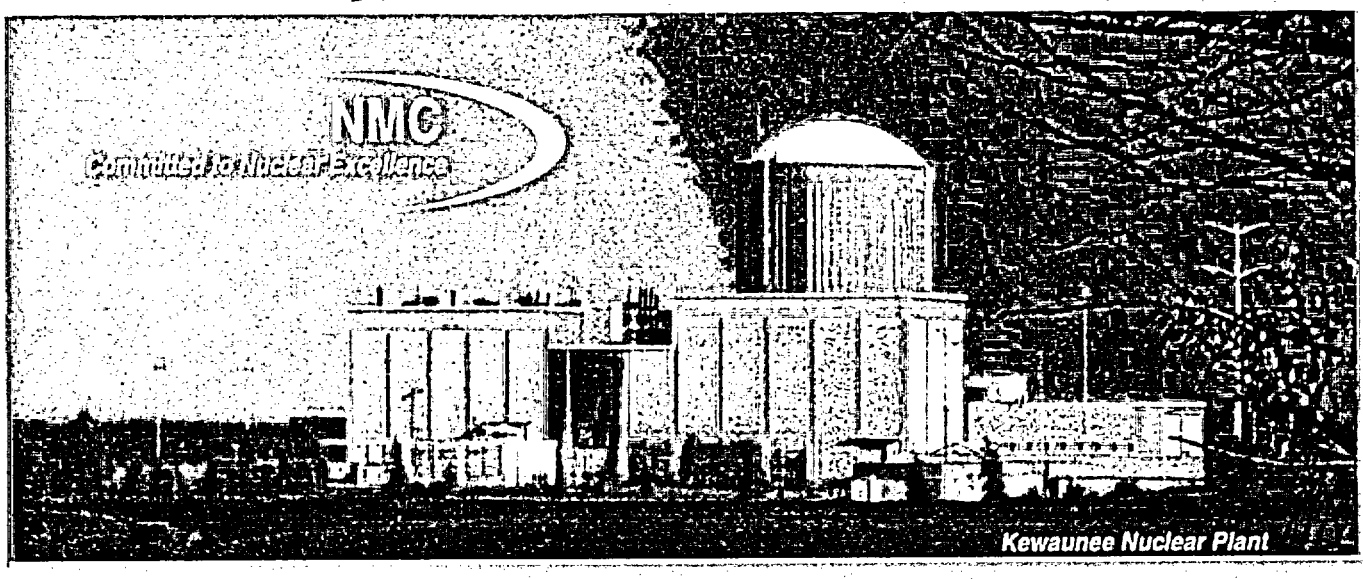
KEWAUNEE NUCLEAR POWER PLANT

ANNUAL ENVIRONMENTAL MONITORING REPORT

January/December 2002



NUCLEAR MANAGEMENT COMPANY, LLC

NMC
Committed to Nuclear Excellence

KEWAUNEE NUCLEAR POWER PLANT

ANNUAL REPORT PART I
PROGRAMMATIC REVIEW OF SAMPLING RESULTS

A small creek on the north edge of the property

Environmental, Inc.
Midwest Laboratory
an Allegheny Technologies Co.

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REPORT TO

NUCLEAR MANAGEMENT CO, LLC

RADIOLOGICAL MONITORING PROGRAM FOR THE KEWAUNEE NUCLEAR POWER PLANT KEWAUNEE, WISCONSIN

ANNUAL REPORT - PART I
SUMMARY AND INTERPRETATION

January 1 to December 31, 2002

Prepared and submitted by:

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PREFACE

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

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1.0 INTRODUCTION

The Kewaunee Nuclear Power Plant is a 535 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. This report summarizes the environmental operation data collected during the period January - December 2002.

Nuclear Management Company, LLC, an operating company for the Kewaunee Nuclear Power Plant, assumes the responsibility for the environmental program at the Plant and any questions relating to this subject should be directed to Mr. Stanley F. Baker, Manager of Radiation Protection, at (920) 388-8103.

2.0 SUMMARY

Results of sample analyses during the period January - December 2002 are summarized in Table 4.5. Radionuclide concentrations measured at indicator locations are compared with levels measured at control locations and in preoperational studies. The comparisons indicate background-level radioactivities in all samples collected.

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 indicates which are indicators and which are 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

The airborne particulate samples are collected on 47 mm diameter glass fiber filters at a volumetric rate of approximately one cubic foot per minute. The filters are collected weekly from six locations (K-1f, K-2, K-7, K-8, K-16 and K-31), and dispatched by mail to Environmental, Inc. for radiometric analysis. The material on the filter is counted for gross beta activity approximately 72 hours or later after collection to allow for decay of naturally-occurring short-lived radionuclides.

Quarterly composites from each sampling location are analyzed for gamma-emitting isotopes by germanium detector.

Airborne Iodine

Charcoal filters are located at locations K-1f, K-2, K-7, K-8, K-16 and K-31. The filters are changed bi-weekly and analyzed for iodine-131 immediately after arrival at the laboratory.

Ambient Gamma Radiation - TLDs

The integrated gamma-ray background is measured at six sampling locations (K-1f, K-2, K-7, K-8, K-15 and K-16), at five milk sampling locations (K-3, K-5, K-25, K-35 and K-37), and four additional sites (K-17, located 4.25 miles west of the plant; K-27, located 1.5 miles northwest of the plant; K-30, located 1.0 miles north of the plant and K-31, located 6.25 miles north-northwest of the plant) by thermoluminescent dosimetry (TLDs). Two TLD cards, each having four main readout areas containing $CaSO_4$: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.

Precipitation

Monthly composites of precipitation samples collected at K-11 are analyzed for tritium activity and counted using a liquid scintillation method.

3.1.2 The Terrestrial Program

Milk

Milk is collected semimonthly from May through October, and monthly during the rest of the year from four herds that graze within four miles of the reactor site (K-5, K-25, K-34 and K-38), from two herds that graze between four and ten miles from the reactor site (K-3 and K-37), and from a dairy in Green Bay (K-28). The samples are analyzed for iodine-131, strontium-89 and -90, cesium-137, barium-lanthanum-140, potassium-40, calcium and stable potassium.

Well Water

One gallon of water is collected quarterly from four off-site wells located at K-10, K-11, K-13 and K-25 and from two on-site wells located at K-1g and K-1h.

Gamma spectroscopic analyses and gross beta on the total residue are performed for each water sample. The concentration of potassium-40 is calculated from total potassium, determined by atomic absorption, on all samples.

Additionally, samples of water from two on-site wells (K-1g and K-1h) are analyzed for gross alpha. Water from the on-site well (K-1g) is also analyzed for tritium, strontium-89 and strontium-90.

Domestic Meat

Domestic meat samples are obtained annually (in the third quarter) at locations K-24, K-29, K-32 and K-34 (if available). The flesh is separated from the bones and analyzed for gross alpha, gross beta and gamma emitting isotopes.

Eggs

Eggs are collected quarterly from locations K-24, K-27 (if available) and K-32. Samples are analyzed for gross beta, strontium-89 and -90, and gamma-emitting isotopes.

Vegetables

Vegetable samples (6 varieties) are collected at locations K-17 and K-26, and two varieties of grain, if available, at location K-23. The samples are analyzed for gross beta, strontium-89 and -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. Cattle feed is collected during the first quarter from the same farms. The samples are analyzed for gross beta, strontium-89 and -90, and gamma emitting isotopes. For the year 2002, six locations for grass collection were available (K-3, K-5, K-25, K-34, K-37 and K-38), cattle feed was available from locations K-3, K-5, K-25, and K-34.

Soil

Soil samples are collected twice a year on-site at K-1f and from the dairy farm locations (K-3, K-5, K-25, K-34, K-37 and K-38). 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 2.5 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 north 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 meet. 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 solids and suspended solids, and potassium-40. The concentration of potassium-40 is calculated from total potassium, which is determined by flame photometry. In addition, quarterly composites of the 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 activities.

Slime

Slime samples are 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, they are also gamma scanned and analyzed for strontium-89 and strontium-90 activities.

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. It is known that the measured radioactivity per unit mass of sediment increases with decreasing particle size, and the sampling procedure is designed to assure collection of very fine particles.

3.1.4 Program Execution

Program execution is summarized in Table 4.4. The program was executed for the year 2002 as described in the preceding sections, with the following exceptions:

Air particulate / Air iodine samples were not available from location K-16 for the weeks ending February, 11 and February 19, 2002. The sampler was out of service.

The air particulate sample from location K-31, for the week ending March 19, 2002, did not represent the total volume collected. The filter, as found, was torn.

No precipitation was available for collection in February, 2002.

Milk, soil and grass was not available from location K-37 (Hardtke Farm) after September, 2002. The farm was dropped from the sampling program.

Vegetables were not available at location K-17, Jansky's Farm. The garden was discontinued.

Surface water was not available for the months of January, February and March, 2002 at locations K-1a and K-1k. The creek and pond were both frozen.

Surface water was not available for the month of December, 2002 at locations K-1k. The pond was frozen.

3.1.5 Program Modifications

Two replacement dairies were added in March, 2002, the Hardtke Farm (K-37) and the Sinkula Farm (K-38).

The Hardtke farm had to subsequently withdraw from the program in September, 2002, due to fire.

3.2 Results and Discussion

The results for the reporting period January to December 2002 are presented in summary form in Table 4.5. For each type of analysis, of each sampled medium, this 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 Nuclear Power Plant refers to data collected by Environmental Inc., Midwest Laboratory.

The tabulated results of all measurements made in 2002 are not included in this section, although references to these results will be made in the discussion. A complete tabulation of results is contained in Part II of the 2002 annual report on the Radiological Monitoring Program for the Kewaunee Nuclear Power Plant.

3.2.1 Atmospheric Nuclear Detonations and Nuclear Accidents

There were no atmospheric nuclear tests or accidents reported in 2002. The last reported test was conducted by the People's Republic of China on October 16, 1980.

3.2.2 The Air Environment

Airborne Particulates

The annual gross beta concentration in air particulates measured 0.023 pCi/m^3 at the indicator locations and 0.022 pCi/m^3 at the controls. The averages were almost identical to the means observed from 1991 (and prior to) through 2001. Results are tabulated below.

Year	Average of Indicators	Average of Controls
	Concentration (pCi/m^3)	
1991	0.018	0.019
1992	0.018	0.019
1993	0.020	0.020
1994	0.016	0.018
1995	0.019	0.018
1996	0.020	0.019
1997	0.019	0.019
1998	0.019	0.019
1999	0.022	0.023
2000	0.022	0.021
2001	0.024	0.023
2002	0.023	0.022

Average annual gross beta concentrations in airborne particulates.

Airborne Particulates (continued)

Gamma spectroscopic analysis of quarterly composites of air particulate filters yielded similar results for indicator and control locations. Beryllium-7, which is produced continuously in the upper atmosphere by cosmic radiation (Arnold and Al-Salih, 1955), was detected in all samples. All other gamma-emitting isotopes were below their respective LLD limits.

Airborne Iodine

Bi-monthly levels of airborne iodine-131 were below the lower limit of detection (LLD) of 0.030 pCi/m^3 at all locations. There is no indication of an effect of the plant operation on the local air environment.

Ambient Gamma Radiation - TLDs

Ambient gamma radiation was monitored by TLDs at fourteen locations: seven indicator and seven control.

Quarterly TLDs at indicator locations measured a mean dose equivalent of (16.1 mR/91 days), in agreement with the mean at the control locations of (15.1 mR/91 days), and were similar to the means obtained in 1991 (and prior to) through 2001. The results are tabulated below. No plant effect on ambient gamma radiation was indicated These values are slightly 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 19.4 mR/91 days, measured at the indicator location K-7.

Year	Average (Indicators)	Average (Controls)
	Dose rate (mR/91 days)	
1991	13.7	12.5
1992	15.0	13.8
1993	15.0	13.8
1994	14.8	13.8
1995	16.7	15.6
1996	15.9	14.9
1997	16.0	15.1
1998	16.1	15.5
1999	17.4	16.9
2000	18.7	18.2
2001	18.6	18.3
2002	16.1	15.1

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

Precipitation

Precipitation was monitored at one indicator location, K-11. The tritium concentration was below the LLD level of 330 pCi/L in all samples.

3.2.3 The Terrestrial Environment

Milk

Of the 116 analyses for iodine-131 in milk, all were below the LLD level of 0.5 pCi/L.

Strontium-89 concentrations measured below an LLD level of 1.5 pCi/L in all samples. Low levels of strontium-90 were found in all samples tested. Mean values were almost identical for indicator and control locations (1.1 pCi/L and 1.2 pCi/L, respectively) and are similar to or less than averages seen from 1989 through 2001.

Barium-lanthanum-140 concentrations were below the LLD of 15 pCi/L and Cesium-137 concentrations were below the LLD of 10 pCi/L in all samples. Potassium-40 results are similar at both the indicator and control locations (1370 and 1405 pCi/L, respectively), and are essentially identical to the levels observed from 1989 through 2001. There was no indication of any effect due to the operation of the KNPP.

Due to the chemical similarities between strontium and calcium, and cesium and potassium, organisms tend to deposit cesium-137 in the soft tissue and muscle and strontium-89 and strontium-90 in the bone. 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. The measured concentrations of stable potassium and calcium are in agreement with previously determined values of 1.50 ± 0.21 g/L and 1.16 ± 0.08 g/L, respectively (National Center for Radiological Health, 1968).

Well Water

Gross alpha and gross beta concentrations, measured at the two on-site wells (K-1g and K-1h), averaged 3.5 pCi/L and 5.1 pCi/L respectively. Other wells tested, both indicators and control, measured below the LLD level of 4.1 pCi/L, similar to values observed from 1989 through 2001.

Levels of tritium and strontium-89, strontium-90 were measured for the on-site well (K-1g). Tritium measured below the LLD of 330 pCi/L in all samples. Strontium-89 concentration measured below the LLD value of 1.0 pCi/L. A slight strontium-90 concentration of 0.6 pCi/L was measured in one of four samples, above the LLD value of 0.5 pCi/L.

All gamma-emitting isotopes measured below their respective LLDs in all samples.

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

Domestic Meat

In domestic meat samples, gross alpha concentration measured below the lower limit of detection for both indicator and control locations. Gross beta concentration averaged 3.1 pCi/g wet for indicator locations and 1.8 pCi/g wet for the control location. The differences are not significant. Gamma-spectroscopic analyses showed that almost all of the beta activity was due to naturally occurring potassium-40. All other gamma-emitting isotopes were below their respective LLD limits.

Eggs

In egg samples, gross beta concentrations averaged 1.34 pCi/g wet for the indicator location and 1.32 pCi/g wet for the control, almost identical to concentrations of naturally-occurring potassium-40 observed in the samples (1.23 and 1.21 pCi/g wet respectively). Other gamma-emitting isotopes were below their respective LLDs. Levels of strontium-89 measured below the LLD of 0.017 pCi/g wet in all samples, strontium-90 measured below the LLD level of 0.011 pCi/g wet.

Vegetables and Grain

In vegetables, gross beta concentrations measured 2.19 pCi/g wet at the control location K-26, due primarily to potassium-40 activity. All other gamma emitting isotopes measured below respective LLDs. Strontium-89 measured below the LLD level of 0.004 pCi/g wet. A low level of strontium-90 was detected in two of the six samples collected and averaged 0.005 pCi/g wet.

In two grain samples (clover and oats) from location K-23, gross beta concentrations averaged 6.65 pCi/g wet, due primarily to potassium-40 and beryllium-7 activity (4.71 and 1.46 pCi/g wet, respectively). Strontium-89 measured below the LLD levels of 0.047 pCi/g wet, strontium-90 averaged 0.026 pCi/g wet for both samples measured.

Grass and Cattle Feed

In grass, mean gross beta concentrations measured 7.75 and 7.20 pCi/g wet at indicator and control locations, respectively, and in all cases was predominantly due to naturally occurring potassium-40 and beryllium-7. All other gamma-emitting isotopes were below their respective LLDs. No strontium-89 and strontium-90 could be detected above the LLD value of 0.11 pCi/g and 0.046 pCi/g wet, respectively.

In cattlefeed, the mean gross beta concentration was lower at the control locations (7.92 pCi/g wet) than at indicator locations (13.07 pCi/g wet). The highest average gross beta levels were in samples from the indicator locations K-5 (17.95 pCi/g wet), and reflected the high combined beryllium-7 and potassium-40 levels observed in the samples. This pattern was similar to that observed since 1978. Strontium-89 levels were below the LLD level of 0.096 pCi/g wet in all samples. Strontium-90 activity was detected in both indicator locations and control samples and averaged 0.033 pCi/g wet and 0.012 pCi/g wet, respectively, similar or lower than levels observed in 1995 through 2001. The presence of radiostrontium can still be attributed to fallout from nuclear testing in previous decades.

With the exceptions of naturally-occurring beryllium and potassium, gamma-emitting isotopes were below their respective LLD levels.

Soil

Gross alpha concentrations in soil samples measured 7.86 pCi/g dry at the indicator locations averaged and 7.93 pCi/g dry at the control locations. Mean gross beta levels measured at the indicator and control locations averaged 27.68 and 29.06 pCi/g dry, respectively, primarily due to the potassium-40 activity. Strontium-89 was below the LLD level of 0.077 pCi/g dry in all samples. Strontium-90 activity was detected in both indicator locations and control samples and averaged 0.083 pCi/g dry and 0.12 pCi/g dry, respectively.

Low levels of Cesium-137 were detected in eleven of thirteen soil samples and were lower at the indicator locations than at control locations (0.085 and 0.17 pCi/g dry, respectively). Potassium-40 was detected in all samples and averaged 17.69 and 19.04 pCi/g dry at indicator and control locations, respectively. All other gamma-emitting isotopes were below their respective LLD's. These levels of detected activities are similar to those observed from 1989 through 2001.

3.2.4 The Aquatic Environment

Surface Water

In one surface water collected at location K-1e, mean gross beta activity in suspended solids was detected at a level of 1.9 pCi/L. All other samples measured below the LLD level of 1.2 pCi/L. Mean gross beta concentration in dissolved solids was higher at the indicator locations (5.7 pCi/L) as compared to the control locations (2.2 pCi/L), similar to activities observed from 1978 through 2001.

Year	Average (Indicators)	Average (Controls)
	Dose rate (mR/91 days)	
1991	5.1	2.2
1992	4.5	2.2
1993	5.0	2.3
1994	5.0	2.3
1995	4.3	2.2
1996	4.3	2.2
1997	6.3	2.4
1998	5.9	2.1
1999	5.6	2.2
2000	7.0	2.4
2001	5.9	2.2
2002	5.7	2.2

Average annual gross beta concentrations in surface water (DS).

The difference in levels 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 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 the 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 the pre-operational studies conducted prior to 1974 supports this assessment.

No tritium was detected above an LLD of 330 pCi/L in any sample.

Strontium-89 concentrations were below the LLD of 1.5 pCi/L. Strontium-90 measured 0.9 pCi/L in six of twenty-six indicator samples. All other samples measured below an LLD value of 0.7 pCi/L.

Gamma-emitting isotopes were below their respective LLDs in all samples.

Fish

In fish, gross beta concentrations averaged 3.46 pCi/g wet in muscles and 1.17 pCi/g wet in bone fractions. In muscle, the gross beta concentration was primarily due to potassium-40 activity.

Cesium-137 concentration in muscle was detected in two of seven samples tested at a level of 0.040 pCi/g wet, lower than levels observed between 1979 and 1991 (average of 0.12 pCi/g wet), and similar to levels seen in 1992 (0.066 pCi/g wet), in 1993 (0.068 pCi/g wet), in 1994 (0.067 pCi/g wet), in 1995 (0.056 pCi/g wet), in 1996 (0.055 pCi/g wet), in 1997 (0.053 pCi/g wet), 1998 (0.075 pCi/g wet), in 1999 (0.062 pCi/g wet), in 2000 (0.063 pCi/g wet) and 0.040 pCi/g wet in 2001.

The strontium-89 concentration was below the LLD of 0.36 pCi/g wet in all samples. Strontium-90 was detected above the LLD value of 0.14 pCi/ g wet in four of seven bone samples tested and averaged 0.24 pCi/g wet.

Periphyton (Slime) or Aquatic Vegetation

In periphyton (slime) and aquatic vegetation samples, mean gross beta concentrations were slightly higher at the control location than at the indicators (5.57 and 4.24 pCi/g wet, respectively).

The strontium-89 concentration was below the LLD of 0.18 pCi/g wet in all samples. Strontium-90 was detected above the LLD value of 0.077 pCi/g wet in two of twelve indicator samples, averaging 0.17 pCi/g wet.

Cs-137 activity was detected, above the LLD value of 0.035 pCi/g wet, in three of twelve indicator samples, averaging 0.048 pCi/g wet, similar or lower than measurements taken from 1989 through 2001. Other gamma-emitting isotopes, with the exception of naturally-occurring beryllium-7 and potassium-40, were below their respective LLDs.

Bottom Sediments

In bottom sediment samples, the mean gross beta concentrations measured 8.46 pCi/g dry at the indicator locations, and 22.47 pCi/g dry at the control, attributable primarily to levels of potassium-40.

Cs-134 was below the LLD level of 0.034 pCi/g dry in all samples. Low levels of cesium-137 were detected in six of eight samples from indicator locations and averaged 0.029 pCi/g dry. Two of two control samples averaged 0.091 pCi/g dry. On average, cesium-137 measurements are lower than or similar to levels observed from 1979 through 2001.

Levels of strontium-89 measured below the detection limit of 0.044 pCi/g dry in all samples. Strontium-90 could not be detected above the LLD level of 0.024 pCi/g dry.

3.3 Land Use Census

The Land Use Census satisfies the requirements of the KNPP 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 $50m^2$ (500 ft^2) producing broad leaf vegetation."

The 2002 Land Use Census was an annual census conducted in the years between the complete five year census. This census is used to verify that no changes have occurred with the locations of the nearest residence, milk animal or garden. "Drive-bys" were conducted to verify that no changes have occurred over the previous census.

The Land Use Census was completed on September 5, 2002. This census is conducted annually during the growing season per Health Physics Procedure HP 1.14.

Table 4.6.1 lists the results of the 2002 census. There were no changes identified from the 2001 census.

Table 4.6.2 describes the changes from 2001 to 2002.

4.0 FIGURES AND TABLES

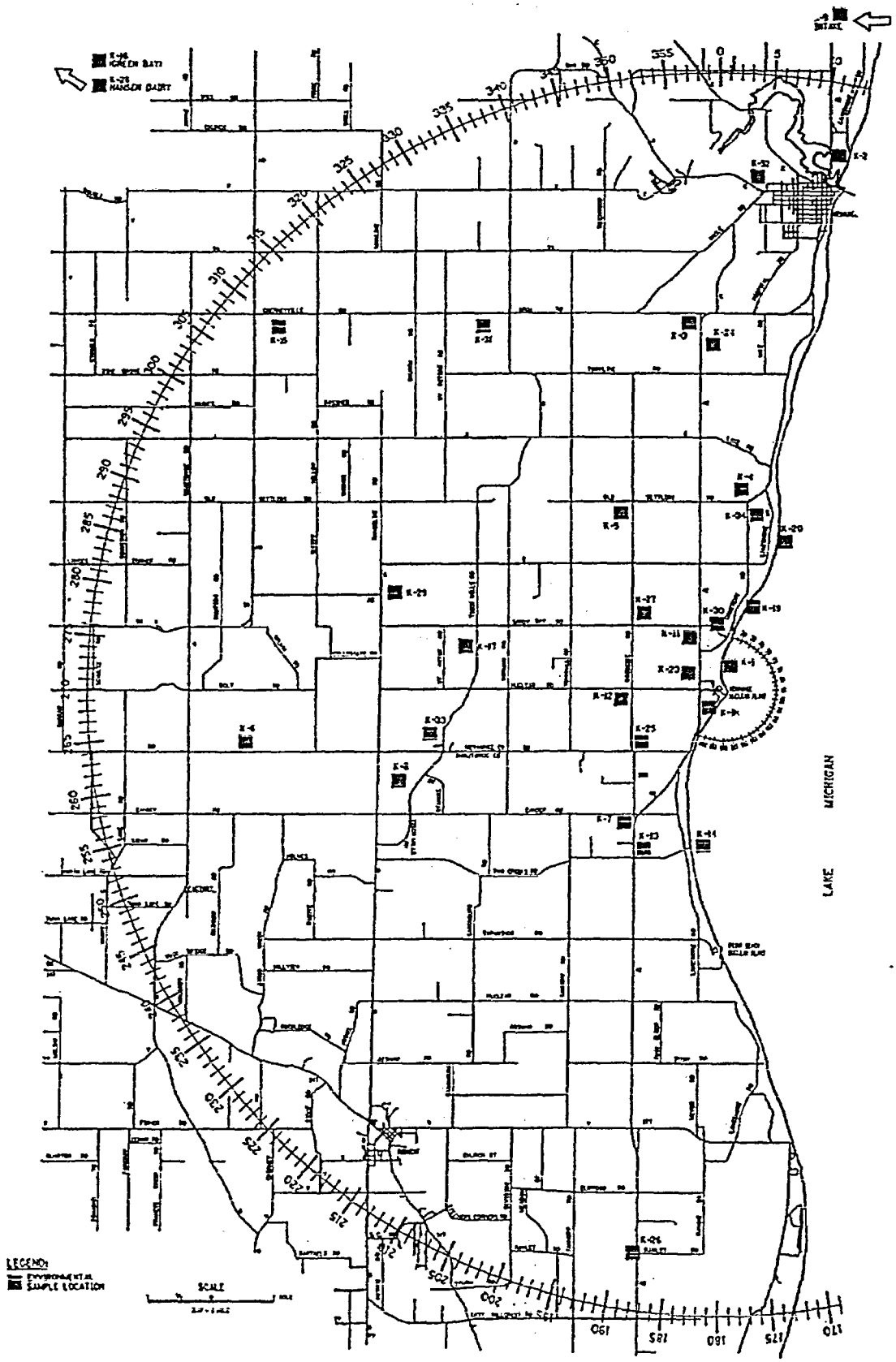

Figure 4-1. Sampling locations, Kewaunee Nuclear Power Plant

Table 4.1. Sampling locations, Kewaunee Nuclear Power Plant.

Code	Type[a]	Distance (miles)[b] and Sector	Location
K-1			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-2	C	9.5 NNE	WPS Operations Building in Kewaunee
K-3	C	6.0 N	Lyle and John Siegmund Farm, N2815 Hy 12, Kewaunee
K-5	I	3.5 NNW	Ed Paplham Farm, E4160 Old Settlers Rd, Kewaunee
K-7	I	2.75 SSW	Ron Zimmerman Farm, 17620 Nero Road, Two Rivers
K-8	C	5.0 WSW	Saint Mary's Church, Tisch Mills
K-9	C	11.5 NNE	Rostok Water Intake for Green Bay, Wisconsin, two miles north of Kewaunee
K-10	I	1.5 NNE	Turner Farm, Kewaunee site
K-11	I	1.0 NW	Harlan Ihlenfeld Farm, N879 Hy 42, Kewaunee
K-13	C	3.0 SSW	Rand's General Store
K-14	I	2.5 S	Two Creeks Park, 2.5 miles south of site
K-15	C	9.25 NW	Gas Substation, 1.5 miles north of Stangelville
K-16	C	26 NW	WPS Division Office Building, Green Bay, Wisconsin
K-17	I	4.25 W	Jansky's Farm, N885 Tk B, Kewaunee
K-20	I	2.5 N	Carl Struck Farm, Lakeshore Dr, Kewaunee
K-23	I	0.5 W	0.5 miles west of plant, Kewaunee site
K-24	I	5.45 N	Fectum Farm, N2653 Hy 42, Kewaunee
K-25	I	2.0 WSW	Wotachek Farm, 4819 E. Cty Tk BB, Denmark
K-26	C	10.7 SSW	Bertler's Fruit Stand (8.0 miles south of "BB")
K-27	I	1.5 NW	Schlies Farm, E4298 Sandy Bay Rd, Kewaunee
K-28	C	26 NW	Hansen Dairy, Green Bay, Wisconsin
K-29	I	5.75 W	Kunesh Farm, Route 1, Kewaunee
K-30	I	1.00N	End of site boundary
K-31	C	6.25NNW	E. Krok Substation
K-32	C	11.50 N	Piggly Wiggly, 931 Marquette Dr., Kewaunee
K-34	I	2.5 N	Leon and Vicki Struck, N1549 Lakeshore Dr., Kewaunee
K-36	I	8.5 mi. NNE	Fiala's Fish Market, Kewaunee
K-37	I	4.0 mi. N	Gary and Ann Hardtke, E4282 Old Settlers Road, Kewaunee
K-38	I	3.8 mi. WNW	Dave Sinkula Farm, N890 Town Hall Road, Kewaunee

[a] I= indicator; C = control.

[b] Distances are measured from reactor stack.

Table 4.2. Type and frequency of collection.

Location	Weekly	Biweekly	Monthly	Quarterly	Semiannually	Annually
K-1a			SW		SL	
K-1b			SW	GR[a]	SL	
K-1c					BS[b]	
K-1d			SW	FI	BS[b], SL	
K-1e			SW		SL	
K-1f	AP	AI		GR[a], TLD	SO	
K-1g				WW		
K-1h				WW		
K-1j					BS[b]	
K-1k			SW		SL	
K-2	AP	AI		TLD		
K-3			MI[c]	GR[a], TLD, CF[d]	SO	
K-5			MI[c]	GR[a], TLD, CF[d]	SO	
K-7	AP	AI		TLD		
K-8	AP	AI		TLD		
K-9			SW		BS[b], SL	
K-10				WW		
K-11			PR	WW		
K-13				WW		
K-14			SW		BS[b], SL	
K-15				TLD		
K-16	AP	AI		TLD		
K-17				TLD		VE
K-20						DM
K-23						GRN
K-24				EG		DM
K-25			MI[c]	GR[a], TLD, CF[d], WW	SO	
K-26						VE
K-27				TLD, EG		DM
K-28			MI[c]			
K-29						DM
K-30				TLD		
K-31	AP	AI		TLD		
K-32				EG		
K-34			MI[c]	GR[a], CF[d]	SO	
K-36				FI		
K-37			MI[c]	GR[a], TLD, CF[d]	SO	
K-38			MI[c]	GR[a], CF[d]	SO	

[a] Three times a year, second, third and fourth quarters.

[b] To be collected in May and November.

[c] Monthly from November through April; semimonthly May through October.

[d] First quarter (January, February, March) only.

Table 4.3. Sample Codes:

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

Table 4.4. Sampling Summary, January - December 2002.

Sample Type	Collection Type and Frequency[a]	Number of Locations	Number of Samples Collected	Number of Samples Missed
Air Environment				
Airborne particulates	C/W	6	310[b]	2
Airborne Iodine	C/BW	6	155	1
TLD's	C/Q	17	56	0
Precipitation	C/M	1	11	1
Terrestrial Environment				
Milk (May-Oct)	G/SM	7	80	0
(Nov-Apr)	G/M	7	36	0
Well water	G/Q	6	24	0
Domestic meat	G/A	3	3	0
Eggs	G/Q	2	8	0
Vegetables - 5 varieties	G/A	2	6	0
Grain - wheat	G/A	1	1	0
- clover	G/A	1	1	0
Grass	G/TA	8	23	0
Cattle feed	G/A	4	8	0
Soil	G/SA	7	13	0
Aquatic Environment				
Surface water	G/M	7	101	7
Fish	G/TA	1	7	0
Slime	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.

[b] A two day collection was made during the week ending June 11, 2002 (locations K-1f, K-2, K-7, K-8, K-31), and have not been included in the number of samples collected.

Table 4.5 Environmental Radiation Monitoring Program Summary.

Name of Facility: Kewaunee Nuclear Power Plant
Location of Facility: Kewaunee County, Wisconsin (County, State)
Docket No. 50-305
Reporting Period January-December, 2002

Sample Type (Units)	Type and Number of Analyses[a]		LLD[b]	Indicator Locations Mean (F)[c] Range[c]	Location with Highest Annual Mean: Location[d]	Location with Highest Annual Mean: Mean (F)[c] Range[c]	Control Locations Mean (F)[c] Range[c]	Number Non-Routine Results[e]
TLDs (Quarterly) (mR/91days)	Gamma	56	3.0	16.1 (28/28) (11.7-21.0)	K-7, Zimmerman Farm 2.75 mi. SSW	19.4 (4/4) (17.5-21.0)	15.1 (28/28) (10.7-20.1)	0
Airborne Particulates (pCi/m^3)	GB	310	0.002	0.023 (104/104) (0.009-0.046)	K-16, WPS Div. Off. 26 mi. NW	0.023 (50/50) (0.009-0.044)	0.023 (206/206) (0.008-0.052)	0
	GS	24						
	Be-7		0.020	0.060 (8/8) (0.044-0.068)	K-16, WPS Div. Office 26 mi. NW	0.064 (4/4) (0.052-0.075)	0.062 (16/16) (0.042-0.077)	0
	Nb-95		0.0019	< LLD	-	-	< LLD	0
	Zr-Nb-95		0.0020	< LLD	-	-	< LLD	0
	Ru-103		0.0017	< LLD	-	-	< LLD	0
	Ru-106		0.012	< LLD	-	-	< LLD	0
	Cs-134		0.0009	< LLD	-	-	< LLD	0
	Cs-137		0.0013	< LLD	-	-	< LLD	0
	Ce-141		0.0029	< LLD	-	-	< LLD	0
	Ce-144		0.0062	< LLD	-	-	< LLD	0
Airborne Iodine (pCi/m^3)	I-131	155	0.03	< LLD	-	-	< LLD	0
Precipitation (pCi/L)	H-3	11	330	< LLD	-	-	None	0
Milk (pCi/L)	I-131	116	0.5	< LLD	-	-	< LLD	0
	Sr-89	76	1.5	< LLD	-	-	< LLD	0
	Sr-90	76	0.7	1.2 (47/52) (0.7-2.8)	K-38, Sinkula Farm 3.8 mi. WNW	1.4 (10/10) (0.8-2.1)	1.2 (24/24) (0.7-1.7)	0
	GS	116						
	K-40		50	1370 (80/80) (1112-1736)	K-3, Siegmund Farm 6.0 mi. N	1442 (18/18) (1290-1593)	1405 (36/36) (1191-1593)	0
	Cs-134		10	< LLD	-	-	< LLD	0
	Cs-137		10	< LLD	-	-	< LLD	0
	Ba-La-140		15	< LLD	-	-	< LLD	0
(g/L)	K-stable	76	1.0	1.60 (52/52) (1.38-1.87)	K-3, Siegmund Farm 6.0 mi. N	1.68 (12/12) (1.56-1.81)	1.60 (24/24) (1.42-1.81)	0
(g/L)	Ca	76	0.4	0.87 (52/52) (0.73-1.10)	K-3, Siegmund Farm 6.0 mi. N	0.90 (12/12) (0.76-1.06)	0.89 (24/24) (0.76-1.06)	0

Table 4.5 Environmental Radiation Monitoring Program Summary.

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Reporting Period January-December, 2002

Sample Type (Units)	Type and Number of Analyses[a]		LLD[b]	Indicator Locations Mean (F)[c] Range[c]	Location with Highest Annual Mean: Location[d]	Location with Highest Annual Mean: Mean (F)[c] Range[c]	Control Locations Mean (F)[c] Range[c]	Number Non-Routine Results[e]
Well Water (pCi/L)	GA	8	3.1	3.5 (2/8) (3.3-3.7)	K-1h, North Well 0.12 mi. NW	3.7 (1/4)	None	0
	GB	24	4.1	5.1 (5/20) (4.3-6.0)	K-1h, North Well 0.12 mi. NW	5.2 (3/4) (4.3-6.0)	< LLD	0
	H-3	4	330	< LLD	-	-	None	0
	K-40(fp)	24	0.87	1.78 (15/20) (0.87-2.87)	K-1h, North Well 0.12 mi. NW	2.54 (4/4) (2.25-2.87)	0.99 (4/4) (0.87-1.14)	0
	Sr-89	4	1.0	< LLD	-	-	None	0
	Sr-90	4	0.5	0.6 (1/4)	K-1g, South Well 0.06 mi. W	0.6 (1/4)	None	0
	GS	24						
	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		15	< LLD	-	-	< LLD	0
	Cs-137		18	< LLD	-	-	< LLD	0
	Ba-La-140		15	< LLD	-	-	< LLD	0
Domestic Meat (pCi/gwet)	GA	3	0.060	< LLD	-	-	< LLD	0
	GB	3	0.030	3.07 (2/2) (2.74-3.40)	K-29, Kunesh Farm 5.75 mi. W	3.40 (1/1) -	1.81 (1/1) -	0
	GS	3						
	Be-7		0.45	< LLD	-	-	< LLD	0
	K-40		0.50	2.65 (2/2) (2.45-2.84)	K-29, Kunesh Farm 5.75 mi. W	2.84 (1/1)	1.44 (1/1) -	0
	Nb-95		0.058	< LLD	-	-	< LLD	0
	Zr-95		0.11	< LLD	-	-	< LLD	0
	Ru-103		0.074	< LLD	-	-	< LLD	0
	Ru-106		0.37	< LLD	-	-	< LLD	0
	Cs-134		0.038	< LLD	-	-	< LLD	0
	Cs-137		0.037	< LLD	-	-	< LLD	0
	Ce-141		0.14	< LLD	-	-	< LLD	0
	Ce-144		0.11	< LLD	-	-	< LLD	0
Eggs (pCi/gwet)	GB	8	0.010	1.34 (4/4) (1.25-1.46)	K-24, Fectum Farm 5.45 mi. N	1.34 (4/4) (1.25-1.46)	1.32 (4/4) (1.26-1.39)	0
	Sr-89	8	0.017	< LLD	-	-	< LLD	0
	Sr-90	8	0.011	< LLD	-	-	< LLD	0
	GS	8						
	Be-7		0.082	< LLD	-	-	< LLD	0
	K-40		0.50	1.23 (4/4) (1.17-1.32)	K-24, Fectum Farm 5.45 mi. N	1.23 (4/4) (1.17-1.32)	1.21 (4/4) (1.11-1.37)	0
	Nb-95		0.009	< LLD	-	-	< LLD	0
	Zr-95		0.021	< LLD	-	-	< LLD	0
	Ru-103		0.009	< LLD	-	-	< LLD	0
	Ru-106		0.11	< LLD	-	-	< LLD	0
	Cs-134		0.010	< LLD	-	-	< LLD	0
	Cs-137		0.010	< LLD	-	-	< LLD	0
	Ce-141		0.018	< LLD	-	-	< LLD	0
	Ce-144		0.072	< LLD	-	-	< LLD	0

Table 4.5 Environmental Radiation Monitoring Program Summary.

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Docket No.: 50-305
Reporting Period: January-December, 2002

Sample Type (Units)	Type and Number of Analyses[a]	LLD[b]	Indicator Locations Mean (F)[c] Range[c]	Location with Highest Annual Mean: Location[d]	Location with Highest Annual Mean: Mean (F)[c] Range[c]	Control Locations Mean (F)[c] Range[c]	Number Non-Routine Results[e]
Vegetables (pCi/gwet)	GB 6	0.010	None	K-26, Bertler's 10.7 mi. SSW	2.19 (6/6) (1.62-3.07)	2.19 (6/6) (1.62-3.07)	0
	Sr-89 6	0.004	None	-	-	< LLD	0
	Sr-90 6	0.003	None	K-26, Bertler's 10.7 mi. SSW	0.005 (2/6) (0.004-0.006)	0.005 (2/6) (0.004-0.006)	0
	GS 6						
	Be-7	0.090	None	-	-	< LLD	0
	K-40	0.50	None	K-26, Bertler's 10.7 mi. SSW	1.87 (6/6) (1.52-2.72)	1.87 (6/6) (1.52-2.72)	0
	Nb-95	0.011	None	-	-	< LLD	0
	Zr-95	0.029	None	-	-	< LLD	0
	Ru-103	0.012	None	-	-	< LLD	0
	Ru-106	0.11	None	-	-	< LLD	0
	Cs-134	0.011	None	-	-	< LLD	0
	Cs-137	0.012	None	-	-	< LLD	0
	Ce-141	0.022	None	-	-	< LLD	0
	Ce-144	0.087	None	-	-	< LLD	0
Grain - Oats & Clover (pCi/gwet)	GB 2	0.010	6.65 (2/2) (5.33-7.96)	K-23, Kewaunee Site, 0.5 mi. W	6.65 (2/2) (5.33-7.96)	None	0
	Sr-89 2	0.047	< LLD	-	-	None	0
	Sr-90 2	0.026	< LLD	-	-	None	0
	GS 2						
	Be-7	0.50	1.46 (2/2) (1.31-1.61)	K-23, Kewaunee Site, 0.5 mi. W	1.46 (2/2) (1.31-1.61)	None	0
	K-40	0.50	4.71 (2/2) (4.15-5.27)	K-23, Kewaunee Site, 0.5 mi. W	4.71 (2/2) (4.15-5.27)	None	0
	Nb-95	0.022	< LLD	-	-	None	0
	Zr-95	0.041	< LLD	-	-	None	0
	Ru-103	0.021	< LLD	-	-	None	0
	Ru-106	0.17	< LLD	-	-	None	0
	Cs-134	0.021	< LLD	-	-	None	0
	Cs-137	0.015	< LLD	-	-	None	0
	Ce-141	0.042	< LLD	-	-	None	0
	Ce-144	0.11	< LLD	-	-	None	0
Cattlefeed (pCi/gwet)	GB 8	0.10	13.07 (6/6) (7.89-25.77)	K-5, Paplham Farm 3.5 mi. NNW	17.95 (2/2) (10.13-25.77)	7.92 (2/2) (4.24-11.60)	0
	Sr-89 8	0.096	< LLD	-	-	< LLD	0
	Sr-90 8	0.005	0.033 (6/6) (0.007-0.068)	K-25, Wotachek Farm 2.0 mi. WSW	0.063 (2/2) (0.057-0.068)	0.012 (2/2) (0.006-0.017)	0
	GS 8						
	Be-7	0.65	< LLD	-	-	< LLD	0
	K-40	0.10	10.90 (6/6) (6.26-18.72)	K-25, Wotachek Farm 2.0 mi. WSW	12.71 (2/2) (8.01-17.41)	7.16 (2/2) (3.60-10.72)	0

Table 4.5 Environmental Radiation Monitoring Program Summary.

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Reporting Period: January-December, 2002

Sample Type (Units)	Type and Number of Analyses[a]	LLD[b]	Indicator Locations Mean (F)[c] Range[c]	Location with Highest Annual Mean: Location[d]	Location with Highest Annual Mean: Mean (F)[c] Range[c]	Control Locations Mean (F)[c] Range[c]	Number Non-Routine Results[e]
Cattlefeed (continued)	Nb-95	0.064	< LLD	-	-	< LLD	0
	Zr-95	0.15	< LLD	-	-	< LLD	0
	Ru-103	0.039	< LLD	-	-	< LLD	0
	Ru-106	0.52	< LLD	-	-	< LLD	0
	Cs-134	0.037	< LLD	-	-	< LLD	0
	Cs-137	0.045	< LLD	-	-	< LLD	0
	Ce-141	0.12	< LLD	-	-	< LLD	0
	Ce-144	0.36	< LLD	-	-	< LLD	0
Grass (pCi/gwet)	GB 23	0.10	7.75 (20/20) (4.55-24.55)	K-38, Sinkula Farm 3.8 mi. WNW	12.95 (3/3) (6.94-24.55)	7.20 (3/3) (6.11-8.30)	0
	Sr-89 23	0.11	< LLD	-	-	< LLD	0
	Sr-90 23	0.046	< LLD	-	-	< LLD	0
	GS 23						
	Be-7	0.32	2.41 (19/20) (0.45-5.38)	K-38, Sinkula Farm 3.8 mi. WNW	3.75 (3/3) (2.92-5.38)	0.96 (3/3) (0.73-1.17)	0
	K-40	0.50	7.08 (20/20) (3.39-23.31)	K-38, Sinkula Farm 3.8 mi. WNW	12.23 (3/3) (5.52-23.31)	6.88 (3/3) (6.52-7.34)	0
	Nb-95	0.037	< LLD	-	-	< LLD	0
	Zr-95	0.086	< LLD	-	-	< LLD	0
	Ru-103	0.036	< LLD		-	< LLD	0
	Ru-106	0.29	< LLD	-	-	< LLD	0
	Cs-134	0.045	< LLD	-	-	< LLD	0
	Cs-137	0.041	< LLD	-	-	< LLD	0
	Ce-141	0.070	< LLD	-	-	< LLD	0
	Ce-144	0.24	< LLD	-	-	< LLD	0
Soil (pCi/gdry)	GA 13	1.0	7.86 (11/11) (2.83-14.29)	K-38, Sinkula Farm 3.8 mi. WNW	12.16 (2/2) (10.02-14.29)	7.93 (2/2) (6.03-9.83)	0
	GB 13	2.0	27.68 (11/11) (17.99-33.69)	K-38, Sinkula Farm 3.8 mi. WNW	33.37 (2/2) (33.04-33.69)	29.06 (2/2) (27.71-30.40)	0
	Sr-89 13	0.077	< LLD	-	-	< LLD	0
	Sr-90 13	0.026	0.083 (10/11) (0.034-0.14)	K-3, Siegmund Farm 6.0 mi. N	0.12 (2/2) (0.04-0.20)	0.12 (2/2) (0.037-0.20)	0
	GS 13						
	Be-7	0.31	< LLD	-	-	< LLD	0
	K-40	1.4	17.69 (11/11) (9.99-22.40)	K-38, Sinkula Farm 3.8 mi. WNW	21.70 (2/2) (21.00-22.40)	19.04 (2/2) (18.54-19.53)	0
	Nb-95	0.033	< LLD	-	-	< LLD	0
	Zr-95	0.069	< LLD	-	-	< LLD	0
	Ru-103	0.030	< LLD		-	< LLD	0
	Ru-106	0.27	< LLD	-	-	< LLD	0
	Cs-134	0.040	< LLD	-	-	< LLD	0
	Cs-137	0.018	0.085 (9/11) (0.026-0.12)	K-3, Siegmund Farm 6.0 mi. N	0.17 (2/2) (0.15-0.18)	0.17 (2/2) (0.15-0.18)	0
	Ce-141	0.056	< LLD	-	-	< LLD	0
	Ce-144	0.14	< LLD	-	-	< LLD	0

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Reporting Period January-December, 2002

Sample Type (Units)	Type and Number of Analyses[a]	LLD[b]	Indicator Locations Mean (F)[c] Range[c]	Location with Highest Annual Mean: Location[d]	Location with Highest Annual Mean: Mean (F)[c] Range[c]	Control Locations Mean (F)[c] Range[c]	Number Non-Routine Results[e]
Surface Water	GB (SS) 101	1.2	1.9 (1/77)	K-1e, South Creek 0.12 mi. S	1.9 (1/12)	< LLD	0
(pCi/L)	GB (DS) 101	1.2	5.7 (77/77) (1.5-25.2)	K-1k, Drainage Pond 0.60 mi. SW	13.6 (8/8) (4.1-25.2)	2.2 (24/24) (1.6-3.3)	0
	GB (TR) 101	1.2	5.8 (77/77) (1.5-25.2)	K-1k, Drainage Pond 0.60 mi. SW	13.6 (8/8) (4.1-25.2)	2.2 (24/24) (1.6-3.3)	0
	GS 101						
	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 34	330	< LLD	-	-	< LLD	0
	Sr-89 34	1.5	< LLD	-	-	< LLD	0
	Sr-90 34	0.7	0.9 (6/26) (0.7-1.3)	K-1d, Cond. Discharge 0.10 mi. E	1.3 (1/4)	< LLD	0
	K-40 101	0.87	3.6 (77/77) (0.9-14.8)	K-1a, North Creek 0.62 mi. N	8.9 (9/9) (5.5-14.8)	1.1 (24/24) (1.0-1.4)	0
Fish (Muscle) (pCi/gwet)	GB 7	0.5	3.46 (7/7) (2.76-5.44)	K-1d, Cond. Discharge 0.10 mi. E	3.46 (7/7) (2.76-5.44)	None	0
	GS 7						
	K-40	0.5	2.41 (7/7) (1.94-3.16)	K-1d, Cond. Discharge 0.10 mi. E	2.41 (7/7) (1.94-3.16)	None	0
	Mn-54	0.028	< LLD	-	-	None	0
	Fe-59	0.13	< LLD	-	-	None	0
	Co-58	0.040	< LLD	-	-	None	0
	Co-60	0.030	< LLD	-	-	None	0
	Cs-134	0.037	< LLD	-	-	None	0
	Cs-137	0.032	0.061 (2/7) (0.041-0.081)	K-1d, Cond. Discharge 0.10 mi. E	0.061 (2/7) (0.041-0.081)	None	0
Fish (Bones) (pCi/gwet)	GB 7	1.99	1.17 (7/7) (0.76-1.52)	K-1d, Cond. Discharge 0.10 mi. E	1.17 (7/7) (0.76-1.52)	None	0
	Sr-89 7	0.36	< LLD	-	-	None	0
	Sr-90 7	0.14	0.24 (4/7) (0.14-0.34)	K-1d, Cond. Discharge 0.10 mi. E	0.24 (4/7) (0.14-0.34)	None	0

Environmental Radiation Monitoring Program Summary.

Name of Facility: Kewaunee Nuclear Power Plant
Location of Facility: Kewaunee County, Wisconsin (County, State)
Docket No. 50-305
Reporting Period: January-December, 2002

Sample Type (Units)	Type and Number of Analyses[a]		LLD[b]	Indicator Locations Mean (F)[c] Range[c]	Location with Highest Annual Mean: Location[d]	Location with Highest Annual Mean: Mean (F)[c] Range[c]	Control Locations Mean (F)[c] Range[c]	Number Non-Routine Results[e]
Periphyton (Slime)	GB	14	0.1	4.24 (12/12) (3.11-6.78)	K-1b, Middle Creek 0.12 mi. N	6.12 (2/2) (5.46-6.78)	5.57 (2/2) (5.29-5.84)	0
(pCi/gwet)	Sr-89	14	0.18	< LLD	-	-	< LLD	0
	Sr-90	14	0.077	0.17 (2/12) (0.077-0.26)	K-14, Two Creeks Park 2.5 mi. S	0.26 (1/2)	< LLD	0
	GS	14						
	Be-7		0.36	1.06 (9/12) (0.43-1.60)	K-14, Two Creeks Park 2.5 mi. S	1.51 (2/2) (1.41-1.60)	0.70 (1/2)	0
	K-40		0.5	3.23 (12/12) (1.67-5.40)	K-9, Rostok Intake 11.5 mi. NNE	5.16 (2/2) (4.76-5.56)	5.16 (2/2) (4.76-5.56)	0
	Mn-54		0.056	< LLD	-	-	< LLD	0
	Co-58		0.053	< LLD	-	-	< LLD	0
	Co-60		0.037	< LLD	-	-	< LLD	0
	Nb-95		0.052	< LLD	-	-	< LLD	0
	Zr-95		0.076	< LLD	-	-	< LLD	0
	Ru-103		0.076	< LLD	-	-	< LLD	0
	Ru-106		0.23	< LLD	-	-	< LLD	0
	Cs-134		0.029	< LLD	-	-	< LLD	0
	Cs-137		0.035	0.048 (3/12) (0.042-0.051)	K-1d, Cond. Discharge 0.10 mi. E	0.050 (1/2)	< LLD	0
	Ce-141		0.091	< LLD	-	-	< LLD	0
	Ce-144		0.200	< LLD	-	-	< LLD	0
Bottom Sediments	GB	10	1.0	8.46 (8/8) (5.31-11.01)	K-9, Rostok Intake 11.5 mi. NNE	22.47 (2/2) (22.47-22.47)	22.47 (2/2) (22.47-22.47)	0
(pCi/gdry)	Sr-89	10	0.044	< LLD	-	-	< LLD	0
	Sr-90	10	0.024	< LLD	-	-	< LLD	0
	GS	10						
	K-40		0.5	7.29 (8/8) (4.70-10.09)	K-9, Rostok Intake 11.5 mi. NNE	10.16 (2/2) (10.08-10.23)	10.16 (2/2) (10.08-10.23)	0
	Co-58		0.024	< LLD	-	-	< LLD	0
	Co-60		0.027	< LLD	-	-	< LLD	0
	Cs-134		0.027	< LLD	-	-	< LLD	0
	Cs-137		0.016	0.029 (6/8) (0.019-0.035)	K-9, Rostok Intake 11.5 mi. NNE	0.091 (2/2) (0.090-0.091)	0.091 (2/2) (0.090-0.091)	0

[a] GA = gross alpha, GB = gross beta, GS = gamma spectroscopy, SS = suspended solids, DS = dissolved solids, 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.
[f] A two day collection was made during the week ending June 11, 2002 (locations K-1f, K-2, K-7, K-8, K-31). The data is not included in the calculation for mean and standard deviation.

Table 4.6.1 Land Use Census

The following table lists an inventory of residence, gardens ≥500 ft^2 and milk animals found nearest to the plant in each of the 10 meteorological sectors within a five mile radius of the Kewaunee Nuclear Power Plant.

Sector	Township No.	Residence	Garden	Milk Animals	Distance From Plant (miles)	Location ID
A	12			X	3.23	
A	13		X		3.05	
A	24	X			1.81	
B	18			X	2.69	K-34
B	24	X			1.26	
B	24		X		1.47	K-19
R	23			X	2.21	
R	26	X	X		1.05	K-11
Q	23	X			1.37	
Q	23		X	X	1.47	K-27
P	20			X	4.20	
P	26	X			1.42	
P	26		X		1.52	
N	26		X		1.16	
N	34			X	2.53	
N	35	X			1.05	
M	34		X		1.58	
M	34			X	1.98	K-25
M	35	X			1.42	
L	35	X			1.05	
L	35		X	X	1.30	
K	10			X	3.24	
K	35	X	X		0.96	
J	11	X	X	(Note 1)	2.68	

Note 1. There were no milk animals located in Sector J within five miles of the Kewaunee Nuclear Power Plant.

Table 4.6.2 Land Use Census

The following is a sector by sector listing of those changes between the 2001 and 2002 census.

Sector A	No changes
Sector B	No changes
Sector R	No changes
Sector Q	No changes
Sector P	No changes
Sector N	No changes
Sector M	No changes

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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, 2002 through December, 2002

Appendix A

Interlaboratory Comparison Program Results

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

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

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

The results in Table A-2 were obtained for Thermoluminescent Dosimeters (TLDs), via International Intercomparison of Environmental Dosimeters under the sponsorships listed in Table A-2. Results of internal laboratory testing is also listed.

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

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

Table A-5 list results of the in-house "duplicate" program for the past twelve months. Acceptance is based on the difference of the results being less than the sum of the errors. Data for previous years available upon request.

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

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

Attachment A lists acceptance criteria for "spiked" samples.

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

Attachment A

ACCEPTANCE CRITERIA FOR "SPIKED" SAMPLES

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

Analysis	Level	One standard deviation for single determination
Gamma Emitters	5 to 100 pCi/liter or kg > 100 pCi/liter or kg	5.0 pCi/liter 5% of known value
Strontium-89[b]	5 to 50 pCi/liter or kg > 50 pCi/liter or kg	5.0 pCi/liter 10% of known value
Strontium-90[b]	2 to 30 pCi/liter or kg > 30 pCi/liter or kg	5.0 pCi/liter 10% of known value
Potassium-40	> 0.1 g/liter or kg	5% of known value
Gross alpha	20 pCi/liter > 20 pCi/liter	5.0 pCi/liter 25% of known value
Gross beta	100 pCi/liter > 100 pCi/liter	5.0 pCi/liter 5% of known value
Tritium	4,000 pCi/liter > 4,000 pCi/liter	1s = (pCi/liter) = $169.85 \times (\text{known})^{0.0933}$ 10% of known value
Radium-226,-228	0.1 pCi/liter	15% of known value
Plutonium	0.1 pCi/liter, gram, or sample	10% of known value
Iodine-131, Iodine-129[b]	55 pCi/liter > 55 pCi/liter	6.0 pCi/liter 10% of known value
Uranium-238, Nickel-63[b] Technetium-99[b]	35 pCi/liter > 35 pCi/liter	6.0 pCi/liter 15% of known value
Iron-55[b]	50 to 100 pCi/liter > 100 pCi/liter	10 pCi/liter 10% of known value
Others[b]	---	20% of known value

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

[b] Laboratory limit.

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

Lab Code	Date	Analysis	Concentration (pCi/L) Laboratory Result[b]	ERA Result[c]	Control Limits
STW-940	02/20/02	Sr-89	53.0 ± 2.5	55.3 ± 5.0	46.6 - 64.0
STW-940	02/20/02	Sr-90	16.6 ± 0.5	15.9 ± 5.0	7.2 - 24.6
STW-942	02/20/02	Gr. Alpha	6.5 ± 0.6	8.0 ± 5.0	0.0 - 16.7
STW-942	02/20/02	Gr. Beta	45.7 ± 3.1	48.3 ± 5.0	39.6 - 57.0
STW-944	02/20/02	Ba-133	25.8 ± 1.5	28.9 ± 5.0	20.2 - 37.6
STW-944	02/20/02	Co-60	76.9 ± 2.7	73.4 ± 5.0	64.7 - 82.1
STW-944	02/20/02	Cs-134	38.7 ± 1.6	42.1 ± 5.0	33.4 - 50.8
STW-944	02/20/02	Cs-137	92.9 ± 2.7	88.8 ± 5.0	80.1 - 97.5
STW-944	02/20/02	Ra-226	15.3 ± 0.7	14.3 ± 2.2	10.6 - 18.0
STW-944	02/20/02	Ra-228	17.5 ± 0.4	16.9 ± 4.2	9.6 - 24.2
STW-944	02/20/02	Uranium	23.8 ± 1.1	28.3 ± 3.0	23.1 - 33.5
STW-944	02/20/02	Zn-65	361.0 ± 9.2	359.0 ± 35.9	298.0 - 420.0
STW-951	05/22/02	Gr. Alpha	23.9 ± 2.5	22.8 ± 5.7	13.0 - 32.6
STW-951	05/22/02	Ra-226	5.9 ± 0.5	6.1 ± 0.9	4.5 - 7.7
STW-951	05/22/02	Ra-228	5.6 ± 0.9	4.5 ± 1.1	2.6 - 6.5
STW-951	05/22/02	Uranium	7.6 ± 0.2	9.3 ± 3.0	4.1 - 14.5
STW-952	05/22/02	Co-60	37.9 ± 0.7	39.1 ± 5.0	30.4 - 47.8
STW-952	05/22/02	Cs-134	14.5 ± 0.8	17.1 ± 5.0	8.4 - 25.8
STW-952	05/22/02	Cs-137	50.0 ± 2.0	52.1 ± 5.0	43.4 - 60.8
STW-952	05/22/02	Gr. Beta	171.0 ± 2.5	189.0 ± 28.4	140.0 - 238.0
STW-952	05/22/02	Sr-89	28.4 ± 4.8	31.7 ± 5.0	23.0 - 40.4
STW-952	05/22/02	Sr-90	32.4 ± 3.1	28.3 ± 5.0	19.6 - 37.0
STW-953[d]	05/22/02	H-3	13900.0 ± 100.0	17400.0 ± 1740.0	14400.0 - 20400.0
STW-954	05/22/02	I-131	14.6 ± 0.3	14.7 ± 2.0	11.2 - 18.2
STW-965	08/21/02	Ba-133	71.9 ± 2.1	80.0 ± 8.0	66.4 - 93.6
STW-965	08/21/02	Co-60	23.8 ± 1.0	23.3 ± 5.0	14.6 - 32.0
STW-965	08/21/02	Cs-134[e]	62.9 ± 1.2	71.7 ± 5.0	63.0 - 80.4
STW-965	08/21/02	Cs-137	219.3 ± 10.7	214.0 ± 10.7	195.0 - 233.0
STW-965	08/21/02	Gr. Alpha	74.4 ± 0.6	58.8 ± 14.7	33.5 - 84.1
STW-965	08/21/02	Gr. Beta	26.7 ± 0.4	21.9 ± 2.2	13.2 - 30.6
STW-965	08/21/02	Ra-226	5.0 ± 0.5	5.0 ± 0.8	3.7 - 6.3
STW-965	08/21/02	Ra-228	6.0 ± 0.7	4.7 ± 1.2	2.7 - 6.7
STW-965	08/21/02	Sr-89	28.4 ± 1.5	29.0 ± 5.0	20.3 - 37.7
STW-965	08/21/02	Sr-90	36.5 ± 1.1	36.4 ± 5.0	27.7 - 45.1
STW-965	08/21/02	Uranium	4.1 ± 0.1	5.0 ± 3.0	0.0 - 10.2
STW-965	08/21/02	Zn-65	92.4 ± 2.2	95.7 ± 9.6	79.4 - 112.0
STW-966	11/20/02	Gr. Alpha	9.3 ± 0.4	12.2 ± 5.0	3.5 - 20.9
STW-966	11/20/02	Gr. Beta	44.7 ± 1.0	47.0 ± 5.0	38.3 - 55.7
STW-967	11/20/02	H-3	10100.0 ± 38.7	10200.0 ± 1020.0	8440.0 - 12000.0
STW-968	11/20/02	Ra-226	11.6 ± 0.1	12.1 ± 1.8	9.0 - 15.2
STW-968	11/20/02	Ra-228	16.0 ± 1.4	15.1 ± 3.8	8.6 - 21.6
STW-968	11/20/02	Uranium	15.5 ± 0.5	19.2 ± 3.0	14.0 - 24.4
STW-969	11/20/02	I-131	6.0 ± 0.4	6.8 ± 2.0	3.3 - 10.2

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

Lab Code	Date	Analysis	Concentration (pCi/L) Laboratory Result[b]	ERA Result[c]	Control Limits
STW-970	11/20/02	Co-60	104.0 ± 7.1	104.0 ± 5.2	95.0 - 113.0
STW-970	11/20/02	Cs-134	48.2 ± 2.3	55.5 ± 5.0	46.8 - 64.2
STW-970	11/20/02	Cs-137	109.0 ± 12.6	117.0 ± 5.9	107.0 - 127.0
STW-970	11/20/02	Gr. Beta	252.0 ± 26.8	288.0 ± 49.5	244.0 - 416.0
STW-970	11/20/02	Sr-89	43.2 ± 0.7	47.6 ± 5.0	38.9 - 56.3
STW-970	11/20/02	Sr-90	7.5 ± 0.2	7.6 ± 5.0	0.0 - 16.2
STW-971	11/20/02	Gr. Alpha	74.9 ± 1.5	103.0 ± 25.8	58.4 - 148.0
STW-971	11/20/02	Ra-226	8.9 ± 0.0	9.1 ± 1.4	6.7 - 11.5
STW-971	11/20/02	Ra-228	15.3 ± 0.1	17.8 ± 4.5	10.1 - 25.5
STW-971	11/20/02	Uranium	51.7 ± 1.6	61.7 ± 6.2	51.0 - 72.4

[a] Results obtained by Environmental, Inc., Midwest Laboratory as a participant in the environmental samples crosscheck program operated 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] Analysis was repeated; result of reanalysis: 16114±487 pCi/L.

[e] ERA acknowledged an unacceptably high percentage of failure for Cs-134 and questioned its own control limits. No problems were identified in the analysis.

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

Lab Code	TLD Type	Date	Measurement	mR Known Value	mR Lab Result ± 2 sigma	mR Control Limits
Environmental, Inc.						
2001-1	CaSO4: Dy Cards	12/24/2001	Reader 1, #1	3.98	3.71 ± 0.12	2.79 - 5.17
2001-1	CaSO4: Dy Cards	12/24/2001	Reader 1, #1	3.98	3.38 ± 0.09	2.79 - 5.17
2001-1	CaSO4: Dy Cards	12/24/2001	Reader 1, #2	7.07	7.89 ± 0.18	4.95 - 9.19
2001-1	CaSO4: Dy Cards	12/24/2001	Reader 1, #2	7.07	7.64 ± 0.25	4.95 - 9.19
2001-1	CaSO4: Dy Cards	12/24/2001	Reader 1, #3	15.9	18.62 ± 0.40	11.13 - 20.67
2001-1	CaSO4: Dy Cards	12/24/2001	Reader 1, #3	15.9	19.58 ± 0.12	11.13 - 20.67
2001-1	CaSO4: Dy Cards	12/24/2001	Reader 1, #4	63.61	78.24 ± 1.23	44.53 - 82.69
2001-1	CaSO4: Dy Cards	12/24/2001	Reader 1, #4	63.61	79.89 ± 2.47	44.53 - 82.69
Environmental, Inc.						
2002-1	CaSO4: Dy Cards	5/28/2002	Reader 1, #1	4.84	4.44 ± 0.16	3.39 - 6.29
2002-1	CaSO4: Dy Cards	5/28/2002	Reader 1, #1	4.84	4.37 ± 0.20	3.39 - 6.29
2002-1	CaSO4: Dy Cards	5/28/2002	Reader 1, #2	8.60	9.08 ± 0.14	6.02 - 11.18
2002-1	CaSO4: Dy Cards	5/28/2002	Reader 1, #2	8.60	8.76 ± 0.16	6.02 - 11.18
2002-1	CaSO4: Dy Cards	5/28/2002	Reader 1, #3	19.34	22.14 ± 0.27	13.54 - 25.14
2002-1	CaSO4: Dy Cards	5/28/2002	Reader 1, #3	19.34	24.03 ± 0.30	13.54 - 25.14
2002-1	CaSO4: Dy Cards	5/28/2002	Reader 1, #4	77.36	92.77 ± 0.58	54.15 - 100.57
2002-1	CaSO4: Dy Cards	5/28/2002	Reader 1, #4	77.36	85.25 ± 0.37	54.15 - 100.57
Environmental, Inc.						
2002-2	CaSO4: Dy Cards	12/13/2002	Reader 1, 30	56.73	71.61 ± 1.79	39.71 - 73.75
2002-2	CaSO4: Dy Cards	12/13/2002	Reader 1, 45[a]	25.21	33.49 ± 1.38	17.65 - 32.77
[a] Precision of the distance (cm) measurement can significantly increase the error. The placement of the card holder on the table could account for the higher error.						
2002-2	CaSO4: Dy Cards	12/13/2002	Reader 1, 60	14.18	17.37 ± 1.24	9.93 - 18.43
2002-2	CaSO4: Dy Cards	12/13/2002	Reader 1, 75	9.08	10.65 ± 1.02	6.36 - 11.80
2002-2	CaSO4: Dy Cards	12/13/2002	Reader 1, 90	6.30	6.37 ± 0.54	4.41 - 8.19
2002-2	CaSO4: Dy Cards	12/13/2002	Reader 1, 120	3.55	4.60 ± 0.41	2.49 - 4.62
2002-2	CaSO4: Dy Cards	12/13/2002	Reader 1, 135	2.80	2.51 ± 0.23	1.96 - 3.64
2002-2	CaSO4: Dy Cards	12/13/2002	Reader 1, 150	2.28	2.22 ± 0.28	1.60 - 2.96

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

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

Lab Code	Sample Type	Date	Analysis	Concentration (pCi/L)[a] Laboratory results 2s, n=1[b]	Known Activity	Control Limits[c]
SPW-11552	Water	1/7/2002	Gr. Alpha	35.33 ± 1.83	34.57	17.29 - 51.86
SPW-11552	Water	1/7/2002	Gr. Beta	112.62 ± 2.44	107.70	96.93 - 118.47
SPMI-595	Milk	1/31/2002	Cs-134	29.63 ± 4.98	27.10	17.10 - 37.10
SPMI-595	Milk	1/31/2002	Cs-137	51.31 ± 7.55	50.89	40.89 - 60.89
SPMI-597	Milk	1/31/2002	Co-60	44.18 ± 7.76	41.36	31.36 - 51.36
SPMI-597	Milk	1/31/2002	Cs-134	20.15 ± 5.08	22.59	12.59 - 32.59
SPMI-597	Milk	1/31/2002	Cs-137	54.88 ± 8.32	50.89	40.89 - 60.89
SPAP-594	Air Filter	2/6/2002	Gr. Beta	1.58 ± 0.02	1.55	0.00 - 11.55
SPW-599	Water	2/19/2002	H-3	47607 ± 595	50189	40151 ± 60227
SPMI-1446	Milk	3/8/2002	I-131(G)	87.84 ± 11.47	85.20	75.20 - 95.20
SPW-1446	Water	3/8/2002	I-131	82.98 ± 1.20	85.20	68.16 - 102.24
SPW-1446	Water	3/8/2002	I-131(G)	92.75 ± 12.87	85.20	75.20 - 95.20
SPMI-1448	Milk	3/8/2002	I-131	88.00 ± 1.13	85.20	68.16 - 102.24
SPVE-1444	Vegetation	3/11/2002	I-131(G)	0.39 ± 0.04	0.42	0.25 - 0.58
SPAP-2078	Air Filter	4/8/2002	Gr. Beta	1.43 ± 0.01	1.55	0.00 - 11.55
SPW-2080	Water	4/5/2002	H-3	49121 ± 608	46912	37530 ± 56294
SPF-2082	Fish	4/5/2002	Cs-134	0.83 ± 0.04	0.83	0.50 - 1.16
SPF-2082	Fish	4/5/2002	Cs-137	1.29 ± 0.07	1.35	0.81 - 1.89
SPMI-2084	Milk	4/8/2002	Cs-134	20.93 ± 5.82	24.69	14.69 - 34.69
SPMI-2084	Milk	4/8/2002	Cs-137	51.83 ± 10.23	50.56	40.56 - 60.56
SPMI-2084	Milk	4/8/2002	I-131	87.72 ± 1.28	88.37	70.70 - 106.04
SPMI-2084	Milk	4/8/2002	I-131(G)	84.08 ± 10.75	88.37	78.37 - 98.37
SPMI-2084	Milk	4/8/2002	Sr-90	62.81 ± 1.99	66.85	53.48 - 80.22
SPW-2115	Water	4/8/2002	I-131	82.42 ± 1.27	88.37	70.70 - 106.04
SPW-2116	Water	4/8/2002	Co-60	32.47 ± 5.78	33.09	23.09 - 43.09
SPW-2116	Water	4/8/2002	Cs-134	30.80 ± 3.60	28.80	18.80 - 38.80
SPW-2116	Water	4/8/2002	Cs-137	53.85 ± 7.07	50.56	40.56 - 60.56
SPW-2116	Water	4/8/2002	I-131(G)	79.09 ± 7.58	88.37	78.37 - 98.37
SPW-2116	Water	4/8/2002	Sr-90	70.35 ± 2.32	66.85	53.48 - 80.22
SPW-2019	Water	5/3/2002	Gr. Alpha	25.89 ± 1.71	34.57	17.29 - 51.86
SPW-2019	Water	5/3/2002	Gr. Beta	101.19 ± 2.37	107.70	96.93 - 118.47
SPCH-3064	Charcoal	5/11/2002	I-131(G)	0.74 ± 0.04	0.85	0.51 - 1.18
SPW-4682	Water	7/17/2002	H-3	40856 ± 548	46179	36943 ± 55415
SPAP-4685	Air Filter	7/17/2002	Gr. Beta	1.58 ± 0.02	1.55	0.00 - 11.55
W-71702S	Water	7/17/2002	Fe-55	10463.00 ± 126.00	12200.60	9760.48 - 14640.72
W-71702S	Water	07/17/02	H-3	45779 ± 583	46179	36943 ± 55415
W-71702S	Water	07/17/02	Ni-63	17.02 ± 1.50	17.10	10.26 - 23.94
SPVE-4910	Vegetation	07/22/02	Sr-90	10.22 ± 0.80	9.04	0.00 - 19.04
W-72302S	Water	07/23/02	Sr-90	21.43 ± 0.97	26.55	16.55 - 36.55
W-80102S	Water	08/01/02	Gr. Alpha	41.25 ± 4.58	34.45	17.23 - 51.68
W-80102S	Water	08/01/02	Gr. Beta	113.66 ± 5.30	107.70	96.93 - 118.47
W-80202S	Water	08/02/02	Tc-99	16.39 ± 0.72	14.13	2.13 - 26.13
SPW-7188	Water	10/25/02	Fe-55	20396 ± 265	22778	18222 - 27334
SPW-7190	Water	10/25/02	Ni-63	227.18 ± 11.60	170.80	102.48 - 239.12

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

Lab Code	Sample Type	Date	Analysis	Concentration (pCi/L) Laboratory results 2s, n=1[b]	Known Activity	Control Limits[c]
SPW-7192	Water	10/25/02	H-3	96310 ± 871	90963	72770 - 109156
SPW-7194	Water	10/25/02	C-14	42938 ± 167	49661	29796 - 69525
SPAP-7198	Air Filter	10/25/02	Gr. Beta	1.65 ± 0.02	1.53	0.00 - 11.53
SPW-7335	Water	10/30/02	Co-60	39.67 ± 7.38	37.05	27.05 - 47.05
SPW-7335	Water	10/30/02	Cs-134	33.09 ± 5.96	34.11	24.11 - 44.11
SPW-7335	Water	10/30/02	Cs-137	46.80 ± 10.39	49.90	39.90 - 59.90
SPMI-7336	Milk	10/30/02	Cs-134	34.40 ± 4.99	34.11	24.11 - 44.11
SPMI-7336	Milk	10/30/02	Cs-137	46.52 ± 8.52	49.91	39.91 - 59.91
SPF-7340	Fish	10/30/02	Cs-134	0.66 ± 0.03	0.68	0.41 - 0.95
SPF-7340	Fish	10/30/02	Cs-137	1.35 ± 0.05	1.33	0.80 - 1.86
SPS-8102	Sediment	11/01/02	Sr-90	14.69 ± 0.67	13.45	3.45 - 23.45

[a] Results are reported in units of pCi/L, except for air filters (pCi/Filter), food products, vegetation, soil, sediment (pCi/g).
[b] Results are based on single determinations.
[c] Control limits are based on Attachment A, Page A2 of this report.

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

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

Lab Code	Sample Type	Date	Analysis	Concentration (pCi/L)[a] Laboratory results (4.66σ) LLD	Activity[b]	Acceptance Criteria (4.66 σ)
SPW-11551	water	1/7/2002	Gr. Alpha	0.47	0.45 ± 0.39	1
SPW-11551	water	1/7/2002	Gr. Beta	1.37	0.55 ± 1.03	3.2
SPAP-590	Air Filter	1/31/2002	Co-60	1.78		100
SPAP-590	Air Filter	1/31/2002	Cs-134	3.42		100
SPAP-590	Air Filter	1/31/2002	Cs-137	2.33		100
SPAP-590	Air Filter	1/31/2002	Gr. Beta	0.74	-0.096 ± 0.38	3.2
SPMI-596	Milk	1/31/2002	Co-60	3.54		10
SPMI-596	Milk	1/31/2002	Cs-134	3.24		10
SPMI-596	Milk	1/31/2002	Cs-137	3.89		10
SPMI-596	Milk	1/31/2002	K-40		1472.1 ± 101.50	0
SPW-598	water	1/31/2002	Co-60	2.30		10
SPW-598	water	1/31/2002	Cs-134	3.74		10
SPW-598	water	1/31/2002	Cs-137	3.23		10
SPW-600	water	1/31/2002	H-3	138.80	-96.5 ± 63.40	200
SPMI-1447	Milk	3/7/2002	I-131(G)	7.63		20
SPVE-1443	Vegetation	3/8/2002	I-131(G)	0.02		20
SPW-1445	water	3/8/2002	Co-60	2.76		10
SPW-1445	water	3/8/2002	Cs-134	2.87		10
SPW-1445	water	3/8/2002	Cs-137	4.34		10
SPW-1445	water	3/8/2002	I-131	0.45	0.17 ± 0.31	0.5
SPW-1445	water	3/8/2002	I-131(G)	6.50		20
SPMI-1447	Milk	3/8/2002	I-131	0.31	0.15 ± 0.22	0.5
SPAP-2077	Air Filter	4/8/2002	Gr. Beta	0.32	-0.055 ± 0.19	3.2
SPW-2079	water	4/5/2002	H-3	134.17	16.13 ± 67.39	200
SPF-2081	Fish	4/5/2002	Cs-134	7.67		100
SPF-2081	Fish	4/5/2002	Cs-137	9.54		100
SPMI-2083	Milk	4/8/2002	Cs-134	2.90		10
SPMI-2083	Milk	4/8/2002	Cs-137	3.03		10
SPMI-2083	Milk	4/8/2002	I-131	0.52	-0.38 ± 0.34	0.5
SPMI-2083	Milk[c]	4/8/2002	Sr-90	0.48	1.29 ± 0.36	1
SPW-2115	water	4/8/2002	Co-60	1.49		10
SPW-2115	water	4/8/2002	Cs-134	2.09		10
SPW-2115	water	4/8/2002	Cs-137	3.78		10
SPW-2115	water	4/8/2002	I-131	0.50	-0.16 ± 0.33	0.5
SPW-2115	water	4/8/2002	I-131(G)	3.30		20
SPW-2115	water	4/8/2002	Sr-90	0.66	0.10 ± 0.32	1
SPW-2018	water	4/22/2002	Gr. Alpha	0.56	-0.24 ± 0.38	1
SPW-2018	water	4/22/2002	Gr. Beta	1.38	3.19 ± 1.03	3.2
SPch-3063	Charcoal	5/11/2002	I-131(G)	8.27		9.6
SPW-4683	water	7/17/2002	H-3	129.00	-62.8 ± 60.30	200
W-71702	water	7/17/2002	Fe-55	33.61	-1.72 ± 15.63	1000
W-71702	water	7/17/2002	Ni-63	2.56	0.71 ± 1.37	20
W-71802B	water	7/18/2002	Gr. Alpha	0.48	0.31 ± 0.36	1
W-71802B	water	7/18/2002	Gr. Beta	1.33	0.9 ± 0.95	3.2

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

Lab Code	Sample Type	Date	Analysis	Concentration (pCi/L)[a] Laboratory results (4.66σ) LLD	Activity[b]	Acceptance Criteria (4.66 σ)
W-72302	water	7/23/2002	Sr-90	0.27	0.027 ± 0.13	1
W-80202	water	8/2/2002	Tc-99	0.34	-0.051 ± 0.16	10
SPW-7189	water	10/25/2002	Fe-55	978.21	21.77 ± 595.33	1000
SPW-7191	water	10/25/2002	Ni-63	11.74	4.47 ± 7.24	20
SPW-7193	water	10/25/2002	H-3	146.00	-92 ± 65.00	200
SPAP-7199	Air Filter	10/25/2002	Gr. Beta	0.00	-0.0024 ± 0.00	3.2
SPMI-7333	Milk	10/30/2002	Cs-134	5.30		10
SPMI-7333	Milk	10/30/2002	Cs-137	4.80		10
SPW-7334	water	10/30/2002	Co-60	3.69		10
SPW-7334	water	10/30/2002	Cs-134	5.37		10
SPW-7334	water	10/30/2002	Cs-137	3.90		10
SPF-7339	Fish	10/30/2002	Cs-134	4.69		100
SPF-7339	Fish	10/30/2002	Cs-137	11.18		100

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

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

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

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

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result
CF-20, 21	1/2/2002	Be-7	0.47 ± 0.25	0.37 ± 0.12	0.42 ± 0.14
CF-20, 21	1/2/2002	Gr. Beta	7.82 ± 0.20	7.95 ± 0.21	7.89 ± 0.14
CF-20, 21	1/2/2002	K-40	6.65 ± 0.55	6.53 ± 0.36	6.59 ± 0.33
CF-20, 21	1/2/2002	Sr-90	0.01 ± 0.01	0.01 ± 0.01	0.01 ± 0.00
AP-11804, 11805	1/2/2002	Be-7	0.054 ± 0.011	0.049 ± 0.019	0.052 ± 0.011
AP-11825, 11826	1/2/2002	Be-7	0.053 ± 0.013	0.043 ± 0.013	0.048 ± 0.009
AP-11846, 11847	1/2/2002	Be-7	0.054 ± 0.018	0.048 ± 0.016	0.051 ± 0.012
WW-150, 151	1/7/2002	Gr. Beta	1.26 ± 0.50	1.04 ± 0.46	1.15 ± 0.34
MI-124, 125	1/8/2002	K-40	1332.30 ± 158.90	1271.70 ± 151.50	1302.00 ± 109.77
W-172, 173	1/8/2002	H-3	153.00 ± 68.00	148.00 ± 68.00	150.50 ± 48.08
SW-11698, 11699	1/8/2002	Gr. Alpha	2.51 ± 1.36	3.71 ± 1.80	3.11 ± 1.13
SW-11698, 11699	1/8/2002	Gr. Beta	7.68 ± 1.33	8.49 ± 1.43	8.09 ± 0.98
U-275, 276	1/10/2002	Gr. Alpha	1.40 ± 1.00	1.10 ± 1.20	1.25 ± 0.78
LW-356, 357	1/16/2002	Gr. Beta	3.47 ± 0.65	2.94 ± 0.61	3.21 ± 0.45
LW-377, 378	1/16/2002	Gr. Beta	2.75 ± 0.68	2.84 ± 0.61	2.79 ± 0.46
SW-525, 526	1/30/2002	Gr. Alpha	0.56 ± 0.35	0.24 ± 0.35	0.40 ± 0.25
SW-525, 526	1/30/2002	Gr. Beta	2.29 ± 0.41	2.58 ± 0.39	2.43 ± 0.28
DW-504, 505	1/31/2002	Gr. Alpha	2.30 ± 1.70	3.90 ± 1.40	3.10 ± 1.10
MI-649, 650	2/5/2002	K-40	1319.40 ± 176.70	1210.80 ± 118.20	1265.10 ± 106.29
DW-697, 698	2/6/2002	Gr. Beta	5.10 ± 1.20	4.70 ± 1.20	4.90 ± 0.85
DW-927, 928	2/8/2002	Sr-90	0.69 ± 0.29	0.71 ± 0.29	0.70 ± 0.21
W-973, 974	2/18/2002	Fe-55	7.29 ± 0.97	6.86 ± 0.94	7.08 ± 0.68
W-1673, 1674	2/25/2002	H-3	2640.00 ± 155.00	2908.00 ± 161.00	2774.00 ± 111.74
SWT-1395, 1396	2/26/2002	Gr. Beta	2.96 ± 0.59	2.29 ± 0.53	2.63 ± 0.40
MI-1268, 1269	2/27/2002	K-40	1460.50 ± 162.50	1573.00 ± 168.00	1516.75 ± 116.87
MI-1268, 1269	2/27/2002	Sr-90	0.77 ± 0.36	0.95 ± 0.40	0.86 ± 0.27
MI-1332, 1333	3/5/2002	K-40	1503.00 ± 164.00	1305.00 ± 168.00	1404.00 ± 117.39
MI-1332, 1333	3/5/2002	Sr-90	1.35 ± 0.38	1.07 ± 0.40	1.21 ± 0.28
MI-1458, 1459	3/6/2002	K-40	1411.70 ± 166.70	1390.00 ± 172.30	1400.85 ± 119.87
DW-10100, 10101	3/9/2002	Gr. Alpha	4.10 ± 1.70	1.80 ± 1.60	2.95 ± 1.17
DW-10111, 10112	3/9/2002	Gr. Alpha	7.10 ± 2.00	8.30 ± 2.30	7.70 ± 1.52
MI-1521, 1522	3/11/2002	K-40	1270.80 ± 103.30	1369.10 ± 121.60	1319.95 ± 79.78
MI-1521, 1522	3/11/2002	Sr-90	1.69 ± 0.46	2.46 ± 0.49	2.07 ± 0.34
MI-1541, 1542	3/11/2002	K-40	1562.20 ± 122.80	1529.30 ± 126.10	1545.75 ± 88.01
MI-1541, 1542	3/11/2002	Sr-90	0.85 ± 0.57	1.48 ± 0.43	1.16 ± 0.36
LW-1651, 1652	3/14/2002	Gr. Beta	2.90 ± 0.57	2.57 ± 0.56	2.74 ± 0.40
DW-10134, 10135	3/16/2002	Gr. Alpha	5.60 ± 1.90	5.40 ± 1.60	5.50 ± 1.24
WW-1694, 1695	3/18/2002	Gr. Beta	1.79 ± 0.59	1.53 ± 0.50	1.66 ± 0.39
SO-1715, 1716	3/19/2002	Cs-137	0.03 ± 0.01	0.02 ± 0.01	0.03 ± 0.01
SO-1715, 1716	3/19/2002	Gr. Beta	18.50 ± 1.70	19.10 ± 1.70	18.80 ± 1.20
DW-10302, 10303	3/20/2002	Gr. Alpha	2.30 ± 1.40	3.30 ± 1.60	2.80 ± 1.06
W-1758, 1759	3/25/2002	Gr. Alpha	2.50 ± 0.70	2.30 ± 0.60	2.40 ± 0.46
W-1758, 1759	3/25/2002	Gr. Beta	4.10 ± 1.20	2.50 ± 1.10	3.30 ± 0.81

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

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result
MI-1926, 1927	3/26/2002	K-40	1414.00 ± 115.00	1316.00 ± 128.00	1365.00 ± 86.04
MI-1926, 1927	3/26/2002	Sr-90	2.30 ± 0.70	2.40 ± 0.70	2.35 ± 0.49
SWU-2010, 2011	3/26/2002	Gr. Beta	2.90 ± 0.60	2.20 ± 0.50	2.55 ± 0.39
DW-10376, 10377	3/27/2002	Gr. Beta	10.50 ± 1.30	10.10 ± 1.50	10.30 ± 0.99
AP-2479, 2480	3/28/2002	Be-7	0.064 ± 0.023	0.068 ± 0.014	0.066 ± 0.013
DW-10395, 10396	3/29/2002	Gr. Alpha	10.20 ± 2.10	14.60 ± 2.40	12.40 ± 1.59
LW-2181, 2182	3/31/2002	Gr. Beta	2.98 ± 0.68	1.99 ± 0.70	2.48 ± 0.49
LW-2181, 2182	3/31/2002	H-3	2694.43 ± 156.53	2688.84 ± 156.40	2691.64 ± 110.64
CW-2437, 2438	3/31/2002	Gr. Beta	1.09 ± 0.61	1.14 ± 0.58	1.11 ± 0.42
CW-2437, 2438	3/31/2002	H-3	6456.70 ± 229.20	6292.80 ± 226.52	6374.75 ± 161.12
MI-1947, 1948	4/1/2002	K-40	1421.40 ± 130.90	1256.80 ± 104.20	1339.10 ± 83.65
AP-2458, 2459	4/1/2002	Be-7	0.077 ± 0.011	0.081 ± 0.010	0.079 ± 0.008
DW-10409, 10410	4/1/2002	Gr. Alpha	39.30 ± 4.00	35.30 ± 3.60	37.30 ± 2.69
MI-2052, 2053	4/3/2002	K-40	1283.70 ± 103.20	1434.80 ± 147.90	1359.25 ± 90.17
MI-2052, 2053	4/3/2002	Sr-90	0.81 ± 0.36	0.75 ± 0.35	0.78 ± 0.25
AP-2711, 2712	4/3/2002	Be-7	0.071 ± 0.01	0.07 ± 0.01	0.07 ± 0.01
W-938, 939	4/9/2002	Ni-63	1.73 ± 0.10	1.82 ± 0.10	1.78 ± 0.07
SS-2202, 2203	4/9/2002	Gr. Beta	5.83 ± 1.16	5.52 ± 1.19	5.67 ± 0.83
SS-2202, 2203	4/9/2002	K-40	5.75 ± 0.48	6.11 ± 0.51	5.93 ± 0.35
F-2307, 2308	4/10/2002	K-40	2.75 ± 0.27	2.49 ± 0.32	2.62 ± 0.21
DW-10476, 10477	4/12/2002	Gr. Alpha	5.10 ± 1.30	3.90 ± 1.60	4.50 ± 1.03
W-2244, 2245	4/15/2002	Gr. Beta	1.70 ± 1.10	1.60 ± 1.00	1.65 ± 0.74
DW-10509, 10510	4/17/2002	Gr. Alpha	6.00 ± 2.00	7.30 ± 1.80	6.65 ± 1.35
SW-2690, 2691	4/24/2002	Gr. Beta	2.25 ± 0.68	2.15 ± 0.59	2.20 ± 0.45
SO-2903, 2904	4/24/2002	Be-7	1.22 ± 0.57	0.78 ± 0.43	1.00 ± 0.36
SO-2903, 2904	4/24/2002	Cs-137	0.13 ± 0.05	0.09 ± 0.05	0.11 ± 0.04
SO-2903, 2904	4/24/2002	K-40	21.06 ± 1.48	19.91 ± 1.16	20.48 ± 0.94
DW-10562, 10563	4/24/2002	Gr. Alpha	2.17 ± 1.13	3.25 ± 1.54	2.71 ± 0.96
DW-10578, 10579	4/29/2002	Gr. Alpha	8.20 ± 2.20	7.40 ± 2.00	7.80 ± 1.49
SO-2861, 2862	4/30/2002	Cs-137	236.40 ± 46.00	200.70 ± 52.60	218.55 ± 34.94
SO-2861, 2862	4/30/2002	K-40	10191.00 ± 784.60	11025.00 ± 941.30	10608.00 ± 612.71
SL-2819, 2820	5/1/2002	Be-7	805.70 ± 301.50	860.73 ± 164.80	833.22 ± 171.80
SL-2819, 2820	5/1/2002	Gr. Beta	5566.00 ± 124.00	5359.00 ± 122.00	5462.50 ± 86.98
SL-2819, 2820	5/1/2002	K-40	5524.00 ± 632.90	5277.50 ± 431.40	5400.75 ± 382.97
SL-2840, 2841	5/1/2002	Be-7	1010.00 ± 352.10	872.95 ± 181.70	941.48 ± 198.11
SL-2840, 2841	5/1/2002	Gr. Beta	4399.00 ± 221.80	4593.00 ± 276.00	4496.00 ± 177.04
SL-2840, 2841	5/1/2002	K-40	2422.80 ± 352.10	2254.10 ± 371.40	2338.45 ± 255.89
MI-2971, 2972	5/5/2002	K-40	1338.90 ± 83.44	1345.80 ± 100.90	1342.35 ± 65.47
MI-2971, 2972	5/5/2002	Sr-90	0.83 ± 0.47	1.65 ± 0.46	1.24 ± 0.33
DW-10603, 10604	5/6/2002	Gr. Alpha	6.30 ± 1.70	5.50 ± 1.60	5.90 ± 1.17
SS-3037, 3038	5/9/2002	K-40	11585.00 ± 749.00	11612.00 ± 787.00	11598.50 ± 543.22
MI-3124, 3125	5/13/2002	K-40	1329.50 ± 103.80	1373.00 ± 107.40	1351.25 ± 74.68
MI-3208, 3209	5/14/2002	K-40	1494.60 ± 158.40	1462.60 ± 182.50	1478.60 ± 120.83
LW-3250, 3251	5/15/2002	Gr. Beta	3.14 ± 0.55	3.28 ± 0.63	3.21 ± 0.42

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

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result
CF-3292, 3293	5/20/2002	K-40	1.33 ± 0.99	1.14 ± 0.91	1.23 ± 0.67
MI-3376, 3377	5/26/2002	K-40	1333.30 ± 159.40	1090.70 ± 143.40	1212.00 ± 107.21
MI-3418, 3419	5/28/2002	K-40	1423.70 ± 121.30	1443.30 ± 164.30	1433.50 ± 102.11
SWT-3461, 3462	5/28/2002	Gr. Beta	2.65 ± 0.54	3.28 ± 0.60	2.97 ± 0.40
SO-3503, 3504	5/29/2002	Cs-137	0.17 ± 0.04	0.18 ± 0.05	0.18 ± 0.03
SO-3503, 3504	5/29/2002	Gr. Beta	27.72 ± 2.26	25.45 ± 2.03	26.58 ± 1.52
SO-3503, 3504	5/29/2002	K-40	20.24 ± 1.19	20.54 ± 1.24	20.39 ± 0.86
SL-3545, 3546	6/3/2002	Gr. Beta	4436.00 ± 90.00	4281.00 ± 89.00	4358.50 ± 63.29
SL-3545, 3546	6/3/2002	K-40	4684.20 ± 734.40	5242.50 ± 884.50	4963.35 ± 574.82
DW-10754, 10755	6/6/2002	Sr-90	0.50 ± 0.30	0.60 ± 0.30	0.55 ± 0.21
SW-3777, 3778	6/11/2002	Gr. Alpha	4.42 ± 1.50	2.97 ± 1.40	3.70 ± 1.02
SW-3777, 3778	6/11/2002	Gr. Beta	7.57 ± 1.22	6.83 ± 1.16	7.20 ± 0.84
MI-3798, 3799	6/11/2002	K-40	1433.40 ± 124.20	1401.20 ± 96.96	1417.30 ± 78.78
LW-3924, 3925	6/13/2002	Gr. Beta	3.05 ± 0.59	3.38 ± 0.72	3.21 ± 0.46
MI-3966, 3967	6/18/2002	K-40	1245.20 ± 109.20	1340.20 ± 121.90	1292.70 ± 81.83
MI-3966, 3967	6/18/2002	Sr-90	2.38 ± 0.51	2.63 ± 0.52	2.51 ± 0.36
MI-3987, 3988	6/19/2002	Sr-90	0.98 ± 0.35	0.97 ± 0.35	0.98 ± 0.25
MI-4095, 4096	6/25/2002	K-40	1256.10 ± 138.20	1199.00 ± 128.30	1227.55 ± 94.29
SWU-4221, 4222	6/25/2002	Gr. Beta	6.89 ± 1.97	5.38 ± 1.93	6.13 ± 1.38
LW-4179, 4180	6/27/2002	Gr. Beta	2.37 ± 0.58	2.00 ± 0.62	2.19 ± 0.42
G-4329, 4330	7/1/2002	Be-7	1394.80 ± 538.40	1098.10 ± 437.40	1246.45 ± 346.84
G-4329, 4330	7/1/2002	Gr. Beta	8.10 ± 0.27	8.00 ± 0.25	8.05 ± 0.18
G-4329, 4330	7/1/2002	K-40	7758.20 ± 1100.00	8399.80 ± 929.30	8079.00 ± 720.00
SL-4337, 4338	7/1/2002	Be-7	1480.90 ± 223.80	1726.40 ± 552.60	1603.65 ± 298.10
SL-4337, 4338	7/1/2002	Cs-137	32.30 ± 14.70	50.97 ± 27.10	41.64 ± 15.42
SL-4337, 4338	7/1/2002	Gr. Beta	5262.40 ± 522.10	5432.40 ± 540.00	5347.40 ± 375.56
SL-4337, 4338	7/1/2002	K-40	2249.00 ± 381.90	2989.90 ± 509.60	2619.45 ± 318.41
AP-4864, 4865	7/1/2002	Be-7	0.085 ± 0.009	0.085 ± 0.006	0.085 ± 0.006
MI-4359, 4360	7/2/2002	K-40	1390.10 ± 168.30	1567.40 ± 194.30	1478.75 ± 128.53
AP-4569, 4570	7/2/2002	Be-7	0.068 ± 0.016	0.086 ± 0.018	0.077 ± 0.012
AP-4843, 4844	7/2/2002	Be-7	0.077 ± 0.016	0.090 ± 0.020	0.084 ± 0.013
AP-4789, 4790	7/3/2002	Be-7	0.080 ± 0.013	0.078 ± 0.015	0.079 ± 0.010
SWU-4810, 4811	7/3/2002	Gr. Beta	2.40 ± 0.84	2.47 ± 0.88	2.43 ± 0.61
MI-4548, 4549	7/9/2002	K-40	1511.80 ± 127.00	1446.80 ± 101.80	1479.30 ± 81.38
DW-4737, 4738	7/12/2002	I-131	0.52 ± 0.20	0.49 ± 0.29	0.51 ± 0.18
MI-4632, 4633	7/15/2002	K-40	1198.40 ± 114.10	1371.30 ± 146.90	1284.85 ± 93.00
MI-5054, 5055	7/30/2002	K-40	1428.80 ± 105.60	1344.30 ± 106.40	1386.55 ± 74.95
G-5075, 5076	7/30/2002	Gr. Beta	7.11 ± 0.07	6.99 ± 0.07	7.05 ± 0.05
SWU-5124, 5125	7/30/2002	Gr. Beta	1.75 ± 0.84	1.90 ± 0.78	1.82 ± 0.57
G-5151, 5152	7/31/2002	Be-7	1.82 ± 0.30	2.05 ± 0.32	1.93 ± 0.22
G-5151, 5152	7/31/2002	K-40	5.13 ± 0.66	5.72 ± 0.70	5.42 ± 0.48
MI-5103, 5104	8/2/2002	K-40	1415.90 ± 70.57	1423.80 ± 129.20	1419.85 ± 73.61
LW-5434, 5435	8/5/2002	Gr. Beta	2.77 ± 0.35	2.26 ± 0.35	2.52 ± 0.25
MI-5215, 5216	8/7/2002	K-40	1361.10 ± 111.90	1358.30 ± 115.80	1359.70 ± 80.52

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

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result
MI-5355, 5356	8/13/2002	K-40	1405.00 ± 165.80	1549.30 ± 114.40	1477.15 ± 100.72
F-5413, 5414	8/15/2002	Gr. Beta	2.37 ± 0.10	2.55 ± 0.10	2.46 ± 0.07
F-5413, 5414	8/15/2002	K-40	1.47 ± 0.32	1.73 ± 0.43	1.60 ± 0.27
MI-5603, 5604	8/26/2002	I-131	0.64 ± 0.34	0.52 ± 0.36	0.58 ± 0.25
MI-5603, 5604	8/26/2002	K-40	1353.60 ± 83.13	1261.40 ± 117.80	1307.50 ± 72.09
MI-5578, 5579	8/27/2002	K-40	1301.50 ± 161.70	1381.60 ± 111.20	1341.55 ± 98.12
VE-5682, 5683	8/28/2002	Be-7	0.29 ± 0.10	0.25 ± 0.11	0.27 ± 0.08
VE-5682, 5683	8/28/2002	Gr. Beta	3.79 ± 0.08	3.80 ± 0.08	3.79 ± 0.06
VE-5682, 5683	8/28/2002	K-40	3.06 ± 0.29	3.31 ± 0.42	3.18 ± 0.25
WW-6188, 6189	8/31/2002	Gr. Beta	2.70 ± 0.57	2.30 ± 0.57	2.50 ± 0.41
SL-5724, 5725	9/3/2002	Be-7	0.92 ± 0.19	1.04 ± 0.23	0.98 ± 0.15
SL-5724, 5725	9/3/2002	Cs-137	0.05 ± 0.02	0.05 ± 0.02	0.05 ± 0.01
SL-5724, 5725	9/3/2002	K-40	2.09 ± 0.31	2.28 ± 0.48	2.19 ± 0.29
MI-5877, 5878	9/9/2002	K-40	1340.70 ± 165.00	1168.50 ± 172.50	1254.60 ± 119.35
MI-6157, 6158	9/19/2002	K-40	1372.10 ± 115.10	1136.50 ± 222.70	1254.30 ± 125.34
MI-6258, 6259	9/24/2002	K-40	1328.60 ± 201.00	1312.60 ± 118.60	1320.60 ± 116.69
LW-6278, 6279	9/30/2002	Gr. Beta	2.15 ± 0.51	1.70 ± 0.50	1.93 ± 0.36
MI-6385, 6386	10/1/2002	K-40	1297.10 ± 168.90	1310.10 ± 128.30	1303.60 ± 106.05
BS-6453, 6454	10/1/2002	Cs-137	0.43 ± 0.03	0.44 ± 0.03	0.44 ± 0.02
BS-6453, 6454	10/1/2002	K-40	16.50 ± 0.51	16.80 ± 0.61	16.65 ± 0.40
SO-6478, 6479	10/1/2002	Cs-137	0.074 ± 0.016	0.070 ± 0.016	0.072 ± 0.011
SO-6478, 6479	10/1/2002	Gr. Alpha	8.01 ± 4.36	7.55 ± 4.57	7.78 ± 3.16
SO-6478, 6479	10/1/2002	Gr. Beta	30.41 ± 4.07	33.04 ± 4.28	31.73 ± 2.95
SO-6478, 6479	10/1/2002	K-40	19.82 ± 0.53	20.39 ± 0.58	20.10 ± 0.39
SO-6478, 6479	10/1/2002	Sr-90	0.087 ± 0.017	0.094 ± 0.020	0.091 ± 0.013
AP-6641, 6642	10/1/2002	Be-7	0.070 ± 0.016	0.080 ± 0.015	0.075 ± 0.011
MI-6544, 6545	10/2/2002	K-40	1331.60 ± 125.20	1326.50 ± 171.60	1329.05 ± 106.21
AP-6857, 6858	10/3/2002	Be-7	0.062 ± 0.015	0.071 ± 0.015	0.066 ± 0.010
AP-6857, 6858	10/3/2002	Be-7	0.062 ± 0.015	0.071 ± 0.015	0.066 ± 0.010
AP-6857, 6858	10/3/2002	Be-7	0.062 ± 0.015	0.071 ± 0.015	0.066 ± 0.010
BS-6620, 6621	10/7/2002	Co-60	0.090 ± 0.020	0.11 ± 0.02	0.10 ± 0.01
BS-6620, 6621	10/7/2002	Cs-137	0.62 ± 0.04	0.63 ± 0.03	0.62 ± 0.02
BS-6620, 6621	10/7/2002	K-40	11.38 ± 0.48	10.78 ± 0.52	11.08 ± 0.35
MI-6651, 6652	10/8/2002	K-40	1565.50 ± 141.00	1640.60 ± 189.20	1603.05 ± 117.98
G-6760, 6761	10/9/2002	Be-7	2.17 ± 0.49	2.31 ± 0.34	2.24 ± 0.30
G-6760, 6761	10/9/2002	K-40	6.24 ± 1.00	6.61 ± 0.60	6.42 ± 0.58
SWU-7054, 7055	10/10/2002	Gr. Beta	3.09 ± 0.57	2.06 ± 0.52	2.57 ± 0.39
U-7126, 7127	10/11/2002	Gr. Beta	2.61 ± 1.24	2.61 ± 1.08	2.61 ± 0.82
XW-7768, 7769	10/14/2002	Cs-137	2.25 ± 0.25	2.09 ± 0.18	2.17 ± 0.15
XW-7768, 7769	10/14/2002	H-3	2.63 ± 0.10	2.64 ± 0.10	2.64 ± 0.07
F-7148, 7149	10/15/2002	K-40	2.57 ± 0.28	2.98 ± 0.44	2.77 ± 0.26
BS-7337, 7338	10/23/2002	Co-60	0.083 ± 0.025	0.073 ± 0.031	0.078 ± 0.020
BS-7337, 7338	10/23/2002	Cs-137	0.082 ± 0.019	0.11 ± 0.04	0.10 ± 0.02
BS-7337, 7338	10/23/2002	Gr. Beta	12.54 ± 2.34	12.99 ± 2.22	12.77 ± 1.61
SO-7407, 7408	10/29/2002	Cs-137	0.14 ± 0.03	0.15 ± 0.03	0.15 ± 0.02
SO-7407, 7408	10/29/2002	Gr. Beta	16.73 ± 2.21	16.62 ± 2.27	16.67 ± 1.58
SO-7407, 7408	10/29/2002	K-40	12.05 ± 0.61	12.27 ± 0.81	12.16 ± 0.51

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

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result
MI-7428, 7429	10/29/2002	K-40	1542.60 ± 213.00	1355.80 ± 185.70	1449.20 ± 141.29
pw-7621, 7622	10/30/2002	Gr. Beta	2.22 ± 0.92	2.08 ± 0.83	2.15 ± 0.62
TD-7653, 7654	10/31/2002	H-3	11122.00 ± 387.00	11259.00 ± 390.00	11190.50 ± 274.71
SW-7569, 7570	11/5/2002	Gr. Beta	15.90 ± 1.25	16.24 ± 1.27	16.07 ± 0.89
SW-7569, 7570	11/5/2002	K-40	14.79 ± 1.48	14.79 ± 1.48	14.79 ± 1.05
SO-8010, 8011	11/7/2002	Cs-137	0.11 ± 0.02	0.11 ± 0.03	0.11 ± 0.02
SO-8010, 8011	11/7/2002	K-40	6.91 ± 0.54	7.21 ± 0.54	7.06 ± 0.38
VE-7747, 7748	11/11/2002	Gr. Beta	3.59 ± 0.05	3.25 ± 0.05	3.42 ± 0.03
VE-7747, 7748	11/11/2002	K-40	3.17 ± 0.36	3.26 ± 0.46	3.22 ± 0.29
MI-7789, 7790	11/13/2002	K-40	1319.30 ± 167.60	1301.20 ± 140.70	1310.25 ± 109.41
DW-8082, 8083	11/29/2002	I-131	0.83 ± 0.24	0.98 ± 0.22	0.90 ± 0.16
SW-8054, 8055	12/2/2002	Gr. Beta	2.60 ± 0.46	2.21 ± 0.39	2.41 ± 0.30
SW-8054, 8055	12/2/2002	K-40	1.44 ± 0.14	1.43 ± 0.14	1.44 ± 0.10
MI-8105, 8106	12/4/2002	K-40	1300.60 ± 111.30	1315.40 ± 108.90	1308.00 ± 77.86
TD-8298, 8299	12/5/2002	H-3	355.00 ± 94.00	469.00 ± 99.00	412.00 ± 68.26
MI-8396, 8397	12/17/2002	K-40	1409.20 ± 117.30	1449.60 ± 108.60	1429.40 ± 79.93
SWT-8654, 8655	12/30/2002	Gr. Beta	1.63 ± 0.50	1.40 ± 0.47	1.51 ± 0.34
AP-8783, 8784	12/31/2002	Be-7	0.044 ± 0.009	0.042 ± 0.008	0.043 ± 0.006

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)[a].

			Concentration[b]			
Lab Code	Type	Date	Analysis	Laboratory result	Known Activity	Control Limits[c]
STW-939	water	12/01/01	Am-241	1.25 ± 0.0	1.19 ± 0.0	0.83 - 1.6
STW-939	water	12/01/01	Co-57	138.9 ± 0.5	143 ± 14.3	100.1 - 185.9
STW-939	water	12/01/01	Co-60	139.1 ± 0.5	141 ± 14.1	98.7 - 183.3
STW-939	water	12/01/01	Cs-134	25.16 ± 0.2	28.5 ± 0.3	19.95 - 37.1
STW-939	water	12/01/01	Cs-137	279.96 ± 0.9	286 ± 28.6	200.2 - 371.8
STW-939[d]	water	12/01/01	Fe-55	19.68 ± 23.2	9.2 ± 0.9	6.44 - 12.0
STW-939	water	12/01/01	Mn-54	253.64 ± 0.9	246 ± 0.2	172.2 - 319.8
STW-939	water	12/01/01	Ni-63	65.88 ± 1.9	88.3 ± 8.8	61.81 - 114.8
STW-939[e]	water	12/01/01	Pu-238	0.060 ± 0.01	0.0 ± 0.0	-
STW-939	water	12/01/01	Pu-239/40	2.79 ± 0.0	2.99 ± 0.3	2.09 - 3.9
STW-939	water	12/01/01	Sr-90	4.88 ± 0.3	4.8 ± 0.5	3.36 - 6.2
STW-939	water	12/01/01	U-233/4	0.89 ± 0.0	0.98 ± 0.1	0.69 - 1.3
STW-939	water	12/01/01	U-238	6.75 ± 0.0	7.8 ± 0.8	5.46 - 10.1
STW-939	water	12/01/01	Zn-65	70.6 ± 1.1	67.3 ± 6.7	47.11 - 87.5
STSO-955	soil	10/16/02	Am-241	40.54 ± 2.7	43.5 ± 4.4	30.45 - 56.6
STSO-955	soil	10/16/02	Co-57	210.58 ± 2.0	246 ± 24.6	172.2 - 319.8
STSO-955	soil	10/16/02	Co-60	84.38 ± 0.9	87.5 ± 8.8	61.25 - 113.8
STSO-955	soil	10/16/02	Cs-134	692.6 ± 2.1	862 ± 86.0	603.4 - 1120.6
STSO-955	soil	10/16/02	Cs-137	96.98 ± 1.7	111 ± 11.1	77.7 - 144.3
STSO-955	soil	10/16/02	Fe-55	1714.6 ± 299.6	1870 ± 187.0	1309 - 2431.0
STSO-955	soil	10/16/02	Mn-54	509.74 ± 3.4	546 ± 54.6	382.2 - 709.8
STSO-955	soil	10/16/02	Ni-63	890.6 ± 22.4	1180 ± 118.0	826 - 1534.0
STSO-955	soil	10/16/02	Pu-238	34.04 ± 6.0	33.3 ± 3.3	23.31 - 43.3
STSO-955	soil	10/16/02	Pu-239/40	68.7 ± 3.7	72.9 ± 7.3	51.03 - 94.8
STSO-955[e]	soil	10/16/02	Sr-90	1.5 ± 3.0	0.0 ± 0.0	-
STSO-955	soil	10/16/02	U-233/4	166.33 ± 3.8	229 ± 22.9	160.3 - 297.7
STSO-955	soil	10/16/02	U-238	169.76 ± 3.8	220 ± 22.0	154 - 286.0
STSO-955	soil	10/16/02	Zn-65	783.59 ± 6.4	809 ± 80.9	566.3 - 1051.7

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

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

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

[d] Known activity below the laboratory LLD. The sample was recounted for 2000 minutes; result : 11.52 ± 5.55 Bq /L

[e] Included in the testing series as a "false positive". No activity expected.

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

Lab Code	Type	Date	Analysis	Concentration[a] Laboratory results	EML Result[b]	Control Limits[c]
STW-945	Water	03/01/02	Am-241	1.68 ± 0.14	1.47	0.79 - 1.41
STW-945	Water	03/01/02	Co-60	349.20 ± 2.60	347.33	0.80 - 1.20
STW-945	Water	03/01/02	Cs-134	3.40 ± 0.60	3.36	0.80 - 1.30
STW-945	Water	03/01/02	Cs-137	57.20 ± 1.70	56.07	0.80 - 1.22
STW-945	Water	03/01/02	Pu-238	0.45 ± 0.11	0.49	0.74 - 1.20
STW-945	Water	03/01/02	Pu-239/40	4.47 ± 0.28	4.22	0.79 - 1.20
STW-945	Water	03/01/02	Sr-90	7.40 ± 1.30	7.58	0.69 - 1.34
STW-945	Water	03/01/02	Uranium	3.27 ± 0.43	2.84	0.75 - 1.33
STW-946	Water	03/01/02	Gr. Alpha	265.40 ± 7.70	375.00	0.58 - 1.29
STW-946	Water	03/01/02	Gr. Beta	930.60 ± 12.00	1030.00	0.61 - 1.43
STW-946	Water	03/01/02	H-3	226.30 ± 32.70	283.70	0.78 - 2.45
STSO-947	Soil	03/01/02	Ac-228	55.00 ± 5.50	51.17	0.80 - 1.38
STSO-947	Soil	03/01/02	Am-241	8.30 ± 3.30	10.93	0.65 - 2.28
STSO-947	Soil	03/01/02	Bi-212	49.20 ± 12.40	53.43	0.50 - 1.34
STSO-947	Soil	03/01/02	Bi-214	46.60 ± 3.10	53.93	0.78 - 1.42
STSO-947	Soil	03/01/02	Cs-137	1401.60 ± 9.10	1326.67	0.80 - 1.25
STSO-947	Soil	03/01/02	K-40	613.10 ± 28.10	621.67	0.80 - 1.32
STSO-947	Soil	03/01/02	Pb-212	51.60 ± 2.60	51.10	0.78 - 1.32
STSO-947	Soil	03/01/02	Pb-214	52.00 ± 3.60	54.37	0.76 - 1.46
STSO-947	Soil	03/01/02	Pu-239/40	14.70 ± 3.50	19.10	0.71 - 1.30
STSO-947	Soil	03/01/02	Sr-90	52.10 ± 6.30	53.76	0.67 - 2.90
STSO-947	Soil	03/01/02	Th-234	122.40 ± 6.30	89.30	0.63 - 2.35
STSO-947	Soil	03/01/02	Uranium	143.40 ± 9.40	194.77	0.71 - 1.32
STVE-948	Vegetation	03/01/02	Am-241	3.10 ± 2.20	2.23	0.73 - 2.02
STVE-948	Vegetation	03/01/02	Cm-244	0.90 ± 0.80	1.32	0.61 - 1.59
STVE-948	Vegetation	03/01/02	Co-60	13.50 ± 2.10	11.23	0.80 - 1.44
STVE-948	Vegetation	03/01/02	Cs-137	350.40 ± 6.30	313.67	0.80 - 1.31
STVE-948	Vegetation	03/01/02	K-40	940.80 ± 45.60	864.33	0.79 - 1.39
STVE-948[d]	Vegetation	03/01/02	Pu-239/40	16.90 ± 0.70	3.54	0.69 - 1.31
STVE-948	Vegetation	03/01/02	Sr-90	543.40 ± 24.90	586.28	0.55 - 1.21
STAP-949	Air Filter	03/01/02	Am-241	0.09 ± 0.05	0.09	0.70 - 2.34
STAP-949	Air Filter	03/01/02	Co-60	30.10 ± 0.30	30.52	0.80 - 1.26
STAP-949	Air Filter	03/01/02	Cs-137	29.90 ± 0.30	28.23	0.80 - 1.32
STAP-949	Air Filter	03/01/02	Mn-54	40.40 ± 0.40	38.53	0.80 - 1.35
STAP-949	Air Filter	03/01/02	Pu-238	0.05 ± 0.02	0.06	0.67 - 1.33
STAP-949	Air Filter	03/01/02	Pu-239/40	0.15 ± 0.02	0.19	0.73 - 1.26
STAP-949	Air Filter	03/01/02	Sr-90	3.40 ± 0.40	4.83	0.53 - 1.84
STAP-949	Air Filter	03/01/02	Uranium	0.80 ± 0.20	0.61	0.79 - 2.10
STAP-950	Air Filter	03/01/02	Gr. Alpha	0.43 ± 0.04	0.53	0.73 - 1.43
STAP-950	Air Filter	03/01/02	Gr. Beta	1.34 ± 0.05	1.30	0.76 - 1.36
STW-959	Water	09/01/02	Am-241	3.00 ± 0.10	3.04	0.79 - 1.41
STW-959	Water	09/01/02	Co-60	258.40 ± 2.30	268.67	0.80 - 1.20
STW-959	Water	09/01/02	Cs-134	50.80 ± 3.30	60.20	0.80 - 1.30
STW-959	Water	09/01/02	Cs-137	80.10 ± 0.30	81.43	0.80 - 1.22
STW-959	Water	09/01/02	Cs-137	80.10 ± 0.30	81.43	0.80 - 1.22
STW-959	Water	09/01/02	Am-241	3.00 ± 0.10	3.04	0.79 - 1.41

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

Lab Code	Type	Date	Analysis	Concentration[b] Laboratory results	EML Result[c]	Control Limits[d]
STW-959	Water	09/01/02	Am-241	3.00 ± 0.10	3.04	0.79 - 1.41
STW-959	Water	09/01/02	Co-60	258.40 ± 2.30	268.67	0.80 - 1.20
STW-959	Water	09/01/02	Cs-134	50.80 ± 3.30	60.20	0.80 - 1.30
STW-959	Water	09/01/02	Cs-137	80.10 ± 0.30	81.43	0.80 - 1.22
STW-959	Water	09/01/02	H-3	271.90 ± 20.90	227.30	0.78 - 2.45
STW-959	Water	09/01/02	Pu-238	4.40 ± 0.20	4.33	0.74 - 1.20
STW-959	Water	09/01/02	Pu-239/40	2.10 ± 0.10	2.07	0.79 - 1.20
STW-959	Water	09/01/02	Sr-90	9.70 ± 0.20	8.69	0.69 - 1.34
STW-959	Water	09/01/02	Uranium	5.60 ± 0.10	6.84	0.75 - 1.33
STW-960	Water	09/01/02	Gr. Alpha	204.90 ± 3.20	210.00	0.58 - 1.29
STW-960	Water	09/01/02	Gr. Beta	852.00 ± 26.50	900.00	0.61 - 1.43
STSO-961	Soil	09/01/02	Ac-228	47.60 ± 1.90	42.30	0.80 - 1.38
STSO-961	Soil	09/01/02	Am-241	7.80 ± 1.40	6.77	0.65 - 2.28
STSO-961	Soil	09/01/02	Bi-212	45.60 ± 1.70	45.93	0.50 - 1.34
STSO-961[e]	Soil	09/01/02	Bi-214	48.80 ± 4.90	33.63	0.78 - 1.42
STSO-961	Soil	09/01/02	Cs-137	819.60 ± 16.60	829.33	0.80 - 1.25
STSO-961	Soil	09/01/02	K-40	705.30 ± 31.40	637.67	0.80 - 1.32
STSO-961	Soil	09/01/02	Pb-212	48.60 ± 3.40	43.43	0.78 - 1.32
STSO-961	Soil	09/01/02	Pb-214	51.10 ± 5.10	35.20	0.76 - 1.46
STSO-961[f]	Soil	09/01/02	Pu-239/40	20.20 ± 0.80	12.90	0.71 - 1.30
STSO-961	Soil	09/01/02	Sr-90	38.50 ± 0.10	41.16	0.67 - 2.90
STSO-961[g]	Soil	09/01/02	Uranium	58.90 ± 0.70	87.21	0.71 - 1.32
STVE-962	Vegetation	09/01/02	Am-241	2.10 ± 0.30	2.25	0.73 - 2.02
STVE-962	Vegetation	09/01/02	Cm-244	1.00 ± 0.30	1.25	0.61 - 1.59
STVE-962	Vegetation	09/01/02	Co-60	11.80 ± 1.50	9.66	0.80 - 1.44
STVE-962	Vegetation	09/01/02	Cs-137	340.30 ± 16.80	300.67	0.80 - 1.31
STVE-962	Vegetation	09/01/02	K-40	1646.00 ± 74.40	1480.00	0.79 - 1.39
STVE-962	Vegetation	09/01/02	Pu-239/40	3.00 ± 0.30	3.43	0.69 - 1.31
STVE-962	Vegetation	09/01/02	Sr-90	345.60 ± 97.80	476.26	0.55 - 1.21
STAP-963[h]	Air Filter	09/01/02	Am-241	0.20 ± 0.01	0.19	0.70 - 2.34
STAP-963	Air Filter	09/01/02	Co-60	24.90 ± 0.60	23.00	0.80 - 1.26
STAP-963	Air Filter	09/01/02	Cs-137	38.00 ± 1.30	32.50	0.80 - 1.32
STAP-963	Air Filter	09/01/02	Mn-54	60.80 ± 1.90	52.20	0.80 - 1.35
STAP-963[h]	Air Filter	09/01/02	Pu-238	0.11 ± 0.02	0.12	0.67 - 1.33
STAP-963[h]	Air Filter	09/01/02	Pu-239/40	0.21 ± 0.01	0.21	0.73 - 1.26
STAP-963	Air Filter	09/01/02	Sr-90	5.20 ± 0.20	5.56	0.53 - 1.84
STAP-963[h]	Air Filter	09/01/02	Uranium	0.41 ± 0.04	0.47	0.79 - 2.10
STAP-964	Air Filter	09/01/02	Gr. Alpha	0.40 ± 0.10	0.29	0.73 - 1.43
STAP-964	Air Filter	09/01/02	Gr. Beta	0.80 ± 0.10	0.87	0.76 - 1.36

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

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

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

[d] An error was found in the conversion from pCi/g to Bq/kg. Corrected result : 2.84 ± 0.59 Bq/kg.

[e] Naturally-occurring radium daughters are present in the shield background, and a probable cause of the higher bias seen for isotopes of lead and bismuth.

[f] Reporting error.The average result of the triplicate analyses was 14.1± 5.7 Bq/kg.

[g] The analysis was repeated in duplicate; result of reanalysis, 87.05 ± 7.64 Bq/kg.

[h] STAP-963, Calculations for the transuranics analyses (Am-241, Uranium, Pu-238, -239/40) were not converted to Bq/total filter. The data listed is the result of recalculation.

APPENDIX B

DATA REPORTING CONVENTIONS

Data Reporting Conventions

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

2.0. Single Measurements

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

where: x = value of the measurement;

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

In cases where the activity is less than the lower limit of detection L, it is reported as: <L,

where L = the lower limit of detection based on 4.66s uncertainty for a background sample.

3.0. Duplicate analyses

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

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

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

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

4.0. Computation of Averages and Standard Deviations

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

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

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

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

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

4.5 In rounding off, the following rules are followed:

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

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

APPENDIX C

Maximum Permissible Concentrations

of Radioactivity in Air and Water

Above Background in Unrestricted Areas

Table C-1. Maximum permissible concentrations of radioactivity in air and water above natural background in unrestricted areas[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.

KEWAUNEE NUCLEAR POWER PLANT

ANNUAL REPORT PART II
DATA TABULATIONS
GRAPHS AND ANALYSES

Beach access to Lake Michigan

Environmental, Inc.
Midwest Laboratory
an Allegheny Technologies Co.

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REPORT TO

NUCLEAR MANAGEMENT CO, LLC

RADIOLOGICAL MONITORING PROGRAM FOR THE KEWAUNEE NUCLEAR POWER PLANT KEWAUNEE, WISCONSIN

ANNUAL REPORT - PART II
DATA TABULATIONS AND ANALYSES

January 1 to December 31, 2002

Prepared and submitted by

ENVIRONMENTAL, Inc.
Midwest Laboratory
Project No. 8002

Approved :

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Stanley F. Baker
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PREFACE

The staff members of Environmental, Inc., Midwest Laboratory were responsible for the acquisition of data presented in this report. Samples were collected by the personnel of Environmental, Inc., Midwest Laboratory and the Kewaunee Nuclear Power Plant.

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1.0 INTRODUCTION

The following constitutes Part II of the final report for the 2002 Radiological Monitoring Program conducted at the Kewaunee Nuclear Power Plant (KNPP), Kewaunee, Wisconsin.

Included are tabulations of data for all samples collected in 2002, graphs of data trends and descriptions of radiochemical procedures. A summary and interpretation of the data presented here are published in Part I of the 2002 Annual Report on the Radiological Monitoring Program for the Kewaunee Nuclear Power Plant.

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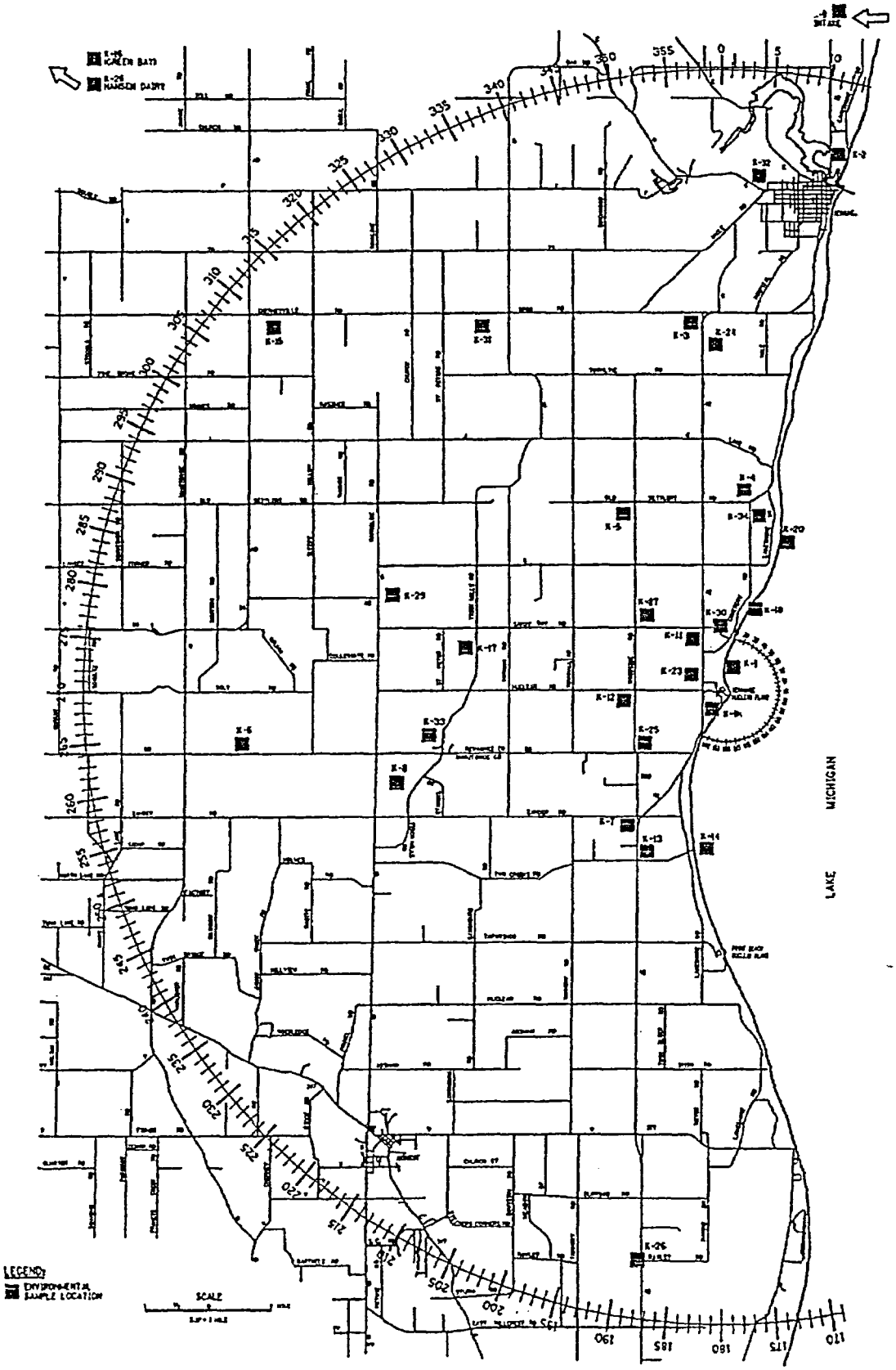

Figure 1. Sampling locations, Kewaunee Nuclear Power Plant

Table 1. Sampling locations, Kewaunee Nuclear Power Plant.

Code	Type[a]	Distance (miles)[b] and Sector	Location
K-1			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-2	C	9.5 NNE	WPS Operations Building in Kewaunee
K-3	C	6.0 N	Lyle and John Siegmund Farm, N2815 Hy 12, Kewaunee
K-5	I	3.5 NNW	Ed Paplham Farm, E4160 Old Settlers Rd, Kewaunee
K-7	I	2.75 SSW	Ron Zimmerman Farm, 17620 Nero Road, Two Rivers
K-8	C	5.0 WSW	Saint Mary's Church, Tisch Mills
K-9	C	11.5 NNE	Rostok Water Intake for Green Bay, Wisconsin, two miles north of Kewaunee
K-10	I	1.5 NNE	Turner Farm, Kewaunee site
K-11	I	1.0 NW	Harlan Ihlenfeld Farm, N879 Hy 42, Kewaunee
K-13	C	3.0 SSW	Rand's General Store
K-14	I	2.5 S	Two Creeks Park, 2.5 miles south of site
K-15	C	9.25 NW	Gas Substation, 1.5 miles north of Stangelville
K-16	C	26 NW	WPS Division Office Building, Green Bay, Wisconsin
K-17	I	4.25 W	Jansky's Farm, N885 Tk B, Kewaunee
K-20	I	2.5 N	Carl Struck Farm, Lakeshore Dr, Kewaunee
K-23	I	0.5 W	0.5 miles west of plant, Kewaunee site
K-24	I	5.45 N	Fectum Farm, N2653 Hy 42, Kewaunee
K-25	I	2.0 WSW	Wotachek Farm, 4819 E. Cty Tk BB, Denmark
K-26	C	10.7 SSW	Bertler's Fruit Stand (8.0 miles south of "BB")
K-27	I	1.5 NW	Schlies Farm, E4298 Sandy Bay Rd, Kewaunee
K-28	C	26 NW	Hansen Dairy, Green Bay, Wisconsin
K-29	I	5.75 W	Kunesh Farm, Route 1, Kewaunee
K-30	I	1.00N	End of site boundary
K-31	C	6.25NNW	E. Krok Substation
K-32	C	11.50 N	Piggly Wiggly, 931 Marquette Dr., Kewaunee
K-34	I	2.5 N	Leon and Vicki Struck, N1549 Lakeshore Dr., Kewaunee
K-36	I	8.5 mi. NNE	Fiala's Fish Market, Kewaunee
K-37	I	4.0 mi. N	Gary and Ann Hardtke, E4282 Old Settlers Road, Kewaunee
K-38	I	3.8 mi. WNW	Dave Sinkula Farm, N890 Town Hall Road, Kewaunee

[a] I= indicator; C = control.

[b] Distances are measured from reactor stack.

[c] Location removed from program in September, 2001.

Table 2. Type and frequency of collection.

Location	Weekly	Biweekly	Monthly	Quarterly	Semiannually	Annually
K-1a			SW		SL	
K-1b			SW	GR[a]	SL	
K-1c					BS[b]	
K-1d			SW	FI	BS[b], SL	
K-1e			SW		SL	
K-1f	AP	AI		GR[a], TLD	SO	
K-1g				WW		
K-1h				WW		
K-1j					BS[b]	
K-1k			SW		SL	
K-2	AP	AI		TLD		
K-3			MI[c]	GR[a], TLD, CF[d]	SO	
K-5			MI[c]	GR[a], TLD, CF[d]	SO	
K-7	AP	AI		TLD		
K-8	AP	AI		TLD		
K-9			SW		BS[b], SL	
K-10				WW		
K-11			PR	WW		
K-13				WW		
K-14			SW		BS[b], SL	
K-15				TLD		
K-16	AP	AI		TLD		
K-17				TLD		VE
K-20						DM
K-23						GRN
K-24				EG		DM
K-25			MI[c]	GR[a], TLD, CF[d], WW	SO	
K-26						VE
K-27				TLD, EG		DM
K-28			MI[c]			
K-29						DM
K-30				TLD		
K-31	AP	AI		TLD		
K-32				EG		
K-34			MI[c]	GR[a], CF[d]	SO	
K-36				FI		
K-37			MI[c]	GR[a], TLD, CF[d]	SO	
K-38			MI[c]	GR[a], CF[d]	SO	

[a] Three times a year, second, third and fourth quarters.
[b] To be collected in May and November.
[c] Monthly from November through April; semimonthly May through October.
[d] First quarter (January, February, March) only.

Table 3. Sample Codes:

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

Note: Page 6 is intentionally left out.

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.

Kewaunee

Air Particulates - Gross Beta

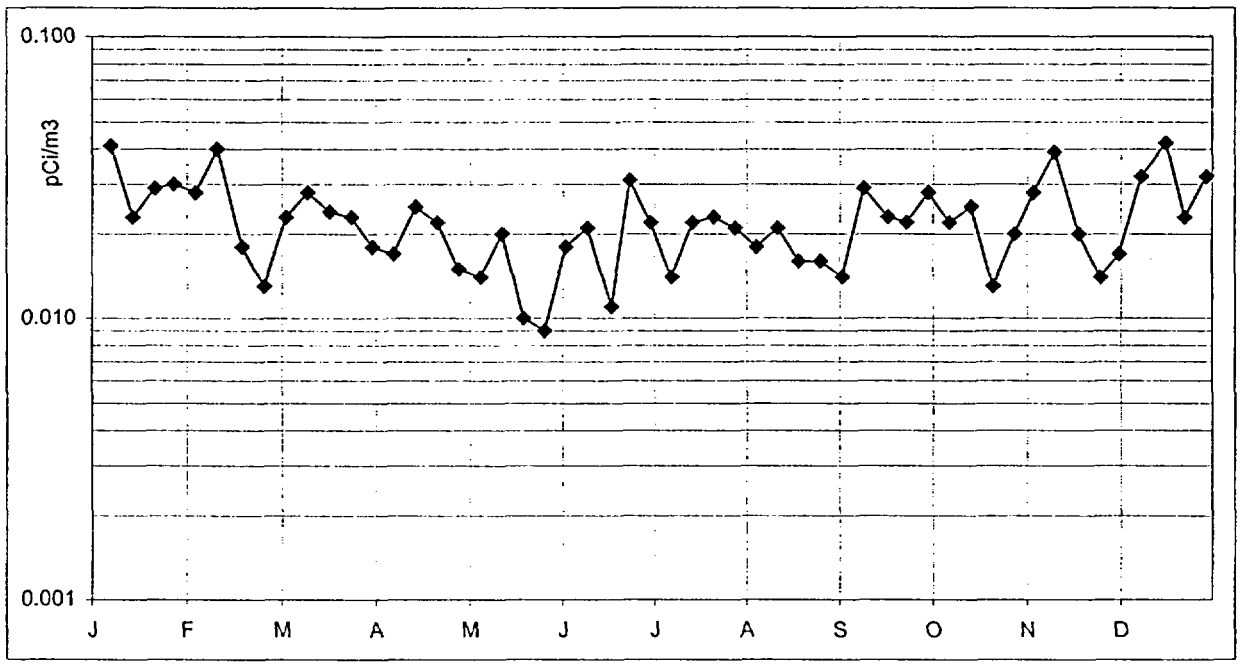

Figure 2. Location K-1f (weekly samples, 2002).

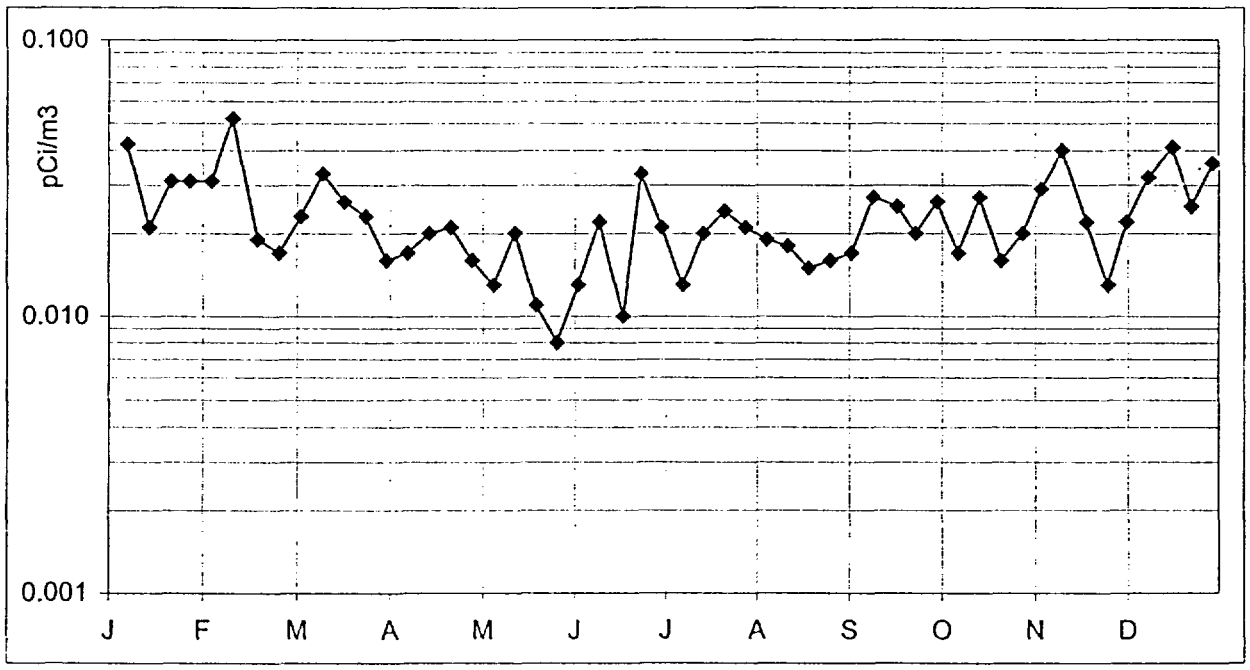

Figure 3. Location K-2 (weekly samples, 2002).

Kewaunee

Air Particulates - Gross Beta

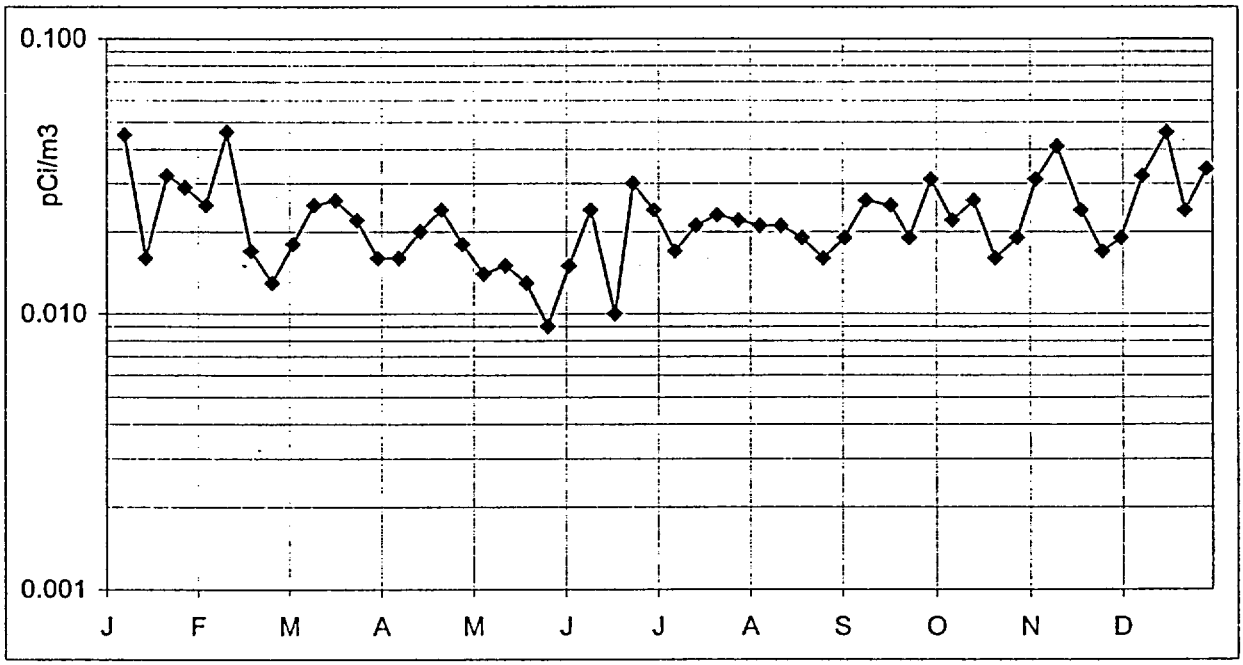

Figure 4. Location K-7 (weekly samples, 2002).

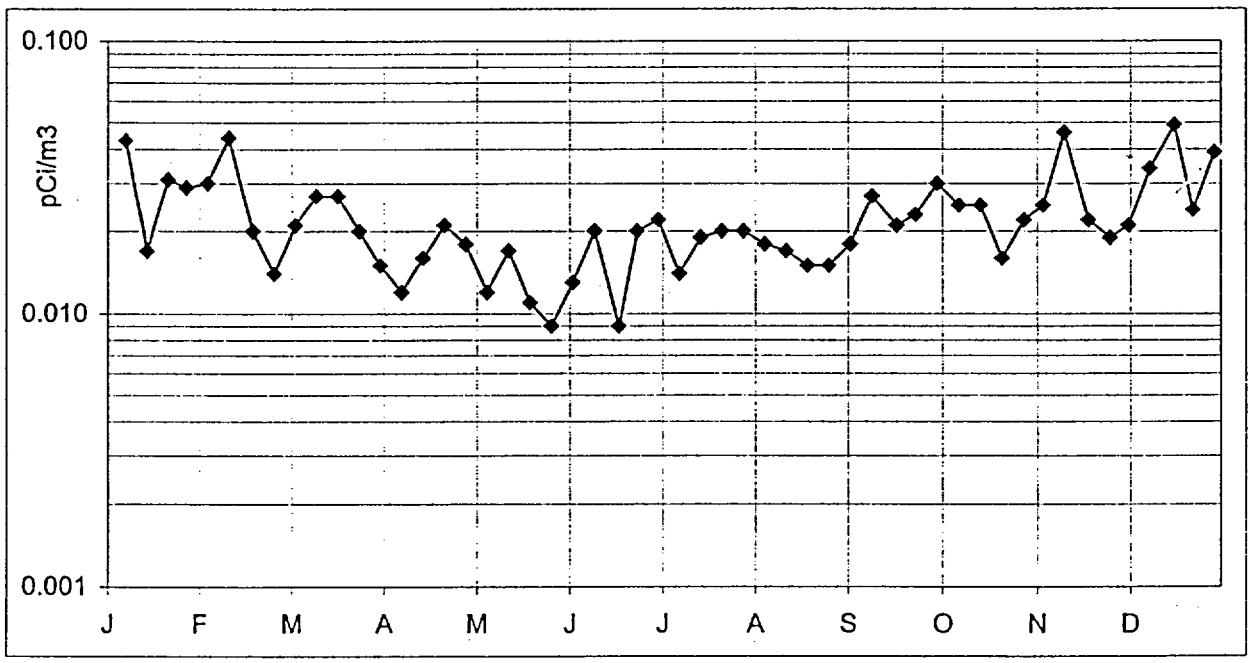

Figure 5. Location K-8 (weekly samples, 2002).

Kewaunee

Air Particulates - Gross Beta

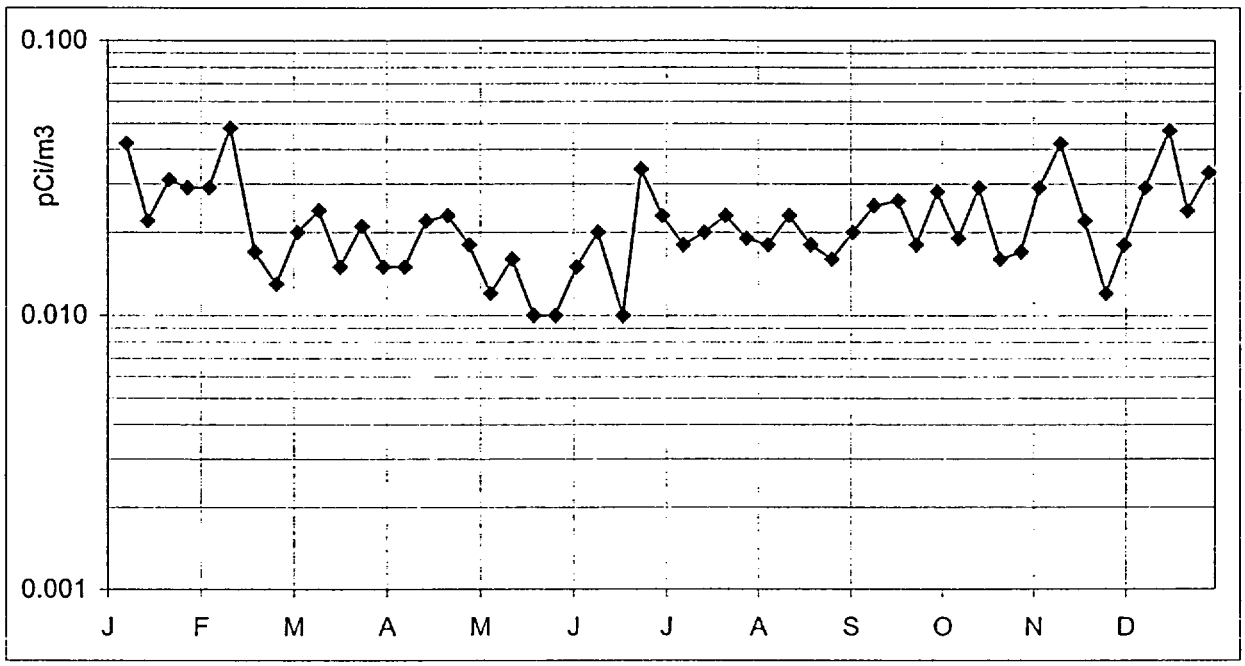

Figure 6. Location K-31 (weekly samples, 2002).

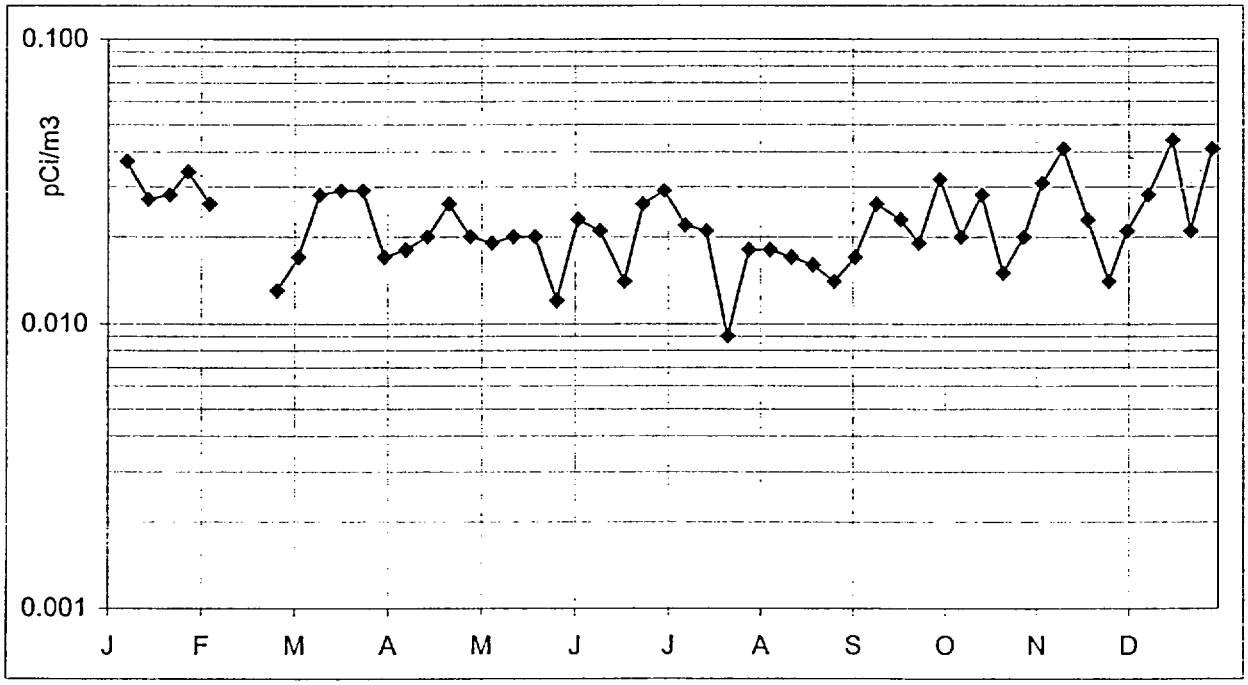

Figure 7. Location K-16 (weekly samples, 2002).

Kewaunee

Air Particulates - Gross Beta

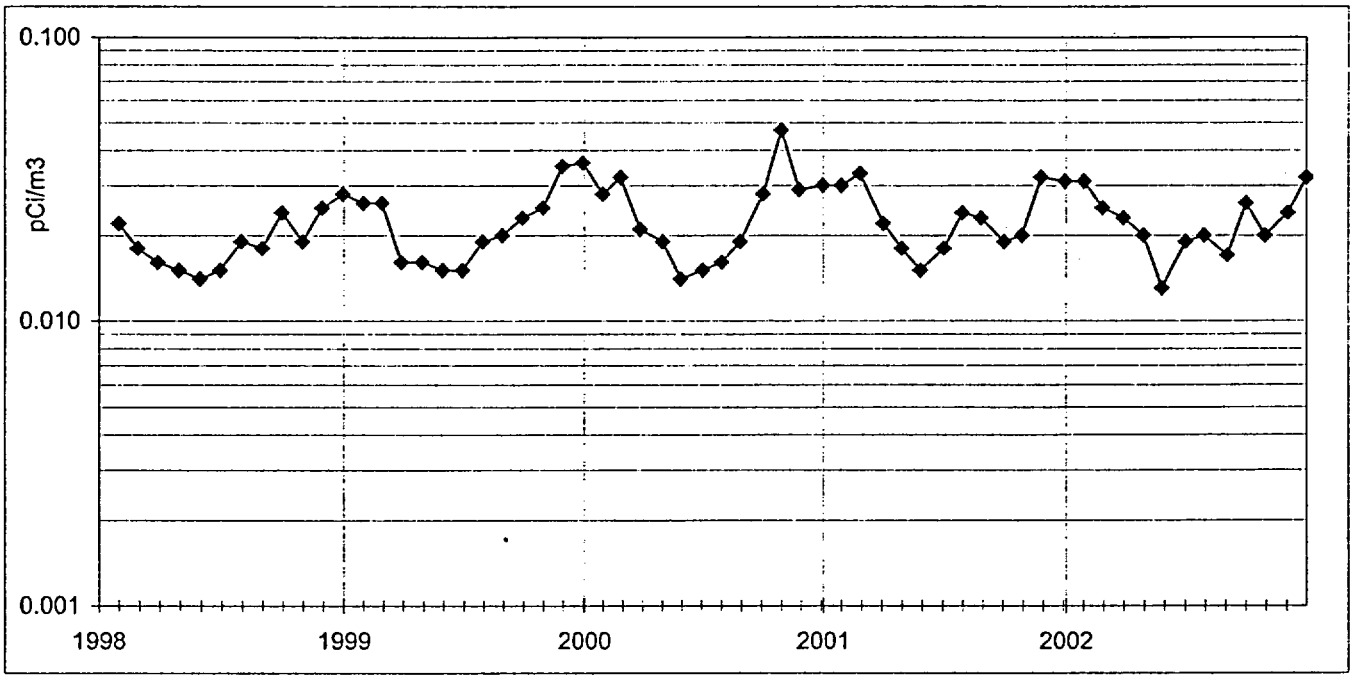

Figure 8. Location K-1f (monthly averages, 1998-2002).

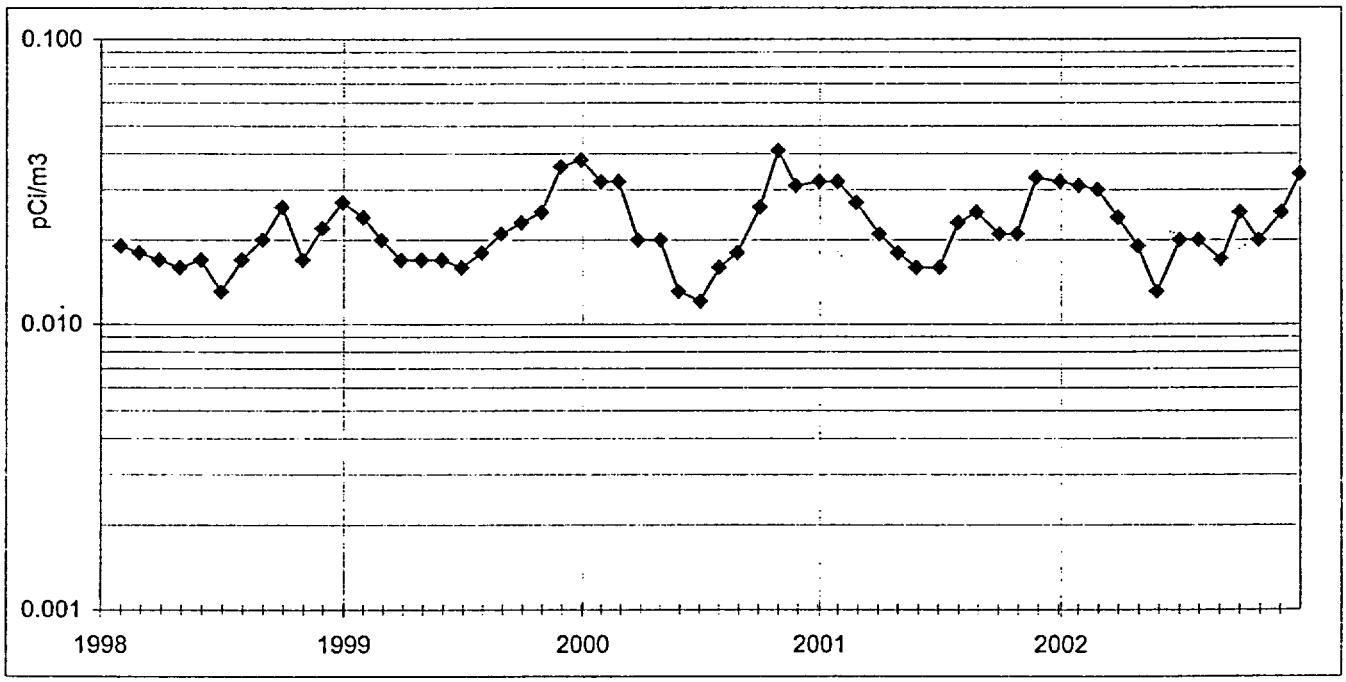

Figure 9. Location K-2 (monthly averages, 1998-2002).

Kewaunee

Air Particulates - Gross Beta

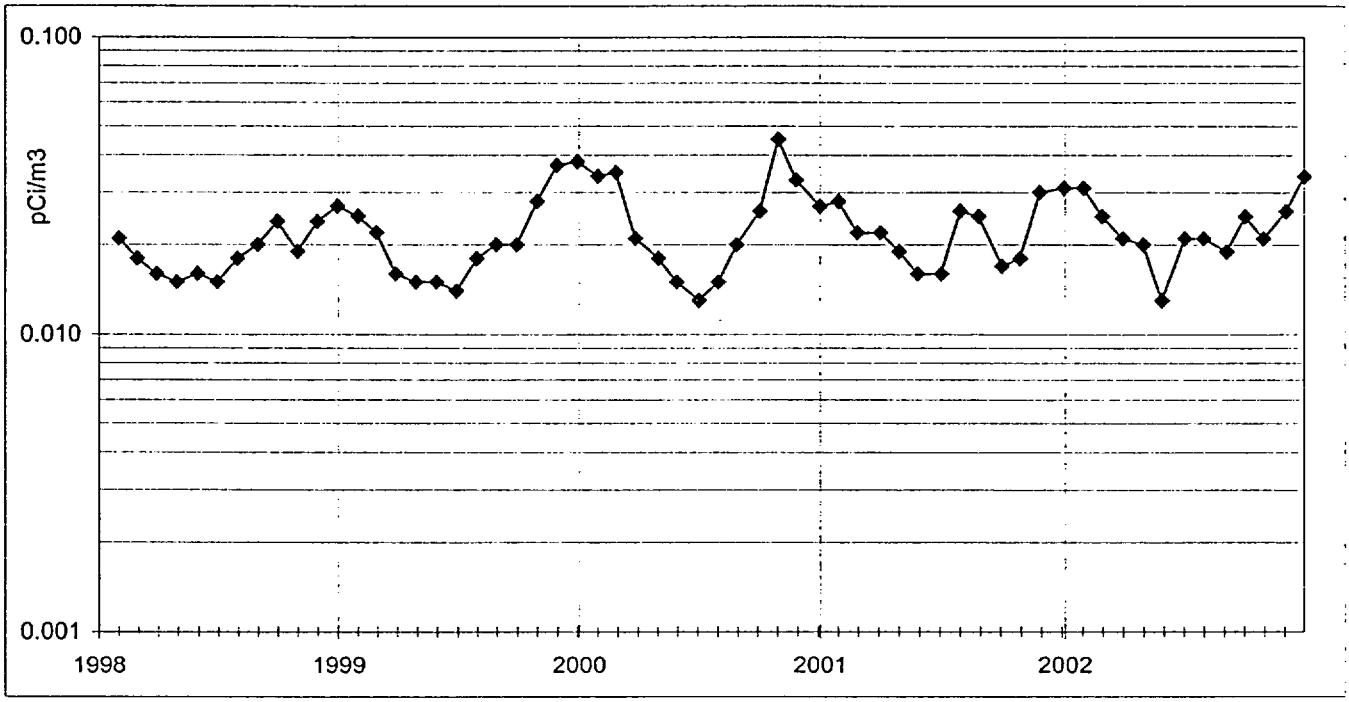

Figure 10. Location K-7 (monthly averages, 1998-2002).

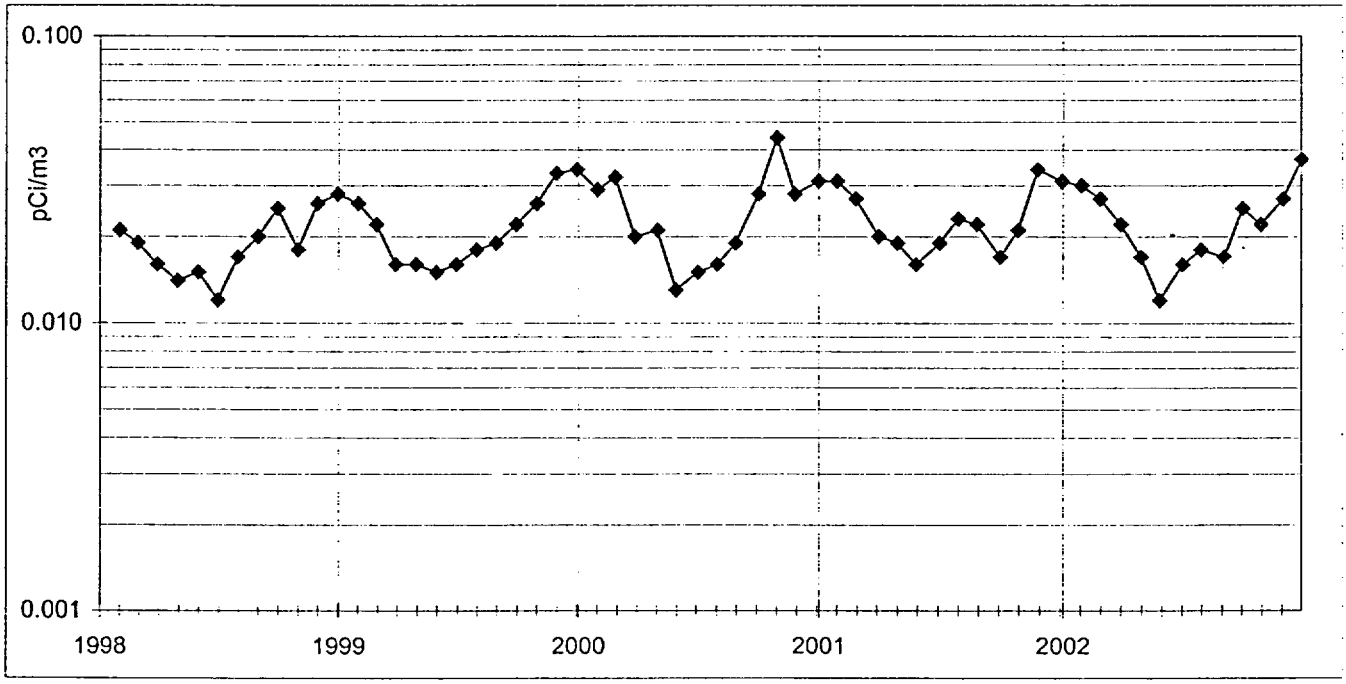

Figure 11. Location K-8 (monthly averages, 1998-2002).

Kewaunee

Air Particulates - Gross Beta

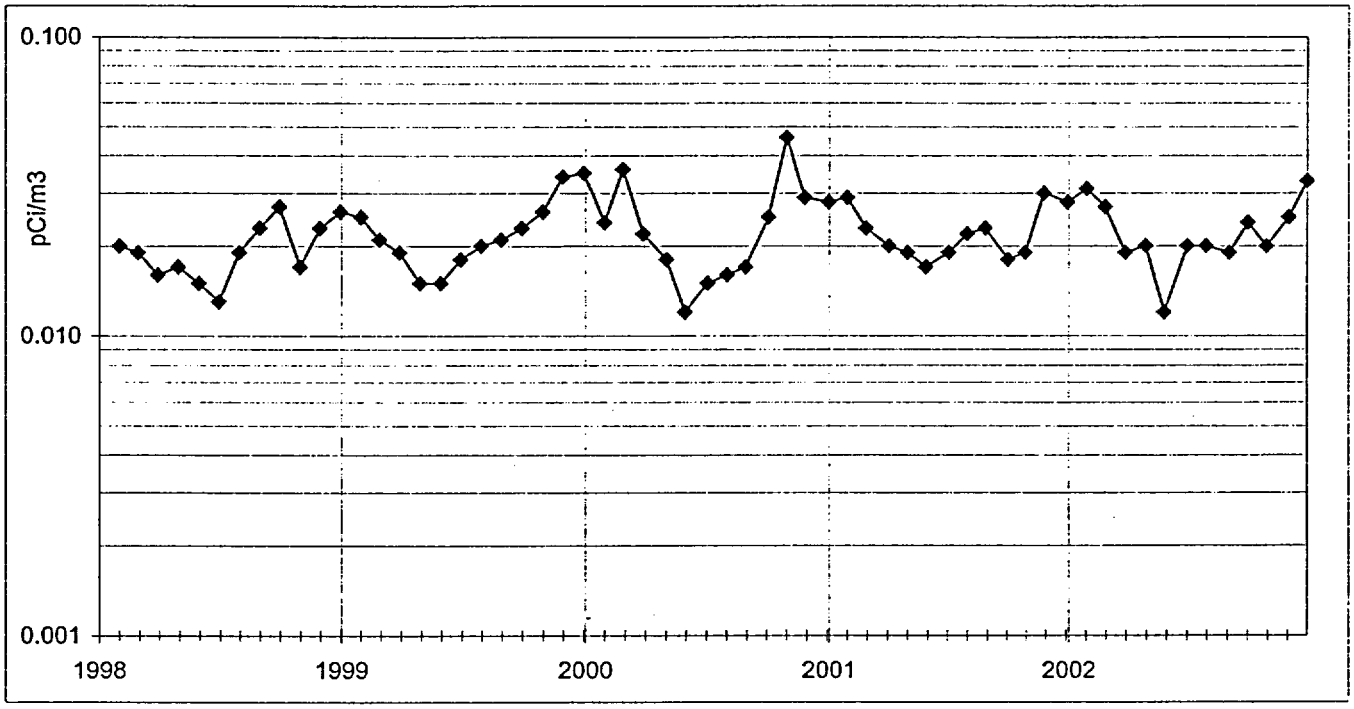

Figure 12. Location K-31 (monthly averages, 1998-2002).
(Results prior to Sep. 98 represent collections from K-15).

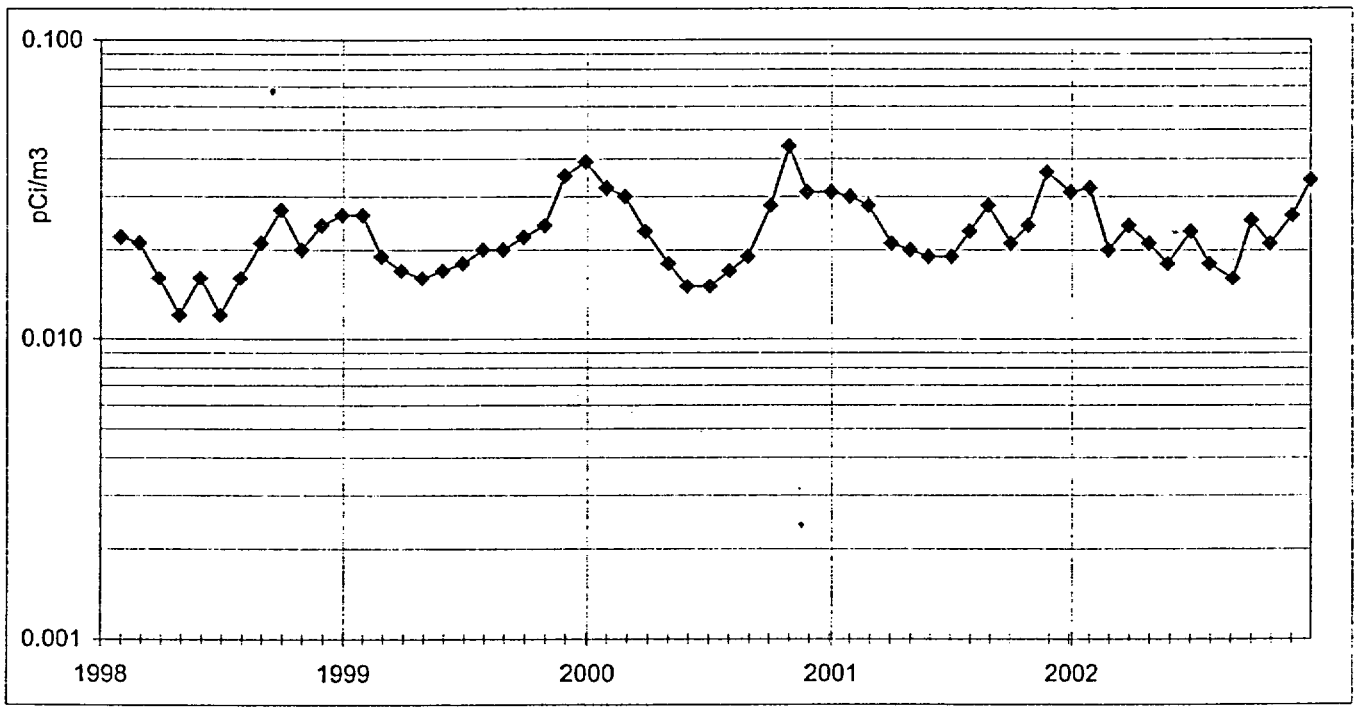

Figure 13. Location K-16 (monthly averages, 1998-2002).

Kewaunee

WELL WATER-GROSS ALPHA

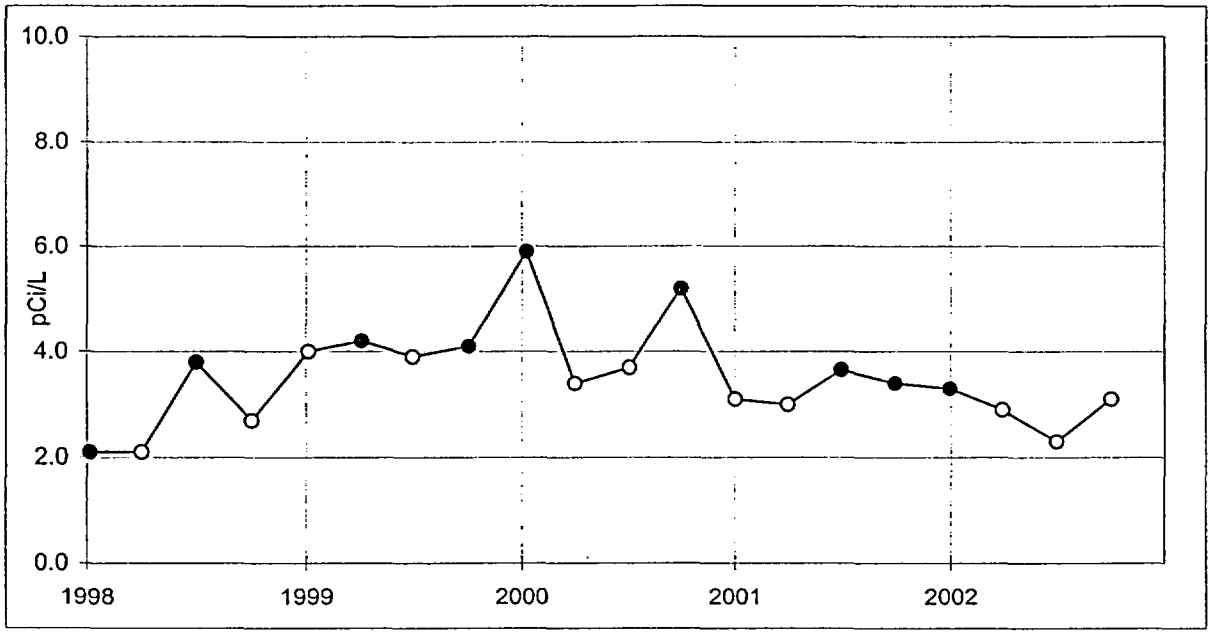

Figure 14. Location K-1g. Total Residue. Quarterly collection.

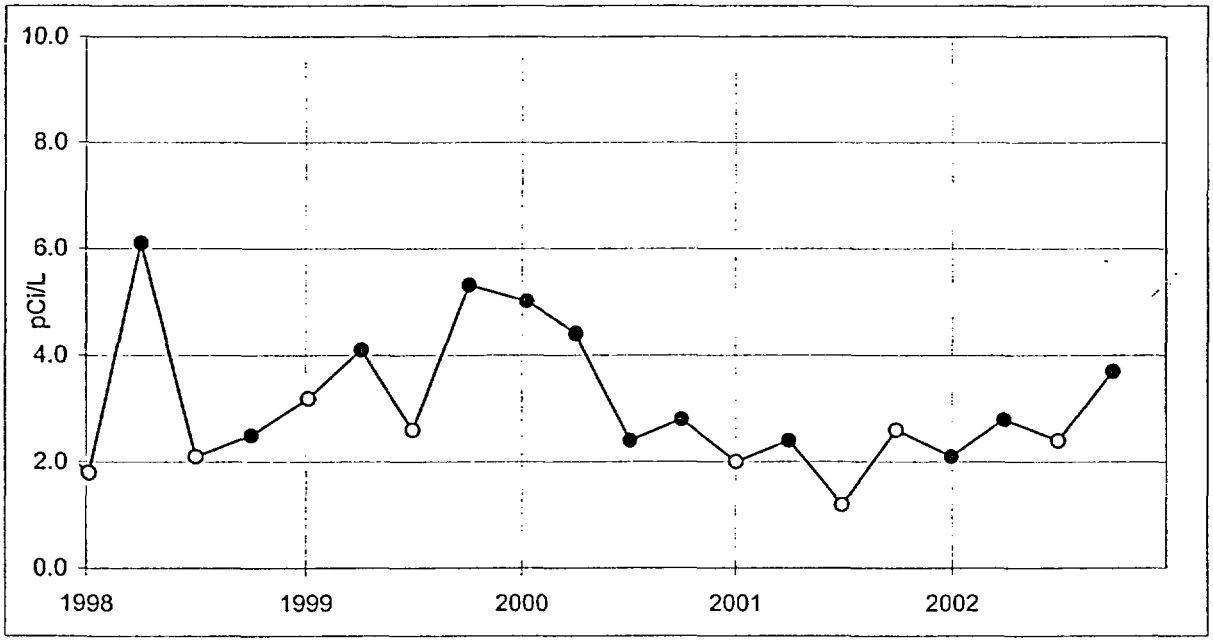

Figure 15. Location K-1h. Total Residue. Quarterly collection.

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

Kewaunee

WELL WATER-GROSS BETA

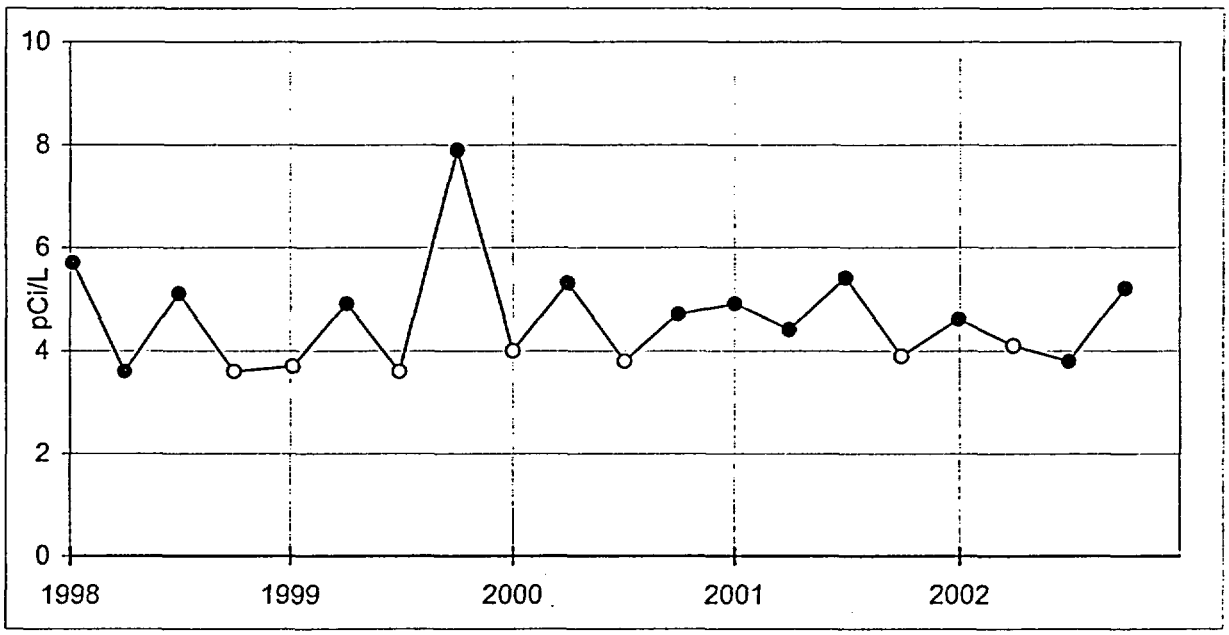

Figure 16. Location K-1g. Total Residue. Quarterly collection.

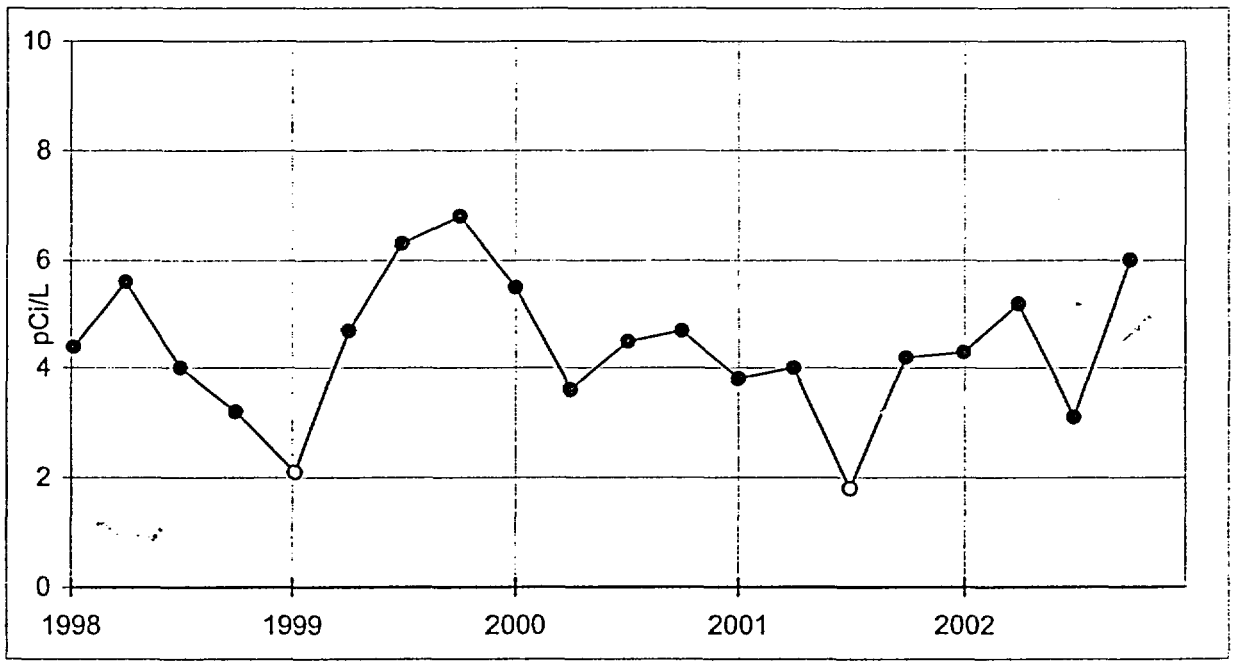

Figure 17. Location K-1h. Total Residue. Quarterly collection.

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

Kewaunee

WELL WATER-GROSS BETA

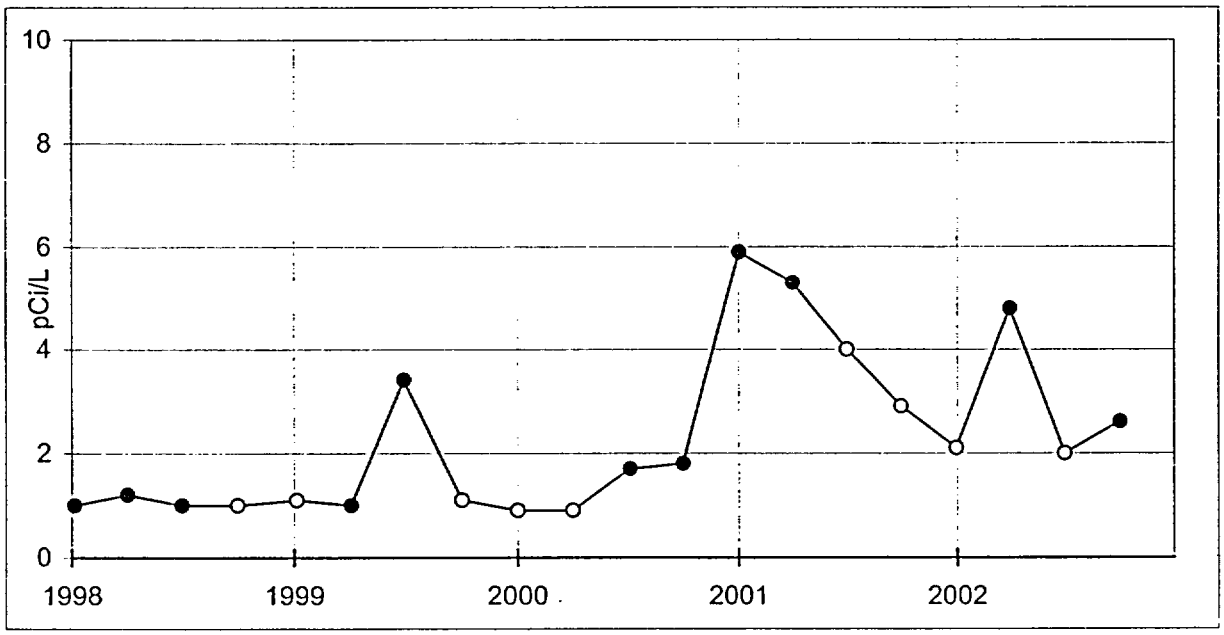

Figure 18. Location K-10. Total Residue. Quarterly collection.

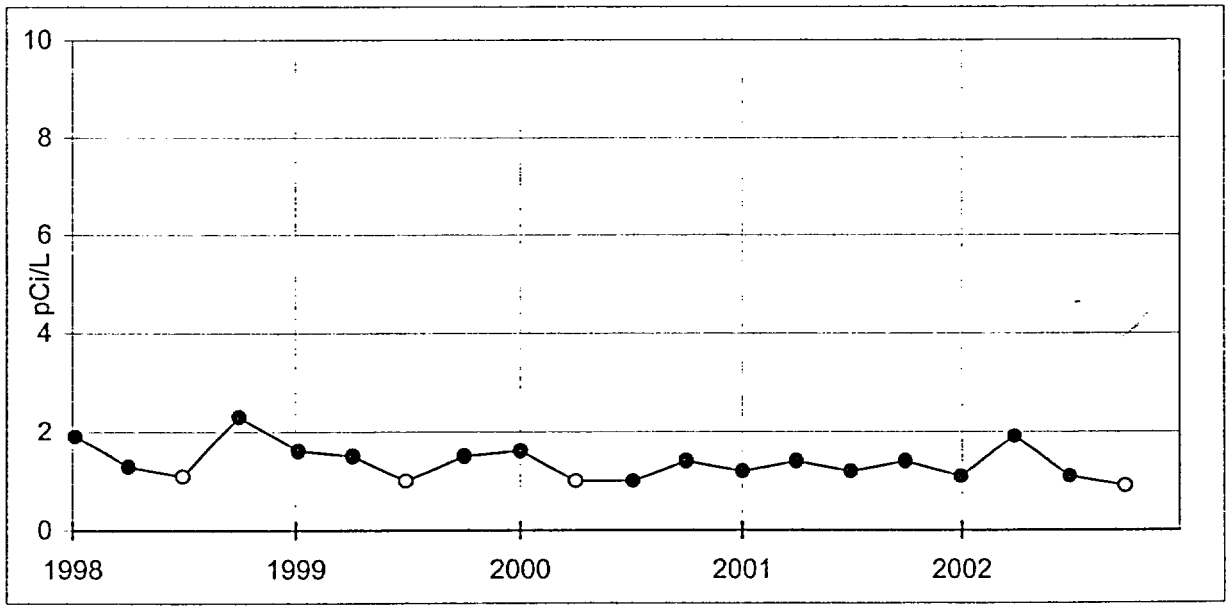

Figure 19. Location K-11. Total Residue. Quarterly collection.

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

Kewaunee

WELL WATER-GROSS BETA

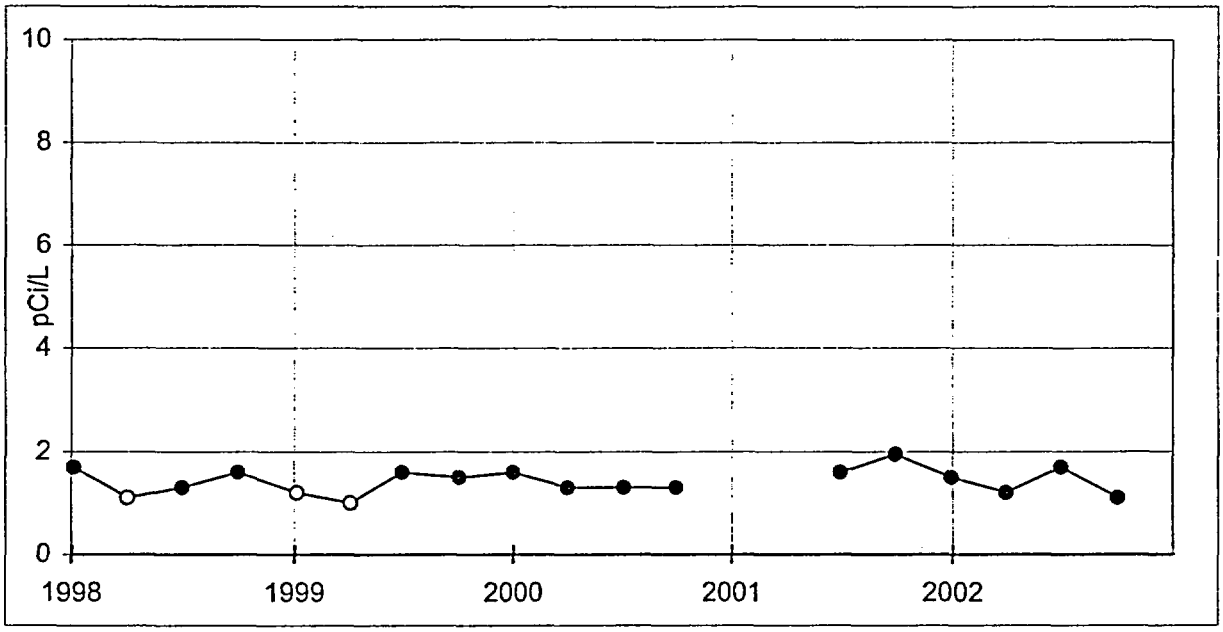

Figure 20. Location K-12. Total Residue. Quarterly collection.
Location discontinued in August of 2000; replaced by K-25 in June, 2001.

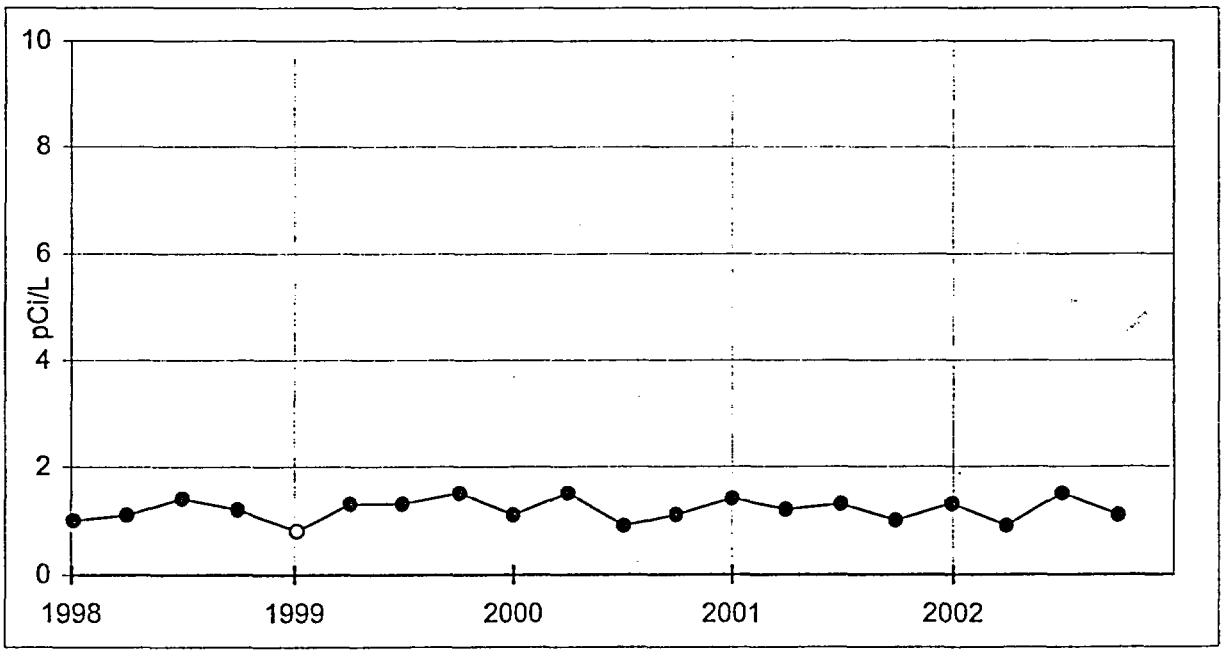

Figure 21. Location K-13. Total Residue. Quarterly collection.

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

Kewaunee
Milk - Strontium-90

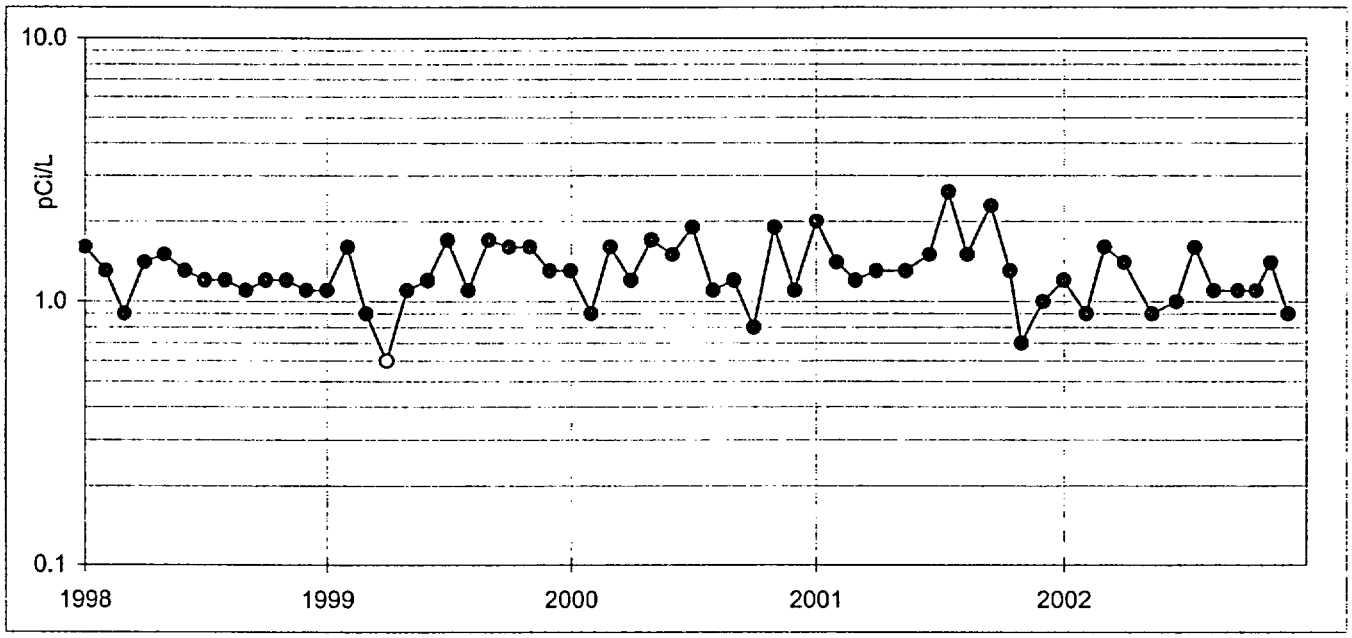

Figure 22. Milk samples. Location K-3.

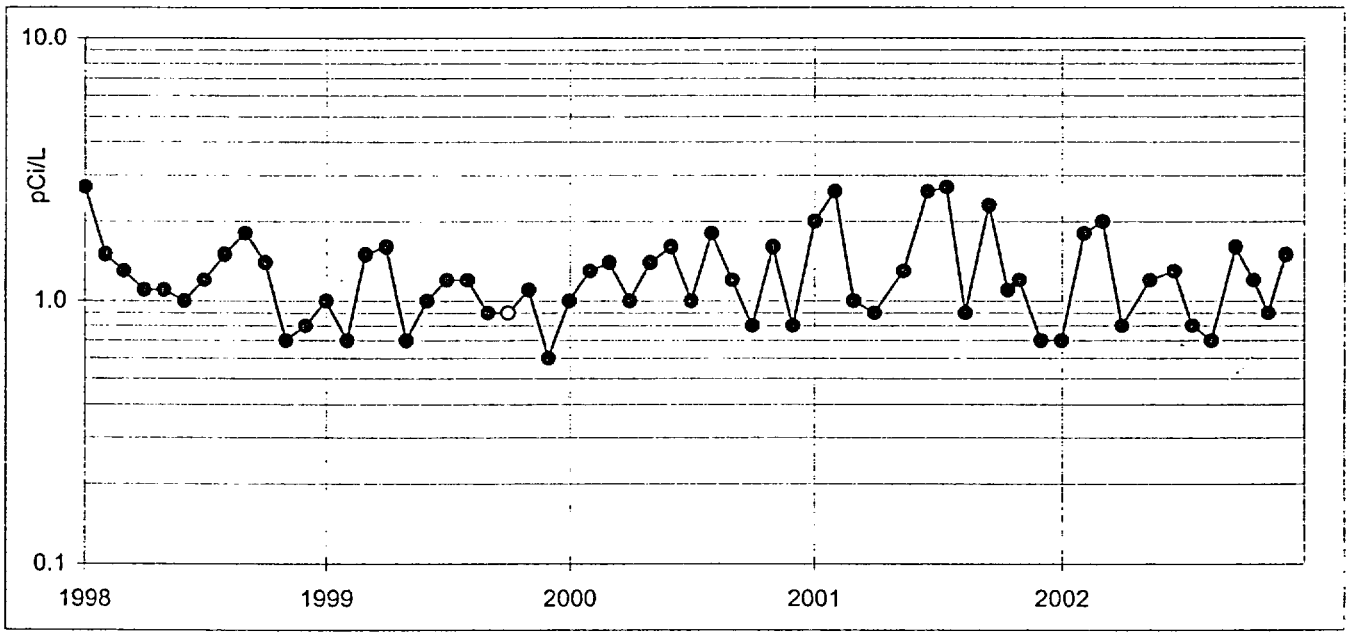

Figure 23. Milk samples. Location K-5.

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

Kewaunee
Milk - Strontium-90

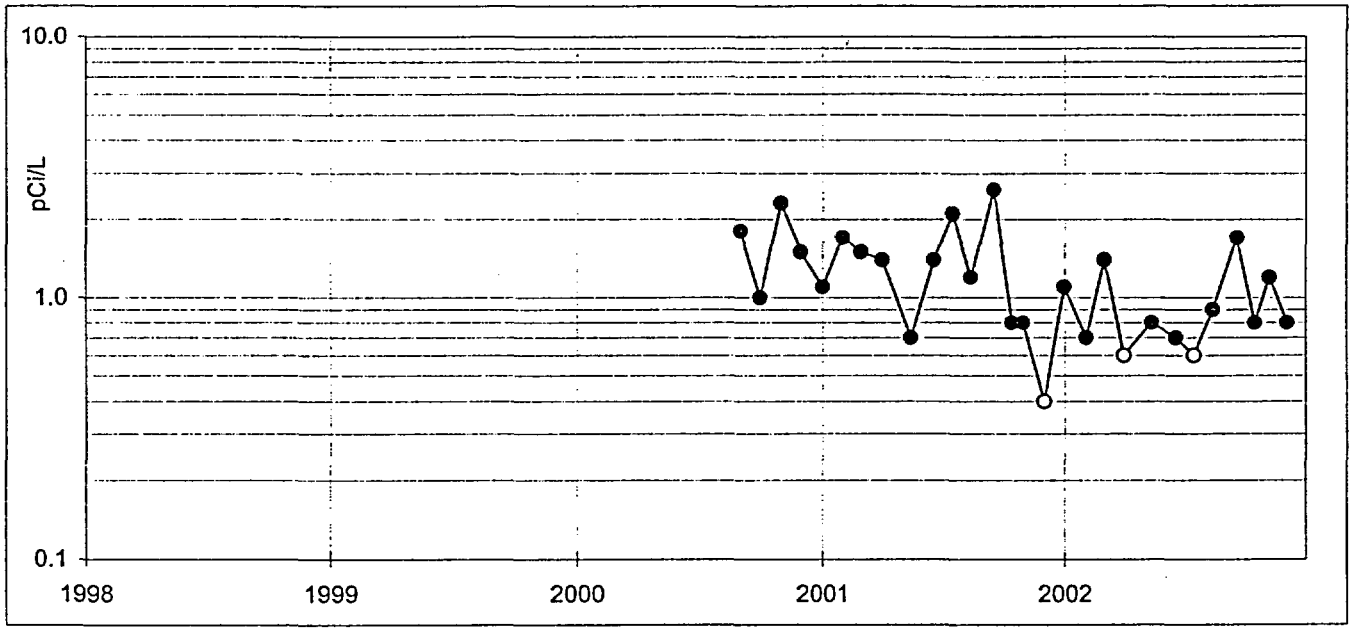

Figure 24. Milk samples. Location K-25.

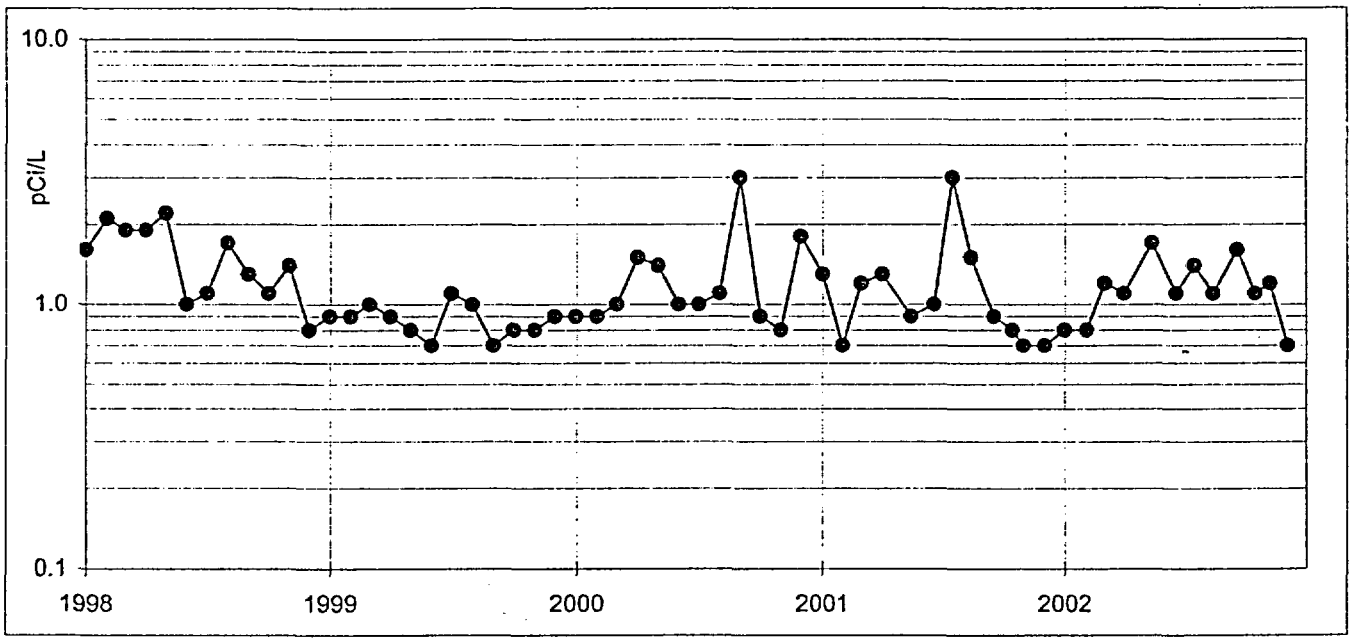

Figure 25. Milk samples. Location K-28.

Kewaunee
Milk - Strontium-90

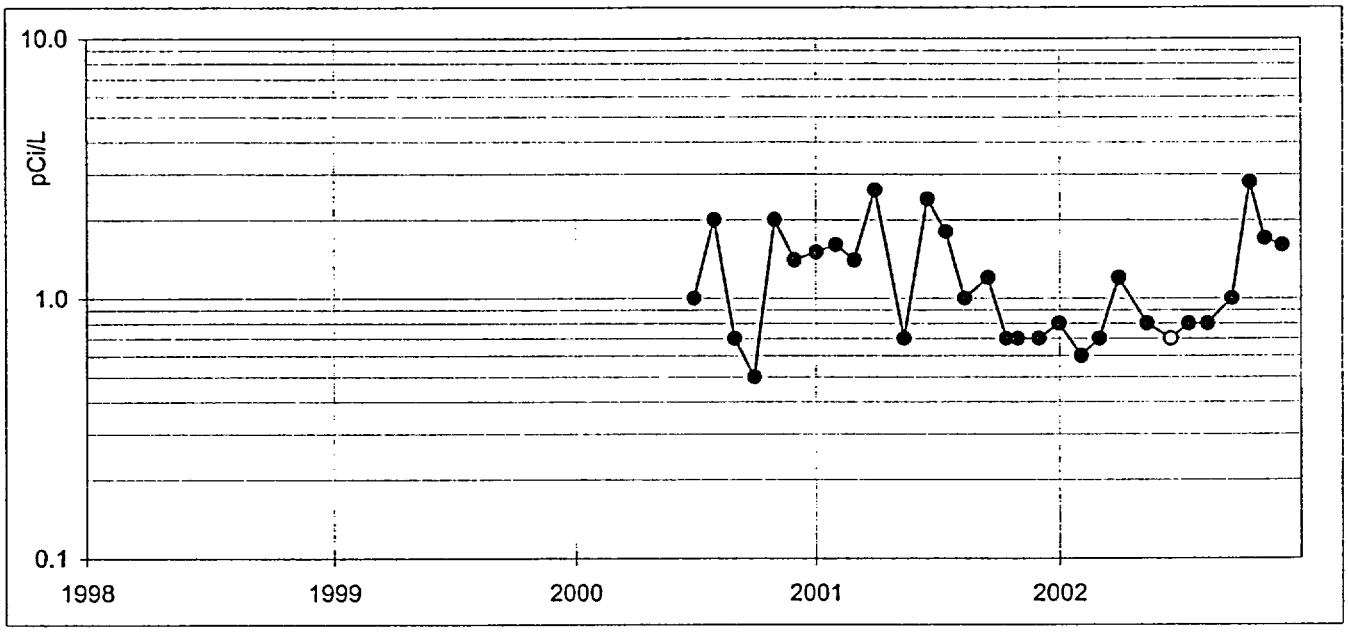

Figure 26. Milk samples. Location K-34.

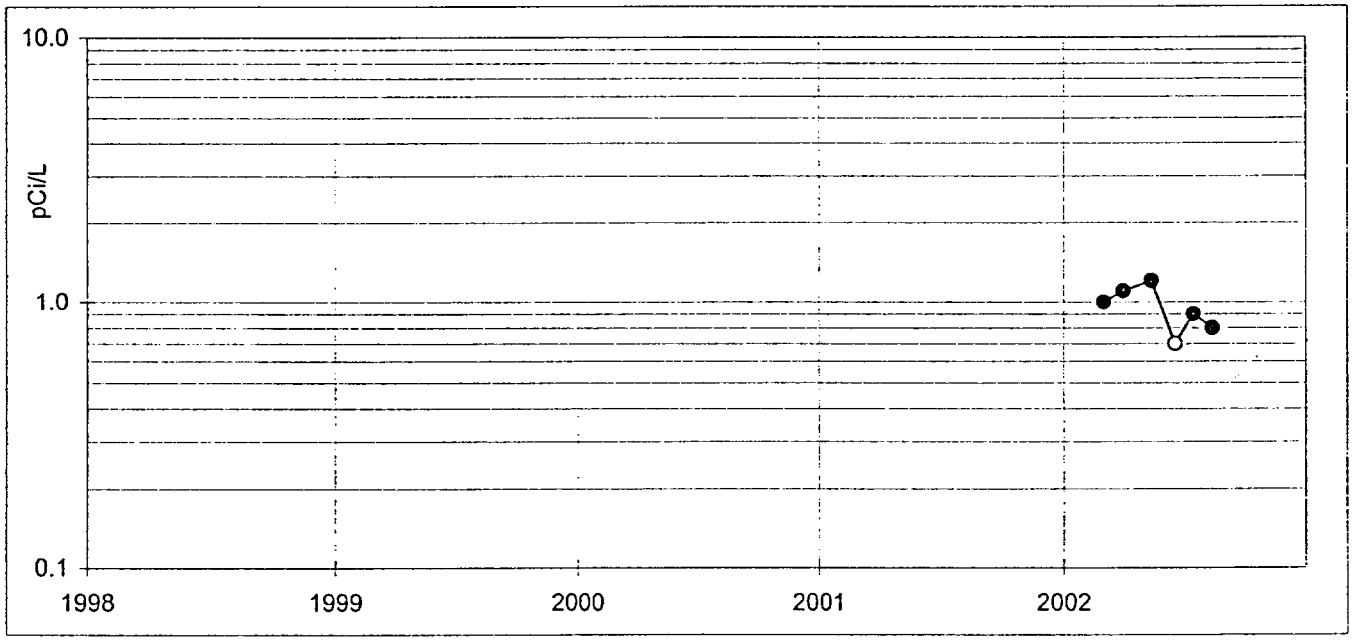

Figure 27. Milk samples. Location K-37.
New location; first collection, March, 2002

Kewaunee
Milk - Strontium-90

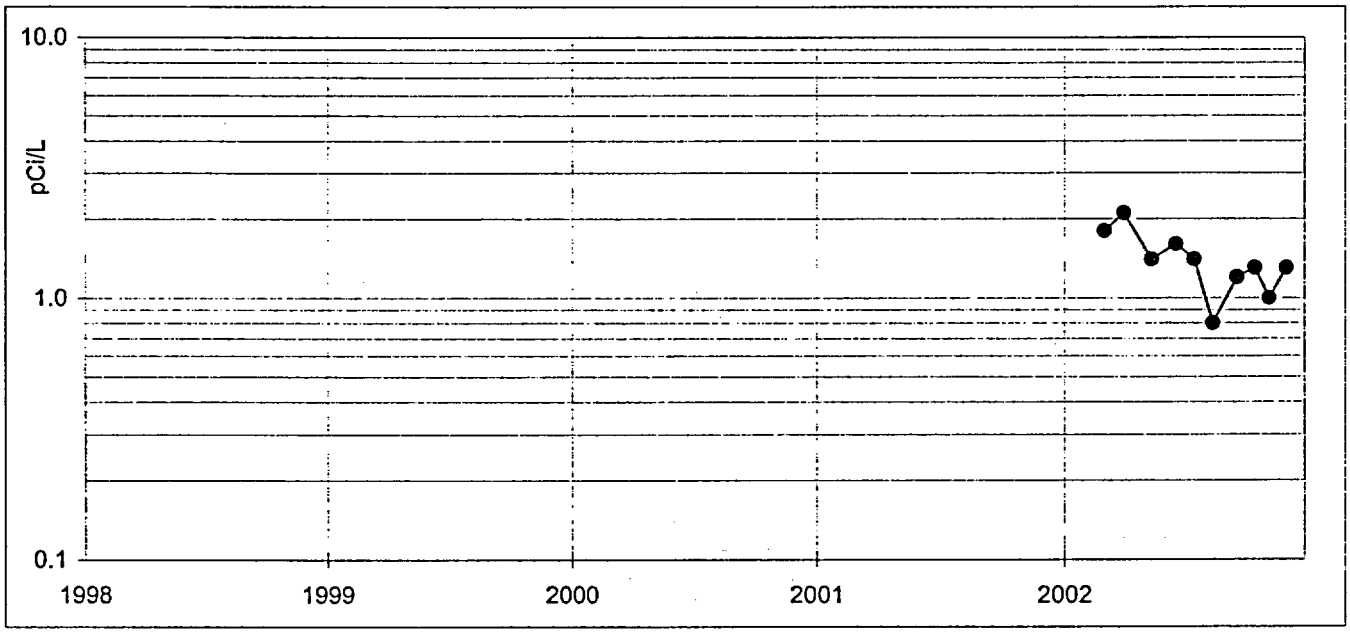

Figure 28. Milk samples. Location K-38.
New location; first collection, March, 2002

Kewaunee

Surface Water - Gross Beta

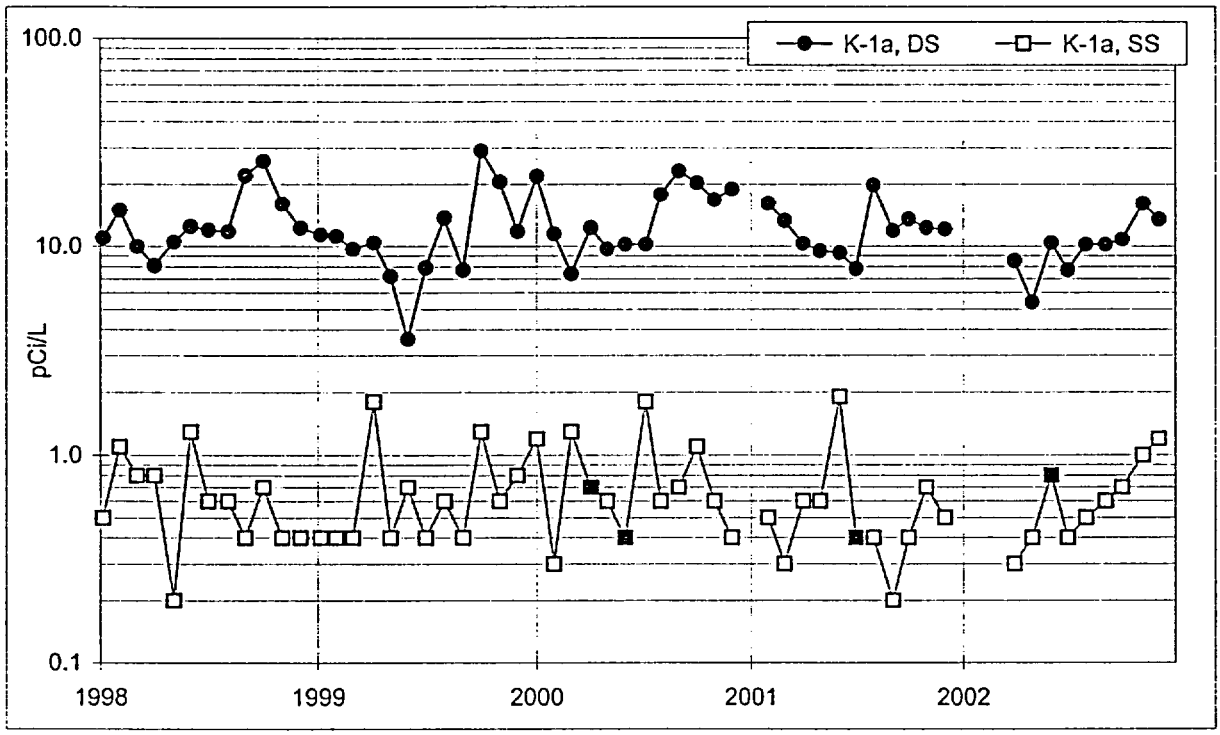

Figure 29. Surface water . North Creek, Onsite (K-1a).

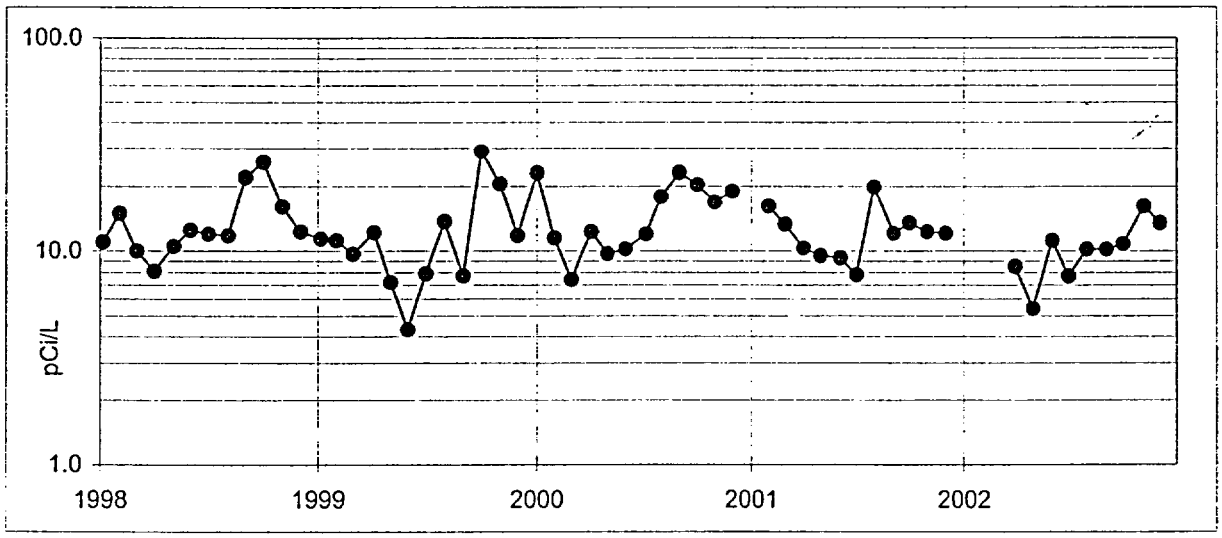

Figure 30. Surface water . North Creek, Onsite (K-1a).
Total Residue

Kewaunee

Surface Water - Gross Beta

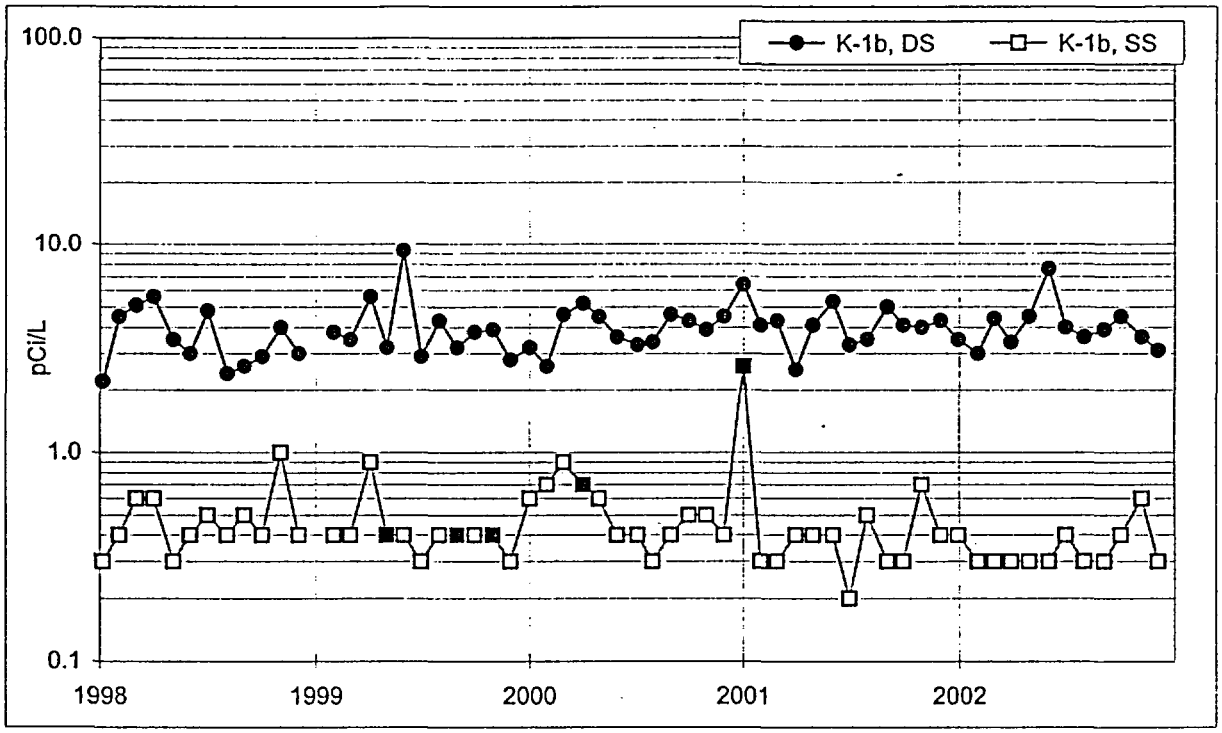

Figure 31. Surface water . Middle Creek, Onsite (K-1b).

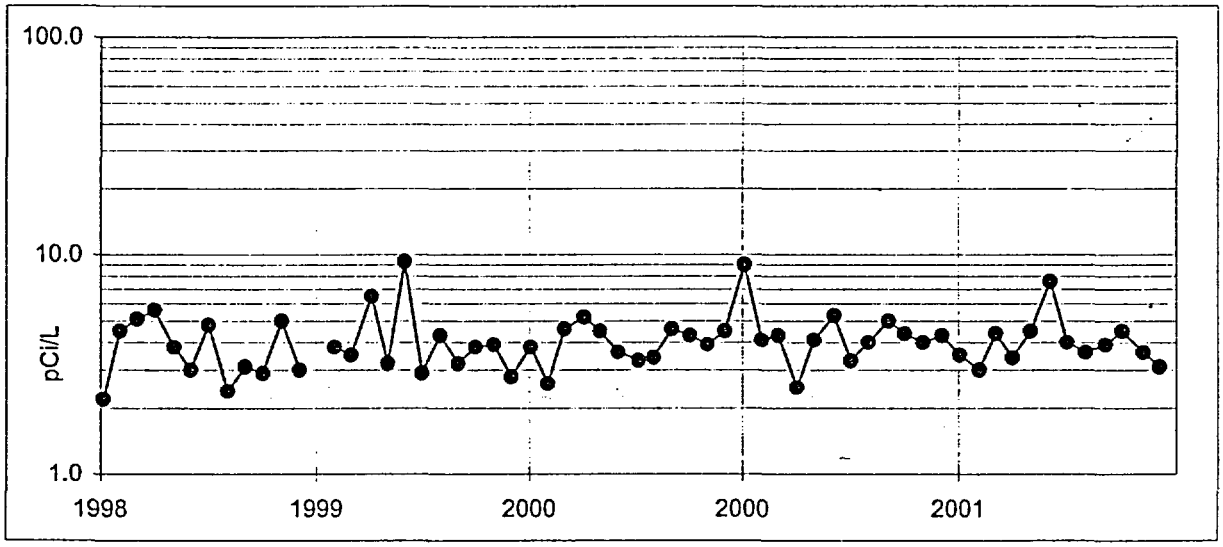

Figure 32. Surface water . Middle Creek, Onsite (K-1b).
Total Residue

Kewaunee

Surface Water - Gross Beta

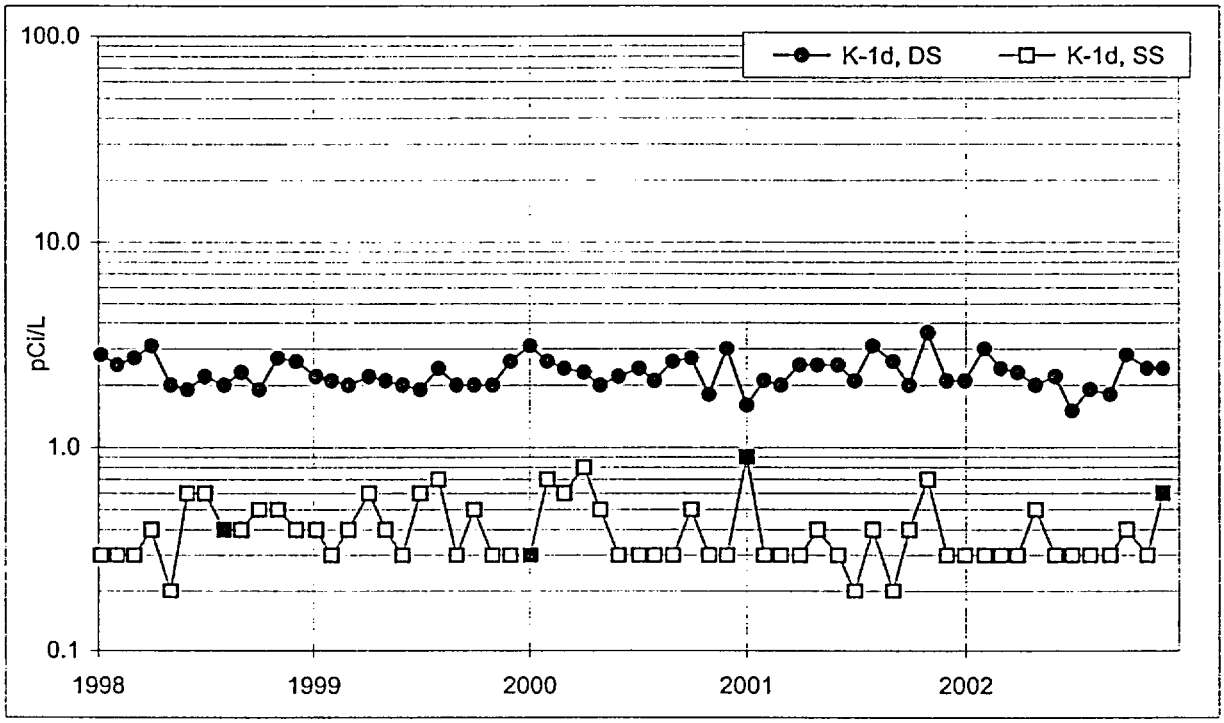

Figure 33. Surface water. Lake Michigan, condenser discharge, Onsite (K-1d).

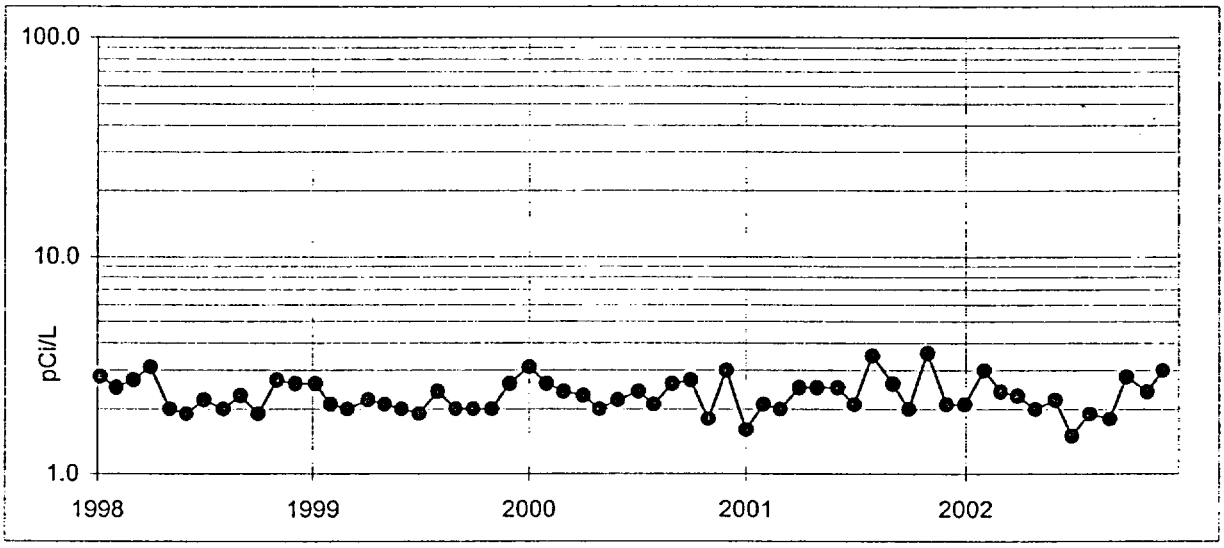

Figure 34. Surface water. Lake Michigan, condenser discharge, Onsite (K-1d).
Total Residue

Kewaunee

Surface Water - Gross Beta

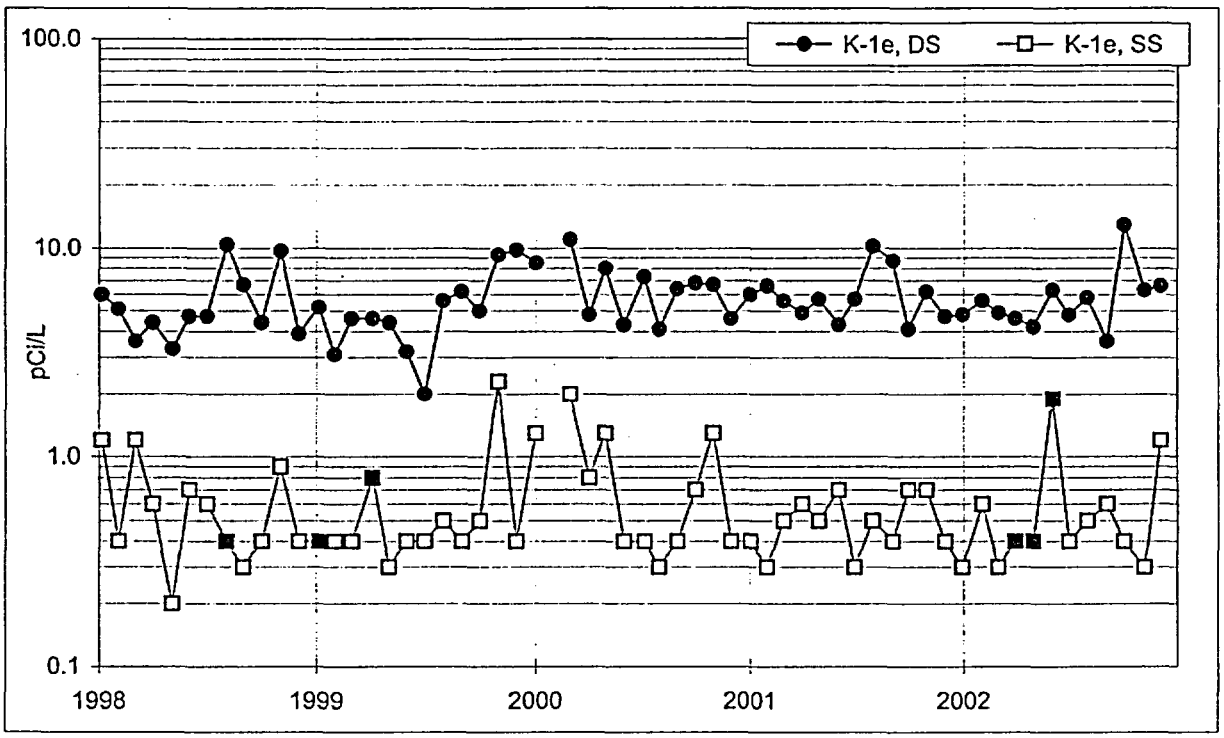

Figure 35. Surface water. South Creek, Onsite (K-1e).

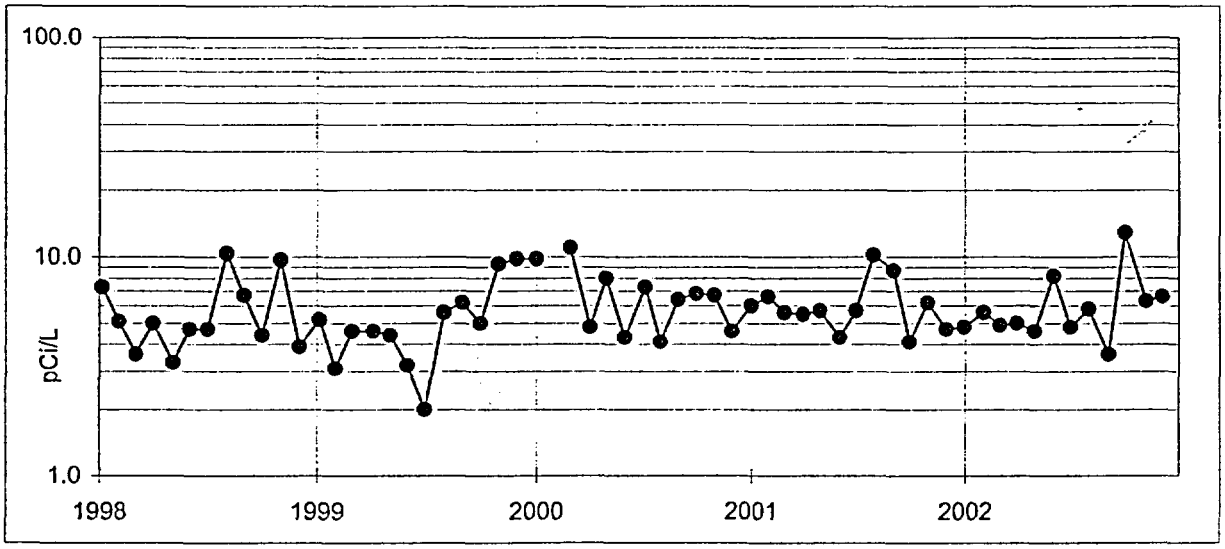

Figure 36. Surface water. South Creek, Onsite (K-1e).
Total Residue

Kewaunee

Surface Water - Gross Beta

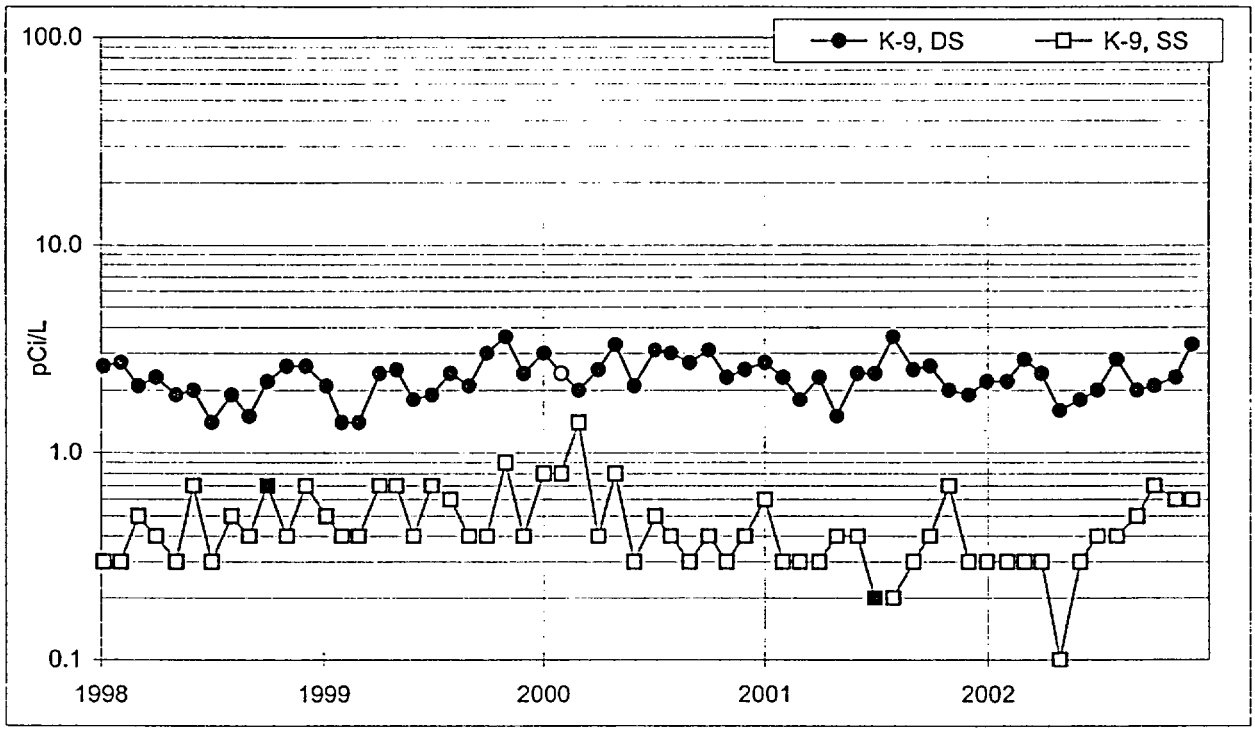

Figure 37. Surface water (raw). Lake Michigan, Rostok Intake (K-9)

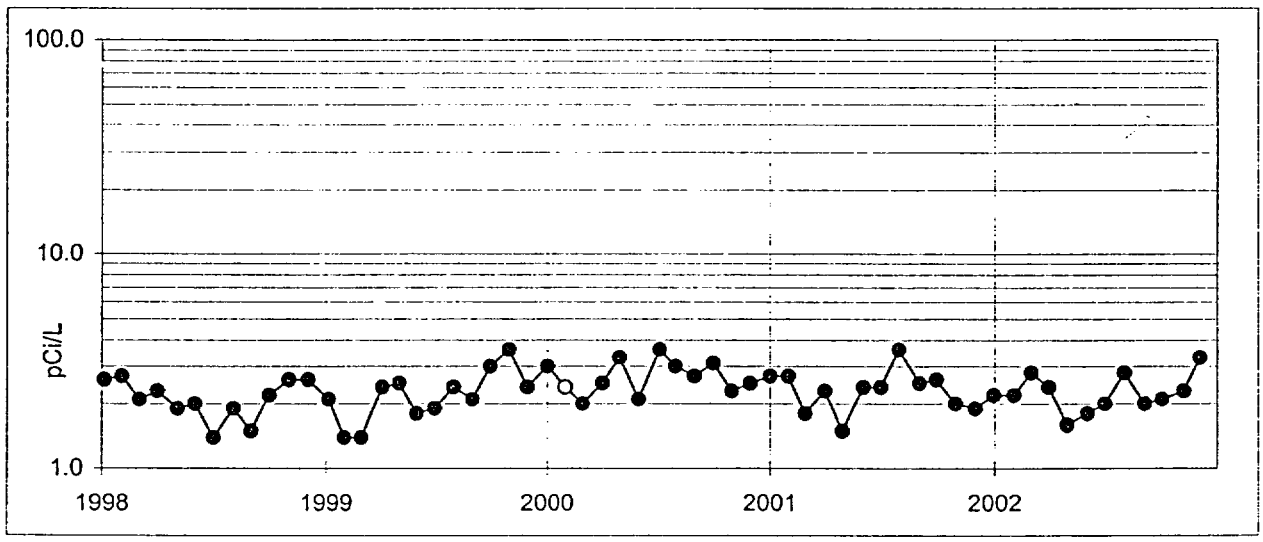

Figure 38. Surface water (raw). Lake Michigan, Rostok Intake (K-9)
Total Residue

Kewaunee

Surface Water - Gross Beta

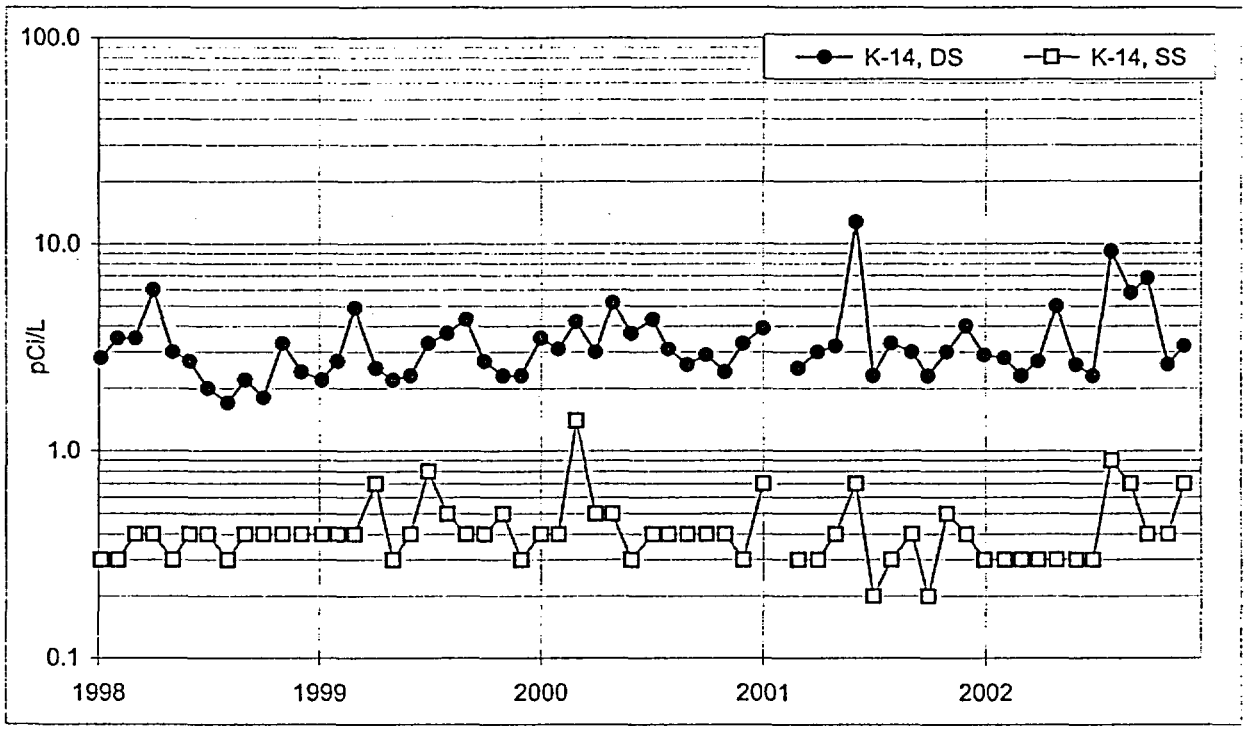

Figure 39. Surface water . Lake Michigan, Two Creeks Park (K-14a).

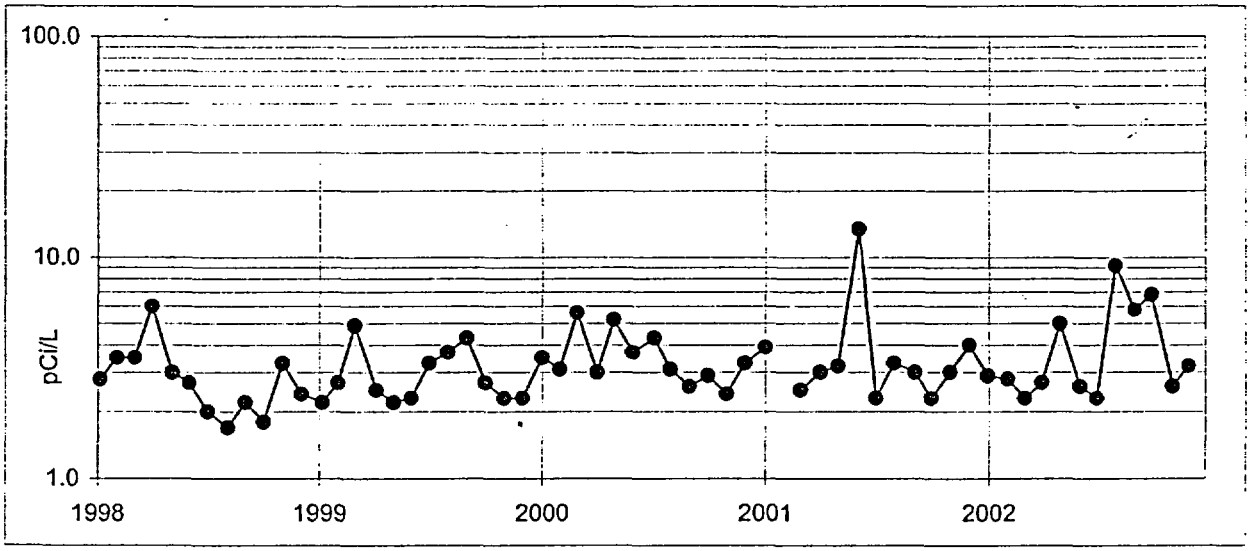

Figure 40. Surface water . Lake Michigan, Two Creeks Park (K-14a).
Total Residue

Kewaunee

Surface Water - Gross Beta

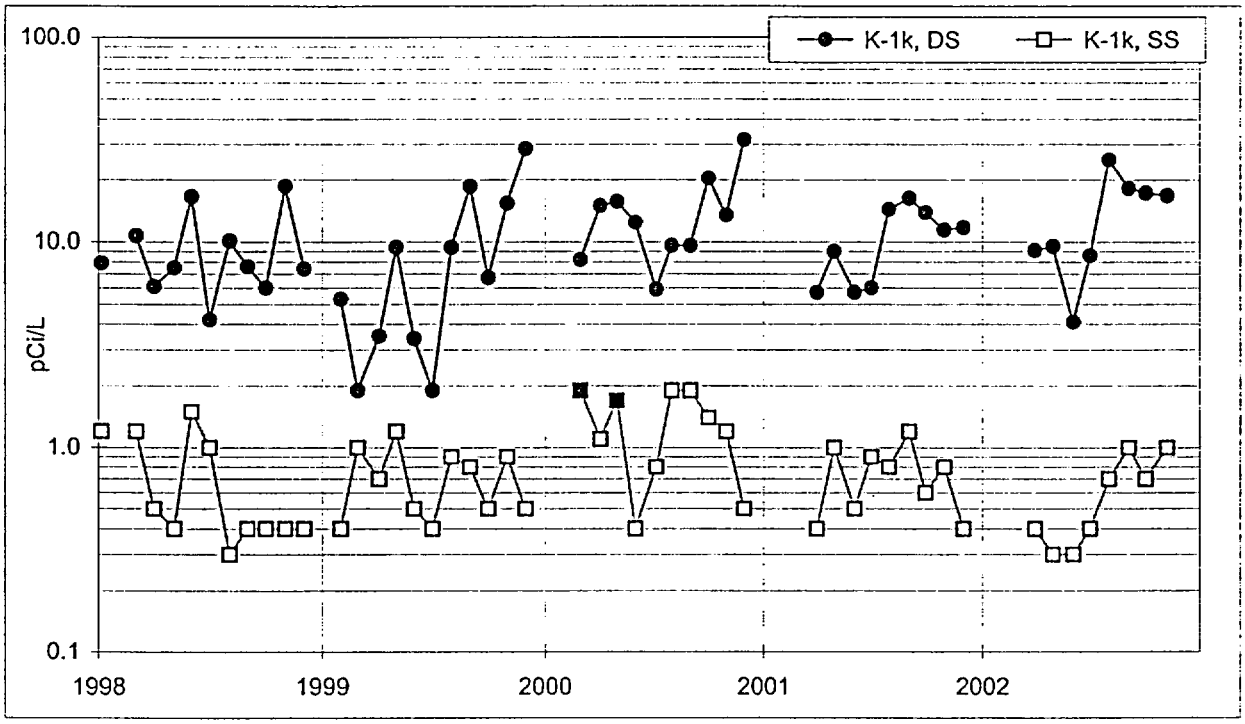

Figure 41. Surface water . School Forest Pond (K-1k).

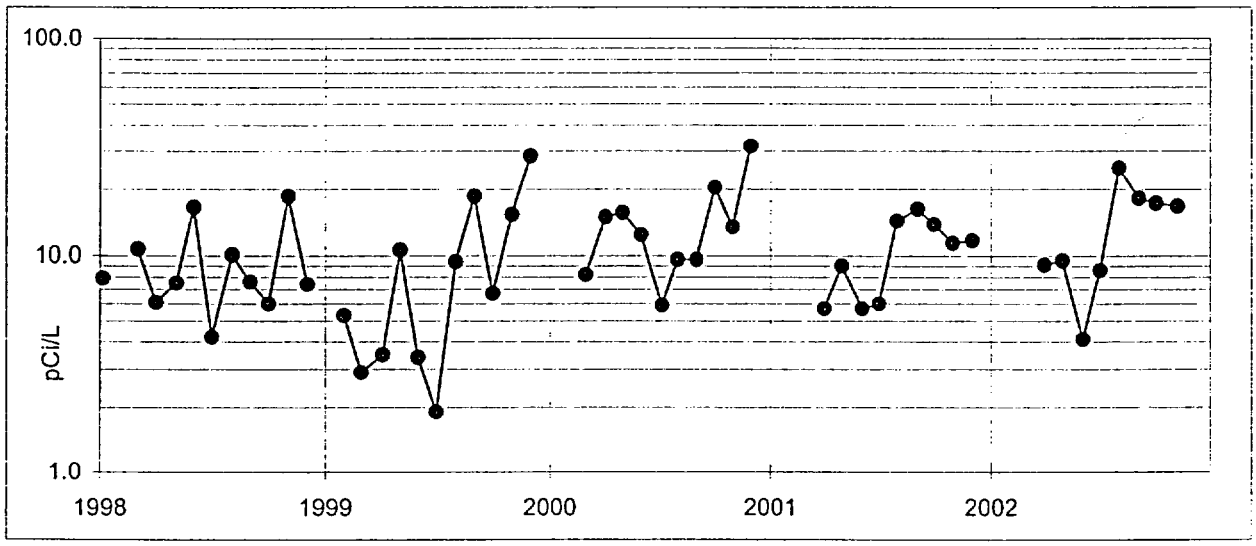

Figure 42. Surface water . School Forest Pond (K-1k).
Total Residue

Kewaunee

Surface Water - Tritium

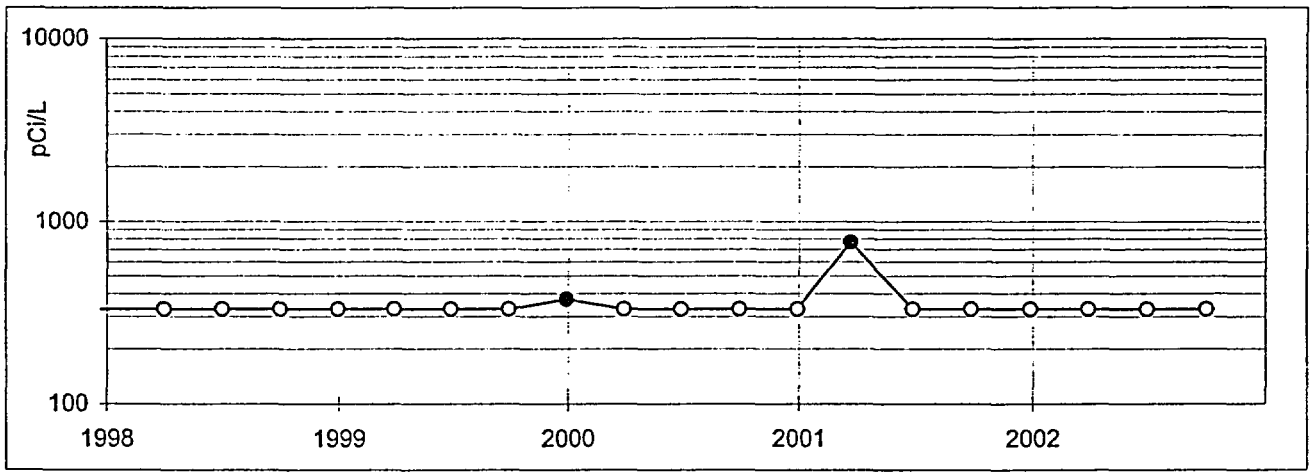

Figure 43. Surface water. Lake Michigan, condenser discharge, K-1d. Quarterly collection.

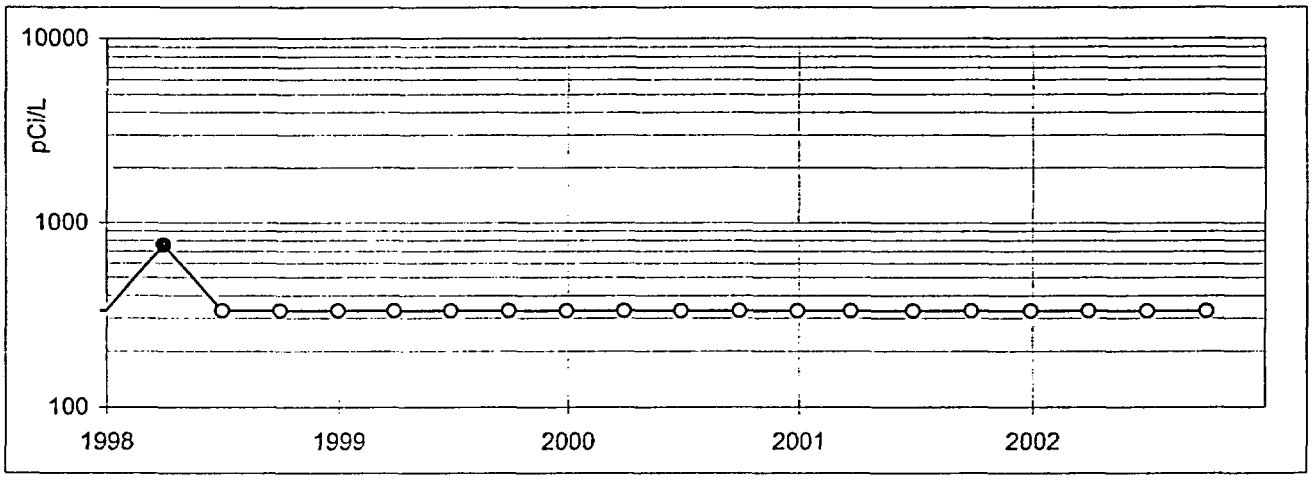

Figure 44. Surface water. Lake Michigan, Two Creeks Park, K-14a. Quarterly collection.

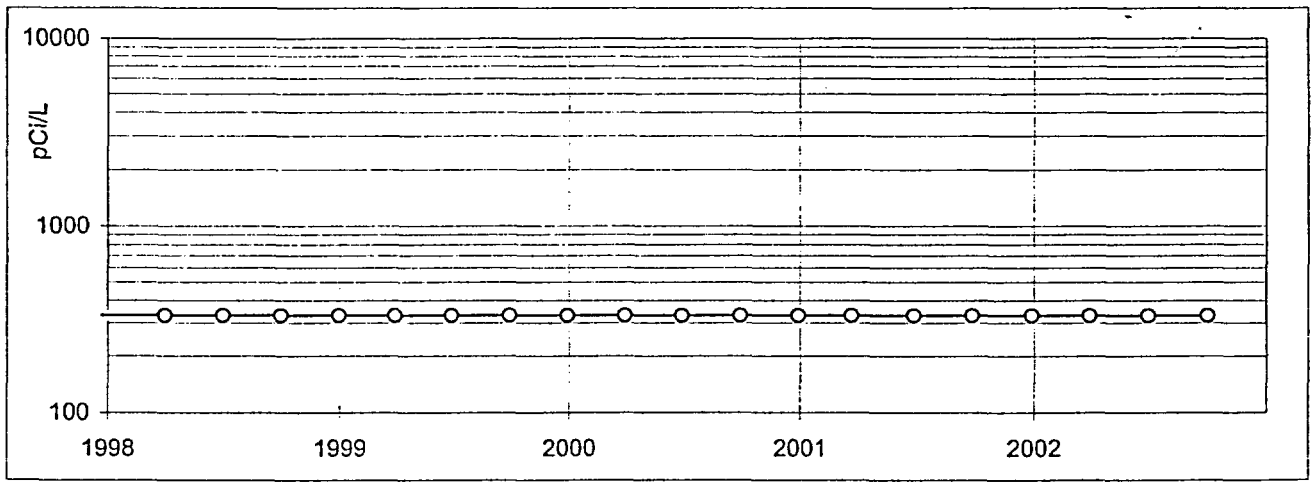

Figure 45. Surface water. Lake Michigan, Rostok Intake, K-9. Quarterly collection.

KEWAUNEE

6.0 DATA TABULATIONS

Table 4. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131[a].
Location: K-1f (Indicator)
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010	Required LLD		0.010
01-08-02	259	0.041 ± 0.004	07-09-02	305	0.014 ± 0.003
01-15-02	304	0.023 ± 0.003	07-16-02	308	0.022 ± 0.003
01-22-02	307	0.029 ± 0.003	07-23-02	299	0.023 ± 0.004
01-28-02	263	0.030 ± 0.004	07-30-02	304	0.021 ± 0.003
02-04-02	303	0.028 ± 0.003	08-06-02	311	0.018 ± 0.003
02-11-02	326	0.040 ± 0.004	08-13-02	301	0.021 ± 0.003
02-19-02	377	0.018 ± 0.002	08-20-02	300	0.016 ± 0.003
02-26-02	303	0.013 ± 0.003	08-27-02	303	0.016 ± 0.003
			09-03-02	305	0.014 ± 0.003
03-05-02	303	0.023 ± 0.003			
03-12-02	307	0.028 ± 0.004	09-10-02	304	0.029 ± 0.003
03-19-02	302	0.024 ± 0.003	09-18-02	347	0.023 ± 0.003
03-26-02	312	0.023 ± 0.003	09-24-02	262	0.022 ± 0.004
04-02-02	296	0.018 ± 0.003	10-01-02	303	0.028 ± 0.003
1st Quarter Mean ± s.d.		0.026 ± 0.008	3rd Quarter Mean ± s.d.		0.021 ± 0.005
04-09-02	301	0.017 ± 0.003	10-08-02	304	0.022 ± 0.003
04-16-02	308	0.025 ± 0.004	10-15-02	308	0.025 ± 0.003
04-23-02	301	0.022 ± 0.003	10-22-02	299	0.013 ± 0.003
04-30-02	306	0.015 ± 0.003	10-29-02	305	0.020 ± 0.003
05-07-02	300	0.014 ± 0.003	11-04-02	289	0.028 ± 0.003
05-14-02	302	0.020 ± 0.003	11-11-02	305	0.039 ± 0.004
05-21-02	306	0.010 ± 0.002	11-19-02	345	0.020 ± 0.003
05-28-02	305	0.009 ± 0.002	11-26-02	315	0.014 ± 0.003
			12-02-02	259	0.017 ± 0.003
06-04-02	306	0.018 ± 0.003			
06-06-02	85	0.012 ± 0.008 [b]	12-09-02	342	0.032 ± 0.003
06-11-02	217	0.021 ± 0.004	12-17-02	301	0.042 ± 0.004
06-19-02	346	0.011 ± 0.003	12-23-02	264	0.023 ± 0.004
06-25-02	261	0.031 ± 0.004	12-30-03	304	0.032 ± 0.004
07-02-02	347	0.022 ± 0.003			
2nd Quarter Mean ± s.d.		0.018 ± 0.006	4th Quarter Mean ± s.d.		0.025 ± 0.009
			Cumulative Average		0.022
			Previous Annual Average		0.024

[a] Iodine-131 is sampled biweekly. Concentrations are < 0.03 pCi/m^3 unless otherwise noted.
[b] Required LLD for I-131 not reached due to low volume; Iodine-131 concentration < 0.046 pCi/m^3.

Table 5. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131[a].
Location: K-2
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010	Required LLD		0.010
01-08-02	259	0.042 ± 0.004	07-09-02	356	0.013 ± 0.003
01-15-02	305	0.021 ± 0.003	07-16-02	351	0.020 ± 0.003
01-22-02	303	0.031 ± 0.003	07-23-02	357	0.024 ± 0.003
01-28-02	267	0.031 ± 0.004	07-30-02	355	0.021 ± 0.003
02-04-02	304	0.031 ± 0.003	08-06-02	359	0.019 ± 0.003
02-11-02	301	0.052 ± 0.004	08-13-02	355	0.018 ± 0.003
02-19-02	347	0.019 ± 0.003	08-20-02	348	0.015 ± 0.002
02-26-02	304	0.017 ± 0.003	08-27-02	355	0.016 ± 0.003
			09-03-02	355	0.017 ± 0.003
03-05-02	302	0.023 ± 0.003			
03-12-02	305	0.033 ± 0.004	09-10-02	355	0.027 ± 0.003
03-19-02	319	0.026 ± 0.003	09-18-02	403	0.025 ± 0.003
03-26-02	339	0.023 ± 0.003	09-24-02	280	0.020 ± 0.003
04-02-02	315	0.016 ± 0.003	10-01-02	303	0.026 ± 0.003
1st Quarter Mean ± s.d.		0.028 ± 0.010	3rd Quarter Mean ± s.d.		0.020 ± 0.004
04-09-02	301	0.017 ± 0.003	10-08-02	304	0.017 ± 0.003
04-16-02	303	0.020 ± 0.003	10-15-02	304	0.027 ± 0.003
04-23-02	328	0.021 ± 0.003	10-22-02	293	0.016 ± 0.003
04-30-02	357	0.016 ± 0.003	10-29-02	284	0.020 ± 0.003
05-07-02	351	0.013 ± 0.003	11-04-02	254	0.029 ± 0.004
05-14-02	330	0.020 ± 0.003	11-11-02	305	0.040 ± 0.004
05-21-02	331	0.011 ± 0.003	11-19-02	346	0.022 ± 0.003
05-28-02	355	0.008 ± 0.002	11-26-02	309	0.013 ± 0.003
			12-02-02	261	0.022 ± 0.003
06-04-02	343	0.013 ± 0.002			
06-06-02	95	< 0.011 [b]	12-09-02	346	0.032 ± 0.003
06-11-02	251	0.022 ± 0.003	12-17-02	300	0.041 ± 0.004
06-19-02	405	0.010 ± 0.002	12-23-02	264	0.025 ± 0.004
06-25-02	308	0.033 ± 0.003	12-30-03	305	0.036 ± 0.004
07-02-02	352	0.021 ± 0.003			
2nd Quarter Mean ± s.d.		0.017 ± 0.007	4th Quarter Mean ± s.d.		0.026 ± 0.009
			Cumulative Average		0.023
			Previous Annual Average		0.023

[a] Iodine-131 is sampled biweekly. Concentrations are < 0.03 pCi/m^3 unless otherwise noted.
[b] Required LLD for I-131 not reached due to low volume; Iodine-131 concentration < 0.041 pCi/m^3.

Table 6. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131[a].
Location: K-7 (Indicator)
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010	Required LLD		0.010
01-08-02	280	0.045 ± 0.004	07-09-02	305	0.017 ± 0.003
01-15-02	326	0.016 ± 0.003	07-16-02	296	0.021 ± 0.003
01-22-02	323	0.032 ± 0.003	07-23-02	307	0.023 ± 0.003
01-28-02	285	0.029 ± 0.003	07-30-02	303	0.022 ± 0.003
02-04-02	323	0.025 ± 0.003	08-06-02	305	0.021 ± 0.003
02-11-02	333	0.046 ± 0.004	08-13-02	307	0.021 ± 0.003
02-19-02	397	0.017 ± 0.002	08-20-02	301	0.019 ± 0.003
02-26-02	331	0.013 ± 0.003	08-27-02	301	0.016 ± 0.003
			09-03-02	310	0.019 ± 0.003
03-05-02	336	0.018 ± 0.003			
03-12-02	335	0.025 ± 0.003	09-10-02	300	0.026 ± 0.003
03-19-02	336	0.026 ± 0.003	09-18-02	343	0.025 ± 0.003
03-26-02	333	0.022 ± 0.003	09-24-02	286	0.019 ± 0.030
04-02-02	318	0.016 ± 0.003	10-01-02	354	0.031 ± 0.003
1st Quarter Mean ± s.d.		0.025 ± 0.011	3rd Quarter Mean ± s.d.		0.022 ± 0.004
04-09-02	302	0.016 ± 0.003	10-08-02	353	0.022 ± 0.003
04-16-02	305	0.020 ± 0.003	10-15-02	358	0.026 ± 0.003
04-23-02	306	0.024 ± 0.003	10-22-02	352	0.016 ± 0.003
04-30-02	305	0.018 ± 0.003	10-29-02	358	0.019 ± 0.003
05-07-02	303	0.014 ± 0.003	11-04-02	304	0.031 ± 0.004
05-14-02	298	0.015 ± 0.003	11-11-02	356	0.041 ± 0.004
05-21-02	309	0.013 ± 0.003	11-19-02	372	0.024 ± 0.003
05-28-02	305	0.009 ± 0.002	11-26-02	366	0.017 ± 0.003
			12-02-02	297	0.019 ± 0.003
06-04-02	304	0.015 ± 0.003			
06-06-02	88	< 0.012 [b]	12-09-02	405	0.032 ± 0.003
06-11-02	216	0.024 ± 0.004	12-17-02	354	0.046 ± 0.004
06-19-02	344	0.010 ± 0.003	12-23-02	303	0.024 ± 0.003
06-25-02	264	0.030 ± 0.004	12-30-03	353	0.034 ± 0.004
07-02-02	305	0.024 ± 0.004			
2nd Quarter Mean ± s.d.		0.018 ± 0.006	4th Quarter Mean ± s.d.		0.027 ± 0.009
			Cumulative Average		0.023
			Previous Annual Average		0.023

[a] Iodine-131 is sampled biweekly. Concentrations are < 0.03 pCi/m^3 unless otherwise noted.

[b] *Required LLD for I-131 not reached due to low volume; Iodine-131 concentration* < 0.045 pCi/m^3.

Table 7. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131[a].
Location: K-8
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010	Required LLD		0.010
01-08-02	259	0.043 ± 0.004	07-09-02	305	0.014 ± 0.003
01-15-02	305	0.017 ± 0.003	07-16-02	296	0.019 ± 0.003
01-22-02	303	0.031 ± 0.003	07-23-02	308	0.020 ± 0.003
01-28-02	267	0.029 ± 0.004	07-30-02	292	0.020 ± 0.003
02-04-02	303	0.030 ± 0.003	08-06-02	296	0.018 ± 0.003
02-11-02	299	0.044 ± 0.004	08-13-02	306	0.017 ± 0.003
02-19-02	350	0.020 ± 0.003	08-20-02	301	0.015 ± 0.003
02-26-02	302	0.014 ± 0.003	08-27-02	304	0.015 ± 0.003
			09-03-02	308	0.018 ± 0.003
03-05-02	305	0.021 ± 0.003			
03-12-02	305	0.027 ± 0.004	09-10-02	301	0.027 ± 0.003
03-19-02	306	0.027 ± 0.003	09-18-02	332	0.021 ± 0.003
03-26-02	303	0.020 ± 0.003	09-24-02	249	0.023 ± 0.004
04-02-02	299	0.015 ± 0.003	10-01-02	305	0.030 ± 0.003
1st Quarter Mean ± s.d.		0.026 ± 0.010	3rd Quarter Mean ± s.d.		0.020 ± 0.005
04-09-02	301	0.012 ± 0.003	10-08-02	302	0.025 ± 0.004
04-16-02	303	0.016 ± 0.003	10-15-02	306	0.025 ± 0.003
04-23-02	307	0.021 ± 0.003	10-22-02	303	0.016 ± 0.003
04-30-02	305	0.018 ± 0.003	10-29-02	307	0.022 ± 0.003
05-07-02	301	0.012 ± 0.003	11-04-02	288	0.025 ± 0.003
05-14-02	301	0.017 ± 0.003	11-11-02	304	0.046 ± 0.004
05-21-02	308	0.011 ± 0.002	11-19-02	371	0.022 ± 0.003
05-28-02	305	0.009 ± 0.002	11-26-02	313	0.019 ± 0.003
			12-02-02	255	0.021 ± 0.003
06-04-02	305	0.013 ± 0.003			
06-06-02	85	0.012 ± 0.008 [b]	12-09-02	347	0.034 ± 0.003
06-11-02	202	0.020 ± 0.004	12-17-02	303	0.049 ± 0.005
06-19-02	195	0.009 ± 0.003	12-23-02	260	0.024 ± 0.004
06-25-02	255	0.020 ± 0.003	12-30-03	303	0.039 ± 0.004
07-02-02	304	0.022 ± 0.003			
2nd Quarter Mean ± s.d.		0.015 ± 0.005	4th Quarter Mean ± s.d.		0.028 ± 0.010
			Cumulative Average		0.022
			Previous Annual Average		0.023

[a] Iodine-131 is sampled biweekly. Concentrations are < 0.03 pCi/m^3 unless otherwise noted.
[b] Required LLD for I-131 not reached due to low volume; Iodine-131 concentration < 0.046 pCi/m^3.

Table 8. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131[a].
Location: K-31
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010	Required LLD		0.010
01-07-98	294	0.042 ± 0.004	07-08-98	314	0.018 ± 0.003
01-14-98	334	0.022 ± 0.003	07-15-98	302	0.020 ± 0.003
01-21-98	334	0.031 ± 0.003	07-22-98	305	0.023 ± 0.003
01-27-98	285	0.029 ± 0.003	07-29-98	305	0.019 ± 0.003
02-03-98	326	0.029 ± 0.003	08-05-98	307	0.018 ± 0.003
02-10-98	325	0.048 ± 0.004	08-12-98	304	0.023 ± 0.003
02-18-98	405	0.017 ± 0.002	08-19-98	300	0.018 ± 0.003
02-25-98	356	0.013 ± 0.002	08-26-98	303	0.016 ± 0.003
			09-02-98	305	0.020 ± 0.003
03-04-98	353	0.020 ± 0.003			
03-11-98	359	0.024 ± 0.003	09-09-98	303	0.025 ± 0.003
03-18-98	352	0.015 ± 0.002 [b]	09-17-98	345	0.026 ± 0.003
03-25-98	335	0.021 ± 0.003	09-23-98	273	0.018 ± 0.003
04-01-98	299	0.015 ± 0.003	09-30-98	323	0.028 ± 0.003
1st Quarter Mean ± s.d.		0.025 ± 0.011	3rd Quarter Mean ± s.d.		0.021 ± 0.004
04-08-98	302	0.015 ± 0.003	10-07-98	329	0.019 ± 0.003
04-15-98	302	0.022 ± 0.003	10-14-98	321	0.029 ± 0.003
04-22-98	316	0.023 ± 0.003	10-21-98	322	0.016 ± 0.003
04-29-98	326	0.018 ± 0.003	10-28-98	331	0.017 ± 0.003
05-06-98	321	0.012 ± 0.003	11-03-98	290	0.029 ± 0.004
05-13-98	313	0.016 ± 0.003	11-10-98	334	0.042 ± 0.004
05-20-98	305	0.010 ± 0.002	11-18-98	380	0.022 ± 0.003
05-27-98	305	0.010 ± 0.003	11-25-98	351	0.012 ± 0.003
			12-01-98	306	0.018 ± 0.003
06-03-98	306	0.015 ± 0.003			
06-05-98	85	0.015 ± 0.009 [c]	12-08-98	374	0.029 ± 0.003
06-10-98	218	0.020 ± 0.004	12-16-98	301	0.047 ± 0.005
06-18-98	345	0.010 ± 0.003	12-22-98	260	0.024 ± 0.004
06-24-98	264	0.034 ± 0.004	12-29-99	304	0.033 ± 0.004
07-01-98	313	0.023 ± 0.003			
2nd Quarter Mean ± s.d.		0.017 ± 0.007	4th Quarter Mean ± s.d.		0.026 ± 0.010
			Cumulative Average		0.022
			Previous Annual Average		0.022

[a] Iodine-131 is sampled biweekly. Concentrations are < 0.03 pCi/m^3 unless otherwise noted.
[b] Filter torn, (refer to KAP #003632)
[c] Required LLD for I-131 not reached due to low volume; Iodine-131 concentration < 0.046 pCi/m^3.

Table 9. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131[a].
Location: K-16
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010	Required LLD		0.010
01-07-02	284	0.037 ± 0.004	07-08-02	283	0.022 ± 0.004
01-14-02	285	0.027 ± 0.004	07-15-02	273	0.021 ± 0.003
01-21-02	278	0.028 ± 0.003	07-22-02	349	0.009 ± 0.002
01-28-02	280	0.034 ± 0.004	07-29-02	304	0.018 ± 0.003
02-04-02	283	0.026 ± 0.002	08-05-02	304	0.018 ± 0.003
02-11-02	ND[b]	-	08-12-02	301	0.017 ± 0.003
02-19-02	ND	-	08-20-02	307	0.016 ± 0.003
02-25-02	356	0.013 ± 0.002	08-27-02	303	0.014 ± 0.003
			09-02-02	295	0.017 ± 0.003
03-04-02	291	0.017 ± 0.003			
03-11-02	301	0.028 ± 0.004	09-09-02	294	0.026 ± 0.003
03-18-02	296	0.029 ± 0.003	09-17-02	335	0.023 ± 0.003
03-25-02	294	0.029 ± 0.004	09-23-02	253	0.019 ± 0.004
04-01-02	293	0.017 ± 0.003	09-30-02	313	0.032 ± 0.003
1st Quarter Mean ± s.d.		0.026 ± 0.007	3rd Quarter Mean ± s.d.		0.019 ± 0.006
04-08-02	292	0.018 ± 0.004	10-08-02	324	0.020 ± 0.003
04-15-02	290	0.020 ± 0.003	10-15-02	320	0.028 ± 0.003
04-22-02	279	0.026 ± 0.003	10-22-02	327	0.015 ± 0.003
04-29-02	279	0.020 ± 0.004	10-29-02	328	0.020 ± 0.003
05-06-02	281	0.019 ± 0.003	11-04-02	275	0.031 ± 0.003
05-13-02	312	0.020 ± 0.004	11-10-02	305	0.041 ± 0.004
05-20-02	286	0.020 ± 0.003	11-19-02	345	0.023 ± 0.003
05-28-02	329	0.012 ± 0.002	11-26-02	309	0.014 ± 0.003
06-03-02	243	0.023 ± 0.004	12-02-02	258	0.021 ± 0.003
06-10-02	285	0.021 ± 0.003	12-09-02	349	0.028 ± 0.003
06-19-02	284	0.014 ± 0.003	12-17-02	301	0.044 ± 0.004
06-25-02	282	0.026 ± 0.003	12-23-02	260	0.021 ± 0.003
07-02-02	291	0.029 ± 0.004	12-30-03	304	0.041 ± 0.004
2nd Quarter Mean ± s.d.		0.021 ± 0.005	4th Quarter Mean ± s.d.		0.027 ± 0.010
			Cumulative Average		0.023
			Previous Annual Average		0.025

[a] Iodine-131 is sampled biweekly. Concentrations are < 0.03 pCi/m^3 unless otherwise noted.
[b] Air sampler out of service.

Table 7. Airborne particulate data, gross beta analyses, monthly averages, minima and maxima.

January

Location	Average	Minima	Maxima
Indicators	0.031	0.016	0.045
K-1f	0.031	0.023	0.041
K-7	0.031	0.016	0.045
Controls	0.031	0.017	0.043
K-2	0.031	0.021	0.042
K-8	0.030	0.017	0.043
K-31	0.031	0.022	0.042
K-16	0.032	0.027	0.037

February

Location	Average	Minima	Maxima
Indicators	0.025	0.013	0.046
K-1f	0.025	0.013	0.040
K-7	0.025	0.013	0.046
Controls	0.026	0.013	0.052
K-2	0.030	0.017	0.052
K-8	0.027	0.014	0.044
K-31	0.027	0.013	0.048
K-16	0.020	0.013	0.026

March

Location	Average	Minima	Maxima
Indicators	0.022	0.016	0.028
K-1f	0.023	0.018	0.028
K-7	0.021	0.016	0.026
Controls	0.022	0.015	0.033
K-2	0.024	0.016	0.033
K-8	0.022	0.015	0.027
K-31	0.019	0.015	0.024
K-16	0.024	0.017	0.029

April

Location	Average	Minima	Maxima
Indicators	0.020	0.015	0.025
K-1f	0.020	0.015	0.025
K-7	0.020	0.016	0.024
Controls	0.019	0.012	0.026
K-2	0.019	0.016	0.021
K-8	0.017	0.012	0.021
K-31	0.020	0.015	0.023
K-16	0.021	0.018	0.026

May

Location	Average	Minima	Maxima
Indicators	0.013	0.009	0.020
K-1f	0.013	0.009	0.020
K-7	0.013	0.009	0.015
Controls	0.014	0.008	0.023
K-2	0.013	0.008	0.020
K-8	0.012	0.009	0.017
K-31	0.012	0.010	0.016
K-16	0.019	0.012	0.023

June

Location	Average	Minima	Maxima
Indicators	0.020	0.010	0.031
K-1f	0.019	0.011	0.031
K-7	0.021	0.010	0.030
Controls	0.019	0.009	0.034
K-2	0.020	0.010	0.033
K-8	0.016	0.009	0.022
K-31	0.020	0.010	0.034
K-16	0.023	0.014	0.029

Note: unless otherwise specified, samples collected on the first, second or third day of the month are grouped with data of the previous month.

Table 7. Airborne particulate data,gross beta analyses, monthly averages, minima and maxima.

July

Location	Average	Minima	Maxima
Indicators	0.020	0.014	0.023
K-1f	0.020	0.014	0.023
K-7	0.021	0.017	0.023
Controls	0.019	0.009	0.024
K-2	0.020	0.013	0.024
K-8	0.018	0.014	0.020
K-31	0.020	0.018	0.023
K-16	0.018	0.009	0.022

August

Location	Average	Minima	Maxima
Indicators	0.018	0.014	0.021
K-1f	0.017	0.014	0.021
K-7	0.019	0.016	0.021
Controls	0.017	0.014	0.023
K-2	0.017	0.015	0.019
K-8	0.017	0.015	0.018
K-31	0.019	0.016	0.023
K-16	0.016	0.014	0.018

September

Location	Average	Minima	Maxima
Indicators	0.025	0.019	0.031
K-1f	0.026	0.022	0.029
K-7	0.025	0.019	0.031
Controls	0.025	0.018	0.032
K-2	0.025	0.020	0.027
K-8	0.025	0.021	0.030
K-31	0.024	0.018	0.028
K-16	0.025	0.019	0.032

October

Location	Average	Minima	Maxima
Indicators	0.020	0.013	0.026
K-1f	0.020	0.013	0.025
K-7	0.021	0.016	0.026
Controls	0.021	0.015	0.029
K-2	0.020	0.016	0.027
K-8	0.022	0.016	0.025
K-31	0.020	0.016	0.029
K-16	0.021	0.015	0.028

November

Location	Average	Minima	Maxima
Indicators	0.025	0.014	0.041
K-1f	0.024	0.014	0.039
K-7	0.026	0.017	0.041
Controls	0.026	0.012	0.046
K-2	0.025	0.013	0.040
K-8	0.027	0.019	0.046
K-31	0.025	0.012	0.042
K-16	0.026	0.014	0.041

December

Location	Average	Minima	Maxima
Indicators	0.033	0.023	0.046
K-1f	0.032	0.023	0.042
K-7	0.034	0.024	0.046
Controls	0.034	0.021	0.049
K-2	0.034	0.025	0.041
K-8	0.037	0.024	0.049
K-31	0.033	0.024	0.047
K-16	0.034	0.021	0.044

Note: unless otherwise specified, 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
Indicator				
K-1f				
Lab Code	KAP-2409	KAP-4568	KAP-6840	KAP-8775
Volume (m^3)	3962	3991	3952	3940
Be-7	0.061 ± 0.015	0.067 ± 0.015	0.067 ± 0.012	0.044 ± 0.015
Nb-95	< 0.0006	< 0.0009	< 0.0007	< 0.0009
Zr-95	< 0.0011	< 0.0013	< 0.0012	< 0.0014
Ru-103	< 0.0009	< 0.0008	< 0.0004	< 0.0010
Ru-106	< 0.0080	< 0.0071	< 0.0055	< 0.0061
Cs-134	< 0.0008	< 0.0005	< 0.0003	< 0.0008
Cs-137	< 0.0007	< 0.0005	< 0.0006	< 0.0007
Ce-141	< 0.0008	< 0.0012	< 0.0009	< 0.0016
Ce-144	< 0.0020	< 0.0040	< 0.0042	< 0.0047
K-7				
Lab Code	KAP-2411	KAP-4571	KAP-6841	KAP-8777
Volume (m^3)	4256	3954	4018	4531
Be-7	0.054 ± 0.015	0.064 ± 0.014	0.068 ± 0.012	0.049 ± 0.012
Nb-95	< 0.0016	< 0.0005	< 0.0006	< 0.0005
Zr-95	< 0.0020	< 0.0015	< 0.0013	< 0.0016
Ru-103	< 0.0015	< 0.0009	< 0.0005	< 0.0006
Ru-106	< 0.0089	< 0.0055	< 0.0038	< 0.0042
Cs-134	< 0.0009	< 0.0006	< 0.0008	< 0.0005
Cs-137	< 0.0009	< 0.0009	< 0.0004	< 0.0005
Ce-141	< 0.0022	< 0.0012	< 0.0015	< 0.0016
Ce-144	< 0.0058	< 0.0026	< 0.0032	< 0.0041

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
Control				
K-2				
Lab Code	KAP-2410	KAP-4569, 70	KAP-6842	KAP-8776
Volume (m^3)	3970	4410	4532	3875
Be-7	0.070 ± 0.015	0.077 ± 0.012	0.061 ± 0.010	0.042 ± 0.013
Nb-95	< 0.0008	< 0.0005	< 0.0005	< 0.0007
Zr-95	< 0.0018	< 0.0014	< 0.0011	< 0.0010
Ru-103	< 0.0009	< 0.0003	< 0.0005	< 0.0009
Ru-106	< 0.0031	< 0.0044	< 0.0019	< 0.0056
Cs-134	< 0.0007	< 0.0005	< 0.0007	< 0.0008
Cs-137	< 0.0004	< 0.0010	< 0.0006	< 0.0009
Ce-141	< 0.0017	< 0.0019	< 0.0013	< 0.0015
Ce-144	< 0.0027	< 0.0050	< 0.0033	< 0.0024
K-8				
Lab Code	KAP-2412	KAP-4572	KAP-6843	KAP-8778
Volume (m^3)	3906	3777	3903	3962
Be-7	0.058 ± 0.020	0.069 ± 0.016	0.051 ± 0.014	0.056 ± 0.013
Nb-95	< 0.0015	< 0.0006	< 0.0010	< 0.0004
Zr-95	< 0.0018	< 0.0012	< 0.0011	< 0.0012
Ru-103	< 0.0011	< 0.0007	< 0.0004	< 0.0006
Ru-106	< 0.0070	< 0.0051	< 0.0041	< 0.0048
Cs-134	< 0.0007	< 0.0004	< 0.0005	< 0.0003
Cs-137	< 0.0005	< 0.0006	< 0.0006	< 0.0004
Ce-141	< 0.0010	< 0.0016	< 0.0016	< 0.0019
Ce-144	< 0.0046	< 0.0054	< 0.0052	< 0.0049

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
Control				
K-31				
Lab Code	KAP-2414	KAP-4574	KAP-6845	KAP-8780
Volume (m^3)	4357	4021	3989	4203
Be-7	0.062 ± 0.016	0.068 ± 0.015	0.061 ± 0.014	0.049 ± 0.012
Nb-95	< 0.0013	< 0.0008	< 0.0006	< 0.0006
Zr-95	< 0.0012	< 0.0016	< 0.0017	< 0.0012
Ru-103	< 0.0012	< 0.0006	< 0.0008	< 0.0009
Ru-106	< 0.0044	< 0.0051	< 0.0045	< 0.0073
Cs-134	< 0.0008	< 0.0006	< 0.0003	< 0.0003
Cs-137	< 0.0004	< 0.0003	< 0.0006	< 0.0006
Ce-141	< 0.0009	< 0.0014	< 0.0018	< 0.0012
Ce-144	< 0.0031	< 0.0022	< 0.0040	< 0.0057
K-16				
Lab Code	KAP-2413	KAP-4573	KAP-6844	KAP-8779
Volume (m^3)	3241	3733	3914	4005
Be-7	0.073 ± 0.025	0.075 ± 0.019	0.054 ± 0.011	0.052 ± 0.016
Nb-95	< 0.0019	< 0.0013	< 0.0006	< 0.0004
Zr-95	< 0.0020	< 0.0009	< 0.0015	< 0.0013
Ru-103	< 0.0017	< 0.0012	< 0.0006	< 0.0007
Ru-106	< 0.012	< 0.0079	< 0.0032	< 0.0061
Cs-134	< 0.0009	< 0.0004	< 0.0007	< 0.0008
Cs-137	< 0.0013	< 0.0005	< 0.0005	< 0.0007
Ce-141	< 0.0029	< 0.0027	< 0.0008	< 0.0019
Ce-144	< 0.0062	< 0.0056	< 0.0033	< 0.0055

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

	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	
Date Placed	01-02-02	04-01-02	07-01-02	10-01-02	
Date Removed	04-01-02	07-01-02	10-01-02	01-02-03	
	mR/91 days[a]				
Indicator					Mean±s.d.
K-1f	15.2 ± 0.3	13.0 ± 0.9	14.7 ± 0.8	11.7 ± 0.6	13.7 ± 1.6
K-5	16.9 ± 0.5	16.1 ± 1.1	16.7 ± 0.5	12.1 ± 0.4	15.5 ± 2.3
K-7	20.0 ± 0.2	18.9 ± 0.8	21.0 ± 0.9	17.5 ± 1.0	19.4 ± 1.5
K-17	19.5 ± 0.3	17.0 ± 0.6	20.2 ± 0.4	15.2 ± 0.5	18.0 ± 2.3
K-25	16.9 ± 0.3	16.7 ± 0.4	17.5 ± 0.5	15.1 ± 0.5	16.6 ± 1.0
K-27	14.9 ± 0.2	14.4 ± 0.9	14.9 ± 0.4	12.3 ± 0.6	14.1 ± 1.2
K-30	15.9 ± 0.3	15.9 ± 0.4	16.7 ± 0.5	14.7 ± 0.4	15.8 ± 0.8
Mean ± s.d.	17.0 ± 2.0	16.0 ± 1.9	17.4 ± 2.4	14.1 ± 2.1	16.1 ± 1.5
Control					
K-2	14.8 ± 0.2	13.4 ± 0.5	14.8 ± 0.5	12.1 ± 0.4	13.8 ± 1.3
K-3	19.2 ± 0.2	17.8 ± 1.0	20.1 ± 1.4	16.2 ± 1.0	18.3 ± 1.7
K-8	17.8 ± 0.5	15.9 ± 0.4	18.0 ± 0.7	14.4 ± 0.3	16.5 ± 1.7
K-15	16.2 ± 0.3	14.5 ± 0.3	16.7 ± 0.2	13.4 ± 0.5	15.2 ± 1.5
K-16	15.5 ± 0.2	12.1 ± 0.3	13.9 ± 0.7	10.7 ± 0.3	13.1 ± 2.1
K-31	14.4 ± 0.7	13.2 ± 0.8	14.0 ± 0.7	11.9 ± 0.8	13.4 ± 1.1
K-35[b]	15.0 ± 0.2	-	-	-	15.0 ± 0.2
K-37[b]	-	15.8 ± 0.5	16.7 ± 0.9	14.5 ± 0.4	15.7 ± 0.5
Mean ± s.d.	16.1 ± 1.8	14.7 ± 2.0	16.3 ± 2.3	13.3 ± 1.9	15.1 ± 1.4

[a] The uncertainty for each location corresponds to the two-standard deviation error of the average dose of eight dosimeters placed at this location.

[b] Location dropped from program; replaced by K-37 in the second quarter, 2002.

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

Date Collected	Lab Code	H-3 pCi/L	H-3 T.U. (100 T.U. = 320 pCi/L)
01/02/02	KP -75	< 330	< 103
02/01/02	ND[a]	-	-
03/05/02	-1414	< 330	< 103
04/02/02	-2075, 6	< 330	< 103
04/30/02	-2965	< 330	< 103
06/04/02	-3723	< 330	< 103
07/02/02	-4429	< 330	< 103
07/30/02	-5123	< 330	< 103
09/03/02	-5814, 5	< 330	< 103
10/01/02	-6997	< 330	< 103
11/04/02	-7617	< 330	< 103
12/02/02	-8118	< 330	< 103

[a] ND=No data, no precipitation sample available for February.

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
Indicators						
K-5						
01-03-02	KMI - 7	< 0.5	< 10	< 10	< 15	1619 ± 182
02-04-02	- 602	< 0.5	< 10	< 10	< 15	1482 ± 134
03-04-02	- 1330	< 0.5	< 10	< 10	< 15	1420 ± 112
04-01-02	- 1915	< 0.5	< 10	< 10	< 15	1339 ± 178
05-01-02	- 2811	< 0.5	< 10	< 10	< 15	1280 ± 137
05-14-02	- 3280	< 0.5	< 10	< 10	< 15	1196 ± 106
06-04-02	- 3538	< 0.5	< 10	< 10	< 15	1372 ± 74
06-19-02	- 3981	< 0.5	< 10	< 10	< 15	1401 ± 129
07-02-02	- 4314	< 0.5	< 10	< 10	< 15	1315 ± 109
07-16-02	- 4702	< 0.5	< 10	< 10	< 15	1468 ± 119
08-01-02	- 5102	< 0.5	< 10	< 10	< 15	1369 ± 91
08-13-02	- 5382	< 0.5	< 10	< 10	< 15	1303 ± 160
09-04-02	- 5727	< 0.5	< 10	< 10	< 15	1112 ± 137
09-18-02	- 6142	< 0.5	< 10	< 10	< 15	1338 ± 184
10-02-02	- 6383	< 0.5	< 10	< 10	< 15	1297 ± 165
10-15-02	- 6946	< 0.5	< 10	< 10	< 15	1332 ± 125
11-05-02	- 7554	< 0.5	< 10	< 10	< 15	1311 ± 173
12-02-02	- 8046	< 0.5	< 10	< 10	< 15	1297 ± 174
K-25						
01-02-02	KMI - 8	< 0.5	< 10	< 10	< 15	1482 ± 176
02-05-02	- 603	< 0.5	< 10	< 10	< 15	1433 ± 159
03-05-02	- 1331	< 0.5	< 10	< 10	< 15	1440 ± 170
04-01-02	- 1916	< 0.5	< 10	< 10	< 15	1392 ± 165
05-02-02	- 2812	< 0.5	< 10	< 10	< 15	1259 ± 162
05-14-02	- 3281	< 0.5	< 10	< 10	< 15	1388 ± 122
06-03-02	- 3539	< 0.5	< 10	< 10	< 15	1349 ± 111
06-19-02	- 3982	< 0.5	< 10	< 10	< 15	1344 ± 160
07-01-02	- 4315	< 0.5	< 10	< 10	< 15	1322 ± 104
07-16-02	- 4703	< 0.5	< 10	< 10	< 15	1332 ± 169
08-02-02	- 5103, 4	< 0.5	< 10	< 10	< 15	1420 ± 74
08-13-02	- 5383	< 0.5	< 10	< 10	< 15	1338 ± 109
09-04-02	- 5728	< 0.5	< 10	< 10	< 15	1323 ± 127
09-18-02	- 6143	< 0.5	< 10	< 10	< 15	1359 ± 175
10-01-02	- 6384	< 0.5	< 10	< 10	< 15	1326 ± 128
10-15-02	- 6947	< 0.5	< 10	< 10	< 15	1256 ± 181
11-06-02	- 7555	< 0.5	< 10	< 10	< 15	1385 ± 179
12-02-02	- 8047	< 0.5	< 10	< 10	< 15	1357 ± 170

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
Indicators						
K-34						
01-02-02	KMI - 10	< 0.5	< 10	< 10	< 15	1411 ± 165
02-04-02	- 605	< 0.5	< 10	< 10	< 15	1487 ± 170
03-04-02	- 1334	< 0.5	< 10	< 10	< 15	1436 ± 87
04-01-02	- 1918	< 0.5	< 10	< 10	< 15	1348 ± 132
05-01-02	- 2814	< 0.5	< 10	< 10	< 15	1364 ± 122
05-14-02	- 3283	< 0.5	< 10	< 10	< 15	1385 ± 171
06-03-02	- 3541	< 0.5	< 10	< 10	< 15	1411 ± 113
06-19-02	- 3984	< 0.5	< 10	< 10	< 15	1404 ± 123
07-01-02	- 4317	< 0.5	< 10	< 10	< 15	1393 ± 117
07-16-02	- 4705	< 0.5	< 10	< 10	< 15	1353 ± 152
08-01-02	- 5106	< 0.5	< 10	< 10	< 15	1469 ± 120
08-13-02	- 5385	< 0.5	< 10	< 10	< 15	1736 ± 193
09-03-02	- 5730	< 0.5	< 10	< 10	< 15	1343 ± 199
09-18-02	- 6145	< 0.5	< 10	< 10	< 15	1520 ± 131
10-01-02	- 6387	< 0.5	< 10	< 10	< 15	1376 ± 125
10-15-02	- 6949	< 0.5	< 10	< 10	< 15	1493 ± 137
11-06-02	- 7557	< 0.5	< 10	< 10	< 15	1294 ± 164
12-02-02	- 8049	< 0.5	< 10	< 10	< 15	1378 ± 122
K-37[a]						
01-02-02						
02-04-02						
03-05-02	KMI - 1335	< 0.5	< 10	< 10	< 15	1454 ± 159
04-02-02	- 1919	< 0.5	< 10	< 10	< 15	1533 ± 175
05-02-02	- 2815	< 0.5	< 10	< 10	< 15	1411 ± 106
05-14-02	- 3284	< 0.5	< 10	< 10	< 15	1313 ± 123
06-04-02	- 3542	< 0.5	< 10	< 10	< 15	1394 ± 125
06-19-02	- 3985	< 0.5	< 10	< 10	< 15	1463 ± 153
07-02-02	- 4318	< 0.5	< 10	< 10	< 15	1448 ± 168
07-16-02	- 4706	< 0.5	< 10	< 10	< 15	1354 ± 121
08-01-02	- 5107	< 0.5	< 10	< 10	< 15	1435 ± 125
08-13-02	- 5386	< 0.5	< 10	< 10	< 15	1337 ± 176
09-03-02[b]						

[a] New location, first collection March, 2002.

[b] Location dropped from program.

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
Indicators						
K-38[a]						
01-02-02						
02-04-02						
03-04-02	KMI - 1336	< 0.5	< 10	< 10	< 15	1379 ± 100
04-01-02	- 1920	< 0.5	< 10	< 10	< 15	1355 ± 168
05-01-02	- 2816	< 0.5	< 10	< 10	< 15	1268 ± 117
05-14-02	- 3285	< 0.5	< 10	< 10	< 15	1316 ± 106
06-04-02	- 3543	< 0.5	< 10	< 10	< 15	1258 ± 110
06-19-02	- 3986	< 0.5	< 10	< 10	< 15	1268 ± 141
07-01-02	- 4319	< 0.5	< 10	< 10	< 15	1268 ± 104
07-16-02	- 4707	< 0.5	< 10	< 10	< 15	1342 ± 97
08-01-02	- 5108	< 0.5	< 10	< 10	< 15	1412 ± 124
08-13-02	- 5387	< 0.5	< 10	< 10	< 15	1297 ± 127
09-03-02	- 5731	< 0.5	< 10	< 10	< 15	1331 ± 118
09-18-02	- 6146	< 0.5	< 10	< 10	< 15	1208 ± 115
10-02-02	- 6388	< 0.5	< 10	< 10	< 15	1404 ± 193
10-15-02	- 6950	< 0.5	< 10	< 10	< 15	1345 ± 172
11-06-02	- 7558	< 0.5	< 10	< 10	< 15	1197 ± 128
12-03-02	- 8050	< 0.5	< 10	< 10	< 15	1221 ± 203

[a] New location, first collection March, 2002.

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
Control						
K-3						
01-03-02	KMI - 6	< 0.5	< 10	< 10	< 15	1537 ± 124
02-05-02	- 601	< 0.5	< 10	< 10	< 15	1428 ± 159
03-05-02	- 1329	< 0.5	< 10	< 10	< 15	1522 ± 176
04-02-02	- 1914	< 0.5	< 10	< 10	< 15	1442 ± 110
05-02-02	- 2810	< 0.5	< 10	< 10	< 15	1593 ± 115
05-14-02	- 3279	< 0.5	< 10	< 10	< 15	1467 ± 116
06-04-02	- 3537	< 0.5	< 10	< 10	< 15	1472 ± 79
06-19-02	- 3980	< 0.5	< 10	< 10	< 15	1290 ± 186
07-01-02	- 4313	< 0.5	< 10	< 10	< 15	1458 ± 107
07-16-02	- 4701	< 0.5	< 10	< 10	< 15	1438 ± 116
08-01-02	- 5101	< 0.5	< 10	< 10	< 15	1395 ± 59
08-13-02	- 5381	< 0.5	< 10	< 10	< 15	1302 ± 112
09-04-02	- 5726	< 0.5	< 10	< 10	< 15	1347 ± 169
09-18-02	- 6141	< 0.5	< 10	< 10	< 15	1476 ± 125
10-02-02	- 6382	< 0.5	< 10	< 10	< 15	1307 ± 187
10-15-02	- 6945	< 0.5	< 10	< 10	< 15	1469 ± 124
11-06-02	- 7553	< 0.5	< 10	< 10	< 15	1442 ± 196
12-03-02	- 8045	< 0.5	< 10	< 10	< 15	1568 ± 204
K-28						
01-03-02	KMI - 9	< 0.5	< 10	< 10	< 15	1383 ± 131
02-05-02	- 604	< 0.5	< 10	< 10	< 15	1410 ± 181
03-05-02	- 1332, 3	< 0.5	< 10	< 10	< 15	1404 ± 117
04-02-02	- 1917	< 0.5	< 10	< 10	< 15	1326 ± 165
05-02-02	- 2813	< 0.5	< 10	< 10	< 15	1409 ± 111
05-14-02	- 3282	< 0.5	< 10	< 10	< 15	1348 ± 178
06-04-02	- 3540	< 0.5	< 10	< 10	< 15	1499 ± 144
06-19-02	- 3983	< 0.5	< 10	< 10	< 15	1423 ± 121
07-02-02	- 4316	< 0.5	< 10	< 10	< 15	1408 ± 113
07-16-02	- 4704	< 0.5	< 10	< 10	< 15	1483 ± 131
08-01-02	- 5105	< 0.5	< 10	< 10	< 15	1288 ± 73
08-13-02	- 5384	< 0.5	< 10	< 10	< 15	1410 ± 112
09-04-02	- 5729	< 0.5	< 10	< 10	< 15	1519 ± 171
09-18-02	- 6144	< 0.5	< 10	< 10	< 15	1234 ± 173
10-01-02	- 6385, 6	< 0.5	< 10	< 10	< 15	1304 ± 106
10-15-02	- 6948	< 0.5	< 10	< 10	< 15	1191 ± 169
11-06-02	- 7556	< 0.5	< 10	< 10	< 15	1232 ± 155
12-03-02	- 8048	< 0.5	< 10	< 10	< 15	1358 ± 118

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 Sr-89 (pCi/L)	Sr-90 (pCi/L)	K (g/L)	Ca (g/L)	Ratios Sr-90 per gram Ca	Cs-137 per gram K
Indicators							
			K-5				
January	KMI -7	< 0.7	0.7 ± 0.3	1.87 ± 0.21	0.78	0.90	< 5.34
February	-602	< 0.7	1.8 ± 0.5	1.71 ± 0.15	0.83	2.17	< 5.84
March	-1330	< 0.8	2.0 ± 0.5	1.64 ± 0.13	0.82	2.44	< 6.09
April	-1915	< 0.8	0.8 ± 0.4	1.55 ± 0.21	1.00	0.80	< 6.46
May	-3322	< 0.8	1.2 ± 0.4	1.43 ± 0.14	1.10	1.09	< 6.99
June	-3989	< 0.9	1.3 ± 0.5	1.60 ± 0.12	0.84	1.55	< 6.24
July	-4709	< 0.7	0.8 ± 0.4	1.61 ± 0.13	0.85	0.94	< 6.22
August	-5389	< 0.9	0.7 ± 0.3	1.54 ± 0.15	0.86	0.81	< 6.47
September	-6148	< 1.2	1.6 ± 0.5	1.42 ± 0.19	0.93	1.72	< 7.06
October	-7465	< 0.8	1.2 ± 0.4	1.52 ± 0.17	0.90	1.33	< 6.58
November	-7554	< 1.3	0.9 ± 0.4	1.52 ± 0.20	0.92	0.98	< 6.60
December	-8046	< 1.2	1.5 ± 0.5	1.50 ± 0.20	0.91	1.65	< 6.67
			K-25				
January	KMI -8	< 0.8	1.1 ± 0.5	1.71 ± 0.20	0.86	1.28	< 5.84
February	-603	< 1.5	0.7 ± 0.4	1.66 ± 0.18	0.79	0.89	< 6.04
March	-1331	< 0.6	1.4 ± 0.4	1.66 ± 0.20	0.80	1.75	< 6.01
April	-1916	< 0.6	< 0.6	1.61 ± 0.19	0.93	< 0.65	< 6.21
May	-3323	< 0.7	0.8 ± 0.4	1.53 ± 0.16	0.87	0.92	< 6.54
June	-3990	< 0.6	0.7 ± 0.3	1.56 ± 0.16	0.81	0.86	< 6.42
July	-4710	< 0.7	< 0.6	1.53 ± 0.16	0.93	< 0.65	< 6.52
August	-5390	< 0.8	0.9 ± 0.4	1.59 ± 0.11	0.81	1.11	< 6.27
September	-6149	< 1.5	1.7 ± 0.5	1.55 ± 0.17	0.81	2.10	< 6.45
October	-7466	< 0.6	0.8 ± 0.4	1.49 ± 0.18	0.88	0.91	< 6.70
November	-7555	< 1.1	1.2 ± 0.4	1.60 ± 0.21	0.90	1.33	< 6.25
December	-8047	< 0.9	0.8 ± 0.3	1.57 ± 0.20	0.98	0.82	< 6.37

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 Sr-89 (pCi/L)	Sr-90 (pCi/L)	K (g/L)	Ca (g/L)	Ratios Sr-90 per gram Ca	Cs-137 per gram K
Indicators							
			K-34				
January	KMI -10	< 1.1	0.8 ± 0.4	1.63 ± 0.19	0.82	0.98	< 6.13
February	-605	< 0.7	0.6 ± 0.3	1.72 ± 0.20	0.85	0.71	< 5.82
March	-1334	< 0.8	0.7 ± 0.4	1.66 ± 0.10	0.83	0.84	< 6.02
April	-1918	< 0.6	1.2 ± 0.4	1.56 ± 0.15	0.82	1.46	< 6.42
May	-3326	< 0.6	0.8 ± 0.3	1.59 ± 0.17	0.88	0.91	< 6.29
June	-3992	< 0.8	< 0.7	1.63 ± 0.14	0.83	< 0.84	< 6.15
July	-4712	< 0.9	0.8 ± 0.4	1.59 ± 0.16	0.88	0.91	< 6.30
August	-5392	< 0.8	0.8 ± 0.3	1.85 ± 0.18	0.73	1.10	< 5.40
September	-6151	< 0.9	1.0 ± 0.4	1.65 ± 0.19	0.90	1.11	< 6.04
October	-7468	< 0.7	2.8 ± 0.6	1.66 ± 0.15	0.88	3.18	< 6.03
November	-7557	< 1.0	1.7 ± 0.4	1.50 ± 0.19	0.84	2.02	< 6.68
December	-8049	< 0.9	1.6 ± 0.4	1.59 ± 0.14	1.10	1.45	< 6.28
			K-37[a]				
January							
February							
March	KMI -1335	< 1.0	1.0 ± 0.3	1.68 ± 0.18	0.88	1.14	< 5.95
April	-1919	< 0.7	1.1 ± 0.4	1.77 ± 0.20	0.88	1.25	< 5.64
May	-3327	< 0.8	1.2 ± 0.4	1.57 ± 0.13	0.99	1.21	< 6.35
June	-3993	< 1.0	< 0.7	1.65 ± 0.16	0.85	< 0.82	< 6.06
July	-4713	< 0.7	0.9 ± 0.4	1.62 ± 0.17	0.93	0.97	< 6.17
August	-5393	< 1.0	0.8 ± 0.4	1.60 ± 0.17	0.78	1.03	< 6.24
September							
October							
November							
December							

[a] New location, first collection March, 2002. Location dropped September, 2002.

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 Sr-89 (pCi/L)	Sr-90 (pCi/L)	K (g/L)	Ca (g/L)	Ratios Sr-90 per gram Ca	Cs-137 per gram K
Indicators							
			K-38[a]				
January							
February							
March	KMI -1336	< 0.6	1.8 ± 0.4	1.59 ± 0.12	0.89	2.02	< 6.27
April	-1920	< 0.6	2.1 ± 0.5	1.57 ± 0.19	0.83	2.53	< 6.38
May	-3328	< 0.7	1.4 ± 0.4	1.49 ± 0.13	0.90	1.56	< 6.70
June	-3994	< 0.7	1.6 ± 0.4	1.46 ± 0.15	0.81	1.98	< 6.85
July	-4714	< 0.7	1.4 ± 0.5	1.51 ± 0.12	0.94	1.49	< 6.63
August	-5394	< 0.7	0.8 ± 0.3	1.57 ± 0.15	0.78	1.03	< 6.39
September	-6152	< 0.9	1.2 ± 0.4	1.47 ± 0.13	0.80	1.50	< 6.81
October	-7469	< 0.7	1.3 ± 0.4	1.59 ± 0.21	0.89	1.46	< 6.29
November	-7558	< 1.1	1.0 ± 0.4	1.38 ± 0.15	0.83	1.20	< 7.23
December	-8050	< 1.0	1.3 ± 0.4	1.41 ± 0.23	0.87	1.49	< 7.08

[a] New location, first collection March, 2002.

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 Sr-89 (pCi/L)	Sr-90 (pCi/L)	K (g/L)	Ca (g/L)	Ratios Sr-90 per gram Ca	Cs-137 per gram K
Control							
			K-3				
January	KMI -6	< 0.8	1.2 ± 0.3	1.78 ± 0.14	0.92	1.30	< 5.63
February	-601	< 0.8	0.9 ± 0.4	1.65 ± 0.18	0.92	0.98	< 6.06
March	-1329	< 0.7	1.6 ± 0.4	1.76 ± 0.20	0.85	1.88	< 5.68
April	-1914	< 0.6	1.4 ± 0.4	1.67 ± 0.13	1.06	1.32	< 6.00
May	-3321	< 0.6	0.9 ± 0.4	1.77 ± 0.13	0.93	0.97	< 5.65
June	-3987, 8	< 0.7	1.0 ± 0.3	1.60 ± 0.15	0.76	1.32	< 6.26
July	-4708	< 0.7	1.6 ± 0.5	1.67 ± 0.13	0.90	1.78	< 5.97
August	-5388	< 0.9	1.1 ± 0.4	1.56 ± 0.10	0.82	1.34	< 6.41
September	-6147	< 0.9	1.1 ± 0.4	1.63 ± 0.17	0.86	1.28	< 6.13
October	-7464	< 0.8	1.1 ± 0.4	1.60 ± 0.18	0.95	1.16	< 6.23
November	-7553	< 1.4	1.4 ± 0.4	1.67 ± 0.23	0.92	1.52	< 6.00
December	-8045	< 1.0	0.9 ± 0.4	1.81 ± 0.24	0.95	0.95	< 5.52
			K-28				
January	KMI -9	< 0.9	0.8 ± 0.3	1.60 ± 0.15	1.06	0.75	< 6.25
February	-604	< 0.7	0.8 ± 0.3	1.63 ± 0.21	0.83	0.96	< 6.13
March	-1332, 3	< 0.5	1.2 ± 0.3	1.62 ± 0.14	0.87	1.38	< 6.16
April	-1917	< 0.6	1.1 ± 0.4	1.53 ± 0.19	0.83	1.33	< 6.52
May	-3325	< 1.3	1.7 ± 0.4	1.59 ± 0.17	0.88	1.93	< 6.27
June	-3991	< 0.7	1.1 ± 0.4	1.69 ± 0.15	0.85	1.29	< 5.92
July	-4711	< 0.8	1.4 ± 0.5	1.67 ± 0.14	0.85	1.65	< 5.98
August	-5391	< 0.7	1.1 ± 0.3	1.56 ± 0.11	0.90	1.22	< 6.41
September	-6150	< 0.8	1.6 ± 0.4	1.59 ± 0.20	0.95	1.68	< 6.28
October	-7467	< 0.7	1.1 ± 0.4	1.44 ± 0.16	0.83	1.33	< 6.93
November	-7556	< 0.9	1.2 ± 0.4	1.42 ± 0.18	0.86	1.40	< 7.02
December	-8048	< 0.9	0.7 ± 0.4	1.57 ± 0.14	0.90	0.78	< 6.37

Table 16. Well water, analyses for gross alpha[a], gross beta, potassium-40, and gamma-emitting isotopes.
Collection: Quarterly.

Sample Description and Concentration (pCi/L)

Indicator

K-1g

Date Collected	01-02-02	04-01-02	07-01-02	10-01-02
Lab Code	KWW-43	KWW-2043	KWW-4352	KWW-6470
Gross alpha	3.3 ± 2.0	< 2.9	< 2.3	< 3.1
Gross beta	4.6 ± 2.4	< 4.1	3.8 ± 1.3	5.2 ± 2.4
K-40 (f.p.)	2.25	2.70	2.25	2.68
Mn-54	< 15	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30	< 30
Co-58	< 15	< 15	< 15	< 15
Co-60	< 15	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15	< 15

K-1h

Date Collected	01-02-02	04-01-02	07-01-02	10-01-02
Lab Code	KWW-44	KWW-2044	KWW-4353	KWW-6471
Gross alpha	2.1 ± 1.3	2.8 ± 1.8	< 2.4	3.7 ± 2.3
Gross beta	4.3 ± 1.2	5.2 ± 1.5	3.1 ± 1.4	6.0 ± 1.4
K-40 (f.p.)	2.34	2.69	2.25	2.87
Mn-54	< 15	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30	< 30
Co-58	< 15	< 15	< 15	< 15
Co-60	< 15	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15	< 15

[a] Gross Alpha analyses required on samples from K-1g and K-1h only.

Table 16. Well water, analyses for gross alpha, gross beta, potassium-40, and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/L)

Indicator

K-10

Date Collected	01-02-02	04-01-02	07-01-02	10-01-02
Lab Code	KWW-45	KWW-2045	KWW-4354	KWW-6472
Gross beta	< 2.1	< 3.0[a]	< 2.0	2.6 ± 1.1
K-40 (f.p.)	< 0.87	< 0.87	< 0.87	0.89
Mn-54	< 15	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30	< 30
Co-58	< 15	< 15	< 15	< 15
Co-60	< 15	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15	< 15

K-11

Date Collected	01-02-02	04-01-02	07-01-02	10-01-02
Lab Code	KWW-46	KWW-2046	KWW-4355	KWW-6473
Gross beta	1.1 ± 0.5	1.9 ± 0.4	1.1 ± 0.5	< 0.9
K-40 (f.p.)	< 0.87	0.97	< 0.87	0.89
Mn-54	< 15	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30	< 30
Co-58	< 15	< 15	< 15	< 15
Co-60	< 15	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15	< 15

[a] Recount of original sample; initial analysis result 4.8 ± 2.4 pCi/L.

Table 16. Well water, analyses for gross alpha, gross beta, potassium-40, and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/L)

Indicator

K-25

Date Collected	01-02-02	04-01-02	07-01-02	10-01-02
Lab Code	KWW-48	KWW-2048	KWW-4356	KWW-6474
Gross beta	1.5 ± 0.6	1.2 ± 0.5	1.7 ± 0.5	1.1 ± 0.5
K-40 (f.p.)	0.95	1.12	0.87	1.02
Mn-54	< 15	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30	< 30
Co-58	< 15	< 15	< 15	< 15
Co-60	< 15	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15	< 15

Control

K-13

Date Collected	01-02-02	04-01-02	07-01-02	10-01-02
Lab Code	KWW-47	KWW-2047	KWW-4357	KWW-6475
Gross beta	1.3 ± 0.3	0.9 ± 0.5	1.5 ± 0.5	1.1 ± 0.5
K-40 (f.p.)	0.87	1.00	0.95	1.14
Mn-54	< 15	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30	< 30
Co-58	< 15	< 15	< 15	< 15
Co-60	< 15	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15	< 15

KEWAUNEE

Table 17. Well waters from K-1g , analyses for tritium, strontium-89, and strontium-90. Collection: Quarterly.

Date Collected	Lab Code	Concentration (pCi/L)		
		H-3	Sr-89	Sr-90
01-02-02	KWW - 43	< 130	< 0.8	< 0.5
04-01-02	- 2043	< 134	< 0.6	< 0.5
07-01-02	- 4352	< 132	< 1.0	< 0.5
10-01-02	- 6470	< 176	< 0.8	0.6 ± 0.3

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-29	K-32
Date Collected	09-03-02	09-03-02	09-04-02
Lab Code	KME-5715	KME-5716	KME-5717
Gross Alpha	< 0.030	< 0.060	< 0.025
Gross Beta	2.74 ± 0.08	3.40 ± 0.13	1.81 ± 0.09
Be-7	< 0.45	< 0.26	< 0.079
K-40	2.45 ± 0.61	2.84 ± 0.36	1.44 ± 0.21
Nb-95	< 0.058	< 0.054	< 0.028
Zr-95	< 0.11	< 0.044	< 0.014
Ru-103	< 0.074	< 0.030	< 0.013
Ru-106	< 0.37	< 0.15	< 0.094
Cs-134	< 0.038	< 0.014	< 0.011
Cs-137	< 0.037	< 0.016	< 0.010
Ce-141	< 0.14	< 0.057	< 0.048
Ce-144	< 0.11	< 0.099	< 0.076

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	01-02-02	04-01-02	07-02-02	10-01-02
Lab Code	KE-11	KE-1912	KE-4320	KE-6380
Gross beta	1.25 ± 0.06	1.46 ± 0.06	1.32 ± 0.05	1.31 ± 0.04
Sr-89	< 0.016	< 0.016	< 0.006	< 0.004
Sr-90	< 0.006	< 0.011	< 0.006	< 0.003
Be-7	< 0.038	< 0.073	< 0.070	< 0.082
K-40	1.32 ± 0.14	1.22 ± 0.23	1.17 ± 0.18	1.21 ± 0.21
Nb-95	< 0.003	< 0.005	< 0.007	< 0.006
Zr-95	< 0.006	< 0.013	< 0.017	< 0.019
Ru-103	< 0.009	< 0.008	< 0.008	< 0.008
Ru-106	< 0.040	< 0.054	< 0.047	< 0.069
Cs-134	< 0.005	< 0.009	< 0.006	< 0.006
Cs-137	< 0.005	< 0.007	< 0.008	< 0.008
Ce-141	< 0.011	< 0.010	< 0.016	< 0.015
Ce-144	< 0.029	< 0.027	< 0.061	< 0.049

Location	K-32			
Date Collected	01-02-02	04-02-02	07-02-02	10-02-02
Lab Code	KE-12	KE-1913	KE-4321	KE-6381
Gross beta	1.28 ± 0.06[a]	1.26 ± 0.08	1.39 ± 0.05	1.33 ± 0.04
Sr-89	< 0.017	< 0.009	< 0.005	< 0.004
Sr-90	< 0.006	< 0.006	< 0.004	< 0.003
Be-7	< 0.053	< 0.051	< 0.079	< 0.054
K-40	1.37 ± 0.14	1.25 ± 0.20	1.11 ± 0.21	1.11 ± 0.17
Nb-95	< 0.004	< 0.006	< 0.009	< 0.008
Zr-95	< 0.011	< 0.014	< 0.021	< 0.006
Ru-103	< 0.007	< 0.007	< 0.006	< 0.007
Ru-106	< 0.031	< 0.058	< 0.11	< 0.062
Cs-134	< 0.005	< 0.008	< 0.010	< 0.008
Cs-137	< 0.005	< 0.006	< 0.010	< 0.005
Ce-141	< 0.011	< 0.012	< 0.018	< 0.015
Ce-144	< 0.029	< 0.036	< 0.072	< 0.043

[a] Result of reanalysis.

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)			
	Indicator		
Location	K-17[a]	K-23	
Date Collected		08-01-02	08-01-02
Lab Code		KVE-5121	KVE-5122
Type		Clover	Wheat
Gross beta		5.33 ± 0.15	7.96 ± 0.28
Sr-89		< 0.016	< 0.047
Sr-90		0.018 ± 0.005	< 0.026
Be-7		1.61 ± 0.32	1.31 ± 0.27
K-40		5.27 ± 0.50	4.15 ± 0.55
Nb-95		< 0.012	< 0.022
Zr-95		< 0.027	< 0.041
Ru-103		< 0.016	< 0.021
Ru-106		< 0.17	< 0.11
Cs-134		< 0.021	< 0.015
Cs-137		< 0.015	< 0.014
Ce-141		< 0.042	< 0.039
Ce-144		< 0.11	< 0.097

Location	K-26 (control)			
Date Collected	09-04-02	09-04-02	09-04-02	09-04-02
Lab Code	KVE-5718	KVE-5719	KVE-5720	KVE-5721
Type	Cabbage	Cucumber	Corn	Watermelon
Gross beta	1.99 ± 0.04	1.93 ± 0.04	2.27 ± 0.05	2.28 ± 0.04
Sr-89	< 0.004	< 0.002	< 0.004	< 0.002
Sr-90	0.006 ± 0.001	0.003 ± 0.001	0.003 ± 0.001	0.004 ± 0.001
Be-7	< 0.090	< 0.056	< 0.040	< 0.021
K-40	1.52 ± 0.26	1.65 ± 0.18	1.79 ± 0.19	1.78 ± 0.13
Nb-95	< 0.011	< 0.006	< 0.007	< 0.003
Zr-95	< 0.029	< 0.012	< 0.010	< 0.007
Ru-103	< 0.008	< 0.006	< 0.008	< 0.004
Ru-106	< 0.11	< 0.053	< 0.040	< 0.031
Cs-134	< 0.009	< 0.006	< 0.007	< 0.004
Cs-137	< 0.012	< 0.005	< 0.006	< 0.004
Ce-141	< 0.018	< 0.012	< 0.019	< 0.009
Ce-144	< 0.082	< 0.035	< 0.056	< 0.018

[a] No vegetable samples available.

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)	
Date Collected	09-04-02	10-02-02
Lab Code	KVE-5722	KVE-6401
Type	Musk melon	Pumpkin
Gross beta	3.07 ± 0.06	1.62 ± 0.03
Sr-89	< 0.004	< 0.001
Sr-90	< 0.003	0.003 ± 0.001
Be-7	< 0.071	< 0.051
K-40	2.72 ± 0.23	1.77 ± 0.27
Nb-95	< 0.008	< 0.009
Zr-95	< 0.011	< 0.028
Ru-103	< 0.006	< 0.012
Ru-106	< 0.047	< 0.087
Cs-134	< 0.008	< 0.011
Cs-137	< 0.009	< 0.011
Ce-141	< 0.013	< 0.022
Ce-144	< 0.052	< 0.087

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
Date Collected	01-03-02	01-03-02
Lab Code	KCF-13	KCF-14
Type	Hay	Silage
Gross beta	11.60 ± 0.23	4.24 ± 0.10
Sr-89	< 0.024	< 0.008
Sr-90	0.017 ± 0.005	0.006 ± 0.002
Be-7	0.62 ± 0.23	0.42 ± 0.15
K-40	10.72 ± 0.69	3.60 ± 0.42
Nb-95	< 0.013	< 0.014
Zr-95	< 0.029	< 0.021
Ru-103	< 0.016	< 0.014
Ru-106	< 0.13	< 0.10
Cs-134	< 0.018	< 0.013
Cs-137	< 0.017	< 0.011
Ce-141	< 0.040	< 0.021
Ce-144	< 0.12	< 0.062

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

Sample Description and Concentration (pCi/g wet)				
	Indicator			
Location	K-5	K-5	K-25	K-25
Date Collected	01-02-02	01-02-02	01-02-02	01-02-02
Lab Code	KCF-15	KCF-16	KCF-17	KCF-18
Type	Hay	Silage	Hay	Silage
Gross beta	25.77 ± 0.52	10.13 ± 0.21	17.91 ± 0.40	8.48 ± 0.19
Sr-89	< 0.096	< 0.015	< 0.036	< 0.072
Sr-90	0.041 ± 0.018	0.007 ± 0.003	0.057 ± 0.011	0.068 ± 0.017
Be-7	< 0.39	< 0.16	< 0.65	< 0.23
K-40	18.72 ± 1.01	6.26 ± 0.52	17.41 ± 1.53	8.01 ± 0.62
Nb-95	< 0.036	< 0.015	< 0.064	< 0.018
Zr-95	< 0.056	< 0.033	< 0.145	< 0.046
Ru-103	< 0.039	< 0.017	< 0.039	< 0.020
Ru-106	< 0.31	< 0.12	< 0.52	< 0.18
Cs-134	< 0.020	< 0.019	< 0.037	< 0.020
Cs-137	< 0.033	< 0.014	< 0.045	< 0.016
Ce-141	< 0.084	< 0.034	< 0.12	< 0.036
Ce-144	< 0.25	< 0.13	< 0.36	< 0.13
Location	K-34	K-34		
Date Collected	01-02-02	01-02-02		
Lab Code	KCF-19	KCF-20, 21		
Type	Silage	Hay		
Gross beta	8.26 ± 0.26	7.89 ± 0.14		
Sr-89	< 0.031	< 0.034		
Sr-90	0.014 ± 0.006	0.011 ± 0.005		
Be-7	< 0.46	0.42 ± 0.14		
K-40	8.38 ± 1.11	6.59 ± 0.33		
Nb-95	< 0.054	< 0.014		
Zr-95	< 0.064	< 0.026		
Ru-103	< 0.026	< 0.008		
Ru-106	< 0.41	< 0.064		
Cs-134	< 0.025	< 0.010		
Cs-137	< 0.040	< 0.007		
Ce-141	< 0.078	< 0.023		
Ce-144	< 0.29	< 0.057		

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

Sample Description and Concentration

	Indicator			
Location	K-1b	K-1f	K-5	K-25
Date Collected	05-01-02	06-11-02	05-01-02	05-01-02
Lab Code	KG-2821	KG-3922	KG-2823	KG-2824
Gross beta	6.70 ± 0.15	5.61 ± 0.18	14.45 ± 0.31	7.85 ± 0.17
Sr-89	< 0.018 [a]	< 0.021	< 0.018	< 0.008
Sr-90	0.013 ± 0.004 [a]	< 0.010	0.016 ± 0.007	< 0.004
Be-7	3.79 ± 0.29	< 0.32	4.23 ± 0.31	0.62 ± 0.23
K-40	5.68 ± 0.56	5.64 ± 0.71	13.39 ± 0.63	5.56 ± 0.71
Mn-54	< 0.015	< 0.018	< 0.014	< 0.025
Co-58	< 0.012	< 0.016	< 0.014	< 0.022
Co-60	< 0.019	< 0.029	< 0.017	< 0.027
Nb-95	< 0.018	< 0.029	< 0.012	< 0.032
Zr-95	< 0.025	< 0.038	< 0.031	< 0.049
Ru-103	< 0.018	< 0.036	< 0.019	< 0.022
Ru-106	< 0.13	< 0.12	< 0.16	< 0.20
Cs-134	< 0.012	< 0.024	< 0.018	< 0.019
Cs-137	< 0.016	< 0.029	< 0.013	< 0.032
Ce-141	< 0.026	< 0.054	< 0.035	< 0.036
Ce-144	< 0.10	< 0.16	< 0.14	< 0.12

	Indicator			Control
Location	K-34	K-37	K-38	K-3
Date Collected	05-01-02	05-01-02	05-01-02	05-01-02
Lab Code	KG-2825	KG-2826	KG-2827	KG-2822
Gross beta	6.85 ± 0.20	4.73 ± 0.11	7.37 ± 0.22	8.30 ± 0.16
Sr-89	< 0.043 [a]	< 0.007	< 0.018	< 0.016
Sr-90	< 0.017 [a]	< 0.003	< 0.009	0.020 ± 0.007
Be-7	3.22 ± 0.35	3.34 ± 0.41	2.92 ± 0.45	0.99 ± 0.18
K-40	6.69 ± 0.54	7.27 ± 0.80	5.52 ± 0.78	6.77 ± 0.51
Mn-54	< 0.022	< 0.015	< 0.024	< 0.010
Co-58	< 0.010	< 0.024	< 0.023	< 0.013
Co-60	< 0.017	< 0.012	< 0.022	< 0.018
Nb-95	< 0.018	< 0.017	< 0.037	< 0.007
Zr-95	< 0.041	< 0.036	< 0.033	< 0.028
Ru-103	< 0.023	< 0.023	< 0.023	< 0.013
Ru-106	< 0.13	< 0.23	< 0.21	< 0.080
Cs-134	< 0.023	< 0.028	< 0.029	< 0.016
Cs-137	< 0.021	< 0.018	< 0.026	< 0.012
Ce-141	< 0.042	< 0.048	< 0.035	< 0.028
Ce-144	< 0.13	< 0.10	< 0.13	< 0.11

[a] result of reanalysis.

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

Sample Description and Concentration				
	Indicator			
Location	K-1b	K-1f	K-5	K-25
Date Collected	07-01-02	07-01-02	07-01-02	07-01-02
Lab Code	KG-4325	KG-4326	KG-4328	KG-4329, 30
Gross beta	4.55 ± 0.14	6.61 ± 0.22	7.98 ± 0.27	8.05 ± 0.18
Sr-89	< 0.009	< 0.034	< 0.033	< 0.025
Sr-90	< 0.005	< 0.013	< 0.014	< 0.016
Be-7	0.81 ± 0.27	1.06 ± 0.31	1.30 ± 0.36	1.25 ± 0.35
K-40	3.39 ± 0.59	5.85 ± 0.77	7.16 ± 0.99	8.08 ± 0.72
Mn-54	< 0.019	< 0.029	< 0.019	< 0.025
Co-58	< 0.018	< 0.021	< 0.033	< 0.032
Co-60	< 0.024	< 0.023	< 0.020	< 0.025
Nb-95	< 0.021	< 0.019	< 0.023	< 0.034
Zr-95	< 0.034	< 0.023	< 0.057	< 0.056
Ru-103	< 0.030	< 0.030	< 0.023	< 0.029
Ru-106	< 0.15	< 0.19	< 0.28	< 0.22
Cs-134	< 0.012	< 0.026	< 0.029	< 0.019
Cs-137	< 0.020	< 0.024	< 0.031	< 0.026
Ce-141	< 0.034	< 0.033	< 0.050	< 0.038
Ce-144	< 0.13	< 0.12	< 0.10	< 0.13

	Indicator			Control
Location	K-34	K-37	K-38	K-3
Date Collected	07-01-02	07-01-02	07-01-02	07-01-02
Lab Code	KG-4331	KG-4332	KG-4333	KG-4327
Gross beta	6.72 ± 0.22	13.03 ± 0.38	24.55 ± 0.63	6.11 ± 0.20
Sr-89	< 0.011	< 0.053	< 0.11	< 0.009
Sr-90	< 0.005	< 0.021	< 0.046	< 0.006
Be-7	0.88 ± 0.33	1.56 ± 0.43	5.38 ± 0.52	0.73 ± 0.33
K-40	6.19 ± 0.79	11.67 ± 1.26	23.31 ± 1.08	7.34 ± 0.88
Mn-54	< 0.033	< 0.026	< 0.040	< 0.016
Co-58	< 0.017	< 0.020	< 0.026	< 0.031
Co-60	< 0.024	< 0.029	< 0.021	< 0.030
Nb-95	< 0.031	< 0.023	< 0.025	< 0.023
Zr-95	< 0.052	< 0.047	< 0.086	< 0.043
Ru-103	< 0.034	< 0.027	< 0.035	< 0.031
Ru-106	< 0.21	< 0.24	< 0.29	< 0.24
Cs-134	< 0.031	< 0.021	< 0.045	< 0.029
Cs-137	< 0.029	< 0.030	< 0.041	< 0.021
Ce-141	< 0.037	< 0.041	< 0.061	< 0.070
Ce-144	< 0.19	< 0.18	< 0.24	< 0.24

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

Sample Description and Concentration (pCi/g wet)				
	Indicator			Control
Location	K-1b	K-1f	K-5	K-25
Date Collected	10-01-02	10-01-02	10-01-02	10-01-02
Lab Code	KG-6394	KG-6395	KG-6397	KG-6398
Gross beta	5.97 ± 0.24	6.94 ± 0.24	9.37 ± 0.32	9.07 ± 0.27
Sr-89	< 0.017	< 0.016	< 0.013	< 0.012
Sr-90	0.014 ± 0.003	0.023 ± 0.005	0.022 ± 0.005	< 0.005
Be-7	1.27 ± 0.30	2.05 ± 0.33	3.55 ± 0.51	0.45 ± 0.21
K-40	4.99 ± 0.66	5.38 ± 0.70	8.36 ± 1.06	6.74 ± 0.79
Mn-54	< 0.019	< 0.015	< 0.016	< 0.022
Co-58	< 0.026	< 0.020	< 0.023	< 0.020
Co-60	< 0.020	< 0.023	< 0.015	< 0.022
Nb-95	< 0.027	< 0.022	< 0.025	< 0.016
Zr-95	< 0.024	< 0.024	< 0.026	< 0.044
Ru-103	< 0.027	< 0.027	< 0.019	< 0.014
Ru-106	< 0.13	< 0.26	< 0.25	< 0.18
Cs-134	< 0.017	< 0.019	< 0.029	< 0.029
Cs-137	< 0.032	< 0.028	< 0.023	< 0.024
Ce-141	< 0.047	< 0.052	< 0.042	< 0.037
Ce-144	< 0.18	< 0.19	< 0.17	< 0.18
	Indicator			Control
Location	K-34	K-37	K-38	K-3
Date Collected	10-01-02	10-01-02	10-01-02	10-01-02
Lab Code	KG-6399	NS[a]	KG-6400	KG-6396
Gross beta	8.98 ± 0.33		6.94 ± 0.24	7.18 ± 0.24
Sr-89	< 0.024		< 0.013	< 0.013
Sr-90	0.028 ± 0.007		0.009 ± 0.004	0.013 ± 0.005
Be-7	4.25 ± 0.47		2.96 ± 0.47	1.17 ± 0.31
K-40	7.45 ± 0.84		7.85 ± 1.14	6.52 ± 0.76
Mn-54	< 0.022		< 0.045	< 0.025
Co-58	< 0.021		< 0.024	< 0.022
Co-60	< 0.034		< 0.032	< 0.020
Nb-95	< 0.030		< 0.020	< 0.025
Zr-95	< 0.034		< 0.082	< 0.029
Ru-103	< 0.022		< 0.032	< 0.025
Ru-106	< 0.22		< 0.28	< 0.27
Cs-134	< 0.020		< 0.031	< 0.029
Cs-137	< 0.019		< 0.040	< 0.024
Ce-141	< 0.047		< 0.049	< 0.053
Ce-144	< 0.16		< 0.18	< 0.17

[a] No Sample; Location dropped from sampling program.

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)

	Indicator		
Location	K-1f	K-5	K-25
Date Collected	05-01-02	05-01-02	05-01-02
Lab Code	KSO-2833	KSO-2835	KSO-2836
Gross alpha	5.00 ± 2.00	7.14 ± 2.51	10.09 ± 2.65
Gross beta	23.01 ± 2.16	28.75 ± 2.42	32.53 ± 2.58
Sr-89	< 0.045	< 0.033	< 0.036
Sr-90	0.14 ± 0.044	0.076 ± 0.020	0.11 ± 0.022
Be-7	< 0.16	< 0.20	< 0.31
K-40	17.38 ± 0.74	20.80 ± 0.78	19.99 ± 0.98
Nb-95	< 0.028	< 0.031	< 0.033
Zr-95	< 0.034	< 0.037	< 0.044
Ru-103	< 0.020	< 0.014	< 0.027
Ru-106	< 0.13	< 0.16	< 0.14
Cs-134	< 0.012	< 0.016	< 0.036
Cs-137	< 0.018	0.058 ± 0.025	0.088 ± 0.031
Ce-141	< 0.052	< 0.056	< 0.037
Ce-144	< 0.07	< 0.12	< 0.13
Location	K-1f	K-5	K-25
Date Collected	10-01-02	10-01-02	10-01-02
Lab Code	KSO-6476	KSO-6478, 9	KSO-6480
Gross alpha	7.60 ± 4.32	7.78 ± 3.16	7.39 ± 4.15
Gross beta	20.55 ± 3.68	31.73 ± 2.95	26.72 ± 3.85
Sr-89	< 0.042	< 0.043	< 0.038
Sr-90	0.057 ± 0.015	0.091 ± 0.013	0.034 ± 0.013
Be-7	< 0.12	< 0.19	< 0.10
K-40	17.43 ± 0.65	20.10 ± 0.39	17.04 ± 0.72
Nb-95	< 0.010	< 0.016	< 0.012
Zr-95	< 0.029	< 0.021	< 0.017
Ru-103	< 0.015	< 0.011	< 0.013
Ru-106	< 0.12	< 0.086	< 0.058
Cs-134	< 0.013	< 0.015	< 0.008
Cs-137	0.026 ± 0.016	0.072 ± 0.011	0.087 ± 0.021
Ce-141	< 0.026	< 0.020	< 0.013
Ce-144	< 0.054	< 0.065	< 0.075

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)

	Indicator		
Location	K-34	K-37	K-38
Date Collected	05-01-02	05-01-02	05-01-02
Lab Code	KSO-2837	KSO-2838	KSO-2839
Gross alpha	7.64 ± 2.81	2.83 ± 2.58	10.02 ± 2.83
Gross beta	30.59 ± 2.87	17.99 ± 2.56	33.69 ± 2.42
Sr-89	< 0.035	< 0.066	< 0.029
Sr-90	0.12 ± 0.024	< 0.026	0.050 ± 0.013
Be-7	< 0.20	0.51 ± 0.16	0.61 ± 0.28
K-40	18.36 ± 1.08	9.99 ± 0.54	22.40 ± 1.20
Nb-95	< 0.022	< 0.020	< 0.025
Zr-95	< 0.045	< 0.014	< 0.069
Ru-103	< 0.024	< 0.014	< 0.030
Ru-106	< 0.27	< 0.056	< 0.18
Cs-134	< 0.037	< 0.012	< 0.040
Cs-137	0.083 ± 0.040	< 0.013	0.12 ± 0.030
Ce-141	< 0.047	< 0.042	< 0.051
Ce-144	< 0.14	< 0.080	< 0.11
Location	K-34	K-37	K-38
Date Collected	10-01-02	10-01-02	10-01-02
Lab Code	KSO-6481	NS[a]	KSO-6482
Gross alpha	6.64 ± 4.46		14.29 ± 5.74
Gross beta	25.83 ± 3.99		33.04 ± 4.37
Sr-89	< 0.053		< 0.044
Sr-90	0.098 ± 0.023		0.056 ± 0.016
Be-7	< 0.13		0.88 ± 0.14
K-40	18.33 ± 0.63		21.00 ± 0.65
Nb-95	< 0.018		< 0.014
Zr-95	< 0.031		< 0.013
Ru-103	< 0.013		< 0.014
Ru-106	< 0.10		< 0.085
Cs-134	< 0.005		< 0.010
Cs-137	0.11 ± 0.018		0.12 ± 0.016
Ce-141	< 0.027		< 0.026
Ce-144	< 0.055		< 0.096

[a] No Sample; Location dropped from sampling program.

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)

	Control	
Location	K-3	K-3
Date Collected	05-01-02	10-01-02
Lab Code	KSO-2834	KSO-6477
Gross alpha	9.83 ± 2.47	6.03 ± 3.86
Gross beta	27.71 ± 2.29	30.40 ± 4.17
Sr-89	< 0.042	< 0.077
Sr-90	0.20 ± 0.029	0.037 ± 0.015
Be-7	< 0.22	< 0.12
K-40	18.54 ± 0.78	19.53 ± 0.65
Nb-95	< 0.018	< 0.011
Zr-95	< 0.033	< 0.031
Ru-103	< 0.021	< 0.018
Ru-106	< 0.083	< 0.10
Cs-134	< 0.022	< 0.014
Cs-137	0.15 ± 0.025	0.18 ± 0.023
Ce-141	< 0.054	< 0.028
Ce-144	< 0.083	< 0.095

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

Sample Description and Concentration (pCi/L)			
Indicator			
K-1a			
Date Collected	01-02-02	02-04-02	03-04-02
Lab Code	NS[a]	NS[a]	NS[a]
Gross beta			
Suspended Solids	-	-	-
Dissolved Solids	-	-	-
Total Residue	-	-	-
K-40 (f.p.)			
Mn-54	-	-	-
Fe-59	-	-	-
Co-58	-	-	-
Co-60	-	-	-
Zn-65	-	-	-
Zr-Nb-95	-	-	-
Cs-134	-	-	-
Cs-137	-	-	-
Ba-La-140	-	-	-
K-1b			
Date Collected	01-02-02	02-04-02	03-04-02
Lab Code	KSW-53	KSW-635	KSW-1366
Gross beta			
Suspended Solids	< 0.4	< 0.3	< 0.3
Dissolved Solids	3.5 ± 0.3	3.0 ± 0.6	4.4 ± 0.7
Total Residue	3.5 ± 0.3	3.0 ± 0.6	4.4 ± 0.7
K-40 (f.p.)	2.08	1.56	1.90
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15

[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			
K-1a			
Date Collected	04-01-02	05-01-02	06-03-02
Lab Code	KSW-2034	KSW-2920	KSW-3558
Gross beta			
Suspended Solids	< 0.3	< 0.4	0.8 ± 0.2
Dissolved Solids	8.5 ± 1.0	5.4 ± 0.9	10.4 ± 1.0
Total Residue	8.5 ± 1.0	5.4 ± 0.9	11.2 ± 1.0
K-40 (f.p.)	5.51	5.71	7.67
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15
K-1b			
Date Collected	04-01-02	05-01-02	06-03-02
Lab Code	KSW-2035	KSW-2921	KSW-3559
Gross beta			
Suspended Solids	< 0.3	< 0.3	< 0.3
Dissolved Solids	3.4 ± 0.6	4.5 ± 0.7	7.6 ± 0.8
Total Residue	3.4 ± 0.6	4.5 ± 0.7	7.6 ± 0.8
K-40 (f.p.)	1.54	2.73	4.90
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15

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

Sample Description and Concentration (pCi/L)			
Indicator			
K-1a			
Date Collected	07-01-02	08-01-02	09-03-02
Lab Code	KSW-4343	KSW-5111	KSW-5743
Gross beta			
Suspended Solids	< 0.4	< 0.5	< 0.6
Dissolved Solids	7.7 ± 1.1	10.2 ± 1.0	10.2 ± 1.2
Total Residue	7.7 ± 1.1	10.2 ± 1.0	10.2 ± 1.2
K-40 (f.p.)	5.71	8.39	9.95
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15
K-1b			
Date Collected	07-01-02	08-01-02	09-03-02
Lab Code	KSW-4344	KSW-5112	KSW-5744
Gross beta			
Suspended Solids	< 0.4	< 0.3	< 0.3
Dissolved Solids	4.0 ± 0.7	3.6 ± 0.6	3.9 ± 0.7
Total Residue	4.0 ± 0.7	3.6 ± 0.6	3.9 ± 0.7
K-40 (f.p.)	2.16	1.73	2.25
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15

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

Sample Description and Concentration (pCi/L)			
Indicator			
K-1a			
Date Collected	10-01-02	11-05-02	12-02-02
Lab Code	KSW-6402	KSW-7569, 70	KSW-8052
Gross beta			
Suspended Solids	< 0.7	< 1.0	< 1.2
Dissolved Solids	10.8 ± 1.1	16.1 ± 0.9	13.5 ± 1.3
Total Residue	10.8 ± 1.1	16.1 ± 0.9	13.5 ± 1.3
K-40 (f.p.)	9.86	14.79	12.46
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15
K-1b			
Date Collected	10-01-02	11-05-02	12-02-02
Lab Code	KSW-6403	KSW-7571	KSW-8053
Gross beta			
Suspended Solids	< 0.4	< 0.6	< 0.3
Dissolved Solids	4.5 ± 0.7	3.6 ± 0.6	3.1 ± 0.6
Total Residue	4.5 ± 0.7	3.6 ± 0.6	3.1 ± 0.6
K-40 (f.p.)	2.53	2.78	2.08
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15

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

Sample Description and Concentration (pCi/L)			
Indicator			
K-1d			
Date Collected	01-02-02	02-04-02	03-04-02
Lab Code	KSW-54	KSW-636	KSW-1367
Gross beta			
Suspended Solids	< 0.3	< 0.3	< 0.3
Dissolved Solids	2.1 ± 0.2	3.0 ± 0.5	2.4 ± 0.4
Total Residue	2.1 ± 0.2	3.0 ± 0.5	2.4 ± 0.4
K-40 (f.p.)	1.21	1.21	1.40
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15
K-1e			
Date Collected	01-02-02	02-04-02	03-04-02
Lab Code	KSW-55	KSW-637	KSW-1368
Gross beta			
Suspended Solids	< 0.3	< 0.6	< 0.3
Dissolved Solids	4.8 ± 0.7	5.6 ± 1.2	4.9 ± 1.1
Total Residue	4.8 ± 0.7	5.6 ± 1.2	4.9 ± 1.1
K-40 (f.p.)	2.25	3.29	2.08
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15

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

Sample Description and Concentration (pCi/L)			
Indicator			
K-1d			
Date Collected	04-01-02	05-01-02	06-03-02
Lab Code	KSW-2036	KSW-2922	KSW-3560
Gross beta			
Suspended Solids	< 0.3	< 0.5	< 0.3
Dissolved Solids	2.3 ± 0.4	2.0 ± 0.7	2.2 ± 0.4
Total Residue	2.3 ± 0.4	2.0 ± 0.7	2.2 ± 0.4
K-40 (fp)	1.34	1.45	0.92
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15
K-1e			
Date Collected	04-01-02	05-01-02	06-03-02
Lab Code	KSW-2037	KSW-2923	KSW-3561
Gross beta			
Suspended Solids	0.4 ± 0.2	0.4 ± 0.2	1.9 ± 0.3
Dissolved Solids	4.6 ± 1.1	4.2 ± 1.2	6.3 ± 1.1
Total Residue	5.0 ± 1.1	4.6 ± 1.2	8.2 ± 1.1
K-40 (fp)	2.47	2.03	4.16
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15

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

Sample Description and Concentration (pCi/L)			
Indicator			
K-1d			
Date Collected	07-01-02	08-01-02	09-03-02
Lab Code	KSW-4345	KSW-5113	KSW-5745
Gross beta			
Suspended Solids	< 0.3	< 0.3	< 0.3
Dissolved Solids	1.5 ± 0.4	1.9 ± 0.4	1.8 ± 0.4
Total Residue	1.5 ± 0.4	1.9 ± 0.4	1.8 ± 0.4
K-40 (f.p.)	1.04	1.04	1.04
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15
K-1e			
Date Collected	07-01-02	08-01-02	09-03-02
Lab Code	KSW-4346	KSW-5114	KSW-5746
Gross beta			
Suspended Solids	< 0.4	< 0.5	< 0.6
Dissolved Solids	4.8 ± 1.3	5.8 ± 1.2	3.6 ± 1.1
Total Residue	4.8 ± 1.3	5.8 ± 1.2	3.6 ± 1.1
K-40 (f.p.)	3.03	4.76	3.63
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15

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

Sample Description and Concentration (pCi/L)			
Indicator			
K-1d			
Date Collected	10-01-02	11-05-02	12-02-02
Lab Code	KSW-6404	KSW-7572	KSW-8054, 5
Gross beta			
Suspended Solids	< 0.4	< 0.3	0.6 ± 0.3
Dissolved Solids	2.8 ± 0.4	2.4 ± 0.4	2.4 ± 0.3
Total Residue	2.8 ± 0.4	2.4 ± 0.4	3.0 ± 0.4
K-40 (f.p.)	1.20	1.41	1.25
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15
K-1e			
Date Collected	10-01-02	11-05-02	12-02-02
Lab Code	KSW-6405	KSW-7573	KSW-8056
Gross beta			
Suspended Solids	< 0.4	< 0.3	< 1.2
Dissolved Solids	12.9 ± 1.5	6.3 ± 1.1	6.6 ± 1.3
Total Residue	12.9 ± 1.5	6.3 ± 1.1	6.6 ± 1.3
K-40 (f.p.)	12.72	5.26	6.66
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15

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

Sample Description and Concentration (pCi/L)			
Indicator			
K-1k			
Date Collected	01-02-02	02-04-02	03-04-02
Lab Code	NS[a]	NS[a]	NS[a]
Gross beta			
Suspended Solids	-	-	-
Dissolved Solids	-	-	-
Total Residue	-	-	-
K-40 (f.p.)			
Mn-54	-	-	-
Fe-59	-	-	-
Co-58	-	-	-
Co-60	-	-	-
Zn-65	-	-	-
Zr-Nb-95	-	-	-
Cs-134	-	-	-
Cs-137	-	-	-
Ba-La-140	-	-	-
Date Collected	04-01-02	05-01-02	06-03-02
Lab Code	KSW-2038	KSW-2924	KSW-3562
Gross beta			
Suspended Solids	< 0.4	< 0.3	< 0.3
Dissolved Solids	9.1 ± 1.2	9.5 ± 1.5	4.1 ± 0.9
Total Residue	9.1 ± 1.2	9.5 ± 1.5	4.1 ± 0.9
K-40 (fp)	7.91	4.26	3.63
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15

[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			
K-1k			
Date Collected	07-01-02	08-01-02	09-03-02
Lab Code	KSW-4347	KSW-5115	KSW-5747
Gross beta			
Suspended Solids	< 0.4	< 0.7	< 1.0
Dissolved Solids	8.6 ± 1.4	25.2 ± 1.8	18.2 ± 1.9
Total Residue	8.6 ± 1.4	25.2 ± 1.8	18.2 ± 1.9
K-40 (f.p.)	3.72	12.54	13.67
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15
Date Collected	10-01-02	11-05-02	12-02-02
Lab Code	KSW-6406	KSW-7574	NS[a]
Gross beta			
Suspended Solids	< 0.7	< 1.0	-
Dissolved Solids	17.3 ± 1.6	16.8 ± 1.5	-
Total Residue	17.3 ± 1.6	16.8 ± 1.5	-
K-40 (f.p.)	14.45	9.52	
Mn-54	< 15	< 15	-
Fe-59	< 30	< 30	-
Co-58	< 15	< 15	-
Co-60	< 15	< 15	-
Zn-65	< 30	< 30	-
Zr-Nb-95	< 15	< 15	-
Cs-134	< 10	< 10	-
Cs-137	< 10	< 10	-
Ba-La-140	< 15	< 15	-

[a] NS= No sample; water frozen.

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

Sample Description and Concentration (pCi/L)			
Indicator			
K-9 (Raw)			
Date Collected	01-02-02	02-04-02	03-04-02
Lab Code	KSW-56	KSW-638	KSW-1369
Gross beta			
Suspended Solids	< 0.3	< 0.3	< 0.3
Dissolved Solids	2.2 ± 0.4	2.2 ± 0.6	2.8 ± 0.8
Total Residue	2.2 ± 0.4	2.2 ± 0.6	2.8 ± 0.8
K-40 (f.p.)	1.21	1.04	1.12
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15
K-9 (Tap)			
Date Collected	01-02-02	02-04-02	03-04-02
Lab Code	KSW-63	KSW-639	KSW-1370
Gross beta			
Suspended Solids	< 0.3	< 0.3	< 0.3
Dissolved Solids	2.0 ± 0.2	2.1 ± 0.4	2.3 ± 0.5
Total Residue	2.0 ± 0.2	2.1 ± 0.4	2.3 ± 0.5
K-40 (f.p.)	1.04	1.04	1.02
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15

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

Sample Description and Concentration (pCi/L)			
Indicator			
K-9 (Raw)			
Date Collected	04-01-02	05-01-02	06-03-02
Lab Code	KSW-2039	KSW-2925	KSW-3563
Gross beta			
Suspended Solids	< 0.3	< 0.1	< 0.3
Dissolved Solids	2.4 ± 0.6	1.6 ± 0.7	1.8 ± 0.6
Total Residue	2.4 ± 0.6	1.6 ± 0.7	1.8 ± 0.6
K-40 (f.p.)	1.15	1.21	1.00
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15
K-9 (Tap)			
Date Collected	04-01-02	05-01-02	06-03-02
Lab Code	KSW-2040	KSW-2926	KSW-3564
Gross beta			
Suspended Solids	< 0.3	< 0.4	< 0.4
Dissolved Solids	2.1 ± 0.5	1.9 ± 0.4	2.3 ± 0.5
Total Residue	2.1 ± 0.5	1.9 ± 0.4	2.3 ± 0.5
K-40 (f.p.)	1.13	1.23	0.99
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15

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

Sample Description and Concentration (pCi/L)			
Indicator			
K-9 (Raw)			
Date Collected	07-01-02	08-01-02	09-03-02
Lab Code	KSW-4348	KSW-5116	KSW-5748
Gross beta			
Suspended Solids	< 0.4	< 0.4	< 0.5
Dissolved Solids	2.0 ± 0.7	2.8 ± 0.7	2.0 ± 0.7
Total Residue	2.0 ± 0.7	2.8 ± 0.7	2.0 ± 0.7
K-40 (f.p.)	0.95	1.04	0.95
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15
K-9 (Tap)			
Date Collected	07-01-02	08-01-02	09-03-02
Lab Code	KSW-4349	KSW-5117	KSW-5749
Gross beta			
Suspended Solids	< 0.4	< 0.4	< 0.4
Dissolved Solids	1.9 ± 0.5	1.7 ± 0.4	1.9 ± 0.4
Total Residue	1.9 ± 0.5	1.7 ± 0.4	1.9 ± 0.4
K-40 (f.p.)	1.04	0.95	0.95
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15

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

Sample Description and Concentration (pCi/L)			
Indicator			
K-9 (Raw)			
Date Collected	10-01-02	11-05-02	12-02-02
Lab Code	KSW-6407	KSW-7575	KSW-8057
Gross beta			
Suspended Solids	< 0.7	< 0.6	< 0.6
Dissolved Solids	2.1 ± 0.6	2.3 ± 0.8	3.3 ± 0.9
Total Residue	2.1 ± 0.6	2.3 ± 0.8	3.3 ± 0.9
K-40 (f.p.)	1.19	1.38	1.26
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15
K-9 (Tap)			
Date Collected	10-01-02	11-05-02	12-02-02
Lab Code	KSW-6408	KSW-7576	KSW-8058
Gross beta			
Suspended Solids	< 0.4	< 0.4	< 0.4
Dissolved Solids	2.1 ± 0.4	2.0 ± 0.5	2.0 ± 0.4
Total Residue	2.1 ± 0.4	2.0 ± 0.5	2.0 ± 0.4
K-40 (f.p.)	1.16	1.32	1.19
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15

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

Sample Description and Concentration (pCi/L)			
Indicator			
K-14a			
Date Collected	01-02-02	02-04-02	03-04-02
Lab Code	KSW-58	KSW-640	KSW-1371
Gross beta			
Suspended Solids	< 0.3	< 0.3	< 0.3
Dissolved Solids	2.9 ± 0.3	2.8 ± 0.6	2.3 ± 0.6
Total Residue	2.9 ± 0.3	2.8 ± 0.6	2.3 ± 0.6
K-40 (fp)	1.38	1.12	1.33
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15
K-14b			
Date Collected	01-02-02	02-04-02	03-04-02
Lab Code	KSW-59	KSW-641	KSW-1372
Gross beta			
Suspended Solids	< 0.3	0.8 ± 0.2	< 0.3
Dissolved Solids	2.9 ± 0.3	2.5 ± 0.5	2.7 ± 0.6
Total Residue	2.9 ± 0.3	3.3 ± 0.5	2.7 ± 0.6
K-40 (fp)	1.64	1.12	1.34
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15

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

Sample Description and Concentration (pCi/L)			
Indicator			
K-14a			
Date Collected	04-01-02	05-01-02	06-03-02
Lab Code	KSW-2041	KSW-2927	KSW-3565
Gross beta			
Suspended Solids	< 0.3	< 0.3	< 0.3
Dissolved Solids	2.7 ± 0.6	5.0 ± 0.7	2.6 ± 0.7
Total Residue	2.7 ± 0.6	5.0 ± 0.7	2.6 ± 0.7
K-40 (fp)	1.61	1.98	1.28
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15
K-14b			
Date Collected	04-01-02	05-01-02	06-03-02
Lab Code	KSW-2042	KSW-2928	KSW-3566
Gross beta			
Suspended Solids	< 0.3	< 0.3	< 0.3
Dissolved Solids	2.5 ± 0.6	4.5 ± 0.7	2.8 ± 0.6
Total Residue	2.5 ± 0.6	4.5 ± 0.7	2.8 ± 0.6
K-40 (fp)	1.70	2.03	1.28
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15

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

Sample Description and Concentration (pCi/L)			
Indicator			
K-14a			
Date Collected	07-01-02	08-01-02	09-03-02
Lab Code	KSW-4350	KSW-5118	KSW-5750
Gross beta			
Suspended Solids	< 0.3	< 0.9	< 0.7
Dissolved Solids	2.3 ± 0.5	9.2 ± 0.9	5.8 ± 0.7
Total Residue	2.3 ± 0.5	9.2 ± 0.9	5.8 ± 0.7
K-40 (fp)	1.12	1.99	1.12
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15
K-14b			
Date Collected	07-01-02	08-01-02	09-03-02
Lab Code	KSW-4351	KSW-5119	KSW-5751
Gross beta			
Suspended Solids	< 0.3	< 0.9	< 0.5
Dissolved Solids	2.4 ± 0.5	7.9 ± 0.8	4.6 ± 0.8
Total Residue	2.4 ± 0.5	7.9 ± 0.8	4.6 ± 0.8
K-40 (fp)	1.12	2.08	1.04
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15

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

Sample Description and Concentration (pCi/L)			
Indicator			
K-14a			
Date Collected	10-01-02	11-05-02	12-02-02
Lab Code	KSW-6409	KSW-7577	KSW-8059
Gross beta			
Suspended Solids	< 0.4	< 0.4	< 0.7
Dissolved Solids	6.8 ± 0.8	2.6 ± 0.6	3.2 ± 0.7
Total Residue	6.8 ± 0.8	2.6 ± 0.6	3.2 ± 0.7
K-40 (fp)	1.35	1.80	1.26
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15
K-14b			
Date Collected	10-01-02	11-05-02	12-02-02
Lab Code	KSW-6410	KSW-7578	KSW-8060
Gross beta			
Suspended Solids	< 0.6	< 0.9	< 0.6
Dissolved Solids	6.6 ± 0.9	3.2 ± 0.7	3.1 ± 0.7
Total Residue	6.6 ± 0.9	3.2 ± 0.7	3.1 ± 0.7
K-40 (fp)	1.52	1.38	1.27
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15

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
Indicator				
K-1a				
1st Quarter	ND[a]	-	-	-
2nd Quarter	KSW -4457	< 330	< 1.0	< 0.6
3rd Quarter	-6411, 2	< 330	< 0.8	0.9 ± 0.4
4th Quarter	-8717, 8	< 330	< 1.0	< 0.6
Annual mean ± s.d.		< 330	< 1.0	0.9
K-1b				
1st Quarter	KSW -1829	< 330	< 0.8	< 0.5
2nd Quarter	-4458	< 330	< 1.1	< 0.5
3rd Quarter	-6413	< 330	< 1.0	< 0.6
4th Quarter	-8719	< 330	< 1.5	< 0.6
Annual mean ± s.d.		< 330	< 1.5	< 0.6
K-1d				
1st Quarter	KSW -1830	< 330	< 0.7	< 0.5
2nd Quarter	-4459	< 330	< 1.0	< 0.5
3rd Quarter	-6414	< 330	< 0.8	< 0.5
4th Quarter	-8720	< 330	< 0.9	1.3 ± 0.4
Annual mean ± s.d.		< 330	< 1.0	1.3
K-1e				
1st Quarter	KSW -1831	< 330	< 1.1	< 0.5
2nd Quarter	-4460	< 330	< 0.9	< 0.5
3rd Quarter	-6415	< 330	< 0.8	0.8 ± 0.3
4th Quarter	-8721	< 330	< 0.8	< 0.5
Annual mean ± s.d.		< 330	< 1.1	0.8

[a] No data; water frozen.

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
Indicator				
K-14a				
1st Quarter	KSW -1834	< 330	< 0.9	0.7 ± 0.3
2nd Quarter	-4464, 5	< 330	< 0.9	< 0.5
3rd Quarter	-6419	< 330	< 0.8	< 0.6
4th Quarter	-8725	< 330	< 1.4	< 0.7
Annual mean ± s.d.		< 330	< 1.4	0.7
K-14b				
1st Quarter	KSW -1835	< 330	< 1.1	< 0.7
2nd Quarter	-4466	< 330	< 0.9	0.7 ± 0.3
3rd Quarter	-7014	< 330	< 0.7	< 0.5
4th Quarter	-8726	< 330	< 0.9	< 0.6
Annual mean ± s.d.		< 330	< 1.1	0.7
K-1k				
1st Quarter	ND[a]	-	-	-
2nd Quarter	KSW -4461	< 330	< 1.0	< 0.6
3rd Quarter	-6416	< 330	< 0.7	0.6 ± 0.3
4th Quarter	-8722	< 330	< 1.4	1.2 ± 0.4
Annual mean ± s.d.		< 330	< 1.4	1.2
Control				
K-9				
1st Quarter	KSW -1832 (Raw)	< 330	< 1.1	< 0.6
	-1833 (Tap)	< 330	< 0.9	< 0.4
2nd Quarter	-4462 (Raw)	< 330	< 0.9	0.5 ± 0.2
	-4463 (Tap)	< 330	< 1.1	< 0.6
3rd Quarter	-6417 (Raw)	< 330	< 0.9	< 0.6
	-6418 (Tap)	< 330	< 1.1	< 0.6
4th Quarter	-8723 (Raw)	< 330	< 1.0	< 0.6
	-8724 (Tap)	< 330	< 1.1	0.7 ± 0.4

[a] No data; water frozen.

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

Sample Description and Concentration (pCi/g wet)

Date Collected	02-13-02		05-07-02		06-14-02	
Lab Code	KF-4322		KF-3536		KF-4323	
Type	Salmon		White Fish		Sucker	
Portion	Flesh	Bones	Flesh	Bones	Flesh	Bones
Gross beta	2.83 ± 0.08	1.29 ± 0.31	3.52 ± 0.08	1.13 ± 0.25	2.82 ± 0.10	0.83 ± 0.32
Sr-89	NA[a]	< 1.54[c]	NA[a]	< 0.16	NA[a]	< 0.28
Sr-90	NA	0.13 ± 0.06	NA	0.14 ± 0.04	NA	< 0.14
K-40	2.15 ± 0.13	NA[a]	2.69 ± 0.42	NA[a]	2.72 ± 0.48	NA[a]
Mn-54	< 0.007	NA	< 0.028	NA	< 0.027	NA
Fe-59	< 0.130	NA	< 0.081	NA	< 0.083	NA
Co-58	< 0.016	NA	< 0.027	NA	< 0.040	NA
Co-60	< 0.005	NA	< 0.015	NA	< 0.016	NA
Cs-134	< 0.007	NA	< 0.033	NA	< 0.036	NA
Cs-137	0.041 ± 0.006	NA	< 0.023	NA	0.081 ± 0.038	NA

Date Collected	06-14-02		08-02-02	
Lab Code	KF-4324		KF-7559	
Type	Perch		Sucker	
Portion	Flesh	Bones	Flesh	Bones
Gross beta	3.09 ± 0.08	1.52 ± 0.39	2.76 ± 0.09	1.36 ± 0.36
Sr-89	NA[a]	< 0.13	NA[a]	< 0.36
Sr-90	NA	< 0.054	NA	0.23 ± 0.057
K-40	1.94 ± 0.51	NA[a]	2.22 ± 0.31	NA[a]
Mn-54	< 0.026	NA	< 0.015	NA
Fe-59	< 0.057	NA	< 0.064	NA
Co-58	< 0.018	NA	< 0.028	NA
Co-60	< 0.016	NA	< 0.012	NA
Cs-134	< 0.037	NA	< 0.015	NA
Cs-137	< 0.028	NA	< 0.018	NA

[a] NA = Not analyzed; analyses not required.

[b] Fiala's Fish Market

[c] Sample received 07-02-02, elevated LLD due to half life of Sr-89.

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

	Sample Description and Concentration (pCi/g wet)			
Date Collected	10-01-02		10-23-02	
Lab Code	KF-6389		KF-7560	
Type	Lake Trout		Sucker	
Portion	Flesh	Bones	Flesh	Bones
Gross beta	3.75 ± 0.13	0.76 ± 0.23	5.44 ± 0.13	1.27 ± 0.38
Sr-89	NA[a]	< 0.16	NA[a]	< 0.14
Sr-90	NA	0.34 ± 0.11	NA	0.24 ± 0.063
K-40	2.02 ± 0.56	NA[a]	3.16 ± 0.49	NA[a]
Mn-54	< 0.026	NA	< 0.019	NA
Fe-59	< 0.068	NA	< 0.040	NA
Co-58	< 0.027	NA	< 0.014	NA
Co-60	< 0.030	NA	< 0.024	NA
Cs-134	< 0.034	NA	< 0.011	NA
Cs-137	< 0.032	NA	< 0.023	NA

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

Sample Description and Concentration

	Indicators			Control
Location	K-1a	K-1b	K-1d	K-9
Date Collected	05-01-02	05-01-02	06-03-02	06-04-02
Lab Code	KSL-2818	KSL-2819, 20	KSL-3544	KSL-3547
Gross beta	3.56 ± 0.16	5.46 ± 0.09	3.97 ± 0.16	5.29 ± 0.10
Sr-89	< 0.021	< 0.008	< 0.008	< 0.007
Sr-90	0.017 ± 0.007	0.007 ± 0.003 [a]	< 0.004	< 0.007
Be-7	0.43 ± 0.24	0.83 ± 0.17	0.93 ± 0.28	< 0.36
K-40	4.89 ± 0.60	5.40 ± 0.38	3.29 ± 0.58	5.56 ± 0.74
Mn-54	< 0.017	< 0.013	< 0.016	< 0.032
Co-58	< 0.018	< 0.026	< 0.014	< 0.023
Co-60	< 0.013	< 0.010	< 0.034	< 0.023
Nb-95	< 0.023	< 0.007	< 0.008	< 0.023
Zr-95	< 0.035	< 0.024	< 0.072	< 0.036
Ru-103	< 0.016	< 0.016	< 0.024	< 0.021
Ru-106	< 0.20	< 0.11	< 0.16	< 0.18
Cs-134	< 0.019	< 0.008	< 0.022	< 0.019
Cs-137	< 0.023	< 0.015	< 0.026	< 0.031
Ce-141	< 0.044	< 0.014	< 0.027	< 0.057
Ce-144	< 0.17	< 0.084	< 0.17	< 0.20

Location	K-1e	K-1k	K-14
Date Collected	05-01-02	06-03-02	05-01-02
Lab Code	KSL-2840, 1	KSL-3545, 6	KSL-2842
Gross beta	4.50 ± 0.18	4.36 ± 0.06	6.44 ± 0.57
Sr-89	< 0.067	< 0.008	< 0.17
Sr-90	< 0.067	< 0.008	0.26 ± 0.08[a]
Be-7	0.94 ± 0.20	1.20 ± 0.34	1.41 ± 0.26
K-40	2.34 ± 0.26	4.96 ± 0.57	3.26 ± 0.46
Mn-54	< 0.012	< 0.023	< 0.012
Co-58	< 0.016	< 0.039	< 0.017
Co-60	< 0.012	< 0.029	< 0.016
Nb-95	< 0.011	< 0.037	< 0.018
Zr-95	< 0.019	< 0.063	< 0.040
Ru-103	< 0.010	< 0.025	< 0.025
Ru-106	< 0.10	< 0.14	< 0.13
Cs-134	< 0.015	< 0.019	< 0.019
Cs-137	< 0.014	< 0.016	0.051 ± 0.019
Ce-141	< 0.012	< 0.032	< 0.023
Ce-144	< 0.047	< 0.110	< 0.074

[a] Result of reanalysis.

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

Sample Description and Concentration

	Indicators			Control
Location	K-1a	K-1b	K-1d	K-9
Date Collected	07-01-02	09-03-02	09-03-02	08-01-02
Lab Code	KSL-4334	KSL-5723	KSL-5724, 5	KSL-5120
Gross beta	4.21 ± 0.14	6.78 ± 0.15	3.11 ± 0.21	5.84 ± 0.14
Sr-89	< 0.010	< 0.018	< 0.010	< 0.012
Sr-90	< 0.050	0.014 ± 0.007	< 0.004	0.023 ± 0.005
Be-7	< 0.18	0.35 ± 0.20	0.98 ± 0.15	0.70 ± 0.18
K-40	3.82 ± 0.54	3.00 ± 0.57	2.19 ± 0.29	4.76 ± 0.45
Mn-54	< 0.017	< 0.017	< 0.009	< 0.015
Co-58	< 0.017	< 0.019	< 0.013	< 0.010
Co-60	< 0.014	< 0.016	< 0.010	< 0.011
Nb-95	< 0.014	< 0.018	< 0.012	< 0.017
Zr-95	< 0.023	< 0.033	< 0.014	< 0.039
Ru-103	< 0.017	< 0.017	< 0.005	< 0.016
Ru-106	< 0.13	< 0.19	< 0.063	< 0.11
Cs-134	< 0.013	< 0.012	< 0.008	< 0.012
Cs-137	< 0.017	< 0.027	0.050 ± 0.013	< 0.012
Ce-141	< 0.027	< 0.021	< 0.014	< 0.030
Ce-144	< 0.080	< 0.082	< 0.070	< 0.13

Location	K-1e	K-1k	K-14
Date Collected	07-01-02	07-01-02	07-01-02
Lab Code	KSL-4335	KSL-4336	KSL-4337, 8
Gross beta	4.08 ± 0.49	4.85 ± 0.14	5.35 ± 0.38
Sr-89	< 0.11	< 0.008	< 0.18
Sr-90	0.077 ± 0.031	0.004 ± 0.002	< 0.077
Be-7	1.54 ± 0.60	< 0.18	1.60 ± 0.30
K-40	1.67 ± 0.84	3.96 ± 0.52	2.62 ± 0.32
Mn-54	< 0.056	< 0.017	< 0.012
Co-58	< 0.053	< 0.017	< 0.021
Co-60	< 0.037	< 0.011	< 0.021
Nb-95	< 0.052	< 0.021	< 0.023
Zr-95	< 0.076	< 0.046	< 0.033
Ru-103	< 0.076	< 0.023	< 0.031
Ru-106	< 0.23	< 0.16	< 0.12
Cs-134	< 0.029	< 0.022	< 0.021
Cs-137	< 0.035	< 0.018	0.042 ± 0.015
Ce-141	< 0.091	< 0.045	< 0.045
Ce-144	< 0.10	< 0.11	< 0.11

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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)

	Indicator				Control
Location	K-1c	K-1d	K-1j	K-14[a]	K-9[a]
Collection Date	05-01-02	05-01-02	05-01-02	05-01-02	05-01-02
Lab Code	KBS-2828	KBS-2829	KBS-2830	KBS-2832	KBS-2831
Gross beta	7.53 ± 1.37	8.88 ± 1.50	10.48 ± 1.63	5.31 ± 1.37	22.47 ± 1.92
Sr-89	< 0.020	< 0.038	< 0.025	< 0.026	< 0.031
Sr-90	< 0.014	< 0.024	< 0.017	< 0.018	0.024 ± 0.013
K-40	6.31 ± 0.56	5.75 ± 0.37	6.65 ± 0.40	4.70 ± 0.34	10.08 ± 0.75
Co-58	< 0.023	< 0.010	< 0.013	< 0.012	< 0.024
Co-60	< 0.011	< 0.009	< 0.012	< 0.009	< 0.027
Cs-134	< 0.024	< 0.007	< 0.007	< 0.005	< 0.027
Cs-137	< 0.016	0.029 ± 0.013	0.035 ± 0.020	0.019 ± 0.010	0.090 ± 0.028

Location	K-1c	K-1d	K-1j	K-14	K-9
Collection Date	11-05-02	11-05-02	11-05-02	11-05-02	11-05-02
Lab Code	KBS-7561	KBS-7562	KBS-7563	KBS-7565	KBS-7564
Gross beta	7.51 ± 1.74	8.26 ± 1.79	11.01 ± 1.93	8.67 ± 1.72	22.47 ± 2.54
Sr-89	< 0.043	< 0.044	< 0.044	< 0.044	< 0.059
Sr-90	< 0.015	< 0.016	< 0.015	0.024 ± 0.010	0.11 ± 0.019
K-40	9.12 ± 0.42	7.57 ± 0.39	10.09 ± 0.45	8.12 ± 0.41	10.23 ± 0.68
Co-58	< 0.008	< 0.011	< 0.010	< 0.010	< 0.016
Co-60	< 0.008	< 0.008	< 0.009	< 0.010	< 0.015
Cs-134	< 0.006	< 0.010	< 0.011	< 0.010	< 0.017
Cs-137	0.031 ± 0.012	0.026 ± 0.012	0.033 ± 0.015	< 0.011	0.091 ± 0.037

[a] Results for K-9 originally reported as K-14.