gr. Beta	1.07 ± 0.54	0.98 ± 0.51	1.03 ± 0.37	Pass
AP-8454, 8455	1/2/2013	Be-7	0.053 ± 0.010	0.042 ± 0.010	0.048 ± 0.007	Pass
AP-8517, 8518	1/3/2013	Be-7	0.051 ± 0.015	0.049 ± 0.017	0.050 ± 0.011	Pass
MI-62, 63	1/8/2013	K-40	1317.70 ± 91.70	1351.90 ± 72.50	1334.80 ± 58.45	Pass
WW-151, 152	1/8/2013	H-3	222.70 ± 81.00	289.70 ± 84.10	256.20 ± 58.38	Pass
SG-107, 108	1/11/2013	Ra-226	55.20 ± 5.53	58.60 ± 5.94	56.90 ± 4.06	Pass
SG-107, 108	1/11/2013	Ra-228	71.60 ± 1.10	74.30 ± 1.70	72.95 ± 1.01	Pass
SG-130, 131	1/14/2013	Ra-226	3.91 ± 0.20	3.45 ± 0.27	3.68 ± 0.17	Pass
SG-130, 131	1/14/2013	Ra-228	2.40 ± 0.33	2.70 ± 0.39	2.55 ± 0.26	Pass
WW-277, 278	1/17/2013	H-3	159.71 ± 77.91	196.57 ± 79.72	178.14 ± 55.73	Pass
WW-256, 257	1/22/2013	H-3	502.70 ± 93.40	483.30 ± 92.60	493.00 ± 65.76	Pass
DW-40010, 40011	1/24/2013	Ra-226	2.55 ± 0.18	2.86 ± 0.20	2.71 ± 0.13	Pass
DW-40010, 40011	1/24/2013	Ra-228	1.78 ± 0.62	2.22 ± 0.62	2.00 ± 0.44	Pass
SWT-361, 362	1/29/2013	Gr. Beta	0.90 ± 0.40	1.01 ± 0.38	0.96 ± 0.28	Pass
DW-484, 485	1/29/2013	Gr. Beta	14.85 ± 1.93	14.81 ± 2.06	14.83 ± 1.41	Pass
S-945, 946	1/29/2013	Cs-137	14.50 ± 0.18	14.45 ± 0.19	14.48 ± 0.13	Pass
S-945, 946	1/29/2013	K-40	7.90 ± 0.74	8.00 ± 0.73	7.95 ± 0.52	Pass
S-340, 341	1/31/2013	Cs-137	0.16 ± 0.05	0.15 ± 0.06	0.15 ± 0.04	Pass
S-340, 341	1/31/2013	K-40	17.35 ± 1.34	19.75 ± 1.25	18.55 ± 0.92	Pass
AP-463, 464	1/31/2013	Be-7	0.27 ± 0.10	0.26 ± 0.10	0.26 ± 0.07	Pass
MI-631, 632	2/13/2013	K-40	1350.50 ± 105.20	1413.70 ± 85.94	1382.10 ± 67.92	Pass
WW-769, 770	2/25/2013	Gr. Beta	1.20 ± 0.33	1.35 ± 0.34	1.28 ± 0.24	Pass
DW-736, 737	2/26/2013	Gr. Beta	1.09 ± 0.54	1.57 ± 0.58	1.33 ± 0.40	Pass
SWU-790, 791	2/26/2013	Gr. Beta	2.68 ± 0.96	2.08 ± 0.95	2.38 ± 0.67	Pass
W-925, 926	2/27/2013	H-3	2265.00 ± 153.00	2329.00 ± 154.00	2297.00 ± 108.54	Pass
AP-1034, 1035	3/7/2013	Be-7	0.17 ± 0.08	0.16 ± 0.09	0.17 ± 0.06	Pass
MI-1076, 1077	3/13/2013	K-40	1347.70 ± 99.32	1396.10 ± 108.00	1371.90 ± 73.36	Pass
CH-1118, 1119	3/14/2013	I-131(G)	109.41 ± 5.69	103.88 ± 7.76	106.65 ± 4.81	Pass
WW-1221, 1222	3/14/2013	H-3	452.11 ± 97.43	403.29 ± 95.46	427.70 ± 68.20	Pass
P-1368, 1369	3/15/2013	H-3	735.24 ± 113.99	666.04 ± 111.41	700.64 ± 79.70	Pass
DW-40017, 40018	3/19/2013	Gr. Alpha	1.43 ± 0.94	1.61 ± 1.00	1.52 ± 0.69	Pass
MI-1473, 1474	4/1/2013	K-40	1618.00 ± 107.00	1767.00 ± 129.00	1692.50 ± 83.80	Pass
AP-2014, 2015	4/1/2013	Be-7	0.055 ± 0.008	0.057 ± 0.006	0.056 ± 0.005	Pass
DW-40023, 40024	4/1/2013	Ra-226	2.29 ± 0.18	2.54 ± 0.20	2.42 ± 0.13	Pass
DW-40023, 40024	4/1/2013	Ra-228	2.99 ± 0.69	2.96 ± 0.67	2.98 ± 0.48	Pass
SWU-736, 737	4/2/2013	Gr. Beta	4.80 ± 0.95	4.43 ± 0.86	4.62 ± 0.64	Pass
AP-2035, 2036	4/2/2013	Be-7	0.070 ± 0.013	0.065 ± 0.013	0.068 ± 0.009	Pass
BS-1680, 1681	4/8/2013	K-40	1995.30 ± 265.70	1992.00 ± 289.40	1993.65 ± 196.44	Pass
SW-1638, 1639	4/9/2013	H-3	1350.77 ± 130.08	1320.45 ± 129.25	1335.61 ± 91.69	Pass

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

Lab Code	Date	Analysis	Concentration (pCi/L) ^a			Acceptance
			First Result	Second Result	Averaged Result	
WW-2394, 2395	4/9/2013	H-3	348.08 ± 88.40	302.43 ± 86.41	325.25 ± 61.81	Pass
DW-40035, 40036	4/12/2013	Ra-226	1.36 ± 0.15	1.29 ± 0.13	1.33 ± 0.10	Pass
DW-40035, 40036	4/12/2013	Ra-228	1.22 ± 0.49	1.38 ± 0.53	1.30 ± 0.36	Pass
MI-1825, 1826	4/15/2013	K-40	1290.20 ± 113.80	1378.60 ± 91.99	1334.40 ± 73.17	Pass
MI-1825, 1826	4/15/2013	Sr-90	0.68 ± 0.32	0.46 ± 0.31	0.57 ± 0.22	Pass
DW-40049, 40050	4/15/2013	Gr. Alpha	1.88 ± 0.69	2.51 ± 0.71	2.20 ± 0.50	Pass
WW-1909, 1910	4/16/2013	H-3	2145.68 ± 156.65	2108.32 ± 155.80	2127.00 ± 110.47	Pass
DW-40064, 40065	4/23/2013	Gr. Alpha	1.95 ± 0.79	1.80 ± 0.81	1.88 ± 0.57	Pass
DW-40066, 40067	4/23/2013	Ra-226	1.98 ± 0.17	1.66 ± 0.16	1.82 ± 0.12	Pass
DW-40066, 40067	4/23/2013	Ra-228	2.30 ± 0.59	2.32 ± 0.59	2.31 ± 0.42	Pass
F-2225, 2226	5/1/2013	K-40	2.81 ± 0.37	2.67 ± 0.39	2.74 ± 0.27	Pass
BS-2267, 2268	5/1/2013	K-40	13.46 ± 0.64	13.59 ± 0.62	13.52 ± 0.45	Pass
SG-2235, 2236	5/2/2013	Ac-228	18.30 ± 0.60	18.50 ± 0.60	18.40 ± 0.42	Pass
SG-2235, 2236	5/2/2013	Gr. Alpha	54.00 ± 3.70	51.90 ± 3.40	52.95 ± 2.51	Pass
SG-2235, 2236	5/2/2013	Pb-214	11.30 ± 0.30	11.20 ± 0.20	11.25 ± 0.18	Pass
AP-2288, 2289	5/2/2013	Be-7	0.19 ± 0.10	0.19 ± 0.08	0.19 ± 0.07	Pass
WW-3091, 3092	5/2/2013	H-3	1107.91 ± 153.49	1263.37 ± 157.43	1185.64 ± 109.94	Pass
SW-2373, 2374	5/8/2013	H-3	324.80 ± 86.81	364.61 ± 88.53	344.71 ± 62.00	Pass
W-2352, 2353	5/9/2013	Ra-226	0.91 ± 0.20	1.29 ± 0.22	1.10 ± 0.15	Pass
W-2352, 2353	5/9/2013	Ra-228	1.28 ± 0.87	1.03 ± 0.94	1.16 ± 0.64	Pass
CF-2499, 2500	5/13/2013	K-40	11.52 ± 0.45	12.55 ± 0.61	12.04 ± 0.38	Pass
F-3987, 3988	5/20/2013	K-40	3.07 ± 0.48	3.05 ± 0.43	3.06 ± 0.32	Pass
BS-4113, 4114	5/20/2013	K-40	8.06 ± 0.44	7.99 ± 0.44	8.02 ± 0.31	Pass
SO-2902, 2903	5/22/2013	Th-228	0.57 ± 0.07	0.51 ± 0.06	0.54 ± 0.05	Pass
SO-2902, 2903	5/22/2013	Th-230	0.39 ± 0.06	0.40 ± 0.05	0.40 ± 0.04	Pass
SO-2902, 2903	5/22/2013	Th-232	0.55 ± 0.07	0.62 ± 0.06	0.59 ± 0.05	Pass
WW-2776, 2777	5/23/2013	H-3	261.76 ± 100.85	283.17 ± 101.68	272.46 ± 71.61	Pass
WW-2818, 2819	5/23/2013	H-3	999.35 ± 126.15	880.63 ± 122.43	939.99 ± 87.90	Pass
S-7271, 7272	5/27/2013	Cs-137	2.82 ± 0.10	2.91 ± 0.09	2.86 ± 0.07	Pass
S-7271, 7272	5/27/2013	K-40	21.52 ± 0.97	21.13 ± 1.02	21.32 ± 0.70	Pass
P-2923, 2924	5/29/2013	H-3	441.31 ± 92.75	374.30 ± 89.94	407.80 ± 64.60	Pass
WW-3133, 3134	6/1/2013	H-3	278.42 ± 86.54	209.45 ± 83.44	243.93 ± 60.11	Pass
WW-3049, 3050	6/5/2013	H-3	156.08 ± 79.16	244.66 ± 83.86	200.37 ± 57.66	Pass
DW-40079, 40080	6/5/2013	Ra-226	6.67 ± 0.30	7.03 ± 0.35	6.85 ± 0.23	Pass
DW-40079, 40080	6/5/2013	Ra-228	5.55 ± 0.75	6.11 ± 0.77	5.83 ± 0.54	Pass
DW-40089, 40090	6/5/2013	Gr. Alpha	6.82 ± 0.90	5.64 ± 1.02	6.23 ± 0.68	Pass
DW-40091, 40092	6/5/2013	Ra-226	3.44 ± 0.19	3.66 ± 0.19	3.55 ± 0.13	Pass
DW-40091, 40092	6/5/2013	Ra-228	3.70 ± 0.68	4.69 ± 0.73	4.20 ± 0.50	Pass
DW-40103, 40104	6/5/2013	Ra-226	0.98 ± 0.22	0.62 ± 0.15	0.80 ± 0.13	Pass
MI-3154, 3155	6/12/2013	K-40	1513.00 ± 128.10	1456.70 ± 110.30	1484.85 ± 84.52	Pass
P-3385, 3386	6/14/2013	H-3	236.88 ± 87.87	242.87 ± 88.14	239.88 ± 62.23	Pass
F-3776, 3777	6/16/2013	Cs-137	0.039 ± 0.015	0.048 ± 0.019	0.044 ± 0.012	Pass
F-3776, 3777	6/16/2013	Gr. Beta	4.52 ± 0.09	4.63 ± 0.09	4.57 ± 0.06	Pass
F-3776, 3777	6/16/2013	K-40	3.40 ± 0.41	3.52 ± 0.39	3.46 ± 0.29	Pass

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

Lab Code	Date	Analysis	Concentration (pCi/L) ^a			Acceptance
			First Result	Second Result	Averaged Result	
S-3238, 3239	6/17/2013	Be-7	1139.80 ± 215.00	1102.00 ± 194.70	1120.90 ± 145.03	Pass
S-3238, 3239	6/17/2013	Cs-134	26.23 ± 13.23	39.91 ± 11.73	33.07 ± 8.84	Pass
S-3238, 3239	6/17/2013	Cs-137	72.75 ± 25.99	85.91 ± 22.58	79.33 ± 17.21	Pass
S-3238, 3239	6/17/2013	K-40	21847.00 ± 656.50	22158.00 ± 622.80	22002.50 ± 452.46	Pass
SO-3343, 3344	6/17/2013	Cs-137	0.087 ± 0.022	0.084 ± 0.017	0.086 ± 0.014	Pass
SO-3343, 3344	6/17/2013	K-40	8.90 ± 0.53	9.47 ± 0.49	9.19 ± 0.36	Pass
DW-40118, 40119	6/26/2013	Gr. Alpha	3.56 ± 1.07	4.51 ± 0.96	4.04 ± 0.72	Pass
DW-40118, 40119	6/26/2013	Ra-226	2.52 ± 0.22	2.48 ± 0.19	2.50 ± 0.15	Pass
DW-40118, 40119	6/26/2013	Ra-228	2.75 ± 0.71	2.86 ± 0.75	2.81 ± 0.52	Pass
WW-3583, 3584	6/27/2013	H-3	6732.57 ± 246.74	6807.94 ± 247.98	6770.26 ± 174.91	Pass
AP-4092, 4093	6/28/2013	Be-7	0.078 ± 0.015	0.083 ± 0.017	0.080 ± 0.011	Pass
E-3608, 3609	7/1/2013	K-40	1.28 ± 0.13	1.29 ± 0.11	1.28 ± 0.09	Pass
MI-3629, 3630	7/1/2013	K-40	1840.70 ± 130.10	1804.90 ± 143.00	1822.80 ± 96.66	Pass
AP-4050, 4051	7/1/2013	Be-7	0.094 ± 0.009	0.093 ± 0.009	0.093 ± 0.006	Pass
DW-40134, 40135	7/1/2013	Ra-226	1.75 ± 0.15	1.56 ± 0.15	1.66 ± 0.11	Pass
DW-40134, 40135	7/1/2013	Ra-228	2.07 ± 0.60	1.61 ± 0.57	1.84 ± 0.41	Pass
AP-4071, 4072	7/3/2013	Be-7	0.066 ± 0.009	0.069 ± 0.011	0.067 ± 0.007	Pass
DW-40144, 40145	7/9/2013	Gr. Alpha	3.66 ± 0.85	2.85 ± 0.79	3.26 ± 0.58	Pass
DW-40146, 40147	7/9/2013	Ra-226	0.70 ± 0.11	0.72 ± 0.11	0.71 ± 0.08	Pass
DW-40146, 40147	7/9/2013	Ra-228	1.00 ± 0.58	0.70 ± 0.52	0.85 ± 0.39	Pass
VE-3818, 3819	7/9/2013	Be-7	0.41 ± 0.11	0.46 ± 0.18	0.43 ± 0.11	Pass
VE-3818, 3819	7/9/2013	K-40	4.67 ± 0.30	4.52 ± 0.43	4.60 ± 0.26	Pass
XW-4646, 4647	7/15/2013	H-3	465.00 ± 111.00	525.00 ± 114.00	495.00 ± 79.56	Pass
WW-4134, 4135	7/16/2013	H-3	315.86 ± 123.54	264.98 ± 121.78	290.42 ± 86.73	Pass
AP-4155, 4156	7/18/2013	Be-7	0.20 ± 0.11	0.16 ± 0.09	0.18 ± 0.07	Pass
MI-4218, 4219	7/22/2013	K-40	1426.80 ± 117.50	1335.70 ± 110.60	1381.25 ± 80.68	Pass
MI-4218, 4219	7/22/2013	Sr-90	0.62 ± 0.32	0.67 ± 0.32	0.65 ± 0.23	Pass
WW-4239, 4240	7/23/2013	H-3	223.71 ± 92.64	221.74 ± 92.56	222.73 ± 65.48	Pass
WW-4394, 4395	7/30/2013	Gr. Alpha	2.63 ± 1.49	2.57 ± 1.11	2.60 ± 0.93	Pass
WW-4394, 4395	7/30/2013	Gr. Beta	3.72 ± 1.17	2.63 ± 1.29	3.18 ± 0.87	Pass
WW-4394, 4395	7/30/2013	H-3	271.50 ± 91.30	297.60 ± 91.50	284.55 ± 64.63	Pass
SWU-4478, 4479	7/30/2013	Gr. Beta	2.07 ± 0.54	2.24 ± 0.55	2.16 ± 0.39	Pass
DW-40159, 40160	7/31/2013	Ra-226	3.39 ± 0.63	2.39 ± 0.45	2.89 ± 0.39	Pass
DW-40159, 40160	7/31/2013	Ra-228	3.29 ± 0.73	2.94 ± 0.68	3.12 ± 0.50	Pass
VE-4436, 4437	8/1/2013	Be-7	0.98 ± 0.21	0.89 ± 0.17	0.94 ± 0.14	Pass
VE-4436, 4437	8/1/2013	K-40	3.95 ± 0.39	3.75 ± 0.31	3.85 ± 0.25	Pass
G-4457, 4458	8/1/2013	Be-7	0.78 ± 0.19	0.67 ± 0.16	0.72 ± 0.12	Pass
G-4457, 4458	8/1/2013	Gr. Beta	6.15 ± 0.14	6.10 ± 0.14	6.13 ± 0.10	Pass
G-4457, 4458	8/1/2013	K-40	4.25 ± 0.36	4.60 ± 0.41	4.42 ± 0.27	Pass
VE-4520, 4521	8/1/2013	K-40	2.20 ± 0.16	2.09 ± 0.17	2.15 ± 0.12	Pass
WW-4772, 4773	8/6/2013	H-3	143.80 ± 86.70	157.80 ± 87.30	150.80 ± 61.52	Pass

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

Lab Code	Date	Analysis	Concentration (pCi/L) ^a			Acceptance
			First Result	Second Result	Averaged Result	
VE-4709, 4710	8/8/2013	Gr. Beta	31.40 ± 1.00	30.70 ± 1.00	31.05 ± 0.71	Pass
VE-4709, 4710	8/8/2013	H-3	1504.00 ± 132.00	1468.00 ± 131.00	1486.00 ± 92.99	Pass
VE-4709, 4710	8/8/2013	U-233/4	0.009 ± 0.002	0.005 ± 0.002	0.007 ± 0.001	Pass
VE-4709, 4710	8/8/2013	U-238	0.005 ± 0.002	0.004 ± 0.001	0.005 ± 0.001	Pass
WW-4562, 4563	8/8/2013	H-3	208.82 ± 105.55	213.13 ± 105.73	210.97 ± 74.70	Pass
SG-4651, 4652	8/13/2013	Gr. Alpha	29.00 ± 3.10	28.80 ± 3.20	28.90 ± 2.23	Pass
SG-4651, 4652	8/13/2013	Gr. Beta	34.10 ± 1.80	34.00 ± 1.80	34.05 ± 1.27	Pass
SG-4651, 4652	8/13/2013	Ra-226	9.00 ± 0.20	8.70 ± 0.20	8.85 ± 0.14	Pass
VE-4835, 4836	8/13/2013	K-40	3.01 ± 0.24	3.08 ± 0.28	3.04 ± 0.19	Pass
WW-4877, 4878	8/14/2013	H-3	217.35 ± 87.57	276.63 ± 90.20	246.99 ± 62.86	Pass
LW-4856, 4857	8/15/2013	Gr. Beta	0.96 ± 0.40	0.94 ± 0.38	0.95 ± 0.28	Pass
W-4982, 4983	8/16/2013	H-3	757.43 ± 112.40	767.56 ± 112.76	762.50 ± 79.60	Pass
VE-4919, 4920	8/19/2013	K-40	4891.90 ± 407.90	4907.40 ± 350.40	4899.65 ± 268.87	Pass
VE-4919, 4920	8/19/2013	Be-7	470.50 ± 159.60	325.10 ± 104.10	397.80 ± 95.27	Pass
DW-40184, 40185	8/19/2013	Ra-228	2.35 ± 0.72	2.53 ± 0.70	2.44 ± 0.50	Pass
DW-40184, 40185	8/19/2013	Ra-228	1.44 ± 0.35	2.30 ± 0.56	1.87 ± 0.33	Pass
AP-5003, 5004	8/22/2013	Be-7	0.23 ± 0.10	0.21 ± 0.10	0.22 ± 0.07	Pass
LW-5229, 5230	8/29/2013	Gr. Beta	1.09 ± 0.86	2.28 ± 0.96	1.69 ± 0.64	Pass
SS-5333, 5334	9/3/2013	Cs-137	89.20 ± 41.60	97.80 ± 34.60	93.50 ± 27.05	Pass
SS-5333, 5334	9/3/2013	K-40	11893.00 ± 681.30	12353.00 ± 778.90	12123.00 ± 517.41	Pass
VE-5313, 5314	9/3/2013	K-40	1.84 ± 0.20	1.85 ± 0.20	1.85 ± 0.14	Pass
VE-5313, 5314	9/3/2013	Gr. Beta	2.38 ± 0.04	2.43 ± 0.04	2.41 ± 0.03	Pass
WW-5617, 5618	9/5/2013	H-3	1987.00 ± 147.00	2094.00 ± 150.00	2040.50 ± 105.01	Pass
AP-5355, 5356	9/5/2013	Be-7	0.22 ± 0.12	0.27 ± 0.14	0.25 ± 0.09	Pass
XW-5694, 5695	9/8/2013	C-14	0.94 ± 0.09	0.78 ± 0.10	0.86 ± 0.07	Pass
VE-5409, 5410	9/9/2013	K-40	3.60 ± 0.26	3.33 ± 0.29	3.46 ± 0.19	Pass
AP-5430, 5431	9/12/2013	Be-7	0.26 ± 0.10	0.26 ± 0.10	0.26 ± 0.07	Pass
MI-5401, 5402	9/12/2013	K-40	1404.60 ± 114.10	1356.10 ± 128.60	1380.35 ± 85.96	Pass
WW-5451, 5452	9/12/2013	H-3	196.66 ± 84.44	200.78 ± 84.64	198.72 ± 59.78	Pass
MI-5484, 5485	9/16/2013	K-40	1398.50 ± 88.93	1364.60 ± 113.30	1381.55 ± 72.02	Pass
WW-5568, 5569	9/17/2013	H-3	274.69 ± 87.95	203.72 ± 84.71	239.20 ± 61.05	Pass
BS-5764, 5765	9/20/2013	Cs-137	0.40 ± 0.03	0.37 ± 0.02	0.39 ± 0.02	Pass
BS-5764, 5765	9/20/2013	K-40	17.97 ± 0.59	17.54 ± 0.55	17.76 ± 0.40	Pass
VE-5638, 5639	9/23/2013	K-40	4.15 ± 0.33	4.46 ± 0.38	4.31 ± 0.25	Pass
WW-5596, 5597	9/23/2013	Gr. Beta	5.97 ± 1.39	5.95 ± 1.45	5.96 ± 1.01	Pass
G-5680, 5681	9/25/2013	Be-7	0.36 ± 0.13	0.35 ± 0.09	0.35 ± 0.08	Pass
G-5680, 5681	9/25/2013	Gr. Beta	3.81 ± 0.11	3.77 ± 0.11	3.79 ± 0.08	Pass
G-5680, 5681	9/25/2013	K-40	3.23 ± 0.32	2.99 ± 0.24	3.11 ± 0.20	Pass
S-5659, 5660	9/26/2013	Ac-228	1.19 ± 0.21	1.06 ± 0.21	1.13 ± 0.15	Pass
S-5659, 5660	9/26/2013	Cs-137	0.13 ± 0.04	0.14 ± 0.05	0.14 ± 0.03	Pass
S-5659, 5660	9/26/2013	K-40	16.08 ± 1.39	16.65 ± 1.46	16.37 ± 1.01	Pass
S-5659, 5660	9/26/2013	Pb-214	0.97 ± 0.15	1.10 ± 0.16	1.04 ± 0.11	Pass
AP-6345, 6346	9/30/2013	Be-7	0.077 ± 0.010	0.081 ± 0.008	0.079 ± 0.006	Pass
AP-6366, 6367	9/30/2013	Be-7	0.078 ± 0.012	0.083 ± 0.014	0.081 ± 0.009	Pass

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

Lab Code	Date	Analysis	Concentration (pCi/L) ^a			Acceptance
			First Result	Second Result	Averaged Result	
DW-5701, 5702	9/30/2013	Gr. Beta	14.48 ± 2.04	13.32 ± 1.84	13.90 ± 1.37	Pass
SG-5722, 5723	9/30/2013	Ra-226	12.41 ± 0.47	11.98 ± 0.59	12.20 ± 0.38	Pass
SG-5722, 5723	9/30/2013	Ra-228	7.84 ± 0.71	8.13 ± 0.97	7.99 ± 0.60	Pass
G-5806, 5807	10/1/2013	Be-7	3.26 ± 0.30	3.11 ± 0.13	3.19 ± 0.16	Pass
G-5806, 5807	10/1/2013	K-40	6.65 ± 0.21	6.68 ± 0.50	6.67 ± 0.27	Pass
SG-5827, 5828	10/1/2013	Ac-228	4.08 ± 0.33	3.92 ± 0.40	4.00 ± 0.26	Pass
SG-5827, 5828	10/1/2013	K-40	2.55 ± 0.65	2.37 ± 0.63	2.46 ± 0.45	Pass
SG-5827, 5828	10/1/2013	Pb-214	3.82 ± 0.17	3.93 ± 0.20	3.88 ± 0.13	Pass
VE-5848, 5849	10/1/2013	K-40	1.62 ± 0.16	1.57 ± 0.14	1.60 ± 0.11	Pass
AP-6408, 6409	10/3/2013	Be-7	0.072 ± 0.015	0.063 ± 0.012	0.068 ± 0.010	Pass
f-5954, 5955	10/3/2013	K-40	2.74 ± 0.36	3.02 ± 0.34	2.88 ± 0.25	Pass
P-6035, 6036	10/7/2013	H-3	198.41 ± 85.00	288.60 ± 89.15	243.51 ± 61.59	Pass
SG-6115, 6116	10/8/2013	Ac-228	5.22 ± 0.50	4.87 ± 0.48	5.05 ± 0.35	Pass
SG-6115, 6116	10/8/2013	K-40	5.61 ± 1.08	6.61 ± 1.04	6.11 ± 0.75	Pass
SG-6115, 6116	10/8/2013	Pb-214	4.29 ± 0.24	4.24 ± 0.20	4.27 ± 0.16	Pass
VE-6136, 6137	10/8/2013	Be-7	0.55 ± 0.18	0.60 ± 0.15	0.58 ± 0.12	Pass
VE-6136, 6137	10/8/2013	K-40	2.78 ± 0.35	2.61 ± 0.33	2.69 ± 0.24	Pass
WW-6198, 6199	10/8/2013	H-3	12973.70 ± 332.60	12757.80 ± 330.00	12865.75 ± 234.27	Pass
VE-6240, 6241	10/9/2013	K-40	14.29 ± 0.29	14.95 ± 0.54	14.62 ± 0.31	Pass
W-5996, 5997	10/9/2013	Gr. Alpha	3.87 ± 1.18	4.07 ± 1.08	3.97 ± 0.80	Pass
W-5996, 5997	10/9/2013	Gr. Beta	9.82 ± 0.85	8.53 ± 0.82	9.18 ± 0.59	Pass
W-5996, 5997	10/9/2013	Ra-228	3.42 ± 1.02	3.39 ± 1.01	3.41 ± 0.72	Pass
DW-40224, 40225	10/11/2013	Ra-226	0.62 ± 0.10	0.76 ± 0.10	0.69 ± 0.07	Pass
DW-40224, 40225	10/11/2013	Ra-228	0.87 ± 0.55	1.00 ± 0.54	0.94 ± 0.39	Pass
WW-6219, 6220	10/11/2013	H-3	455.41 ± 111.54	354.66 ± 107.84	405.03 ± 77.57	Pass
CF-6261, 6262	10/14/2013	Be-7	1.97 ± 0.24	2.06 ± 0.22	2.01 ± 0.16	Pass
CF-6261, 6262	10/14/2013	K-40	11.55 ± 0.56	12.06 ± 0.61	11.80 ± 0.41	Pass
MI-6303, 6304	10/14/2013	K-40	1507.30 ± 110.80	1482.40 ± 110.00	1494.85 ± 78.07	Pass
VE-6534, 6535	10/17/2013	K-40	15.96 ± 0.17	16.16 ± 0.36	16.06 ± 0.20	Pass
S-6471, 6472	10/18/2013	Ac-228	0.94 ± 0.19	0.78 ± 0.18	0.86 ± 0.13	Pass
S-6471, 6472	10/18/2013	K-40	12.82 ± 1.05	12.90 ± 1.17	12.86 ± 0.79	Pass
S-6471, 6472	10/18/2013	Pb-214	0.88 ± 0.11	0.72 ± 0.12	0.80 ± 0.08	Pass
VE-6597, 6598	10/22/2013	K-40	2.46 ± 0.22	2.58 ± 0.20	2.52 ± 0.15	Pass
WW-6576, 6577	10/22/2013	H-3	745.60 ± 110.70	663.30 ± 107.60	704.45 ± 77.19	Pass
LW-6681, 6682	10/29/2013	Gr. Beta	2.00 ± 0.92	2.17 ± 0.98	2.09 ± 0.67	Pass
SWU-6765, 6766	10/29/2013	Gr. Beta	3.07 ± 0.61	2.90 ± 0.65	2.99 ± 0.45	Pass
WW-6849, 6850	10/29/2013	H-3	863.00 ± 113.80	826.60 ± 112.50	844.80 ± 80.01	Pass
MI-6786, 6787	10/30/2013	K-40	1370.60 ± 109.60	1449.20 ± 105.50	1409.90 ± 76.06	Pass
SO-6744, 6745	10/30/2013	Ac-228	0.46 ± 0.11	0.51 ± 0.11	0.48 ± 0.08	Pass
SO-6744, 6745	10/30/2013	Bi-214	0.48 ± 0.10	0.30 ± 0.10	0.39 ± 0.07	Pass
SO-6744, 6745	10/30/2013	Cs-137	0.21 ± 0.04	0.24 ± 0.04	0.23 ± 0.03	Pass
SO-6744, 6745	10/30/2013	Gr. Beta	27.40 ± 1.14	27.44 ± 1.11	27.42 ± 0.80	Pass
SO-6744, 6745	10/30/2013	K-40	14.93 ± 0.88	15.20 ± 0.90	15.07 ± 0.63	Pass
SO-6744, 6745	10/30/2013	Pb-212	0.43 ± 0.04	0.40 ± 0.05	0.42 ± 0.03	Pass
SO-6744, 6745	10/30/2013	Ra-226	1.47 ± 0.35	1.31 ± 0.36	1.39 ± 0.25	Pass
SO-6744, 6745	10/30/2013	Tl-208	0.16 ± 0.04	0.16 ± 0.04	0.16 ± 0.03	Pass

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

Lab Code	Date	Analysis	Concentration (pCi/L) ^a			Acceptance
			First Result	Second Result	Averaged Result	
DW-40238, 40239	10/31/2013	Ra-228	0.94 ± 0.41	1.60 ± 0.55	1.27 ± 0.34	Pass
WW-7018, 7019	11/1/2013	H-3	593.09 ± 104.72	648.69 ± 106.89	620.89 ± 74.82	Pass
CF-6870, 6871	11/4/2013	K-40	12.67 ± 0.49	13.30 ± 0.47	12.98 ± 0.34	Pass
XW-6828, 6829	11/4/2013	K-40	97.99 ± 55.33	160.21 ± 74.99	129.10 ± 46.60	Pass
BS-6891, 6892	11/5/2013	Cs-137	0.018 ± 0.010	0.018 ± 0.009	0.018 ± 0.007	Pass
BS-6891, 6892	11/5/2013	Gr. Beta	12.41 ± 1.74	9.97 ± 1.57	11.19 ± 1.17	Pass
BS-6891, 6892	11/5/2013	K-40	6.49 ± 0.33	6.28 ± 0.40	6.39 ± 0.26	Pass
WW-6912, 6913	11/5/2013	Gr. Alpha	2.87 ± 1.30	4.46 ± 1.47	3.67 ± 0.98	Pass
WW-6912, 6913	11/5/2013	Gr. Beta	3.18 ± 0.87	3.18 ± 0.87	3.18 ± 0.62	Pass
WW-6912, 6913	11/5/2013	H-3	349.01 ± 101.42	430.14 ± 98.06	389.58 ± 70.54	Pass
SO-6954, 6955	11/6/2013	Cs-137	0.14 ± 0.03	0.12 ± 0.02	0.13 ± 0.02	Pass
SO-6954, 6955	11/6/2013	K-40	15.16 ± 0.72	14.11 ± 0.64	14.64 ± 0.48	Pass
S-6976, 6977	11/13/2013	K-40	22.36 ± 0.69	22.62 ± 0.72	22.49 ± 0.50	Pass
DW-40246, 40247	11/15/2013	Gr. Alpha	15.00 ± 3.41	20.31 ± 4.00	17.65 ± 2.63	Pass
CF-7102, 7103	11/18/2013	Be-7	17.79 ± 0.51	18.09 ± 0.80	17.94 ± 0.48	Pass
DW-40250, 40251	11/18/2013	Ra-226	27.77 ± 2.84	26.15 ± 2.67	26.96 ± 1.95	Pass
DW-40250, 40251	11/18/2013	Ra-228	7.91 ± 0.94	6.32 ± 0.84	7.12 ± 0.63	Pass
WW-7164, 7165	11/19/2013	H-3	266.90 ± 91.10	268.90 ± 91.20	267.90 ± 64.45	Pass
SS-7334, 7335	11/20/2013	K-40	15.51 ± 0.72	14.14 ± 0.80	14.83 ± 0.54	Pass
WW-7558, 7559	11/22/2013	H-3	229.86 ± 83.89	191.77 ± 82.05	210.82 ± 58.67	Pass
LW-7292, 7293	11/26/2013	Gr. Beta	1.92 ± 0.75	2.38 ± 0.77	2.15 ± 0.54	Pass
W-7229, 7230	12/1/2013	Ra-226	0.87 ± 0.23	0.88 ± 0.25	0.88 ± 0.17	Pass
W-7229, 7230	12/1/2013	Ra-228	3.00 ± 0.98	3.27 ± 1.16	3.14 ± 0.76	Pass
SG-7313, 7314	12/2/2013	Ac-228	6.33 ± 0.23	6.69 ± 0.30	6.51 ± 0.19	Pass
SG-7313, 7314	12/2/2013	K-40	5.47 ± 0.61	6.24 ± 0.74	5.86 ± 0.48	Pass
SG-7313, 7314	12/2/2013	Pb-214	5.60 ± 0.14	5.37 ± 0.16	5.49 ± 0.11	Pass
W-7432, 7433	12/4/2013	Gr. Beta	5.35 ± 1.20	3.89 ± 1.23	4.62 ± 0.86	Pass
WW-7516, 7517	12/10/2013	H-3	369.30 ± 95.64	269.22 ± 91.35	319.26 ± 66.13	Pass
SG-7579, 7580	12/20/2013	Ra-226	3.72 ± 0.11	3.85 ± 0.30	3.79 ± 0.16	Pass
SG-7579, 7580	12/20/2013	Ra-228	2.38 ± 0.18	2.77 ± 0.44	2.58 ± 0.24	Pass
LW-7684, 7685	12/23/2013	Gr. Beta	0.84 ± 0.51	1.96 ± 0.61	1.40 ± 0.40	Pass
DW-40261, 40262	12/27/2013	Ra-226	0.54 ± 0.10	0.67 ± 0.10	0.61 ± 0.07	Pass
DW-40261, 40262	12/27/2013	Ra-228	1.09 ± 0.51	1.12 ± 0.43	1.11 ± 0.33	Pass
SWU-7663, 7664	12/30/2013	Gr. Beta	2.85 ± 0.71	3.88 ± 0.77	3.37 ± 0.52	Pass

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

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

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

Lab Code ^b	Date	Analysis	Laboratory result	Concentration ^a		Acceptance
				Known Activity	Control Limits ^c	
MAAP-738	02/01/13	Am-241	0.10 ± 0.02	0.10	0.07 - 0.14	Pass
MAAP-738	02/01/13	Co-57	2.58 ± 0.06	2.36	1.65 - 3.07	Pass
MAAP-738	02/01/13	Co-60	0.01 ± 0.03	0.00	NA ^c	Pass
MAAP-738	02/01/13	Cs-134	1.82 ± 0.13	1.78	1.25 - 2.31	Pass
MAAP-738	02/01/13	Cs-137	2.93 ± 0.10	2.60	1.82 - 3.38	Pass
MAAP-738	02/01/13	Mn-54	4.87 ± 0.13	4.26	2.98 - 5.54	Pass
MAAP-738	02/01/13	Pu-238	0.12 ± 0.02	0.13	0.09 - 0.17	Pass
MAAP-738	02/01/13	Pu-239/40	0.11 ± 0.02	0.12	0.09 - 0.16	Pass
MAAP-738	02/01/13	Sr-90	1.39 ± 0.14	1.49	1.04 - 1.94	Pass
MAAP-738	02/01/13	U-233/4	0.03 ± 0.01	0.03	0.02 - 0.04	Pass
MAAP-738	02/01/13	U-238	0.23 ± 0.03	0.23	0.16 - 0.30	Pass
MAAP-738	02/01/13	Zn-65	3.84 ± 0.20	3.13	2.19 - 4.07	Pass
MAAP-738 ^e	02/01/13	Gr. Alpha	0.14 ± 0.03	1.20	0.36 - 2.04	Fail
MAAP-738	02/01/13	Gr. Beta	0.93 ± 0.06	0.85	0.43 - 1.28	Pass
MAW-806	02/01/13	Am-241	0.71 ± 0.08	0.69	0.48 - 0.90	Pass
MAW-806	02/01/13	Co-57	31.20 ± 0.40	30.90	21.60 - 40.20	Pass
MAW-806	02/01/13	Co-60	19.70 ± 0.30	16.56	13.69 - 25.43	Pass
MAW-806	02/01/13	Cs-134	23.20 ± 0.50	24.40	17.10 - 31.70	Pass
MAW-806	02/01/13	Cs-137	0.03 ± 0.12	0.00	NA ^c	Pass
MAW-806	02/01/13	Fe-55	34.00 ± 3.30	44.00	30.80 - 57.20	Pass
MAW-806	02/01/13	H-3	511.60 ± 12.50	507.00	355.00 - 659.00	Pass
MAW-806	02/01/13	K-40	2.20 ± 0.90	0.00	NA ^c	Pass
MAW-806	02/01/13	Mn-54	27.60 ± 0.50	27.40	19.20 - 35.60	Pass
MAW-806	02/01/13	Ni-63	34.30 ± 2.80	33.40	23.40 - 43.40	Pass
MAW-806	02/01/13	Pu-238	0.83 ± 0.10	0.88	0.62 - 1.15	Pass
MAW-806	02/01/13	Pu-239/40	0.02 ± 0.02	0.01	NA ^d	Pass
MAW-806	02/01/13	Sr-90	9.30 ± 0.80	10.50	7.40 - 13.70	Pass
MAW-806	02/01/13	Tc-99	10.25 ± 0.40	13.10	9.20 - 17.00	Pass
MAW-806	02/01/13	U-233/4	0.31 ± 0.05	0.32	0.22 - 0.41	Pass
MAW-806	02/01/13	U-238	1.91 ± 0.13	1.95	1.37 - 2.54	Pass
MAW-806	02/01/13	Zn-65	31.60 ± 0.80	30.40	21.30 - 39.50	Pass
MAW-811	02/01/13	Gr. Alpha	1.87 ± 0.09	2.31	0.69 - 3.93	Pass
MAW-811	02/01/13	Gr. Beta	13.04 ± 0.13	13.00	6.50 - 19.50	Pass
MAW-811	02/01/13	I-129	4.60 ± 0.19	6.06	4.24 - 7.88	Pass

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

Lab Code ^b	Date	Analysis	Laboratory result	Concentration ^a		Acceptance
				Known Activity	Control Limits ^c	
MASO-739	02/01/13	Am-241	106.90 ± 11.40	113.00	79.00 - 147.00	Pass
MASO-739	02/01/13	Co-57	0.60 ± 0.50	0.00	NA ^c	Pass
MASO-739	02/01/13	Co-60	739.20 ± 28.50	691.00	484.00 - 898.00	Pass
MASO-739	02/01/13	Cs-134	863.30 ± 34.10	887.00	621.00 - 1153.00	Pass
MASO-739	02/01/13	Cs-137	661.80 ± 25.70	587.00	411.00 - 763.00	Pass
MASO-739	02/01/13	K-40	745.80 ± 33.30	625.30	437.70 - 812.90	Pass
MASO-739	02/01/13	Mn-54	1.10 ± 1.00	0.00	NA ^c	Pass
MASO-739	02/01/13	Zn-65	1109.60 ± 44.10	995.00	697.00 - 1294.00	Pass
MASO-744	02/01/13	Ni-63	682.60 ± 16.80	670.00	469.00 - 871.00	Pass
MASO-744	02/01/13	Pu-238	0.20 ± 0.90	0.52	NA ^d	Pass
MASO-744	02/01/13	Pu-239/40	88.30 ± 9.00	79.50	55.70 - 103.40	Pass
MASO-744 ^f	02/01/13	Sr-90	408.40 ± 14.00	628.00	440.00 - 816.00	Fail
MASO-744	02/01/13	Tc-99	380.50 ± 16.80	444.00	311.00 - 577.00	Pass
MASO-744	02/01/13	U-233/4	53.20 ± 4.80	62.50	43.80 - 81.30	Pass
MASO-744	02/01/13	U-238	242.10 ± 10.20	281.00	197.00 - 365.00	Pass
MAVE-747	02/01/13	Co-57	10.37 ± 0.17	8.68	6.08 - 11.28	Pass
MAVE-747	02/01/13	Co-60	6.48 ± 0.17	5.85	4.10 - 7.61	Pass
MAVE-747	02/01/13	Cs-134	0.02 ± 0.04	0.00	NA ^c	Pass
MAVE-747	02/01/13	Cs-137	7.79 ± 0.21	6.87	4.81 - 8.93	Pass
MAVE-747	02/01/13	Mn-54	0.00 ± 0.05	0.00	NA ^c	Pass
MAVE-747	02/01/13	Zn-65	7.29 ± 0.33	6.25	4.38 - 8.13	Pass
MASO-5043	08/01/13	Am-241	1.40 ± 1.70	0.00	NA ^c	Pass
MASO-5043 ^g	08/01/13	Co-57	699.60 ± 3.90	0.00	NA ^c	Fail
MASO-5043	08/01/13	Cs-134	1191.70 ± 23.00	1172.00	820.00 - 1524.00	Pass
MASO-5043	08/01/13	Cs-137	1072.00 ± 5.10	977.00	684.00 - 1270.00	Pass
MASO-5043	08/01/13	K-40	760.00 ± 16.20	633.00	443.00 - 823.00	Pass
MASO-5043	08/01/13	Mn-54	753.80 ± 4.90	674.00	472.00 - 876.00	Pass
MASO-5043	08/01/13	Ni-63	560.00 ± 23.70	571.00	400.00 - 742.00	Pass
MASO-5043	08/01/13	Pu-238	68.40 ± 7.50	61.50	43.10 - 80.00	Pass
MASO-5043	08/01/13	Pu-239/40	0.40 ± 0.80	0.36	NA ^d	Pass
MASO-5043	08/01/13	Sr-90	383.90 ± 14.50	460.00	322.00 - 598.00	Pass
MASO-5043	08/01/13	Tc-99	-1.00 ± 10.50	0.00	NA ^c	Pass
MASO-5043	08/01/13	U-233/4	23.80 ± 3.30	30.00	21.00 - 39.00	Pass
MASO-5043	08/01/13	U-238	26.80 ± 3.50	34.00	23.80 - 44.20	Pass
MASO-5043	08/01/13	Zn-65	-351.50 ± 5.50	0.00	NA ^c	Pass

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

Lab Code ^b	Date	Analysis	Laboratory result	Concentration ^a		Acceptance
				Known Activity	Control Limits ^c	
MAW-5052	08/01/13	I-129	2.75 ± 0.20	3.79	2.65 - 4.93	Pass
MAW-5094	08/01/13	Am-241	0.00 ± 0.01	0.00	NA ^c	Pass
MAW-5094	08/01/13	Co-57	0.01 ± 0.09	0.00	NA ^c	Pass
MAW-5094	08/01/13	Co-60	23.20 ± 0.32	23.58	16.51 - 30.65	Pass
MAW-5094	08/01/13	Cs-134	27.60 ± 0.58	30.40	21.00 - 39.00	Pass
MAW-5094	08/01/13	Cs-137	32.31 ± 0.52	31.60	22.10 - 41.10	Pass
MAW-5094	08/01/13	Fe-55	39.20 ± 3.50	53.30	37.30 - 69.30	Pass
MAW-5094	08/01/13	Gr. Alpha	0.54 ± 0.05	0.70	0.21 - 1.19	Pass
MAW-5094	08/01/13	Gr. Beta	5.85 ± 0.09	5.94	2.97 - 8.91	Pass
MAW-5094	08/01/13	H-3	1.20 ± 3.00	0.00	NA ^c	Pass
MAW-5094	08/01/13	K-40	2.22 ± 0.90	0.00	NA ^c	Pass
MAW-5094	08/01/13	Mn-54	0.01 ± 0.11	0.00	NA ^c	Pass
MAW-5094	08/01/13	Ni-63	21.80 ± 3.30	26.40	18.50 - 34.30	Pass
MAW-5094	08/01/13	Pu-238	1.30 ± 0.11	1.22	0.85 - 1.58	Pass
MAW-5094	08/01/13	Pu-239/40	0.98 ± 0.09	1.00	0.70 - 1.30	Pass
MAW-5094	08/01/13	Sr-90	6.40 ± 0.60	7.22	5.05 - 9.39	Pass
MAW-5094	08/01/13	Tc-99	13.10 ± 0.70	16.20	11.30 - 21.10	Pass
MAW-5094	08/01/13	U-233/4	0.08 ± 0.02	0.07	NA ^d	Pass
MAW-5094	08/01/13	U-238	0.03 ± 0.01	0.03	NA ^d	Pass
MAW-5094	08/01/13	Zn-65	35.30 ± 0.90	34.60	24.20 - 45.00	Pass
MAVE-5046	08/01/13	Co-57	0.01 ± 0.03	0.00	NA ^c	Pass
MAVE-5046	08/01/13	Co-60	0.00 ± 0.04	0.00	NA ^c	Pass
MAVE-5046	08/01/13	Cs-134	5.71 ± 0.23	5.20	3.64 - 6.76	Pass
MAVE-5046	08/01/13	Cs-137	7.64 ± 0.20	6.60	4.62 - 8.58	Pass
MAVE-5046	08/01/13	Mn-54	9.08 ± 0.24	7.88	5.52 - 10.24	Pass
MAVE-5046	08/01/13	Zn-65	2.92 ± 0.25	2.63	1.84 - 3.42	Pass

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

Lab Code ^b	Date	Analysis	Laboratory result	Concentration ^a		Acceptance
				Known Activity	Control Limits ^c	
MAAP-5046	08/01/13	Am-241	0.01 ± 0.02	0.00	NA ^c	Pass
MAAP-5046	08/01/13	Co-57	3.48 ± 0.14	3.40	1.90 - 3.50	Pass
MAAP-5046	08/01/13	Co-60	2.44 ± 0.08	3.40	1.60 - 3.00	Pass
MAAP-5046	08/01/13	Cs-134	0.01 ± 0.03	0.00	NA ^c	Pass
MAAP-5046	08/01/13	Cs-137	3.09 ± 0.13	2.70	1.90 - 3.50	Pass
MAAP-5046	08/01/13	Gr. Alpha	0.28 ± 0.04	0.90	0.27 - 1.53	Pass
MAAP-5046	08/01/13	Gr. Beta	1.90 ± 0.08	1.63	0.82 - 2.45	Pass
MAAP-5046	08/01/13	Mn-54	3.95 ± 0.12	3.50	2.50 - 4.60	Pass
MAAP-5046	08/01/13	Pu-238	0.14 ± 0.028	0.12	0.087 - 0.16	Pass
MAAP-5046	08/01/13	Pu-239/40	0.10 ± 0.022	0.092	0.064 - 0.12	Pass
MAAP-5046	08/01/13	Sr-90	1.69 ± 4.10	1.81	1.27 - 2.35	Pass
MAAP-5046 ^h	08/01/13	U-233/4	0.04 ± 0.01	0.03	0.02 - 0.04	Fail
MAAP-5046	08/01/13	U-238	0.19 ± 0.027	0.21	0.14 - 0.27	Pass
MAAP-5046	08/01/13	Zn-65	3.27 ± 0.18	2.70	2.50 - 4.60	Pass

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

^b Laboratory codes as follows: MAW (water), MAAP (air filter), MASO (soil), MAVE (vegetation).

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

^d Provided in the series for "sensitivity evaluation". MAPEP does not provide control limits.

^e The filter was recounted overnight, no significant alpha activity could be detected.

^f The sample was reanalyzed using additional fuming nitric separations. Result of reanalysis: 574.4 ± 35.2 Bq/kg.

^g Interference from Eu-152 resulted in misidentification of Co-57.

^h Result of repeat analysis: 0.031 ± 0.013 pCi/filter.

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

Lab Code ^b	Date	Analysis	Concentration (pCi/L) ^b		Control Limits	Acceptance
			Laboratory Result ^c	ERA Result ^d		
ERAP-1174	03/18/13	Am-241	65.2 ± 4.4	66.8	41.2 - 90.4	Pass
ERAP-1174	03/18/13	Co-60	226.5 ± 4.1	214.0	166.0 - 267.0	Pass
ERAP-1174	03/18/13	Cs-134	1101.2 ± 23.6	1110.0	706.0 - 1380.0	Pass
ERAP-1174	03/18/13	Cs-137	1065.6 ± 21.4	940.0	706.0 - 1230.0	Pass
ERAP-1174	03/18/13	Fe-55	178.8 ± 88.0	225.0	69.8 - 440.0	Pass
ERAP-1174	03/18/13	Mn-54	< 3.1	0.0	0.0 - 50.0	Pass
ERAP-1174	03/18/13	Pu-238	50.0 ± 3.0	51.1	34.3 - 65.9	Pass
ERAP-1174	03/18/13	Pu-239/40	65.7 ± 2.6	65.2	47.2 - 85.2	Pass
ERAP-1174	03/18/13	U-233/4	54.0 ± 2.5	59.4	36.8 - 89.6	Pass
ERAP-1174	03/18/13	U-238	55.6 ± 2.6	58.9	38.1 - 81.4	Pass
ERAP-1174	03/18/13	Uranium	112.0 ± 5.6	121.0	67.0 - 184.0	Pass
ERAP-1174	03/18/13	Zn-65	236.6 ± 13.8	199.0	142.0 - 275.0	Pass
ERAP-1175	03/18/13	Gr. Alpha	52.3 ± 2.8	42.3	14.2 - 65.7	Pass
ERAP-1175	03/18/13	Gr. Beta	36.2 ± 2.0	25.1	15.9 - 36.6	Pass
ERAP-1174	03/18/13	Pu-238	788.0	788.0	474.0 - 1090.0	Pass
ERAP-1174	03/18/13	Pu-239/40	366.0	366.0	239.0 - 506.0	Pass
ERAP-1174	03/18/13	Sr-90	8530.0	8530.0	3250.0 - 13500.0	Pass
ERAP-1174	03/18/13	U-233/4	1920.0	1920.0	1170.0 - 2460.0	Pass
ERAP-1174	03/18/13	U-238	1900.0	1900.0	1180.0 - 2410.0	Pass
ERAP-1174	03/18/13	Uranium	3920.0	3920.0	2130.0 - 5170.0	Pass
ERAP-1174	03/18/13	Ac-228	1240.0	1240.0	795.0 - 1720.0	Pass
ERAP-1174	03/18/13	Bi-212	1240.0	1240.0	330.0 - 1820.0	Pass
ERAP-1174	03/18/13	Bi-214	3660.0	3660.0	2200.0 - 5270.0	Pass
ERAP-1174	03/18/13	Co-60	7920.0	7920.0	5360.0 - 10900.0	Pass
ERAP-1174	03/18/13	Cs-134	6370.0	6370.0	4160.0 - 7650.0	Pass
ERAP-1174	03/18/13	Cs-137	6120.0	6120.0	4690.0 - 7870.0	Pass
ERAP-1174	03/18/13	K-40	10300.0	10300.0	7520.0 - 13800.0	Pass
ERAP-1174	03/18/13	Mn-54	0.0	0.0	0.0 - 1000.0	Pass
ERAP-1174	03/18/13	Pb-212	1240.0	1240.0	812.0 - 1730.0	Pass
ERAP-1174	03/18/13	Pb-214	3660.0	3660.0	2140.0 - 5460.0	Pass
ERAP-1174	03/18/13	Th-234	1900.0	1900.0	601.0 - 3570.0	Pass
ERAP-1174	03/18/13	Zn-65	1400.0	1400.0	1110.0 - 1860.0	Pass
ERSO-1176	03/18/13	Am-241	293.1 ± 97.4	229.0	134.0 - 297.0	Pass
ERSO-1176	03/18/13	Pu-238	909.0 ± 180.0	788.0	474.0 - 1090.0	Pass
ERSO-1176	03/18/13	Pu-239/40	432.0 ± 120.0	366.0	239.0 - 506.0	Pass
ERSO-1176	03/18/13	Sr-90	8050.8 ± 376.0	8530.0	3250.0 - 13500.0	Pass
ERSO-1176	03/18/13	U-233/4	1662.6 ± 150.0	1920.0	1170.0 - 2460.0	Pass
ERSO-1176	03/18/13	U-238	1682.8 ± 160.0	1900.0	1180.0 - 2410.0	Pass
ERSO-1176	03/18/13	Uranium	3404.0 ± 330.5	3920.0	2130.0 - 5170.0	Pass
ERSO-1176	03/18/13	Ac-228	1335.0 ± 132.0	1240.0	795.0 - 1720.0	Pass
ERSO-1176	03/18/13	Bi-212	1420.0 ± 311.0	1240.0	330.0 - 1820.0	Pass
ERSO-1176	03/18/13	Bi-214	2626.0 ± 60.0	3660.0	2200.0 - 5270.0	Pass
ERSO-1176	03/18/13	Co-60	7951.0 ± 45.4	7920.0	5360.0 - 10900.0	Pass
ERSO-1176	03/18/13	Cs-134	5785.0 ± 51.0	6370.0	4160.0 - 7650.0	Pass
ERSO-1176	03/18/13	Cs-137	6106.0 ± 47.9	6120.0	4690.0 - 7870.0	Pass
ERSO-1176	03/18/13	K-40	11756.0 ± 284.3	10300.0	7520.0 - 13800.0	Pass
ERSO-1176	03/18/13	Mn-54	< 28.0	0.0	0.0 - 1000.0	Pass
ERSO-1176	03/18/13	Pb-212	1096.0 ± 29.1	1240.0	812.0 - 1730.0	Pass
ERSO-1176	03/18/13	Pb-214	2875.0 ± 60.0	3660.0	2140.0 - 5460.0	Pass
ERSO-1176	03/18/13	Th-234	2404.0 ± 218.3	1900.0	601.0 - 3570.0	Pass
ERSO-1176	03/18/13	Zn-65	1542.0 ± 56.4	1400.0	1110.0 - 1860.0	Pass

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

Lab Code ^b	Date	Analysis	Concentration (pCi/L) ^b		Control Limits	Acceptance
			Laboratory Result ^c	ERA Result ^d		
ERVE-1180	03/18/13	Am-241	569.8 ± 81.7	553.0	338.0 - 735.0	Pass
ERVE-1180	03/18/13	Cm-244	1260.9 ± 107.3	1340.0	657.0 - 2090.0	Pass
ERVE-1180	03/18/13	Co-60	2130.5 ± 48.0	1920.0	1320.0 - 2680.0	Pass
ERVE-1180	03/18/13	Cs-134	1296.5 ± 68.0	1240.0	797.0 - 1610.0	Pass
ERVE-1180	03/18/13	Cs-137	600.1 ± 34.3	544.0	394.0 - 757.0	Pass
ERVE-1180	03/18/13	K-40	34078.0 ± 787.0	31900.0	23000.0 - 44800.0	Pass
ERVE-1180	03/18/13	Mn-54	< 28.7	0.0	0.0 - 300.0	Pass
ERVE-1180	03/18/13	Pu-238	2476.5 ± 259.4	1980.0	1180.0 - 2710.0	Pass
ERVE-1180	03/18/13	Pu-239/40	2659.3 ± 273.2	2260.0	1390.0 - 3110.0	Pass
ERVE-1180	03/18/13	Sr-90	3809.7 ± 420.5	3840.0	2190.0 - 5090.0	Pass
ERVE-1180	03/18/13	U-233/4	2460.6 ± 205.0	2460.0	1620.0 - 3160.0	Pass
ERVE-1180	03/18/13	U-238	2319.1 ± 189.6	2440.0	1630.0 - 3100.0	Pass
ERVE-1180	03/18/13	Uranium	4866.3 ± 375.6	5010.0	3390.0 - 6230.0	Pass
ERVE-1180	03/18/13	Zn-65	1052.5 ± 82.1	878.0	633.0 - 1230.0	Pass
ERW-1184	03/18/13	Am-241	114.5 ± 8.1	118.0	79.5 - 158.0	Pass
ERW-1184	03/18/13	Co-60	2221.8 ± 17.0	2270.0	1970.0 - 2660.0	Pass
ERW-1184	03/18/13	Cs-134	1309.4 ± 58.4	1400.0	1030.0 - 1610.0	Pass
ERW-1184	03/18/13	Cs-137	1865.9 ± 22.0	1880.0	1600.0 - 2250.0	Pass
ERW-1184	03/18/13	Fe-55	503.1 ± 105.0	712.0	424.0 - 966.0	Pass
ERW-1184	03/18/13	Mn-54	< 9.4	0.0	0.0 - 100.0	Pass
ERW-1184	03/18/13	Pu-238	98.4 ± 5.6	98.8	73.1 - 123.0	Pass
ERW-1184	03/18/13	Pu-239/40	184.5 ± 7.7	185.0	144.0 - 233.0	Pass
ERW-1184	03/18/13	Sr-90	125.7 ± 6.0	137.0	89.2 - 181.0	Pass
ERW-1184	03/18/13	U-233/4	44.9 ± 3.4	48.8	36.7 - 62.9	Pass
ERW-1184	03/18/13	U-238	46.5 ± 3.5	48.4	36.9 - 59.4	Pass
ERW-1184	03/18/13	Uranium	93.3 ± 7.1	99.5	73.1 - 129.0	Pass
ERW-1184	03/18/13	Zn-65	412.8 ± 32.0	384.0	320.0 - 484.0	Pass
ERW-1186	03/18/13	Gr. Alpha	109.1 ± 5.7	130.0	46.2 - 201.0	Pass
ERW-1186	03/18/13	Gr. Beta	74.5 ± 6.4	78.9	45.2 - 117.0	Pass
ERW-1188	03/18/13	H-3	12279.0 ± 319.0	12300.0	8240.0 - 17500.0	Pass

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

^b Laboratory codes as follows: ERW (water), ERAP (air filter), ERSO (soil), ERVE (vegetation). Results are reported in units of pCi/L, except for air filters (pCi/Filter), vegetation and soil (pCi/kg).

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

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

APPENDIX B. DATA REPORTING CONVENTIONS

Data Reporting Conventions

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

2.0. Single Measurements

Each single measurement is reported as follows: $x \pm s$
where: x = value of the measurement;
 s = 2σ counting uncertainty (corresponding to the 95% confidence level).

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

3.0. Duplicate analyses

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

- 3.1. Individual results: For two analysis results; $x_1 \pm s_1$ and $x_2 \pm s_2$
Reported result: $x \pm s$; where $x = (1/2)(x_1 + x_2)$ and $s = (1/2)\sqrt{s_1^2 + s_2^2}$
- 3.2. Individual results: $< L_1$, $< L_2$ Reported result: $< L$, where L = lower of L_1 and L_2
- 3.3. Individual results: $x \pm s$, $< L$ Reported result: $x \pm s$ if $x \geq L$; $< L$ otherwise.

4.0. Computation of Averages and Standard Deviations

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

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

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

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

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

4.5 In rounding off, the following rules are followed:

- 4.5.1. If the number following those to be retained is less than 5, the number is dropped, and the retained numbers are kept unchanged. As an example, 11.443 is rounded off to 11.44.
- 4.5.2. If the number following those to be retained is equal to or greater than 5, the number is dropped and the last retained number is raised by 1. As an example, 11.445 is rounded off to 11.45.

APPENDIX C

Table C-1. Effluent Concentrations.^a

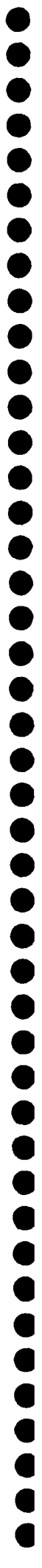
	Air (pCi/m ³)	Water (pCi/L)	
Gross alpha	1×10^{-3}	Strontium-89	8,000
Gross beta	1	Strontium-90	500
Iodine-131 ^b	2.8×10^{-1}	Cesium-137	1,000
		Barium-140	8,000
		Iodine-131	1,000
		Potassium-40 ^c	4,000
		Gross alpha	2
		Gross beta	10
		Tritium	1×10^6

^a Taken from Table 2 of Appendix B to Code of Federal Regulations Title 10, Part 20, and appropriate footnotes. Concentrations may be averaged over a period not greater than one year.

^b Value adjusted by a factor of 700 to reduce the dose resulting from the air-grass-cow-milk-child pathway.

^c A natural radionuclide.

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**2013
Annual
Radiological
Environmental
Operating
Report**

*Kewaunee Power Station
Part II, Data
Tabulations, Graphs
and Analyses*

Dominion Energy Kewaunee, Inc.



REPORT TO
DOMINION NUCLEAR

RADIOLOGICAL MONITORING PROGRAM FOR
THE KEWAUNEE POWER STATION
KEWAUNEE, WISCONSIN

ANNUAL REPORT - PART II
DATA TABULATIONS AND ANALYSES

January 1 to December 31, 2013

Prepared and submitted by

ATI ENVIRONMENTAL, Inc.
Midwest Laboratory
Project No. 8002

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PREFACE

Staff members of ATI Environmental, Inc., Midwest Laboratory were responsible for the acquisition of data presented in this report. Samples were collected by personnel of ATI Environmental, Inc., Midwest Laboratory and the Kewaunee Power Station.

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1.0 INTRODUCTION

The following constitutes Part II of the final report for the 2013 Radiological Monitoring Program conducted at the Kewaunee Power Station (KPS), Kewaunee, Wisconsin.

Included are tabulations of data for all samples collected in 2013 along with graphs of data trends. A summary and interpretation of the data presented here are published in Part I of the 2013 Annual Report on the Radiological Monitoring Program for the Kewaunee Power Station.

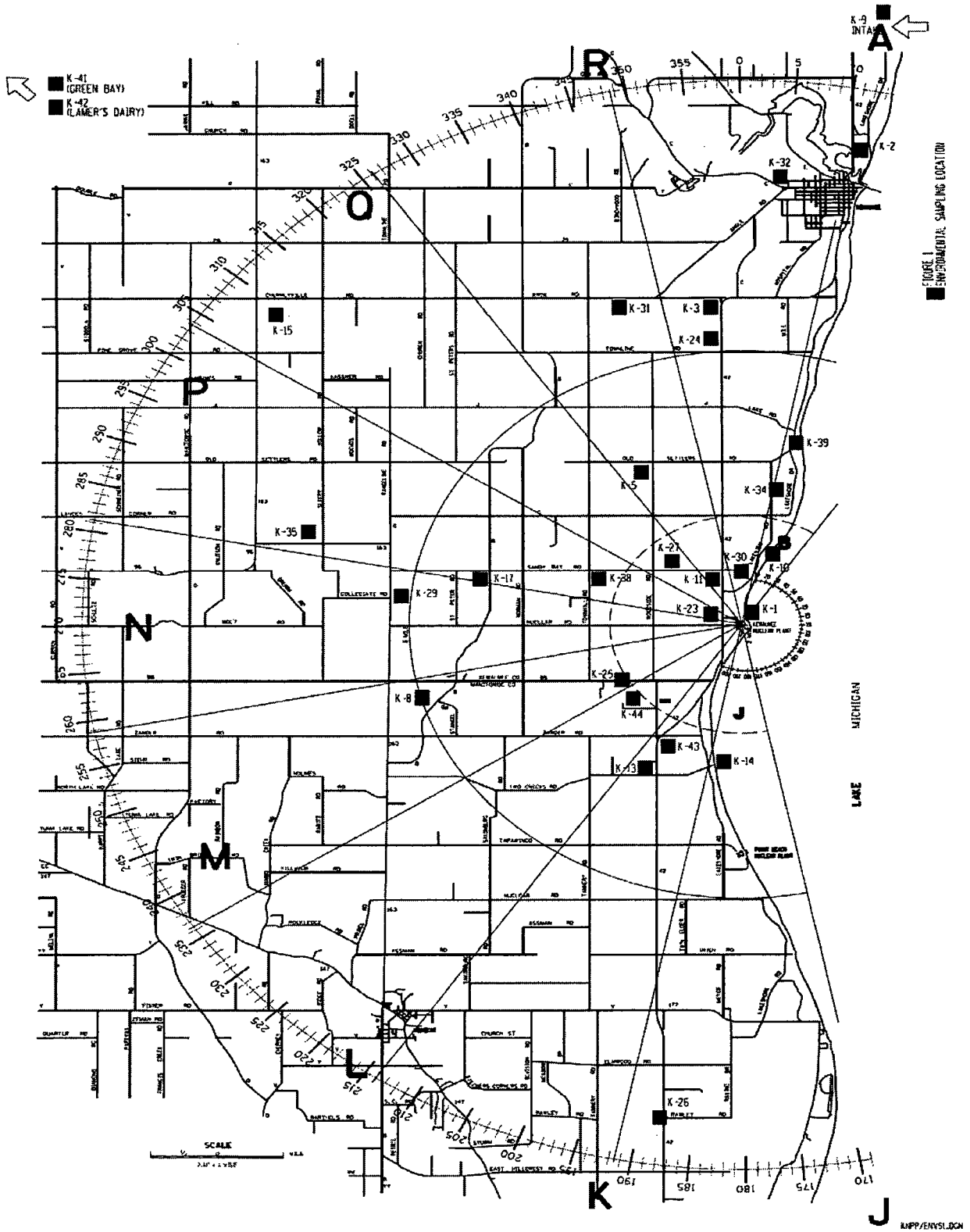


Figure 1. Sampling locations, Kewaunee Power Station

Table 1. Sampling locations, Kewaunee Power Station.

Code	Type ^a	Distance (miles) ^b and Sector	Location
K-1	I		Onsite
K-1a	I	0.62 N	North Creek
K-1b	I	0.12 N	Middle Creek
K-1c	I	0.10 N	500' north of condenser discharge
K-1d	I	0.10 E	Condenser discharge
K-1e	I	0.12 S	South Creek
K-1f	I	0.12 S	Meteorological Tower
K-1g	I	0.06 W	South Well
K-1h	I	0.12 NW	North Well
K-1j	I	0.10 S	500' south of condenser discharge
K-1k	I	0.60 SW	Drainage Pond, south of plant
K-1l	I	0.13 N	ISFSI Southeast
K-1m	I	0.15 N	ISFSI East
K-1n	I	0.16 N	ISFSI Northwest
K-1o	I	0.16 N	ISFSI North
K-1p	I	0.17 N	ISFSI Northwest
K-1q	I	0.16 N	ISFSI West
K-1r	I	0.13 N	ISFSI West
K-1s	I	0.12 N	ISFSI Southwest
K-2	C	8.91 NNE	WPS Operations Building in Kewaunee
K-3	C	5.9 N	Lyle and John Siegmund Farm, N2815 Hy 42, Kewaunee
K-5	I	3.2 NNW	Ed Papham Farm, E4160 Old Settlers Rd, Kewaunee
K-8	C	4.85 WSW	St. Isadore the Farmer Church, 18424 Tisch Mills Rd, Tisch Mills
K-9	C	11.5 NNE	Green Bay Municipal Pumping Station, six miles east of Green Bay (sample source is Lake Michigan water from Rostok Intake, two miles north of Kewaunee).
K-10	I	1.35 NNE	Turner Farm, Kewaunee site
K-11	I	0.96 NW	Harlan Ihlenfeld Farm, N879 Hy 42, Kewaunee
K-13	C	3.0 SSW	Rand's General Store, Two Creeks
K-14	I	2.6 S	Two Creeks Park, 2.6 miles south of site
K-15	C	9.25 NW	Gas Substation, 1.5 miles north of Stangelville
K-17	I	4.0 W	Jansky's Farm, N885 Tk B, Kewaunee
K-23a	I	0.5 W	0.5 miles west of plant, Kewaunee site
K-23b	I	0.6 N	0.6 miles north of plant, Kewaunee site
K-24	I	5.4 N	Fictum Farm, N2653 Hy 42, Kewaunee
K-25	I	1.9 SW	Wotachek Farm, 3968 E. Cty Tk BB, Two Rivers
K-26	C	9.1 SSW	Sandy's Vegetable Stand (8.0 miles south of "BB")

Table 1. Sampling locations, Kewaunee Power Station (continued).

Code	Type ^a	Distance (miles) ^b and Sector	Location
K-27	I	1.53 NW	Schleis Farm, E4298 Sandy Bay Rd, Kewaunee
K-29	I	5.34 W	Kunesh Farm, E3873 Cty Tk G, Kewaunee
K-30	I	0.8 N	End of site boundary
K-31	C	6.35 NNW	E. Krok Substation, Krok Road
K-32	C	7.8 N	Piggly Wiggly, 931 Marquette Dr., Kewaunee
K-34	I	2.7 N	Leon and Vicki Struck, N1549 Lakeshore Dr., Kewaunee
K-35	C	6.71 mi. WNW	Duane Ducat, N1215 Sleepy Hollow Rd., Kewaunee
K-36	I		Fiala's Fish market, 216 Milwaukee, Kewaunee
K-38	I	2.45 mi. WNW	Dave Sinkula Farm, N890 Town Hall Road, Kewaunee
K-39	I	3.46 mi. N	Francis Wojta, N1859 Lakeshore Dr., Kewaunee
K-41	C	22 NW	KPS-EOF, 3060 Voyager Dr. , Green Bay
K-42	C	28.1 W	Lamers Dairy Products obtained from Green Bay markets.
K-43	I	2.71 SSW	Gary Maigatter Property, 17333 Hwy 42, Two Rivers
K-44	I	2.63 SW	Gerald Schleis Property, 4728 Schleis Rd., Two Rivers

^a I = indicator; C = control.

^b Distances are measured from reactor stack.

Table 2. Type and frequency of collection.

Location	Weekly	Monthly	Quarterly	Semiannually	Annually
K-1a		SW		SL ^f	
K-1b		SW	GR ^a	SL ^f	
K-1c				BS ^b	
K-1d		SW	FI ^a	SL ^f BS ^b	
K-1e		SW		SL ^f	
K-1f	AP ^g , AI		GR ^a TLD	SO	
K-1g, K-1h			WW		
K-1j				BS ^b	
K-1k		SW		SL ^f	
K-1l through K-1s			TLD		
K-2	AP ^g , AI		TLD		
K-3, K-5		MI ^c	GR ^a TLD	SO	CF ^d
K-8	AP ^g , AI		TLD		
K-9		SW ⁱ		SL ^f BS ^b	
K-10, K-13			WW		
K-11		PR	WW		
K-14		SW ^h		SL ^f BS ^b	
K-15, K-17			TLD		
K-23a, b					GRN / GLV ^e
K-24			EG		DM
K-25			TLD		
K-26					VE / GLV ^e
K-27			TLD		
K-29					DM
K-30			TLD		
K-31	AP ^g , AI		TLD		
K-32			EG		DM
K-34, K-35		MI ^c	GR ^a	SO	CF ^d
K-38		MI ^c	GR ^a WW	SO	CF ^d
K-39		MI ^c	GR ^a TLD	SO	CF ^d
K-41	AP ^g , AI		TLD		
K-42		MI ^c			
K-43	AP ^g , AI		TLD		
K-44		MI ^c			

^a Three times a year, second, third and fourth quarters.

^b Collected in May and November.

^c Monthly November - April; semimonthly May - October.

^d First quarter (January, February, March) only.

^e Alternate, if milk is not available.

^f Second and third quarters.

^g Frequency may be increased dependent on dust loading.

^h Two samples are collected, North (K-14a) and South (K-14b) of Two Creeks Road.

ⁱ Two samples, raw and treated.

Table 3. Sample Codes:

<u>Code</u>	<u>Description</u>
AI	Airborne Iodine
AP	Airborne particulates
BS	Bottom sediments
CF	Cattlefeed
DM	Domestic Meat
EG	Eggs
FI	Fish
GLV	Green Leafy Vegetables
GRN	Grain
GR	Grass
MI	Milk
PR	Precipitation
SL	Slime
SO	Soil
SW	Surface water
TLD	Thermoluminescent Dosimeter
VE	Vegetables
WW	Well water

GRAPHS OF DATA TRENDS

Note: Conventions used in trending data.

The following conventions should be used in the interpretation of the graphs of data trends:

1. Both solid and open data points may be used in the graphs. A solid point indicates an activity, an open point, a lower limit of detection (LLD) value.
2. Data points are connected by a solid line. A break in the plot indicates missing data.

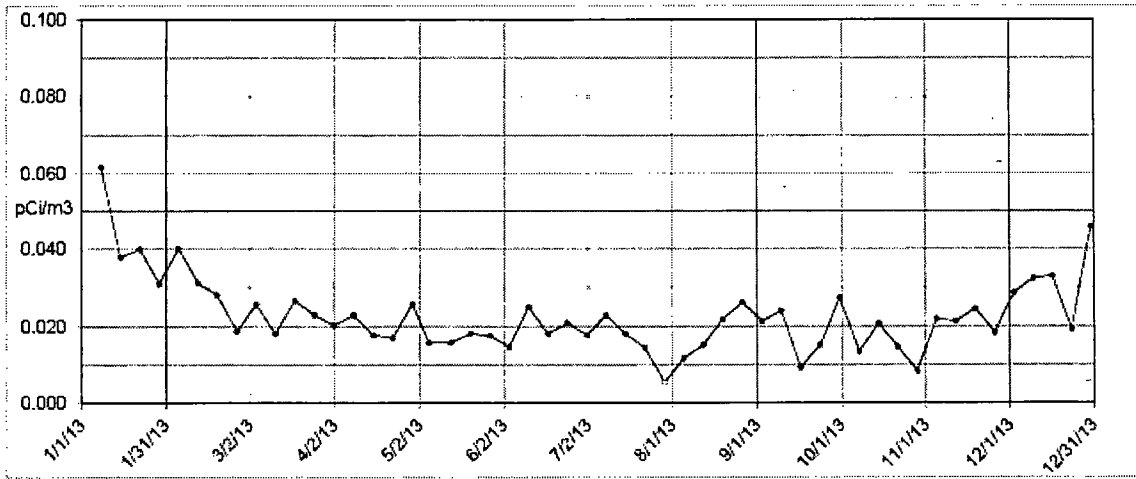


Figure 2. Location K-1f (weekly samples, 2013).

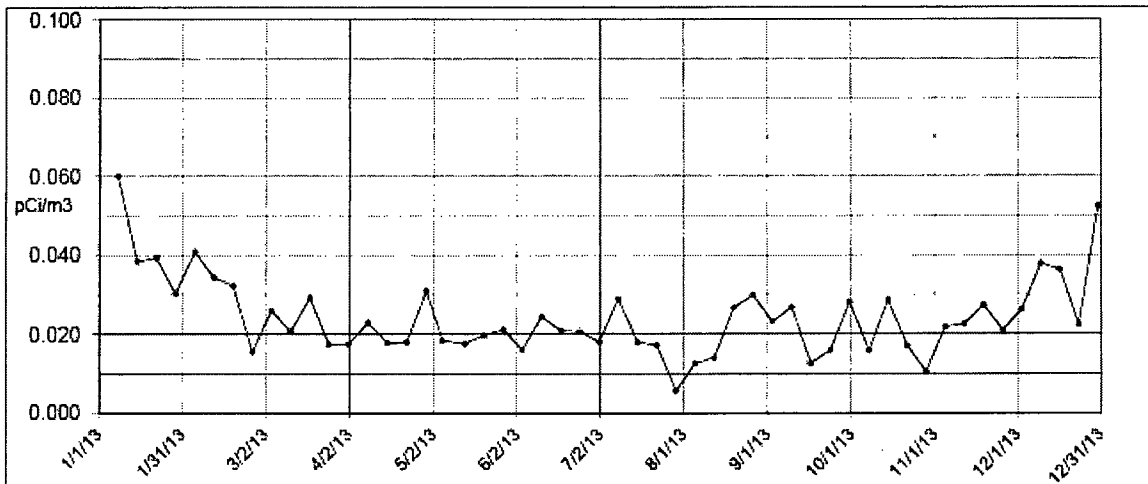


Figure 3. Location K-2 (weekly samples, 2013).

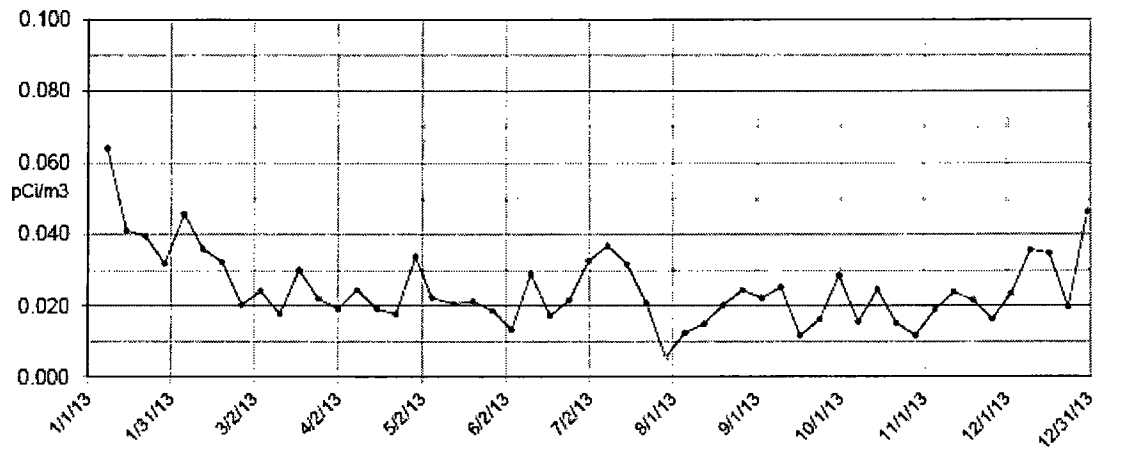


Figure 4. Location K-8 (weekly samples, 2013).

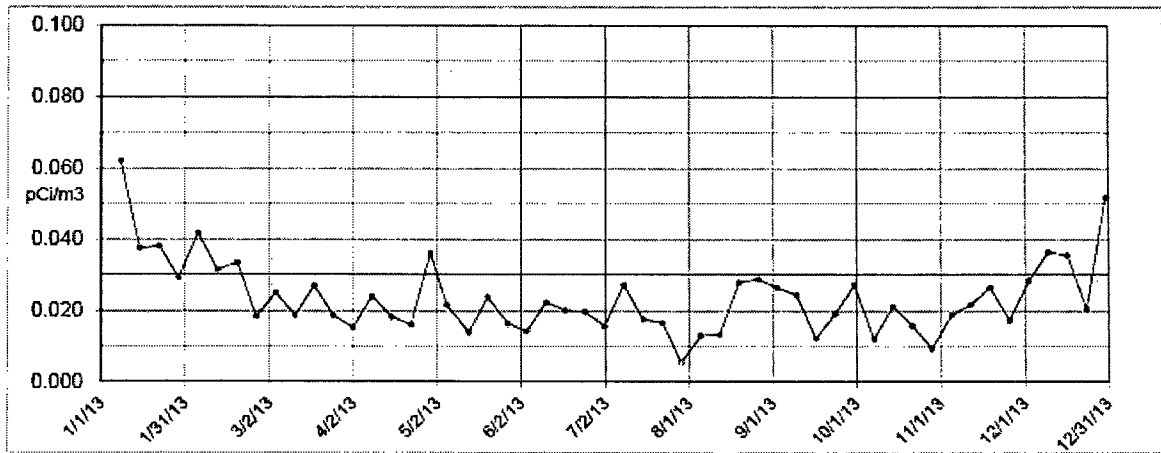


Figure 5. Location K-31 (weekly samples, 2013).

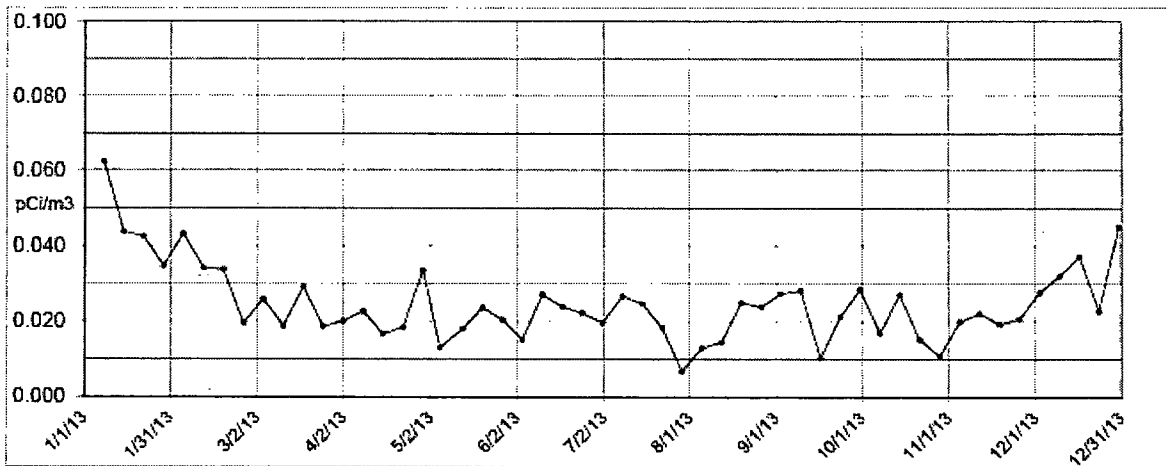


Figure 6. Location K-41 (weekly samples, 2013).

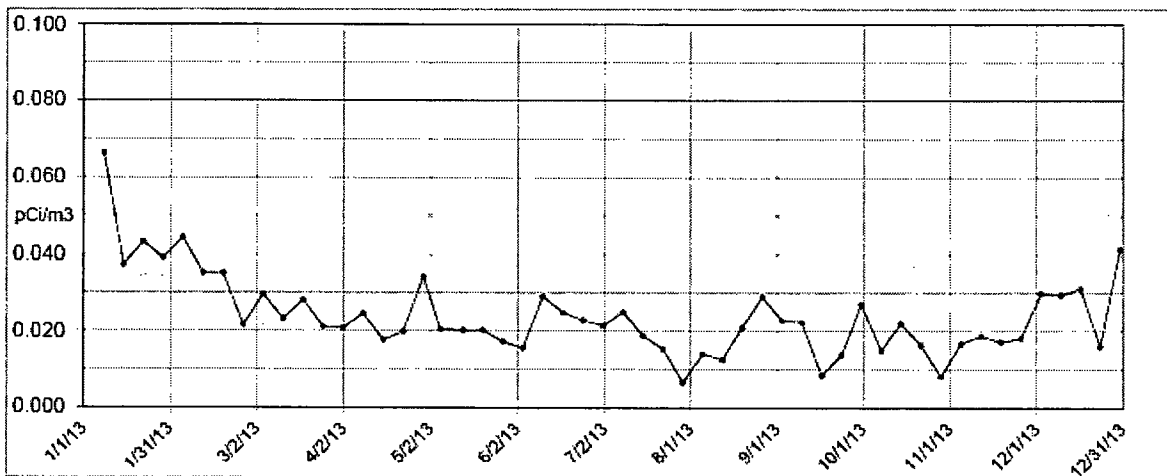


Figure 7. Location K-43 (weekly samples, 2013).

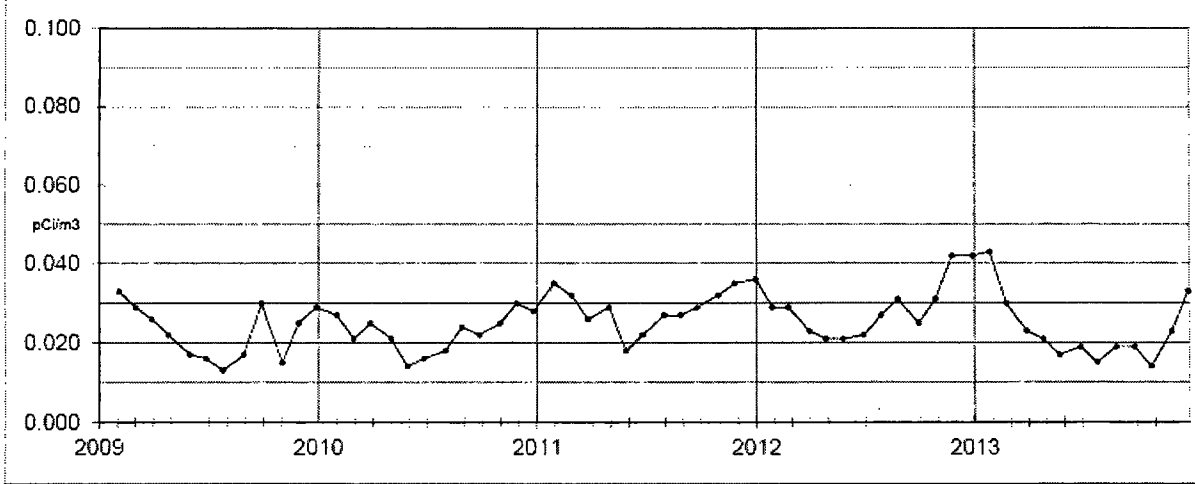


Figure 8. Location K-1f (monthly averages, 2009-2013).

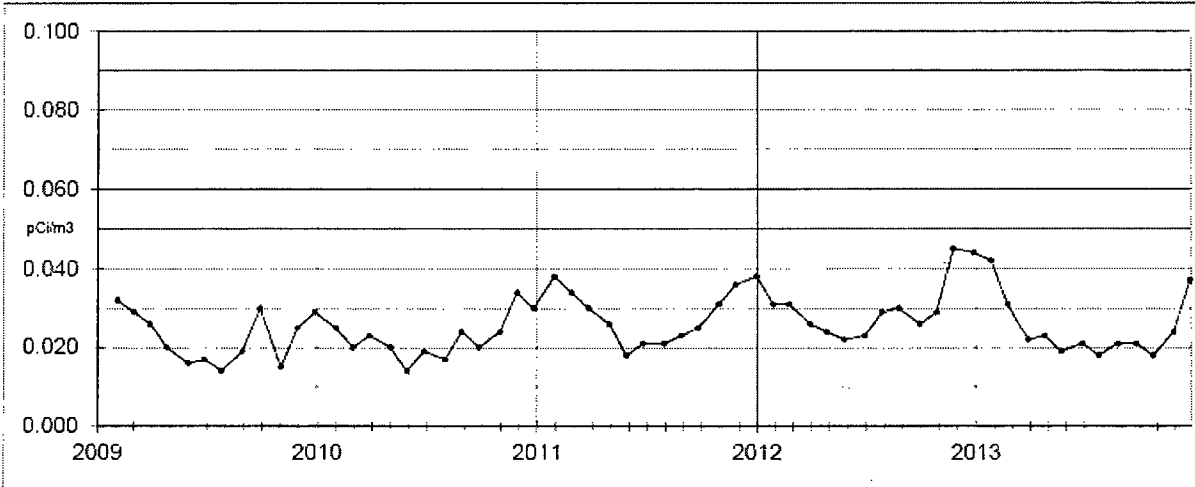


Figure 9. Location K-2 (monthly averages, 2009-2013).

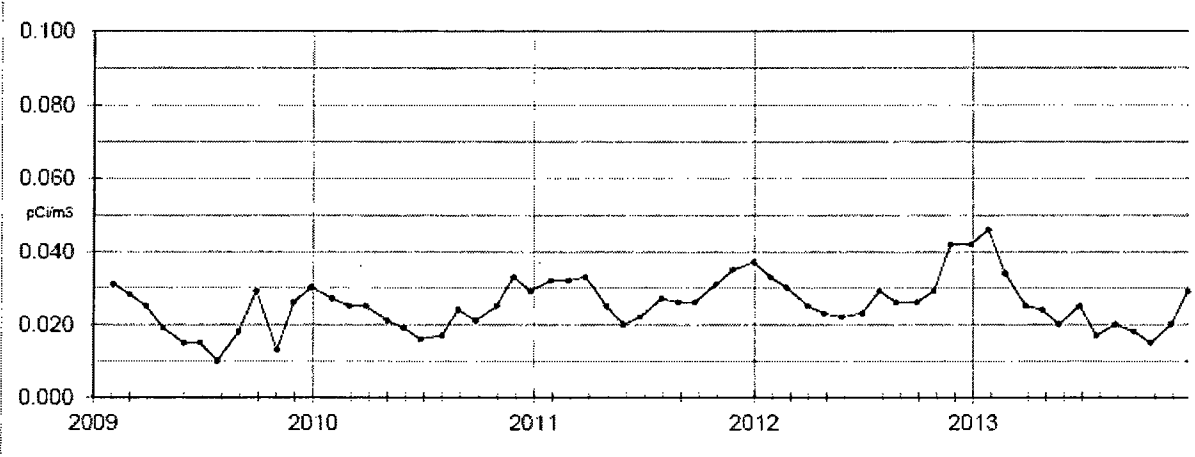


Figure 10. Location K-7/K-43 (monthly averages, 2009-2013).

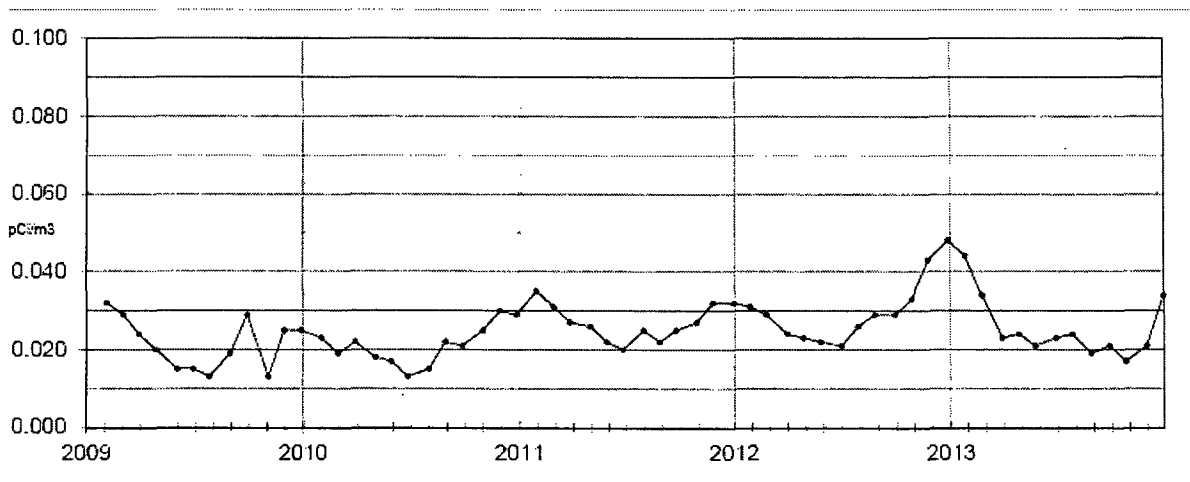


Figure 11. Location K-8 (monthly averages, 2009-2013).

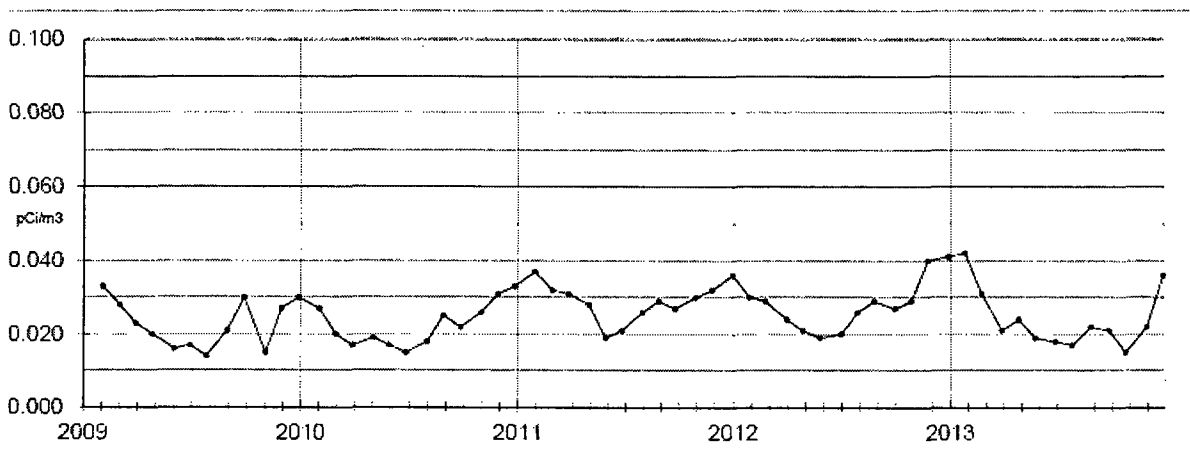


Figure 12. Location K-31 (monthly averages, 2009-2013).

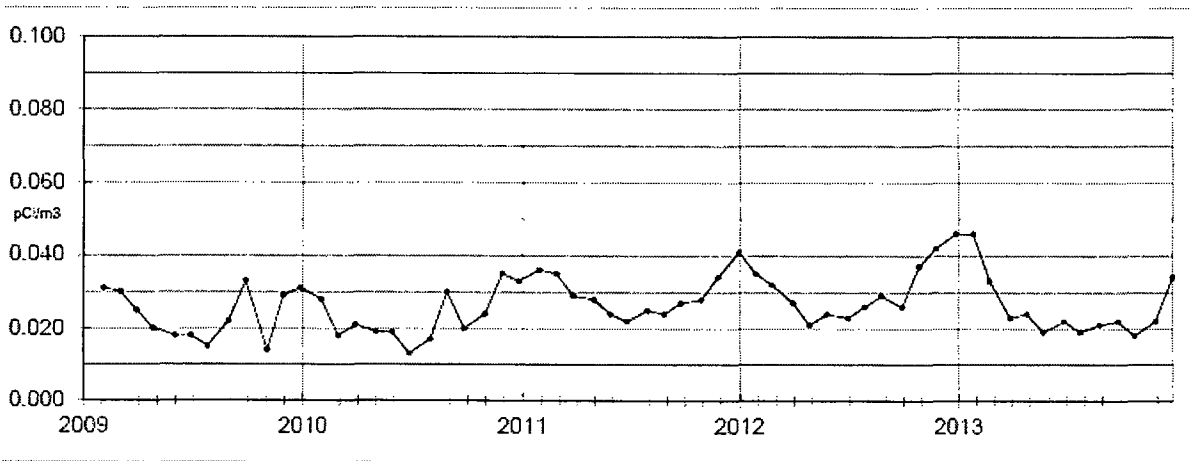


Figure 13. Location K-41 (monthly averages, 2009-2013).

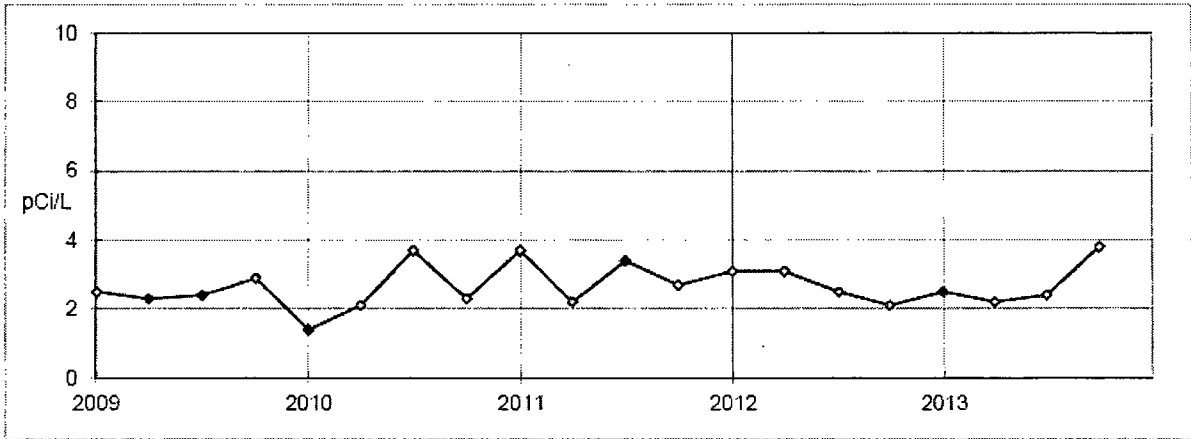


Figure 14. Location K-1g. Total Residue. Quarterly collection.



Figure 15. Location K-1h. Total Residue. Quarterly collection.

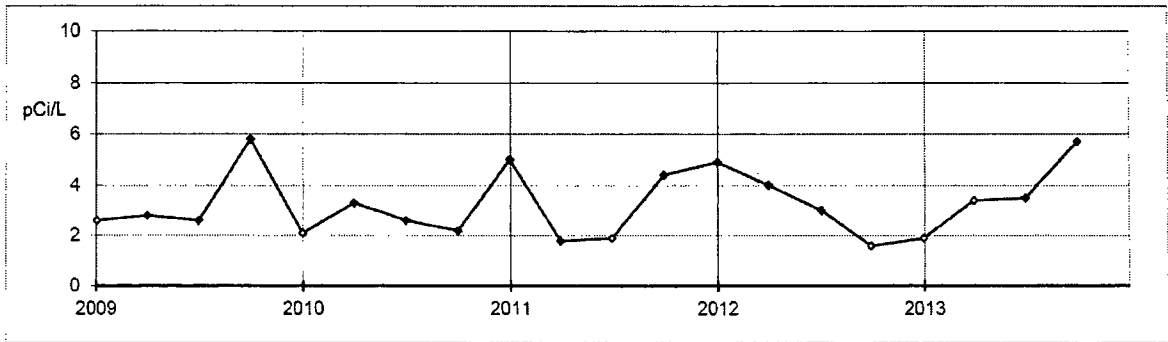


Figure 16. Location K-1g. Total Residue. Quarterly collection.

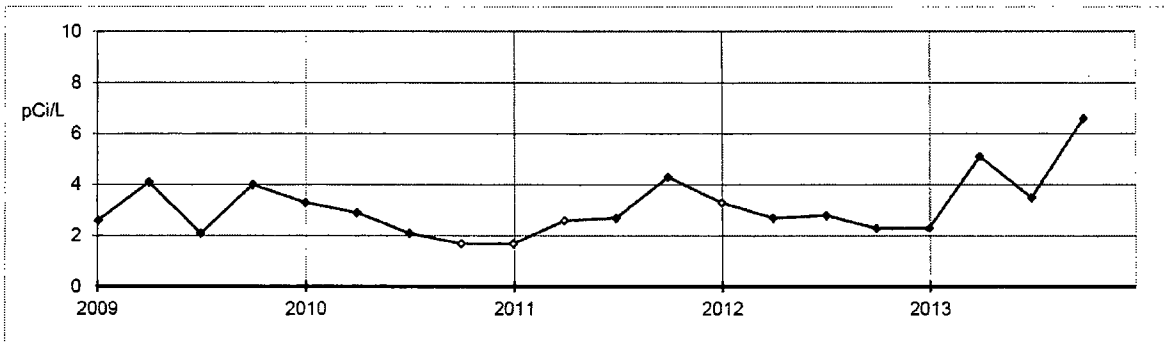


Figure 17. Location K-1h. Total Residue. Quarterly collection.

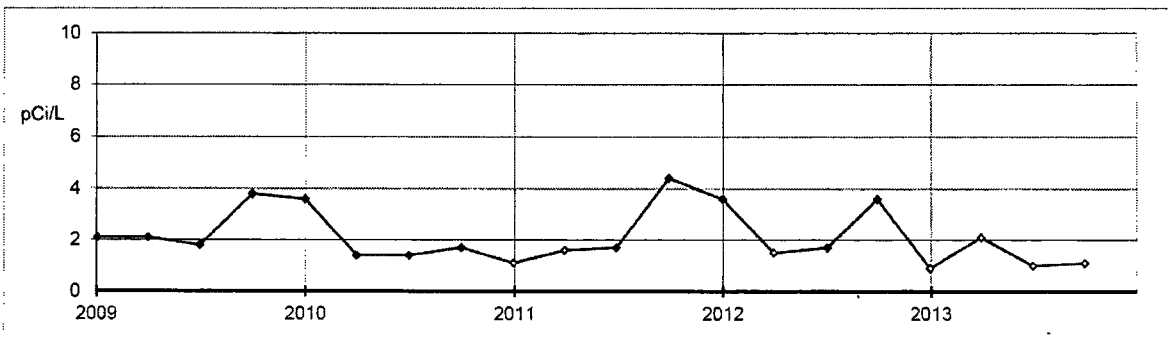


Figure 18. Location K-10. Total Residue. Quarterly collection.

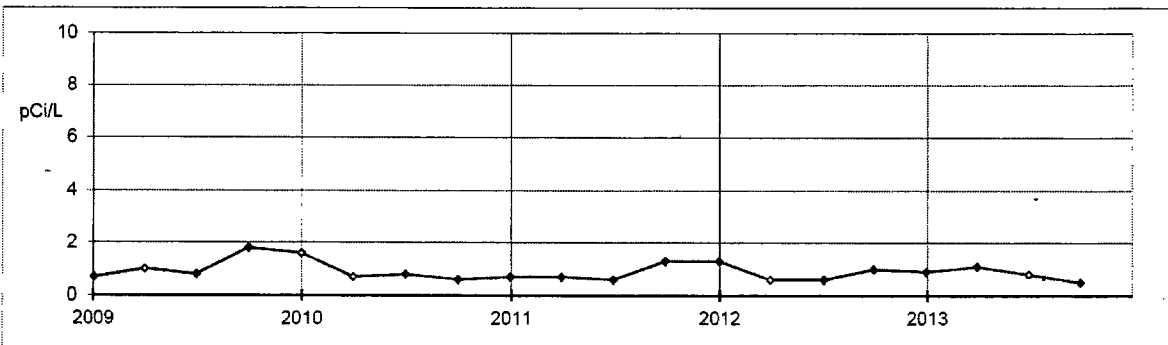


Figure 19. Location K-11. Total Residue. Quarterly collection.

Note: An open data point indicates activity less than the lower limit of detection (LLD).

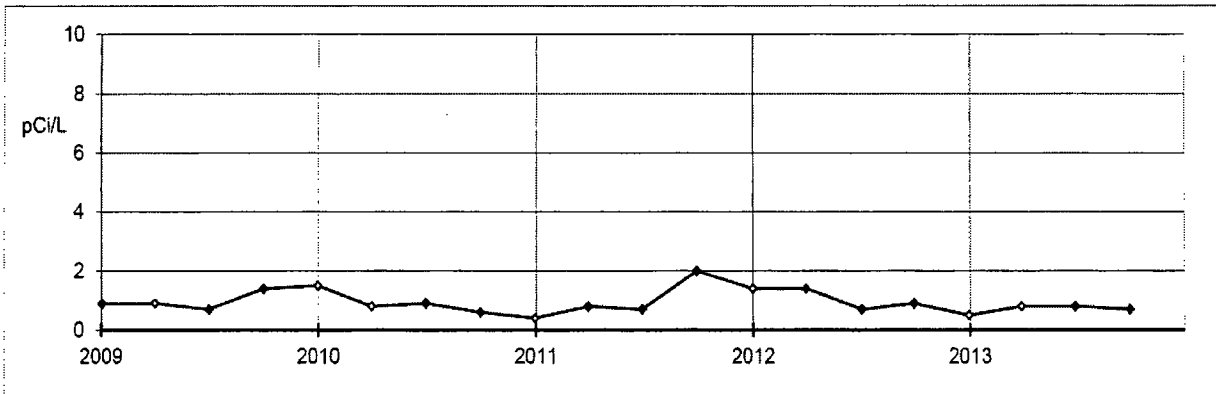


Figure 20. Location K-13. Total Residue. Quarterly collection.

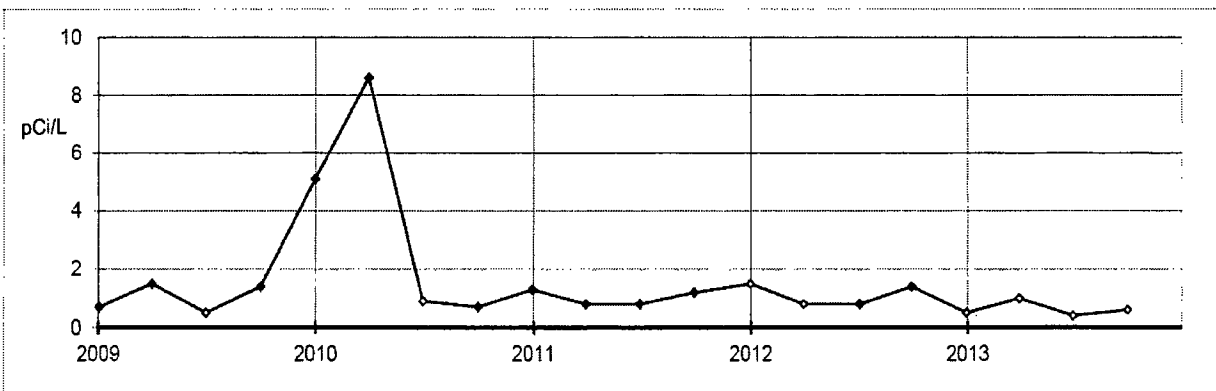


Figure 21. Location K-38. Total Residue. Quarterly collection.

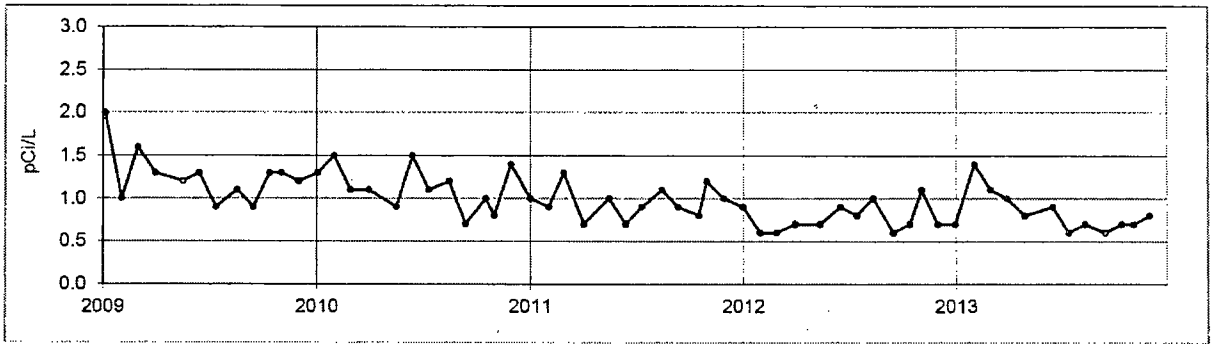


Figure 22. Milk samples. Location K-3.

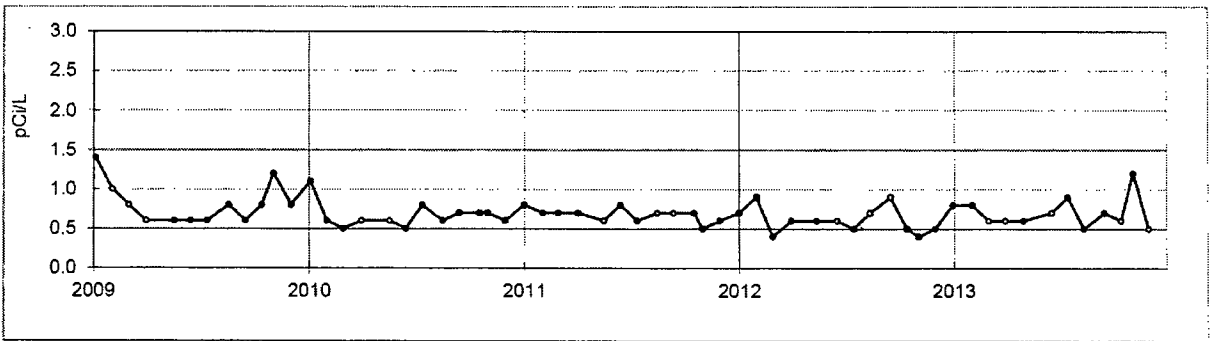


Figure 23. Milk samples. Location K-5.

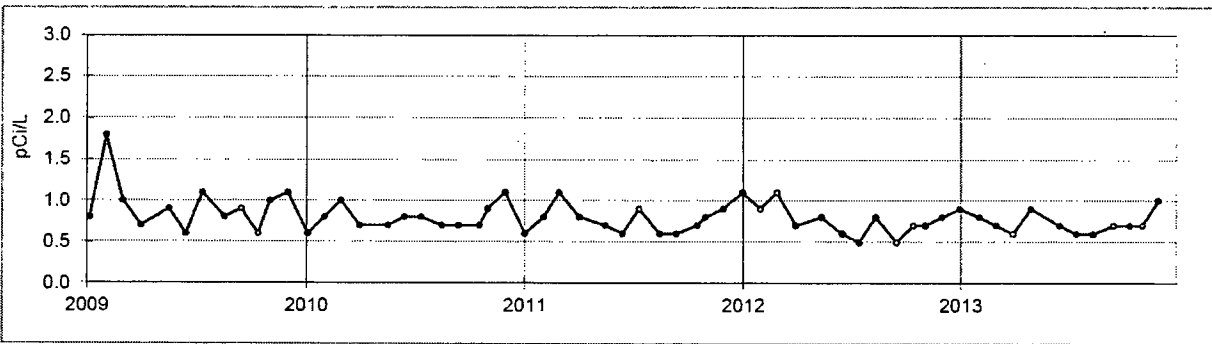


Figure 24. Milk samples. Location K-28 / K-42.

K-42 (Lamer's Dairy Products) replaced K-28 in March, 2010.

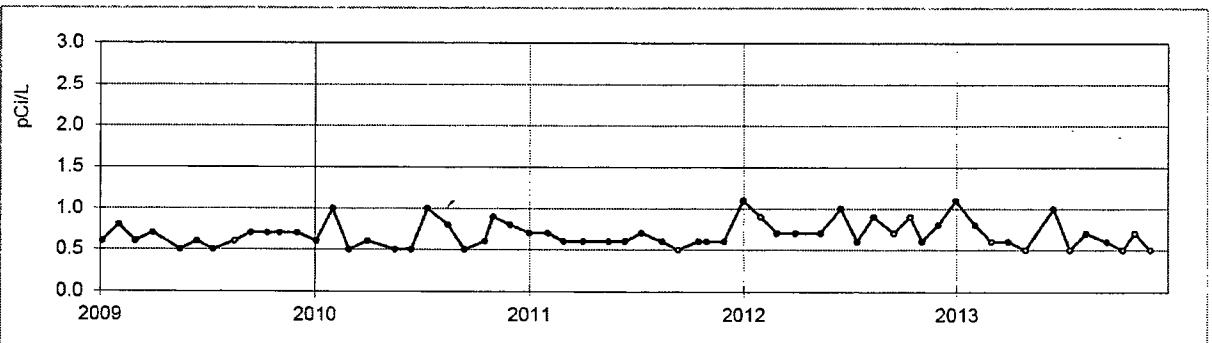


Figure 25. Milk samples. Location K-34.

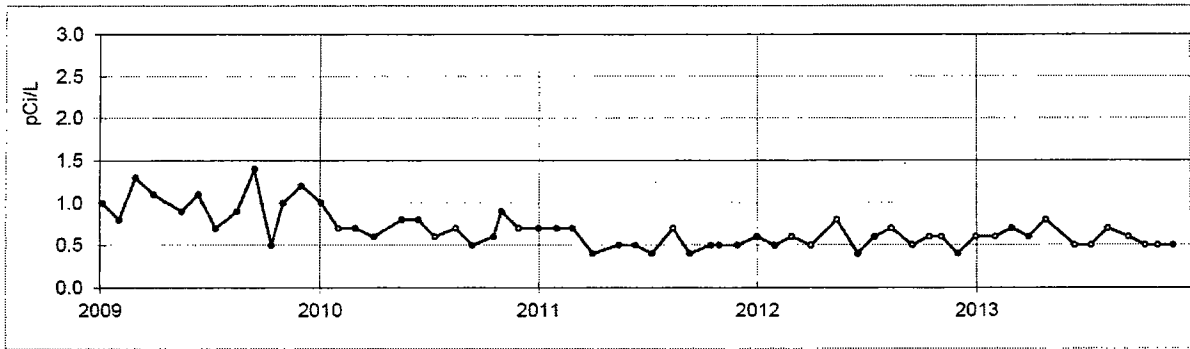


Figure 26. Milk samples. Location K-35.

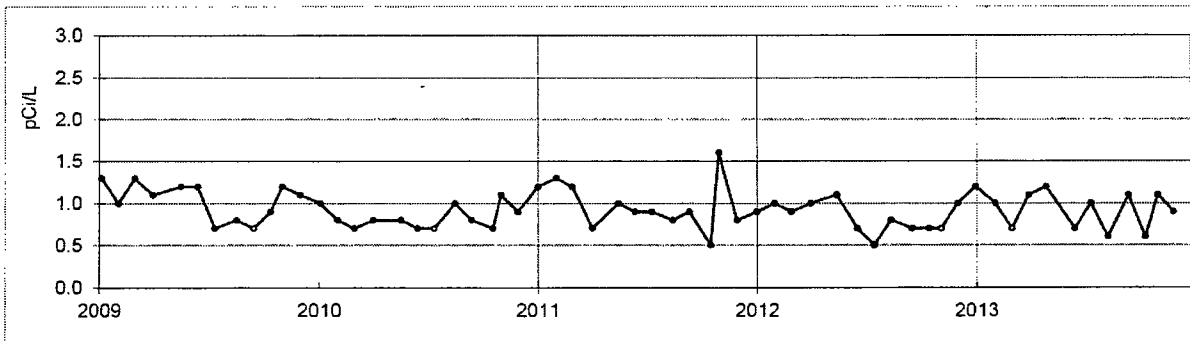


Figure 27. Milk samples. Location K-38.

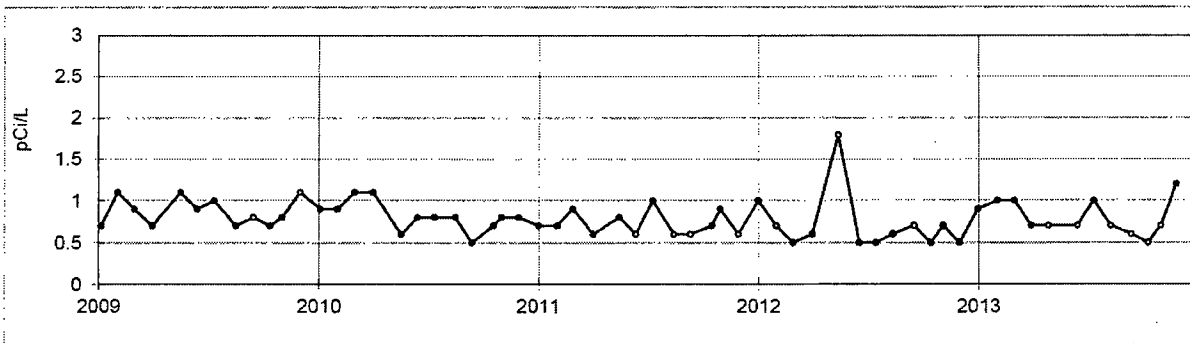


Figure 28. Milk samples. Location K-39.

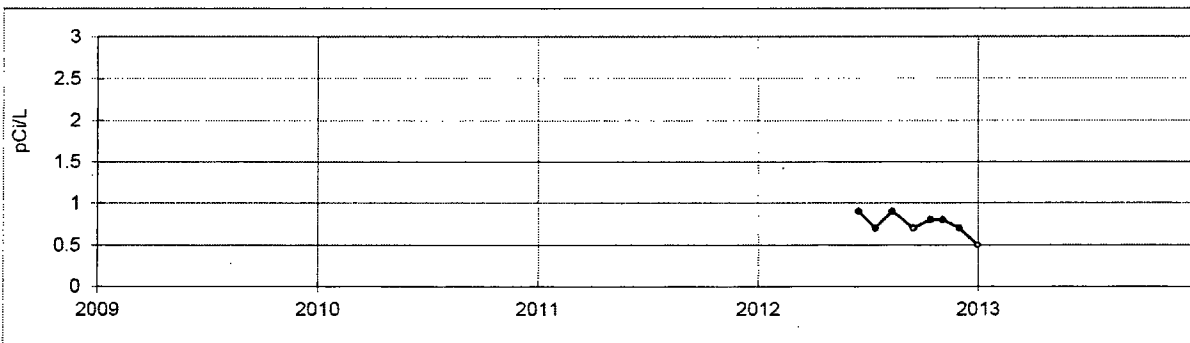


Figure 29. Milk samples. Location K-44 ^a.

^a Last collection Jan. 2, 2013, Dairy out of business, cows sold.

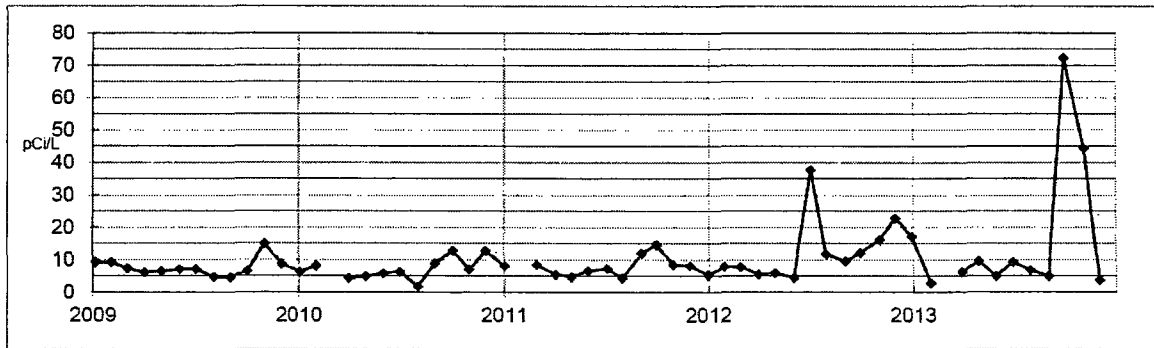


Figure 30. Surface water . North Creek, Onsite (K-1a).

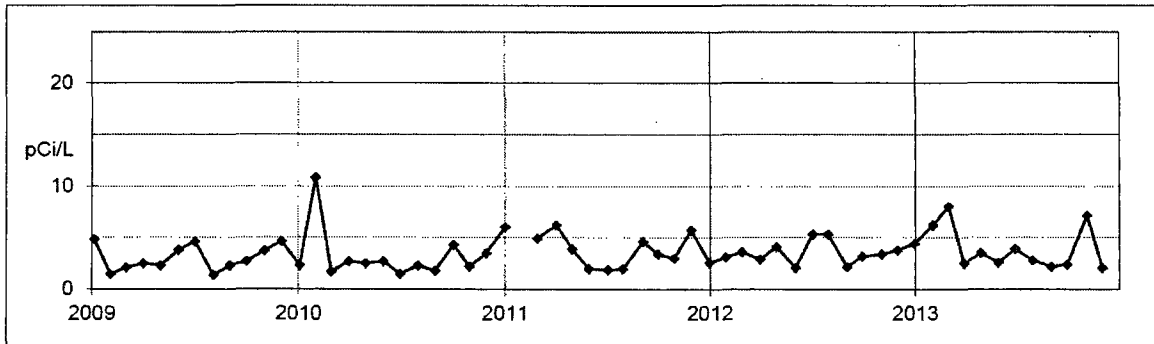


Figure 31. Surface water . Middle Creek, Onsite (K-1b).

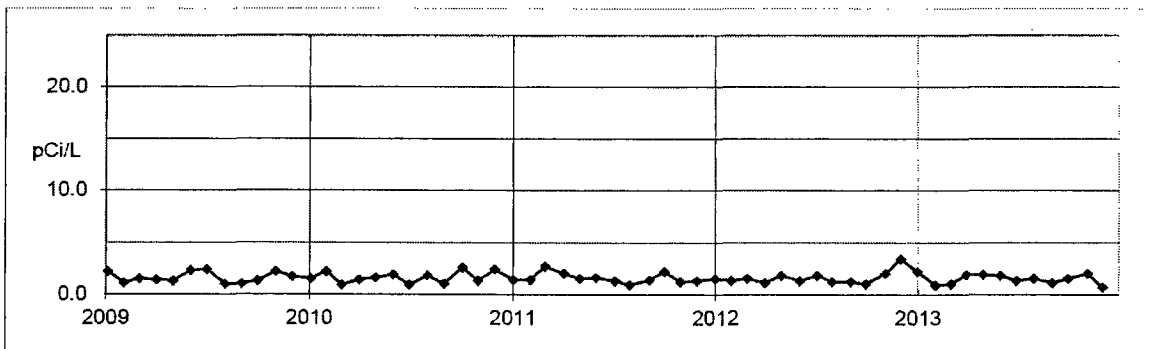


Figure 32. Surface water. Lake Michigan, condenser discharge, Onsite (K-1d).

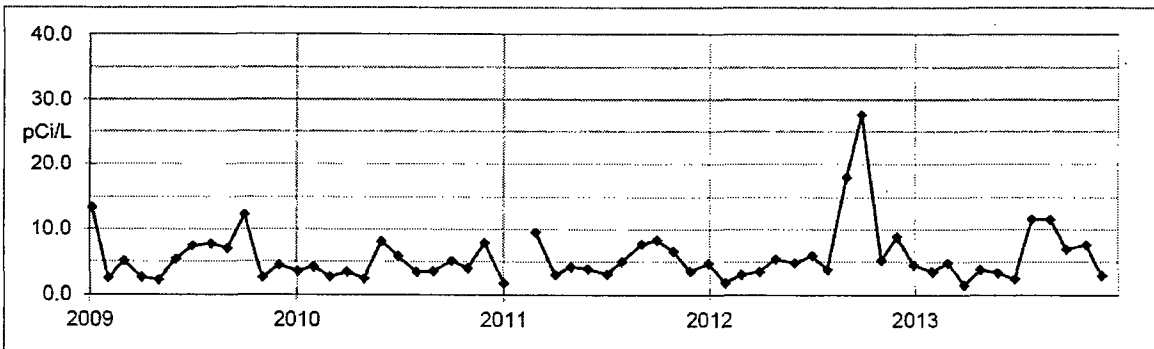


Figure 33. Surface water. South Creek, Onsite (K-1e).

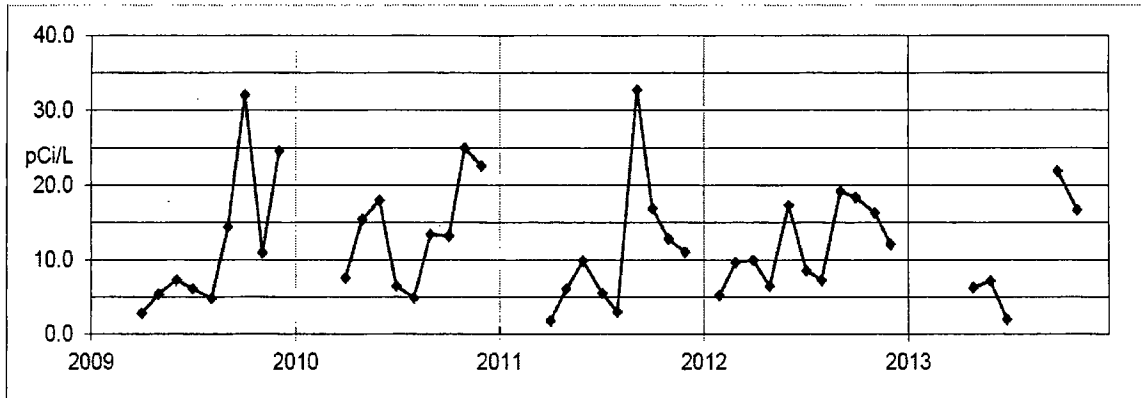


Figure 34. Surface water. School Forest Pond (K-1k).

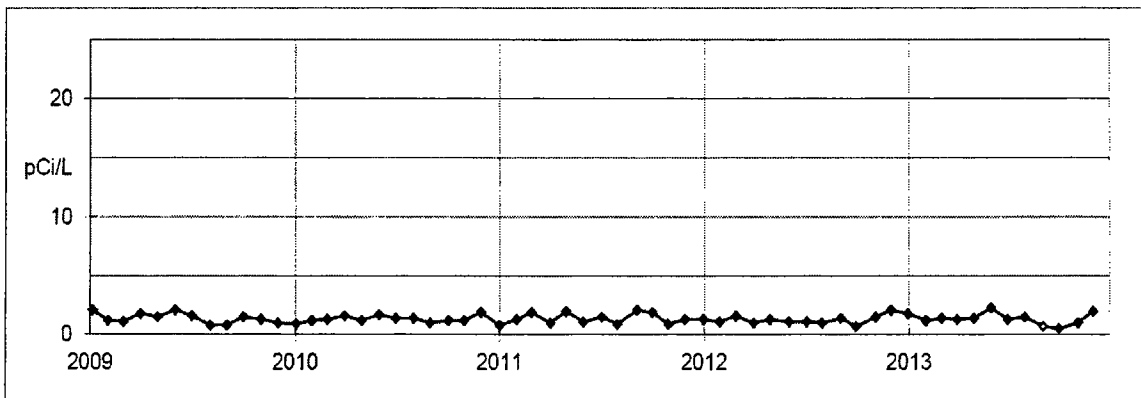


Figure 35. Surface water (raw). Lake Michigan, Rostok Intake (K-9)

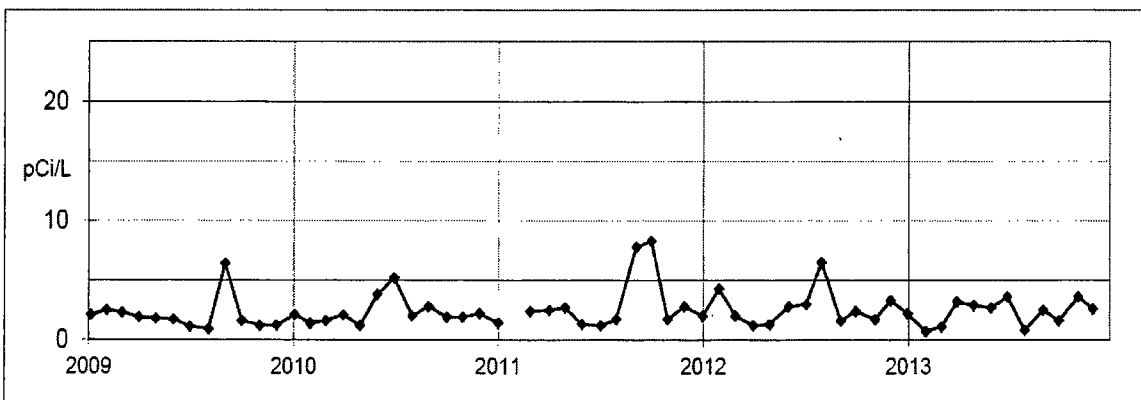


Figure 36. Surface water . Lake Michigan, Two Creeks Park (K-14a).

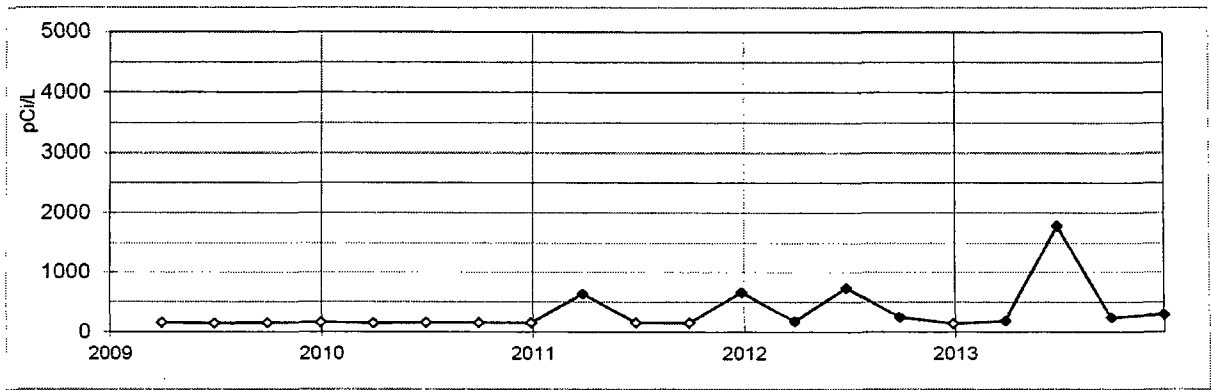


Figure 37. Surface water. Lake Michigan, condenser discharge, K-1d. Quarterly collection.

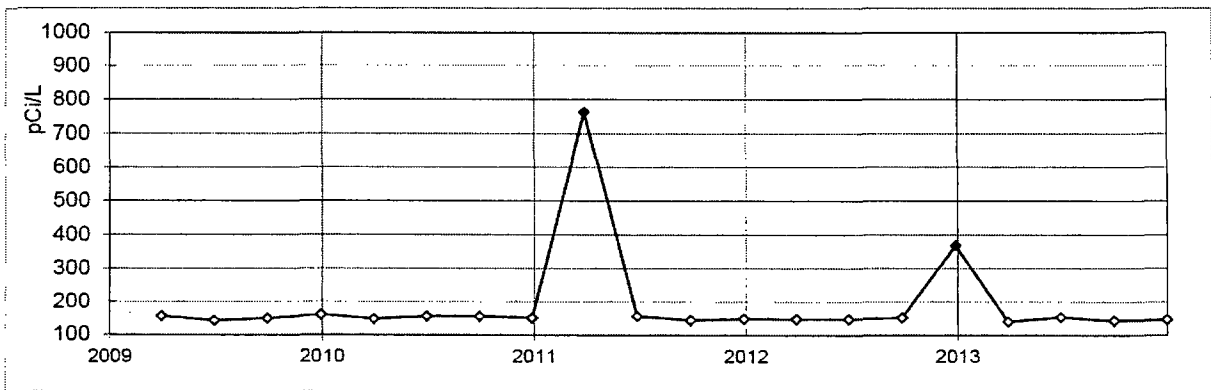


Figure 38. Surface water. Lake Michigan, Two Creeks Park, K-14a. Quarterly collection.

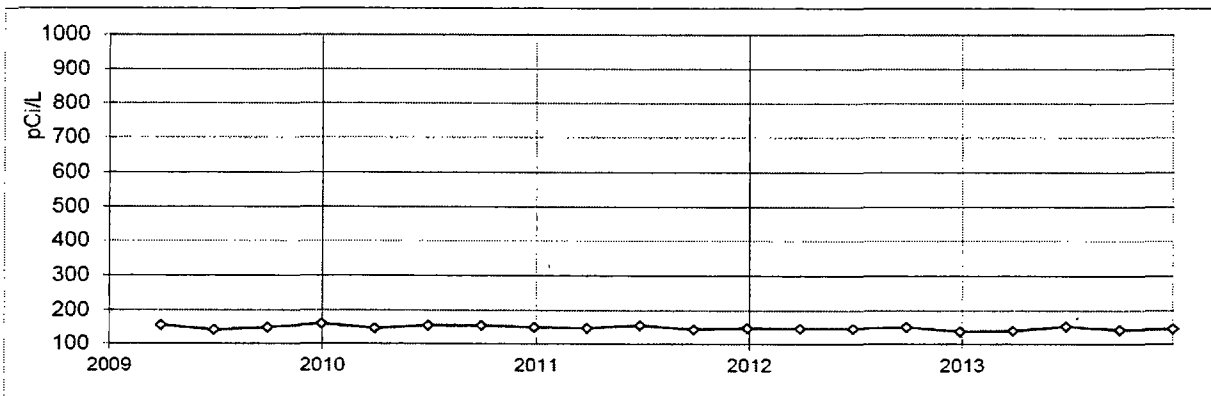


Figure 39. Surface water. Lake Michigan, Rostok Intake, K-9. Quarterly collection.

DATA TABULATIONS

Table 4. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131^a.

Location: K-1f

Units: pCi/m³

Collection: Continuous, weekly exchange.

Date Collected	Volume (m ³)	Gross Beta	Date Collected	Volume (m ³)	Gross Beta
<u>Required LLD</u>		<u>0.010</u>	<u>Required LLD</u>		<u>0.010</u>
01-08-13	345	0.062 ± 0.005	07-09-13	301	0.023 ± 0.004
01-15-13	301	0.038 ± 0.004	07-16-13	302	0.018 ± 0.004
01-22-13	304	0.040 ± 0.004	07-23-13	302	0.014 ± 0.004
01-29-13	301	0.031 ± 0.004	07-30-13	301	< 0.005 ^b
02-05-13	302	0.040 ± 0.004	08-06-13	302	0.012 ± 0.004
02-12-13	303	0.031 ± 0.004	08-13-13	303	0.015 ± 0.004
02-19-13	309	0.028 ± 0.004	08-20-13	299	0.022 ± 0.004
02-26-13	295	0.019 ± 0.003	08-27-13	304	0.026 ± 0.004
03-05-13	303	0.026 ± 0.003	09-03-13	302	0.021 ± 0.004
03-12-13	300	0.018 ± 0.003	09-10-13	307	0.024 ± 0.004
03-19-13	307	0.027 ± 0.004	09-17-13	299	0.009 ± 0.004
03-26-13	297	0.023 ± 0.003	09-24-13	303	0.015 ± 0.004
04-02-13	304	0.020 ± 0.004	10-01-13	302	0.027 ± 0.004
1st Quarter Mean ± s.d.		0.031 ± 0.012	3rd Quarter Mean ± s.d.		0.019 ± 0.006
04-09-13	301	0.023 ± 0.004	10-08-13	303	0.013 ± 0.004
04-16-13	303	0.018 ± 0.003	10-15-13	302	0.021 ± 0.004
04-23-13	302	0.017 ± 0.004	10-22-13	303	0.015 ± 0.004
04-30-13	302	0.026 ± 0.004	10-29-13	303	0.008 ± 0.003
05-06-13	260	0.016 ± 0.004	11-05-13	304	0.022 ± 0.004
05-14-13	352	0.016 ± 0.003	11-12-13	302	0.021 ± 0.004
05-21-13	296	0.018 ± 0.004	11-19-13	303	0.025 ± 0.004
05-28-13	302	0.018 ± 0.003	11-26-13	293	0.018 ± 0.004
06-04-13	302	0.015 ± 0.003	12-03-13	305	0.029 ± 0.004
06-11-13	301	0.025 ± 0.004	12-10-13	302	0.032 ± 0.004
06-18-13	303	0.018 ± 0.003	12-17-13	304	0.033 ± 0.004
06-25-13	302	0.021 ± 0.004	12-24-13	301	0.019 ± 0.004
07-02-13	304	0.018 ± 0.003	12-31-13	301	0.046 ± 0.004
2nd Quarter Mean ± s.d.		0.019 ± 0.004	4th Quarter Mean ± s.d.		0.023 ± 0.010
Cumulative Average					0.023

^a Iodine-131 concentrations are < 0.03 pCi/m³ unless otherwise noted.^b Very light particulate matter collected from all locations.

Table 5. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131^a.

Location: K-2

Units: pCi/m³

Collection: Continuous, weekly exchange.

Date Collected	Volume (m ³)	Gross Beta	Date Collected	Volume (m ³)	Gross Beta
<u>Required LLD</u>		<u>0.010</u>	<u>Required LLD</u>		<u>0.010</u>
01-08-13	347	0.060 ± 0.004	07-09-13	302	0.029 ± 0.004
01-15-13	301	0.038 ± 0.004	07-16-13	302	0.018 ± 0.004
01-22-13	304	0.039 ± 0.004	07-23-13	300	0.017 ± 0.004
01-29-13	301	0.030 ± 0.004	07-30-13	301	0.006 ± 0.004 ^b
02-05-13	302	0.041 ± 0.004	08-06-13	304	0.013 ± 0.004
02-12-13	303	0.034 ± 0.004	08-13-13	302	0.014 ± 0.004
02-19-13	309	0.032 ± 0.004	08-20-13	305	0.027 ± 0.004
02-26-13	296	0.016 ± 0.003	08-27-13	301	0.030 ± 0.004
03-05-13	302	0.026 ± 0.003	09-03-13	302	0.023 ± 0.004
03-12-13	300	0.021 ± 0.003	09-10-13	305	0.027 ± 0.004
03-19-13	307	0.029 ± 0.004	09-17-13	302	0.013 ± 0.004
03-26-13	297	0.017 ± 0.003	09-24-13	300	0.016 ± 0.004
04-02-13	304	0.018 ± 0.003	10-01-13	302	0.028 ± 0.004
1st Quarter Mean ± s.d.		0.031 ± 0.012	3rd Quarter Mean ± s.d.		0.020 ± 0.008
04-09-13	300	0.023 ± 0.004	10-08-13	302	0.016 ± 0.004
04-16-13	303	0.018 ± 0.003	10-15-13	303	0.029 ± 0.004
04-23-13	303	0.018 ± 0.004	10-22-13	301	0.017 ± 0.004
04-30-13	302	0.031 ± 0.004	10-29-13	303	0.011 ± 0.004
05-06-13	260	0.018 ± 0.004	11-05-13	305	0.022 ± 0.004
05-14-13	349	0.018 ± 0.003	11-12-13	303	0.023 ± 0.004
05-21-13	301	0.020 ± 0.004	11-19-13	311	0.027 ± 0.004
05-28-13	302	0.021 ± 0.003	11-26-13	292	0.021 ± 0.004
06-04-13	302	0.016 ± 0.003	12-03-13	306	0.026 ± 0.004
06-11-13	303	0.024 ± 0.004	12-10-13	301	0.038 ± 0.004
06-18-13	305	0.021 ± 0.004	12-17-13	304	0.036 ± 0.004
06-25-13	298	0.021 ± 0.004	12-24-13	301	0.022 ± 0.004
07-02-13	304	0.018 ± 0.003	12-31-13	302	0.052 ± 0.005
2nd Quarter Mean ± s.d.		0.021 ± 0.004	4th Quarter Mean ± s.d.		0.026 ± 0.011
Cumulative Average					0.024

^a Iodine-131 concentrations are < 0.03 pCi/m³ unless otherwise noted.^b Very light particulate matter collected from all locations.

Table 6. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131^a.

Location: K-8

Units: pCi/m³

Collection: Continuous, weekly exchange.

Date Collected	Volume (m ³)	Gross Beta	Date Collected	Volume (m ³)	Gross Beta
<u>Required LLD</u>		<u>0.010</u>	<u>Required LLD</u>		<u>0.010</u>
01-08-13	344	0.064 ± 0.005	07-09-13	300	0.037 ± 0.005
01-15-13	301	0.041 ± 0.004	07-16-13	305	0.032 ± 0.004
01-22-13	308	0.039 ± 0.004	07-23-13	299	0.021 ± 0.004
01-29-13	301	0.032 ± 0.004	07-30-13	301	< 0.005 ^b
02-05-13	302	0.046 ± 0.004	08-06-13	304	0.012 ± 0.004
02-12-13	302	0.036 ± 0.004	08-13-13	274	0.015 ± 0.004
02-19-13	307	0.032 ± 0.004	08-20-13	298	0.020 ± 0.004
02-26-13	297	0.020 ± 0.004	08-27-13	305	0.024 ± 0.004
			09-03-13	302	0.022 ± 0.004
03-05-13	304	0.024 ± 0.004			
03-12-13	300	0.018 ± 0.003	09-10-13	306	0.025 ± 0.004
03-19-13	304	0.030 ± 0.004	09-17-13	299	0.012 ± 0.004
03-26-13	296	0.022 ± 0.003	09-24-13	303	0.016 ± 0.004
04-02-13	307	0.019 ± 0.004	10-01-13	289	0.029 ± 0.004
1st Quarter Mean ± s.d.		0.033 ± 0.013	3rd Quarter Mean ± s.d.		0.022 ± 0.008
04-09-13	298	0.024 ± 0.004	10-08-13	303	0.015 ± 0.004
04-16-13	306	0.019 ± 0.003	10-15-13	302	0.025 ± 0.004
04-23-13	303	0.018 ± 0.004	10-22-13	303	0.015 ± 0.004
04-30-13	301	0.034 ± 0.004	10-29-13	305	0.012 ± 0.004
05-06-13	260	0.022 ± 0.004	11-05-13	304	0.019 ± 0.004
05-14-13	347	0.021 ± 0.003	11-12-13	303	0.024 ± 0.004
05-21-13	299	0.021 ± 0.004	11-19-13	311	0.022 ± 0.004
05-28-13	303	0.019 ± 0.003	11-26-13	292	0.016 ± 0.004
			12-03-13	305	0.023 ± 0.004
06-04-13	302	0.013 ± 0.003			
06-11-13	300	0.029 ± 0.004	12-10-13	301	0.036 ± 0.004
06-18-13	303	0.017 ± 0.003	12-17-13	304	0.035 ± 0.004
06-25-13	304	0.022 ± 0.004	12-24-13	301	0.020 ± 0.004
07-02-13	303	0.033 ± 0.004	12-31-13	301	0.046 ± 0.004
2nd Quarter Mean ± s.d.		0.022 ± 0.006	4th Quarter Mean ± s.d.		0.024 ± 0.010
			Cumulative Average		0.025

^a Iodine-131 concentrations are < 0.03 pCi/m³ unless otherwise noted.^b Very light particulate matter collected from all locations.

Table 7. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131^a.

Location: K-31
 Units: pCi/m³
 Collection: Continuous, weekly exchange.

Date Collected	Volume (m ³)	Gross Beta	Date Collected	Volume (m ³)	Gross Beta
<u>Required LLD</u>		<u>0.010</u>	<u>Required LLD</u>		<u>0.010</u>
01-08-13	346	0.062 ± 0.005	07-09-13	301	0.027 ± 0.004
01-15-13	301	0.037 ± 0.004	07-16-13	303	0.018 ± 0.004
01-22-13	304	0.038 ± 0.004	07-23-13	301	0.017 ± 0.004
01-29-13	301	0.029 ± 0.004	07-30-13	301	< 0.005 ^b
02-05-13	302	0.042 ± 0.004	08-06-13	304	0.013 ± 0.004
02-12-13	303	0.031 ± 0.004	08-13-13	302	0.013 ± 0.004
02-19-13	310	0.033 ± 0.004	08-20-13	305	0.028 ± 0.004
02-26-13	295	0.018 ± 0.003	08-27-13	300	0.029 ± 0.004
			09-03-13	302	0.026 ± 0.004
03-05-13	302	0.025 ± 0.003			
03-12-13	300	0.019 ± 0.003	09-10-13	306	0.024 ± 0.004
03-19-13	307	0.027 ± 0.004	09-17-13	302	0.012 ± 0.004
03-26-13	298	0.019 ± 0.003	09-24-13	300	0.019 ± 0.004
04-02-13	303	0.015 ± 0.003	10-01-13	302	0.027 ± 0.004
1st Quarter Mean ± s.d.		0.030 ± 0.013	3rd Quarter Mean ± s.d.		0.021 ± 0.006
04-09-13	301	0.024 ± 0.004	10-08-13	303	0.012 ± 0.004
04-16-13	302	0.018 ± 0.003	10-15-13	303	0.021 ± 0.004
04-23-13	302	0.016 ± 0.004	10-22-13	301	0.016 ± 0.004
04-30-13	302	0.036 ± 0.004	10-29-13	303	0.009 ± 0.003
05-06-13	260	0.022 ± 0.004	11-05-13	305	0.019 ± 0.004
05-14-13	348	0.014 ± 0.003	11-12-13	303	0.022 ± 0.004
05-21-13	300	0.024 ± 0.004	11-19-13	311	0.026 ± 0.004
05-28-13	302	0.017 ± 0.003	11-26-13	292	0.017 ± 0.004
			12-03-13	306	0.028 ± 0.004
06-04-13	303	0.014 ± 0.003			
06-11-13	302	0.022 ± 0.003	12-10-13	301	0.036 ± 0.004
06-18-13	305	0.020 ± 0.004	12-17-13	304	0.035 ± 0.004
06-25-13	299	0.020 ± 0.004	12-24-13	302	0.020 ± 0.004
07-02-13	304	0.016 ± 0.003	12-31-13	302	0.052 ± 0.005
2nd Quarter Mean ± s.d.		0.020 ± 0.006	4th Quarter Mean ± s.d.		0.024 ± 0.012
			Cumulative Average		0.024

^a Iodine-131 concentrations are < 0.03 pCi/m³ unless otherwise noted.

^b Very light particulate matter collected from all locations.

Table 8. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131^a.

Location: K-41

Units: pCi/m³

Collection: Continuous, weekly exchange.

Date Collected	Volume (m ³)	Gross Beta	Date Collected	Volume (m ³)	Gross Beta
<u>Required LLD</u>		<u>0.010</u>	<u>Required LLD</u>		<u>0.010</u>
01-08-13	346	0.062 ± 0.005	07-09-13	302	0.027 ± 0.004
01-15-13	301	0.044 ± 0.004	07-16-13	305	0.025 ± 0.004
01-22-13	304	0.043 ± 0.004	07-23-13	300	0.018 ± 0.004
01-29-13	302	0.035 ± 0.004	07-30-13	301	0.007 ± 0.004 ^b
02-05-13	301	0.043 ± 0.004	08-06-13	305	0.013 ± 0.004
02-12-13	302	0.034 ± 0.004	08-13-13	305	0.014 ± 0.004
02-19-13	311	0.034 ± 0.004	08-20-13	296	0.025 ± 0.004
02-26-13	294	0.020 ± 0.003	08-27-13	306	0.024 ± 0.004
03-05-13	303	0.026 ± 0.003	09-03-13	302	0.027 ± 0.004
03-12-13	300	0.019 ± 0.003	09-10-13	301	0.028 ± 0.004
03-19-13	307	0.029 ± 0.004	09-17-13	308	0.010 ± 0.004
03-26-13	298	0.019 ± 0.003	09-24-13	299	0.021 ± 0.004
04-02-13	304	0.020 ± 0.004	10-01-13	302	0.028 ± 0.004
1st Quarter Mean ± s.d.		0.033 ± 0.013	3rd Quarter Mean ± s.d.		0.021 ± 0.007
04-09-13	302	0.023 ± 0.004	10-08-13	302	0.017 ± 0.004
04-16-13	301	0.017 ± 0.003	10-15-13	305	0.027 ± 0.004
04-23-13	303	0.018 ± 0.004	10-22-13	300	0.015 ± 0.004
04-30-13	302	0.034 ± 0.004	10-29-13	302	0.011 ± 0.004
05-06-13	261	0.013 ± 0.004	11-05-13	305	0.020 ± 0.004
05-14-13	342	0.018 ± 0.003	11-12-13	303	0.022 ± 0.004
05-21-13	306	0.024 ± 0.004	11-19-13	311	0.019 ± 0.004
05-28-13	302	0.020 ± 0.003	11-26-13	293	0.021 ± 0.004
06-04-13	303	0.015 ± 0.003	12-03-13	305	0.028 ± 0.004
06-11-13	301	0.027 ± 0.004	12-10-13	301	0.032 ± 0.004
06-18-13	305	0.024 ± 0.004	12-17-13	305	0.037 ± 0.004
06-25-13	300	0.022 ± 0.004	12-24-13	300	0.023 ± 0.004
07-02-13	303	0.020 ± 0.004	12-31-13	302	0.045 ± 0.004
2nd Quarter Mean ± s.d.		0.021 ± 0.006	4th Quarter Mean ± s.d.		0.024 ± 0.009
			Cumulative Average		0.025

^a Iodine-131 concentrations are < 0.03 pCi/m³ unless otherwise noted.^b Very light particulate matter collected from all locations.

Table 9. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131^a.

Location: K-43

Units: pCi/m³

Collection: Continuous, weekly exchange.

Date Collected	Volume (m ³)	Gross Beta	Date Collected	Volume (m ³)	Gross Beta
<u>Required LLD</u>		<u>0.010</u>	<u>Required LLD</u>		<u>0.010</u>
01-08-13	344	0.066 ± 0.005	07-09-13	300	0.025 ± 0.004
01-15-13	301	0.037 ± 0.004	07-16-13	305	0.019 ± 0.004
01-22-13	308	0.043 ± 0.004	07-23-13	299	0.015 ± 0.004
01-29-13	301	0.039 ± 0.004	07-30-13	301	0.007 ± 0.004 ^b
02-05-13	302	0.044 ± 0.004	08-06-13	304	0.014 ± 0.004
02-12-13	302	0.035 ± 0.004	08-13-13	300	0.013 ± 0.004
02-19-13	306	0.035 ± 0.004	08-20-13	298	0.021 ± 0.004
02-26-13	298	0.022 ± 0.003	08-27-13	304	0.029 ± 0.004
			09-03-13	301	0.023 ± 0.004
03-05-13	304	0.030 ± 0.004			
03-12-13	300	0.023 ± 0.003	09-10-13	306	0.022 ± 0.004
03-19-13	304	0.028 ± 0.004	09-17-13	299	0.008 ± 0.004
03-26-13	294	0.021 ± 0.003	09-24-13	303	0.014 ± 0.004
04-02-13	309	0.021 ± 0.004	10-01-13	302	0.027 ± 0.004
1st Quarter Mean ± s.d.		0.034 ± 0.013	3rd Quarter Mean ± s.d.		0.018 ± 0.007
04-09-13	298	0.025 ± 0.004	10-08-13	303	0.015 ± 0.004
04-16-13	306	0.018 ± 0.003	10-15-13	302	0.022 ± 0.004
04-23-13	303	0.020 ± 0.004	10-22-13	303	0.016 ± 0.004
04-30-13	301	0.034 ± 0.004	10-29-13	303	0.008 ± 0.003
05-06-13	260	0.021 ± 0.004	11-05-13	304	0.017 ± 0.004
05-14-13	346	0.020 ± 0.003	11-12-13	301	0.019 ± 0.004
05-21-13	298	0.020 ± 0.004	11-19-13	311	0.017 ± 0.004
05-28-13	302	0.017 ± 0.003	11-26-13	292	0.018 ± 0.004
			12-03-13	305	0.030 ± 0.004
06-04-13	302	0.016 ± 0.003			
06-11-13	301	0.029 ± 0.004	12-10-13	302	0.029 ± 0.004
06-18-13	302	0.025 ± 0.004	12-17-13	304	0.031 ± 0.004
06-25-13	304	0.023 ± 0.004	12-24-13	301	0.016 ± 0.004
07-02-13	304	0.021 ± 0.004	12-31-13	301	0.041 ± 0.004
2nd Quarter Mean ± s.d.		0.022 ± 0.005	4th Quarter Mean ± s.d.		0.021 ± 0.009
Cumulative Average					0.024

^a Iodine-131 concentrations are < 0.03 pCi/m³ unless otherwise noted.^b Very light particulate matter collected from all locations.

Table 10. Airborne particulate data, gross beta analyses, monthly averages, minima and maxima.

January			
Location	Average	Minima	Maxima
Indicators	0.045	0.031	0.066
K-1f	0.043	0.031	0.062
K-43	0.046	0.037	0.066
Controls	0.044	0.029	0.064
K-2	0.042	0.030	0.060
K-8	0.044	0.032	0.064
K-31	0.042	0.029	0.062
K-41	0.046	0.035	0.062

April			
Location	Average	Minima	Maxima
Indicators	0.023	0.017	0.034
K-1f	0.021	0.017	0.026
K-43	0.024	0.018	0.034
Controls	0.024	0.016	0.036
K-2	0.023	0.018	0.031
K-8	0.024	0.018	0.034
K-31	0.024	0.016	0.036
K-41	0.024	0.016	0.036

February			
Location	Average	Minima	Maxima
Indicators	0.032	0.019	0.044
K-1f	0.030	0.019	0.040
K-43	0.034	0.022	0.044
Controls	0.032	0.016	0.046
K-2	0.031	0.016	0.041
K-8	0.034	0.020	0.046
K-31	0.031	0.018	0.042
K-41	0.033	0.020	0.043

May			
Location	Average	Minima	Maxima
Indicators	0.020	0.008	0.033
K-1f	0.017	0.016	0.018
K-43	0.020	0.017	0.021
Controls	0.020	0.013	0.024
K-2	0.019	0.018	0.021
K-8	0.021	0.019	0.022
K-31	0.019	0.014	0.024
K-41	0.019	0.013	0.024

March			
Location	Average	Minima	Maxima
Indicators	0.024	0.018	0.030
K-1f	0.023	0.018	0.027
K-43	0.025	0.021	0.030
Controls	0.022	0.015	0.030
K-2	0.022	0.017	0.029
K-8	0.023	0.018	0.030
K-31	0.021	0.015	0.027
K-41	0.023	0.019	0.029

June			
Location	Average	Minima	Maxima
Indicators	0.022	0.015	0.029
K-1f	0.019	0.015	0.025
K-43	0.025	0.021	0.029
Controls	0.018	0.008	0.033
K-2	0.021	0.018	0.024
K-8	0.023	0.013	0.033
K-31	0.018	0.014	0.022
K-41	0.022	0.015	0.027

Note: Samples collected on the first, second or third day of the month are grouped with data of the previous month.

Table 10. Airborne particulate data, gross beta analyses, monthly averages, minima and maxima.

July			
Location	Average	Minima	Maxima
Indicators	0.018	< 0.007	0.025
K-1f	0.018	< 0.014	0.023
K-43	0.017	0.007	0.025
Controls	0.022	0.006	0.037
K-2	0.018	0.006	0.029
K-8	0.030	< 0.021	0.037
K-31	0.021	< 0.017	0.027
K-41	0.019	0.007	0.027

October			
Location	Average	Minima	Maxima
Indicators	0.015	0.008	0.022
K-1f	0.014	0.008	0.021
K-43	0.015	0.008	0.022
Controls	0.017	0.009	0.029
K-2	0.018	0.011	0.029
K-8	0.017	0.012	0.025
K-31	0.015	0.009	0.021
K-41	0.018	0.011	0.027

August			
Location	Average	Minima	Maxima
Indicators	0.020	0.012	0.029
K-1f	0.019	0.012	0.026
K-43	0.020	0.013	0.029
Controls	0.021	0.012	0.030
K-2	0.021	0.013	0.030
K-8	0.019	0.012	0.024
K-31	0.022	0.013	0.029
K-41	0.021	0.013	0.027

November			
Location	Average	Minima	Maxima
Indicators	0.022	0.017	0.030
K-1f	0.023	0.018	0.029
K-43	0.020	0.017	0.030
Controls	0.022	0.016	0.028
K-2	0.024	0.021	0.027
K-8	0.021	0.016	0.024
K-31	0.022	0.017	0.028
K-41	0.022	0.019	0.028

September			
Location	Average	Minima	Maxima
Indicators	0.019	0.008	0.027
K-1f	0.019	0.009	0.027
K-43	0.018	0.008	0.027
Controls	0.021	0.010	0.029
K-2	0.021	0.013	0.028
K-8	0.021	0.012	0.029
K-31	0.021	0.012	0.027
K-41	0.022	0.010	0.028

December			
Location	Average	Minima	Maxima
Indicators	0.031	0.016	0.046
K-1f	0.033	0.019	0.046
K-43	0.029	0.016	0.041
Controls	0.035	0.020	0.052
K-2	0.037	0.022	0.052
K-8	0.034	0.020	0.046
K-31	0.036	0.020	0.052
K-41	0.034	0.023	0.045

Note: Samples collected on the first, second or third day of the month are grouped with data of the previous month.

Table 11. Airborne particulate samples, quarterly composites of weekly samples, analysis for gamma-emitting isotopes.

	Sample Description and Concentration (pCi/m ³)			
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
<u>Indicator</u>				
<u>K-1f</u>				
Lab Code	KAP- 2030	KAP- 4100	KAP- 6397	KAP- 7896
Volume (m ³)	3971	3930	3927	3926
Be-7	0.061 ± 0.016	0.078 ± 0.016	0.070 ± 0.016	0.047 ± 0.012
Nb-95	< 0.0013	< 0.0009	< 0.0016	< 0.0006
Zr-95	< 0.0017	< 0.0011	< 0.0014	< 0.0013
Ru-103	< 0.0012	< 0.0013	< 0.0010	< 0.0009
Ru-106	< 0.0061	< 0.0067	< 0.0076	< 0.0049
Cs-134	< 0.0007	< 0.0009	< 0.0008	< 0.0007
Cs-137	< 0.0006	< 0.0005	< 0.0008	< 0.0006
Ce-141	< 0.0017	< 0.0020	< 0.0018	< 0.0014
Ce-144	< 0.0047	< 0.0041	< 0.0053	< 0.0029
<u>K-43</u>				
Lab Code	KAP- 2035	KAP- 4105	KAP- 6402	KAP- 7901
Volume (m ³)	3973	3927	3922	3932
Be-7	0.070 ± 0.013	0.071 ± 0.013	0.071 ± 0.016	0.037 ± 0.009
Nb-95	< 0.0012	< 0.0011	< 0.0013	< 0.0007
Zr-95	< 0.0009	< 0.0012	< 0.0015	< 0.0009
Ru-103	< 0.0009	< 0.0011	< 0.0008	< 0.0007
Ru-106	< 0.0059	< 0.0050	< 0.0072	< 0.0057
Cs-134	< 0.0006	< 0.0005	< 0.0011	< 0.0009
Cs-137	< 0.0008	< 0.0004	< 0.0005	< 0.0004
Ce-141	< 0.0015	< 0.0012	< 0.0011	< 0.0019
Ce-144	< 0.0049	< 0.0033	< 0.0049	< 0.0042

Table 11. Airborne particulate samples, quarterly composites of weekly samples, analysis for gamma-emitting isotopes, (continued).

	Sample Description and Concentration (pCi/m ³)			
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
<u>Control</u>				
<u>K-2</u>				
Lab Code	KAP- 2031	KAP- 4101	KAP- 6398	KAP- 7897
Volume (m ³)	3973	3932	3928	3934
Be-7	0.072 ± 0.018	0.071 ± 0.017	0.077 ± 0.017	0.059 ± 0.014
Nb-95	< 0.0012	< 0.0011	< 0.0017	< 0.0010
Zr-95	< 0.0016	< 0.0016	< 0.0023	< 0.0026
Ru-103	< 0.0011	< 0.0014	< 0.0017	< 0.0011
Ru-106	< 0.0037	< 0.0076	< 0.0082	< 0.0081
Cs-134	< 0.0007	< 0.0006	< 0.0011	< 0.0009
Cs-137	< 0.0008	< 0.0009	< 0.0007	< 0.0009
Ce-141	< 0.0014	< 0.0024	< 0.0024	< 0.0017
Ce-144	< 0.0049	< 0.0054	< 0.0063	< 0.0048
<u>K-8</u>				
Lab Code	KAP- 2032	KAP- 4102	KAP- 6399	KAP- 7898
Volume (m ³)	3973	3929	3885	3935
Be-7	0.064 ± 0.012	0.096 ± 0.015	0.068 ± 0.020	0.049 ± 0.010
Nb-95	< 0.0010	< 0.0012	< 0.0010	< 0.0009
Zr-95	< 0.0016	< 0.0011	< 0.0017	< 0.0009
Ru-103	< 0.0008	< 0.0011	< 0.0013	< 0.0007
Ru-106	< 0.0046	< 0.0064	< 0.0048	< 0.0047
Cs-134	< 0.0006	< 0.0008	< 0.0011	< 0.0007
Cs-137	< 0.0006	< 0.0004	< 0.0008	< 0.0006
Ce-141	< 0.0014	< 0.0021	< 0.0028	< 0.0013
Ce-144	< 0.0031	< 0.0050	< 0.0054	< 0.0031

Table 11. Airborne particulate samples, quarterly composites of weekly samples, analysis for gamma-emitting isotopes, (continued).

	Sample Description and Concentration (pCi/m ³)			
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
<u>Control</u>				
<u>K-31</u>				
Lab Code	KAP- 2033	KAP- 4103	KAP- 6400	KAP- 7899
Volume (m ³)	3972	3930	3929	3936
Be-7	0.071 ± 0.013	0.080 ± 0.016	0.068 ± 0.013	0.054 ± 0.020
Nb-95	< 0.0009	< 0.0012	< 0.0007	< 0.0009
Zr-95	< 0.0013	< 0.0019	< 0.0013	< 0.0013
Ru-103	< 0.0010	< 0.0011	< 0.0010	< 0.0009
Ru-106	< 0.0036	< 0.0068	< 0.0047	< 0.0085
Cs-134	< 0.0006	< 0.0009	< 0.0007	< 0.0011
Cs-137	< 0.0008	< 0.0006	< 0.0006	< 0.0008
Ce-141	< 0.0014	< 0.0022	< 0.0010	< 0.0016
Ce-144	< 0.0034	< 0.0047	< 0.0024	< 0.0053
<u>K-41</u>				
Lab Code	KAP- 2034	KAP- 4104	KAP- 6401	KAP- 7900
Volume (m ³)	3973	3931	3932	3934
Be-7	0.078 ± 0.019	0.090 ± 0.016	0.081 ± 0.016	0.048 ± 0.011
Nb-95	< 0.0014	< 0.0011	< 0.0015	< 0.0007
Zr-95	< 0.0016	< 0.0011	< 0.0019	< 0.0007
Ru-103	< 0.0008	< 0.0015	< 0.0012	< 0.0006
Ru-106	< 0.0061	< 0.0076	< 0.0074	< 0.0077
Cs-134	< 0.0009	< 0.0007	< 0.0009	< 0.0008
Cs-137	< 0.0003	< 0.0008	< 0.0006	< 0.0005
Ce-141	< 0.0022	< 0.0018	< 0.0015	< 0.0009
Ce-144	< 0.0041	< 0.0052	< 0.0039	< 0.0023

Table 12. Ambient gamma radiation (TLD), quarterly exposure.

	<u>1st Qtr.</u>	<u>2nd Qtr.</u>	<u>3rd Qtr.</u>	<u>4th Qtr.</u>	
Date Placed	01-02-13	04-01-13	07-01-13	10-01-13	
Date Removed	04-01-13	07-01-13	10-01-13	01-02-14	
mR/91 days					
<u>Indicator</u>					<u>Mean±s.d.</u>
K-1f	12.5 ± 0.8	12.8 ± 0.5	14.1 ± 0.9	14.8 ± 0.9	13.6 ± 1.1
K-5	15.4 ± 0.8	15.7 ± 0.8	17.1 ± 0.5	16.5 ± 0.6	16.2 ± 0.8
K-17	11.9 ± 0.5	20.6 ± 1.2	15.3 ± 0.3	NS ^a	15.9 ± 4.4
K-25	15.4 ± 0.6	15.9 ± 0.5	17.8 ± 0.5	18.9 ± 0.4	17.0 ± 1.6
K-27	15.7 ± 0.3	18.9 ± 0.9	18.7 ± 0.3	22.1 ± 0.6	18.9 ± 2.6
K-30	14.3 ± 1.1	15.0 ± 0.8	17.6 ± 1.2	17.9 ± 0.3	16.2 ± 1.8.
K-39	14.8 ± 0.4	15.0 ± 0.5	18.0 ± 0.5	17.5 ± 0.6	16.3 ± 1.7
K-43	13.9 ± 0.6	15.2 ± 0.7	14.7 ± 0.8	18.9 ± 0.5	15.7 ± 2.2
Mean ± s.d.	14.2 ± 1.4	16.1 ± 2.5	16.7 ± 1.7	18.1 ± 2.3	16.3 ± 1.6
<u>Control</u>					
K-2	13.5 ± 0.5	15.8 ± 0.7	14.9 ± 0.7	20.2 ± 0.4	16.1 ± 2.9
K-3	15.4 ± 0.9	17.3 ± 0.6	18.0 ± 1.0	19.7 ± 0.8	17.6 ± 1.8
K-8	13.6 ± 0.6	14.9 ± 0.4	15.8 ± 0.8	15.6 ± 0.6	15.0 ± 1.0
K-15	12.0 ± 0.4	13.0 ± 0.3	14.4 ± 0.5	16.8 ± 0.4	14.1 ± 2.1
K-31	12.1 ± 0.5	11.6 ± 0.3	13.1 ± 0.6	14.0 ± 0.5	12.7 ± 1.1
K-41	15.0 ± 0.9	17.7 ± 0.8	17.0 ± 1.0	19.9 ± 0.8	17.4 ± 2.0
Mean ± s.d.	13.6 ± 1.4	15.1 ± 2.4	15.5 ± 1.8	17.7 ± 2.6	15.5 ± 1.7
<u>Inside the Protected Area</u>					
Date Placed	12-19-12	03-25-13	06-20-13	09-26-13	
Date Removed	03-25-13	06-20-13	09-26-13	01-02-14	
K-1L	12.5 ± 0.6	13.0 ± 1.4	13.2 ± 0.5	15.3 ± 0.8	13.5 ± 1.1
K-1M	15.7 ± 0.9	15.4 ± 1.5	16.7 ± 0.7	17.1 ± 1.4	16.2 ± 0.9
K-1N	11.8 ± 0.7	13.4 ± 0.9	12.0 ± 0.9	13.9 ± 0.8	12.8 ± 0.8
K-1O	11.5 ± 0.3	13.9 ± 0.4	11.7 ± 0.5	14.6 ± 0.8	12.9 ± 1.3
K-1P	11.1 ± 0.4	11.0 ± 1.4	11.6 ± 0.5	12.2 ± 0.8	11.5 ± 0.6
K-1Q	11.1 ± 0.7	13.0 ± 0.8	10.5 ± 0.8	13.3 ± 0.4	12.0 ± 1.3
K-1R	15.0 ± 0.4	15.9 ± 0.8	15.7 ± 0.8	16.5 ± 0.5	15.8 ± 0.3
K-1S	15.3 ± 0.7	15.1 ± 0.7	16.0 ± 0.5	16.3 ± 0.6	15.7 ± 0.6
Mean ± s.d.	13.0 ± 2.0	13.8 ± 1.6	13.4 ± 2.4	14.9 ± 1.7	13.8 ± 0.8

^a NS = No sample available, TLDs could not be collected.

Table 13. Precipitation samples collected at Location K-11; analysis for tritium.

Date Collected	Lab Code	H-3	
		pCi/L	T.U. (100 T.U. = 320 pCi/L)
01/02/13	KP- 28	< 139	< 43
02/04/13	KP- 486	< 136	< 43
03/04/13	KP- 918	< 137	< 43
04/01/13	KP- 1389	< 150	< 47
05/01/13	KP- 2204	< 142	< 44
06/03/13	KP- 2941	154 ± 79	48 ± 25
07/01/13	KP- 3669	< 165	< 52
08/01/13	KP- 4433	< 184	< 58
09/03/13	KP- 5225	< 150	< 47
10/01/13	KP- 5789	< 148	< 46
11/05/13	KP- 6888	< 142	< 44
12/02/13	KP- 7240	< 148	< 46

Table 14. Milk, analyses for iodine-131 and gamma-emitting isotopes.
Collection: Semimonthly during grazing season, monthly at other times.

Collection Date	Lab Code	Concentration (pCi/L)				
		I-131	Cs-134	Cs-137	Ba-La-140	K-40
<u>Indicators</u>						
<u>K-5</u>						
01-03-13	KMI- 3	< 0.2	< 2.5	< 3.6	< 2.8	1400 ± 109
02-05-13	KMI- 446	< 0.2	< 2.8	< 3.9	< 4.9	1370 ± 102
03-05-13	KMI- 887	< 0.4	< 3.0	< 2.4	< 3.8	1421 ± 92
04-02-13	KMI- 1381	< 0.4	< 2.8	< 3.2	< 2.4	1305 ± 95
05-02-13	KMI- 2188	< 0.2	< 3.6	< 3.2	< 1.6	1456 ± 112
05-14-13	KMI- 2510	< 0.3	< 2.2	< 4.6	< 3.4	1371 ± 115
06-03-13	KMI- 2844	< 0.3	< 3.3	< 2.6	< 4.1	1285 ± 112
06-18-13	KMI- 3346	< 0.3	< 4.0	< 2.2	< 2.9	1390 ± 115
07-01-13	KMI- 3601	< 0.3	< 3.3	< 3.5	< 6.9	1439 ± 115
07-16-13	KMI- 3927	< 0.4	< 2.2	< 3.6	< 1.8	1350 ± 109
08-01-13	KMI- 4426	< 0.2	< 3.3	< 3.7	< 1.9	1330 ± 116
08-13-13	KMI- 4733	< 0.2	< 3.4	< 2.4	< 1.9	1412 ± 119
09-03-13	KMI- 5211	< 0.3	< 3.4	< 2.0	< 2.0	1332 ± 113
09-17-13	KMI- 5487	< 0.4	< 3.4	< 3.3	< 2.2	1344 ± 118
10-01-13	KMI- 5778	< 0.2	< 2.3	< 3.5	< 3.2	1440 ± 102
10-15-13	KMI- 6264	< 0.5	< 3.0	< 3.5	< 1.2	1282 ± 111
11-05-13	KMI- 6859	< 0.2	< 4.3	< 3.3	< 5.1	1380 ± 125
12-03-13	KMI- 7223	< 0.2	< 4.0	< 2.9	< 1.5	1413 ± 111
<u>K-34</u>						
01-03-13	KMI- 4	< 0.4	< 2.2	< 3.1	< 4.7	1533 ± 97
02-04-13	KMI- 447	< 0.3	< 2.4	< 2.9	< 5.0	1535 ± 107
03-04-13	KMI- 888	< 0.4	< 2.7	< 3.3	< 3.1	1571 ± 100
04-01-13	KMI- 1382	< 0.3	< 3.1	< 3.8	< 4.0	1469 ± 98
05-01-13	KMI- 2189	< 0.3	< 2.9	< 3.6	< 4.2	1358 ± 119
05-14-13	KMI- 2511	< 0.4	< 4.0	< 4.4	< 2.7	1463 ± 109
06-03-13	KMI- 2845	< 0.3	< 3.8	< 4.9	< 2.9	1442 ± 113
06-18-13	KMI- 3347	< 0.3	< 3.2	< 3.1	< 1.7	1374 ± 115
07-01-13	KMI- 3602	< 0.4	< 2.4	< 3.5	< 2.8	1533 ± 96
07-16-13	KMI- 3928	< 0.4	< 3.4	< 4.8	< 3.1	1446 ± 113
08-01-13	KMI- 4427	< 0.3	< 2.8	< 3.6	< 1.5	1417 ± 116
08-13-13	KMI- 4734	< 0.2	< 2.1	< 4.2	< 2.5	1392 ± 116
09-03-13	KMI- 5212	< 0.4	< 2.7	< 3.8	< 6.9	1417 ± 103
09-17-13	KMI- 5488	< 0.3	< 4.4	< 5.8	< 3.5	1303 ± 113
10-01-13	KMI- 5779	< 0.2	< 2.7	< 3.3	< 4.9	1464 ± 101
10-15-13	KMI- 6265	< 0.4	< 4.0	< 4.7	< 3.6	1435 ± 135
11-05-13	KMI- 6860	< 0.2	< 6.8	< 5.8	< 2.7	1476 ± 155
12-02-13	KMI- 7224	< 0.4	< 3.6	< 3.4	< 2.9	1426 ± 103

Table 14. Milk, analyses for iodine-131 and gamma-emitting isotopes (continued).

Collection Date	Lab Code	Concentration (pCi/L)				
		I-131	Cs-134	Cs-137	Ba-La-140	K-40
<u>Indicators</u>						
<u>K-38</u>						
01-03-13	KMI- 6	< 0.2	< 2.0	< 2.1	< 3.9	1425 ± 96
02-04-13	KMI- 449	< 0.2	< 3.2	< 3.2	< 3.2	1448 ± 111
03-04-13	KMI- 890	< 0.4	< 2.8	< 2.2	< 2.9	1435 ± 95
04-01-13	KMI- 1384	< 0.2	< 2.6	< 3.8	< 4.5	1434 ± 81
05-01-13	KMI- 2191	< 0.3	< 3.8	< 3.0	< 1.6	1487 ± 117
05-14-13	KMI- 2513	< 0.3	< 3.4	< 3.4	< 2.4	1347 ± 97
06-03-13	KMI- 2847	< 0.4	< 3.4	< 4.6	< 4.4	1315 ± 123
06-18-13	KMI- 3349	< 0.3	< 3.9	< 3.8	< 2.8	1454 ± 131
07-01-13	KMI- 3604	< 0.2	< 2.1	< 3.5	< 2.3	1352 ± 117
07-16-13	KMI- 3930	< 0.4	< 2.9	< 4.6	< 3.2	1360 ± 119
08-01-13	KMI- 4429	< 0.3	< 2.6	< 5.7	< 4.3	1354 ± 130
08-13-13	KMI- 4736	< 0.2	< 3.3	< 3.3	< 3.0	1344 ± 109
09-03-13	KMI- 5214	< 0.3	< 3.2	< 2.8	< 8.1	1442 ± 99
09-17-13	KMI- 5490	< 0.3	< 2.7	< 3.8	< 2.8	1374 ± 110
10-01-13	KMI- 5781	< 0.5	< 3.6	< 3.0	< 3.4	1360 ± 97
10-15-13	KMI- 6267	< 0.5	< 3.7	< 5.0	< 2.8	1349 ± 124
11-05-13	KMI- 6862	< 0.2	< 4.0	< 1.8	< 2.3	1260 ± 97
12-02-13	KMI- 7226	< 0.2	< 3.5	< 3.5	< 2.8	1429 ± 101
<u>K-39</u>						
01-03-13	KMI- 7	< 0.2	< 2.5	< 3.7	< 5.6	1435 ± 105
02-04-13	KMI- 450	< 0.2	< 3.7	< 4.5	< 4.4	1301 ± 105
03-04-13	KMI- 891	< 0.4	< 2.5	< 2.6	< 4.4	1331 ± 83
04-01-13	KMI- 1385	< 0.2	< 2.7	< 3.5	< 3.2	1391 ± 94
05-01-13	KMI- 2192	< 0.3	< 2.3	< 3.1	< 1.2	1368 ± 107
05-14-13	KMI- 2514	< 0.3	< 2.1	< 2.1	< 0.7	1339 ± 88
06-03-13	KMI- 2848	< 0.4	< 3.6	< 5.1	< 4.1	1385 ± 123
06-18-13	KMI- 3350	< 0.3	< 4.1	< 5.3	< 3.7	1354 ± 126
07-01-13	KMI- 3605	< 0.2	< 2.8	< 3.1	< 2.4	1385 ± 101
07-16-13	KMI- 3931	< 0.3	< 1.7	< 3.7	< 1.4	1387 ± 102
08-01-13	KMI- 4430	< 0.3	< 3.6	< 3.5	< 2.2	1269 ± 111
08-13-13	KMI- 4737	< 0.2	< 3.1	< 3.3	< 1.3	1350 ± 112
09-03-13	KMI- 5215	< 0.2	< 2.4	< 3.0	< 3.2	1359 ± 108
09-17-13	KMI- 5491	< 0.4	< 3.9	< 5.3	< 2.9	1322 ± 122
10-01-13	KMI- 5782	< 0.5	< 6.2	< 7.2	< 5.5	1425 ± 170
10-15-13	KMI- 6268	< 0.4	< 3.0	< 2.9	< 1.5	1338 ± 103
11-05-13	KMI- 6863	< 0.2	< 3.9	< 4.4	< 4.2	1330 ± 112
12-03-13	KMI- 7227	< 0.4	< 4.0	< 3.0	< 3.3	1478 ± 113

Table 14. Milk, analyses for iodine-131 and gamma-emitting isotopes (continued).

Collection Date	Lab Code	Concentration (pCi/L)				
		I-131	Cs-134	Cs-137	Ba-La-140	K-40
<u>Indicator</u>						
<u>K-44</u>						
01-03-13	KMI- 9	< 0.2	< 2.1	< 2.3	< 4.5	1332 ± 77
02-04-13	NS ^a					
 <u>Control</u>						
<u>K-3</u>						
01-03-13	KMI- 2	< 0.2	< 2.7	< 3.8	< 5.6	1357 ± 111
02-05-13	KMI- 445	< 0.2	< 3.0	< 3.3	< 2.9	1376 ± 106
03-05-13	KMI- 886	< 0.2	< 3.0	< 3.8	< 3.2	1501 ± 98
04-02-13	KMI- 1380	< 0.2	< 2.3	< 2.2	< 1.7	1425 ± 96
05-02-13	KMI- 2187	< 0.3	< 3.2	< 3.9	< 3.3	1438 ± 107
05-14-13	KMI- 2509	< 0.3	< 3.2	< 4.8	< 2.7	1494 ± 134
06-04-13	KMI- 2843	< 0.2	< 3.1	< 3.9	< 2.6	1395 ± 107
06-18-13	KMI- 3345	< 0.4	< 2.9	< 4.2	< 1.6	1440 ± 106
07-02-13	KMI- 3600	< 0.2	< 2.8	< 2.9	< 1.8	1521 ± 107
07-16-13	KMI- 3926	< 0.4	< 2.3	< 3.0	< 2.1	1415 ± 102
08-02-13	KMI- 4425	< 0.2	< 3.3	< 3.4	< 1.5	1421 ± 109
08-13-13	KMI- 4732	< 0.2	< 3.0	< 2.7	< 1.1	1434 ± 113
09-03-13	KMI- 5210	< 0.3	< 3.0	< 2.8	< 4.5	1416 ± 100
09-17-13	KMI- 5486	< 0.4	< 3.0	< 3.4	< 1.8	1436 ± 130
10-02-13	KMI- 5777	< 0.2	< 2.2	< 3.4	< 3.4	1458 ± 100
10-15-13	KMI- 6263	< 0.5	< 3.1	< 2.8	< 3.2	1472 ± 123
11-05-13	KMI- 6858	< 0.2	< 3.6	< 3.5	< 3.6	1501 ± 114
12-03-13	KMI- 7222	< 0.2	< 4.2	< 1.6	< 1.3	1440 ± 110

^a No sample. Cows sold, farm out of dairy business.

Table 14. Milk, analyses for iodine-131 and gamma-emitting isotopes (continued).

Collection Date	Lab Code	Concentration (pCi/L)				
		I-131	Cs-134	Cs-137	Ba-La-140	K-40
<u>Controls</u>						
<u>K-35</u>						
01-03-13	KMI- 5	< 0.2	< 3.0	< 3.4	< 4.6	1517 ± 98
02-05-13	KMI- 448	< 0.2	< 3.3	< 3.3	< 3.5	1475 ± 106
03-05-13	KMI- 889	< 0.4	< 2.3	< 3.6	< 2.7	1476 ± 109
04-02-13	KMI- 1383	< 0.3	< 3.0	< 3.3	< 2.7	1531 ± 101
05-02-13	KMI- 2190	< 0.2	< 2.2	< 2.4	< 2.3	1518 ± 128
05-14-13	KMI- 2512	< 0.3	< 3.1	< 3.6	< 3.0	1471 ± 113
06-04-13	KMI- 2846	< 0.2	< 3.7	< 5.7	< 3.0	1440 ± 139
06-18-13	KMI- 3348	< 0.3	< 2.2	< 4.2	< 2.4	1502 ± 123
07-02-13	KMI- 3603	< 0.4	< 4.1	< 3.1	< 4.4	1514 ± 120
07-16-13	KMI- 3929	< 0.3	< 2.7	< 4.4	< 2.6	1483 ± 122
08-02-13	KMI- 4428	< 0.3	< 3.6	< 4.0	< 1.2	1527 ± 117
08-13-13	KMI- 4735	< 0.2	< 2.5	< 3.3	< 1.2	1470 ± 111
09-04-13	KMI- 5213	< 0.4	< 2.4	< 3.0	< 2.5	1540 ± 99
09-17-13	KMI- 5489	< 0.3	< 1.8	< 5.5	< 2.0	1394 ± 122
10-01-13	KMI- 5780	< 0.2	< 2.7	< 3.7	< 3.2	1479 ± 105
10-15-13	KMI- 6266	< 0.4	< 2.8	< 3.0	< 2.5	1488 ± 111
11-05-13	KMI- 6861	< 0.2	< 4.3	< 5.2	< 2.1	1454 ± 121
12-03-13	KMI- 7225	< 0.2	< 3.0	< 3.0	< 2.2	1469 ± 110
<u>K-42</u>						
01-02-13	KMI- 8	< 0.3	< 3.5	< 2.7	< 6.7	1339 ± 101
02-04-13	KMI- 451	< 0.4	< 3.3	< 2.3	< 4.0	1304 ± 109
03-04-13	KMI- 892	< 0.4	< 2.9	< 4.1	< 2.2	1499 ± 105
04-01-13	KMI- 1386	< 0.2	< 2.1	< 3.0	< 2.6	1369 ± 103
05-01-13	KMI- 2193	< 0.3	< 2.9	< 3.9	< 1.6	1372 ± 116
05-14-13	KMI- 2515	< 0.3	< 2.5	< 3.2	< 2.0	1464 ± 124
06-03-13	KMI- 2849	< 0.4	< 3.8	< 4.1	< 5.3	1414 ± 113
06-18-13	KMI- 3351	< 0.3	< 3.1	< 3.9	< 2.9	1402 ± 122
07-01-13	KMI- 3606	< 0.2	< 3.5	< 5.4	< 3.5	1421 ± 109
07-16-13	KMI- 3932	< 0.4	< 4.1	< 4.4	< 3.1	1331 ± 118
08-01-13	KMI- 4431	< 0.3	< 3.0	< 3.8	< 1.5	1360 ± 112
08-13-13	KMI- 4738	< 0.2	< 3.1	< 3.8	< 2.9	1431 ± 107
09-03-13	KMI- 5216	< 0.5	< 2.1	< 3.3	< 3.7	1402 ± 96
09-17-13	KMI- 5492	< 0.3	< 3.8	< 3.7	< 1.6	1388 ± 122
10-01-13	KMI- 5783	< 0.4	< 2.3	< 2.9	< 2.1	1451 ± 93
10-15-13	KMI- 6269	< 0.3	< 4.6	< 3.8	< 4.2	1521 ± 127
11-05-13	KMI- 6864	< 0.2	< 6.9	< 5.9	< 4.5	1422 ± 177
12-02-13	KMI- 7228	< 0.2	< 3.0	< 3.3	< 3.0	1446 ± 91

Table 15. Milk, analyses for strontium-89, strontium-90, stable potassium, stable calcium, and ratios of strontium-90 per gram of calcium and cesium-137 per gram of potassium. Collection: Monthly composites.

Collection Period	Lab Code	Concentration				Ratios	
		Sr-89 (pCi/L)	Sr-90 (pCi/L)	K (g/L)	Ca (g/L)	Sr-90 per gram Ca	Cs-137 per gram K
<u>Indicators</u>							
K-5							
January	KMI - 3	< 0.9	0.8 ± 0.3	1.71 ± 0.13	1.10	0.73	< 5.85
February	- 446	< 0.8	0.8 ± 0.3	1.67 ± 0.12	1.12	0.71	< 5.99
March	- 887	< 1.0	< 0.6	1.73 ± 0.11	1.01	< 0.59	< 5.78
April	- 1381	< 1.2	< 0.6	1.59 ± 0.12	1.06	< 0.57	< 6.29
May	- 2575	< 0.9	0.6 ± 0.3	1.72 ± 0.14	0.92	0.65	< 5.81
June	- 3432	< 0.9	< 0.7	1.63 ± 0.14	0.87	< 0.80	< 6.13
July	- 4508	< 0.9	0.9 ± 0.4	1.70 ± 0.14	0.86	1.05	< 5.88
August	- 5065	< 0.8	0.5 ± 0.3	1.67 ± 0.14	0.91	0.55	< 5.99
September	- 5664	< 0.8	0.7 ± 0.4	1.63 ± 0.14	0.96	0.73	< 6.13
October	- 6694	< 1.0	< 0.6	1.66 ± 0.13	0.86	< 0.70	< 6.02
November	- 6859	< 1.2	1.2 ± 0.4	1.68 ± 0.15	1.27	0.94	< 5.95
December	- 7223	< 1.0	< 0.5	1.72 ± 0.14	1.25	0.40	< 5.81
K-34							
January	KMI - 4	< 0.8	1.1 ± 0.4	1.87 ± 0.12	1.28	0.86	< 5.35
February	- 447	< 0.8	0.8 ± 0.3	1.87 ± 0.13	1.07	0.75	< 5.35
March	- 888	< 1.0	< 0.6	1.92 ± 0.12	1.41	< 0.43	< 5.21
April	- 1382	< 0.9	0.6 ± 0.3	1.79 ± 0.12	1.06	0.57	< 5.59
May	- 2576	< 0.7	< 0.5	1.72 ± 0.14	0.90	< 0.56	< 5.81
June	- 3433	< 0.7	1.0 ± 0.3	1.72 ± 0.14	0.90	1.11	< 5.81
July	- 4509	< 0.8	< 0.5	1.82 ± 0.13	0.83	< 0.60	< 5.49
August	- 5066	< 0.7	0.7 ± 0.3	1.71 ± 0.14	0.92	< 0.76	< 5.85
September	- 5665	< 0.7	0.6 ± 0.3	1.66 ± 0.13	0.96	0.63	< 6.02
October	- 6695	< 0.8	< 0.5	1.77 ± 0.14	0.89	0.56	< 5.65
November	- 6860	< 1.3	< 0.7	1.80 ± 0.19	1.12	0.63	< 5.56
December	- 7224	< 0.8	< 0.5	1.74 ± 0.13	1.06	0.47	< 5.75

Table 15. Milk, analyses for strontium-89, strontium-90, stable potassium, stable calcium, and ratios of strontium-90 per gram of calcium and cesium-137 per gram of potassium (continued).

Collection Period	Lab Code	Concentration				Ratios	
		Sr-89 (pCi/L)	Sr-90 (pCi/L)	K (g/L)	Ca (g/L)	Sr-90 per gram Ca	Cs-137 per gram K
<u>Indicators</u>							
K-38							
January	KMI - 6	< 0.7	1.2 ± 0.4	1.74 ± 0.12	1.05	1.14	< 5.75
February	- 449	< 0.8	1.0 ± 0.3	1.77 ± 0.14	1.07	0.93	< 5.65
March	- 890	< 1.1	< 0.7	1.75 ± 0.12	1.24	< 0.56	< 5.71
April	- 1384	< 0.9	1.1 ± 0.4	1.75 ± 0.10	1.06	1.04	< 5.71
May	- 2578	< 0.7	1.2 ± 0.4	1.73 ± 0.13	1.04	1.15	< 5.78
June	- 3435	< 0.7	0.7 ± 0.3	1.69 ± 0.15	0.87	0.80	< 5.92
July	- 4511	< 0.7	1.0 ± 0.4	1.65 ± 0.14	0.99	1.01	< 6.06
August	- 5068	< 0.8	0.6 ± 0.3	1.65 ± 0.15	0.88	0.68	< 6.06
September	- 5667	< 0.7	1.1 ± 0.4	1.72 ± 0.13	1.16	0.95	< 5.81
October	- 6697	< 0.8	0.6 ± 0.3	1.65 ± 0.13	0.97	0.62	< 6.06
November	- 6862	< 0.8	1.1 ± 0.3	1.54 ± 0.12	1.02	1.08	< 6.49
December	- 7226	< 0.8	0.9 ± 0.3	1.74 ± 0.12	1.07	0.84	< 5.75
K-39							
January	KMI - 7	< 0.8	0.9 ± 0.4	1.75 ± 0.13	1.13	0.80	< 5.71
February	- 450	< 0.9	1.0 ± 0.4	1.59 ± 0.13	1.08	0.93	< 6.29
March	- 891	< 1.1	1.0 ± 0.5	1.62 ± 0.10	1.44	0.69	< 6.17
April	- 1385	< 1.0	0.7 ± 0.4	1.70 ± 0.11	1.01	0.69	< 5.88
May	- 2579	< 1.0	< 0.7	1.65 ± 0.12	0.96	< 0.73	< 6.06
June	- 3436	< 0.9	< 0.7	1.67 ± 0.15	0.94	< 0.74	< 5.99
July	- 4512	< 0.7	1.0 ± 0.4	1.69 ± 0.12	1.05	0.95	< 5.92
August	- 5069	< 0.9	< 0.7	1.60 ± 0.14	1.00	0.70	< 6.25
September	- 5668	< 0.8	< 0.6	1.63 ± 0.14	1.03	0.58	< 6.13
October	- 6698	< 0.8	< 0.5	1.68 ± 0.17	1.12	< 0.45	< 5.95
November	- 6863	< 0.9	< 0.7	1.62 ± 0.14	1.31	0.53	< 6.17
December	- 7227	< 0.9	1.2 ± 0.4	1.80 ± 0.14	1.25	0.96	< 5.56
K-44							
January	KMI - 9	< 0.7	< 0.5	1.62	1.17	< 0.43	< 6.17
February		NS ^a					
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							

^aNo sample. Cows sold, farm out of dairy business.

Table 15. Milk, analyses for strontium-89, strontium-90, stable potassium, stable calcium, and ratios of strontium-90 per gram of calcium and cesium-137 per gram of potassium (continued).

Collection Period	Lab Code	Concentration				Ratios	
		Sr-89 (pCi/L)	Sr-90 (pCi/L)	K (g/L)	Ca (g/L)	Sr-90 per gram Ca	Cs-137 per gram K
<u>Control</u>		<u>K-3</u>					
January	KMI - 2	< 0.7	0.7 ± 0.3	1.65 ± 0.14	1.23	0.57	< 6.06
February	- 445	< 0.8	1.4 ± 0.4	1.68 ± 0.13	1.22	1.15	< 5.95
March	- 886	< 1.1	1.1 ± 0.4	1.83 ± 0.12	1.01	1.09	< 5.46
April	- 1380	< 1.0	1.0 ± 0.4	1.74 ± 0.12	1.27	0.79	< 5.75
May	- 2574	< 0.8	0.8 ± 0.3	1.79 ± 0.15	0.98	0.82	< 5.59
June	- 3431	< 0.7	0.9 ± 0.3	1.73 ± 0.13	0.96	0.94	< 5.78
July	- 4507	< 0.7	0.6 ± 0.3	1.79 ± 0.13	0.86	0.70	< 5.59
August	- 5064	< 0.7	0.7 ± 0.3	1.74 ± 0.14	1.02	0.69	< 5.75
September	- 5663	< 0.7	< 0.6	1.74 ± 0.14	1.00	0.60	< 5.75
October	- 6693	< 0.8	0.7 ± 0.3	1.79 ± 0.14	0.97	0.72	< 5.59
November	- 6858	< 0.9	0.7 ± 0.3	1.83 ± 0.14	1.12	0.63	< 5.46
December	- 7222	< 0.9	0.8 ± 0.3	1.76 ± 0.13	1.18	0.68	< 5.68
		<u>K-35</u>					
January	KMI - 5	< 0.6	< 0.6	1.85 ± 0.12	1.20	< 0.50	< 5.41
February	- 448	< 0.8	< 0.6	1.80 ± 0.13	1.17	< 0.51	< 5.56
March	- 889	< 0.9	0.7 ± 0.3	1.80 ± 0.13	1.27	0.55	< 5.56
April	- 1383	< 0.9	0.6 ± 0.3	1.87 ± 0.12	0.99	0.61	< 5.35
May	- 2577	< 1.2	< 0.8	1.82 ± 0.15	0.94	< 0.85	< 5.49
June	- 3434	< 0.6	< 0.5	1.79 ± 0.16	0.94	< 0.53	< 5.59
July	- 4510	< 0.7	< 0.5	1.83 ± 0.15	1.02	< 0.49	< 5.46
August	- 5067	< 0.9	< 0.7	1.83 ± 0.14	0.96	0.73	< 5.46
September	- 5666	< 0.8	< 0.6	1.79 ± 0.13	0.92	< 0.65	< 5.59
October	- 6696	< 0.8	< 0.5	1.81 ± 0.13	1.00	< 0.50	< 5.52
November	- 6861	< 0.9	< 0.5	1.77 ± 0.15	1.22	0.41	< 5.65
December	- 7225	< 0.8	0.5 ± 0.3	1.79 ± 0.13	1.22	0.41	< 5.59
		<u>K-42</u>					
January	KMI - 8	< 0.9	0.9 ± 0.3	1.63 ± 0.12	1.05	0.86	< 6.13
February	- 451	< 0.9	0.8 ± 0.3	1.59 ± 0.13	1.06	0.75	< 6.29
March	- 892	< 1.1	0.7 ± 0.4	1.83 ± 0.13	1.30	0.54	< 5.46
April	- 1386	< 1.0	< 0.6	1.67 ± 0.13	1.06	< 0.57	< 5.99
May	- 2580	< 0.9	0.9 ± 0.4	1.73 ± 0.15	0.91	0.99	< 5.78
June	- 3437	< 0.8	0.7 ± 0.4	1.72 ± 0.14	0.90	0.78	< 5.81
July	- 4513	< 0.8	0.6 ± 0.3	1.68 ± 0.14	1.12	0.54	< 5.95
August	- 5070	< 0.7	0.6 ± 0.3	1.70 ± 0.13	0.84	0.71	< 5.88
September	- 5669	< 0.9	< 0.7	1.70 ± 0.13	0.88	< 0.80	< 5.88
October	- 6699	< 0.9	0.7 ± 0.3	1.81 ± 0.13	0.90	0.78	< 5.52
November	- 6864	< 1.7	< 0.7	1.73 ± 0.22	1.15	0.61	< 5.78
December	- 7228	< 1.0	1.0 ± 0.4	1.76 ± 0.11	1.09	0.92	< 5.68

Table 16. Well water, analyses for gross alpha, gross beta, tritium, strontium-89^a, strontium-90^a, potassium-40 and gamma-emitting isotopes.

Collection: Quarterly.

Sample Description and Concentration (pCi/L)				
Indicator				
<u>K-1g</u>				
Date Collected	01-02-13	04-01-13	07-01-13	10-01-13
Lab Code	KWW- 22	KWW- 1399	KWW- 3677	KWW- 5850
Gross alpha	2.5 ± 1.8	< 2.2	< 2.4	< 3.8
Gross beta	< 1.9	< 3.4	3.5 ± 1.3	5.7 ± 1.6
H-3	< 139	< 150	< 146	< 143
Sr-89	< 0.7	< 0.7	< 0.9	< 0.7
Sr-90	< 0.4	< 0.5	< 0.6	0.5 ± 0.3
K-40 (ICP)	2.78	3.05	2.63	2.54
Mn-54	< 3.1	< 1.5	< 2.3	< 1.4
Fe-59	< 6.4	< 4.1	< 3.8	< 6.4
Co-58	< 2.1	< 3.5	< 2.9	< 2.5
Co-60	< 2.1	< 1.9	< 2.3	< 1.8
Zn-65	< 4.2	< 2.8	< 2.3	< 2.7
Zr-Nb-95	< 3.5	< 3.5	< 2.8	< 4.1
Cs-134	< 2.7	< 1.9	< 2.4	< 2.2
Cs-137	< 2.9	< 2.9	< 1.8	< 2.4
Ba-La-140	< 3.8	< 6.3	< 3.4	< 3.0
<u>K-1h</u>				
Date Collected	01-02-13	04-01-13	07-01-13	10-01-13
Lab Code	KWW- 23	KWW- 1400	KWW- 3678	KWW- 5851
Gross alpha	3.2 ± 1.8	< 2.6	2.5 ± 1.8	4.3 ± 2.9
Gross beta	2.3 ± 1.2	5.1 ± 2.3	3.5 ± 1.2	6.6 ± 1.6
H-3	< 139	< 150	< 146	< 143
K-40 (ICP)	2.74	3.09	2.53	2.74
Mn-54	< 2.2	< 2.0	< 1.7	< 2.1
Fe-59	< 4.3	< 4.4	< 2.1	< 3.4
Co-58	< 1.5	< 2.5	< 2.2	< 2.2
Co-60	< 2.0	< 2.6	< 2.3	< 1.6
Zn-65	< 5.1	< 5.1	< 6.3	< 2.1
Zr-Nb-95	< 3.1	< 4.2	< 3.4	< 4.5
Cs-134	< 1.9	< 2.4	< 2.7	< 2.1
Cs-137	< 2.6	< 2.6	< 3.2	< 1.8
Ba-La-140	< 7.6	< 7.0	< 7.6	< 10.0

^a Strontium analyses required on samples from K-1g only.

Table 17. Well water, analyses for gross beta, tritium, potassium-40, and gamma-emitting isotopes.

Collection: Quarterly.				
Sample Description and Concentration (pCi/L)				
<u>Indicator</u>				
<u>K-10</u>				
Date Collected	01-02-13	04-01-13	07-01-13	10-01-13
Lab Code	KWW- 24	KWW- 1401	KWW- 3679	KWW- 5852
Gross beta	< 0.9	< 2.1	< 1.0	< 1.1
H-3	< 139	< 150	< 146	< 143
K-40 (ICP)	0.29	0.41	1.43	1.69
Mn-54	< 2.3	< 3.7	< 2.1	< 3.5
Fe-59	< 6.4	< 5.5	< 2.0	< 5.3
Co-58	< 2.8	< 3.1	< 2.4	< 2.1
Co-60	< 2.1	< 3.0	< 2.8	< 2.6
Zn-65	< 4.7	< 6.0	< 3.8	< 3.4
Zr-Nb-95	< 3.2	< 3.6	< 2.2	< 4.5
Cs-134	< 1.9	< 2.6	< 2.0	< 2.4
Cs-137	< 1.3	< 3.1	< 2.8	< 2.9
Ba-La-140	< 4.1	< 8.4	< 3.2	< 12.3
<u>K-11</u>				
Date Collected	01-02-13	04-01-13	07-01-13	10-01-13
Lab Code	KWW- 25	KWW- 1402	KWW- 3736	KWW- 5853
Gross beta	0.9 ± 0.4	1.1 ± 0.5	< 0.8	0.5 ± 0.3
H-3	< 139	< 150	< 146	< 143
K-40 (ICP)	0.89	0.97	0.84	0.82
Mn-54	< 1.6	< 2.3	< 2.7	< 2.3
Fe-59	< 3.2	< 5.2	< 3.8	< 2.2
Co-58	< 1.7	< 1.6	< 2.2	< 2.4
Co-60	< 1.6	< 2.0	< 2.3	< 1.7
Zn-65	< 2.3	< 4.5	< 4.3	< 3.6
Zr-Nb-95	< 2.0	< 2.5	< 3.1	< 2.4
Cs-134	< 1.6	< 1.8	< 2.7	< 2.0
Cs-137	< 1.9	< 2.3	< 3.6	< 2.0
Ba-La-140	< 4.8	< 4.2	< 2.3	< 8.1

Table 17. Well water, analyses for gross beta, tritium, potassium-40, and gamma-emitting isotopes.

Collection: Quarterly.				
Sample Description and Concentration (pCi/L)				
<u>Indicator</u>				
<u>K-38</u>				
Date Collected	01-02-13	04-01-13	07-01-13	10-01-13
Lab Code	KWW- 27	KWW- 1404	KWW- 3681	KWW- 5855
Gross beta	< 0.5	< 1.0	< 0.4	< 0.6
H-3	< 139	< 150	< 146	< 143
K-40 (ICP)	< 0.30	0.25	< 0.30	< 0.30
Mn-54	< 1.0	< 2.3	< 1.8	< 2.1
Fe-59	< 2.6	< 6.6	< 4.2	< 6.5
Co-58	< 0.7	< 2.6	< 1.4	< 2.3
Co-60	< 1.3	< 2.3	< 2.5	< 2.2
Zn-65	< 2.1	< 2.4	< 3.6	< 2.4
Zr-Nb-95	< 1.5	< 3.7	< 2.3	< 4.3
Cs-134	< 0.8	< 2.4	< 2.6	< 2.4
Cs-137	< 1.2	< 2.8	< 1.5	< 2.7
Ba-La-140	< 2.4	< 6.3	< 2.7	< 6.8
<u>Control</u>				
<u>K-13</u>				
Date Collected	01-02-13	04-01-13	07-01-13	10-01-13
Lab Code	KWW- 26	KWW- 1403	KWW- 3680	KWW- 5854
Gross beta	< 0.5	< 0.8	0.8 ± 0.3	0.7 ± 0.3
H-3	< 139	< 150	< 146	< 143
K-40 (ICP)	1.06	1.07	0.93	0.98
Mn-54	< 1.0	< 5.3	< 2.5	< 1.7
Fe-59	< 3.1	< 11.6	< 2.6	< 5.6
Co-58	< 1.4	< 3.6	< 3.1	< 2.2
Co-60	< 1.2	< 2.1	< 2.2	< 2.4
Zn-65	< 1.9	< 8.2	< 3.3	< 4.5
Zr-Nb-95	< 1.7	< 5.8	< 2.3	< 3.2
Cs-134	< 1.2	< 2.5	< 2.2	< 2.5
Cs-137	< 1.3	< 3.5	< 3.2	< 2.9
Ba-La-140	< 3.2	< 9.4	< 2.0	< 11.1

Table 18. Domestic meat samples (chickens), analyses of flesh for gross alpha, gross beta, and gamma-emitting isotopes. Annual collection.

Sample Description and Concentration (pCi/g wet)		
	Indicator	Control
Location	K-24	K-32
Date Collected	09-03-13	09-03-13
Lab Code	KME- 5311	KME- 5312
Gross Alpha	0.061 ± 0.033	0.040 ± 0.024
Gross Beta	2.97 ± 0.094	2.68 ± 0.075
Be-7	< 0.16	< 0.11
K-40	2.99 ± 0.38	2.40 ± 0.30
Nb-95	< 0.027	< 0.013
Zr-95	< 0.027	< 0.014
Ru-103	< 0.021	< 0.016
Ru-106	< 0.151	< 0.113
Cs-134	< 0.015	< 0.008
Cs-137	< 0.021	< 0.012
Ce-141	< 0.031	< 0.031
Ce-144	< 0.152	< 0.079

Table 19. Eggs, analyses for gross beta, strontium-89, strontium-90 and gamma emitting isotopes.
Collection: Quarterly

Sample Description and Concentration (pCi/g wet)				
Location	K-24			
Date Collected	01-02-13	04-01-13	07-01-13	10-01-13
Lab Code	KE- 29	KE- 1387	KE- 3607	KE- 5816
Gross beta	1.60 ± 0.05	1.67 ± 0.05	1.51 ± 0.04	1.57 ± 0.04
Sr-89	< 0.007	< 0.006	< 0.009	< 0.009
Sr-90	< 0.003	< 0.003	< 0.002	< 0.004
Be-7	< 0.054	< 0.055	< 0.060	< 0.061
K-40	1.09 ± 0.11	1.43 ± 0.12	1.44 ± 0.13	1.52 ± 0.13
Nb-95	< 0.007	< 0.006	< 0.015	< 0.009
Zr-95	< 0.009	< 0.006	< 0.010	< 0.016
Ru-103	< 0.006	< 0.005	< 0.011	< 0.012
Ru-106	< 0.041	< 0.039	< 0.044	< 0.057
Cs-134	< 0.003	< 0.004	< 0.004	< 0.005
Cs-137	< 0.004	< 0.004	< 0.003	< 0.005
Ce-141	< 0.014	< 0.009	< 0.033	< 0.026
Ce-144	< 0.035	< 0.029	< 0.034	< 0.039
Location	K-32			
Date Collected	01-02-13	04-01-13	07-01-13	10-01-13
Lab Code	KE- 30	KE- 1388	KE- 3609	KE- 5817
Gross beta	1.44 ± 0.04	1.32 ± 0.04	0.95 ± 0.03	1.48 ± 0.04
Sr-89	< 0.006	< 0.011	< 0.009	< 0.012
Sr-90	< 0.003	< 0.005	< 0.002	0.008 ± 0.003
Be-7	< 0.074	< 0.051	< 0.076	< 0.079
K-40	1.18 ± 0.10	1.38 ± 0.11	1.29 ± 0.11	1.08 ± 0.13
Nb-95	< 0.009	< 0.007	< 0.013	< 0.012
Zr-95	< 0.007	< 0.007	< 0.010	< 0.012
Ru-103	< 0.007	< 0.009	< 0.014	< 0.016
Ru-106	< 0.033	< 0.021	< 0.046	< 0.044
Cs-134	< 0.003	< 0.004	< 0.004	< 0.006
Cs-137	< 0.004	< 0.005	< 0.004	< 0.006
Ce-141	< 0.018	< 0.014	< 0.032	< 0.038
Ce-144	< 0.027	< 0.042	< 0.042	< 0.046

Table 20. Vegetable and grain samples, analyses for gross beta, strontium-89, strontium-90, and gamma-emitting isotopes. Annual collection.

Sample Description and Concentration (pCi/g wet)			
Location	Indicator		
	K-23		
Date Collected	08-01-13	08-01-13	
Lab Code	KVE- 4435	KVE- 4436	
Type	Clover	Wheat	
Gross beta	4.32 ± 0.11	6.54 ± 0.19	
Sr-89	< 0.014	< 0.052	
Sr-90	< 0.004	< 0.016	
Be-7	0.59 ± 0.17	0.98 ± 0.213	
K-40	3.70 ± 0.36	3.95 ± 0.39	
Nb-95	< 0.016	< 0.017	
Zr-95	< 0.017	< 0.018	
Ru-103	< 0.014	< 0.016	
Ru-106	< 0.088	< 0.124	
Cs-134	< 0.009	< 0.013	
Cs-137	< 0.016	< 0.014	
Ce-141	< 0.017	< 0.018	
Ce-144	< 0.057	< 0.105	

Location	Indicator		Control
	K-1A	K-24	K-3
Date Collected	09-03-13	09-03-13	10-01-13
Lab Code	KVE- 5313	KVE- 5315	KVE- 5847
Type	Corn	Lettuce	Pumpkin
Gross beta	2.38 ± 0.04	6.99 ± 0.12	2.35 ± 0.04
Sr-89	< 0.009	< 0.013	< 0.004
Sr-90	< 0.003	0.008 ± 0.003	< 0.002
Be-7	< 0.084	< 0.158	< 0.051
K-40	1.84 ± 0.20	7.02 ± 0.45	1.99 ± 0.13
Nb-95	< 0.011	< 0.013	< 0.006
Zr-95	< 0.017	< 0.017	< 0.008
Ru-103	< 0.012	< 0.016	< 0.004
Ru-106	< 0.063	< 0.110	< 0.029
Cs-134	< 0.007	< 0.011	< 0.005
Cs-137	< 0.004	< 0.011	< 0.005
Ce-141	< 0.013	< 0.032	< 0.012
Ce-144	< 0.060	< 0.088	< 0.035

Table 20. Vegetable and grain samples, analyses for gross beta, strontium-89, strontium-90, and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/g wet)				
Location	K-26 (control)			
	09-04-13	09-04-13	09-04-13	09-04-13
Date Collected	09-04-13	09-04-13	09-04-13	09-04-13
Lab Code	KVE- 5316	KVE- 5317	KVE- 5318	KVE- 5319
Type	Melon	Zucchini	Cauliflower	Kohlrabi
Gross beta	1.92 ± 0.03	2.50 ± 0.04	3.47 ± 0.08	4.82 ± 0.09 ^a
Sr-89	< 0.004	< 0.005	< 0.004	< 0.008
Sr-90	< 0.002	0.002 ± 0.001	< 0.002	0.005 ± 0.002
Be-7	< 0.044	< 0.056	< 0.079	< 0.046
K-40	1.77 ± 0.12	2.18 ± 0.20	3.24 ± 0.26	2.17 ± 0.16
Nb-95	< 0.006	< 0.005	< 0.012	< 0.007
Zr-95	< 0.005	< 0.012	< 0.012	< 0.008
Ru-103	< 0.003	< 0.006	< 0.008	< 0.004
Ru-106	< 0.026	< 0.070	< 0.068	< 0.045
Cs-134	< 0.004	< 0.007	< 0.006	< 0.003
Cs-137	< 0.004	< 0.004	< 0.010	< 0.006
Ce-141	< 0.011	< 0.012	< 0.011	< 0.014
Ce-144	< 0.035	< 0.049	< 0.051	< 0.050
K-26 (control)				
Date Collected	09-04-13	09-04-13	10-02-13	
Lab Code	KVE- 5320	KVE- 5321	KVE- 5848	
Type	Potatoes	Yellow Beans	Pumpkin	
Gross beta	4.66 ± 0.07	3.07 ± 0.05	1.89 ± 0.03	
Sr-89	< 0.007	< 0.006	< 0.003	
Sr-90	< 0.003	< 0.002	< 0.002	
Be-7	< 0.049	< 0.074	< 0.050	
K-40	4.07 ± 0.27	2.61 ± 0.22	1.62 ± 0.16	
Nb-95	< 0.009	< 0.005	< 0.004	
Zr-95	< 0.015	< 0.008	< 0.009	
Ru-103	< 0.009	< 0.005	< 0.008	
Ru-106	< 0.090	< 0.068	< 0.063	
Cs-134	< 0.006	< 0.006	< 0.006	
Cs-137	< 0.009	< 0.007	< 0.006	
Ce-141	< 0.017	< 0.015	< 0.017	
Ce-144	< 0.070	< 0.049	< 0.045	

^a Result of recalculation.

Table 21. Cattlefeed, analyses for gross beta, strontium-89, strontium-90, and gamma-emitting isotopes.

Collection: First Quarter.

Sample Description and Concentration (pCi/g wet)				
Control				
Location	K-3	K-3	K-35	K-35
Date Collected	01-03-13	01-03-13	01-02-13	01-02-13
Lab Code	KCF- 31	KCF- 37	KCF- 34	KCF- 40
Type	Silage	Haylage	Silage	Haylage
Gross beta	5.30 ± 0.16	11.72 ± 0.32	4.10 ± 0.12	11.97 ± 0.35
Sr-89	< 0.014	< 0.015	< 0.009	< 0.035
Sr-90	< 0.007	0.015 ± 0.005	< 0.004	< 0.016
Be-7	0.27 ± 0.095	< 0.068	0.21 ± 0.061	0.33 ± 0.11
K-40	4.32 ± 0.25	10.46 ± 0.31	2.99 ± 0.14	10.34 ± 0.39
Nb-95	< 0.007	< 0.009	< 0.005	< 0.010
Zr-95	< 0.014	< 0.012	< 0.006	< 0.017
Ru-103	< 0.007	< 0.008	< 0.006	< 0.009
Ru-106	< 0.057	< 0.054	< 0.031	< 0.072
Cs-134	< 0.007	< 0.006	< 0.003	< 0.006
Cs-137	< 0.008	< 0.006	< 0.004	< 0.008
Ce-141	< 0.014	< 0.009	< 0.010	< 0.022
Ce-144	< 0.049	< 0.043	< 0.034	< 0.054
Indicator				
Location	K-5	K-5	K-34	K-34
Date Collected	01-02-13	01-03-13	01-02-13	01-02-13
Lab Code	KCF- 32	KCF- 38	KCF- 33	KCF- 39
Type	Silage	Hay	Silage	Haylage
Gross beta	6.33 ± 0.19	13.97 ± 0.41	7.56 ± 0.27	5.62 ± 0.25
Sr-89	< 0.017	< 0.017	< 0.015	< 0.035
Sr-90	< 0.008	0.010 ± 0.005	0.010 ± 0.004	0.024 ± 0.010
Be-7	0.22 ± 0.09	< 0.11	< 0.063	0.31 ± 0.07
K-40	4.27 ± 0.26	11.19 ± 0.40	5.43 ± 0.21	9.50 ± 0.25
Nb-95	< 0.007	< 0.006	< 0.009	< 0.007
Zr-95	< 0.010	< 0.011	< 0.012	< 0.007
Ru-103	< 0.007	< 0.011	< 0.010	< 0.008
Ru-106	< 0.065	< 0.084	< 0.055	< 0.049
Cs-134	< 0.005	< 0.008	< 0.006	< 0.005
Cs-137	< 0.006	< 0.012	< 0.006	< 0.006
Ce-141	< 0.016	< 0.021	< 0.011	< 0.012
Ce-144	< 0.054	< 0.074	< 0.051	< 0.034

Table 21. Cattlefeed, analyses for gross beta, strontium-89, strontium-90, and gamma-emitting isotopes (continued).

Location	Sample Description and Concentration (pCi/g wet)			
	Indicator			
Date Collected	K-38	K-38	K-39	K-39
Lab Code	01-02-13	01-02-13	01-02-13	01-02-13
Type	KCF- 35	KCF- 41	KCF- 36	KCF- 43
	Silage	Hay	Silage	Hay
Gross beta	6.30 ± 0.20	8.45 ± 0.37	6.28 ± 0.20	18.94 ± 0.59
Sr-89	< 0.023	< 0.054	< 0.013	< 0.030
Sr-90	< 0.012	0.029 ± 0.014	0.008 ± 0.003	< 0.013
Be-7	< 0.15	0.75 ± 0.22	0.13 ± 0.04	0.24 ± 0.08
K-40	4.48 ± 0.32	5.89 ± 0.51	4.13 ± 0.14	15.25 ± 0.48
Nb-95	< 0.012	< 0.019	< 0.005	< 0.009
Zr-95	< 0.011	< 0.027	< 0.008	< 0.019
Ru-103	< 0.010	< 0.020	< 0.003	< 0.011
Ru-106	< 0.082	< 0.109	< 0.034	< 0.115
Cs-134	< 0.008	< 0.019	< 0.004	< 0.008
Cs-137	< 0.013	< 0.015	< 0.004	< 0.012
Ce-141	< 0.020	< 0.029	< 0.010	< 0.012
Ce-144	< 0.082	< 0.142	< 0.029	< 0.064

Table 22. Grass, analyses for gross beta, strontium-89, strontium-90, and gamma-emitting isotopes.
 Collection: Quarterly, April through December
 Units: pCi/g wet

Sample Description and Concentration				
Location	Indicator			
	K-1b	K-1f	K-5	K-34
Date Collected	06-03-13	06-03-13	06-03-13	06-03-13
Lab Code	KG- 2926	KG- 2927	KG- 2929	KG- 2930
Gross beta	6.85 ± 0.19	7.91 ± 0.21	7.55 ± 0.19	7.64 ± 0.20
Sr-89	< 0.012	< 0.017	< 0.010	< 0.008
Sr-90	0.008 ± 0.004	< 0.008	< 0.005	< 0.004
Be-7	0.77 ± 0.18	0.70 ± 0.16	0.55 ± 0.15	0.52 ± 0.14
K-40	5.47 ± 0.42	6.41 ± 0.45	7.07 ± 0.46	6.24 ± 0.36
Mn-54	< 0.008	< 0.011	< 0.009	< 0.008
Co-58	< 0.012	< 0.011	< 0.013	< 0.009
Co-60	< 0.012	< 0.015	< 0.010	< 0.007
Nb-95	< 0.010	< 0.013	< 0.010	< 0.010
Zr-95	< 0.015	< 0.022	< 0.018	< 0.014
Ru-103	< 0.019	< 0.014	< 0.009	< 0.012
Ru-106	< 0.123	< 0.088	< 0.072	< 0.096
Cs-134	< 0.013	< 0.008	< 0.010	< 0.009
Cs-137	< 0.016	< 0.016	< 0.010	< 0.010
Ce-141	< 0.030	< 0.017	< 0.028	< 0.013
Ce-144	< 0.139	< 0.055	< 0.087	< 0.067

Location	Indicator		Control	
	K-38	K-39	K-3	K-35
Date Collected	06-03-13	06-03-13	06-03-13	06-03-13
Lab Code	KG- 2932	KG- 2933	KG- 2928	KG- 2931
Gross beta	8.49 ± 0.22	6.62 ± 0.18	6.30 ± 0.16	8.50 ± 0.21
Sr-89	< 0.010	< 0.011	< 0.006	< 0.010
Sr-90	< 0.005	< 0.005	< 0.003	< 0.005
Be-7	0.83 ± 0.13	0.51 ± 0.13	0.27 ± 0.11	0.47 ± 0.14
K-40	7.63 ± 0.44	6.69 ± 0.40	5.60 ± 0.38	6.86 ± 0.45
Mn-54	< 0.008	< 0.007	< 0.011	< 0.013
Co-58	< 0.011	< 0.010	< 0.006	< 0.012
Co-60	< 0.013	< 0.008	< 0.010	< 0.012
Nb-95	< 0.015	< 0.015	< 0.013	< 0.011
Zr-95	< 0.022	< 0.021	< 0.020	< 0.013
Ru-103	< 0.008	< 0.012	< 0.010	< 0.011
Ru-106	< 0.112	< 0.076	< 0.075	< 0.106
Cs-134	< 0.010	< 0.008	< 0.011	< 0.011
Cs-137	< 0.010	< 0.012	< 0.011	< 0.014
Ce-141	< 0.021	< 0.015	< 0.023	< 0.029
Ce-144	< 0.085	< 0.062	< 0.086	< 0.104

Table 22. Grass samples, analyses for gross beta, strontium-89, strontium-90, and gamma-emitting isotopes (continued).

Sample Description and Concentration				
Location	Indicator			
	K-1b	K-1f	K-5	K-34
Date Collected	07-01-13	07-01-13	07-01-13	07-01-13
Lab Code	KG- 3610	KG- 3611	KG- 3613	KG- 3614
Gross beta	10.77 ± 0.44	7.93 ± 0.22	7.34 ± 0.23	14.08 ± 0.44
Sr-89	< 0.034	< 0.017	< 0.027	< 0.030
Sr-90	< 0.012	< 0.007	< 0.010	< 0.012
Be-7	5.90 ± 0.50	0.66 ± 0.16	0.90 ± 0.15	3.38 ± 0.31
K-40	8.50 ± 0.78	5.96 ± 0.38	6.06 ± 0.44	11.17 ± 0.70
Mn-54	< 0.029	< 0.009	< 0.010	< 0.019
Co-58	< 0.021	< 0.012	< 0.010	< 0.010
Co-60	< 0.015	< 0.008	< 0.011	< 0.015
Nb-95	< 0.019	< 0.015	< 0.012	< 0.019
Zr-95	< 0.040	< 0.015	< 0.013	< 0.027
Ru-103	< 0.027	< 0.010	< 0.013	< 0.018
Ru-106	< 0.273	< 0.108	< 0.133	< 0.178
Cs-134	< 0.024	< 0.011	< 0.010	< 0.015
Cs-137	< 0.030	< 0.009	< 0.008	< 0.021
Ce-141	< 0.054	< 0.022	< 0.022	< 0.030
Ce-144	< 0.156	< 0.079	< 0.074	< 0.077
Location	Indicator		Control	
	K-38	K-39	K-3	K-35
Date Collected	07-01-13	07-01-13	07-01-13	07-01-13
Lab Code	KG- 3616	KG- 3617	KG- 3612	KG- 3615
Gross beta	8.25 ± 0.23	7.35 ± 0.20	7.73 ± 0.23	8.96 ± 0.25
Sr-89	< 0.016	< 0.016	< 0.016	< 0.024
Sr-90	< 0.005	< 0.007	< 0.007	0.011 ± 0.006
Be-7	0.98 ± 0.17	0.88 ± 0.15	1.08 ± 0.16	1.51 ± 0.17
K-40	5.75 ± 0.37	5.57 ± 0.37	5.89 ± 0.42	6.39 ± 0.47
Mn-54	< 0.011	< 0.012	< 0.009	< 0.016
Co-58	< 0.010	< 0.012	< 0.007	< 0.007
Co-60	< 0.010	< 0.007	< 0.013	< 0.013
Nb-95	< 0.012	< 0.013	< 0.012	< 0.017
Zr-95	< 0.017	< 0.022	< 0.018	< 0.012
Ru-103	< 0.012	< 0.015	< 0.014	< 0.012
Ru-106	< 0.105	< 0.132	< 0.101	< 0.128
Cs-134	< 0.010	< 0.010	< 0.009	< 0.013
Cs-137	< 0.011	< 0.010	< 0.015	< 0.014
Ce-141	< 0.021	< 0.024	< 0.015	< 0.022
Ce-144	< 0.079	< 0.087	< 0.085	< 0.092

Table 22. Grass samples, analyses for gross beta, strontium-89, strontium-90, and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/g wet)				
Location	Indicator			
	K-1b	K-1f	K-5	K-34
Date Collected	10-01-13	10-01-13	10-01-13	10-01-13
Lab Code	KG- 5806	KG- 5808	KG- 5810	KG- 5811
Gross beta	10.33 ± 0.32	7.85 ± 0.19	8.11 ± 0.16	10.96 ± 0.34
Sr-89	< 0.066	< 0.022	< 0.014	< 0.056
Sr-90	< 0.026	< 0.008	< 0.005	< 0.021
Be-7	3.26 ± 0.30	1.49 ± 0.09	0.99 ± 0.22	3.54 ± 0.26
K-40	6.68 ± 0.50	5.60 ± 0.18	7.33 ± 0.43	8.22 ± 0.49
Mn-54	< 0.018	< 0.005	< 0.011	< 0.010
Co-58	< 0.010	< 0.004	< 0.013	< 0.015
Co-60	< 0.014	< 0.005	< 0.009	< 0.010
Nb-95	< 0.025	< 0.010	< 0.021	< 0.016
Zr-95	< 0.026	< 0.014	< 0.026	< 0.027
Ru-103	< 0.013	< 0.006	< 0.014	< 0.013
Ru-106	< 0.099	< 0.073	< 0.112	< 0.122
Cs-134	< 0.014	< 0.006	< 0.013	< 0.014
Cs-137	< 0.018	< 0.008	< 0.011	< 0.016
Ce-141	< 0.031	< 0.020	< 0.031	< 0.037
Ce-144	< 0.086	< 0.040	< 0.087	< 0.114
Location	Indicator		Control	
	K-38	K-39	K-3	K-35
Date Collected	10-01-13	10-01-13	10-01-13	10-01-13
Lab Code	KG- 5813	KG- 5814	KG- 5809	KG- 5812
Gross beta	18.99 ± 0.43	8.74 ± 0.24	8.48 ± 0.18	9.73 ± 0.20
Sr-89	< 0.049	< 0.033	< 0.018	< 0.024
Sr-90	< 0.019	< 0.013	< 0.006	< 0.009
Be-7	3.91 ± 0.34	2.33 ± 0.12	1.56 ± 0.19	0.92 ± 0.10
K-40	15.54 ± 0.79	6.96 ± 0.22	6.67 ± 0.42	8.52 ± 0.25
Mn-54	< 0.019	< 0.006	< 0.014	< 0.008
Co-58	< 0.016	< 0.006	< 0.013	< 0.005
Co-60	< 0.023	< 0.004	< 0.010	< 0.008
Nb-95	< 0.015	< 0.011	< 0.014	< 0.009
Zr-95	< 0.048	< 0.015	< 0.031	< 0.016
Ru-103	< 0.019	< 0.006	< 0.016	< 0.006
Ru-106	< 0.128	< 0.051	< 0.109	< 0.082
Cs-134	< 0.019	< 0.005	< 0.010	< 0.007
Cs-137	< 0.025	< 0.008	< 0.011	< 0.009
Ce-141	< 0.040	< 0.014	< 0.034	< 0.017
Ce-144	< 0.129	< 0.045	< 0.066	< 0.045

Table 23. Soil samples, analyses for gross alpha, gross beta, strontium-89, strontium-90, and gamma-emitting isotopes.
Collection: Semiannually

Sample Description and Concentration (pCi/g dry)		
Location	Indicator	
	K-1f	K-5
Date Collected	05-01-13	05-01-13
Lab Code	KSO- 2211	KSO- 2213
Gross alpha	9.24 ± 1.77	8.30 ± 1.58
Gross beta	22.87 ± 1.56	28.85 ± 1.58
Sr-89	< 0.063	< 0.075
Sr-90	< 0.026	0.049 ± 0.021
Be-7	< 0.28	< 0.45
K-40	18.17 ± 0.79	21.49 ± 0.88
Nb-95	< 0.070	< 0.042
Zr-95	< 0.057	< 0.069
Ru-103	< 0.044	< 0.037
Ru-106	< 0.236	< 0.174
Cs-134	< 0.021	< 0.025
Cs-137	< 0.026	0.134 ± 0.030
Ce-141	< 0.120	< 0.134
Ce-144	< 0.165	< 0.198
Date Collected	10-01-13	10-01-13
Lab Code	KSO- 5856	KSO- 5858
Gross alpha	4.49 ± 2.60	8.51 ± 3.17
Gross beta	20.26 ± 2.89	28.18 ± 3.12
Sr-89	< 0.067	< 0.076
Sr-90	< 0.022	< 0.026
Be-7	< 0.23	< 0.33
K-40	13.05 ± 0.68	18.77 ± 0.81
Nb-95	< 0.026	< 0.050
Zr-95	< 0.049	< 0.053
Ru-103	< 0.018	< 0.045
Ru-106	< 0.170	< 0.160
Cs-134	< 0.015	< 0.019
Cs-137	0.053 ± 0.027	0.080 ± 0.027
Ce-141	< 0.083	< 0.103
Ce-144	< 0.120	< 0.163

Table 23. Soil samples, analyses for gross alpha, gross beta, strontium-89, strontium-90, and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/g dry)			
Location	Indicator		
	K-34	K-38	K-39
Date Collected	05-01-13	05-01-13	05-01-13
Lab Code	KSO- 2214	KSO- 2216	KSO- 2217
Gross alpha	9.43 ± 1.62	7.15 ± 1.45	6.52 ± 1.60
Gross beta	28.16 ± 1.62	28.92 ± 1.51	29.27 ± 1.62
Sr-89	< 0.093	< 0.105	< 0.086
Sr-90	< 0.037	0.040 ± 0.022	< 0.031
Be-7	< 0.39	< 0.48	< 0.30
K-40	20.21 ± 0.86	21.59 ± 0.86	21.55 ± 0.78
Nb-95	< 0.097	< 0.056	< 0.071
Zr-95	< 0.078	< 0.075	< 0.058
Ru-103	< 0.033	< 0.071	< 0.035
Ru-106	< 0.166	< 0.257	< 0.150
Cs-134	< 0.019	< 0.024	< 0.016
Cs-137	0.075 ± 0.030	0.13 ± 0.033	0.056 ± 0.022
Ce-141	< 0.117	< 0.127	< 0.115
Ce-144	< 0.174	< 0.167	< 0.124
Date Collected	10-01-13	10-01-13	10-01-13
Lab Code	KSO- 5859	KSO- 5861	KSO- 5862
Gross alpha	5.86 ± 3.52	5.72 ± 1.56	9.39 ± 1.77
Gross beta	27.40 ± 3.00	28.32 ± 1.79	30.08 ± 1.76
Sr-89	< 0.076	< 0.066	< 0.103
Sr-90	< 0.024	< 0.022	< 0.034
Be-7	< 0.31	< 0.32	< 0.27
K-40	19.38 ± 0.85	18.71 ± 0.83	20.43 ± 0.95
Nb-95	< 0.021	< 0.049	< 0.036
Zr-95	< 0.028	< 0.028	< 0.061
Ru-103	< 0.036	< 0.027	< 0.041
Ru-106	< 0.090	< 0.160	< 0.165
Cs-134	< 0.019	< 0.021	< 0.018
Cs-137	0.090 ± 0.026	0.11 ± 0.026	0.062 ± 0.035
Ce-141	< 0.084	< 0.109	< 0.093
Ce-144	< 0.141	< 0.126	< 0.147

Table 23. Soil samples, analyses for gross alpha, gross beta, strontium-89, strontium-90, and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/g dry)		
Location	Control	
	K-3	K-35
Date Collected	05-01-13	05-01-13
Lab Code	KSO- 2212	KSO- 2215
Gross alpha	6.55 ± 1.39	8.68 ± 2.01
Gross beta	26.01 ± 1.63	26.06 ± 1.51
Sr-89	< 0.095	< 0.098
Sr-90	< 0.038	0.039 ± 0.021
Be-7	< 0.35	< 0.34
K-40	19.87 ± 0.87	17.86 ± 0.80
Nb-95	< 0.070	< 0.065
Zr-95	< 0.056	< 0.039
Ru-103	< 0.032	< 0.048
Ru-106	< 0.181	< 0.112
Cs-134	< 0.020	< 0.022
Cs-137	0.17 ± 0.031	0.14 ± 0.028
Ce-141	< 0.110	< 0.109
Ce-144	< 0.137	< 0.143
Date Collected	10-01-13	10-01-13
Lab Code	KSO- 5857	KSO- 5860
Gross alpha	14.30 ± 3.86	6.28 ± 3.15
Gross beta	33.30 ± 3.26	17.62 ± 2.81
Sr-89	< 0.105	< 0.103
Sr-90	< 0.034	< 0.025
Be-7	< 0.30	< 0.31
K-40	18.52 ± 0.84	15.85 ± 0.78
Nb-95	< 0.041	< 0.044
Zr-95	< 0.037	< 0.041
Ru-103	< 0.029	< 0.019
Ru-106	< 0.162	< 0.170
Cs-134	< 0.017	< 0.019
Cs-137	0.14 ± 0.032	0.10 ± 0.034
Ce-141	< 0.085	< 0.102
Ce-144	< 0.152	< 0.089

Table 24. Surface water samples, analyses for gross beta, potassium-40 and gamma-emitting isotopes.

Collection: Monthly

Sample Description and Concentration (pCi/L)			
<u>Indicator</u>			
<u>K-1a</u>			
Date Collected	01-02-13	02-04-13	03-04-13
Lab Code	KSW- 10	KSW- 452	NS ^a
Gross beta			
Suspended Solids	1.5 ± 0.4	< 0.8	-
Dissolved Solids	15.6 ± 1.4	2.8 ± 1.0	-
Total Residue	17.1 ± 1.5	2.8 ± 1.0	-
K-40 (ICP)	7.10	1.61	-
Mn-54	< 2.8	< 3.1	-
Fe-59	< 6.0	< 4.3	-
Co-58	< 3.1	< 3.5	-
Co-60	< 2.9	< 3.1	-
Zn-65	< 7.1	< 7.1	-
Zr-Nb-95	< 2.9	< 4.9	-
Cs-134	< 2.8	< 2.8	-
Cs-137	< 3.6	< 3.5	-
Ba-La-140	< 6.0	< 6.8	-
<u>K-1b</u>			
Date Collected	01-02-13	02-04-13	03-04-13
Lab Code	KSW- 11	KSW- 453	KSW- 904
Gross beta			
Suspended Solids	0.8 ± 0.3	< 0.7	< 0.8
Dissolved Solids	3.6 ± 0.6	6.2 ± 1.0	8.0 ± 1.1
Total Residue	4.4 ± 0.7	6.2 ± 1.0	8.0 ± 1.1
K-40 (ICP)	2.46	3.94	2.21
Mn-54	< 2.8	< 1.8	< 4.2
Fe-59	< 3.7	< 5.1	< 6.5
Co-58	< 2.8	< 2.1	< 2.0
Co-60	< 3.4	< 2.2	< 2.9
Zn-65	< 7.2	< 2.6	< 5.4
Zr-Nb-95	< 5.0	< 3.5	< 3.7
Cs-134	< 3.8	< 2.5	< 2.7
Cs-137	< 5.0	< 2.7	< 3.4
Ba-La-140	< 3.0	< 3.4	< 6.9

^a NS= No sample; water frozen.

Table 24. Surface water samples, analyses for gross beta, potassium-40, and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/L)			
Indicator			
<u>K-1a</u>			
Date Collected	04-01-13	05-01-13	06-03-13
Lab Code	KSW- 1391	KSW- 2195	KSW- 2904
Gross beta			
Suspended Solids	1.3 ± 0.5	< 0.8	< 0.8
Dissolved Solids	5.0 ± 1.0	9.6 ± 1.3	5.0 ± 1.0
Total Residue	6.3 ± 1.1	9.6 ± 1.3	5.0 ± 1.0
K-40 (ICP)	4.50	6.93	4.36
Mn-54	< 2.9	< 3.1	< 4.2
Fe-59	< 8.3	< 3.3	< 3.9
Co-58	< 3.7	< 2.7	< 2.7
Co-60	< 3.3	< 3.7	< 3.1
Zn-65	< 4.2	< 4.7	< 3.7
Zr-Nb-95	< 2.7	< 3.1	< 4.4
Cs-134	< 3.6	< 2.3	< 3.6
Cs-137	< 3.9	< 2.8	< 4.3
Ba-La-140	< 4.9	< 4.6	< 4.8
<u>K-1b</u>			
Date Collected	04-01-13	05-01-13	06-03-13
Lab Code	KSW- 1392	KSW- 2196	KSW- 2905
Gross beta			
Suspended Solids	< 0.7	< 0.7	< 0.7
Dissolved Solids	2.5 ± 0.6	3.5 ± 0.8	2.6 ± 0.7
Total Residue	2.5 ± 0.6	3.5 ± 0.8	2.6 ± 0.7
K-40 (ICP)	3.18	2.33	1.94
Mn-54	< 4.3	< 2.0	< 4.2
Fe-59	< 4.9	< 5.1	< 9.0
Co-58	< 2.9	< 2.7	< 3.4
Co-60	< 3.3	< 1.3	< 3.2
Zn-65	< 6.7	< 1.9	< 4.2
Zr-Nb-95	< 4.4	< 3.5	< 3.7
Cs-134	< 3.9	< 2.5	< 3.3
Cs-137	< 3.4	< 3.9	< 4.1
Ba-La-140	< 4.5	< 1.5	< 7.2

Table 24. Surface water samples, analyses for gross beta, potassium-40, and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/L)			
<u>Indicator</u>			
<u>K-1a</u>			
Date Collected	07-01-13	08-01-13	09-03-13
Lab Code	KSW- 3661	KSW- 4417	KSW- 5217
Gross beta			
Suspended Solids	< 0.7	< 0.8	< 0.8
Dissolved Solids	9.3 ± 1.4	6.8 ± 1.8	5.0 ± 1.0
Total Residue	9.3 ± 1.4	6.8 ± 1.8	5.0 ± 1.0
K-40 (ICP)	6.74	3.78	7.10
Mn-54	< 3.6	< 0.8	< 3.0
Fe-59	< 6.4	< 3.6	< 5.2
Co-58	< 3.0	< 1.7	< 3.7
Co-60	< 3.8	< 3.0	< 2.2
Zn-65	< 6.2	< 3.7	< 4.9
Zr-Nb-95	< 3.2	< 2.9	< 3.3
Cs-134	< 2.8	< 2.3	< 3.5
Cs-137	< 4.3	< 3.1	< 3.2
Ba-La-140	< 5.1	< 3.0	< 3.0
<u>K-1b</u>			
Date Collected	07-01-13	08-01-13	09-03-13
Lab Code	KSW- 3662	KSW- 4418	KSW- 5218
Gross beta			
Suspended Solids	< 0.8	< 0.7	< 0.7
Dissolved Solids	3.9 ± 0.8	2.8 ± 1.0	2.2 ± 0.6
Total Residue	3.9 ± 0.8	2.8 ± 1.0	2.2 ± 0.6
K-40 (ICP)	3.39	2.11	2.58
Mn-54	< 4.1	< 1.9	< 5.0
Fe-59	< 8.6	< 4.8	< 7.3
Co-58	< 3.8	< 3.7	< 2.9
Co-60	< 3.4	< 1.3	< 3.7
Zn-65	< 1.9	< 2.8	< 9.8
Zr-Nb-95	< 3.5	< 3.4	< 2.5
Cs-134	< 3.8	< 2.9	< 4.7
Cs-137	< 3.7	< 3.0	< 5.3
Ba-La-140	< 5.2	< 2.9	< 6.2

Table 24. Surface water samples, analyses for gross beta, potassium-40, and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/L)			
Indicator			
<u>K-1a</u>			
Date Collected	10-01-13	11-05-13	12-02-13
Lab Code	KSW- 5792	KSW- 6875	KSW- 7232
Gross beta			
Suspended Solids	< 0.8	1.1 ± 0.4	< 0.8
Dissolved Solids	72.2 ± 2.4	43.2 ± 2.7	3.8 ± 1.1
Total Residue	72.2 ± 2.4	44.3 ± 2.7	3.8 ± 1.1
K-40 (ICP)	51.91	31.24	2.07
Mn-54	< 2.5	< 4.0	< 2.6
Fe-59	< 3.2	< 5.6	< 3.4
Co-58	< 3.8	< 6.0	< 2.6
Co-60	< 2.1	< 7.1	< 2.5
Zn-65	< 4.3	< 6.1	< 5.5
Zr-Nb-95	< 2.8	< 5.8	< 4.7
Cs-134	< 2.7	< 5.8	< 3.6
Cs-137	< 2.7	< 4.9	< 2.6
Ba-La-140	< 5.9	< 4.4	< 1.7
<u>K-1b</u>			
Date Collected	10-01-13	11-05-13	12-02-13
Lab Code	KSW- 5793	KSW- 6876	KSW- 7233
Gross beta			
Suspended Solids	< 0.7	0.8 ± 0.4	< 0.7
Dissolved Solids	2.4 ± 0.5	6.3 ± 0.9	2.1 ± 0.7
Total Residue	2.4 ± 0.5	7.1 ± 1.0	2.1 ± 0.7
K-40 (ICP)	2.34	2.85	2.12
Mn-54	< 2.5	< 2.2	< 1.9
Fe-59	< 4.4	< 5.9	< 7.6
Co-58	< 2.8	< 1.6	< 1.6
Co-60	< 2.1	< 1.9	< 1.7
Zn-65	< 3.6	< 2.9	< 2.8
Zr-Nb-95	< 4.7	< 3.5	< 2.7
Cs-134	< 3.0	< 2.7	< 2.8
Cs-137	< 3.2	< 2.8	< 2.8
Ba-La-140	< 11.2	< 4.3	< 3.9

Table 24. Surface water samples, analyses for gross beta, potassium-40 and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/L)			
<u>Indicator</u>			
<u>K-1d</u>			
Date Collected	01-02-13	02-04-13	03-04-13
Lab Code	KSW- 12	KSW- 454	KSW- 905
Gross beta			
Suspended Solids	0.7 ± 0.3	< 0.8	< 0.7
Dissolved Solids	1.5 ± 0.3	0.9 ± 0.4	1.0 ± 0.4
Total Residue	2.2 ± 0.4	0.9 ± 0.4	1.0 ± 0.4
K-40 (ICP)	1.18	1.21	1.29
Mn-54	< 3.4	< 1.9	< 3.3
Fe-59	< 6.9	< 6.4	< 10.3
Co-58	< 2.8	< 1.9	< 5.5
Co-60	< 2.4	< 2.2	< 6.3
Zn-65	< 7.6	< 1.7	< 12.7
Zr-Nb-95	< 3.7	< 3.5	< 4.2
Cs-134	< 2.9	< 1.7	< 6.5
Cs-137	< 1.4	< 2.2	< 3.2
Ba-La-140	< 3.2	< 3.6	< 5.4
<u>K-1e</u>			
Date Collected	01-02-13	02-04-13	03-04-13
Lab Code	KSW- 13	KSW- 455	KSW- 906
Gross beta			
Suspended Solids	< 0.5	< 0.7	< 0.8
Dissolved Solids	4.5 ± 0.8	3.5 ± 1.0	4.8 ± 1.2
Total Residue	4.5 ± 0.8	3.5 ± 1.0	4.8 ± 1.2
K-40 (ICP)	3.84	4.26	5.21
Mn-54	< 2.1	< 1.8	< 3.6
Fe-59	< 5.0	< 3.0	< 6.0
Co-58	< 2.5	< 2.8	< 3.1
Co-60	< 2.6	< 2.5	< 3.7
Zn-65	< 3.1	< 5.2	< 5.8
Zr-Nb-95	< 2.4	< 4.2	< 2.9
Cs-134	< 2.4	< 2.3	< 3.9
Cs-137	< 2.5	< 2.8	< 4.3
Ba-La-140	< 3.8	< 4.8	< 5.2

Table 24. Surface water samples, analyses for gross beta, potassium-40, and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/L)			
Indicator			
<u>K-1d</u>			
Date Collected	04-01-13	05-01-13	06-03-13
Lab Code	KSW- 1393	KSW- 2197	KSW- 2906
Gross beta			
Suspended Solids	< 0.8	< 0.8	< 0.8
Dissolved Solids	1.9 ± 0.5	1.9 ± 0.5	1.8 ± 0.5
Total Residue	1.9 ± 0.5	1.9 ± 0.5	1.8 ± 0.5
K-40 (ICP)	1.25	1.60	1.16
Mn-54	< 3.4	< 2.1	< 3.8
Fe-59	< 7.5	< 4.2	< 6.4
Co-58	< 3.7	< 2.5	< 2.1
Co-60	< 3.5	< 1.5	< 3.1
Zn-65	< 8.8	< 2.3	< 3.5
Zr-Nb-95	< 4.5	< 3.1	< 4.5
Cs-134	< 4.4	< 2.1	< 4.0
Cs-137	< 4.2	< 3.7	< 3.8
Ba-La-140	< 4.6	< 1.6	< 5.3
<u>K-1e</u>			
Date Collected	04-01-13	05-01-13	06-03-13
Lab Code	KSW- 1394	KSW- 2198	KSW- 2907
Gross beta			
Suspended Solids	< 0.7	< 0.7	< 0.7
Dissolved Solids	1.5 ± 0.7	3.8 ± 1.0	3.3 ± 1.0
Total Residue	1.5 ± 0.7	3.8 ± 1.0	3.3 ± 1.0
K-40 (ICP)	2.71	3.99	3.47
Mn-54	< 3.9	< 3.2	< 4.2
Fe-59	< 5.4	< 4.8	< 3.4
Co-58	< 3.4	< 3.2	< 3.1
Co-60	< 3.7	< 2.7	< 3.4
Zn-65	< 3.9	< 7.1	< 5.4
Zr-Nb-95	< 3.4	< 4.5	< 2.5
Cs-134	< 3.6	< 2.8	< 2.3
Cs-137	< 4.9	< 4.9	< 4.0
Ba-La-140	< 5.2	< 5.1	< 3.8

Table 24. Surface water samples, analyses for gross beta, potassium-40, and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/L)			
<u>Indicator</u>			
<u>K-1d</u>			
Date Collected	07-01-13	08-01-13	09-03-13
Lab Code	KSW- 3625	KSW- 4419	KSW- 5219
Gross beta			
Suspended Solids	< 0.8	< 0.7	< 0.7
Dissolved Solids	1.3 ± 0.4	1.5 ± 0.7	1.1 ± 0.4
Total Residue	1.3 ± 0.4	1.5 ± 0.7	1.1 ± 0.4
K-40 (ICP)	1.11	1.13	1.12
Mn-54	< 1.8	< 2.7	< 2.0
Fe-59	< 5.3	< 3.0	< 6.7
Co-58	< 1.7	< 2.2	< 3.1
Co-60	< 2.2	< 2.0	< 3.3
Zn-65	< 3.3	< 4.3	< 3.4
Zr-Nb-95	< 3.4	< 3.6	< 3.2
Cs-134	< 2.8	< 3.0	< 3.8
Cs-137	< 3.0	< 3.5	< 4.2
Ba-La-140	< 4.7	< 1.7	< 4.6
<u>K-1e</u>			
Date Collected	07-01-13	08-01-13	09-03-13
Lab Code	KSW- 3663	KSW- 4420	KSW- 5220
Gross beta			
Suspended Solids	< 0.7	< 0.7	< 0.7
Dissolved Solids	2.4 ± 0.8	11.5 ± 2.1	11.5 ± 1.7
Total Residue	2.4 ± 0.8	11.5 ± 2.1	11.5 ± 1.7
K-40 (ICP)	2.87	8.13	7.98
Mn-54	< 1.5	< 3.6	< 1.6
Fe-59	< 3.5	< 6.5	< 3.7
Co-58	< 2.5	< 3.5	< 1.7
Co-60	< 2.2	< 3.6	< 1.3
Zn-65	< 3.4	< 2.4	< 5.1
Zr-Nb-95	< 2.1	< 3.6	< 1.7
Cs-134	< 2.7	< 3.4	< 2.4
Cs-137	< 2.7	< 3.8	< 3.1
Ba-La-140	< 3.6	< 3.6	< 4.0

Table 24. Surface water samples, analyses for gross beta, potassium-40, and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/L)			
Indicator			
<u>K-1d</u>			
Date Collected	10-01-13	11-05-13	12-02-13
Lab Code	KSW- 5794	KSW- 6877	KSW- 7234
Gross beta			
Suspended Solids	< 0.8	< 0.8	< 0.8
Dissolved Solids	1.5 ± 0.3	2.0 ± 0.7	0.7 ± 0.4
Total Residue	1.5 ± 0.3	2.0 ± 0.7	0.7 ± 0.4
K-40 (ICP)	1.25	1.12	1.17
Mn-54	< 2.8	< 2.3	< 5.7
Fe-59	< 5.9	< 4.3	< 8.7
Co-58	< 1.4	< 1.5	< 5.4
Co-60	< 2.3	< 1.8	< 4.7
Zn-65	< 3.8	< 2.3	< 8.4
Zr-Nb-95	< 2.7	< 2.9	< 2.6
Cs-134	< 2.3	< 2.6	< 6.2
Cs-137	< 3.3	< 2.1	< 7.3
Ba-La-140	< 11.6	< 3.0	< 3.2
<u>K-1e</u>			
Date Collected	10-01-13	11-05-13	12-02-13
Lab Code	KSW- 5795	KSW- 6878	KSW- 7235
Gross beta			
Suspended Solids	< 0.7	< 0.7	< 0.7
Dissolved Solids	6.9 ± 0.9	7.6 ± 1.0	2.9 ± 0.9
Total Residue	6.9 ± 0.9	7.6 ± 1.0	2.9 ± 0.9
K-40 (ICP)	7.39	3.85	2.64
Mn-54	< 2.6	< 1.4	< 4.4
Fe-59	< 5.3	< 5.3	< 4.3
Co-58	< 3.5	< 2.2	< 2.1
Co-60	< 1.7	< 1.3	< 3.5
Zn-65	< 3.1	< 2.1	< 1.8
Zr-Nb-95	< 3.3	< 3.1	< 3.9
Cs-134	< 2.8	< 2.4	< 3.9
Cs-137	< 2.9	< 2.8	< 2.3
Ba-La-140	< 5.2	< 2.4	< 3.4

Table 24. Surface water samples, analyses for gross beta, potassium-40 and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/L)			
<u>Indicator</u>			
<u>K-1k</u>			
Date Collected	01-02-13	02-04-13	03-04-13
Lab Code	NS ^a	NS ^a	NS ^a
Gross beta			
Suspended Solids	-	-	-
Dissolved Solids	-	-	-
Total Residue	-	-	-
K-40 (ICP)	-	-	-
Mn-54	-	-	-
Fe-59	-	-	-
Co-58	-	-	-
Co-60	-	-	-
Zn-65	-	-	-
Zr-Nb-95	-	-	-
Cs-134	-	-	-
Cs-137	-	-	-
Ba-La-140	-	-	-
Date Collected	04-01-13	05-01-13	06-03-13
Lab Code	NS ^a	KSW- 2199	KSW- 2908
Gross beta			
Suspended Solids	-	< 0.9	< 1.3
Dissolved Solids	-	6.3 ± 0.7	7.2 ± 0.8
Total Residue	-	6.3 ± 0.7	7.2 ± 0.8
K-40 (ICP)	-	4.79	5.35
Mn-54	-	< 3.2	< 1.9
Fe-59	-	< 3.3	< 5.0
Co-58	-	< 3.4	< 2.0
Co-60	-	< 2.8	< 3.0
Zn-65	-	< 4.7	< 4.4
Zr-Nb-95	-	< 3.5	< 4.4
Cs-134	-	< 3.1	< 3.1
Cs-137	-	< 3.9	< 3.8
Ba-La-140	-	< 4.2	< 5.8

^a NS= No sample; water frozen.

Table 24. Surface water samples, analyses for gross beta, potassium-40, and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/L)			
Indicator			
<u>K-1k</u>			
Date Collected	07-01-13	08-01-13	09-01-13
Lab Code	KSW- 3664	NS ^a	NS ^a
Gross beta			
Suspended Solids	< 0.8	-	-
Dissolved Solids	2.0 ± 0.5	-	-
Total Residue	2.0 ± 0.5	-	-
K-40 (ICP)	2.17	-	-
Mn-54	< 4.3	-	-
Fe-59	< 7.6	-	-
Co-58	< 3.7	-	-
Co-60	< 2.5	-	-
Zn-65	< 4.0	-	-
Zr-Nb-95	< 6.0	-	-
Cs-134	< 3.9	-	-
Cs-137	< 4.4	-	-
Ba-La-140	< 5.5	-	-
Date Collected	10-01-13	11-05-13	12-02-13
Lab Code	KSW- 5796	KSW- 6879	NS ^a
Gross beta			
Suspended Solids	< 0.7	< 0.8	-
Dissolved Solids	21.9 ± 0.9	16.7 ± 1.2	-
Total Residue	21.9 ± 0.9	16.7 ± 1.2	-
K-40 (ICP)	7.22	6.03	-
Mn-54	< 2.9	< 2.2	-
Fe-59	< 5.1	< 3.3	-
Co-58	< 1.5	< 2.7	-
Co-60	< 1.6	< 1.9	-
Zn-65	< 2.7	< 2.1	-
Zr-Nb-95	< 4.0	< 3.0	-
Cs-134	< 3.6	< 2.1	-
Cs-137	< 3.6	< 2.5	-
Ba-La-140	< 5.4	< 2.8	-

^a NS= No sample; inaccessible.

Table 24. Surface water samples, analyses for gross beta, potassium-40 and gamma-emitting isotopes.

Collection: Monthly

Sample Description and Concentration (pCi/L)			
<u>Indicator</u>			
<u>K-9 (Raw)</u>			
Date Collected	01-02-13	02-04-13	03-04-13
Lab Code	KSW- 14	KSW- 456	KSW- 907
Gross beta			
Suspended Solids	0.6 ± 0.3	< 0.8	< 0.7
Dissolved Solids	1.2 ± 0.3	1.2 ± 0.4	1.4 ± 0.4
Total Residue	1.8 ± 0.4	1.2 ± 0.4	1.4 ± 0.4
K-40 (ICP)	1.17	1.16	1.16
Mn-54	< 2.3	< 1.8	< 3.2
Fe-59	< 3.2	< 5.4	< 4.7
Co-58	< 1.8	< 2.1	< 2.3
Co-60	< 2.1	< 2.7	< 2.3
Zn-65	< 2.5	< 2.9	< 3.2
Zr-Nb-95	< 2.7	< 3.3	< 1.8
Cs-134	< 2.6	< 2.0	< 2.9
Cs-137	< 2.7	< 1.8	< 3.0
Ba-La-140	< 3.0	< 3.1	< 2.9
<u>K-9 (Tap)</u>			
Date Collected	01-02-13	02-04-13	03-04-13
Lab Code	KSW- 15	KSW- 457	KSW- 908
Gross beta			
Suspended Solids	0.7 ± 0.3	< 0.8	< 0.7
Dissolved Solids	1.3 ± 0.3	0.7 ± 0.4	0.7 ± 0.4
Total Residue	2.0 ± 0.4	0.7 ± 0.4	0.7 ± 0.4
K-40 (ICP)	1.21	1.16	1.19
Mn-54	< 1.5	< 2.3	< 3.6
Fe-59	< 3.7	< 4.6	< 6.7
Co-58	< 1.8	< 2.6	< 3.0
Co-60	< 2.1	< 2.7	< 3.9
Zn-65	< 2.9	< 1.6	< 4.9
Zr-Nb-95	< 2.6	< 2.2	< 3.7
Cs-134	< 1.2	< 2.2	< 3.4
Cs-137	< 1.5	< 2.1	< 3.6
Ba-La-140	< 4.9	< 2.7	< 4.9

Table 24. Surface water samples, analyses for gross beta, potassium-40, and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/L)			
Indicator			
<u>K-9 (Raw)</u>			
Date Collected	04-01-13	05-01-13	06-03-13
Lab Code	KSW- 1395	KSW- 2200	KSW- 2909
Gross beta			
Suspended Solids	< 0.8	< 0.8	< 0.7
Dissolved Solids	1.3 ± 0.4	1.4 ± 0.4	2.3 ± 0.5
Total Residue	1.3 ± 0.4	1.4 ± 0.4	2.3 ± 0.5
K-40 (ICP)	1.19	1.36	1.11
Mn-54	< 3.8	< 2.2	< 2.2
Fe-59	< 6.4	< 3.8	< 1.9
Co-58	< 3.0	< 3.2	< 2.0
Co-60	< 3.4	< 2.7	< 2.7
Zn-65	< 3.1	< 2.8	< 2.5
Zr-Nb-95	< 3.3	< 3.2	< 4.9
Cs-134	< 3.7	< 2.7	< 3.0
Cs-137	< 2.6	< 2.1	< 1.9
Ba-La-140	< 5.5	< 2.3	< 2.7
<u>K-9 (Tap)</u>			
Date Collected	04-01-13	05-01-13	06-03-13
Lab Code	KSW- 1396	KSW- 2201	KSW- 2910
Gross beta			
Suspended Solids	< 0.8	< 0.7	< 0.8
Dissolved Solids	1.2 ± 0.4	2.2 ± 0.7	2.1 ± 0.7
Total Residue	1.2 ± 0.4	2.2 ± 0.7	2.1 ± 0.7
K-40 (ICP)	1.21	1.34	1.12
Mn-54	< 2.0	< 2.7	< 3.7
Fe-59	< 4.4	< 5.3	< 7.5
Co-58	< 2.8	< 2.9	< 4.1
Co-60	< 3.0	< 1.9	< 3.1
Zn-65	< 3.4	< 3.1	< 7.0
Zr-Nb-95	< 4.3	< 2.4	< 4.3
Cs-134	< 2.2	< 2.8	< 4.1
Cs-137	< 3.9	< 3.6	< 3.7
Ba-La-140	< 3.4	< 4.0	< 4.3

Table 24. Surface water samples, analyses for gross beta, potassium-40, and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/L)			
<u>Indicator</u>			
<u>K-9 (Raw)</u>			
Date Collected	07-01-13	08-01-13	09-03-13
Lab Code	KSW- 3665	KSW- 4421	KSW- 5221
Gross beta			
Suspended Solids	< 0.8	< 0.7	< 0.7
Dissolved Solids	1.3 ± 0.4	1.5 ± 0.7	< 0.6
Total Residue	1.3 ± 0.4	1.5 ± 0.7	< 0.7
K-40 (ICP)	1.11	1.12	1.12
Mn-54	< 1.8	< 3.6	< 1.4
Fe-59	< 5.5	< 6.6	< 4.5
Co-58	< 2.3	< 2.1	< 2.9
Co-60	< 3.5	< 2.6	< 2.2
Zn-65	< 2.8	< 4.8	< 5.2
Zr-Nb-95	< 3.5	< 2.9	< 2.7
Cs-134	< 2.7	< 2.7	< 2.4
Cs-137	< 2.4	< 2.4	< 2.1
Ba-La-140	< 5.6	< 2.5	< 2.0
<u>K-9 (Tap)</u>			
Date Collected	07-01-13	08-01-13	09-03-13
Lab Code	KSW- 3666	KSW- 4422	KSW- 5222
Gross beta			
Suspended Solids	< 0.7	< 0.8	< 0.7
Dissolved Solids	1.5 ± 0.4	1.6 ± 0.4	1.3 ± 0.4
Total Residue	1.5 ± 0.4	1.6 ± 0.4	1.3 ± 0.4
K-40 (ICP)	1.12	1.14	1.14
Mn-54	< 2.0	< 1.9	< 3.1
Fe-59	< 3.8	< 4.5	< 3.8
Co-58	< 2.1	< 2.3	< 2.2
Co-60	< 2.3	< 1.4	< 1.6
Zn-65	< 4.2	< 3.5	< 4.1
Zr-Nb-95	< 2.2	< 2.7	< 2.7
Cs-134	< 2.4	< 3.1	< 3.3
Cs-137	< 2.4	< 3.3	< 1.8
Ba-La-140	< 2.4	< 1.7	< 2.4

Table 24. Surface water samples, analyses for gross beta, potassium-40, and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/L)			
Indicator			
<u>K-9 (Raw)</u>			
Date Collected	10-01-13	11-05-13	12-02-13
Lab Code	KSW- 5797	KSW- 6880	KSW- 7236
Gross beta			
Suspended Solids	< 0.7	< 0.8	< 0.7
Dissolved Solids	0.5 ± 0.3	1.0 ± 0.4	2.0 ± 0.6
Total Residue	0.5 ± 0.3	1.0 ± 0.4	2.0 ± 0.6
K-40 (ICP)	1.12	1.07	1.16
Mn-54	< 1.7	< 2.1	< 3.4
Fe-59	< 4.4	< 2.8	< 3.0
Co-58	< 2.4	< 2.3	< 1.9
Co-60	< 1.4	< 1.9	< 2.1
Zn-65	< 4.4	< 3.1	< 3.1
Zr-Nb-95	< 3.8	< 2.3	< 2.2
Cs-134	< 3.1	< 2.6	< 2.9
Cs-137	< 1.9	< 2.6	< 3.7
Ba-La-140	< 12.7	< 5.3	< 1.8
<u>K-9 (Tap)</u>			
Date Collected	10-01-13	11-05-13	12-02-13
Lab Code	KSW- 5798	KSW- 6881	KSW- 7237
Gross beta			
Suspended Solids	< 0.7	< 0.7	< 0.8
Dissolved Solids	1.0 ± 0.3	1.1 ± 0.4	2.2 ± 0.5
Total Residue	1.0 ± 0.3	1.1 ± 0.4	2.2 ± 0.5
K-40 (ICP)	1.10	1.06	1.12
Mn-54	< 3.5	< 2.3	< 2.5
Fe-59	< 5.0	< 4.9	< 4.1
Co-58	< 4.3	< 2.6	< 1.5
Co-60	< 2.6	< 1.7	< 2.1
Zn-65	< 3.7	< 4.3	< 4.0
Zr-Nb-95	< 4.6	< 3.0	< 3.7
Cs-134	< 3.3	< 2.7	< 2.9
Cs-137	< 3.8	< 2.7	< 2.5
Ba-La-140	< 9.7	< 5.6	< 3.6

Table 24. Surface water, analyses for gross beta, potassium-40 and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/L)			
<u>Indicator</u>			
<u>K-14a</u>			
Date Collected	01-02-13	02-04-13	03-04-13
Lab Code	KSW- 16	KSW- 458	KSW- 909
Gross beta			
Suspended Solids	< 0.8	< 0.7	< 0.8
Dissolved Solids	2.2 ± 0.4	2.2 ± 0.5	1.1 ± 0.4
Total Residue	2.2 ± 0.4	2.2 ± 0.5	1.1 ± 0.4
K-40 (ICP)	1.53	1.70	1.50
Mn-54	< 1.7	< 2.3	< 3.1
Fe-59	< 3.9	< 5.3	< 4.1
Co-58	< 1.4	< 2.5	< 2.1
Co-60	< 1.8	< 2.3	< 2.8
Zn-65	< 2.7	< 3.8	< 5.9
Zr-Nb-95	< 2.5	< 2.8	< 4.1
Cs-134	< 1.7	< 2.6	< 2.4
Cs-137	< 2.1	< 1.8	< 3.0
Ba-La-140	< 3.5	< 2.9	< 2.9
<u>K-14b</u>			
Date Collected	01-02-13	02-04-13	03-04-13
Lab Code	KSW- 17	KSW- 487	KSW- 910
Gross beta			
Suspended Solids	< 0.7	< 0.8	< 0.7
Dissolved Solids	1.3 ± 0.3	1.8 ± 0.5	3.0 ± 0.8
Total Residue	1.3 ± 0.3	1.8 ± 0.5	3.0 ± 0.8
K-40 (ICP)	1.53	1.70	1.53
Mn-54	< 1.8	< 2.0	< 2.0
Fe-59	< 4.1	< 5.6	< 5.0
Co-58	< 0.9	< 2.5	< 1.7
Co-60	< 1.3	< 2.4	< 1.8
Zn-65	< 2.6	< 3.4	< 2.8
Zr-Nb-95	< 1.2	< 3.4	< 3.3
Cs-134	< 1.6	< 2.2	< 2.9
Cs-137	< 2.0	< 3.0	< 2.3
Ba-La-140	< 3.2	< 3.8	< 2.5

Table 24. Surface water, analyses for gross beta, potassium-40 and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/L)			
<u>Indicator</u>			
<u>K-14a</u>			
Date Collected	04-01-13	05-01-13	06-03-13
Lab Code	KSW- 1397	KSW- 2202	KSW- 2911
Gross beta			
Suspended Solids	< 0.7	< 0.8	< 0.7
Dissolved Solids	3.2 ± 0.6	2.9 ± 0.8	2.7 ± 0.7
Total Residue	3.2 ± 0.6	2.9 ± 0.8	2.7 ± 0.7
K-40 (ICP)	2.12	1.80	1.05
Mn-54	< 2.8	< 3.2	< 4.5
Fe-59	< 5.1	< 5.0	< 4.0
Co-58	< 2.0	< 2.4	< 3.7
Co-60	< 2.7	< 2.9	< 2.9
Zn-65	< 6.7	< 1.8	< 3.7
Zr-Nb-95	< 3.7	< 3.3	< 3.2
Cs-134	< 3.9	< 2.2	< 2.8
Cs-137	< 3.4	< 2.1	< 3.9
Ba-La-140	< 5.9	< 1.7	< 3.8
<u>K-14b</u>			
Date Collected	04-01-13	05-01-13	06-03-13
Lab Code	KSW- 1398	KSW- 2203	KSW- 2912
Gross beta			
Suspended Solids	< 0.8	< 0.8	< 0.8
Dissolved Solids	2.7 ± 0.6	3.8 ± 0.8	2.1 ± 0.7
Total Residue	2.7 ± 0.6	3.8 ± 0.8	2.1 ± 0.7
K-40 (ICP)	2.03	1.80	1.12
Mn-54	< 3.0	< 1.8	< 4.2
Fe-59	< 5.4	< 4.1	< 6.5
Co-58	< 2.3	< 2.1	< 2.4
Co-60	< 2.4	< 3.7	< 4.0
Zn-65	< 3.9	< 3.5	< 5.8
Zr-Nb-95	< 2.3	< 2.4	< 4.2
Cs-134	< 2.9	< 3.6	< 4.9
Cs-137	< 2.6	< 3.6	< 3.2
Ba-La-140	< 3.5	< 3.7	< 4.1

Table 24. Surface water, analyses for gross beta, potassium-40 and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/L)			
Indicator			
<u>K-14a</u>			
Date Collected	07-01-13	08-01-13	09-03-13
Lab Code	KSW- 3667	KSW- 4423	KSW- 5223
Gross beta			
Suspended Solids	< 0.8	< 0.7	< 0.7
Dissolved Solids	3.6 ± 0.6	0.8 ± 0.4	2.5 ± 0.5
Total Residue	3.6 ± 0.6	0.8 ± 0.4	2.5 ± 0.5
K-40 (ICP)	2.13	1.16	1.12
Mn-54	< 2.7	< 3.0	< 2.8
Fe-59	< 3.5	< 6.6	< 3.4
Co-58	< 2.7	< 1.9	< 1.5
Co-60	< 2.0	< 2.7	< 2.6
Zn-65	< 3.0	< 3.1	< 3.4
Zr-Nb-95	< 4.5	< 3.3	< 2.1
Cs-134	< 3.1	< 2.5	< 2.5
Cs-137	< 2.2	< 3.8	< 2.4
Ba-La-140	< 6.9	< 6.4	< 2.4
<u>K-14b</u>			
Date Collected	07-01-13	08-01-13	09-03-13
Lab Code	KSW- 3668	KSW- 4424	KSW- 5224
Gross beta			
Suspended Solids	0.7 ± 0.4	< 0.7	< 0.7
Dissolved Solids	2.8 ± 0.5	0.9 ± 0.4	4.5 ± 0.9
Total Residue	3.5 ± 0.6	0.9 ± 0.4	4.5 ± 0.9
K-40 (ICP)	1.85	1.15	1.14
Mn-54	< 1.3	< 2.9	< 3.3
Fe-59	< 2.7	< 5.2	< 8.3
Co-58	< 1.6	< 3.6	< 1.7
Co-60	< 2.0	< 4.0	< 3.7
Zn-65	< 4.2	< 8.1	< 4.9
Zr-Nb-95	< 2.9	< 4.0	< 2.7
Cs-134	< 2.1	< 3.3	< 2.5
Cs-137	< 3.1	< 3.9	< 4.3
Ba-La-140	< 3.5	< 5.6	< 4.3

Table 24. Surface water, analyses for gross beta, potassium-40 and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/L)			
Indicator			
<u>K-14a</u>			
Date Collected	10-01-13	11-05-13	12-02-13
Lab Code	KSW- 5799	KSW- 6882	KSW- 7238
Gross beta			
Suspended Solids	< 0.8	1.4 ± 0.5	< 0.7
Dissolved Solids	1.6 ± 0.3	2.2 ± 0.5	2.6 ± 0.6
Total Residue	1.6 ± 0.3	3.6 ± 0.7	2.6 ± 0.6
K-40 (ICP)	1.15	1.30	1.36
Mn-54	< 3.1	< 4.1	< 2.4
Fe-59	< 6.5	< 7.7	< 3.2
Co-58	< 2.0	< 4.7	< 2.3
Co-60	< 2.3	< 5.5	< 1.7
Zn-65	< 3.1	< 9.4	< 3.6
Zr-Nb-95	< 4.2	< 5.6	< 1.7
Cs-134	< 2.9	< 5.1	< 2.9
Cs-137	< 2.7	< 6.2	< 2.6
Ba-La-140	< 4.8	< 3.5	< 4.8
<u>K-14b</u>			
Date Collected	10-01-13	11-05-13	12-02-13
Lab Code	KSW- 5800	KSW- 6883	KSW- 7239
Gross beta			
Suspended Solids	< 0.7	< 0.7	< 0.8
Dissolved Solids	1.4 ± 0.3	2.0 ± 0.5	2.9 ± 0.8
Total Residue	1.4 ± 0.3	2.0 ± 0.5	2.9 ± 0.8
K-40 (ICP)	1.13	1.30	1.37
Mn-54	< 2.8	< 4.1	< 3.7
Fe-59	< 5.3	< 5.9	< 3.1
Co-58	< 2.9	< 3.9	< 4.7
Co-60	< 1.1	< 3.8	< 4.8
Zn-65	< 3.6	< 4.0	< 5.8
Zr-Nb-95	< 3.6	< 3.5	< 2.6
Cs-134	< 3.1	< 3.9	< 6.0
Cs-137	< 3.1	< 4.9	< 4.6
Ba-La-140	< 5.4	< 4.2	< 2.9

Table 25. Surface water, analyses for tritium, strontium-89 and strontium-90.
Collection: Quarterly composites of monthly samples.

Location and Collection Period	Lab Code	Concentration pCi/L		
		H-3	Sr-89	Sr-90
<u>Indicator</u>				
<u>K-1a</u>				
1st Quarter ^a	KSW -1088	< 140	< 1.7	< 0.6
2nd Quarter	-3262	< 153	< 1.5	< 0.6
3rd Quarter	-5420	< 143	< 1.1	< 0.5
4th Quarter	-7495	187 ± 86	< 1.0	< 0.7
<u>K-1b</u>				
1st Quarter	KSW -1089	< 140	< 1.3	< 0.7
2nd Quarter	-3263	< 153	< 1.5	< 0.5
3rd Quarter	-5421	< 143	< 1.3	< 0.6
4th Quarter	-7497	< 146	< 0.9	< 0.5
<u>K-1d</u>				
1st Quarter	KSW -1090	183 ± 93	< 1.4	< 0.8
2nd Quarter	-3264	1782 ± 155 ^b	< 1.4	< 0.5
3rd Quarter	-5422	240 ± 87 ^c	< 1.3	< 0.6
4th Quarter	-7498	292 ± 91	< 0.8	< 0.5
<u>K-1e</u>				
1st Quarter	KSW -1091	< 140	< 1.0	< 0.5
2nd Quarter	-3265	< 153	< 1.1	< 0.4
3rd Quarter	-5423	305 ± 90 ^c	< 1.2	< 0.6
4th Quarter	-7499	185 ± 86	< 0.7	< 0.5

^a The composite consisted of January and February collections, no sample was available in March.

^b Individual months of the composite were analyzed for tritium.

Results of analyses (pCi/L):	KSW-1393	4/1/2013	< 201
	KSW-2197	5/1/2013	< 200
	KSW-2906	6/3/2013	4433 ± 214

^c Activity confirmed by reanalysis.

Table 25. Surface water, analyses for tritium, strontium-89 and strontium-90 (continued).

Location and Collection Period		Concentration pCi/L		
		H-3	Sr-89	Sr-90
<u>Indicator</u>				
<u>K-14a</u>				
1st Quarter	KSW -1094	< 140	< 1.3	< 0.7
2nd Quarter	-3269	< 153	< 1.4	< 0.5
3rd Quarter	-5427	< 143	< 1.3	< 0.7
4th Quarter	-7503	< 146	< 1.1	< 0.5
<u>K-14b</u>				
1st Quarter	KSW -1095	< 140	< 1.1	< 0.6
2nd Quarter	-3270	< 153	< 1.4	< 0.5
3rd Quarter	-5428	< 143	< 1.1	0.6 ± 0.3
4th Quarter	-7504	< 146	< 1.0	0.5 ± 0.3
<u>K-1k</u>				
1st Quarter	NS ^a			
2nd Quarter	KSW -3266	< 153	< 1.2	< 0.4
3rd Quarter	-5424	209 ± 86 ^b	< 2.6	< 0.5
4th Quarter	-7500	171 ± 86	< 2.0	0.9 ± 0.5
<u>Control</u>				
<u>K-9</u>				
1st Quarter	KSW -1092 (Raw)	< 140	< 1.3	< 0.7
	-1093 (Tap)	< 140	< 0.8	< 0.5
2nd Quarter	KSW -3267 (Raw)	< 153	< 1.2	< 0.5
	-3268 (Tap)	< 153	< 1.7	< 0.6
3rd Quarter	KSW -5425 (Raw)	< 143	< 1.5	< 0.7
	-5426 (Tap)	< 143	< 1.3	< 0.6
4th Quarter	KSW -7501 (Raw)	< 146	< 1.5	< 0.6
	-7502 (Tap)	< 146	< 1.1	< 0.5

^a No samples; water frozen.^b Activity confirmed by reanalysis.

Table 26. Fish, collected at K-1d, analyses for gross beta, strontium-89, strontium-90 and gamma-emitting isotopes.
Collection: Three times a year

Sample Description and Concentration (pCi/g wet)				
Collected	04-05-13		07-12-13	
Lab Code	KF- 2194		KF- 4432	
Type	Carp		Carp	
Portion	Flesh	Bones	Flesh	Bones
Gross beta	2.99 ± 0.34	2.10 ± 0.69	2.35 ± 0.09	2.03 ± 0.63
Sr-89	NA ^a	< 0.23	NA ^a	< 0.17
Sr-90	NA	0.13 ± 0.06	NA	0.40 ± 0.06
K-40	2.66 ± 0.36	NA ^a	1.83 ± 0.37	NA ^a
Mn-54	< 0.012	NA	< 0.021	NA
Fe-59	< 0.049	NA	< 0.059	NA
Co-58	< 0.015	NA	< 0.018	NA
Co-60	< 0.007	NA	< 0.015	NA
Cs-134	< 0.013	NA	< 0.015	NA
Cs-137	< 0.010	NA	< 0.021	NA
Collected	11-07-13			
Lab Code	KF- 7241			
Type	Chinook Salmon			
Portion	Flesh	Bones		
Gross beta	3.97 ± 0.08	5.20 ± 0.79		
Sr-89	NA ^a	< 0.17		
Sr-90	NA	< 0.067		
K-40	3.27 ± 0.40	NA ^a		
Mn-54	< 0.009	NA		
Fe-59	< 0.021	NA		
Co-58	< 0.010	NA		
Co-60	< 0.004	NA		
Cs-134	< 0.016	NA		
Cs-137	< 0.013	NA		

^a NA = Not analyzed; analyses not required.

Table 27. Slime or aquatic vegetation, analyses for gross beta, strontium-89, strontium-90, and gamma-emitting isotopes.
Collection: Semiannually

Sample Description and Concentration (pCi/g wet)				
Location	Indicators			Control
	K-1a	K-1b	K-1d	K-9
Date Collected	06-03-13	06-03-13	06-03-13	06-03-13
Lab Code	KSL- 2934	KSL- 2935	KSL- 2936	KSL- 2939
Gross beta	5.65 ± 0.22	9.47 ± 0.25	4.45 ± 0.36	6.70 ± 0.21
Sr-89	< 0.085	< 0.017	< 0.147	< 0.020
Sr-90	< 0.034	< 0.006	< 0.040	< 0.008
Be-7	0.56 ± 0.03	< 0.142	0.68 ± 0.04	0.97 ± 0.17
K-40	1.83 ± 0.04	3.98 ± 0.32	2.04 ± 0.05	5.79 ± 0.43
Mn-54	< 0.002	< 0.009	< 0.002	< 0.011
Co-58	< 0.002	< 0.012	< 0.003	< 0.006
Co-60	0.016 ± 0.002	< 0.008	0.024 ± 0.002	< 0.009
Nb-95	< 0.004	< 0.007	< 0.004	< 0.012
Zr-95	< 0.004	< 0.021	< 0.003	< 0.017
Ru-103	< 0.003	< 0.013	< 0.003	< 0.010
Ru-106	< 0.016	< 0.084	< 0.015	< 0.122
Cs-134	< 0.001	< 0.011	< 0.001	< 0.008
Cs-137	0.007 ± 0.001	< 0.009	0.011 ± 0.001	< 0.013
Ce-141	< 0.005	< 0.024	< 0.007	< 0.019
Ce-144	< 0.008	< 0.094	< 0.014	< 0.103
Location	K-1e	K-1k	K-14	
Date Collected	06-03-13	06-03-13	06-03-13	
Lab Code	KSL- 2937	KSL- 2938	KSL- 2940	
Gross beta	2.97 ± 0.24	4.79 ± 0.13	10.05 ± 0.35	
Sr-89	< 0.055	< 0.013	< 0.125	
Sr-90	< 0.021	< 0.006	0.055 ± 0.030	
Be-7	0.79 ± 0.03	0.36 ± 0.15	0.58 ± 0.04	
K-40	1.69 ± 0.04	3.90 ± 0.33	3.62 ± 0.07	
Mn-54	< 0.002	< 0.011	< 0.002	
Co-58	< 0.002	< 0.011	< 0.003	
Co-60	0.027 ± 0.002	< 0.009	0.012 ± 0.002	
Nb-95	< 0.004	< 0.010	< 0.005	
Zr-95	< 0.005	< 0.015	< 0.004	
Ru-103	< 0.003	< 0.012	< 0.003	
Ru-106	< 0.009	< 0.079	< 0.017	
Cs-134	< 0.001	< 0.011	< 0.002	
Cs-137	0.012 ± 0.001	< 0.012	0.010 ± 0.002	
Ce-141	< 0.007	< 0.025	< 0.009	
Ce-144	< 0.011	< 0.092	< 0.013	

Table 27. Slime or aquatic vegetation, analyses for gross beta, strontium-89, strontium-90, and gamma-emitting isotopes.
Collection: Semiannually

Sample Description and Concentration (pCi/g wet)				
Location	Indicators			Control
	K-1a	K-1b	K-1d	K-9
Date Collected	09-03-13	09-03-13	09-03-13	09-03-13
Lab Code	KSL- 5322	KSL- 5323	KSL- 5324	KSL- 5327
Gross beta	3.54 ± 0.33	4.49 ± 0.10	5.21 ± 0.58	7.03 ± 0.17
Sr-89	< 0.14	< 0.015	< 0.28	< 0.043
Sr-90	< 0.048	< 0.005	< 0.094	< 0.015
Be-7	0.56 ± 0.14	0.38 ± 0.12	0.93 ± 0.20	0.51 ± 0.10
K-40	2.04 ± 0.15	3.35 ± 0.28	2.14 ± 0.23	4.48 ± 0.16
Mn-54	< 0.007	< 0.010	< 0.010	< 0.007
Co-58	< 0.008	< 0.007	< 0.014	< 0.005
Co-60	< 0.005	< 0.006	0.022 ± 0.009	< 0.007
Nb-95	< 0.017	< 0.007	< 0.028	< 0.008
Zr-95	< 0.014	< 0.016	< 0.023	< 0.014
Ru-103	< 0.010	< 0.009	< 0.022	< 0.007
Ru-106	< 0.068	< 0.061	< 0.081	< 0.047
Cs-134	< 0.006	< 0.007	< 0.009	< 0.006
Cs-137	< 0.008	< 0.008	0.027 ± 0.011	< 0.006
Ce-141	< 0.044	< 0.018	< 0.051	< 0.014
Ce-144	< 0.051	< 0.063	< 0.069	< 0.039
Location	K-1e	K-1k	K-14	
Date Collected	09-03-13	09-03-13	08-01-13	
Lab Code	KSL- 5325	KSL- 5326	KSL- 4434	
Gross beta	2.97 ± 0.25	6.25 ± 0.12	2.82 ± 0.21	
Sr-89	< 0.042	< 0.025	< 0.075	
Sr-90	< 0.020	0.014 ± 0.005	< 0.025	
Be-7	0.49 ± 0.15	0.13 ± 0.06	1.25 ± 0.07	
K-40	0.97 ± 0.19	4.57 ± 0.20	2.47 ± 0.08	
Mn-54	< 0.013	< 0.006	< 0.003	
Co-58	< 0.012	< 0.006	< 0.003	
Co-60	< 0.014	< 0.005	0.010 ± 0.002	
Nb-95	< 0.018	< 0.010	< 0.006	
Zr-95	< 0.025	< 0.013	< 0.009	
Ru-103	< 0.013	< 0.007	< 0.004	
Ru-106	< 0.094	< 0.056	< 0.023	
Cs-134	< 0.013	< 0.004	< 0.002	
Cs-137	< 0.013	< 0.007	0.017 ± 0.003	
Ce-141	< 0.028	< 0.014	< 0.017	
Ce-144	< 0.079	< 0.040	< 0.026	

Table 28. Bottom sediment samples, analyses for gross beta, strontium-89, strontium-90, and gamma-emitting isotopes.
Collection: May and November

Sample Description and Concentration (pCi/g dry)					
Location	Indicator				Control
	K-1c	K-1d	K-1j	K-14	K-9
Collection Date	05-01-13	05-01-13	05-01-13	05-01-13	05-01-13
Lab Code	KBS- 2206	KBS- 2207	KBS- 2208	KBS- 2210	KBS- 2209
Gross beta	13.38 ± 1.77	10.18 ± 1.61	12.22 ± 1.74	9.53 ± 1.63	18.63 ± 1.88
Sr-89	< 0.065	< 0.064	< 0.052	< 0.044	< 0.081
Sr-90	< 0.026	< 0.024	< 0.022	0.022 ± 0.011	< 0.036
K-40	9.91 ± 0.50	6.55 ± 0.41	7.71 ± 0.43	6.73 ± 0.40	9.43 ± 0.69
Co-58	< 0.014	< 0.013	< 0.014	< 0.014	< 0.026
Co-60	< 0.006	< 0.008	< 0.009	< 0.008	< 0.024
Cs-134	< 0.012	< 0.009	< 0.011	< 0.009	< 0.019
Cs-137	< 0.014	0.027 ± 0.013	0.020 ± 0.012	< 0.010	0.048 ± 0.021
Location	K-1c	K-1d	K-1j	K-14	K-9
Collection Date	11-05-13	11-05-13	11-05-13	11-05-13	11-05-13
Lab Code	KBS- 6889	KBS- 6890	KBS- 6891	KBS- 6894	KBS- 6893
Gross beta	21.11 ± 2.05	14.58 ± 1.79	12.41 ± 1.74	8.84 ± 1.60	15.84 ± 1.85
Sr-89	< 0.047	< 0.053	< 0.067	< 0.032	< 0.049
Sr-90	< 0.019	< 0.022	< 0.026	< 0.013	< 0.020
K-40	7.31 ± 0.43	6.80 ± 0.42	6.28 ± 0.40	9.11 ± 0.49	8.91 ± 0.74
Co-58	< 0.012	< 0.008	< 0.012	< 0.020	< 0.027
Co-60	< 0.009	< 0.004	< 0.007	< 0.013	< 0.008
Cs-134	< 0.009	< 0.010	< 0.009	< 0.014	< 0.017
Cs-137	0.029 ± 0.011	0.030 ± 0.014	0.018 ± 0.009	< 0.013	0.052 ± 0.022

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Dominion[®]

**2013
Annual
Radiological
Environmental
Operating
Report**

*Kewaunee Power Station
Part III, Corrective
Actions written during
reporting period*

Dominion Energy Kewaunee, Inc.

State Change History

<p>Submit by HOLSCHBACH, DARRYL M</p>	<p>Draft 11/19/2013 18:31:40 Owner : HOLSCHBACH, DARRYL M</p>	<p>Submit by HOLSCHBACH, DARRYL M</p>	<p>Supervisor Review 11/19/2013 18:32:16 Owner : HALE, JAMES M.</p>	<p>Complete by AHRENS, GARY M</p>	<p>O/R Review 11/19/2013 22:09:25 Owner : OLSOWY, TIMOTHY F</p>	<p>Complete by TAYLOR, STEVEN C.</p>	<p>CRT Review 11/20/2013 5:35:49 Owner : OLSOWY, TIMOTHY F</p>
<p>CA by OLSOWY, TIMOTHY F</p>	<p>CRT Assignment Creation 11/20/2013 9:25:20 Owner : OLSOWY, TIMOTHY F</p>	<p>Update CR by OLSOWY, TIMOTHY F</p>	<p>CRT Review 11/20/2013 9:27:41 Owner : OLSOWY, TIMOTHY F</p>	<p>Complete by OLSOWY, TIMOTHY F</p>	<p>Assignments Pending 11/26/2013 11:55:30 Owner : OLSOWY, TIMOTHY F</p>		

Section 1

Applicable to site: KEWA
Record #: CR533125
Revision Number: 0
Submitter: HOLSCHBACH, DARRYL M
Submitter Dept.: KEWA - Chemistry
Submitter Phone Number: 8146
Submitter Pager Number: 3050323
One-Line Description: Document planned loss of power to Air sampler K-1f
Description: This CR is to document the planned loss of power to environmental air sampler K-1f. Power was out for Work Order KW100721249 13504BKR maintenance Per procedure Chemistry was notified that K-1f Air Sampler would be out of service when MCC35B is de-energized during 13504BKR maintenance. Total time lost was 4 hours and 25minutes. Time out of service was identified by air sampler telemetry and verified when the sample filters were exchanged.

Request a corrective action to document the power outage in the Annual Radiological Environmental Monitoring Report.

Discovery Date: 11/14/2013
Discovery Time: 11:25:00
Method of Discovery: SELR (Self-revealing issue)
Literal 1: **If this CR is associated with the BACC Program, please ensure that the CR Description contains sufficient information to ensure the ability to quickly locate the component, which will ensure ALARA.**

Associated with Boric Acid?: No
Applicable to unit: None
Associated w/ Equipment Location?: No
System(s): 63-MET--METEOROLOGICAL/ENV
Equipment Location Display: **Equipment Location - Critical Component - PRA Flag - Quality Classification - Component Description**

Equipment Location Links:
Initial Actions: Chemistry was notified by electrical maintenance of planned power outage. Total time out was verified.
Additional C/A processes req'd?: Other
Text Question 1: **Provide details for any Additional C/A processes needed:**
Text Answer 1: Request a corrective action to document the power outage in the Annual Radiological Environmental Monitoring Report.

C/As Initiated (REA, WR, ETC):
Tag Hung: No
Tag Number:
Additional Contacts:
Supervisor - CR Review: HALE, JAMES M.

Question G: **Is this CR an Operability/Reportability Issue Requiring O/R Review?**
Yes/No G: Yes
Question H: **Does this CR affect personnel safety?**
Yes/No H: No
Question I: **Does this CR affect plant safety?**
Yes/No I: No
Question J: **Does this CR involve plant equipment?**
Yes/No J: No
Question K: **Is this CR an environmental concern?**
Yes/No K: No
Literal 2: **Unit Conditions:**
Unit 1% Pwr: 0
Unit 2% Pwr: NA
Unit 3% Pwr: NA
Unit 1 Mode: 7
Unit 2 Mode: NA
Unit 3 Mode: NA
OP-AA-102 Review Req'd?: Yes
Is a TS SSC Affected?: No
TS SSC Operability Assessment: N/A
Text Question 2: **Basis for operability:**
Text Answer 2: NON-FUNCTIONAL. K-1f Environmental Air Sampler was NON-FUNCTIONAL during planned maintenance.

 The K-1f Environmental Air Sampler is required per Table 2.2.1-A, Radiological Environmental Monitoring Manual. Per Table 2.2.1-A if specimens are unobtainable due to sampling equipment malfunction, reasonable efforts shall be made to correct the problem prior to the end of the next sampling period. Per Table 2.2.1-B of the REMM, samples for Airborne Particulate are required weekly. Power has now been restored and K-1f Environmental Air Sampler is returned to functional.

Question L: **Is an Operability Assessment req'd for an SSC, which is Functional for its TRM function, to demonstrate operability for its TS function?**
Yes / No L: No
Literal 4: **The basis for establishing IOD can be documented in the "Basis for Operability" field. An IOD assignment does not necessarily need to be created.**

Is an IOD Assignment Required?: No
LCO entered: No
Applicable LCO:
Non-TS SSC Functionality Assessment.: Non-Functional
Literal 5: **NOTE: If a RAS is to be assigned to determine the answer to the next question, select "TBD" (to be determined) for the answer to the next question.**

Does it impact a TS SSC?: No
Literal 6: **The basis for establishing Non-TS SSC Functionality may be documented in the "Basis for Operability" field. A RAS assignment does not necessarily need to be created in these instances.**

Is a RAS Assignment Needed?: No
Literal 7: **If this Condition Report is addressing an SSC, document the qualification status of the SSC in the following field. Otherwise select N/A. NOTE: An SSC can be Operable or Functional and still not be Fully Qualified.**

SSC Qualification Status: N/A
Reportable condition?: No
Text Question 3: **Reportability Comments:**
Text Answer 3:
Can IOD be established?: (None)
Literal 3: **If this CR is associated with any system leakage, provide answers to the following:**
Leak Classification: (None)

Leakage Severity: (None)
O/R Comments:
Significance: 4
Deficiency Type: Equipment & Non-Equipment
Potential Repeat: No
Previous Issues (PIs, CRs): No history search required for Significance 4 item. This was planned maintenance and an expected condition.
CR FLAGS: Reviewed / None Selected
CRT Report Section(s): 2
Screening Date:
License Renewal Flags: (None)
Affected Department: (None)
CRT Comments: **HI LEVEL**

CA (273664) to RP (Holschbach/Hale) to document the power outage in the Annual Radiological Environmental Monitoring Report. (Due Date: 3/31/2014)

Comments:
Old Record #:

Section 2

Trend Review Complete?: No
Process Code: (None) **Activity Codes:** (None)
Human Error Types: (None) **Process Related Failure:** (None)
Org. & Mgmt Failure mode: (None) **HU Failure modes:** (None)
Equipment Failure Modes: (None) **Primary INPO criteria:** (None)
Secondary INPO criteria: (None) **Operations Hot Buttons:** (None)
Engineering Hot Buttons: (None) **Maintenance Hot Buttons:** (None)
RP Hot Buttons: (None) **Chemistry Hot Buttons:** (None)
EP Hot Buttons: (None) **Training Hot Buttons:** (None)
Security Hot Buttons: (None) **OR Hot Buttons:** (None)
O&P Hot Buttons: (None) **NSS Hot Buttons:** (None)
Supply Chain Hot Buttons: (None) **Procedures Hot Buttons:** (None)
Reactivity Mgmt Hot Buttons: (None) **Other Hot Buttons:** (None)

Section 3

Work Order Number(s):
Status Description:
Status Date:
Actual Finish Date:
Work Performed Description:

Section 5

CR Completed Date: **CR Printed Date:**
CR Validated Date: **CR Who Validated:** (None)
RM Attachment Links:

Subtasks

[Show Subtasks](#)
[Expand All](#)

Attachments

Principal to: CA273664: KEWA - Document the power outage in the Annual Rad Environmental Monitoring Report by OLSOWY, TIMOTHY F (11/20/2013 9:26:21)

Change History

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State Change History

Submit by HOLSCHBACH, DARRYL M	Draft 8/14/2013 12:04:17 Owner : HOLSCHBACH, DARRYL M	Submit by HOLSCHBACH, DARRYL M	Supervisor Review 8/14/2013 12:04:34 Owner : HALE, JAMES M.	Complete by HALE, JAMES M.	CRT Review 8/14/2013 14:42:03 Owner : OLSOWY, TIMOTHY F	CA by PRIBEK, BARBARA A	CRT Assignment Creation 8/15/2013 7:12:52 Owner : OLSOWY, TIMOTHY F
Update CR by PRIBEK, BARBARA A	CRT Review 8/15/2013 7:46:32 Owner : OLSOWY, TIMOTHY F	Complete by LANGER JR, JAMES E	Assignments Pending 8/19/2013 15:57:44 Owner : OLSOWY, TIMOTHY F				

Section 1

Applicable to site: KEWA
Record #: CR523183
Revision Number: 0
Submitter: HOLSCHBACH, DARRYL M
Submitter Dept.: KEWA - Chemistry
Submitter Phone Number: 8146
Submitter Pager Number: 3050323
One-Line Description: Environmental Air Monitoring Sampler K-8 Loss of Power 8/7/2013
Description: Environmental Air Monitoring Sampler K-8 had reduced run time for the week of 8/6/2013 to 8/13/2013. The sampler, K-8, at the Tisch Mills Church was off from 8/7/13 02:17 am to 8/7/13 8:24 pm according to telemetry. A strong wind and thunderstorm went through the area on 8/7/13 in the morning hours.
 The total run time recorded for the week was 152.07 hours.
 CA to RP/Chemistry to report and document in the Annual Radiological Environmental Operating Report.
Discovery Date: 8/7/2013
Discovery Time: 2:17:00
Method of Discovery: SELR (Self-revealing issue)
Literal 1: **If this CR is associated with the BACC Program, please ensure that the CR Description contains sufficient information to ensure the ability to quickly locate the component, which will ensure ALARA.**
Associated with Boric Acid?: No
Applicable to unit: None
Associated w/ Equipment Location?: No
System(s): 63-MET--METEOROLOGICAL/ENV
Equipment Location Display: **Equipment Location - Critical Component - PRA Flag - Quality Classification - Component Description**
Equipment Location Links:
Initial Actions: Verified total hours was normal for other Environmental Air Monitoring samplers. Informed state of possible impact of storm on their samplers. Initiated CR
 Other
Additional C/A processes req'd?: Other
Text Question 1: **Provide details for any Additional C/A processes needed:**
Text Answer 1: CA to RP/Chemistry to report and document in the Annual Radiological Environmental Operating Report.
C/As Initiated (REA, WR, ETC):
Tag Hung: No
Tag Number:
Additional Contacts:
Supervisor - CR Review: HALE, JAMES M.

Question G: **Is this CR an Operability/Reportability Issue Requiring O/R Review?**
Yes/No G: No
Question H: **Does this CR affect personnel safety?**
Yes/No H: No
Question I: **Does this CR affect plant safety?**
Yes/No I: No
Question J: **Does this CR involve plant equipment?**
Yes/No J: No
Question K: **Is this CR an environmental concern?**
Yes/No K: No
Literal 2: **Unit Conditions:**
Unit 1% Pwr:
Unit 2% Pwr: NA
Unit 3% Pwr: NA
Unit 1 Mode: (None)
Unit 2 Mode: NA
Unit 3 Mode: NA
OP-AA-102 Review Req'd?: (None)
Is a TS SSC Affected?: (None)
TS SSC Operability Assessment: (None)
Text Question 2: **Basis for operability:**
Text Answer 2:
Question L: **Is an Operability Assessment req'd for an SSC, which is Functional for its TRM function, to demonstrate operability for its TS function?**
Yes / No L: (None)
Literal 4: **The basis for establishing IOD can be documented in the "Basis for Operability" field. An IOD assignment does not necessarily need to be created.**
Is an IOD Assignment Required?: (None)
LCO entered: (None)
Applicable LCO:
Non-TS SSC Functionality Assessment.: (None)
Literal 5: **NOTE: If a RAS is to be assigned to determine the answer to the next question, select "TBD" (to be determined) for the answer to the next question.**
Does it impact a TS SSC?: (None)
Literal 6: **The basis for establishing Non-TS SSC Functionality may be documented in the "Basis for Operability" field. A RAS assignment does not necessarily need to be created in these instances.**
Is a RAS Assignment Needed?: (None)
Literal 7: **If this Condition Report is addressing an SSC, document the qualification status of the SSC in the following field. Otherwise select N/A. NOTE: An SSC can be Operable or Functional and still not be Fully Qualified.**
SSC Qualification Status: (None)
Reportable condition?: (None)
Text Question 3: **Reportability Comments:**
Text Answer 3:
Can IOD be established?: (None)
Literal 3: **If this CR is associated with any system leakage, provide answers to the following:**
Leak Classification: (None)
Leakage Severity: (None)
O/R Comments:
Significance: 4
Deficiency Type: Equipment
Potential Repeat: No
Previous Issues (PIs, CRs): No history related to K-8 based on CR search by "Sampler"

 CR search identified the following:
 CR449852 - K-41 (EOF) Air Sampler Cartridge Found Disconnected from Air

Sampler (10/26/2011)
 CR435700 - K-1f Air Sampler Totalizer Display not working (07/26/2011)
 CR429221 - K-41 Air Sampler Indicated Air Flow Rate Out of Acceptable Range (05/31/2011)
 CR429220 - K1-f Air Sampler Indicated Air Flow Rate Out of Range (05/31/2011)
 CR406655 - Environmental Air Sampler indicated air flow outside the range of 27-33 LPM (K-1F & K-2) (12/08/2010).
 CR405614 - Environmental Air Sampler not indicating proper flow value (K-2) (11/30/2010)
 CR399804 - Environmental Air Samplers not Indicating Proper Flow Value (K-1f, K-2, K-7, & K-41) (10/20/2010).
 CR369046 - K-7 Air Sampler-Unexpected Run Hours Found during Air Filter Collection (02/16/2010).
 zz - reviewed / none selected

CR FLAGS:
CRT Report Section(s):
Screening Date:
License Renewal Flags:
Affected Department:
CRT Comments:

2

 (None)
 (None)
 CA (267098) to Chemistry (Holschbach/Hale) to report and document reduced run time for Sampler K-8 in the Annual Radiological Environmental Operating Report. (Due Date: 05/29/2014)
 8/14/2013 14:42:03 - HALE, JAMES M.:
 Agree the action to include in annual environmental report is what is required.-
 Entered by [HALE, JAMES M.] from [CR] [Supervisor Review]

Comments:

8/15/2013 7:46:32 - PRIBEK, BARBARA A:
 Change state of this CR back to CRT Review after creating CA

Old Record #:

Section 2

Trend Review Complete?: No
Process Code: UNK (Unknown) **Activity Codes:** UNK(Unknown)

Human Error Types:	(None)	Process Related Failure:	(None)
Org. & Mgmt Failure mode:	(None)	HU Failure modes:	(None)
Equipment Failure Modes:	(None)	Primary INPO criteria:	(None)
Secondary INPO criteria:	(None)	Operations Hot Buttons:	(None)
Engineering Hot Buttons:	(None)	Maintenance Hot Buttons:	(None)
RP Hot Buttons:	(None)	Chemistry Hot Buttons:	(None)
EP Hot Buttons:	(None)	Training Hot Buttons:	(None)
Security Hot Buttons:	(None)	OR Hot Buttons:	(None)
O&P Hot Buttons:	(None)	NSS Hot Buttons:	(None)
Supply Chain Hot Buttons:	(None)	Procedures Hot Buttons:	(None)
Reactivity Mgmt Hot Buttons:	(None)	Other Hot Buttons:	(None)

Section 3

Work Order Number(s):
Status Description:
Status Date:
Actual Finish Date:
Work Performed Description:

Section 5

CR Completed Date: **CR Printed Date:**
CR Validated Date: **CR Who Validated:** (None)
RM Attachment Links:

Subtasks

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Attachments

Principal to: CA267098: KEWA - Report Reduced Run Time in the Annual Radiological Env Operating Report by **PRIBEK, BARBARA A** (8/15/2013 7:45:09)

Change History

State Change History

Submit by HOLSCHBACH, DARRYL M	Draft 2/6/2013 11:17:15 Owner : HOLSCHBACH, DARRYL M	Submit by HOLSCHBACH, DARRYL M	Supervisor Review 2/6/2013 11:49:43 Owner : ADAMS, RICHARD W	Complete by ADAMS, RICHARD W	O/R Review 2/6/2013 12:15:57 Owner : FICTUM, HOLLY C	Complete by BUNKELMAN, TIMOTHY J	CRT Review 2/6/2013 15:57:48 Owner : FICTUM, HOLLY C
To O/R by AHRENS, GARY M	O/R Review 2/7/2013 9:47:50 Owner : FICTUM, HOLLY C	Complete by AHRENS, GARY M	CRT Review 2/7/2013 9:48:33 Owner : FICTUM, HOLLY C	CA by WALESH, DEBRA J	CRT Assignment Creation 2/8/2013 11:44:31 Owner : FICTUM, HOLLY C	Complete by WALESH, DEBRA J	Assignments Pending 2/8/2013 11:47:06 Owner : FICTUM, HOLLY C
Return by WALESH, DEBRA J	CRT Assignment Creation 2/12/2013 13:57:17 Owner : FICTUM, HOLLY C	Complete by WALESH, DEBRA J	Assignments Pending 2/12/2013 14:00:42 Owner : FICTUM, HOLLY C				

Section 1

Applicable to site: KEWA
Record #: CR504725
Revision Number: 0
Submitter: HOLSCHBACH, DARRYL M
Submitter Dept.: KEWA - Chemistry
Submitter Phone Number: 8146
Submitter Pager Number: 3050323
One-Line Description: Contract Vendor not able to collect milk sample for site K-44
Description: The Contract Vendor indicated he was not able to collect milk sample for site K-44 on 2/4/2013. The farmer may have sold his cows. An investigation is ongoing whether site K-44 will continue to participate in the REMP program.

Discovery Date: REMP Program owner to remediate the issue as necessary.
 2/6/2013
Discovery Time: 10:00:00
Method of Discovery: SELR (Self-revealing issue)
Literal 1: **If this CR is associated with the BACC Program, please ensure that the CR Description contains sufficient information to ensure the ability to quickly locate the component, which will ensure ALARA.**

Associated with Boric Acid?: No
Applicable to unit: None
Associated w/ Equipment Location?: No
System(s): N/A
Equipment Location Display: **Equipment Location - Critical Component - PRA Flag - Quality Classification - Component Description**

Equipment Location Links:
Initial Actions: Informed by Contract Vendor.
 Attempting to contact K-44 farm
 Informed REMP program owner.

Additional C/A processes req'd?: Other
Text Question 1: **Provide details for any Additional C/A processes needed:**
Text Answer 1: REMP Program owner to remediate the issue as necessary.
C/As Initiated (REA, WR, ETC):

Tag Hung: No
Tag Number:
Additional Contacts:
Supervisor - CR Review: ADAMS, RICHARD W
Question G: **Is this CR an Operability/Reportability Issue Requiring O/R Review?**
Yes/No G: Yes
Question H: **Does this CR affect personnel safety?**
Yes/No H: No
Question I: **Does this CR affect plant safety?**
Yes/No I: No
Question J: **Does this CR involve plant equipment?**
Yes/No J: No
Question K: **Is this CR an environmental concern?**
Yes/No K: No
Literal 2: **Unit Conditions:**
Unit 1% Pwr: 100
Unit 2% Pwr: NA
Unit 3% Pwr: NA
Unit 1 Mode: 1
Unit 2 Mode: NA
Unit 3 Mode: NA
OP-AA-102 Review Req'd?: Yes
Is a TS SSC Affected?: No
TS SSC Operability Assessment: N/A
Text Question 2: **Basis for operability:**
Text Answer 2: NON-FUNCTIONAL. K-44 is required per Table 2.2.1-A, Radiological Environmental Monitoring Program, as a sample location. K-44 is non-functional as a monitoring site in support of the REMM program.

 Per Notation b of Table 2.2.1-A, all deviations from the sampling schedule shall be documented, as required by REMM 2.4.1.c in the Annual Radiological Environmental Operating Report.
 Suitable alternative media and locations may be chosen for the particular pathway in question and appropriate substitutions made within 30 days in the REMM. The cause of the unavailability of samples for that pathway and the new location(s) for obtaining replacement samples will be identified in the Annual Radiological Environmental Operating Report.

 REMM requirements met with samples at alternate locations.
Question L: **Is an Operability Assessment req'd for an SSC, which is Functional for its TRM function, to demonstrate operability for its TS function?**
Yes / No L: No
Literal 4: **The basis for establishing IOD can be documented in the "Basis for Operability" field. An IOD assignment does not necessarily need to be created.**
Is an IOD Assignment Required?: No
LCO entered: No
Applicable LCO:
Non-TS SSC Functionality Assessment.: Non-Functional
Literal 5: **NOTE: If a RAS is to be assigned to determine the answer to the next question, select "TBD" (to be determined) for the answer to the next question.**
Does it impact a TS SSC?: No
Literal 6: **The basis for establishing Non-TS SSC Functionality may be documented in the "Basis for Operability" field. A RAS assignment does not necessarily need to be created in these instances.**
Is a RAS Assignment Needed?: No
Literal 7: **If this Condition Report is addressing an SSC, document the qualification status of the SSC in the following field. Otherwise select N/A. NOTE: An SSC can be Operable or Functional and still not be Fully Qualified.**
SSC Qualification Status: N/A

Reportable condition?: No
Text Question 3: **Reportability Comments:**
Text Answer 3: No immediate reportability required.
Can IOD be established?: (None)
Literal 3: **If this CR is associated with any system leakage, provide answers to the following:**
Leak Classification: (None)
Leakage Severity: (None)
O/R Comments:
Significance: 3
Deficiency Type: Non-Equipment
Potential Repeat: Yes
Previous Issues (PIs, CRs): CA022290 KEWA - CA to Chem to correct map in Procedure SP-63-164, "Environmental Sample Collect (Inactive)
 CA022291 KEWA - CA to RP to correct map in Radiological Environmental Monitoring Manual (REMM) (Inactive)
 CA022292 KEWA - CA to RP to report discrepancy in next annual (2007) Annual Environmental Monit (Inactive)
 CA022427 KEWA - RP to det, doc, correct issue regarding RETSCODE Software Verification (Inactive)
 CA022481 KEWA - CA to RP to correct discrepancies as described by addendum to the 2007 Annual (Inactive)
 CA025009 KEWA - Present NOD recommendation re: user groups to the peer group for update (Inactive)
 CA068037 KEWA - Evaluate ambient radionuclides concentrations/background concentrations (Inactive)
 CA068039 KEWA - Evaluate and document the significance of atmospheric deposition of plant-relate (Inactive)
 CA069128 KEWA - Modify HP-01.014 Land Use Census Program. (Inactive)
 CA069139 KEWA - RP to evaluate and document the impact/extent of this RIS (Inactive)
 CA074118 KEWA - Update REMM w/removal of the K-25 location & addition of replacement location (Inactive)
 CA077666 KEWA - Develop individualized training plan for recently hired (6/16/2008) Health Physi (Inactive)
 CA079522 KEWA - Document the basis for the current sample locations in a more retrievable manner (Inactive)
 CA090622 KEWA - Ensure documentation of when settling plug samples are attempted & not available (Inactive)
 CA090623 KEWA - Det & impl. needed program changes to ensure necessary results are reported (Inactive)
 CA125991 KEWA - Develop a sampling procedure for settling plugs water retrieval. (Inactive)
 CA151384 KEWA - Det, doc & resolve, as necessary, obsolete hardcopy procedures were ident. in RP (Inactive)
CR FLAGS: Reviewed / None Selected
CRT Report Section(s): 2
Screening Date:
License Renewal Flags: (None)
Affected Department: (None)
CRT Comments: **HI LEVEL**

 CA to RP (REMP) Program Owner to det, doc and resolve issue IAW PI-AA-200 for the Contract Vendor not able to collect milk sample for site K-44.

 UPDATE on 02/12/2013:
 Createdd CA 255394 and assigned to RP as requested to report and document per Notation b of Table 2.2.1-A, all deviations from the sampling schedule shall be documented, as required by REMM 2.4.1.c in the Annual Radiological Environmental Operating Report.
Comments: 2/12/2013 13:57:17 - WALESH, DEBRA J:
 Returning to create a CA to RP as requested to report and document per Notation b of Table 2.2.1-A, all deviations from the sampling schedule shall be documented, as required by REMM 2.4.1.c in the Annual Radiological

Environmental Operating Report.

Old Record #:

Section 2

Trend Review Complete?: No
Process Code: UNK (Unknown) Activity Codes: SAA(Sampling)

Human Error Types: (None) Process Related Failure: (None)
Org. & Mgmt Failure mode: (None) HU Failure modes: (None)
Equipment Failure Modes: (None) Primary INPO criteria: (None)
Secondary INPO criteria: (None) Operations Hot Buttons: (None)
Engineering Hot Buttons: (None) Maintenance Hot Buttons: (None)
RP Hot Buttons: (None) Chemistry Hot Buttons: (None)
EP Hot Buttons: (None) Training Hot Buttons: (None)
Security Hot Buttons: (None) OR Hot Buttons: (None)
O&P Hot Buttons: (None) NSS Hot Buttons: (None)
Supply Chain Hot Buttons: (None) Procedures Hot Buttons: (None)
Reactivity Mgmt Hot Buttons: (None) Other Hot Buttons: (None)

Section 3

Work Order Number(s):
Status Description:
Status Date:
Actual Finish Date:
Work Performed Description:

Section 5

CR Completed Date: CR Printed Date:
CR Validated Date: CR Who Validated: (None)
RM Attachment Links:

Subtasks

Show Subtasks
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Attachments

Principal to: CA255231: KEWA - Det, doc and resolve issue IAW PI-AA-200 for the Contract Vendor not able to col
(Inactive) by WALESH, DEBRA J (2/8/2013 11:46:22)
Principal to: CA255394: KEWA - Report & doc per Notation b of Table 2.2.1-A, all deviations from the sampling by
WALESH, DEBRA J (2/12/2013 13:59:11)

Change History