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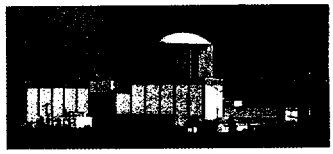
Kewaunee Nuclear Power Plant
N490, State Highway 42
Kewaunee, WI 54216-9511
920-388-2560

Operated by
Nuclear Management Company, LLC



April 26, 2001

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Ladies/Gentlemen:

DOCKET 50-305
OPERATING LICENSE DPR-43
KEWAUNEE NUCLEAR POWER PLANT
ANNUAL ENVIRONMENTAL MONITORING REPORT JANUARY-DECEMBER 2000

Attached is the 2000 Annual Environmental Monitoring Report for the Kewaunee Nuclear Power Plant (KNPP). This report was prepared by Teledyne Isotopes and satisfies the requirements of KNPP Technical Specification 6.9.b.1.

The results of the 2000 Land Use Census, submitted in accordance with KNPP's Offsite Dose Calculation Manual, Section 3/4.7.1, are also included in this report.

Sincerely,

Kyle A. Hoops
Manager-Kewaunee Plant

BRG

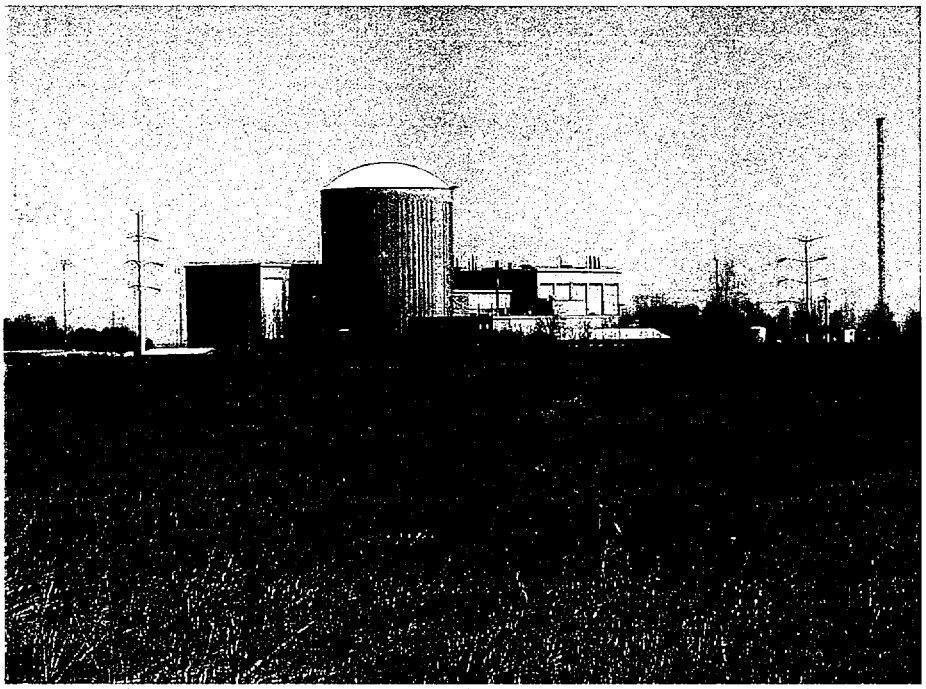
Attach.

cc - US NRC, Region III
US NRC Senior Resident Inspector

IE25

KEWAUNEE NUCLEAR POWER PLANT

ANNUAL ENVIRONMENTAL MONITORING REPORT JAN-DEC 2000



OPERATED BY THE NUCLEAR MANAGEMENT COMPANY, LLC

NMC
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ANNUAL REPORT PART I

PROGRAMATIC REVIEW OF SAMPLING RESULTS

A small creek on the north edge of the property

Environmental, Inc.
Midwest Laboratory
an Allegheny Technologies Co.

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

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, 2000

Prepared and submitted by:

ENVIRONMENTAL Inc.
Midwest Laboratory
Project No. 8002

Approved :

Bronia Grob, M.Sc.
Laboratory Manager

Richard P. Farrell, M.Sc. HP
Mgr. Radiation Protection, KNPP

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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In addition, the following tables are in the Appendices:

Appendix A

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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 2000.

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. Richard P. Farrell, Manager of Radiation Protection, at (920) 388-8276.

2.0 SUMMARY

Results of sample analyses during the period January - December 2000 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-31 and K-16), and dispatched by mail to Teledyne 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-31 and K-16. 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 four milk sampling locations (K-3, K-4, K-5 and K-6), 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-4, K-5, K-12 and K-19), from two herds that graze between four and ten miles from the reactor site (K-3 and K-6), 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-12 and K-13 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, which is determined by flame photometry 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-27 (if available), K-29, K-32 and K-34. 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), K-32 and K-34.. 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 six dairy farms (K-3, K-4, K-5, K-6, K-12 and K-19). The samples are analyzed for gross beta, strontium-89 and -90, and gamma emitting isotopes. During the first quarter, cattle feed is collected from the same six dairy farms and the same analyses are performed.

Soil

Soil samples are collected twice a year on-site at K-1f and from the six dairy farms (K-3, K-4, K-5, K-6, K-12 and K-19). 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 Sediments

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 2000 as described in the preceding sections, with the following exceptions:

No TLD was available for the third quarter from location K-4. The telephone pole was removed from the Stangel farm and the TLD lost.
Milk, grass, soil samples were not collected from Stangel farm after September. A replacement farm (Wotachek, K-25) was added in October.

Milk, grass and soil samples were not available from Novitsky Farm (K-6) after April, 2000. A replacement farm (Holly, K-33) was located in May. K-33 (Holly), in turn, was replaced by the Ducat Farm (K-35) in October.
The second quarter TLD was collected from K-6, relocated to K-33 for the third quarter and K-35 for the fourth quarter.

No milk, grass or soil was available from the Paral Farm (K-19) after April. A replacement farm (Struck, K-34) was located for the July collection. Domestic meat (pigeons) were collected at this location, chickens were not available from K-27.

No milk was collected from the LeCaptain Farm (K-12) after August. The farmer retired from the dairy business.

Surface water was not available for the months of January and February at location K-1k. The pond was frozen.

Surface water was not available for the month of February at location K-1e. The creek was frozen.

3.1.5 Program Modifications

A number of farmers retired or went out of the dairy business in the year 2000.. Replacements were found for all but one location.

1.) Paral Farm (K-19) left the dairy business in May, 2000. It was replaced by the Struck Farm (K-34) in July, 2000. In addition to milk, grass, soil and cattlefeed collections, domestic meat has been added from this location.

2.) Stangel Farm (K-4) was replaced by Wotachek Farm (K-25) in the third quarter.

3.) Novitsky Farm (K-6) was replaced by the Holly Farm (K-33) in the third quarter.

4.) LeCaptain Farm (K-12) went out of the dairy business in August, 2000.

5.) Holly Farm (K-33) was replaced by K-35 (Ducat Farm) in the fourth quarter.

3.2 Results and Discussion

The results for the reporting period January to December 2000 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 locations and for all 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 Teledyne Brown Engineering Environmental Services, Midwest Laboratory.

The tabulated results of all measurements made in 2000 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 2000 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 2000. 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 0.022 pCi/m^3 at the indicator locations and 0.021 pCi/m^3 at the controls. The averages were almost identical to the means observed from 1990 (and prior to) through 1999. Results are tabulated below.

Year	Average of Indicators	Average of Controls
	Concentration (pCi/m^3)	
1990	0.024	0.024
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

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 (18.7 mR/91 days), in agreement with the mean at the control locations of (18.2 mR/91 days), and were similar to the means obtained in 1990 (and prior to) through 1999. 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 22.5 mR/91 days, measured at the indicator location K-7.

Year	Average (Indicators)	Average (Controls)
	Dose rate (mR/91 days)	
1990	14.4	14.4
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

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 110 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 2.0 pCi/L in all samples. Low levels of strontium-90 were found in all samples tested. The mean values were similar for indicator and control locations (1.4 and 1.3 pCi/L, respectively) and are similar to or less than averages seen from 1989 through 1999.

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 (1411 and 1423 pCi/L, respectively), and are essentially identical to the levels observed from 1989 through 1999. 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 5.1 pCi/L and 4.9 pCi/L respectively. All other well water locations, both indicators and control, measured below the LLD level of 4.0 pCi/L. These results are similar to values observed from 1989 through 1999.

Levels of tritium and strontium-89 and -90 were measured for the on-site well (K-1g). Tritium measured below the LLD of 330 pCi/L in all samples. Concentrations of strontium-89 and strontium-90 were below the detection limits of 0.8 and 0.5 pCi/L, respectively

All gamma-emitting isotopes were 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.

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 3.2 pCi/g wet for indicator locations and 3.3 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 1.27 pCi/g wet for the indicator location and 1.30 pCi/g wet for the control, almost identical to the concentrations of naturally-occurring potassium-40 observed in the samples (1.26 and 1.25 pCi/g wet respectively). Other gamma-emitting isotopes were below their respective LLDs. Levels of strontium-89 measured below the LLD of 0.007 pCi/g wet in all samples, strontium-90 measured below the LLD level of 0.004 pCi/g wet.

Vegetables and Grain

In vegetables, gross beta concentrations were similar at both the indicator and control locations (2.57 and 2.90 pCi/g wet, respectively), due primarily to potassium-40 activity. Naturally-occurring beryllium-7 was detected in one lettuce sample at a concentration of 0.28 pCi/g wet. All other gamma emitting isotopes measured below their respective LLDs. Strontium-89 measured below the LLD level of 0.013 pCi/g wet in all samples. A low level of strontium-90 was detected in three of eight samples collected from both control and indicator locations and averaged 0.011 pCi/g wet.

In two grain samples (clover and wheat) from location K-23, gross beta concentrations averaged 2.95 pCi/g wet, due primarily to potassium-40 activity (3.14 pCi/g wet). Trace beryllium-7 was detected in one of the two grain samples. Strontium-89 measured below the LLD levels of 0.021 pCi/g wet, strontium-90 averaged 0.019 pCi/g wet for both samples measured.

Grass and Cattle Feed

In grass, mean gross beta concentrations were almost dentical at both indicator and control locations (6.38 and 6.44 pCi/g wet, respectively) and in both cases was predominantly due to naturally occurring potassium-40 and beryllium-7. All other gamma-emitting isotopes were below their respective LLDs. Strontium-89 was below the LLD of 0.080 pCi/g wet in all samples. Strontium-90 activity was detected in one of two samples from the indicator location K-34 at a level of 0.033 pCi/g wet.

In cattlefeed, the mean gross beta concentration was lower at the control locations (9.15 pCi/g wet) than at indicator locations (11.29 pCi/g wet). The highest average gross beta levels were in samples from the indicator locations K-19 (19.46 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 0.055 pCi/g wet in all samples. Strontium-90 activity was detected in two of the eight indicator locations and measured 0.029 pCi/g wet at the indicator locations and less than 0.021 pCi/g wet at the control locations, similar or lower than levels observed in 1995 through 1999. Presence of radiostrontium is attributable to fallout from previous nuclear testing. All other gamma-emitting isotopes were below respective LLD levels.

Soil

Gross alpha concentrations in soil samples measured 8.69 pCi/g dry at the indicator locations averaged and 7.58 pCi/g dry at the control locations. Mean gross beta levels measured at the indicator and control locations averaged 25.43 and 28.28 pCi/g dry, respectively, and is primarily due to the potassium-40 activity. Strontium-89 was below the LLD level of 0.099 pCi/g dry in all samples. Strontium-90 was detected in nine of fourteen samples, and was slightly higher at the indicators than the control locations (0.071 and 0.049 pCi/g dry, respectively).

Soil (continued)

Low levels of Cesium-137 were detected in eight of fourteen samples and were slightly lower at the indicator locations than at control locations (0.15 and 0.20 pCi/g dry, respectively). Potassium-40 was detected in all samples and averaged 18.37 and 19.07 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 1999.

3.2.4 The Aquatic Environment

Surface Water

In surface water, mean gross beta activity in suspended solids was below the LLD level of 2.0 pCi/L in all samples. Mean gross beta concentration in dissolved solids was higher at indicator locations (7.0 pCi/L) as compared to the control locations (2.4 pCi/L) and similar to activities observed from 1978 through 1999.

Year	Average (Indicators)	Average (Controls)
	Dose rate (mR/91 days)	
1990	4.1	2.6
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

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 concentration levels 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 the LLD of 330 pCi/L in all samples. Tritium was detected in one composite sample from location K-1d for the fourth quarter, 1999, at a concentration of 372 pCi/L.

Surface Water (continued)

Strontium-89 and strontium-90 concentrations were below their respective LLDs of 2.2 and 2.0 pCi/L in all samples.

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

Fish

In fish, gross beta concentrations averaged 2.90 pCi/g wet in muscles and 1.49 pCi/g wet in bone fractions. In muscle, the gross beta concentration was primarily due to potassium-40 activity. Cesium-137 concentration in muscle averaged 0.063 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) and 1999 (0.062 pCi/g wet). The strontium-89 concentration was below the LLD of 0.32 pCi/g wet in all samples. Strontium-90 was detected in all bone samples and averaged 0.27 pCi/g wet.

Periphyton (Slime) or Aquatic Vegetation

In periphyton (slime) and aquatic vegetation samples, mean gross beta concentrations were slightly higher at the indicator locations than at the control (3.34 and 2.45 pCi/g wet, respectively). Strontium-89 concentration measured below the LLD levels of 0.27. Strontium-90 was detected in two of thirteen indicator samples and averaged 0.15 pCi/g wet .

Traces of Cs-137 were detected in samples from three locations (K-1d, K-1e and K-14) at an average concentration of 0.052 pCi/g wet. This activity is similar to or lower than measurements taken from 1989 through 1999. 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 8.81 pCi/g dry at the indicator locations, and 6.19 pCi/g dry at the control, attributable primarily to levels of potassium-40.

Cs-134 was below the LLD level of 0.023 pCi/g dry in all samples. Low levels of cesium-137 were detected in five of eight samples from indicator locations and averaged 0.035 pCi/g dry. One of two control samples measured 0.0.024 pCi/g dry. On average, cesium-137 measurements are lower than or similar to levels observed from 1979 through 1999.

Levels of Strontium-89 measured below the detection limit of 0.11 pCi/g dry in all samples. Strontium-90 could not be detected above the LLD level of 0.038 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 2000 Land Use Census was completed using a door-to-door format to identify the presence of milk animals, gardens and farm crops within a five-mile radius of the KNPP. This census is conducted every five years during the growing season.

The Land Use Census was completed on July 21, 2000. The census is conducted annually during the growing season per Health Physics Procedure HP 1.14. Details of the 2000 Land Use Census are presented in Appendix D.

4.0 FIGURES AND TABLES

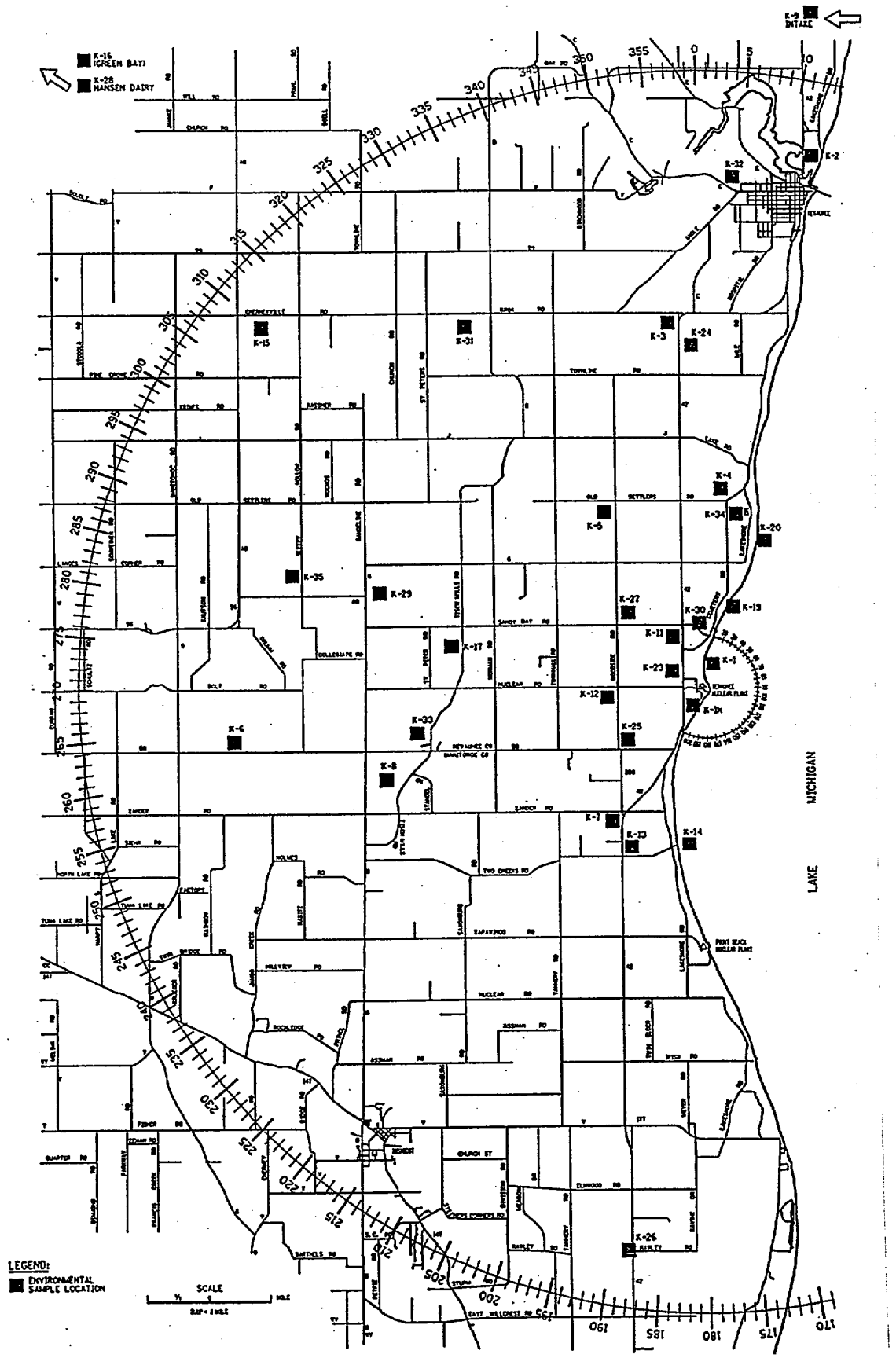

Figure 4-1. Sampling locations, Kewaunee Nuclear Power Plant

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-4	I	3.0 N	Tom Stangel Farm, E4804 Old Settlers Rd, Kewaunee
K-5	I	3.5 NNW	Ed Paplham Farm, E4160 Old Settlers Rd, Kewaunee
K-6	C	6.7 WSW	Novitsky Farm, E1870 City Tk BB, Denmark
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-12	I	1.5 WSW	LeCaptain Farm, N491 Woodside Rd, 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-19	I	1.75 NNE	Wayne Paral Farm, N1048 Lakeview Dr, 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	1.00 N	End of site boundary
K-31	I	6.25NNW	E. Krok Substation
K-32	C	11.5 N	Piggly Wiggly, 931 Marquette Dr., Kewaunee
K-33	C	4.4 mi. W	Holly Farm, 0.75 mi. N of Tisch Mills, Hwy. B.
K-34	I	2.5 N	Leon and Vicki Struck, N1549 Lakeshore Dr., Kewaunee
K-35	C	6.0 mi. WNW	Jean & Dwayne Ducat, N1215 Sleepy Hollow Rd., Kewaunee
K-36	I	8.5 mi. NNE	Fiala's Fish Market, Kewaunee

[a] I= indicator; C = control.

[b] Distances are measured from reactor stack.

Table 4.2. Type and frequency of collection.

Location	Frequency					
	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-4			MI[c]	GR[a], TLD, CF[d]	SO	
K-5			MI[c]	GR[a], TLD, CF[d]	SO	
K-6			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-12			MI[c]	GR[a], CF[d], WW	SO	
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]	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-33			MI[c]	GR[a], TLD, CF[d]	SO	
K-34			MI[c]	GR[a], CF[d]	SO	DM
K-35			MI[c]	GR[a], TLD, CF[d]	SO	
K-36				FI		

[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 Type Codes:

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

Table 4.4. Sampling Summary, January - December 2000.

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	318	0
Airborne Iodine	C/BW	6	156	0
TLD's	C/Q	17	54	2
Precipitation	C/M	1	12	0
Terrestrial Environment				
Milk (May-Oct)	G/SM	10	71	3
(Nov-Apr)	G/M	10	39	0
Well water	G/Q	6	24	0
Domestic meat	G/A	5	4	0
Eggs	G/Q	2	8	0
Vegetables - 5 varieties	G/A	2	8	0
Grain - wheat	G/A	1	1	0
- clover	G/A	1	1	0
Grass	G/TA	10	24	0
Cattle feed	G/A	6	12	0
Soil	G/SA	10	14	0
Aquatic Environment				
Surface water	G/M	8	105	3
Fish	G/TA	1	6	0
Slime	G/SA	7	15	0
Bottom sediments	G/SA	5	10	0

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

Frequency is coded as follows: W = weekly; BW = bi-weekly; SM = semimonthly; M = monthly; Q = quarterly; SA = semiannually; TA = three times per year; A = annually.

Table 4.5 Environmental Radiation Monitoring Program Summary.

Name of Facility: Kewaunee Nuclear Power Plant — Docket No. 50-305

Location of Facility: Kewaunee County, Wisconsin (County, State) — Reporting Period January-December, 2000

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[c]
TLDs (Quarterly) (mR/91days)	Gamma	54	3.0	18.7 (26/26) (15.3-23.3)	K-7, Zimmerman 2.75 mi. SSW	22.5 (4/4) (21.5-23.3)	18.2 (28/28) (14.9-21.6)	0
Airborne Particulates (pCi/m^3)	GB	318	0.002	0.022 (106/106) (0.007-0.055)	K-7, Zimmerman 2.75 mi. SSW	0.022 (53/53) (0.009-0.055)	0.021 (212/212) (0.006-0.053)	0
	GS	24						
	Be-7		0.020	0.059 (8/8) (0.040-0.075)	K-2, WPS Bldg. 9.5 mi. NNE	0.060 (4/4) (0.053-0.071)	0.055 (16/16) (0.039-0.071)	0
	Nb-95		0.0013	< LLD	-	-	< LLD	0
	Zr-Nb-95		0.0020	< LLD	-	-	< LLD	0
	Ru-103		0.0015	< LLD	-	-	< LLD	0
	Ru-106		0.0071	< LLD	-	-	< LLD	0
	Cs-134		0.0037	< LLD	-	-	< LLD	0
	Cs-137		0.0010	< LLD	-	-	< LLD	0
	Ce-141		0.0021	< LLD	-	-	< LLD	0
	Ce-144		0.0055	< LLD	-	-	< LLD	0
Airborne Iodine (pCi/m^3)	I-131	156	0.03	< LLD	-	-	< LLD	0
Precipitation (pCi/L)	H-3	12	330	< LLD	-	-	None	0
Milk (pCi/L)	I-131	110	0.5	< LLD	-	-	< LLD	0
	Sr-89	77	2.0	< LLD	-	-	< LLD	0
	Sr-90	77	0.5	1.4 (42/42) (0.5-2.8)	K-25, Wotachek Farm 2.75 mi. WSW	1.6 (3/3) (1.0-2.3)	1.3 (35/35)) (0.8-3.0)	0
	GS	110						
	K-40		50	1411 (57/57) (1152-2042)	K-25, Wotachek Farm 2.75 mi. WSW	1618 (4/4) (1356-2042)	1423 (53/53) (1227-1821)	0
	Cs-134		10	< LLD	-	-	< LLD	0
	Cs-137		10	< LLD	-	-	< LLD	0
	Ba-La-140		15	< LLD	-	-	< LLD	0
(g/L)	K-stable	77	1.0	1.63 (42/42) (1.37-1.96)	K-25, Wotachek Farm 2.75 mi. WSW	1.84 (3/3) (1.76-1.96)	1.63 (35/35) (1.42-1.84)	0
(g/L)	Ca	77	0.4	0.86 (42/42) (0.72-1.07)	K-6, Novitsky Farm 6.7 mi. WSW	1.01 (3/3) (0.97-1.06)	0.88 (35/35) (0.77-1.06)	0

Table 4.5 Environmental Radiation Monitoring Program Summary.

Name of Facility Kewaunee Nuclear Power Plant — Docket No. 50-305
Location of Facility Kewaunee County, Wisconsin (County, State) — Reporting Period January-December, 2000

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[c]
Well Water (pCi/L)	GA 8	3.7	5.1 (4/8) (4.4-5.9)	K-1g, South Well 0.06 mi. W	5.6 (2/4) (5.2-5.9)	None	0
	GB 24	4.0	4.9 (5/20) (4.5-5.5)	K-1g, South Well 0.06 mi. W	5.0 (2/4) (4.7-5.3)	<LLD	0
	H-3 4	330	< LLD	-	-	None	0
	K-40(fp) 24	0.87	1.84 (18/20) (0.95-2.85)	K-1h, North Well 0.12 mi. NW	2.75 (4/4) (2.60-2.85)	1.00 (4/4) (0.95-1.04)	0
	Sr-89 4	0.8	< LLD	-	-	None	0
	Sr-90 4	0.5	< LLD	-	-	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 4	1.10	< LLD	-	-	< LLD	0
	GB 4	0.03	3.20 (2/2) (2.70-3.45)	K-24, Fectum Farm 5.45 mi. N	3.66 (1/1) -	3.29 (1/1) -	0
	GS 4						
	Be-7	0.52	< LLD	-	-	< LLD	0
	K-40	0.50	2.58 (2/2) (2.45-2.69)	K-24, Fectum Farm 5.45 mi. N	4.47 (1/1)	2.47 (1/1) -	0
	Nb-95	0.11	< LLD	-	-	< LLD	0
	Zr-95	0.086	< LLD	-	-	< LLD	0
	Ru-103	0.11	< LLD	-	-	< LLD	0
	Ru-106	0.38	< LLD	-	-	< LLD	0
	Cs-134	0.042	< LLD	-	-	< LLD	0
	Cs-137	0.057	< LLD	-	-	< LLD	0
	Ce-141	0.15	< LLD	-	-	< LLD	0
	Ce-144	0.22	< LLD	-	-	< LLD	0
Eggs (pCi/gwet)	GB 8	0.01	1.27 (4/4) (1.22-1.38)	K-32, Grocery Store 11.5 mi. N	1.30 (4/4) (1.24-1.33)	1.30 (4/4) (1.24-1.33)	0
	Sr-89 8	0.007	< LLD	-	-	< LLD	0
	Sr-90 8	0.004	< LLD	-	-	< LLD	0
	GS 8						
	Be-7	0.089	< LLD	-	-	< LLD	0
	K-40	0.50	1.26 (4/4) (1.11-1.35)	K-24, Fectum Farm 5.45 mi. N	1.26 (4/4) (1.11-1.35)	1.25 (4/4) (1.11-1.38)	0
	Nb-95	0.014	< LLD	-	-	< LLD	0
	Zr-95	0.021	< LLD	-	-	< LLD	0
	Ru-103	0.010	< LLD	-	-	< LLD	0
	Ru-106	0.068	< LLD	-	-	< LLD	0
	Cs-134	0.009	< LLD	-	-	< LLD	0
	Cs-137	0.007	< LLD	-	-	< LLD	0
	Ce-141	0.019	< LLD	-	-	< LLD	0
	Ce-144	0.067	< LLD	-	-	< LLD	0

Table 4.5 Environmental Radiation Monitoring Program Summary.

Name of Facility: Kewaunee Nuclear Power Plant — Docket No. 50-305
Location of Facility: Kewaunee County, Wisconsin (County, State) — Reporting Period: January-December, 2000

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 8	0.010	2.57 (3/3) (1.54-3.40)	K-26, Bertler's Fruit Stand, 10.7 mi. SSW	2.90 (5/5) (1.51-6.04)	2.90 (5/5) (1.51-6.04)	0
	Sr-89 8	0.013	< LLD	-	-	< LLD	0
	Sr-90 8	0.005	0.014 (1/3)	K-17, Jansky's Farm 4.25 mi. W	0.014 (1/3)	0.009 (2/5) (0.008-0.010)	0
	GS 8						0
	Be-7	0.12	0.28 (1/3)	K-17, Jansky's Farm 4.25 mi. W	0.28 (1/3)	< LLD	0
	K-40	0.50	2.33 (3/3) (1.41-2.90)	K-17, Jansky's Farm 4.25 mi. W	2.33 (3/3) (1.41-2.90)	1.98 (5/5) (1.24-2.27)	0
	Nb-95	0.013	< LLD	-	-	< LLD	0
	Zr-95	0.025	< LLD	-	-	< LLD	0
	Ru-103	0.012	< LLD	-	-	< LLD	0
	Ru-106	0.12	< LLD	-	-	< LLD	0
	Cs-134	0.018	< LLD	-	-	< LLD	0
	Cs-137	0.013	< LLD	-	-	< LLD	0
	Ce-141	0.025	< LLD	-	-	< LLD	0
	Ce-144	0.11	< LLD	-	-	< LLD	0
Grain - Oats & Clover	GB 2	0.010	2.95 (2/2) (2.66-3.24)	K-23, Kewaunee Site, 0.5 mi. W	2.95 (2/2) (2.66-3.24)	None	0
(pCi/gwet)	Sr-89 2	0.021	< LLD	-	-	None	0
	Sr-90 2	0.006	< LLD	-	-	None	0
	GS 2						0
	Be-7	0.62	0.79 (1/2)	K-23, Kewaunee Site, 0.5 mi. W	0.79 (1/2)	None	0
	K-40	0.50	3.14 (2/2) (2.72-3.55)	K-23, Kewaunee Site, 0.5 mi. W	3.14 (2/2) (2.72-3.55)	None	0
	Nb-95	0.028	< LLD	-	-	None	0
	Zr-95	0.032	< LLD	-	-	None	0
	Ru-103	0.027	< LLD	-	-	None	0
	Ru-106	0.21	< LLD	-	-	None	0
	Cs-134	0.018	< LLD	-	-	None	0
	Cs-137	0.023	< LLD	-	-	None	0
	Ce-141	0.042	< LLD	-	-	None	0
	Ce-144	0.16	< LLD	-	-	None	0
Cattlefeed (pCi/gwet)	GB 12	0.10	11.29 (8/8) (1.99-21.23)	K-19, Paral Farm 1.75 mi. NNE	19.46 (2/2) (17.68-21.23)	9.15 (4/4) (3.26-14.04)	0
	Sr-89 12	0.055	< LLD	-	-	None	0
	Sr-90 12	0.021	0.029 (2/8) (0.025-0.032)	K-19, Paral Farm 1.75 mi. NNE	0.032 (1/2)	< LLD	0
	GS 12						
	Be-7	0.35	< LLD	K-6, Novitsky Farm 6.7 mi. WSW	0.70 (1/2)	0.36 (1/4)	0
	K-40	0.35	11.55 (8/8) (1.75-22.41)	K-5, Paplham Farm 3.5 mi. NNW	13.91 (2/2) (7.94-19.88)	9.46 (4/4) (3.71-15.57)	0

Table 4.5 Environmental Radiation Monitoring Program Summary.

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Location of Facility: Kewaunee County, Wisconsin (County, State) — Reporting Period January-December, 2000

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[c]
Cattlefeed (continued)	Nb-95	0.052	< LLD	-	-	< LLD	0
	Zr-95	0.071	< LLD	-	-	< LLD	0
	Ru-103	0.032	< LLD	-	-	< LLD	0
	Ru-106	0.27	< LLD	-	-	< LLD	0
	Cs-134	0.048	< LLD	-	-	< LLD	0
	Cs-137	0.041	< LLD	-	-	< LLD	0
	Ce-141	0.078	< LLD	-	-	< LLD	0
	Ce-144	0.17	< LLD	-	-	< LLD	0
Grass (pCi/gwet)	GB 24	0.10	6.38 (18/18) (3.81-9.47)	K-25, Wotachek Farm 2.75 mi. WSW	9.40 (1/1)	6.44 (6/6) (3.48-9.32)	0
	Sr-89 24	0.080	< LLD	-	-	None	0
	Sr-90 24	0.030	0.033 (1/18)	K-34, Struck Farm 2.5 mi. N	0.033 (1/2)	< LLD	0
	GS 24						
	Be-7	0.47	2.58 (15/18) (0.96-5.88)	K-1b, Middle Creek 0.12 mi. N	4.08 (2/3) (2.28-5.88)	1.95 (6/6) (0.66-3.67)	0
	K-40	0.50	7.03 (18/18) (4.63-9.62)	K-5, Paplham Farm 3.5 mi. NNW	8.49 (3/3) (7.76-9.62)	7.91 (6/6) (6.48-10.20)	0
	Nb-95	0.030	< LLD	-	-	< LLD	0
	Zr-95	0.071	< LLD	-	-	< LLD	0
	Ru-103	0.031	< LLD		-	< LLD	0
	Ru-106	0.310	< LLD	-	-	< LLD	0
	Cs-134	0.032	< LLD	-	-	< LLD	0
	Cs-137	0.032	< LLD	-	-	< LLD	0
	Ce-141	0.054	< LLD	-	-	< LLD	0
	Ce-144	0.24	< LLD	-	-	< LLD	0
Soil (pCi/gdry)	GA 14	3.91	8.69 (8/10) (5.90-13.07)	K-5, Paplham Farm 3.5 mi. NNW	10.94 (2/2) (8.81-13.07)	7.58 (4/4) (7.12-8.04)	0
	GB 14	2.00	25.43 (10/10) (13.84-34.12)	K-5, Paplham Farm 3.5 mi. NNW	29.26 (2/2) (24.40-34.12)	28.28 (4/4) (25.17-30.66)	0
	Sr-89 14	0.099	< LLD	-	-	< LLD	0
	Sr-90 14	0.019	0.071 (6/10) (0.045-0.095)	K-34, Struck Farm 2.5 mi. N	0.089 (1/1)	0.049 (3/4) (0.041-0.053)	0
	GS 14						
	Be-7	0.43	0.48 (1/10)	K-25, Wotachek Farm 2.75 mi. WSW	0.48 (1/1)	< LLD	0
	K-40	1.4	18.37 (10/10) (12.53-25.77)	K-5, Paplham Farm 3.5 mi. NNW	21.31 (2/2) (16.84-25.77)	19.07 (4/4) (17.63-19.97)	0
	Nb-95	0.060	< LLD	-	-	< LLD	0
	Zr-95	0.083	< LLD	-	-	< LLD	0
	Ru-103	0.038	< LLD		-	< LLD	0
	Ru-106	0.39	< LLD	-	-	< LLD	0
	Cs-134	0.069	< LLD	-	-	< LLD	0
	Cs-137	0.080	0.15 (5/10) (0.086-0.23)	K-12, LeCaptain Farm 1.5 mi. WSW	0.23 (2/2) (0.22-0.23)	0.20 (3/4) (0.19-0.21)	0
	Ce-141	0.11	< LLD	-	-	< LLD	0
	Ce-144	0.23	< LLD	-	-	< LLD	0

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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[c]
Surface Water	GB (SS) 105	2.0	< LLD	-	-	< LLD	0
(pCi/L)	GB (DS) 105	1.2	6.9 (81/81) (1.8-31.6)	K-1a, North Creek 0.62 mi. N	15.0 (12/12) (7.4-23.1)	2.4 (24/24) (1.7-3.3)	0
	GB (TR) 105	1.2	7 (81/81) (1.8-31.6)	K-1a, North Creek 0.62 mi. N	15.3 (12/12) (7.4-23.1)	2.4 (24/24) (1.7-3.6)	0
	GS 105						
	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 36	330	< LLD	-	-	< LLD	0
	Sr-89 36	2.2	< LLD	-	-	< LLD	0
	Sr-90 36	2.0	< LLD	-	-	< LLD	0
	K-40 (f.p.) 105	0.87	4.5 (81/81) (0.95-19.0)	K-1a, North Creek 0.62 mi. N	12.0 (12/12) (5.2-19.0)	1.1 (24/24) (0.95-1.3)	0
Fish (Muscle) (pCi/gwet)	GB 6	0.5	2.90 (6/6) (2.23-3.71)	K-1d, Cond. Discharge 0.10 mi. E	2.90 (6/6) (2.23-3.71)	None	0
	GS 6						
	K-40	0.5	2.81 (6/6) (1.74-3.86)	K-1d, Cond. Discharge 0.10 mi. E	2.81 (6/6) (1.74-3.86)	None	0
	Mn-54	0.024	< LLD	-	-	None	0
	Fe-59	0.120	< LLD	-	-	None	0
	Co-58	0.048	< LLD	-	-	None	0
	Co-60	0.024	< LLD	-	-	None	0
	Cs-134	0.020	< LLD	-	-	None	0
	Cs-137	0.016	0.063 (4/6) (0.029-0.12)	K-1d, Cond. Discharge 0.10 mi. E	0.063 (4/6) (0.029-0.12)	None	0
Fish (Bones) (pCi/gwet)	GB 6	0.1	1.49 (6/6) (0.78-2.58)	K-1d, Cond. Discharge 0.10 mi. E	1.49 (6/6) (0.78-2.58)	None	0
	Sr-89 6	0.32	< LLD	-	-	None	0
	Sr-90 6	0.010	0.27 (6/6) (0.06-0.59)	K-1d, Cond. Discharge 0.10 mi. E	0.27 (6/6) (0.06-0.59)	None	0 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, 2000

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 15	0.1	3.34 (13/13) (1.84-4.77)	K-1a, North Creek 0.62 mi. N	4.77 (2/2) (4.76-4.77)	2.45 (2/2) (2.33-2.56)	0
(pCi/gwet)	Sr-89 15	0.27	< LLD	-	-	< LLD	0
	Sr-90 15	0.086	0.15 (2/13) (0.11-0.19)	K-1e, South Creek 0.12 mi. S	0.19 (1/2)	< LLD	0
	GS 15						
	Be-7	0.48	0.98 (2/13) (0.75-1.20)	K-1d, Cond. Discharge 0.10 mi. E	1.20 (1/2)	< LLD	0
	K-40	0.5	2.82 (12/13) (1.22-4.84)	K-1a, North Creek 0.62 mi. N	4.66 (2/2) (4.48-4.84)	2.99 (2/2) (2.88-3.10)	0
	Mn-54	0.026	< LLD	-	-	< LLD	0
	Co-58	0.023	< LLD	-	-	< LLD	0
	Co-60	0.022	< LLD	-	-	< LLD	0
	Nb-95	0.024	< LLD	-	-	< LLD	0
	Zr-95	0.056	< LLD	-	-	< LLD	0
	Ru-103	0.025	< LLD	-	-	< LLD	0
	Ru-106	0.22	< LLD	-	-	< LLD	0
	Cs-134	0.031	< LLD	-	-	< LLD	0
	Cs-137	0.033	0.052 (4/13) (0.035-0.066)	K-1d, Cond. Discharge 0.10 mi. E	0.66 (1/2)	< LLD	0
	Ce-141	0.045	< LLD	-	-	< LLD	0
	Ce-144	0.17	< LLD	-	-	< LLD	0
Bottom Sediments	GB 10	1.0	8.81 (8/8) (6.06-12.00)	K-1j, Cond. Discharge 0.10 mi. S	10.31 (2/2) (8.62-12.00)	6.19 (2/2) (5.84-6.54)	0
(pCi/gdry)	Sr-89 10	0.11	< LLD	-	-	< LLD	0
	Sr-90 10	0.038	< LLD	-	-	< LLD	0
	GS 10						
	K-40	0.5	7.22 (8/8) (6.12-8.66)	K-1j, Cond. Discharge 0.10 mi. S	8.32 (2/2) (7.97-8.66)	4.89 (2/2) (4.42-5.36)	0
	Co-58	0.019	< LLD	-	-	< LLD	0
	Co-60	0.016	< LLD	-	-	< LLD	0
	Cs-134	0.023	< LLD	-	-	< LLD	0
	Cs-137	0.018	0.035 (5/8) (0.025-0.041)	K-1d, Cond. Discharge 0.10 mi. E	0.038 (1/2)	0.024 (1/2)	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.

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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, 2000 through December, 2000

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 (e.g., milk or water) 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.

The results in Table A-1 were obtained through participation in the environmental sample crosscheck program for milk, water and air filters during the past twelve months. Data for previous years is available upon request.

This program was conducted by the U.S. Environmental Protection Agency Office of Research and Development National Exposure Research Laboratory Characterization Research Division-Las Vegas, Nevada.

The results in Table A-2 were obtained for Thermoluminescent Dosimeters (TLDs), via various International Intercomparisons of Environmental Dosimeters under the sponsorships listed in Table A-2. Results of crosscheck testing with Teledyne Brown Engineering are 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.

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 determinations
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	Sample Type	Date Collected	Analysis	Concentration in pCi/L[b] Laboratory results ±2 Sigma[c]	ERA Result[d] 1s, N=1	Control Limits
STW-863	WATER	Jan, 2000	Gr. Alpha	39.3 ± 5.2	25.4 ± 6.4	14.5 - 36.3
The analysis was repeated and recalculated with Am-241 efficiency; result of reanalysis 29.32 ± 5.79 pCi/L. Internal spike program results do not indicate a problem.						
STW-863	WATER	Jan, 2000	Gr. Beta	40.7 ± 1.2	42.1 ± 4.2	33.4 - 50.8
STW-866	WATER	Jan, 2000	Sr-89	17.1 ± 2.2	22.5 ± 5.0	13.8 - 31.2
STW-866	WATER	Jan, 2000	Sr-90	8.1 ± 0.6	9.6 ± 5.0	0.9 - 18.3
STW-868	WATER	Feb, 2000	Ra-226	7.6 ± 0.5	8.3 ± 1.2	6.1 - 10.4
STW-868	WATER	Feb, 2000	Ra-228	5.6 ± 1.0	2.3 ± 0.6	1.3 - 3.2
Result of reanalysis: 6.34 ± 0.94. Activity confirmed by gamma spectroscopy (6.00 ± 1.42 pCi/L).						
STW-868	WATER	Feb, 2000	Uranium	5.4 ± 0.2	6.1 ± 3.0	0.9 - 11.3
STW-869	WATER	Mar, 2000	H-3	23,500.0 ± 306.0	23,800.0 ± 2,380.0	19,800.0 - 27,800.0
STW-867	WATER	Mar, 2000	Gr. Alpha	83.6 ± 5.8	58.4 ± 5.8	33.3 - 83.5
Results were recalculated with Am-241 efficiency; 57.80 ± 5.73 pCi/L. Refer to STW-863.						
STW-867	WATER	Mar, 2000	Gr. Beta	15.4 ± 0.9	16.8 ± 1.7	8.1 - 25.5
STW-876	WATER	Mar, 2000	I-131	18.7 ± 0.6	19.9 ± 2.0	14.7 - 25.1
STW-877	WATER	Apr, 2000	Gr. Alpha	52.3 ± 2.3	54.0 ± 13.5	30.8 - 77.2
STW-877	WATER	Apr, 2000	Ra-226	17.5 ± 1.1	18.6 ± 2.8	13.8 - 23.4
STW-877	WATER	Apr, 2000	Ra-228	3.7 ± 0.4	3.6 ± 0.9	2.0 - 5.1
STW-878	WATER	Apr, 2000	Co-60	19.2 ± 0.6	16.9 ± 5.0	8.2 - 25.6
STW-878	WATER	Apr, 2000	Cs-134	81.0 ± 1.3	86.4 ± 5.0	77.7 - 95.1
STW-878	WATER	Apr, 2000	Cs-137	119.0 ± 2.6	123.0 ± 6.2	112.0 - 134.0
STW-878	WATER	Apr, 2000	Gr. Beta	276.0 ± 9.6	289.0 ± 43.4	214.0 - 364.0
STW-878	WATER	Apr, 2000	Sr-89	32.3 ± 3.3	50.7 ± 5.0	42.0 - 59.4
STW-878	WATER	Apr, 2000	Sr-90	11.3 ± 1.0	32.8 ± 5.0	24.1 - 41.5
An error was found in calculation. Result of recalculation: Sr-89, 55.5± 7.2 pCi/L / Sr-90, 30.7 ± 3.0 pCi/L. Results of reanalysis: Sr-89, 47.4 ± 14.5 pCi/L / Sr-90, 33.0 ± 1.35 pCi/L. Both results are within limits.						
STW-879	WATER	Jun, 2000	Ba-133	22.4 ± 2.1	25.5 ± 5.0	16.8 - 34.2
STW-879	WATER	Jun, 2000	Co-60	69.9 ± 3.7	65.6 ± 5.0	56.9 - 74.3
STW-879	WATER	Jun, 2000	Cs-134	13.5 ± 0.8	13.8 ± 5.0	5.1 - 22.5
STW-879	WATER	Jun, 2000	Cs-137	232.0 ± 7.8	238.0 ± 11.9	217.0 - 259.0
STW-879	WATER	Jun, 2000	Zn-65	50.9 ± 3.8	54.6 ± 5.5	45.3 - 63.9
STW-880	WATER	Jun, 2000	Ra-226	2.8 ± 0.2	3.0 ± 0.5	2.2 - 3.8
STW-880	WATER	Jun, 2000	Ra-228	10.0 ± 0.9	13.0 ± 3.3	7.4 - 18.6
STW-880	WATER	Jun, 2000	Uranium	57.0 ± 4.4	63.4 ± 6.3	52.6 - 74.2
STW-883	WATER	Jul, 2000	Gr. Alpha	6.9 ± 1.1	7.2 ± 5.0	0.0 - 15.9
STW-883	WATER	Jul, 2000	Gr. Beta	88.8 ± 9.8	87.5 ± 10.0	70.2 - 105.0
STW-884	WATER	Aug, 2000	H-3	8,740.0 ± 174.0	8,320.0 ± 832.0	6,910.0 - 9,730.0
STW-891	WATER	Sep, 2000	Ra-226	17.9 ± 1.3	18.9 ± 2.8	14.0 - 23.8
STW-891	WATER	Sep, 2000	Ra-228	5.7 ± 0.5	6.2 ± 1.6	3.5 - 8.8

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

Lab Code	Sample Type	Date Collected	Analysis	Concentration in pCi/L[b] Laboratory results ±2 Sigma[c]	ERA Result[d] 1s, N=1	Control Limits
STW-891	WATER	Sep, 2000	Uranium	10.3 ± 0.1	11.9 ± 3.0	6.7 - 17.1
STW-892	WATER	Oct, 2000	I-131	16.9 ± 0.3	15.9 ± 1.6	10.7 - 21.1
STW-892	WATER	Oct, 2000	I-131(g)	17.1 ± 5.4	15.9 ± 1.6	10.7 - 21.1
STW-893	WATER	Oct, 2000	Gr. Alpha	66.3 ± 5.3	74.4 ± 18.6	42.2 - 107.0
STW-893	WATER	Oct, 2000	Ra-226	10.1 ± 1.0	10.5 ± 1.6	7.8 - 13.2
STW-893	WATER	Oct, 2000	Ra-228	21.2 ± 0.5	19.4 ± 4.9	11.0 - 27.8
STW-893	WATER	Oct, 2000	Uranium	41.4 ± 1.9	44.5 ± 4.5	36.8 - 52.2
STW-894	WATER	Oct, 2000	Co-60	93.4 ± 1.6	91.1 ± 5.0	82.4 - 99.8
STW-894	WATER	Oct, 2000	Cs-134	54.8 ± 0.3	59.8 ± 5.0	51.1 - 68.5
STW-894	WATER	Oct, 2000	Cs-137	45.5 ± 2.3	45.0 ± 5.0	36.3 - 53.7
STW-894	WATER	Oct, 2000	Cs-137	45.5 ± 2.3	45.0 ± 5.0	36.3 - 53.7
STW-894	WATER	Oct, 2000	Gr. Beta	209.0 ± 7.9	256.0 ± 38.4	189.0 - 323.0
STW-894	WATER	Oct, 2000	Sr-89	32.8 ± 3.0	41.3 ± 5.0	32.6 - 50.0
STW-894	WATER	Oct, 2000	Sr-90	16.0 ± 2.4	18.0 ± 5.0	9.3 - 26.7
STW-895	WATER	Nov, 2000	Gr. Alpha	50.3 ± 2.6	60.3 ± 15.1	34.4 - 86.2
STW-895	WATER	Nov, 2000	Gr. Beta	28.6 ± 1.3	25.5 ± 5.0	16.8 - 34.2
STW-896	WATER	Nov, 2000	Ba-133	78.0 ± 2.0	82.2 ± 8.2	68.0 - 96.4
STW-896	WATER	Nov, 2000	Co-60	30.8 ± 1.7	27.8 ± 5.0	19.1 - 36.5
STW-896	WATER	Nov, 2000	Cs-134	67.2 ± 3.3	76.0 ± 5.0	67.3 - 84.7
The mean value for Cs-134 of all participating laboratories was 70.7 pCi/L. Other gamma emitters are within limits, the counting efficiency is not suspect. Library values were reviewed and found to be correct.						
STW-896	WATER	Nov, 2000	Cs-137	109.0 ± 1.0	106.0 ± 5.3	96.8 - 115.0
STW-896	WATER	Nov, 2000	Zn-65	81.5 ± 7.4	79.0 ± 7.9	65.3 - 92.7

[a] Results obtained by Environmental, Inc., Midwest Laboratory as a participant in the environmental samples crosscheck program operated by Environmental Resources Associates (ERA).

[b] All results are in pCi/L, except for elemental potassium (K) data in milk, which are in mg/L; air filter samples, which are in pCi/Filter.

[c] Unless otherwise indicated, the laboratory results are given as the mean ± 2 standard deviations for three determinations.

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

Table A-2. Crosscheck program results; Thermoluminescent Dosimeters. (TLDs).

Lab Code	TLD Type	Date	Measurement	mR: Laboratory results ± 2 Sigma	mR: Known Value	mR: Average ± 2 Sigma (All Participants)
Environmental, Inc.						
1999-1	LiF-100 Chips	Mar, 1999	Reader 1, #1	14.5 ± 0.5	15.4	-
1999-1	LiF-100 Chips	Mar, 1999	Reader 1, #2	29.3 ± 1.0	31.8	-
1999-1	LiF-100 Chips	Mar, 1999	Reader 1, #3	60.0 ± 0.2	59.1	-
Environmental, Inc.						
1999-2	$CaSO_4$: Dy Cards	Mar, 1999	Reader 1, #1	18.3 ± 0.5	15.4	-
1999-2	$CaSO_4$: Dy Cards	Mar, 1999	Reader 1, #2	35.9 ± 1.3	31.8	-
1999-2	$CaSO_4$: Dy Cards	Mar, 1999	Reader 1, #3	66.5 ± 4.4	59.1	-
Chips and Cards were irradiated by Teledyne Brown Engineering, Westwood, New Jersey, in March, 1999.						
Environmental, Inc.						
2000-1	LiF-100 Chips	Mar, 2000	Reader 1, #1	14.4 ± 0.2	17.8	-
2000-1	LiF-100 Chips	Mar, 2000	Reader 1, #2	32.4 ± 0.1	35.5	-
2000-1	LiF-100 Chips	Mar, 2000	Reader 1, #3	61.8 ± 0.9	62.2	-
Environmental, Inc.						
2000-2	$CaSO_4$: Dy Cards	Mar, 2000	Reader 1, #1	21.3 ± 0.3	17.8	-
2000-2	$CaSO_4$: Dy Cards	Mar, 2000	Reader 1, #2	40.1 ± 1.9	35.5	-
2000-2	$CaSO_4$: Dy Cards	Mar, 2000	Reader 1, #3	69.9 ± 3.5	62.2	-
Chips and Cards were irradiated by Teledyne Brown Engineering, Westwood, New Jersey, in March, 2000.						

Table A-3. In-house "spike" samples.

Lab Code	Sample Type	Date Collected	Analysis	Concentration in pCi/L[a] Laboratory results 2s, n=1[b]	Known Activity	Control[c] Limits
SPW-271	WATER	Jan, 2000	Ra-226	14.81 ± 0.44	13.76	9.63 - 17.89
SPW-271	WATER	Jan, 2000	Ra-228	16.97 ± 2.12	14.68	10.28 - 19.08
SPW-272	WATER	Jan, 2000	Gr. Alpha	44.35 ± 1.95	41.14	20.57 - 61.71
SPW-272	WATER	Jan, 2000	Gr. Beta	31.19 ± 5.02	29.50	19.50 - 39.50
SPW-756	WATER	Jan, 2000	H-3	56339.00 ± 666.00	57667.00	46133.60 - 69200.40
SPW-480	WATER	Jan, 2000	Co-60	32.33 ± 2.87	28.36	18.36 - 38.36
SPW-480	WATER	Jan, 2000	Cs-137	35.58 ± 4.20	36.83	26.83 - 46.83
SPMI-482	MILK	Jan, 2000	Sr-90	16.93 ± 1.07	14.10	4.10 - 24.10
SPAP-484	AIR FILTER	Jan, 2000	Cs-137	1.84 ± 0.01	1.72	1.03 - 2.41
SPW-917	WATER	Feb, 2000	Gr. Alpha	16.59 ± 1.90	41.10	20.55 - 61.65
An insufficient amount of Am-241 spike was available for an accurate test.						
SPW-917	WATER	Feb, 2000	Gr. Beta	32.61 ± 2.06	29.43	19.43 - 39.43
SPW-918	WATER	Feb, 2000	Ra-226	21.15 ± 0.49	20.68	14.48 - 26.88
SPW-918	WATER	Feb, 2000	Ra-228	14.24 ± 1.64	14.51	10.16 - 18.86
SPVE-1262	VEGETATION	Mar, 2000	I-131(g)	1.17 ± 0.07	1.12	0.67 - 1.57
SPCH-1264	CHARCOAL CANISTER	Mar, 2000	I-131(g)	0.56 ± 0.02	0.53	0.32 - 0.74
SPMI-1274	MILK	Mar, 2000	I-131	47.02 ± 3.36	48.00	36.00 - 60.00
SPW-1301	WATER	Mar, 2000	I-131	66.03 ± 1.06	76.84	61.47 - 92.21
SPW-1301	WATER	Mar, 2000	I-131(g)	80.31 ± 6.28	76.84	66.84 - 86.84
SPW-1477	WATER	Mar, 2000	Gr. Alpha	32.09 ± 1.82	41.13	20.57 - 61.70
SPW-1477	WATER	Mar, 2000	Gr. Beta	29.20 ± 1.56	29.38	19.38 - 39.38
SPW-1478	WATER	Mar, 2000	Ra-226	21.78 ± 0.47	20.69	14.48 - 26.90
SPW-1478	WATER	Mar, 2000	Ra-228	14.41 ± 1.70	14.39	10.07 - 18.71
SPMI-2275	MILK	Apr, 2000	Cs-134	33.53 ± 2.82	32.12	22.12 - 42.12
SPMI-2275	MILK	Apr, 2000	Cs-137	36.38 ± 4.94	36.66	26.66 - 46.66
SPMI-2275	MILK	Apr, 2000	I-131	46.06 ± 0.82	55.50	44.40 - 66.60
SPW-2277	WATER	Apr, 2000	Ra-226	20.51 ± 0.44	20.68	14.48 - 26.88
SPW-2278	WATER	Apr, 2000	Gr. Alpha	40.22 ± 2.50	38.44	19.22 - 57.66
SPW-2278	WATER	Apr, 2000	Gr. Beta	32.63 ± 1.81	29.30	19.30 - 39.30
SPW-2278	WATER	Apr, 2000	Ra-228	14.91 ± 1.70	14.25	9.98 - 18.53
SPW-2279	WATER	Apr, 2000	Co-60	37.12 ± 3.86	34.54	24.54 - 44.54
SPW-2279	WATER	Apr, 2000	Cs-134	34.70 ± 3.32	32.12	22.12 - 42.12
SPW-2279	WATER	Apr, 2000	Cs-137	39.60 ± 5.12	36.66	26.66 - 46.66
SPW-2279	WATER	Apr, 2000	I-131	49.92 ± 0.67	55.50	44.40 - 66.60
SPW-2279	WATER	Apr, 2000	I-131(g)	60.63 ± 6.58	55.50	45.50 - 65.50
SPW-2281	WATER	Apr, 2000	H-3	58829.00 ± 682.00	56996.00	45596.80 - 68395.20
SPAP-3097	AIR FILTER	Apr, 2000	Cs-137	1.81 ± 0.02	1.71	1.03 - 2.39
SPW-3093	WATER	May, 2000	I-131	83.39 ± 1.06	85.38	68.30 - 102.46
SPW-3094	WATER	May, 2000	Ra-226	20.86 ± 0.42	20.68	14.48 - 26.88
SPW-3094	WATER	May, 2000	Ra-228	14.17 ± 1.59	14.12	9.88 - 18.36
SPW-3095	WATER	May, 2000	Gr. Alpha	38.99 ± 2.09	38.44	19.22 - 57.66

Table A-3. In-house "spike" samples.

Lab Code	Sample Type	Date Collected	Analysis	Concentration in pCi/L[a] Laboratory results 2s, n=1[b]	Known Activity	Control[c] Limits
SPW-3095	WATER	May, 2000	Gr. Beta	30.65 ± 1.53	29.30	19.30 - 39.30
SPAP-274	AIR FILTER	May, 2000	Gr. Beta	5.08 ± 0.03	5.97	-4.03 - 15.97
SPMI-3138	MILK	May, 2000	I-131	85.08 ± 1.05	85.38	68.30 - 102.46
SPF-3180	FISH	May, 2000	Cs-134	0.52 ± 0.02	0.50	0.30 - 0.70
SPF-3180	FISH	May, 2000	Cs-137	0.65 ± 0.04	0.59	0.35 - 0.82
SPAP-3902	AIR FILTER	Jun, 2000	Gr. Beta	5.81 ± 0.03	5.35	-4.65 - 15.35
SPF-5182	FISH	Jun, 2000	Cs-134	0.60 ± 0.04	0.59	0.35 - 0.83
SPF-5182	FISH	Jun, 2000	Cs-137	0.60 ± 0.05	0.58	0.35 - 0.81
SPW-3911	WATER	Jun, 2000	Ra-226	23.73 ± 0.85	20.68	14.48 - 26.88
SPW-3911	WATER	Jun, 2000	Ra-228	20.43 ± 1.77	20.75	14.53 - 26.98
SPW-3910	WATER	Jun, 2000	Gr. Alpha	38.28 ± 2.12	38.44	19.22 - 57.66
SPW-3910	WATER	Jun, 2000	Gr. Beta	35.14 ± 1.74	29.22	19.22 - 39.22
SPW-4342	WATER	Jun, 2000	Sr-89	73.70 ± 4.77	81.00	64.80 - 97.20
SPW-4342	WATER	Jun, 2000	Sr-90	58.13 ± 2.17	55.90	44.72 - 67.08
SPW-4687	WATER	Jul, 2000	Ra-226	21.07 ± 0.56	20.68	14.48 - 26.88
SPW-4687	WATER	Jul, 2000	Ra-228	16.35 ± 1.70	20.75	14.53 - 26.98
SPW-4688	WATER	Jul, 2000	H-3	56205.00 ± 663.00	56228.00	44982.40 - 67473.60
SPAP-4807	AIR FILTER	Jul, 2000	Gr. Beta	6.07 ± 0.02	5.96	-4.04 - 15.96
SPAP-4809	AIR FILTER	Jul, 2000	Cs-137	1.82 ± 0.02	1.71	1.03 - 2.39
SPMI-4856	MILK	Jul, 2000	Cs-134	33.24 ± 3.74	29.56	19.56 - 39.56
SPMI-4856	MILK	Jul, 2000	Cs-137	39.80 ± 6.77	36.45	26.45 - 46.45
SPMI-4856	MILK	Jul, 2000	Sr-89	46.35 ± 5.10	56.34	45.07 - 67.61
SPMI-4856	MILK	Jul, 2000	Sr-90	70.47 ± 2.06	69.73	55.78 - 83.68
SPW-5372	WATER	Jul, 2000	Co-60	33.31 ± 4.61	33.24	23.24 - 43.24
SPW-5372	WATER	Jul, 2000	Cs-134	59.70 ± 4.57	58.26	48.26 - 68.26
SPW-5372	WATER	Jul, 2000	Cs-137	40.00 ± 5.58	36.42	26.42 - 46.42
SPW-4686	WATER	Aug, 2000	Gr. Alpha	34.12 ± 1.71	38.43	19.22 - 57.65
SPW-4686	WATER	Aug, 2000	Gr. Beta	35.42 ± 1.51	29.21	19.21 - 39.21
SPW-5564	WATER	Aug, 2000	Sr-89	62.97 ± 4.73	67.61	54.09 - 81.13
SPW-5564	WATER	Aug, 2000	Sr-90	65.40 ± 2.47	55.70	44.56 - 66.84
SPW-5792	WATER	Aug, 2000	Ra-226	12.82 ± 0.30	13.79	9.65 - 17.93
SPW-5792	WATER	Aug, 2000	Ra-228	15.00 ± 1.21	13.69	9.58 - 17.80
SPW-6631	WATER	Sep, 2000	Ra-228	22.20 ± 2.20	20.32	14.22 - 26.42
SPW-6632	WATER	Sep, 2000	Ra-226	13.58 ± 0.29	13.79	9.65 - 17.93
SPW-6632	WATER	Sep, 2000	Ra-228	18.84 ± 2.59	20.32	14.22 - 26.42
SPW-6633	WATER	Sep, 2000	Fe-55	1757.00 ± 674.00	1852.00	1481.60 - 2222.40
SPW-5791	WATER	Sep, 2000	Gr. Alpha	52.28 ± 9.41	69.00	34.50 - 103.50
SPW-5791	WATER	Sep, 2000	Gr. Beta	34.60 ± 4.71	29.10	19.10 - 39.10
SPW-6630	WATER	Sep, 2000	Gr. Alpha	71.54 ± 7.15	69.14	34.57 - 103.71
SPW-6630	WATER	Sep, 2000	Gr. Beta	37.78 ± 1.62	29.04	19.04 - 39.04
SPW-7744	WATER	Oct, 2000	Ra-226	12.36 ± 0.25	13.79	9.65 - 17.93

Table A-3. In-house "spike" samples.

Lab Code	Sample Type	Date Collected	Analysis	Concentration in pCi/L[a] Laboratory results 2s, n=1[b]	Known Activity	Control[c] Limits
SPW-7744	WATER	Oct, 2000	Ra-228	10.37 ± 1.15	13.40	9.38 - 17.42
SPW-7745	WATER	Oct, 2000	H-3	54650.00 ± 643.00	55391.00	44312.80 - 66469.20
SPAP-7764	AIR FILTER	Oct, 2000	Gr. Beta	6.14 ± 0.03	5.91	-4.09 - 15.91
SPAP-7766	AIR FILTER	Oct, 2000	Cs-137	1.84 ± 0.01	1.69	1.01 - 2.37
SPMI-8347	MILK	Oct, 2000	Cs-134	29.18 ± 6.51	26.83	16.83 - 36.83
SPMI-8347	MILK	Oct, 2000	Cs-134	29.37 ± 3.63	26.83	16.83 - 36.83
SPMI-8347	MILK	Oct, 2000	Cs-137	39.04 ± 8.76	36.20	26.20 - 46.20
SPMI-8347	MILK	Oct, 2000	Cs-137	34.89 ± 5.71	36.20	26.20 - 46.20
SPF-8349	FISH	Oct, 2000	Cs-134	0.56 ± 0.02	0.54	0.32 - 0.75
SPF-8349	FISH	Oct, 2000	Cs-137	0.92 ± 0.04	0.87	0.52 - 1.22
SPW-8369	WATER	Oct, 2000	Co-60	32.49 ± 1.86	32.19	22.19 - 42.19
SPW-8369	WATER	Oct, 2000	Cs-134	55.87 ± 1.71	53.66	43.66 - 63.66
SPW-8369	WATER	Oct, 2000	Cs-137	36.46 ± 2.73	36.21	26.21 - 46.21
SPW-7743	WATER	Oct, 2000	Gr. Alpha	51.28 ± 2.28	69.10	34.55 - 103.65
SPW-7743	WATER	Oct, 2000	Gr. Beta	36.86 ± 1.66	29.00	19.00 - 39.00
SPW-9101	WATER	Nov, 2000	Ra-226	14.35 ± 0.24	13.79	9.65 - 17.93
SPW-9101	WATER	Nov, 2000	Ra-228	22.14 ± 1.56	20.09	14.06 - 26.12
SPW-9102	WATER	Dec, 2000	Gr. Alpha	77.76 ± 3.02	69.14	34.57 - 103.71
SPW-9102	WATER	Dec, 2000	Gr. Beta	36.71 ± 1.65	28.99	18.99 - 38.99
SPW-9726	WATER	Dec, 2000	Gr. Alpha	43.03 ± 2.18	69.14	34.57 - 103.71
SPW-9726	WATER	Dec, 2000	Gr. Beta	32.17 ± 1.55	28.89	18.89 - 38.89
SPW-9727	WATER	Dec, 2000	Ra-226	13.35 ± 0.29	13.79	9.65 - 17.93
SPW-9727	WATER	Dec, 2000	Ra-228	15.44 ± 1.23	19.75	13.83 - 25.68
SPCH-10228	CHARCOAL CANISTER	Dec, 2000	Ba-133	1.80 ± 0.05	2.11	1.26 - 2.95

[a] All results are in pCi/L, except for elemental potassium (K) in milk, which are in mg/L.; air filter samples, which are in pCi/Filter; and food products, which are in mg/kg.

[b] All samples are the results of 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, Sawdust is used for the spike matrix.

Table A-4. In-house "blank" samples.

Lab Code	Sample Type	Sample Date	Analysis	Concentration pCi/L[a]. Laboratory results (4.66 Sigma) LLD	Activity[b]	Acceptance Criteria (4.66 Sigma)
SPW-270	WATER	Jan 2000	Gr. Alpha	< 0.50	0.52 ± 0.41	< 1.0
SPW-270	WATER	Jan 2000	Gr. Beta	< 1.50	-0.34 ± 1.11	< 3.2
SPW-270	WATER	Jan 2000	Ra-226		0.06 ± 0.01	< 1.0
SPW-270	WATER	Jan 2000	Ra-228	< 0.94	0.14 ± 0.45	< 2.0
SPW-447	WATER	Jan 2000	H-3	< 184.00	-54.70 ± 88.60	< 200.0
SPW-481	WATER	Jan 2000	Co-60	< 2.42		< 10.0
SPW-481	WATER	Jan 2000	Cs-134	< 3.99		< 10.0
SPW-481	WATER	Jan 2000	Cs-137	< 2.90		< 10.0
SPMI-483	MILK	Jan 2000	Cs-137	< 2.73		< 10.0
SPMI-483	MILK	Jan 2000	Sr-90		1.03 ± 0.40	< 1.0
Low level of Sr-90 concentration in milk (1-5 pCi/L) is not unusual.						
SPAP-485	AIR FILTER	Jan 2000	Cs-137	< 1.64		< 100.0
SPW-919	WATER	Feb 2000	Gr. Alpha	< 0.80	0.56 ± 0.61	< 1.0
SPW-919	WATER	Feb 2000	Gr. Beta	< 1.65	0.11 ± 1.16	< 3.2
SPW-919	WATER	Feb 2000	Ra-226	< 0.02	0.02 ± 0.01	< 1.0
SPW-919	WATER	Feb 2000	Ra-228	< 0.60	0.02 ± 0.01	< 2.0
SPVE-1263	VEGETATION	Mar 2000	Cs-134	< 11.48		< 100.0
SPVE-1263	VEGETATION	Mar 2000	Cs-137	< 24.82		< 100.0
SPCH-1265	CHARCOAL CANISTER	Mar 2000	I-131(g)	< 7.00		< 9.6
SPMI-1292	MILK	Mar 2000	I-131	< 0.32	0.05 ± 0.18	< 0.5
SPMI-1292	MILK	Mar 2000	I-131(g)	< 4.60		< 20.0
SPW-1302	WATER	Mar 2000	I-131	< 0.30	0.01 ± 0.14	< 0.5
SPW-1479	WATER	Mar 2000	Gr. Alpha	< 0.84	-0.32 ± 0.53	< 1.0
SPW-1479	WATER	Mar 2000	Gr. Beta	< 1.86	-1.39 ± 1.19	< 3.2
SPW-1479	WATER	Mar 2000	Ra-226	< 0.01	0.06 ± 0.01	< 1.0
SPW-1479	WATER	Mar 2000	Ra-228	< 1.00	1.17 ± 0.60	< 2.0
SPMI-2276	MILK	Apr 2000	Cs-134	< 4.20		< 10.0
SPMI-2276	MILK	Apr 2000	Cs-137	< 3.33		< 10.0
SPMI-2276	MILK	Apr 2000	I-131	< 0.50	0.32 ± 0.30	< 0.5
SPW-2280	WATER	Apr 2000	Co-60	< 2.78		< 10.0
SPW-2280	WATER	Apr 2000	Cs-134	< 3.56		< 10.0

Table A-4. In-house "blank" samples.

Lab Code	Sample Type	Sample Date	Analysis	Concentration pCi/L[a]. Laboratory results (4.66 Sigma) LLD	Activity[b]	Acceptance Criteria (4.66 Sigma)
SPW-2280	WATER	Apr 2000	Cs-137	< 2.81		< 10.0
SPW-2280	WATER	Apr 2000	Gr. Alpha	< 0.60	0.55 ± 0.45	< 1.0
SPW-2280	WATER	Apr 2000	Gr. Beta	< 1.66	0.62 ± 1.11	< 3.2
SPW-2280	WATER	Apr 2000	I-131	< 0.29	-0.16 ± 0.19	< 0.5
SPW-2280	WATER	Apr 2000	I-131(g)	< 3.42		< 20.0
SPW-2280	WATER	Apr 2000	Ra-226		0.03 ± 0.01	< 1.0
SPW-2280	WATER	Apr 2000	Ra-228	< 0.87	0.65 ± 0.47	< 2.0
SPW-2282	WATER	Apr 2000	H-3	< 151.60	-5.40 ± 74.90	< 200.0
SPAP-3098	AIR FILTER	Apr 2000	Cs-137	< 1.37		< 100.0
SPW-3096	WATER	May 2000	Gr. Alpha	< 0.68		< 1.0
SPW-3096	WATER	May 2000	Gr. Beta	< 1.62		< 3.2
SPW-3096	WATER	May 2000	Ra-226		0.05 ± 0.01	< 1.0
SPW-3096	WATER	May 2000	Ra-228	< 0.90	0.05 ± 0.01	< 2.0
SPAP-273	AIR FILTER	May 2000	Gr. Beta	< 0.54	0.90 ± 0.32	< 3.2
SPMI-3139	MILK	May 2000	I-131	< 0.33		< 0.5
SPF-3181	FISH	May 2000	Cs-134	< 3.02		< 100.0
SPF-3181	FISH	May 2000	Cs-137	< 4.99		< 100.0
SPAP-3903	AIR FILTER	Jun 2000	Gr. Beta	< 0.48		< 3.2
SPW-3912	WATER	Jun 2000	Gr. Alpha	< 0.35	0.28 ± 0.28	< 1.0
SPW-3912	WATER	Jun 2000	Gr. Beta	< 1.22	0.54 ± 0.86	< 3.2
SPW-3912	WATER	Jun 2000	Ra-226		0.04 ± 0.02	< 1.0
SPW-3912	WATER	Jun 2000	Ra-228	< 0.65		< 2.0
SPMI-4343	MILK	Jun 2000	Sr-89	< 0.73		< 5.0
SPMI-4343	MILK	Jun 2000	Sr-90	< 0.56		< 1.0
SPW-4689	WATER	Jul 2000	Ra-226		0.03 ± 0.01	< 1.0
SPW-4689	WATER	Jul 2000	Ra-228	< 0.93	1.11 ± 0.55	< 2.0
SPW-4690	WATER	Jul 2000	H-3	< 178.00	18.57 ± 89.13	< 200.0
SPW-4808	WATER	Jul 2000	Gr. Alpha	< 0.45		< 1.0
SPAP-4810	AIR FILTER	Jul 2000	Cs-137	< 2.18		< 100.0
SPMI-4857	MILK	Jul 2000	Cs-137	< 6.13		< 10.0
SPMI-4857	MILK	Jul 2000	I-131(g)	< 7.19		< 20.0

Table A-4. In-house "blank" samples.

Lab Code	Sample Type	Sample Date	Analysis	Concentration pCi/L[a]. Laboratory results (4.66 Sigma) LLD	Activity[b]	Acceptance Criteria (4.66 Sigma)
SPMI-4857	MILK	Jul 2000	Sr-89	< 0.66		<5.0
SPMI-4857	MILK	Jul 2000	Sr-90		1.15 ±0.32	<1.0
Low level of Sr-90 concentration in milk (1-5 pCi/L) is not unusual.						
SPF-5183	FISH	Jul 2000	Cs-134	< 17.71		<100.0
SPF-5183	FISH	Jul 2000	Cs-137	< 12.81		<100.0
SPW-4689	WATER	Jul 2000	Gr. Alpha	< 0.50		<1.0
SPW-4689	WATER	Jul 2000	Gr. Beta	< 1.20		<3.2
SPW-5373	WATER	Jul 2000	Co-60	< 5.20		<10.0
SPW-5373	WATER	Jul 2000	Cs-134	< 4.80		<10.0
SPW-5373	WATER	Jul 2000	Cs-137	< 4.00		<10.0
SPW-5565	WATER	Aug 2000	Sr-89	< 1.56	-0.64 ±1.11	<5.0
SPW-5565	WATER	Aug 2000	Sr-90	< 0.59	0.17 ±0.30	<1.0
SPW-5793	WATER	Aug 2000	Gr. Alpha	< 0.51	0.02 ±0.36	<1.0
SPW-5793	WATER	Aug 2000	Ra-226		0.05 ±0.02	<1.0
SPW-5793	WATER	Aug 2000	Ra-228	< 0.95	0.26 ±0.47	<2.0
SPW-5793	WATER	Aug 2000	Gr. Beta	< 1.40	-0.13 ±1.01	<3.2
SPW-6634	WATER	Sep 2000	Fe-55	< 617.00	-105.90 ±453.40	<1000.0
SPW-6634	WATER	Sep 2000	Ra-226	< 0.01	0.03 ±0.01	<1.0
SPW-6634	WATER	Sep 2000	Ra-228	< 0.99	0.36 ±0.51	<2.0
SPW-6634	WATER	Sep 2000	Gr. Alpha	< 0.67	-0.22 ±0.45	<1.0
SPW-6634	WATER	Sep 2000	Gr. Beta	< 1.60	-0.20 ±1.12	<3.2
SPSO-10595	SOIL	Oct 2000	Cs-134	< 16.87		<100.0
SPSO-10595	SOIL	Oct 2000	Cs-137	< 9.40		<100.0
SPW-7746	WATER	Oct 2000	Ra-226	< 0.03	0.04 ±0.02	<1.0
SPW-7746	WATER	Oct 2000	Ra-228	< 1.08	0.00 ±0.87	<2.0
SPW-7747	WATER	Oct 2000	H-3	< 158.00	-38.00 ±77.00	<200.0
SPAP-7765	AIR FILTER	Oct 2000	Gr. Beta	< 0.64	0.00 ±0.00	<3.2
SPAP-7767	AIR FILTER	Oct 2000	Co-60	< 0.19		<100.0
SPAP-7767	AIR FILTER	Oct 2000	Cs-134	< 0.32		<100.0
SPAP-7767	AIR FILTER	Oct 2000	Cs-137	< 2.32		<100.0
SPMI-8348	MILK	Oct 2000	Cs-134	< 3.35		<10.0
SPMI-8348	MILK	Oct 2000	Cs-137	< 3.07		<10.0

Table A-4. In-house "blank" samples.

Lab Code	Sample Type	Sample Date	Analysis	Concentration pCi/L[a]. Laboratory results (4.66 Sigma) LLD	Activity[b]	Acceptance Criteria (4.66 Sigma)
SPF-8350	FISH	Oct 2000	Cs-134	< 10.26		< 100.0
SPF-8350	FISH	Oct 2000	Cs-137	< 10.51		< 100.0
SPW-8370	WATER	Oct 2000	Co-60	< 4.67		< 10.0
SPW-8370	WATER	Oct 2000	Cs-134	< 5.28		< 10.0
SPW-8370	WATER	Oct 2000	Cs-137	< 4.93		< 10.0
SPW-7746	WATER	Oct 2000	Gr. Alpha	< 0.46	0.06 ± 0.33	< 1.0
SPW-7746	WATER	Oct 2000	Gr. Beta	< 1.24	0.00 ± 0.87	< 3.2
SPW-9103	WATER	Nov 2000	Ra-226	< 0.01	0.02 ± 0.01	< 1.0
SPW-9103	WATER	Nov 2000	Ra-228	< 1.00	0.14 ± 0.48	< 2.0
SPW-9729	WATER	Dec 2000	Gr. Alpha	< 0.46	0.23 ± 0.36	< 1.0
SPW-9729	WATER	Dec 2000	Gr. Beta	< 1.33	-0.46 ± 0.98	< 3.2
SPW-9729	WATER	Dec 2000	Ra-226	< 0.02	0.05 ± 0.01	< 1.0
SPW-9729	WATER	Dec 2000	Ra-228	< 0.70	0.22 ± 0.35	< 2.0
SPW-9103	WATER	Dec 2000	Gr. Alpha	< 0.51	-0.11 ± 0.37	< 1.0
SPW-9103	WATER	Dec 2000	Gr. Beta	< 1.21	0.55 ± 0.91	< 3.2
SPCH-10583	CHARCOAL CANISTER	Dec 2000	I-131(g)	< 1.49		< 9.6

[a] Liquid sample results are reported in pCi/Liter, air filter sample results are in pCi/filter, charcoal sample results are in pCi/charcoal, and solid sample results are in pCi/kilogram.
[b] The activity reported is the net activity result.

Table A-5. In-house "duplicate" samples.

Lab Codes	Sample Date	Analysis	Concentration in pCi/L[a] First Result	Second Result	Averaged Result
CF-23, 24	Jan, 2000	Gr. Beta	13.05 ± 0.39	12.46 ± 0.36	12.75 ± 0.26
CF-23, 24	Jan, 2000	K-40	13.00 ± 0.90	11.73 ± 0.79	12.36 ± 0.60
CF-23, 24	Jan, 2000	Sr-90	0.01 ± 0.00	0.01 ± 0.00	0.01 ± 0.00
WW-65, 66	Jan, 2000	Co-60	-0.53 ± 1.62	0.44 ± 2.11	-0.04 ± 1.33
WW-65, 66	Jan, 2000	Cs-137	-2.13 ± 1.70	0.41 ± 2.35	-0.86 ± 1.45
WW-65, 66	Jan, 2000	H-3	131.62 ± 84.13	182.81 ± 86.33	157.22 ± 60.27
WW-686, 687	Jan, 2000	Gr. Beta	4.76 ± 1.22	4.59 ± 1.27	4.67 ± 0.88
AP-1204, 1205	Jan, 2000	Be-7	0.19 ± 0.09	0.10 ± 0.07	0.14 ± 0.06
SW-68, 69	Jan, 2000	K-40 (FP)	1.30 ± 0.13	1.30 ± 0.13	1.30 ± 0.09
MI-277, 278	Jan, 2000	I-131	-0.08 ± 0.27	-0.00 ± 0.26	-0.04 ± 0.19
MI-277, 278	Jan, 2000	K-40	1,664.70 ± 113.20	1,431.30 ± 90.30	1,548.00 ± 72.40
MI-277, 278	Jan, 2000	Sr-90	0.63 ± 0.42	0.51 ± 0.40	0.57 ± 0.29
SW-728, 729	Jan, 2000	Co-60	0.39 ± 1.79	1.04 ± 1.53	0.72 ± 1.18
SW-728, 729	Jan, 2000	Cs-137	-0.67 ± 1.86	1.22 ± 1.38	0.27 ± 1.16
SW-403, 404	Jan, 2000	H-3	795.21 ± 109.04	857.22 ± 111.09	826.22 ± 77.83
SWT-437, 438	Jan, 2000	Gr. Beta	1.73 ± 0.57	2.60 ± 0.58	2.16 ± 0.41
PW-637, 638	Jan, 2000	Co-60	4.90 ± 2.92	-2.56 ± 2.80	1.17 ± 2.02
PW-637, 638	Jan, 2000	Cs-137	2.73 ± 2.51	-1.68 ± 2.71	0.53 ± 1.85
PW-637, 638	Jan, 2000	Gr. Beta	1.67 ± 1.31	4.00 ± 1.59	2.83 ± 1.03
SW-587, 588	Jan, 2000	Co-60	-1.24 ± 1.86	-0.27 ± 1.79	-0.76 ± 1.29
SW-587, 588	Jan, 2000	Cs-137	1.35 ± 1.94	0.23 ± 1.80	0.79 ± 1.32
SW-587, 588	Jan, 2000	Gr. Beta	3.80 ± 1.56	6.76 ± 1.75	5.28 ± 1.17
SW-611, 612	Jan, 2000	H-3	2,229.26 ± 158.61	2,115.19 ± 155.80	2,172.23 ± 111.16
SW-459, 460	Feb, 2000	Gr. Beta	2.15 ± 0.94	2.79 ± 0.94	2.47 ± 0.66
WW-774, 775	Feb, 2000	Co-60	4.26 ± 3.48	1.61 ± 4.46	2.93 ± 2.83
WW-774, 775	Feb, 2000	Cs-137	-1.19 ± 3.78	2.37 ± 4.65	0.59 ± 2.99
WW-774, 775	Feb, 2000	H-3	2,841.35 ± 174.48	2,566.76 ± 168.19	2,704.05 ± 121.17
SW-707, 708	Feb, 2000	Gr. Alpha	2.20 ± 1.73	0.16 ± 1.29	1.18 ± 1.08
SW-707, 708	Feb, 2000	Gr. Beta	7.90 ± 1.70	7.70 ± 1.70	7.80 ± 1.20
SW-707, 708	Feb, 2000	H-3	117.00 ± 92.00	69.00 ± 90.00	93.00 ± 64.35
CW-854, 855	Feb, 2000	Gr. Beta	2.13 ± 1.36	1.34 ± 1.25	1.74 ± 0.93
SW-881, 882	Feb, 2000	H-3	1,794.91 ± 145.81	1,762.31 ± 144.95	1,778.61 ± 102.80
SW-959, 960	Feb, 2000	Gr. Alpha	1.04 ± 1.00	0.92 ± 0.67	0.98 ± 0.60
SW-959, 960	Feb, 2000	Gr. Beta	1.24 ± 0.89	1.79 ± 0.90	1.51 ± 0.63
PW-1055, 1056	Feb, 2000	Co-60	-0.72 ± 3.18	1.73 ± 1.89	0.51 ± 1.85
PW-1055, 1056	Feb, 2000	Cs-137	0.55 ± 2.81	0.90 ± 1.86	0.72 ± 1.69
PW-1055, 1056	Feb, 2000	Gr. Beta	2.40 ± 1.52	2.20 ± 1.50	2.30 ± 1.07

Table A-5. In-house "duplicate" samples.

Lab Codes	Sample Date	Analysis	Concentration in pCi/L[a] First Result	Second Result	Averaged Result
MI-1079, 1080	Mar, 2000	Calcium	0.79 ± 0.08	0.78 ± 0.08	0.79 ± 0.06
MI-1079, 1080	Mar, 2000	K-40	1,229.00 ± 138.00	1,387.00 ± 162.00	1,308.00 ± 106.40
MI-1079, 1080	Mar, 2000	Sr-90	0.90 ± 0.40	1.70 ± 0.50	1.30 ± 0.32
CW-1156, 1157	Mar, 2000	H-3	1,994.51 ± 143.09	2,012.54 ± 143.55	2,003.53 ± 101.34
SW-1967, 1968	Mar, 2000	Gr. Beta	11.96 ± 1.31	12.57 ± 1.31	12.27 ± 0.93
SW-2468, 2469	Mar, 2000	Sr-90	0.93 ± 0.45	0.50 ± 0.29	0.72 ± 0.27
WW-1402, 1403	Mar, 2000	H-3	93.34 ± 97.05	60.63 ± 95.75	76.98 ± 68.17
LW-1269, 1270	Mar, 2000	Gr. Beta	1.97 ± 0.57	3.22 ± 0.69	2.60 ± 0.45
AP-,	Mar, 2000	Be-7	0.06 ± 0.01	0.07 ± 0.01	0.07 ± 0.01
MI-1541, 1542	Mar, 2000	K-40	1,380.00 ± 122.00	1,476.00 ± 158.00	1,428.00 ± 99.81
CW-1571, 1572	Mar, 2000	Gr. Beta	2.29 ± 1.48	1.35 ± 1.27	1.82 ± 0.98
CW-1693, 1694	Mar, 2000	Gr. Beta	0.56 ± 1.18	1.91 ± 1.49	1.24 ± 0.95
SWT-,	Mar, 2000	Gr. Beta	2.36 ± 0.65	2.01 ± 0.57	2.19 ± 0.43
WW-1916, 1917	Mar, 2000	H-3	25.37 ± 90.21	3.90 ± 89.27	14.63 ± 63.46
AP-2155, 2156	Mar, 2000	Be-7	0.07 ± 0.01	0.07 ± 0.01	0.07 ± 0.01
SWU-2547, 2548	Mar, 2000	Sr-90	0.57 ± 0.24	0.55 ± 0.24	0.56 ± 0.17
CW-1798, 1799	Mar, 2000	Gr. Beta	2.73 ± 1.85	0.76 ± 1.71	1.75 ± 1.26
AP-2176, 2177	Mar, 2000	Be-7	0.06 ± 0.01	0.08 ± 0.02	0.07 ± 0.01
WW-2046, 2047	Mar, 2000	H-3	221.85 ± 101.64	185.19 ± 100.24	203.52 ± 71.38
SW-1967, 1968	Apr, 2000	K-40	9.20 ± 0.90	9.10 ± 0.90	9.15 ± 0.64
SW-2241, 2242	Apr, 2000	Gr. Alpha	2.49 ± 1.44	3.15 ± 1.53	2.82 ± 1.05
SW-2241, 2242	Apr, 2000	Gr. Beta	8.37 ± 1.36	7.20 ± 1.29	7.79 ± 0.94
WW-,	Apr, 2000	Gr. Beta	4.20 ± 0.64	4.68 ± 0.73	4.44 ± 0.49
WW-2711, 2712	Apr, 2000	Cs-137	-0.76 ± 2.19	1.43 ± 3.63	0.34 ± 2.12
WW-2711, 2712	Apr, 2000	H-3	3,877.05 ± 192.54	3,951.88 ± 193.99	3,914.46 ± 136.66
WW-2511, 2512	Apr, 2000	H-3	108.10 ± 79.80	127.80 ± 80.70	117.95 ± 56.75
SO-2435, 2436	Apr, 2000	K-40	4.73 ± 0.38	4.83 ± 0.53	4.78 ± 0.33
SS-2669, 2670	Apr, 2000	K-40	8.60 ± 0.55	9.18 ± 0.45	8.89 ± 0.36
SWU-2732, 2733	Apr, 2000	Gr. Beta	3.33 ± 0.68	3.19 ± 0.69	3.26 ± 0.48
PW-2605, 2606	Apr, 2000	Co-60	0.36 ± 1.10	1.05 ± 2.03	0.71 ± 1.16
PW-2605, 2606	Apr, 2000	Cs-137	-0.07 ± 0.93	-0.98 ± 2.37	-0.53 ± 1.27
PW-2605, 2606	Apr, 2000	Gr. Beta	1.51 ± 1.31	2.91 ± 1.39	2.21 ± 0.96
WW-2711, 2712	Apr, 2000	H-3	3,877.00 ± 192.50	3,951.90 ± 194.00	3,914.45 ± 136.65
WW-2711, 2712	Apr, 2000	Co-60	0.97 ± 1.93	0.82 ± 3.64	0.90 ± 2.06
BS-3212, 3213	Apr, 2000	Gr. Beta	7.90 ± 1.97	7.57 ± 1.88	7.74 ± 1.36
SW-,	May, 2000	K-40	1.30 ± 0.13	1.20 ± 0.12	1.25 ± 0.09
MI-2810, 2811	May, 2000	K-40	1,285.00 ± 111.00	1,338.00 ± 127.00	1,311.50 ± 84.34

Table A-5. In-house "duplicate" samples.

Lab Codes	Sample Date	Analysis	Concentration in pCi/L[a] First Result	Second Result	Averaged Result
SW-3003, 3004	May, 2000	Gr. Beta	5.06 ± 0.73	5.27 ± 0.73	5.17 ± 0.52
F-2831, 2832	May, 2000	Co-60	0.01 ± 0.01	0.00 ± 0.01	0.01 ± 0.01
F-2831, 2832	May, 2000	Cs-137	-0.00 ± 0.01	0.00 ± 0.01	0.00 ± 0.01
WW-3128, 3129	May, 2000	Gr. Beta	5.41 ± 1.35	4.43 ± 1.22	4.92 ± 0.91
BS-3411, 3412	May, 2000	Co-60	-0.00 ± 0.01	0.01 ± 0.01	0.00 ± 0.01
BS-3411, 3412	May, 2000	Cs-137	0.01 ± 0.01	0.00 ± 0.01	0.00 ± 0.00
F-3436, 3437	May, 2000	Co-60	0.01 ± 0.01	0.00 ± 0.01	0.01 ± 0.00
F-3436, 3437	May, 2000	Cs-137	0.00 ± 0.01	-0.00 ± 0.00	-0.00 ± 0.00
F-2978, 2979	May, 2000	K-40	2.72 ± 0.26	2.14 ± 0.30	2.43 ± 0.20
SS-3482, 3483	May, 2000	Cs-137	0.11 ± 0.03	0.12 ± 0.03	0.12 ± 0.02
SS-3482, 3483	May, 2000	K-40	11.26 ± 0.57	11.37 ± 0.54	11.32 ± 0.39
BS-3458, 3459	May, 2000	Co-60	0.01 ± 0.01	0.02 ± 0.01	0.01 ± 0.01
BS-3458, 3459	May, 2000	Cs-137	0.04 ± 0.01	0.03 ± 0.02	0.03 ± 0.01
MI-3510, 3511	May, 2000	Co-60	0.48 ± 3.05	-0.80 ± 2.74	-0.16 ± 2.05
MI-3510, 3511	May, 2000	Cs-137	1.17 ± 2.96	0.38 ± 2.60	0.77 ± 1.97
MI-3510, 3511	May, 2000	I-131	-0.06 ± 0.25	-0.04 ± 0.24	-0.05 ± 0.17
SO-3629, 3630	May, 2000	Cs-137	0.23 ± 0.03	0.20 ± 0.03	0.22 ± 0.02
SO-3629, 3630	May, 2000	Gr. Beta	20.49 ± 2.82	19.14 ± 2.73	19.82 ± 1.96
SO-3629, 3630	May, 2000	K-40	13.03 ± 0.61	12.25 ± 0.57	12.64 ± 0.42
SW-3904, 3905	May, 2000	Gr. Beta	6.27 ± 1.83	7.02 ± 1.90	6.65 ± 1.32
SW-3904, 3905	May, 2000	Co-60	-0.65 ± 1.54	1.32 ± 1.77	0.33 ± 1.17
SW-3904, 3905	May, 2000	Cs-137	0.19 ± 1.22	-0.16 ± 1.15	0.01 ± 0.84
SW-3904, 3905	May, 2000	Gr. Beta	6.27 ± 1.83	7.02 ± 1.90	6.64 ± 1.32
SP-3833, 3834	May, 2000	Gr. Alpha	4.19 ± 1.34	3.22 ± 1.20	3.71 ± 0.90
MI-3105, 3106	May, 2000	K-40	1,460.00 ± 173.00	1,452.00 ± 110.00	1,456.00 ± 102.50
VE-3191, 3192	May, 2000	Be-7	0.42 ± 0.23	0.39 ± 0.16	0.40 ± 0.14
VE-3191, 3192	May, 2000	Gr. Alpha	0.15 ± 0.06	0.28 ± 0.07	0.22 ± 0.05
VE-3191, 3192	May, 2000	Gr. Beta	3.76 ± 0.13	3.88 ± 0.14	3.82 ± 0.10
VE-3191, 3192	May, 2000	K-40	3.58 ± 0.43	3.47 ± 0.72	3.53 ± 0.42
MI-3718, 3719	May, 2000	K-40	1,447.00 ± 165.00	1,444.00 ± 177.00	1,445.50 ± 120.99
DW-3770, 3771	May, 2000	Gr. Beta	5.92 ± 1.32	4.54 ± 1.10	5.23 ± 0.86
MI-3653, 3654	Jun, 2000	K-40	1,407.00 ± 170.00	1,388.00 ± 102.00	1,397.50 ± 99.13
SW-4614, 4615	Jun, 2000	Sr-90	0.50 ± 0.27	0.55 ± 0.27	0.53 ± 0.19
WW-3883, 3884	Jun, 2000	H-3	4,401.80 ± 204.60	4,298.00 ± 202.70	4,349.90 ± 144.00
WW-3883, 3884	Jun, 2000	Co-60	0.91 ± 3.01	-0.28 ± 1.52	0.32 ± 1.69
WW-3883, 3884	Jun, 2000	Cs-137	0.49 ± 2.16	0.66 ± 1.82	0.57 ± 1.41
WW-3883, 3884	Jun, 2000	H-3	4,401.78 ± 204.63	4,297.96 ± 202.67	4,349.87 ± 144.00

Table A-5. In-house "duplicate" samples.

Lab Codes	Sample Date	Analysis	Concentration in pCi/L[a] First Result	Second Result	Averaged Result
BS-3980, 3981	Jun, 2000	Cs-137	0.07 ± 0.02	0.08 ± 0.02	0.08 ± 0.01
BS-3980, 3981	Jun, 2000	Cs-137	0.06 ± 0.02	0.07 ± 0.02	0.07 ± 0.01
BS-3980, 3981	Jun, 2000	K-40	1,458.60 ± 69.40	1,421.90 ± 52.20	1,440.25 ± 43.42
VE-4065, 4066	Jun, 2000	K-40	6.37 ± 0.54	6.34 ± 0.51	6.36 ± 0.37
WW-4252, 4253	Jun, 2000	H-3	705.40 ± 114.10	718.90 ± 114.60	712.15 ± 80.86
TSWU-4283, 4284	Jun, 2000	Gr. Beta	3.24 ± 0.63	3.11 ± 0.62	3.18 ± 0.44
F-4438, 4439	Jun, 2000	Gr. Beta	2.25 ± 0.06	2.13 ± 0.06	2.19 ± 0.04
SW-4459, 4460	Jun, 2000	H-3	532.20 ± 108.10	670.50 ± 112.90	601.35 ± 78.15
WW-4480, 4481	Jun, 2000	H-3	601.50 ± 99.50	573.10 ± 108.50	587.30 ± 73.61
SW-4375, 4376	Jun, 2000	Gr. Beta	4.53 ± 1.59	4.43 ± 1.54	4.48 ± 1.11
SW-4375, 4376	Jun, 2000	Cs-137	-0.09 ± 1.61	-0.43 ± 1.39	-0.26 ± 1.06
AP-,	Jun, 2000	Be-7	0.06 ± 0.02	0.07 ± 0.01	0.07 ± 0.01
AP-4712, 4713	Jun, 2000	Be-7	0.07 ± 0.02	0.09 ± 0.02	0.08 ± 0.01
SW-4537, 4538	Jun, 2000	H-3	584.10 ± 108.80	599.20 ± 109.30	591.65 ± 77.11
SL-4636, 4637	Jul, 2000	Be-7	0.93 ± 0.18	0.56 ± 0.12	0.75 ± 0.11
SL-4636, 4637	Jul, 2000	Gr. Beta	2.41 ± 0.32	2.69 ± 0.32	2.55 ± 0.23
SL-4636, 4637	Jul, 2000	K-40	1.25 ± 0.24	1.13 ± 0.30	1.19 ± 0.19
SL-4636, 4637	Jul, 2000	Sr-90	0.04 ± 0.02	0.05 ± 0.03	0.05 ± 0.02
G-4667, 4668	Jul, 2000	Be-7	0.93 ± 0.20	0.98 ± 0.31	0.96 ± 0.18
G-4667, 4668	Jul, 2000	Gr. Beta	6.16 ± 0.13	6.68 ± 0.14	6.42 ± 0.10
G-4667, 4668	Jul, 2000	K-40	7.72 ± 0.51	8.43 ± 0.83	8.08 ± 0.49
WW-4818, 4819	Jul, 2000	H-3	13.30 ± 77.10	29.70 ± 77.90	21.50 ± 54.80
MI-4839, 4840	Jul, 2000	K-40	1,313.00 ± 173.00	1,398.00 ± 161.00	1,355.50 ± 118.16
MI-4949, 4950	Jul, 2000	K-40	1,307.00 ± 56.00	1,346.00 ± 58.00	1,326.50 ± 40.31
LW-4991, 4992	Jul, 2000	Gr. Beta	2.78 ± 0.66	2.22 ± 0.55	2.50 ± 0.43
MI-4903, 4904	Jul, 2000	K-40	1,383.10 ± 193.20	1,328.00 ± 153.10	1,355.55 ± 123.25
MI-4881, 4882	Jul, 2000	K-40	1,538.40 ± 103.00	1,438.00 ± 125.30	1,488.20 ± 81.10
MI-4881, 4882	Jul, 2000	Sr-90	1.01 ± 0.37	1.38 ± 0.42	1.19 ± 0.28
G-5388, 5389	Jul, 2000	Be-7	1.64 ± 0.16	1.52 ± 0.21	1.58 ± 0.13
G-5388, 5389	Jul, 2000	K-40	5.51 ± 0.33	5.86 ± 0.49	5.69 ± 0.30
G-5388, 5389	Jul, 2000	Gr. Beta	5.64 ± 0.15	5.81 ± 0.15	5.73 ± 0.11
SWU-5473, 5474	Jul, 2000	Gr. Beta	3.50 ± 0.67	3.17 ± 0.61	3.34 ± 0.45
SW-5410, 5411	Jul, 2000	Gr. Beta	1.95 ± 0.81	1.89 ± 1.04	1.92 ± 0.66
PW-5550, 5551	Jul, 2000	Gr. Beta	0.71 ± 1.15	2.50 ± 1.49	1.61 ± 0.94
WW-5623, 5624	Jul, 2000	H-3	22,713.90 ± 429.00	22,265.50 ± 424.90	22,489.70 ± 301.90
MI-5529, 5530	Aug, 2000	K-40	1,396.80 ± 103.80	1,278.20 ± 117.50	1,337.50 ± 78.39
VE-,	Aug, 2000	K-40	1.66 ± 0.32	1.93 ± 0.33	1.80 ± 0.23

Table A-5. In-house "duplicate" samples.

Lab Codes	Sample Date	Analysis	Concentration in pCi/L[a] First Result	Second Result	Averaged Result
MI-5808, 5809	Aug, 2000	K-40	1,261.90 ± 124.40	1,234.40 ± 152.80	1,248.15 ± 98.52
CW-6514, 6515	Aug, 2000	Gr. Beta	1.42 ± 0.37	1.44 ± 0.41	1.43 ± 0.28
MI-5933, 5934	Aug, 2000	Calcium	0.88 ± 0.09	0.89 ± 0.09	0.89 ± 0.06
MI-5933, 5934	Aug, 2000	Sr-90	3.29 ± 0.51	1.72 ± 0.47	2.51 ± 0.35
VE-6002, 6003	Aug, 2000	Sr-90	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00
VE-6002, 6003	Aug, 2000	K-40	1.44 ± 0.23	1.78 ± 0.18	1.61 ± 0.14
PW-6209, 6210	Aug, 2000	H-3	528.20 ± 112.70	578.50 ± 114.50	553.35 ± 80.33
SW-6291, 6292	Aug, 2000	Gr. Beta	4.14 ± 1.58	1.95 ± 1.32	3.05 ± 1.03
WW-6312, 6313	Aug, 2000	H-3	7,804.20 ± 262.70	7,221.70 ± 253.80	7,512.95 ± 182.64
WW-5981, 5982	Aug, 2000	Gr. Beta	4.85 ± 0.78	5.87 ± 0.79	5.36 ± 0.56
PW-6341, 6342	Aug, 2000	Gr. Beta	2.45 ± 1.42	2.63 ± 1.37	2.54 ± 0.99
CW-6514, 6515	Aug, 2000	H-3	5,600.10 ± 226.80	5,434.30 ± 223.90	5,517.20 ± 159.35
MI-6409, 6410	Sep, 2000	I-131	-0.04 ± 0.23	0.19 ± 0.24	0.08 ± 0.17
MI-6409, 6410	Sep, 2000	K-40	1,367.80 ± 111.40	1,368.60 ± 107.50	1,368.20 ± 77.41
MI-6409, 6410	Sep, 2000	Sr-90	1.19 ± 0.35	0.80 ± 0.30	1.00 ± 0.23
MI-6542, 6543	Sep, 2000	K-40	1,298.00 ± 140.10	1,470.60 ± 139.70	1,384.30 ± 98.92
MI-6450, 6451	Sep, 2000	K-40	1,237.20 ± 102.10	1,328.10 ± 108.30	1,282.65 ± 74.42
MI-7102, 7103	Sep, 2000	I-131	-0.11 ± 0.23	-0.02 ± 0.25	-0.07 ± 0.17
MI-7102, 7103	Sep, 2000	K-40	1,473.10 ± 101.40	1,400.70 ± 168.60	1,436.90 ± 98.37
SWT-7262, 7263	Sep, 2000	Gr. Beta	3.45 ± 0.66	2.32 ± 0.57	2.89 ± 0.44
SWU-7283, 7284	Sep, 2000	Gr. Beta	2.75 ± 0.55	2.87 ± 0.56	2.81 ± 0.39
SWU-7283, 7284	Sep, 2000	H-3	197.76 ± 94.07	172.31 ± 93.00	185.04 ± 66.14
SW-7081, 7082	Sep, 2000	H-3	89.32 ± 92.99	42.38 ± 90.37	65.85 ± 64.83
AP-7685, 7686	Sep, 2000	Be-7	0.07 ± 0.01	0.07 ± 0.01	0.07 ± 0.01
AP-7706, 7707	Sep, 2000	Be-7	0.06 ± 0.01	0.05 ± 0.01	0.05 ± 0.01
SW-7482, 7483	Sep, 2000	Gr. Beta	5.31 ± 1.75	6.70 ± 1.85	6.01 ± 1.27
SP-7347, 7348	Sep, 2000	Gr. Alpha	6.12 ± 1.54	5.68 ± 1.49	5.90 ± 1.07
SW-7436, 7437	Sep, 2000	H-3	40.60 ± 79.90	72.00 ± 81.40	56.30 ± 57.03
CW-7748, 7749	Sep, 2000	Gr. Alpha	0.47 ± 0.28	0.65 ± 0.36	0.56 ± 0.23
CW-7748, 7749	Sep, 2000	Gr. Beta	2.35 ± 0.39	2.02 ± 0.38	2.19 ± 0.27
SL-7304, 7305	Oct, 2000	Gr. Beta	2.94 ± 0.23	2.90 ± 0.23	2.92 ± 0.17
SL-7304, 7305	Oct, 2000	K-40	1.14 ± 0.36	1.73 ± 0.58	1.44 ± 0.34
BS-7369, 7370	Oct, 2000	Cs-137	10.79 ± 4.96	20.04 ± 9.40	15.41 ± 5.31
SO-7950, 7951	Oct, 2000	Ac-228	0.66 ± 0.10	0.77 ± 0.10	0.72 ± 0.07
SO-7950, 7951	Oct, 2000	Bi-214	0.42 ± 0.06	0.57 ± 0.07	0.49 ± 0.05
SO-7950, 7951	Oct, 2000	Cs-137	0.20 ± 0.31	0.21 ± 0.04	0.20 ± 0.16
SO-7950, 7951	Oct, 2000	Gr. Beta	29.22 ± 1.98	28.02 ± 1.98	28.62 ± 1.40

Table A-5. In-house "duplicate" samples.

Lab Codes	Sample Date	Analysis	Concentration in pCi/L[a] First Result	Second Result	Averaged Result
SO-7950, 7951	Oct, 2000	K-40	21.36 ± 0.93	21.77 ± 0.89	21.56 ± 0.64
SO-7950, 7951	Oct, 2000	Pb-212	0.72 ± 0.12	0.92 ± 0.12	0.82 ± 0.09
SO-7950, 7951	Oct, 2000	Ra-226	1.21 ± 0.33	1.30 ± 0.31	1.26 ± 0.22
SO-7950, 7951	Oct, 2000	Tl-208	0.21 ± 0.04	0.25 ± 0.03	0.23 ± 0.02
VE-7554, 7555	Oct, 2000	Gr. Beta	0.73 ± 0.02	0.74 ± 0.02	0.74 ± 0.01
MI-7622, 7623	Oct, 2000	K-40	1,505.90 ± 142.70	1,453.60 ± 172.00	1,479.75 ± 111.74
F-8219, 8220	Oct, 2000	K-40	2.94 ± 0.22	3.39 ± 0.38	3.16 ± 0.22
WW-7844, 7845	Oct, 2000	H-3	-68.13 ± 74.09	84.23 ± 81.38	8.05 ± 55.03
WW-8240, 8241	Oct, 2000	Gr. Beta	0.35 ± 1.89	1.61 ± 2.28	0.98 ± 1.48
WW-8240, 8241	Oct, 2000	H-3	72.46 ± 92.95	38.87 ± 91.51	55.66 ± 65.22
BS-8170, 8171	Oct, 2000	Gr. Beta	11.96 ± 2.55	11.30 ± 2.39	11.63 ± 1.75
BS-8170, 8171	Oct, 2000	K-40	8.36 ± 0.46	8.76 ± 0.47	8.56 ± 0.33
MI-8085, 8086	Oct, 2000	Calcium	0.94	0.94	0.94
MI-8085, 8086	Oct, 2000	Sr-90	1.04 ± 0.35	0.75 ± 0.31	0.90 ± 0.24
MI-8149, 8150	Oct, 2000	K-40	1,358.10 ± 95.81	1,341.80 ± 178.00	1,349.95 ± 101.07
SO-8967, 8968	Oct, 2000	Be-7	1.25 ± 0.37	1.27 ± 0.35	1.26 ± 0.26
SO-8967, 8968	Oct, 2000	Cs-137	0.05 ± 0.02	0.05 ± 0.02	0.05 ± 0.02
SO-8967, 8968	Oct, 2000	K-40	4.53 ± 0.66	4.46 ± 0.58	4.50 ± 0.44
MI-8522, 8523	Oct, 2000	I-131	-0.05 ± 0.23	0.18 ± 0.25	0.07 ± 0.17
SWU-8894, 8895	Oct, 2000	Gr. Beta	3.63 ± 0.62	2.45 ± 0.61	3.04 ± 0.43
MI-8802, 8803	Nov, 2000	I-131	-0.22 ± 0.24	-0.25 ± 0.26	-0.24 ± 0.18
MI-8802, 8803	Nov, 2000	K-40	1,340.50 ± 113.80	1,453.50 ± 100.50	1,397.00 ± 75.91
MI-8802, 8803	Nov, 2000	Sr-89	0.19 ± 1.31	0.61 ± 1.34	0.40 ± 0.94
MI-8802, 8803	Nov, 2000	Sr-90	1.10 ± 0.39	0.90 ± 0.38	1.00 ± 0.27
LW-8823, 8824	Nov, 2000	Gr. Beta	2.13 ± 0.55	1.59 ± 0.52	1.86 ± 0.38
VE-9014, 9015	Nov, 2000	Gr. Alpha	0.10 ± 0.06	0.15 ± 0.07	0.12 ± 0.05
VE-9014, 9015	Nov, 2000	Gr. Beta	5.59 ± 0.17	5.90 ± 0.19	5.74 ± 0.13
PW-9991, 9992	Nov, 2000	Gr. Beta	2.50 ± 0.01	3.49 ± 1.18	3.00 ± 0.59
SW-9991, 9992	Nov, 2000	Co-60	1.16 ± 1.70	-2.94 ± 3.39	-0.89 ± 1.89
SW-9991, 9992	Nov, 2000	Cs-134	-0.07 ± 1.85	2.27 ± 3.73	1.10 ± 2.08
SW-9991, 9992	Nov, 2000	Cs-137	-0.88 ± 1.67	3.84 ± 3.45	1.48 ± 1.92
DW-9682, 9683	Dec, 2000	Gr. Beta	1.61 ± 1.02	2.10 ± 0.94	1.86 ± 0.69
MI-9749, 9750	Dec, 2000	K-40	1,562.40 ± 118.70	1,495.90 ± 168.30	1,529.15 ± 102.97
AP-10782, 10783	Dec, 2000	Be-7	0.21 ± 0.10	0.31 ± 0.14	0.26 ± 0.09
AP-10824, 10825	Dec, 2000	Be-7	0.06 ± 0.02	0.07 ± 0.01	0.06 ± 0.01
WW-10424, 10425	Dec, 2000	H-3	1,690.87 ± 137.81	1,551.48 ± 1,339.42	1,621.18 ± 673.25

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

Lab Code	Sample Type	Date Collected	Analysis	Concentration[b] Laboratory result[c]	MAPEP Result[d] 1s, N=1	Control Limits
STSO-882	SOIL	Jan, 2000	Am-241	64.90 ± 6.49	61.10	42.77 - 79.43
STSO-882	SOIL	Jan, 2000	Co-57	721.10 ± 83.80	949.00	664.30 - 1,233.70
The MAPEP soil sample (STSO-882), as received, did not closely match a standard gamma geometry. The results for gamma-emitting isotopes are reanalyses, with a reduced sample size.						
STSO-882	SOIL	Jan, 2000	Co-60	1,264.40 ± 78.60	1,180.00	826.00 - 1,534.00
STSO-882	SOIL	Jan, 2000	Cs-134	969.30 ± 76.90	1,047.00	732.90 - 1,361.10
STSO-882	SOIL	Jan, 2000	Cs-137	944.00 ± 92.00	930.00	651.00 - 1,209.00
STSO-882	SOIL	Jan, 2000	K-40	811.70 ± 79.90	652.00	456.40 - 847.60
STSO-882	SOIL	Jan, 2000	Mn-54	1,103.30 ± 64.20	1,023.00	716.10 - 1,329.90
STSO-882	SOIL	Jan, 2000	Ni-63	711.00 ± 71.10	960.00	672.00 - 1,248.00
STSO-882	SOIL	Jan, 2000	Pu-239/40	67.90 ± 6.79	74.40	52.08 - 96.72
STSO-882	SOIL	Jan, 2000	Sr-90	345.00 ± 34.50	304.00	212.80 - 395.20
STSO-882	SOIL	Jan, 2000	U-233/4	62.90 ± 6.29	90.00	63.00 - 117.00
Incomplete dissolution of the sample is suspected. Results of reanalysis: U-233/234 67.3 ± 3.3 pCi/g, U-238 68.1 ± 8.9 pCi/g.						
STSO-882	SOIL	Jan, 2000	U-238	63.20 ± 6.32	93.00	65.10 - 120.90
STSO-882	SOIL	Jan, 2000	Zn-65	1,544.30 ± 61.50	1,540.00	1,078.00 - 2,002.00

[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] Unless otherwise indicated, laboratory results are given as the mean ± 1 standard deviations for three determinations.

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

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

Lab Code	Sample Type	Date Collected	Analysis	Concentration [b] Laboratory result[c]	EML Result[d]	Control Limits[e]
STSO-870	SOIL	Mar, 2000	Ac-228	98.300 ± 7.100	97.600	0.79 - 1.75
STSO-870	SOIL	Mar, 2000	Bi-212	98.500 ± 15.100	106.000	0.42 - 1.22
STSO-870	SOIL	Mar, 2000	Bi-214	88.000 ± 3.800	86.700	0.75 - 1.42
STSO-870	SOIL	Mar, 2000	Cs-137	324.000 ± 5.000	339.000	0.83 - 1.32
STSO-870	SOIL	Mar, 2000	K-40	872.000 ± 34.000	811.000	0.78 - 1.53
STSO-870	SOIL	Mar, 2000	Pb-212	93.700 ± 2.700	97.300	0.74 - 1.33
STSO-870	SOIL	Mar, 2000	Pb-214	100.100 ± 3.700	86.500	0.65 - 1.45
STSO-870	SOIL	Mar, 2000	Pu-238	19.800 ± 3.000	18.600	0.52 - 2.84
STSO-870	SOIL	Mar, 2000	Pu-239/40	8.100 ± 1.700	7.000	0.69 - 1.74
STSO-870	SOIL	Mar, 2000	Sr-90	13.600 ± 3.100	20.200	0.60 - 3.66
STVE-871	VEGETATION	Mar, 2000	Am-241	9.800 ± 0.900	10.400	0.68 - 2.70
STVE-871	VEGETATION	Mar, 2000	Co-60	46.500 ± 2.100	52.800	0.69 - 1.46
STVE-871	VEGETATION	Mar, 2000	Cs-137	1,872.000 ± 46.000	1,380.000	0.80 - 1.40
STVE-871	VEGETATION	Mar, 2000	K-40	506.400 ± 28.000	521.000	0.79 - 1.42
STVE-871	VEGETATION	Mar, 2000	Pu-239/40	14.300 ± 1.500	15.500	0.68 - 1.59
STVE-871	VEGETATION	Mar, 2000	Sr-90	1,198.000 ± 85.000	1,780.000	0.50 - 1.33
STAP-872	AIR FILTER	Mar, 2000	Co-57	5.900 ± 0.100	5.310	0.65 - 1.39
STAP-872	AIR FILTER	Mar, 2000	Co-60	5.900 ± 0.100	5.320	0.75 - 1.32
STAP-872	AIR FILTER	Mar, 2000	Cs-137	7.500 ± 0.100	6.100	0.73 - 1.37
STAP-872	AIR FILTER	Mar, 2000	Gr. Alpha	3.300 ± 0.100	3.020	0.50 - 1.55
STAP-872	AIR FILTER	Mar, 2000	Gr. Beta	2.700 ± 0.100	2.420	0.72 - 1.67
STAP-872	AIR FILTER	Mar, 2000	Mn-54	31.800 ± 0.300	27.200	0.76 - 1.33
STAP-872	AIR FILTER	Mar, 2000	Pu-238	0.060 ± 0.030	0.080	0.74 - 1.40
STAP-872	AIR FILTER	Mar, 2000	Pu-239/40	0.090 ± 0.010	0.089	0.76 - 1.44
STAP-872	AIR FILTER	Mar, 2000	Ru-106	3.500 ± 1.000	2.010	0.59 - 1.30
Result within activity ± error margin.						
STAP-872	AIR FILTER	Mar, 2000	Sr-90	0.310 ± 0.160	0.242	0.61 - 1.93
STAP-872	AIR FILTER	Mar, 2000	Uranium	0.120 ± 0.010	0.126	0.80 - 3.35
STW-874	WATER	Mar, 2000	Am-241	1.700 ± 0.220	1.950	0.75 - 1.49
STW-874	WATER	Mar, 2000	Co-60	51.000 ± 1.200	48.900	0.80 - 1.20

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

Lab Code	Sample Type	Date Collected	Analysis	Concentration[b] Laboratory result[c]	EML Result[d]	Control Limits[e]
STW-874	WATER	Mar, 2000	Cs-137	108.600 ± 1.800	103.000	0.80 - 1.26
STW-874	WATER	Mar, 2000	Fe-55	33.000 ± 1.200	33.100	0.44 - 1.53
STW-874	WATER	Mar, 2000	Gr. Alpha	1,217.000 ± 35.000	1,700.000	0.61 - 1.32
STW-874	WATER	Mar, 2000	Gr. Beta	792.000 ± 25.000	690.000	0.55 - 1.54
STW-874	WATER	Mar, 2000	H-3	147.000 ± 26.000	79.400	0.71 - 1.79
Analysis was repeated; result of reanalysis; 97.5 ± 11.6 Bq/l.						
STW-874	WATER	Mar, 2000	Ni-63	101.000 ± 6.000	112.000	0.25 - 1.75
STW-874	WATER	Mar, 2000	Pu-238	0.750 ± 0.170	0.944	0.78 - 1.25
STW-874	WATER	Mar, 2000	Pu-239/40	0.990 ± 0.090	0.918	0.80 - 1.39
STW-874	WATER	Mar, 2000	Sr-90	4.460 ± 0.990	3.390	0.75 - 1.50
STW-874	WATER	Mar, 2000	Uranium	0.270 ± 0.020	0.995	0.67 - 1.42
Result reported was for U-234. Result for U (total); 0.58 ± 0.02 pCi/L.						
STSO-885	SOIL	Sep, 2000	Ac-228	78.000 ± 1.500	80.200	0.80 - 1.50
STSO-885	SOIL	Sep, 2000	Bi-212	73.000 ± 3.300	80.500	0.45 - 1.23
STSO-885	SOIL	Sep, 2000	Bi-214	91.000 ± 4.000	83.300	0.78 - 1.50
STSO-885	SOIL	Sep, 2000	Cs-137	925.700 ± 14.200	1,020.000	0.80 - 1.29
STSO-885	SOIL	Sep, 2000	K-40	713.600 ± 7.100	713.000	0.80 - 1.37
STSO-885	SOIL	Sep, 2000	Pb-212	66.100 ± 4.300	79.300	0.74 - 1.36
STSO-885	SOIL	Sep, 2000	Pb-214	100.100 ± 3.700	86.300	0.76 - 1.53
STSO-885	SOIL	Sep, 2000	Pu-239/40	18.400 ± 0.400	16.800	0.71 - 1.33
STSO-885	SOIL	Sep, 2000	Sr-90	39.900 ± 5.300	50.400	0.61 - 3.91
STSO-885	SOIL	Sep, 2000	Th-234	154.700 ± 9.300	148.000	0.68 - 2.36
STSO-885	SOIL	Sep, 2000	Uranium	254.300 ± 13.000	327.000	0.62 - 1.35
STW-886	WATER	Sep, 2000	Am-241	1.300 ± 0.200	1.190	0.76 - 1.48
STW-886	WATER	Sep, 2000	Co-60	71.900 ± 7.200	73.700	0.80 - 1.20
STW-886	WATER	Sep, 2000	Cs-137	62.700 ± 6.300	67.000	0.80 - 1.24
STW-886	WATER	Sep, 2000	H-3	92.300 ± 8.900	91.300	0.74 - 2.29
STW-886	WATER	Sep, 2000	Pu-238	0.700 ± 0.100	0.786	0.74 - 1.22
STW-886	WATER	Sep, 2000	Pu-239/40	0.600 ± 0.100	0.591	0.75 - 1.26
STW-886	WATER	Sep, 2000	Sr-90	4.600 ± 0.400	4.530	0.64 - 1.50

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

Lab Code	Sample Type	Date Collected	Analysis	Concentration [b] Laboratory result[c]	EML Result[d]	Control Limits[e]
STW-886	WATER	Sep, 2000	Uranium	0.800 ± 0.100	0.916	0.73 - 1.37
STW-887	WATER	Sep, 2000	Gr. Alpha	1,113.700 ± 17.900	1,070.000	0.58 - 1.26
STW-887	WATER	Sep, 2000	Gr. Beta	1,129.400 ± 16.700	950.000	0.56 - 1.50
STAP-888	AIR FILTER	Sep, 2000	Am-241	0.060 ± 0.010	0.032	0.69 - 2.40
STAP-888	AIR FILTER	Sep, 2000	Co-57	16.500 ± 0.600	14.500	0.69 - 1.37
STAP-888	AIR FILTER	Sep, 2000	Co-60	9.200 ± 0.400	8.430	0.79 - 1.30
STAP-888	AIR FILTER	Sep, 2000	Cs-137	8.800 ± 0.500	7.410	0.78 - 1.35
STAP-888	AIR FILTER	Sep, 2000	Mn-54	50.200 ± 2.300	43.200	0.80 - 1.36
STAP-888	AIR FILTER	Sep, 2000	Pu-238	0.033 ± 0.010	0.045	0.66 - 1.35
STAP-888	AIR FILTER	Sep, 2000	Pu-239/40	0.080 ± 0.010	0.074	0.69 - 1.29
STAP-888	AIR FILTER	Sep, 2000	Sr-90	3.300 ± 0.100	1.640	0.55 - 2.05
STAP-888	AIR FILTER	Sep, 2000	U-233/4	0.034 ± 0.001	0.040	0.80 - 1.92
STAP-888	AIR FILTER	Sep, 2000	U-238	0.032 ± 0.010	0.041	0.80 - 1.59
Result within activity ± error margin.						
STAP-888	AIR FILTER	Sep, 2000	Uranium	0.070 ± 0.010	0.083	0.80 - 2.54
STAP-889	AIR FILTER	Sep, 2000	Gr. Alpha	2.840 ± 0.010	2.350	0.57 - 1.47
STAP-889	AIR FILTER	Sep, 2000	Gr. Beta	2.080 ± 0.020	1.520	0.76 - 1.52
STVE-890	VEGETATION	Sep, 2000	Am-241	5.900 ± 1.200	5.600	0.72 - 2.34
STVE-890	VEGETATION	Sep, 2000	Cm-244	3.200 ± 0.100	3.600	0.61 - 1.61
STVE-890	VEGETATION	Sep, 2000	Co-60	29.400 ± 0.400	32.800	0.75 - 1.51
STVE-890	VEGETATION	Sep, 2000	Cs-137	739.300 ± 23.000	867.000	0.80 - 1.37
STVE-890	VEGETATION	Sep, 2000	K-40	597.500 ± 49.300	639.000	0.78 - 1.43
STVE-890	VEGETATION	Sep, 2000	Pu-239/40	4.500 ± 0.200	9.600	0.67 - 1.49
No reason for deviation was found with original result. The result of reanalysis; 12.1 ±1.1 Bq/kg.						
STVE-890	VEGETATION	Sep, 2000	Sr-90	1,201.500 ± 117.300	1,150.000	0.52 - 1.23

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

Lab Code	Sample Type	Date Collected	Analysis	Concentration [b] Laboratory result[c]	EML Result[d]	Control Limits[e]

[a] The Environmental Measurements Laboratory provides the following nuclear species : Air Filters, Soil, Vegetation and Water.

[b] Results are reported in Bq/L with the following exceptions: Air Filter results are reported in Bq/Filter, Soil results are reported in Bq/Kg, Vegetation results are reported in Bq/Kg.

[c] Laboratory results are reported as the mean of three determinations ± standard deviation.

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

[e] The control limits are reported by EML as the ratio of Reported Value / EML value.

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:

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

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

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

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

4.5 In rounding off, the following rules are followed:

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

4.5.2. If the figure following those to be retained is equal to or greater than 5, the figure is dropped and the last retained figure 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 II 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.

APPENDIX D

2000 Annual Land Use Census Data

Land Use Census

The following table lists an inventory of residence, gardens ≥500 ft2 and milk animals found nearest to the plant in each of the 10 meteorological sectors within a five mile radius of the Kewaunee Nuclear Power Plant

Sector	Township No.	Residence	Garden	Milk Animals	Disteance From Plant (miles)	Sample ID
A	24	X			2.00	
A	13		X		3.05	
A	12			X	3.23	K-4
B	24	X			1.26	
B	24		X		1.47	K-19
B	18			X	2.71	K-34
R	26	X	X		1.05	K-11
R	23			X	2.20	
Q	23	X			1.37	
Q	23		X	X	1.50	K-27
P	26	X			1.42	
P	26		X		1.52	
P	22			X	2.09	
N	35	X			1.05	
N	26		X		1.16	
N	34			X	1.54	K-12
M	35	X			1.42	
M	34		X		1.58	
M	34			X	1.98	K-25
L	35	X			1.05	
L	35		X	X	1.28	
K	35	X	X		0.96	
K	10			X	3.28	
J	11	X	X	(Note 1)	2.68	

Note 1 : There are no milk animals in Sector J within 5 miles of the plant

Land Use Census

The following is a sector by sector listing of those changes between the 1999 and 2000 census.

Sector A	The garden changed from township 24 (1.95 mi) to township 13 at (3.05 mi). The milk animal changed from township 13 (2.66 mi) to township 12 (3.23 mi).
Sector B	The milk animal changed from township 24 (1.47 mi) to township 18 (2.71 mi).
Sector R	No changes
Sector Q	The garden changed from township 23 (1.33 mi) to township 23 at (1.50 mi). The milk animal changed from township 23 (1.39 mi) to township 23 (1.50 mi).
Sector P	No changes
Sector N	No changes
Sector M	The garden changed from township 35(1.33 mi) to township 34 at (1.58 mi). The milk animal changed from township 34 (1.49 mi) to township 34 (1.98 mi).
Sector L	No changes
Sector K	The milk animal changed from township 10 (1.80 mi) to township 10 (3.28 mi).
Sector J	A garden location was identified in township 11 (2.68 mi).

Land Use Census

Five Year Comparision

Sector	Number of Occupied Homes				Number of Vacant Homes			
	1985	1990	1995	2000	1985	1990	1995	2000
J	4	4	3	4	na	0	1	0
K	54	55	56	62	na	4	2	2
L	35	29	29	31	na	0	1	0
M	88	101	103	92	na	9	6	3
N	30	32	31	36	na	2	4	1
P	39	48	46	46	na	4	4	2
Q	41	48	47	48	na	5	5	5
R	37	34	37	38	na	6	4	4
A	35	37	37	34	na	2	2	2
B	27	30	28	36	na	1	1	0

Sector	Number of Farms with Milk Animals				Number of Fields			
	1985	1990	1995	2000	1985	1990	1995	2000
J	0	0	0	0	0	0	0	1
K	16	11	12	7	18	18	16	5
L	10	8	7	6	16	15	14	15
M	10	8	8	7	17	19	18	13
N	9	8	7	5	12	11	10	7
P	13	9	9	7	18	14	14	14
Q	19	20	20	14	24	24	25	23
R	19	10	10	5	17	13	13	9
A	12	7	7	7	19	13	10	9
B	6	6	6	3	7	6	6	5

Sector	Number of Gardens			
	1985	1990	1995	2000
J	2	0	0	1
K	33	16	18	24
L	23	12	12	14
M	56	29	26	25
N	20	8	8	9
P	29	16	19	22
Q	29	15	16	8
R	25	12	12	10
A	20	9	10	5
B	21	8	8	9

LAND USE CENSUS WORKSHEET

(to be used every 5th year)

Date 2000

Inventory of residence, gardens ≥ 500 square feet, and milk animals found nearest to the plant in each of the 10 meteorological sectors within a 5 mile radius of the Kewaunee Nuclear Power Plant.

SECTOR	TOWNSHIP NO.	RESIDENTS NAME & ADDRESS	GARDEN YES/NO	DISTANCE HOUSE IS FROM PLANT	DISTANCE MILK ANIMALS (IF ANY) GRAZE FROM PLANT	TYPE OF FIELDS (IF ANY)	DISTANCE FIELDS ARE FROM PLANT
B	6	Paul Wisnicky (B1)		4.56			
B	6	Cindy & Dave Hardtke	No	4.70	4.68	corn, hay alfalfa	4.59
B	6	Norbert Gaedtke	No	4.79	—	—	—
B	6	Harold Petrick	No	4.53	—	—	—
B	6	Dave Mielke	No	4.02	—	—	—
B	7	Anton Kalcik	Yes	3.21	—	soy beans hay, barley	2.95
B	7	Francis Wotja (B2)	Yes	3.47	3.48	corn, oats, barley alfalfa soy beans	2.05
B	7	Joseph Riha (B3)	No	3.63	—	—	—
B	7	Don Schleis	No	3.69	—	—	—
B	7	Dorthy Stangel	No	3.45	—	—	—
B	7	Stollberg Family -	Yes	3.53	—	—	—
B	18	Pearl Clapper	No	2.20	—	—	—
B	18	Annamae Struck	No	2.31	—	—	—
B	18	Renee Castro	No	2.34	—	—	—
B	18	Cottage (B4)	No	2.36	—	—	—

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B	18	Henry Potts	No	2.32	—	—	—
B	18	Gilbert Weith	No	2.26	—	—	—
B	18	Thomas Burke (B5)	No	2.68	—	—	—
B	18	Warren Lambin (B6)	No	2.53	—	—	—
B	18	Marie Struck	No	2.73	—	—	—
B	18	Leon Struck	Yes	2.69	2.71	corn, oats soy beans alfalfa	2.11
B	18	Gary Struck	No	2.65	—	—	—
B	18	Larry Struck	Yes	2.84	—	—	—
B	18	Roger Urban	Yes	2.93	—	—	—
B	18	Millie Nimmer	No	2.95	—	—	—
B	18	The Brown Family	Yes	2.42	—	—	—
B	18	David Biddick	No	2.26	—	—	—
B	18	Dan Crowley	No	2.44	—	—	—
B	19	William Zemke	Yes	2.11	—	—	—
B	19	Foreman Residence (B7)	No	2.05	—	—	—

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B	24	Tammy Rusch	No	1.26	—	—	—
B	24	Ed Korolewski	No	2.02	—	—	—
B	24	Wayne Paral	Yes	1.47	—	Corn, hay soybeans	1.32
B	24	Edward Knoblock	No	1.63	—	—	—
B	24	Lorraine Arahe	No	2.54	—	—	—
B	24	Larry Seville	No	1.52	—	—	—

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A	1	Gary Oswald	Yes	4.11	—	—	—
A	1	Frank Seidl	No	4.68	—	—	—
A	1	Fictom Residence	No	4.13	—	—	—
A	1	Jon Albrecht	No	4.95	—	—	—
A	1	Scott Jergenson	No	4.58	—	—	—
A	1	Johannes Wakker	No	4.79	4.78	alfalfa corn	4.53
A	2	Mark Paplham	No	4.74	—	—	—
A	2	Mike Paplham (AI)	No	4.77	4.81	corn, alfalfa soy beans	3.89
A	2	Dick Paplham	Yes	4.63	—	—	—
A	2	Koehler Residence	Yes	5.00	—	—	—
A	6	Scott Ihlenfeldt	No	4.95	—	—	—
A	11	Kenneth Repitz	No	3.53	3.50	corn, soy beans winter wheat	3.28
A	11	Charles Seidl	No	4.05	—	—	—
A	11	Brian Repitz	No	3.37	—	—	—
A	11	Udder Farms	No	4.04	4.01	alfalfa corn, beans	3.79

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A	11	Randy Ihlenfeldt	No	3.95			
A	11	Dusty Smidle	No	3.15			
A	11	Leonard Zeiss	No	3.61			
A	12	Tom Garot	No	4.00			
A	12	Wilmer Albert	No	3.94	3.90	corn, hay, oats, barley	3.53
A	12	Glenda Fiala	No	3.91			
A	12	Arden & Clara Koehler	No	3.84		oats, corn, hay	3.54
A	12	Beth Schad	Yes	3.79			
A	12	Tom Stangel (A3)	NO	3.21	3.23	corn, hay, oats, alfalfa	1.58
A	12	Arnold Kustka	No	3.11			
A	13	Schultz Family	No	2.14			
A	13	Bob Hardtke	Yes	3.05			
A	13	Melinda Burmeister	No	2.12			
A	13	Dave Seiler	No	2.18			
A	14	Vacant Home (A4)	No	2.65			

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A	14	David Smidle	No	2.73			
A	14	Delores Treglown	No	2.63			
A	24	Dorthy Ihlenfeldt (A5)	No	2.00		hay	1.81
A	36	Elmer Grimm	No	5.00	5.03	corn	4.98
A	36	Carol Grimm	No	5.00			

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R	2	Donald Waurunek	No	4.26	4.29	corn, hay grain, oats	4.13
R	3	Barbara Payer	Yes	4.74			
R	3	Vacant Home (R1)	No	4.92			
R	3	Mark Ovradnik	No	4.63			
R	3	Vacant Home (R2)	No	4.52			
R	3	Vacant House (R3)	No	4.47			
R	3	Gordon Peterson	No	4.37			
R	3	Carol Kraynik	No	4.63			
R	3	Leonard Koudelka	No	4.84			
R	9	Bruce Erichsen (R4)	No	4.82	4.75	corn, oats soy, beans alfalfa	4.40
R	9	Stan Kubec	No	4.74			
R	9	Bessy Kubec	Yes	4.69			
R	10	Richard Damp	No	3.79			
R	10	Vic Koller	No	3.94			
R	10	Tim & Tina Gruetzmacher	No	4.57			

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R	10	Mike VanGoethem	Yes	4.42			
R	10	Kevin Koudelka	No	4.47			
R	11	Eben Koss	No	4.16		alfalfa corn	4.16
R	11	Roger Steffel	Yes	3.50			
R	11	Robert Kinjerski	No	3.21			
R	11	Doris Hardtke	No	3.26			
R	11	Gary Hardtke (R5)	No	3.29	3.32	corn, wheat + alfalfa	1.58
R	11	Gloria Paplham	Yes	3.36			
R	11	Ron VanGoethem	No	3.74			
R	11	Darlene Witcpalek	Yes	4.00			
R	14	Bonnie Gilson	Yes	2.32			
R	14	Bernard Lumaye	No	2.06			
R	14	Greg & Tammy Paplham	No	3.05			
R	14	Francis Forney	No	3.16			
R	14	Jim Broderick	No	3.07			

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R	14	Vacant Home (R6)	No	2.24	—	—	—
R	14	Ron Kinjerski	No	2.58	—	—	—
R	15	Ron Paplham (R7)	No	3.33	3.21	corn, hay alfalfa	2.00
R	23	Gene & Carol Mueller	Yes	1.84	—	—	—
R	23	Lavern Mueller	No	1.87	—	oats, corn barley, wheat soy beans	1.32
R	23	Linda Mueller (R8)	No	2.11	—	—	—
R	23	Bill Hardtke	No	2.15	—	hay, corn wheat	1.63
R	23	Edward Augustian	Yes	2.21	2.20	hay corn oats, soybeans	2.00
R	23	Bob DeGreef	No	2.32	—	—	—
R	23	Lucy Faust	No	2.00	—	—	—
R	24	Irl Karnopp (R9)		1.58			
R	26	Harlan Ihlenfeldt	Yes	1.05	—	soybeans, oats corn, barley	1.01

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Q	4	Vacant Home (Q1)	No	4.97	—	—	—
Q	4	Bob Levy	No	4.93	—	—	—
Q	4	Mary Ann Levy	No	4.89	—	—	—
Q	8	Debbie Bauer	No	5.05	—	hay, wheat, corn oats, soybeans	4.97
Q	8	Tony & Rose Blazei (Q2)		4.80			
Q	8	Gary Plansky	No	4.97	4.96	grain hay	4.95
Q	8	Gene E. Jerovitz	No	4.95	4.98	corn, oats barley, hay	4.79
Q	9	Dana Gruetzmacher (Q3)	No	4.68	4.65	grain, hay	4.21
Q	9	Bruce Erichsen	No	4.93	—	corn, oats hay	3.26
Q	9	William Erichsen (Q4)	Yes	4.74	4.70	corn, alfalfa oats, soybeans	4.53
Q	9	Mary Bradley	No	4.53	—	—	—
Q	9	Wayne Selner	No	4.07	4.09	alfalfa barley, corn	4.05
Q	9	Paul & Jackie Gaetsch	No	4.94	—	—	—
Q	9	Tony Ratajczak	No	4.84	—	—	—

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Q	9	Clayton Meyer	No	4.91	—	—	—
Q	10	Steve Tadish	Yes	3.68	3.69	corn, alfalfa oats, soybeans	3.40
Q	10	Mark Schmeling	No	3.95	3.92	corn, hay barley	3.74
Q	10	Kevin Koudelka	No	4.42	—	—	—
Q	10	Carl Smidel	No	4.13	4.09	corn, hay grain, oats	3.82
Q	15	Allan & Barb. Smith	No	3.79	—	—	—
Q	15	Vacant House (Q5)	No	3.74	—	—	—
Q	15	Mary Pekarek	No	3.33	—	—	—
Q	15	Sylvester Sinkula	No	3.26	—	—	—
Q	15	Leon Kunish (Q6)		2.79			
Q	15	Joseph Swagel	No	2.74	2.76	corn, hay, oats alfalfa	2.48
Q	15	Vacant House	No	3.49	—	—	—
Q	15	Lawarence Jandrin	No	3.24	—	—	—
Q	16	Steve Sinkula	No	3.42	3.47	oats, corn alfalfa	3.00
Q	16	Maresh Family	No	3.12	—	—	—

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Q	16	Dave Zellner	No	3.89	———	———	———
Q	16	Wayne Schmidt	No	3.22	———	———	———
Q	16	Leon Schmidt (Q7)		3.27			
Q	16	Christina Pekarek	Yes	3.58	3.61	hay, corn, oats soy beans wheat	3.53
Q	16	Larry Wolechka	Yes	3.75	3.77	corn, oats alfalfa, soybeans	3.68
Q	16	Dennis Cherney	No	4.13	———	hay, corn oats	3.89
Q	17	Sydney LaCrosse (Q8)	N/A	4.37	N/A	N/A	N/A
Q	17	Vacant Home (Q9)	No	4.90	———	———	———
Q	17	Isadore Kostrewski	No	4.84	———	grain, oats hay, corn	4.79
Q	17	Adaline Bauer	No	4.82	———	———	———
Q	21	Randy Pilgrim	No	3.47	———	oats, corn hay	3.16
Q	21	Mike Sinkula (Q10)	No	3.00	———	hay, oats corn	2.55
Q	21	Vaccant House (Q11)	No	3.03	———	———	———
Q	21	Wolechka Family (Q12)		3.16			
Q	21	Randy Pilgrim	No	3.47	———	hay, corn oats	3.16

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Q	22	Glen Kunesh	No	2.78	2.74	corn, oats hay	2.44
Q	22	Dawn Kinjerski	No	2.34	—	—	—
Q	22	Susan Derosier	No	2.48	—	—	—
Q	22	Darlene Sandrin	Yes	3.11	—	—	—
Q	22	Bob Siebold	No	2.55	—	alfalfa, oats soybeans	2.32
Q	23	Marvin Schleis	Yes	1.47	1.50	corn, alfalfa wheat, soybeans	1.32
Q	23	Denise Schleis	Yes	1.74	—	—	—
Q	23	Tammy Schleis	No	1.37	—	—	—
Q	27	Ken Paplham	Yes	1.81	—	corn alfalfa	1.58

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P	16	Tracy Tulachka	Yes	3.84	—	—	—
P	16	Terry Kevusky (P1)	No	3.90	—	—	—
P	17	Laddie Walechka	Yes	4.12	—	—	—
P	17	Richard & Elise Plansky	Yes	4.14	—	—	—
P	17	Charles Hlinak	Yes	4.16	—	—	—
P	17	Dvora Kenny	Yes	4.20	—	—	—
P	17	Joseph Konop Jr.	No	4.36	—	hay, corn oats	4.52
P	17	Vacant Home (P2)	No	4.38	—	—	—
P	17	Cecelia Konop	Yes	4.42	—	—	—
P	17	Stanley La Crosse (P3)	No	4.68	4.63	alfalfa, corn soybeans, wheat	3.89
P	17	Lawrence Dworak	No	4.41	—	—	—
P	17	Tom La Crosse (P3)	No	4.63	4.63	alfalfa, corn soybeans, wheat	3.89
P	17	Joseph Tadish	Yes	4.53	—	winter wheat oats, hay	4.80
P	19	David Nuhlicek	No	4.92	—	—	—
P	19	Tom Daron (P4)	Yes	4.71	—	—	—

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P	20	Carol LaCrosse	Yes	4.39	—	—	—
P	20	James Langer (P5)	Yes	3.65	—	oats, wheat green beans hay	3.05
P	20	James Parma	Yes	3.75	—	—	—
P	20	Leonard Sinkula (P6)	Yes	3.87	—	—	—
P	20	St. Joseph's Parish House	No	3.94	—	—	—
P	20	Kenneth Langer	Yes	3.73	—	green beans hay	3.00
P	20	Melvin & Dorthy Koller	No	4.17	—	—	—
P	20	Shirley LaCrosse	No	4.37	—	—	—
P	20	Jim Hlinak	No	4.47	4.51	corn, soy beans winter wheat hay	4.26
P	20	Ernest Klimesh	No	4.20	4.16	corn, hay grains	4.11
P	20	Terry Daron (P7)	Yes	4.48	—	corn hay	4.58
P	20	Leo Rabas (P8)	Yes	4.61	4.67	hay, corn, oats barley, winter wheat	4.47
P	21	Darwin Pekarek	No	2.86	—	—	—
P	21	Jim & Deb Niemojuski	Yes	2.78	—	—	—
P	21	Vacant Home (P9)	No	2.70	—	—	—

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P	21	Sally Kline	No	3.78	—	—	—
P	21	Wayne Melnarik	No	3.82	—	—	—
P	21	Martha Oehlke	No	3.92	—	—	—
P	21	Kathy Grant & Joe Mills	Yes	3.90	—	—	—
P	21	Ronald Schleis	Yes	3.87	—	—	—
P	21	Ken Schleis (P10)		3.69			
P	22	Francis Schleis	No	2.15	2.09	oats, hay corn	2.02
P	26	Mandy Steffel	No	1.42	—	—	—
P	26	Alvin Beranek	Yes	1.52	—	oats	1.37
P	27	Robert Dworak	No	2.53	—	—	—
P	27	David & Linda Sinkula (P11)	Yes	2.63	2.54	corn, oats wheat, barley	2.42
P	27	Jim Dworak	No	2.50	—	—	—
P	28	Doug & Chris Lambert	No	2.63	—	—	—
P	28	Mark Tulachka	No	2.66	—	—	—

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P	29	Francis Riha	Yes	3.87	—	soybeans corn	3.52
P	29	William Jansky	Yes	4.04	—	—	—
P	29	Julie Jasper	No	4.02	—	—	—
P	30	Mary Dworak (P12)	No	4.60	—	—	—

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N	26	Ray Wotachek	Yes	1.16	—	—	—
N	27	Vacant House (N1)	No	2.13	—	—	—
N	28	Duane Pekarek	Yes	2.53	2.57	corn, alfalfa oats, wheat	2.47
N	28	Sylvester Parma	No	2.76	—	hay, oats soybeans	2.74
N	28	Richard Zellner	No	3.42	—	—	—
N	28	Ann Bauer	Yes	3.44	3.41	corn, oats, peas alfalfa, hay	2.77
N	28	Schultz Residence (N2)					
N	29	M. McCown (N3)					
N	29	Leona & Arthur Riha	No	3.53	—	—	—
N	29	New House (N4)	No	3.53	—	—	—
N	29	Mary Siebold	No	3.90	—	—	—
N	29	David Siebold	No	3.95	—	—	—
N	29	Helen Osmondson	No	3.95	—	—	—
N	29	Gary Bodart	No	4.29	—	—	—
N	29	Elise Bruechert	No	4.05	—	—	—

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SECTOR	TOWNSHIP NO.	RESIDENTS NAME & ADDRESS	GARDEN YES/NO	DISTANCE HOUSE IS FROM PLANT	DISTANCE MILK ANIMALS (IF ANY) GRAZE FROM PLANT	TYPE OF FIELDS (IF ANY)	DISTANCE FIELDS ARE FROM PLANT
N	29	Kevin Pribyl (N5)		4.00			
N	30	Kathy Zellner	No	4.53	———	———	———
N	30	Donald Lambrecht	Yes	4.55	4.57	oats, corn alfalfa	3.95
N	30	Gary Holly	No	4.59	4.63	corn hay	4.42
N	31	Mayme Kunesh	No	4.88	———	———	———
N	31	Joe Cherney	No	4.89	———	←	———
N	31	Greg Gulbrand (N6)		4.83			
N	31	Mike LaCrosse	Yes	4.68	———	———	———
N	31	Pattrick Schlies (N7)		4.79			
N	32	Peter Mitchell	No	4.05	———	———	———
N	32	Mary Balm	No	4.16	———	———	———
N	32	Bob Holly	Yes	4.46	———	———	———
N	32	Ron Mitchell	Yes	4.47	———	———	———
N	32	Mike Both	No	4.44	———	———	———
N	32	George Siebold (N8)		3.53			

LAND USE CENSUS WORKSHEET

(to be used every 5th year)

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N	32	Eugene Johanek	No	4.47	—	—	—
N	32	Dean Lester	No	4.48	—	—	—
N	32	Butch Schmidt (N9)		4.47			
N	32	Jeff Stoeger	Yes	3.68	—	hay	3.68
N	33	Leon Koch	Yes	3.37	—	—	—
N	34	Donald LeCaptian	No	1.53	1.54	oats, barley corn, wheat soybeans, alfalfa	1.26
N	35	Dennis Kinjerski	No	1.05	—	—	—

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M	3	George Wotachek	No	2.16	—	—	—
M	3	Paul Tulachka	Yes	2.52	2.55	corn, grain winter wheat	2.47
M	3	Lakeview Hill Mobile Homes (M1)	—	—	—	—	—
M	3	Residents of Lakeview Hill Mobile Homes: Walter Staff	No	2.56	—	—	—
M	3	Greg Phillips	No	2.64	—	—	—
M	3	Lynn Caputo	No	2.66	—	—	—
M	3	Myre Sisel	No	2.68	—	—	—
M	4	Norbert Michalski (M2)	Yes	2.84	2.86	corn, beans alfalfa, oats soybeans	2.21
M	4	Bill & Jerome Hlinak (M3)	Yes	2.89	2.92	corn, barley oats, alfalfa soy beans	2.95
M	4	Jerry Kaiser	No	3.11	—	—	—
M	4	Tom Staskal (M4)	Yes	3.63	3.64	alfalfa, oats hay, teff	3.47
M	4	Vacant Home (M5)	No	3.70	—	—	—
M	4	Pat Olewinski (M6)	No	3.89	—	—	—
M	5	Tom Rezek (M7)		3.95			
M	5	Louis & Florence Jansky (M8)	Yes	3.63	—	—	—

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M	5	Joe Renak	No	3.87			
M	5	Earl Bruemmer	Yes	3.93		corn	4.21
M	5	Vernon Gulbrand	No	4.37			
M	5	Robert Yanda	Yes	4.51			
M	5	Tina Christman	Yes	4.53			
M	5	Ed Riha	No	4.55			
M	5	Bob Seidl	No	4.56			
M	5	Ben Stangel (M9)	No	4.59			
M	5	Donna Stahura	No	4.32			
M	5	Arthur Madden	No	4.21			
M	5	Jeff Kummerow	No	4.11			
M	6	Eugene Stangel	No	4.68			
M	6	Tom Schultz	Yes	4.71			
M	6	St. Mary Parish/Rev. Gerald Kempen	No	5.05			
M	6	Lori Gretz	No	4.65			

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M	6	Tom Vincent	No	4.88	—	—	—
M	6	Ron Lambert	No	4.87	—	—	—
M	6	Betsy Tulachka	No	4.91	—	—	—
M	6	Jim Miller	No	4.95	—	—	—
M	6	Vacant House (M10)	No	4.90	—	—	—
M	6	Bruce Tesarek	No	5.05	—	—	—
M	6	Mike Wagner	Yes	4.79	—	—	—
M	6	Victor Vigue	No	4.99	—	—	—
M	6	Vickie Young (M11)		4.74			
M	6	Dean & Linda White	No	4.53	—	—	—
M	6	Jeanette Fabian	Yes	4.73	—	—	—
M	6	Meg Wauter	Yes	4.84	—	—	—
M	6	Lawrence Roethle	Yes	4.71	—	—	—
M	8	Kathy Hasselman	No	4.68	—	corn, oats alfalfa	4.84
M	8	Lisa Hanson	No	4.79	—	—	—

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M	8	Lisa Rolston	Yes	4.76	4.74	—	—
M	8	David Johnson	No	4.53	—	—	—
M	8	Lewis Stevens	No	4.42	—	—	—
M	8	Dale Popp	No	4.39	—	—	—
M	8	Patty Olson	No	4.55	—	—	—
M	8	John & Lynn Taddy	No	4.58	—	—	—
M	8	Tommy Fernando	No	4.51	—	—	—
M	8	Brian Haelfrisch (M12)		4.32			
M	8	Ray Yanda (M13)	Yes	4.21	—	—	—
M	8	Mike & Mary Reel	No	4.29	—	—	—
M	9	Bruce Ackerman	Yes	3.96	—	alfalfa	3.95
M	31	Jim Stangel	No	4.63	—	—	—
M	31	Patty Guetschow (M14)		4.71			
M	31	Arlene Kunesh	No	4.74	—	—	—
M	31	Mitchell Pelner	No	4.79	—	—	—

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Inventory of residence, gardens > 500 square feet, and milk animals found nearest to the plant in each of the 10 meteorological sectors within a 5 mile radius of the Kewaunee Nuclear Power Plant.

SECTOR	TOWNSHIP NO.	RESIDENTS NAME & ADDRESS	GARDEN YES/NO	DISTANCE HOUSE IS FROM PLANT	DISTANCE MILK ANIMALS (IF ANY) GRAZE FROM PLANT	TYPE OF FIELDS (IF ANY)	DISTANCE FIELDS ARE FROM PLANT
M	31	Chris Wotachek	Yes	4.82			
M	31	Lonnie Hewuse (M15)		4.84			
M	31	Ronald Kobes	No	4.81			
M	31	Judith Lischka	No	4.83			
M	31	Phillip Kearns (M16)					
M	31	Tom Kent	Yes	4.79			
M	31	John Lischka	No	4.85			
M	31	T.M. Rosenbaum (M17)					
M	31	Mike Bolm	No	4.63			
M	31	Jim Plansky	Yes	4.71			
M	32	Mark Schultz	No	3.58			
M	32	Delores Schultz	No	3.63			
M	32	Tom Schultz	No	3.75			
M	32	Chris Kohnle	No	3.85			
M	32	Jim Kolarik	No	4.42			

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M	32	Don (Red) Zachek	No	4.53	—	—	—
M	32	Rosemary Baxter	Yes	4.54	—	—	—
M	32	Ione Ballard	Yes	4.42	—	—	—
M	32	Bob Kirchner	No	4.42	—	—	—
M	32	George Plos	No	4.44	—	—	—
M	32	Matt Kohnle	No	4.43	—	—	—
M	32	Dorthy Vansickle	No	4.42	—	—	—
M	32	Peggy Kohnle	No	4.41	—	—	—
M	32	Hauschultz Residence	No	4.40	—	—	—
M	32	Michelle Kreft	No	4.41	—	—	—
M	32	April Ledvina	Yes	4.42	—	—	—
M	33	Paul Wotachek	No	2.63	—	hay, oats corn, wheat	2.65
M	33	Mary Parma	No	2.58	—	Corn, hay	2.23
M	33	Alice Kanera Farm (M18)	No	3.11	—	corn, barley, hay oats, soy beans	2.79
M	34	Margie Parmenter	Yes	1.68	—	—	—

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M	34	Jergensen Farm (M19)	Yes	1.74	—	hay, corn, oats, beans	1.32
M	34	Dale Pekarek	Yes	1.58	—	—	—
M	34	Joe Wotachek	No	1.96	1.98	oats, barley, corn, alfalfa wheat, soy beans	1.60
M	34	Bob Tulachka	No	2.52	2.51	corn, soy beans small grain	2.32
M	35	Vacant House (M20)	No	1.47	—	—	—
M	35	George Baldwin	No	1.42	—	—	—

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L	2	Celestine Johanek (L1)	Yes	1.73	—	—	—
L	2	Norbert Stangel	Yes	2.08	—	barley hay	1.89
L	3	Gerald Schleis	Yes	2.44	2.46	corn, wheat oats, hay	2.05
L	3	Jean Schleis	Yes	2.26	—	—	—
L	3	Norman Blattler	No	2.31	—	—	—
L	3	Carl Kroll	No	2.42	—	beans, soy beans	2.20
L	3	Al Ihlenfeldt	No	2.95	—	corn, wheat soy beans	2.61
L	3	Dennis Schleis	Yes	2.19	—	hay	2.22
L	4	Norbert Smidel	No	3.21	3.18	Soy beans, oat corn, barley oats, hay	2.93
L	8	Jan Dewane	Yes	4.52	—	—	—
L	8	Krista & Mark Wilcox	Yes	4.59	—	—	—
L	8	Jerry Eis	No	4.63	—	—	—
L	8	Harry Mewe (L2)	No	4.94	—	—	—
L	8	Lensmeyer Family	No	4.42	—	—	—
L	8	Grace Novitski	Yes	4.31	4.30	hay, corn oats	4.53

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L	8	George Novitsky	No	4.64	—	—	—
L	9	Norbert Koenig (L3)	Yes	3.19	—	hay	3.24
L	9	David & Amy Katzka	Yes	3.69	3.72	oats hay	3.70
L	10	Dan Miller	No	3.16	—	hay	2.95
L	10	Rod Kubsh & Joan Neuser	No	3.68	—	—	—
L	10	Charles Blaha	Yes	3.11	—	Hay	3.11
L	10	Marie Blaha (L4)	No	3.09	—	Hay, corn	2.95
L	10	Victor Blaha	No	3.40	—	—	—
L	16	Jim Budnik	No	4.27	—	—	—
L	16	Ray Hallada	Yes	4.84	—	—	—
L	16	Kevin Schroeder	No	4.11	—	hay	4.05
L	16	Steve Malchek	No	4.56	—	—	—
L	17	Paul Krause (L5)	Yes	5.00	—	—	—
L	17	Dale Kapetsky	No	4.68	4.70	hay, corn wheat, oats	4.57
L	35	Lydia Ratajczak	Yes	1.30	1.28	alfalfa, hay oats, corn	.89

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L	35	John Hermann (L6)	No	1.05	—	—	—

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K	2	Tina Wotachek (K1)		1.39			
K	2	Kenneth Gretz	Yes	1.96	—	—	—
K	2	Dave Riha	No	2.11	—	—	—
K	2	Carl Rusch	No	1.78	—	—	—
K	2	Alvin Zellner (K2)	No	1.60	—	—	—
K	2	Lake Shore Apts (K3)	No	1.64	—	—	—
K	2	Perry Lauscher	Yes	1.75	—	—	—
K	2	The Gerdmans	No	2.07	—	—	—
K	2	Charles Arnone	Yes	1.69	—	—	—
K	2	Ralph Noack	Yes	1.79	—	—	—
K	2	Laurie Grasso	Yes	2.05	—	—	—
K	2	New House (K4)	No	2.21	—	—	—
K	10	Ron Zimmerman	Yes	2.61	—	—	—
K	10	Roger Lehrmann	No	3.16	—	—	—
K	10	Carol Kohnle	Yes	2.68	—	—	—

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K	10	Lori Louscher (K5)					
K	10	Jon Sponhotz	No	3.11	—	—	—
K	10	Bert Schefchek (K6)	No	3.05	—	—	—
K	10	Vacant House (K7)	No	3.07	—	—	—
K	10	Lynn Blaha (K8)	Yes	3.11	—	—	—
K	10	Robert Kuehl (K9)		3.24			
K	10	Brent Miller	No	3.31	—	—	—
K	10	Lee Englebrecht	No	3.24	3.28	corn, oats alfalfa barley	3.04
K	11	Byron Johnson	Yes	2.74	—	—	—
K	11	Mark Johanek	No	2.94	—	—	—
K	11	Grace Barta (K10)	No	2.90	—	—	—
K	11	Dorthy Wachal	Yes	2.89	—	—	—
K	11	Don & Terry Abbet	Yes	2.95	—	—	—
K	11	Edward Glaser (K11)	Yes	3.05	—	—	—
K	11	John Reynolds	Yes	3.08	—	—	—

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K	11	Florence Reynolds	Yes	3.11			
K	11	Tom Miller	No	2.84			
K	11	Hilary Wojta	Yes	2.68			
K	11	Jerome Wojta (K12)		2.31			
K	11	Gary Maigatter	Yes	2.79			
K	11	Charles Goodsole	Yes	2.11			
K	11	Jim Reynolds	Yes	3.02			
K	14	Evertt Bergmann	No	3.68			
K	14	James Clarkson	No	4.05			
K	15	Rick Barta (K13)	Yes	3.43	3.50	corn, grain, hay	2.63
K	15	Allen Johanek	No	3.62	3.64	alfalfa, corn, soybeans, oats, barley	3.58
K	15	Dan Koehler	No	3.58			
K	15	Bob Nelson	Yes	3.64			
K	15	Robert Dworak (K14)	Yes	4.00			
K	15	Reinke & Stodola Farm	No	4.37	4.41	corn, hay	4.21

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K	15	Vacant Home (K15)	No	4.43			
K	15	Lynn Gessert	No	4.53			
K	15	Ken Gessert	No	4.10			
K	15	Edwin Gessert	No	4.19	4.29		
K	16	Anthony Skubal	No	4.63			
K	21	Mike Eslinger (K16)	No	4.73	4.79		
K	22	Eugene Blahanik	Yes	4.58			
K	22	Mike Chevalier	No	4.32			
K	22	Dorthy Zik	Yes	4.63			
K	22	Ann Reinke	No	4.47			
K	23	Dwayne Hanzel	No	5.00			
K	23	Ken Magyar (K17)		21.95			
K	23	Roger Jacobs	No	4.84			
K	23	Mitchell Derenne	No	4.68			
K	23	Steve Jaeger	No	4.63	4.68	oats, corn, hay	4.13

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K	23	John Sand	No	5.03			
K	23	Edward Gessert III	No	4.26			
K	35	Kenneth Krofta	Yes	0.96			
K	35	Tim Mumper (K18)		1.00			

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J	11	Jim & Susan Knorr	Yes	2.68	———	———	———
J	11	Roger Miller	No	2.75	———	corn, soybeans winter wheat	2.63
J	11	Thomas Sprang	No	2.80	———	———	———
J	11	Phil DuPlessis	No	2.95	———	———	———

ANNUAL REPORT PART II

DATA TABULATIONS
GRAPHS AND ANALYSES

Beach access to Lake Michigan

Environmental, Inc.
Midwest Laboratory
an Allegheny Technologies Co.

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

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, 2000

Prepared and submitted by

ENVIRONMENTAL, Inc.
Midwest Laboratory
Project No. 8002

Approved :

Bronia Grob, M.Sc.
Laboratory Manager

Richard P. Farrell, M.Sc. HP
Mgr. Radiation Protection, KNPP

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 Wisconsin Public Service Corporation.

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1.0 INTRODUCTION

The following constitutes Part II of the final report for the 2000 Radiological Monitoring Program conducted at the Kewaunee Nuclear Power Plant (KNPP), Kewaunee, Wisconsin.

Included are tabulations of data for all samples collected in 2000, 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 2000 Annual Report on the Radiological Monitoring Program for the Kewaunee Nuclear Power Plant.

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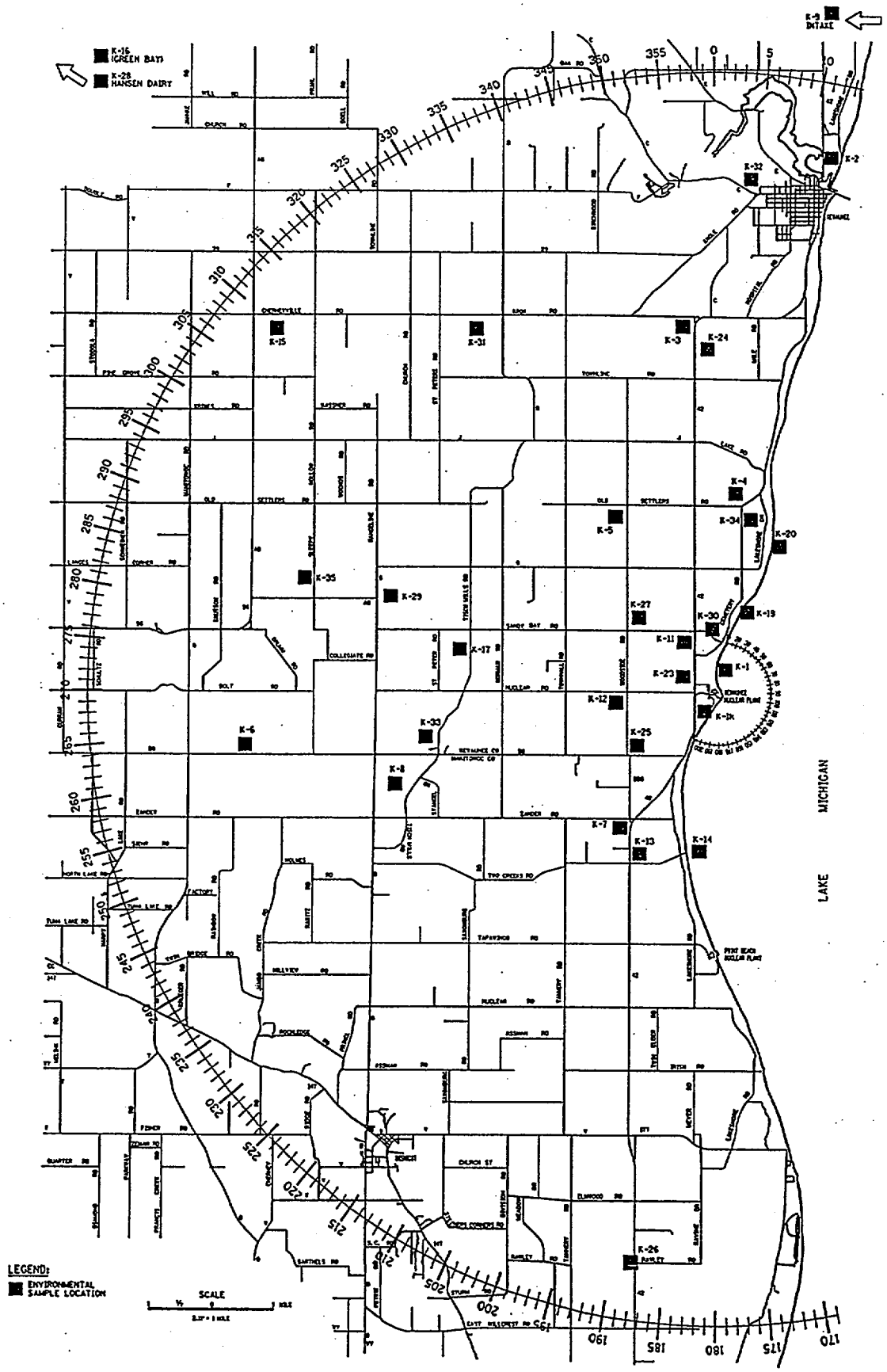

Figure 1. Sampling locations, Kewaunee Nuclear Power Plant

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-4	I	3.0 N	Tom Stangel Farm, E4804 Old Settlers Rd, Kewaunee
K-5	I	3.5 NNW	Ed Paplham Farm, E4160 Old Settlers Rd, Kewaunee
K-6	C	6.7 WSW	Novitsky Farm, E1870 City Tk BB, Denmark
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-12	I	1.5 WSW	LeCaptain Farm, N491 Woodside Rd, 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-19	I	1.75 NNE	Wayne Paral Farm, N1048 Lakeview Dr, 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	1.00 N	End of site boundary
K-31	I	6.25NNW	E. Krok Substation
K-32	C	11.5 N	Piggly Wiggly, 931 Marquette Dr., Kewaunee
K-33	C	4.4 mi. W	Holly Farm, 0.75 mi. N of Tisch Mills, Hwy. B.
K-34	I	2.5 N	Leon and Vicki Struck, N1549 Lakeshore Dr., Kewaunee
K-35	C	6.0 mi. WNW	Jean & Dwayne Ducat, N1215 Sleepy Hollow Rd., Kewaunee
K-36	I	8.5 mi. NNE	Fiala's Fish Market, Kewaunee

[a] I= indicator; C = control.

[b] Distances are measured from reactor stack.

Table 2. Type and frequency of collection.

Location	Frequency					
	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-4			MI[c]	GR[a], TLD, CF[d]	SO	
K-5			MI[c]	GR[a], TLD, CF[d]	SO	
K-6			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-12			MI[c]	GR[a], CF[d], WW	SO	
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]	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-33			MI[c]	GR[a], TLD, CF[d]	SO	
K-34			MI[c]	GR[a], CF[d]	SO	DM
K-35			MI[c]	GR[a], TLD, CF[d]	SO	
K-36				FI		

[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 Type Codes:

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

Note: Page 6 is intentionally left out.

5.0 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.

Air Particulates - Gross Beta

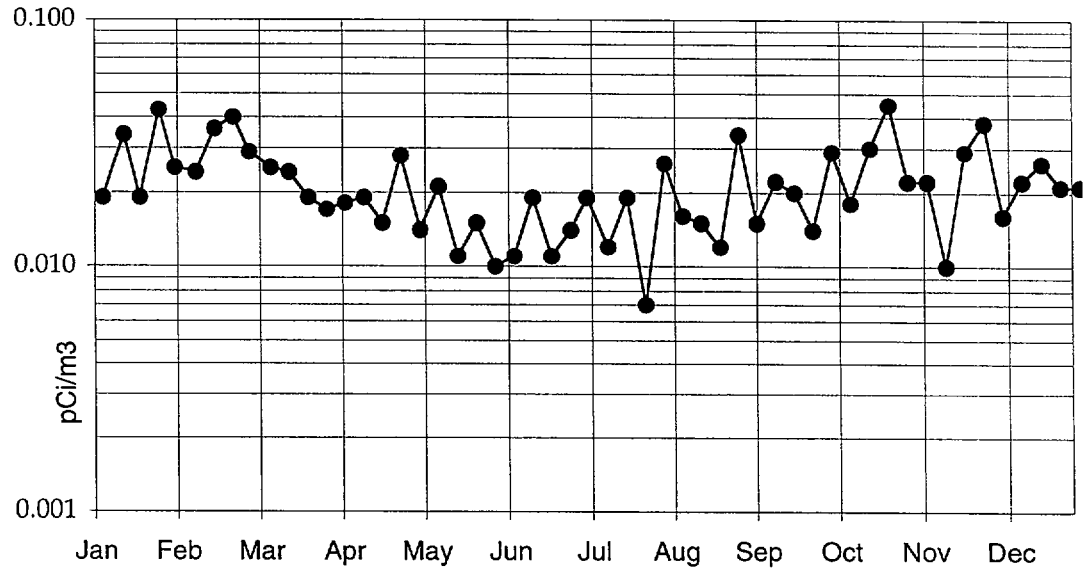

Figure 2. Location K-1f (weekly samples, 2000).

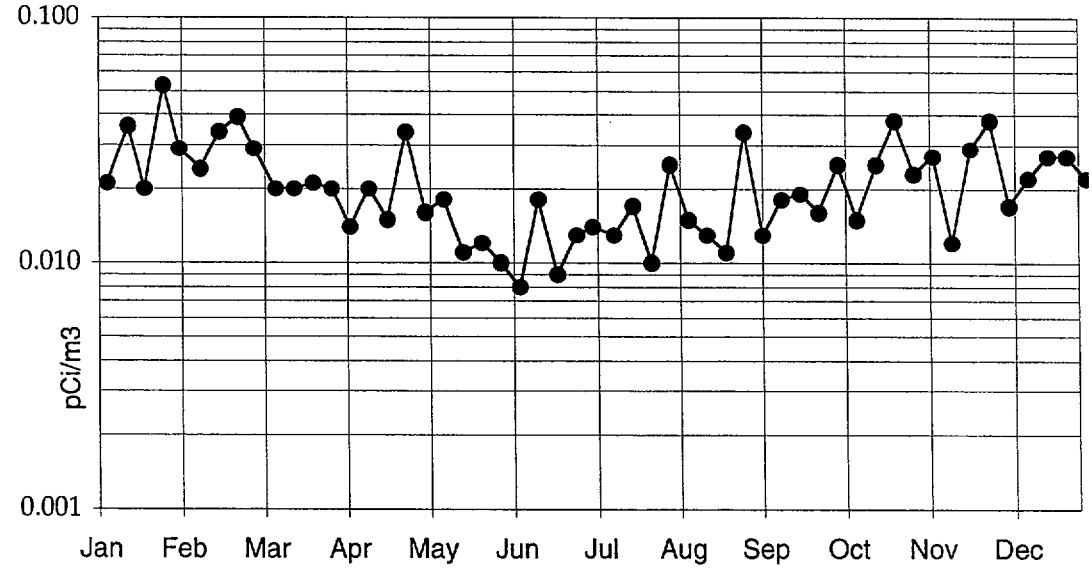

Figure 3. Location K-2 (weekly samples, 2000).

Kewaunee

Air Particulates - Gross Beta

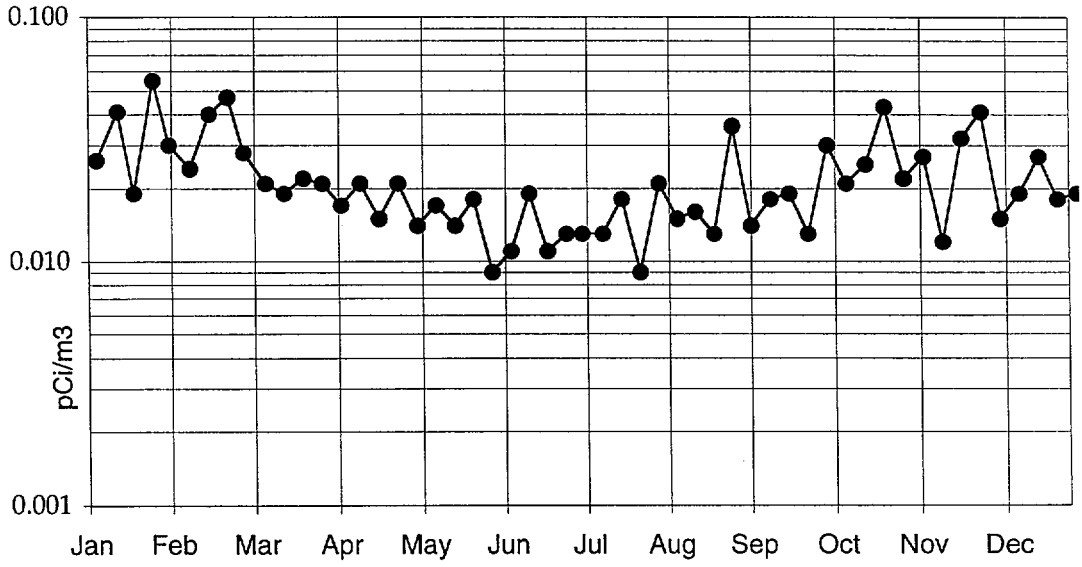

Figure 4. Location K-7 (weekly samples, 2000).

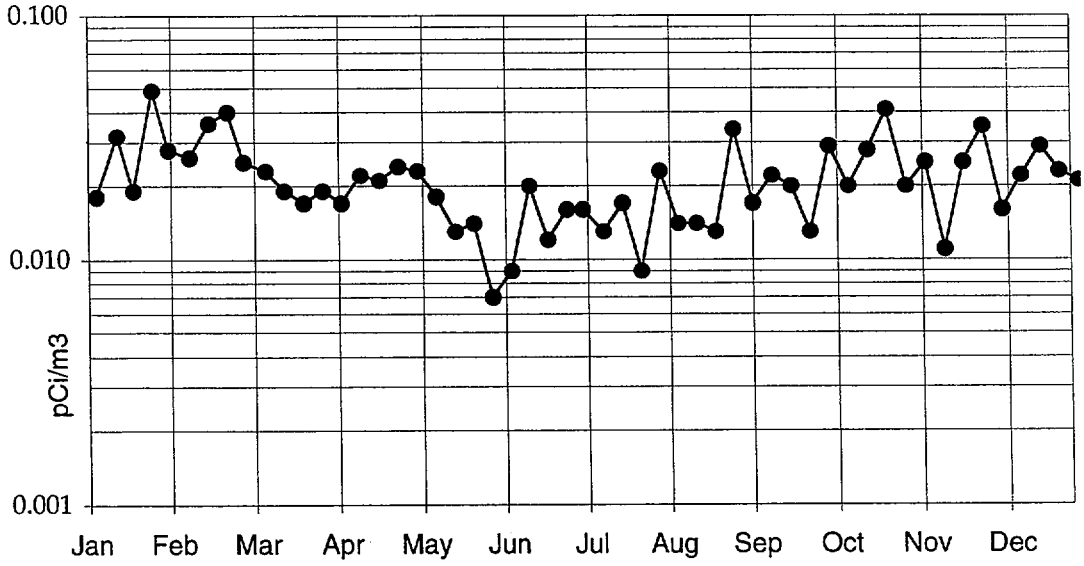

Figure 5. Location K-8 (weekly samples, 2000).

Air Particulates - Gross Beta

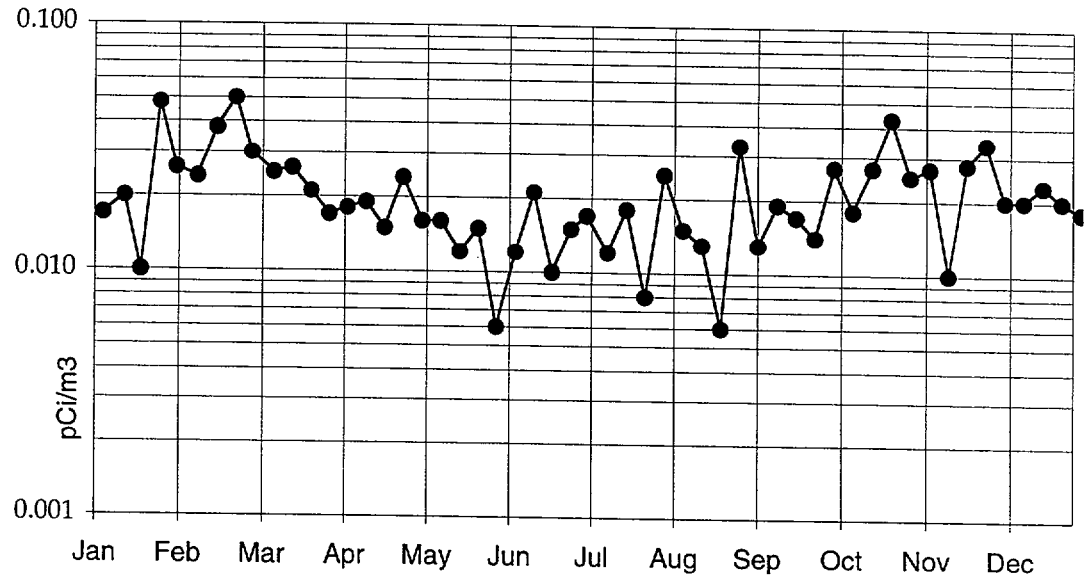

Figure 6. Location K-31 (weekly samples, 2000).

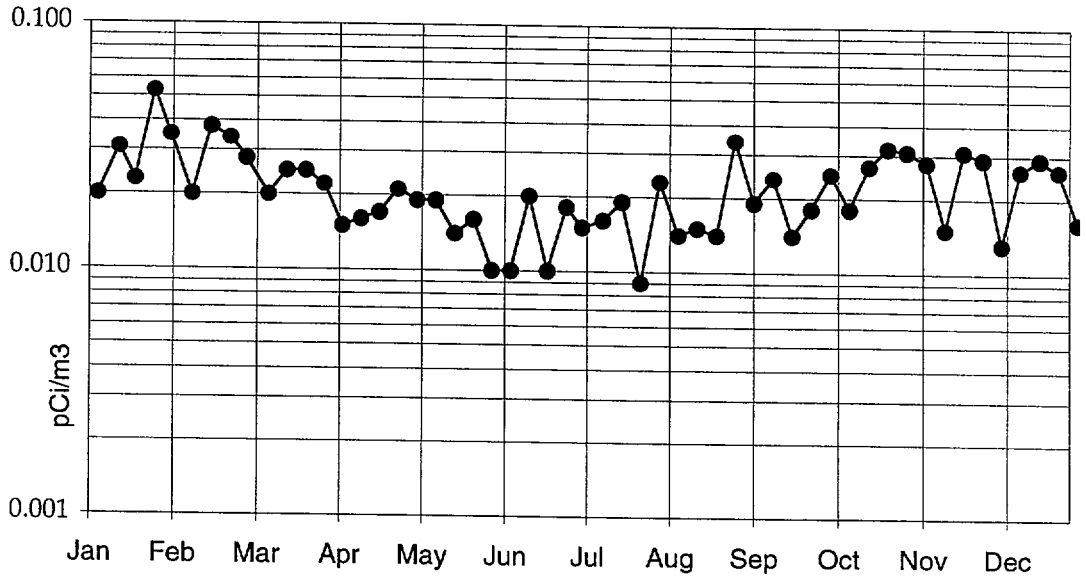

Figure 7. Location K-16 (weekly samples, 2000).

Kewaunee

Air Particulates - Gross Beta

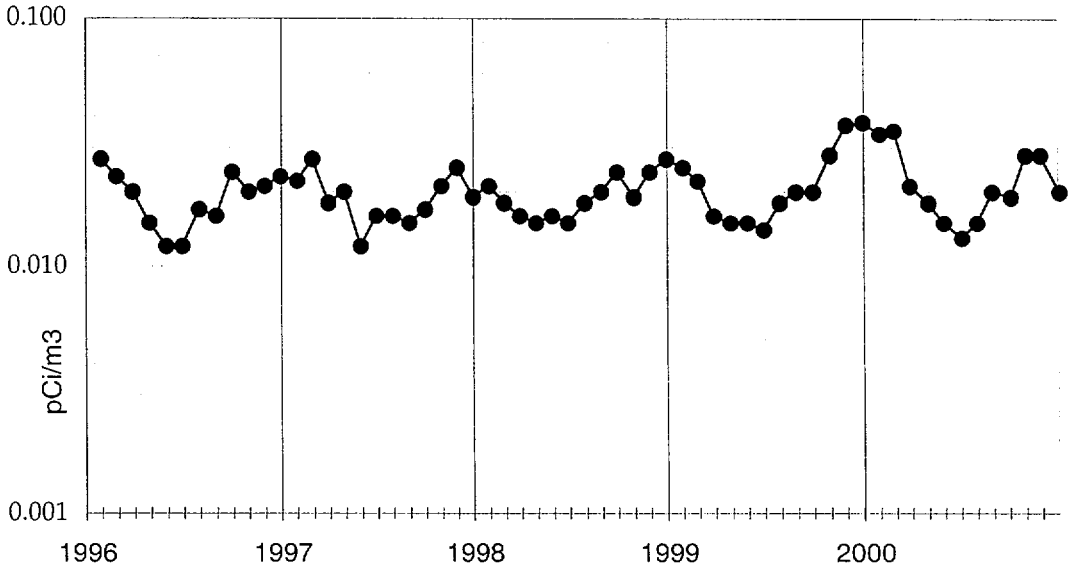

Figure 10. Location K-7 (monthly averages, 1996-2000).

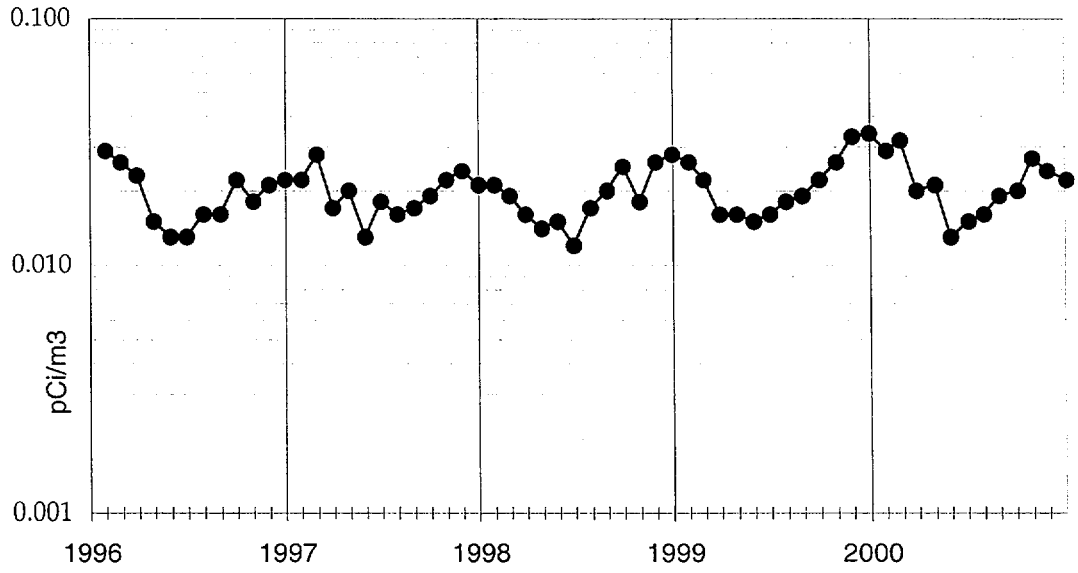

Figure 11. Location K-8 (monthly averages, 1996-2000).

Kewaunee

Air Particulates - Gross Beta

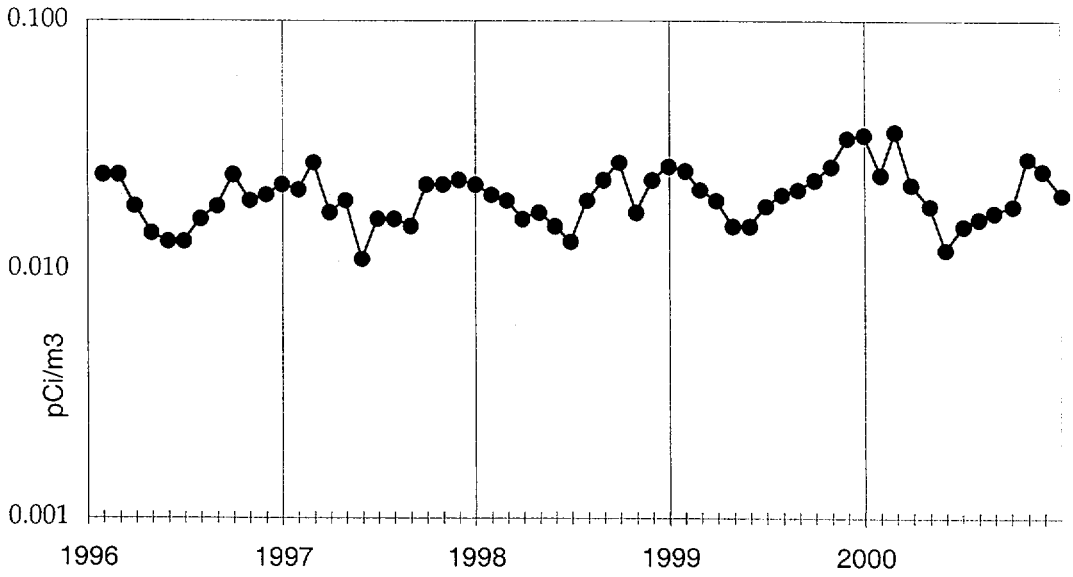

Figure 12. Location K-31 (monthly averages,1996-2000).
(Results prior to Sep. 98 represent collections from K-15).

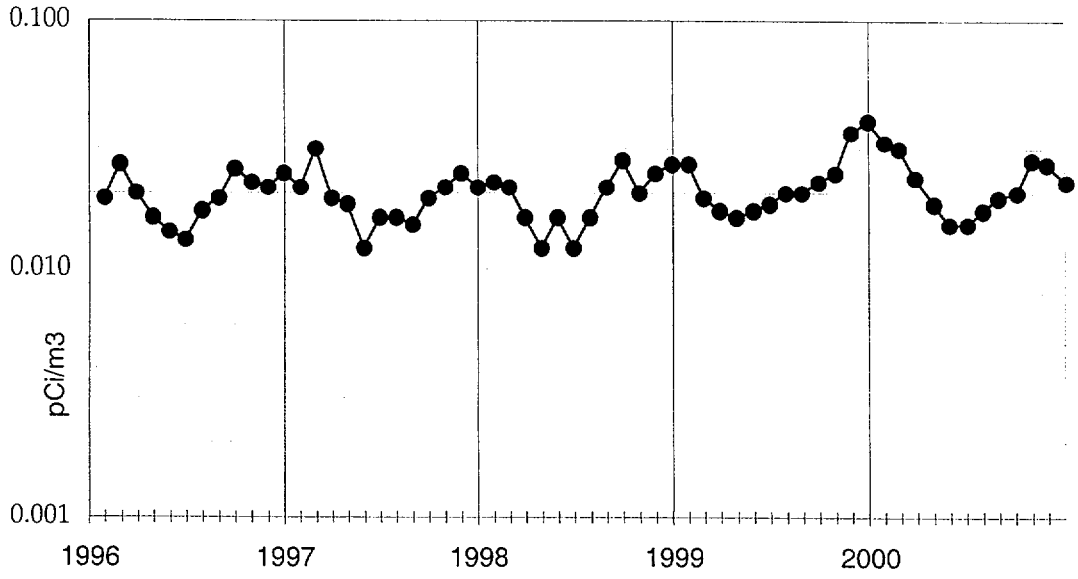

Figure 12. Location K-16 (monthly averages, 1996-2000).

WELL WATER-GROSS ALPHA

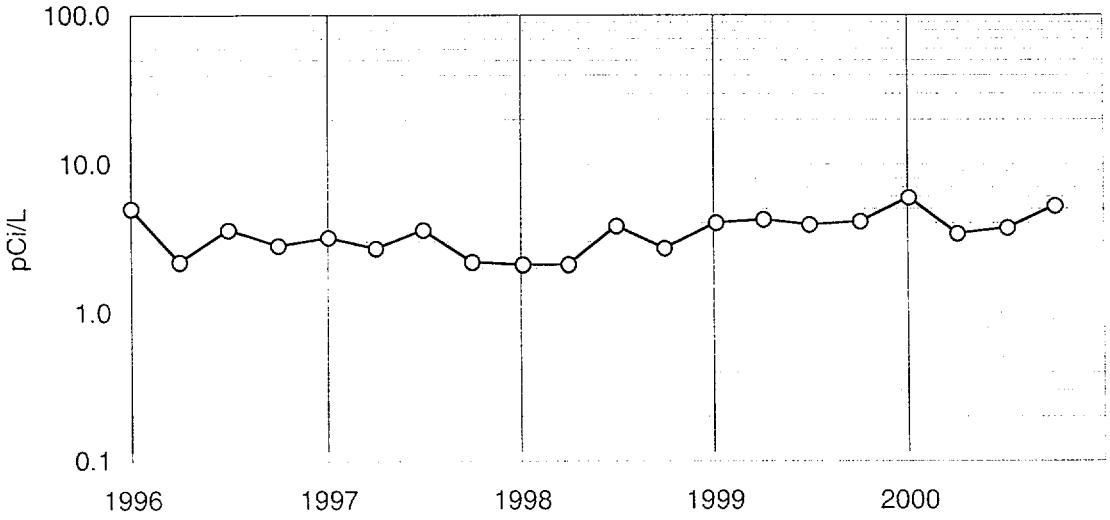

Figure 14. Well water samples. Location K-1g.
Total Residue. Quarterly collection.

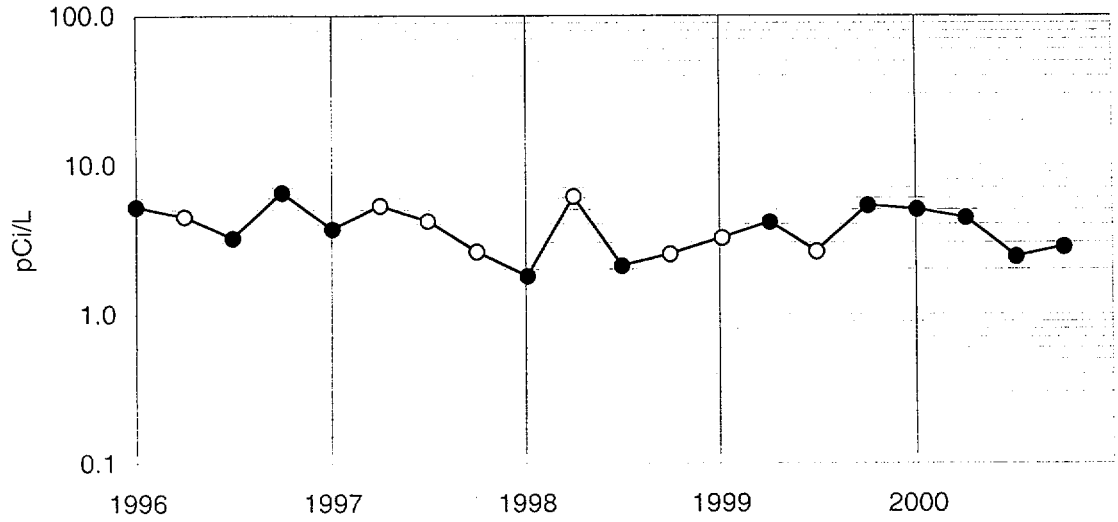

Figure 15. Well water samples. Location K-1h
Total Residue. Quarterly collection.

WELL WATER-GROSS BETA

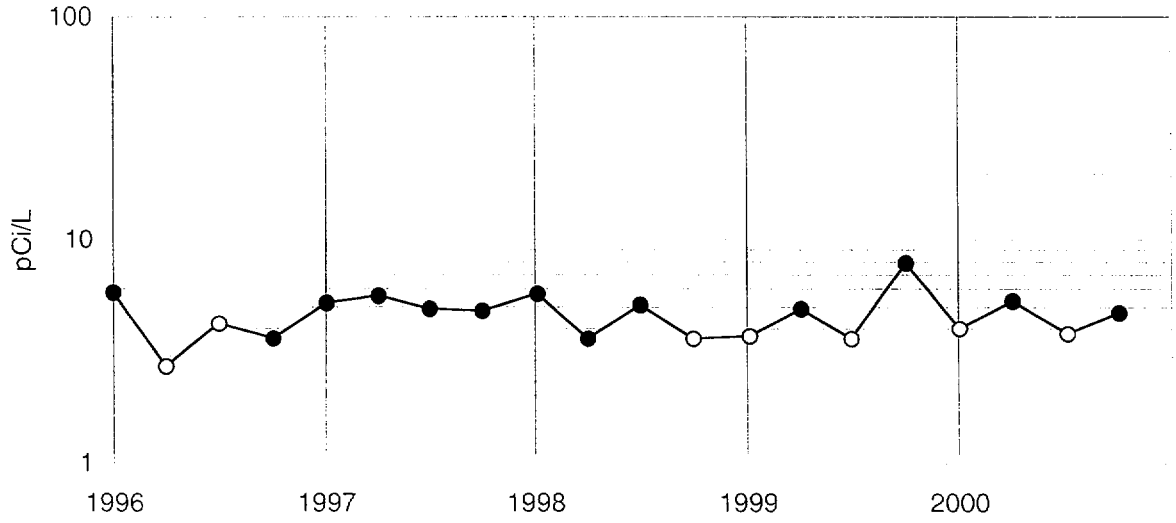

Figure 16. Well water. Location K-1g.
Total Residue. Quarterly collection.

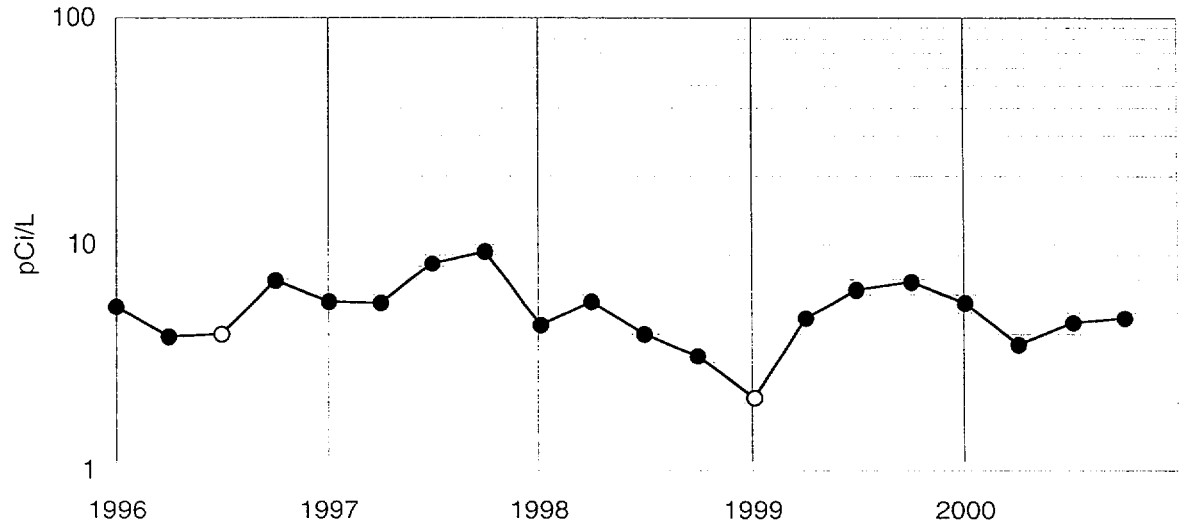

Figure 17. Well water. Location K-1h.
Total Residue. Quarterly collection.

WELL WATER-GROSS BETA

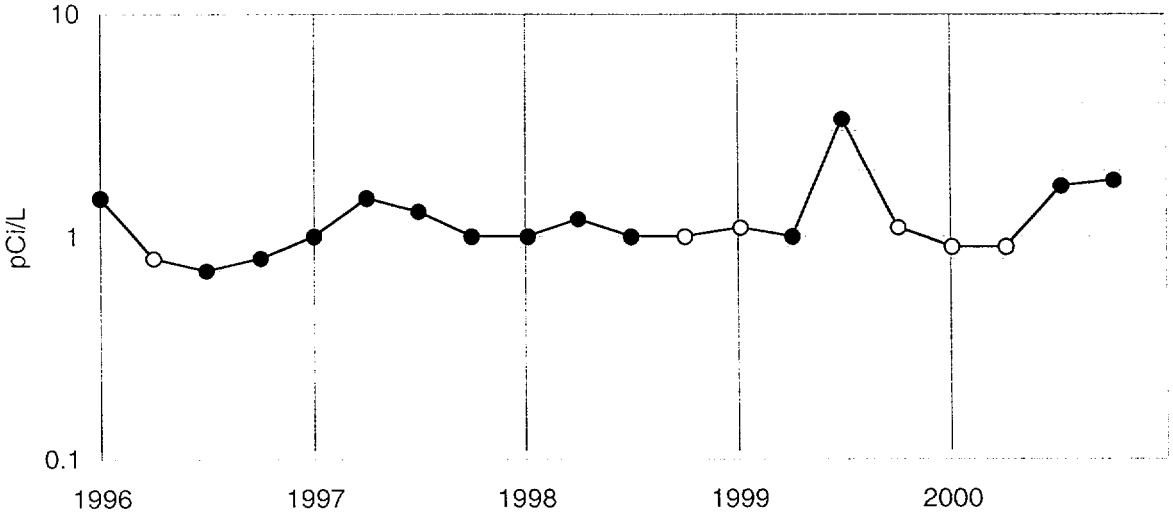

Figure 18. Well water. Location K-10.
Total Residue. Quarterly collection.

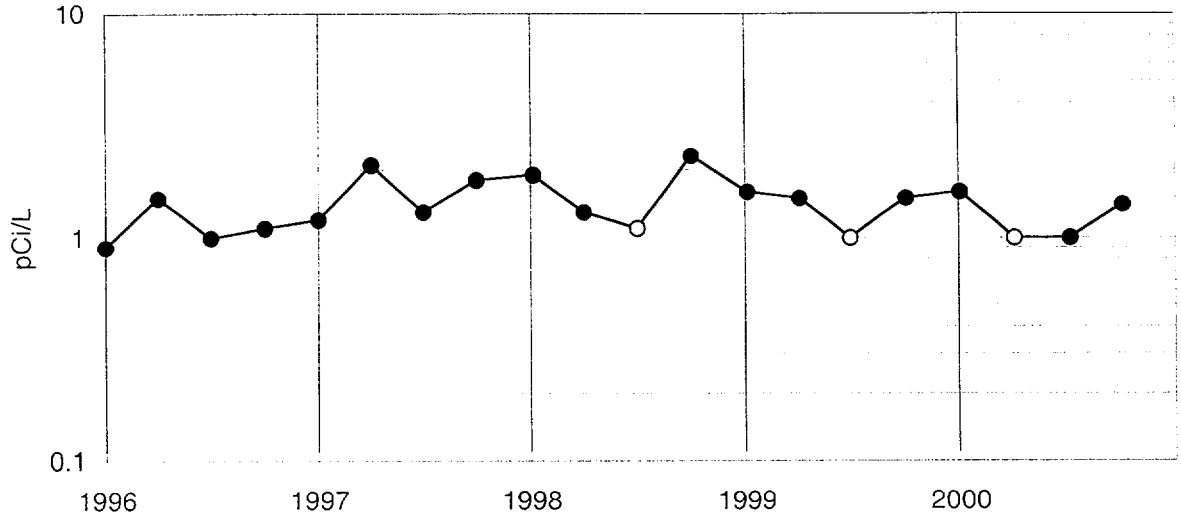

Figure 19. Well water. Location K-11.
Total Residue. Quarterly collection.

WELL WATER-GROSS BETA

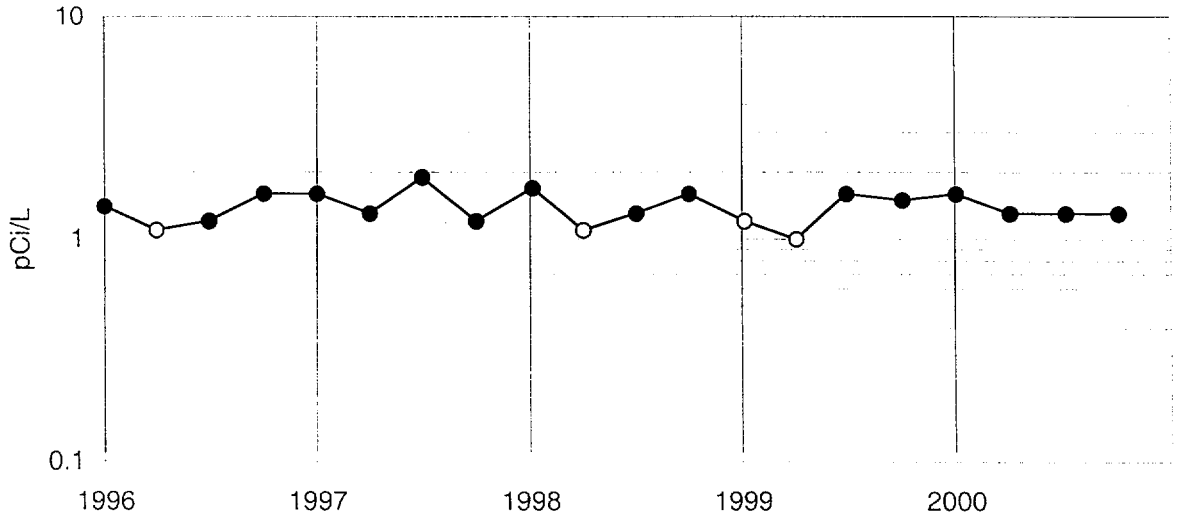

Figure 20. Well water. Location K-12.
Total Residue. Quarterly collection.

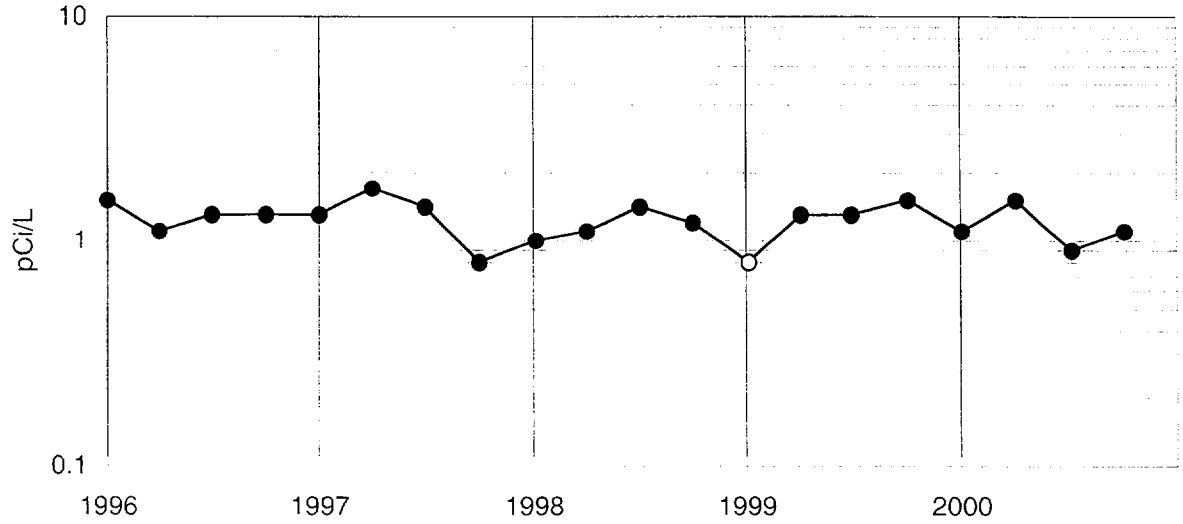

Figure 21. Well water. Location K-13.
Total Residue. Quarterly collection.

Milk - Strontium-90

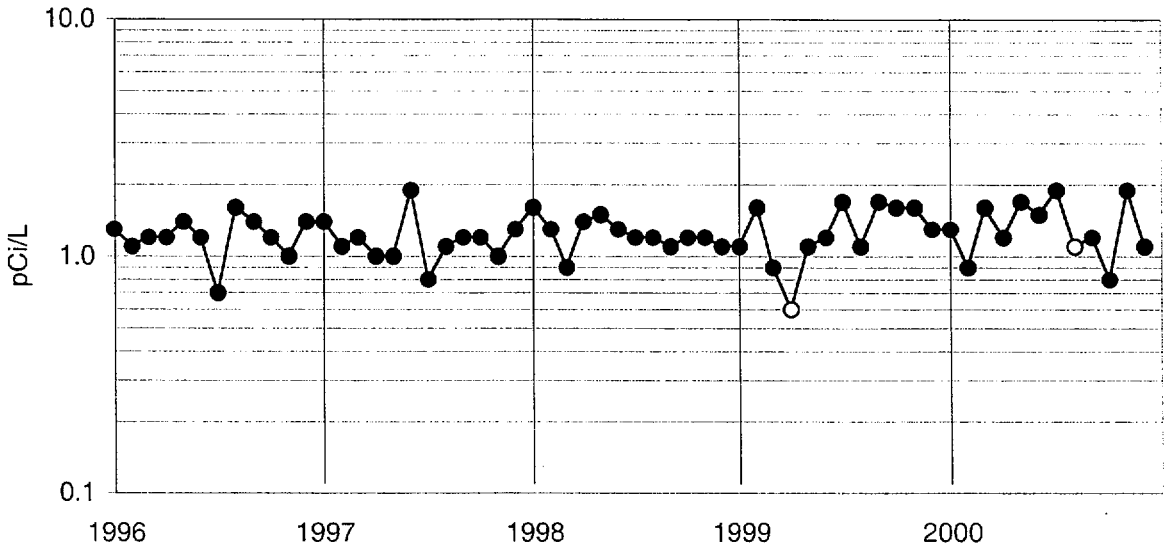

Figure 22. Milk samples. Location K-3.

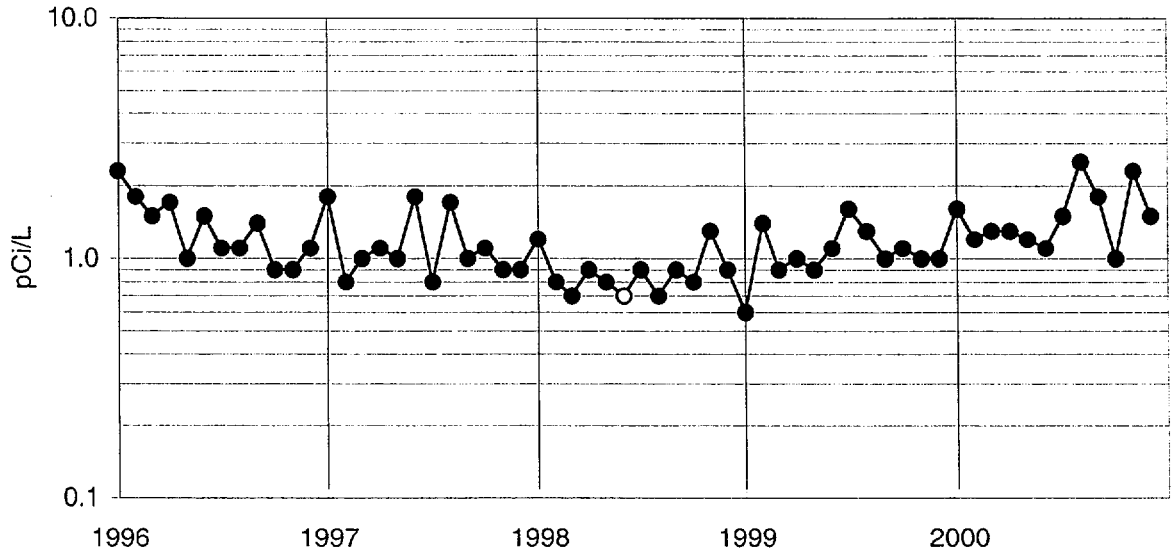

Figure 23. Milk samples. Location K-4.
NOTE: K-4 replaced by K-25 in September, 2000.

Kewaunee

Milk - Strontium-90

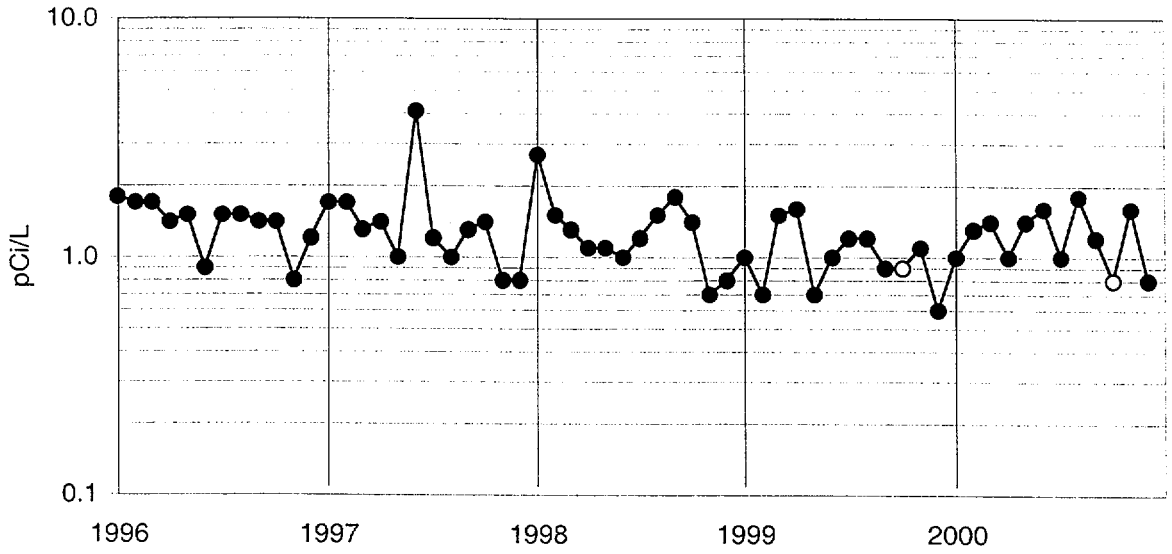

Figure 24. Milk samples. Location K-5.

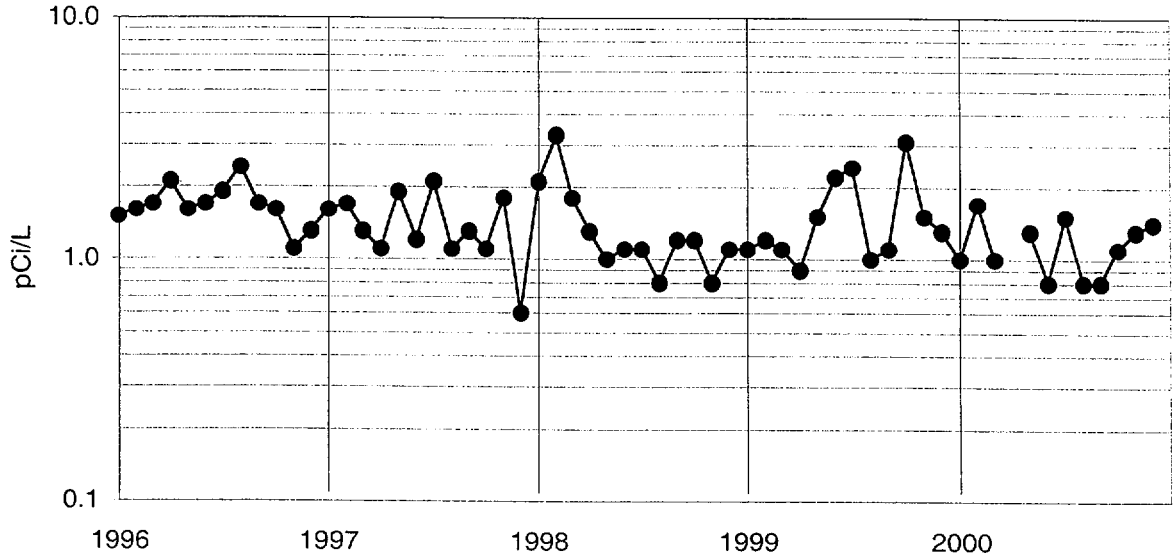

Figure 26. Milk samples. Location K-6.
Note: Location K-6 replaced by K-33 in May, 2000.
NOTE: K-33 replaced by K-35 in September, 2000.

Milk - Strontium-90

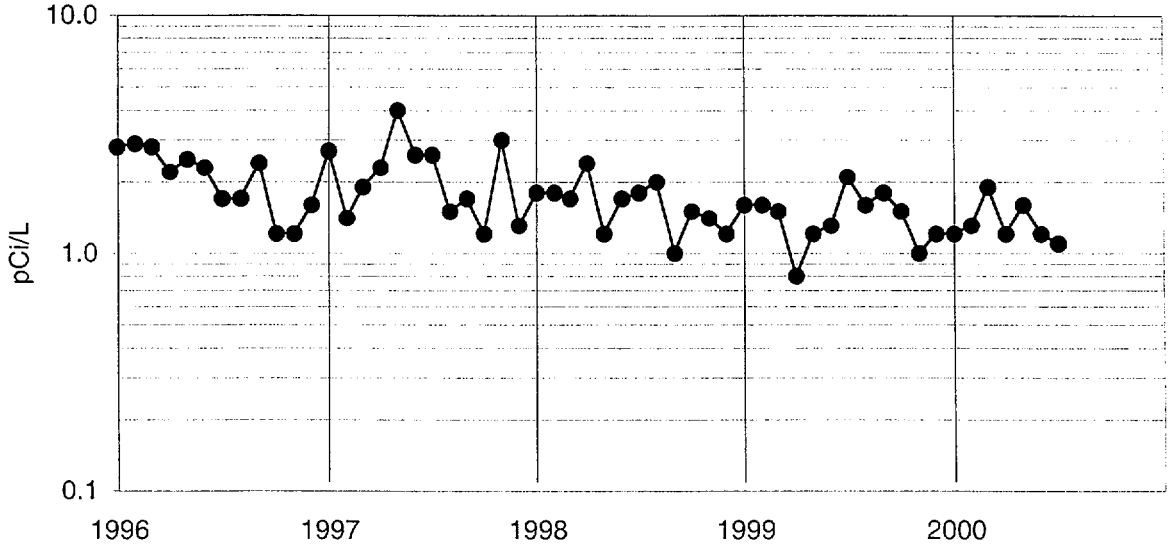

Figure 26. Milk samples. Location K-12.

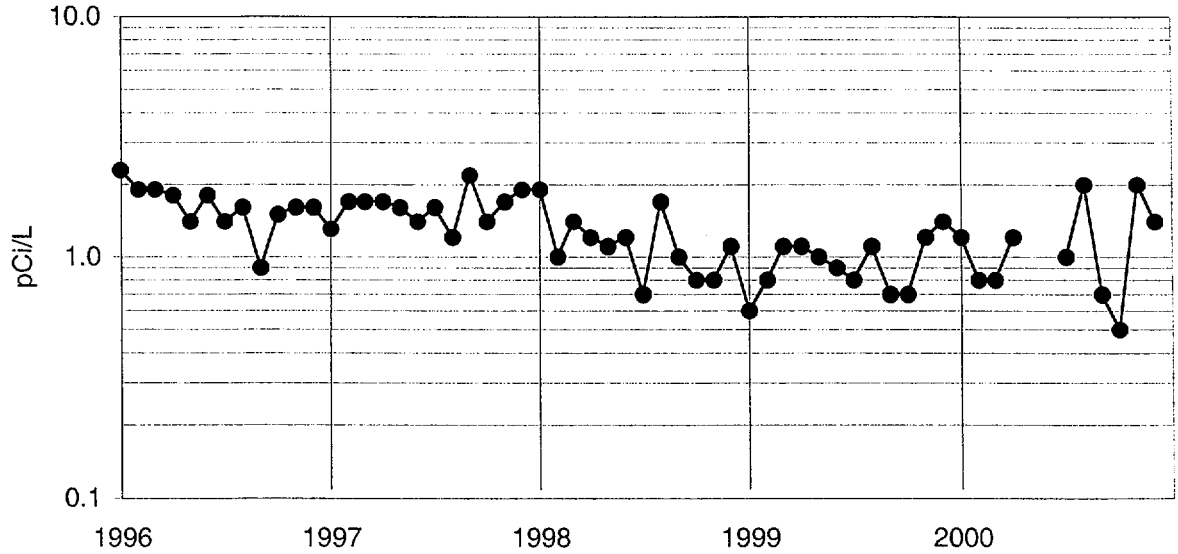

Figure 27. Milk samples. Location K-19.
Note: Location K-19 replaced by K-34 in July, 2000.

Kewaunee

Milk - Strontium-90

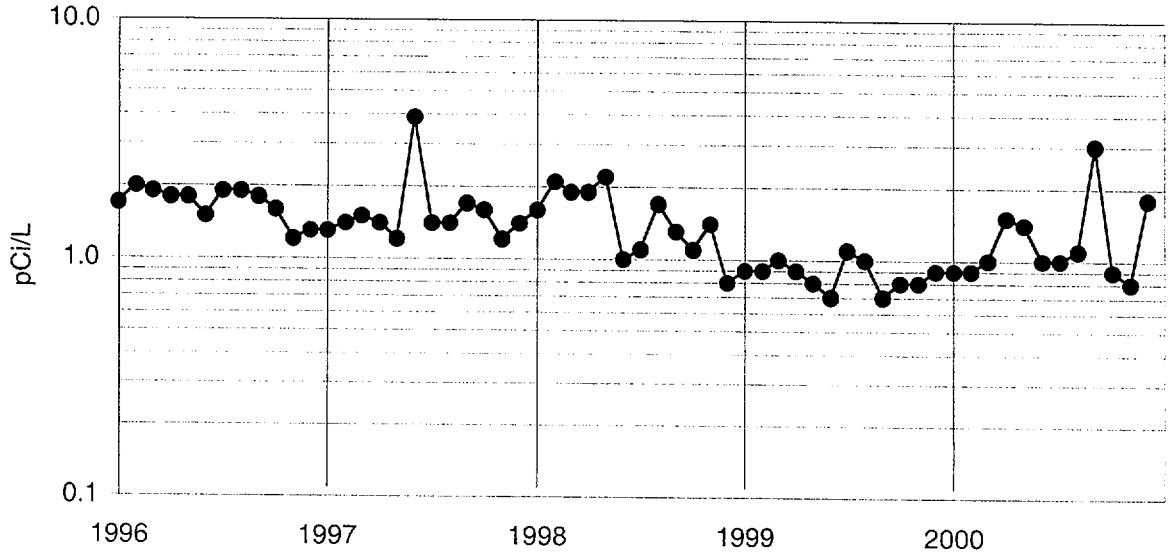

Figure 28. Milk samples. Location K-28.

Surface Water - Gross Beta

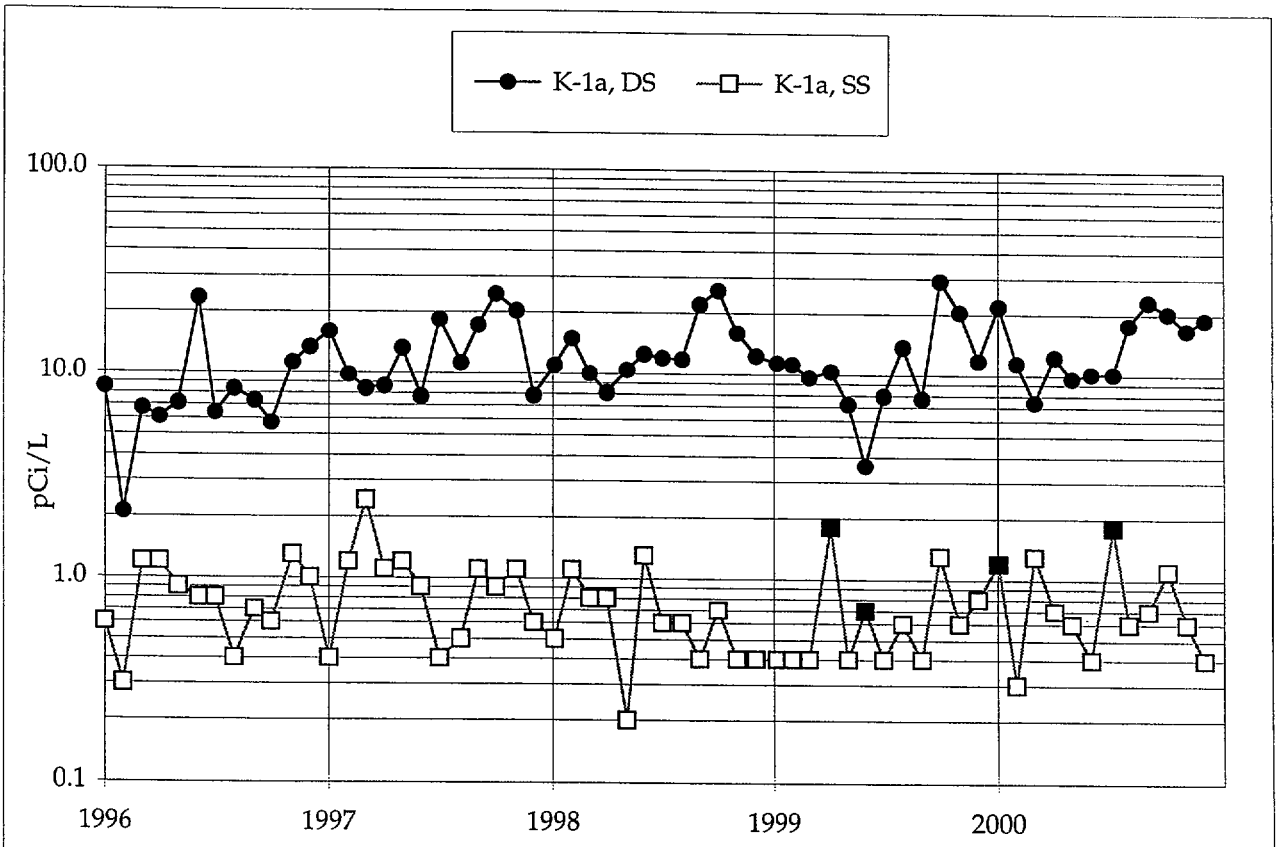

Figure 29. Surface water . North Creek, Onsite (K-1a).

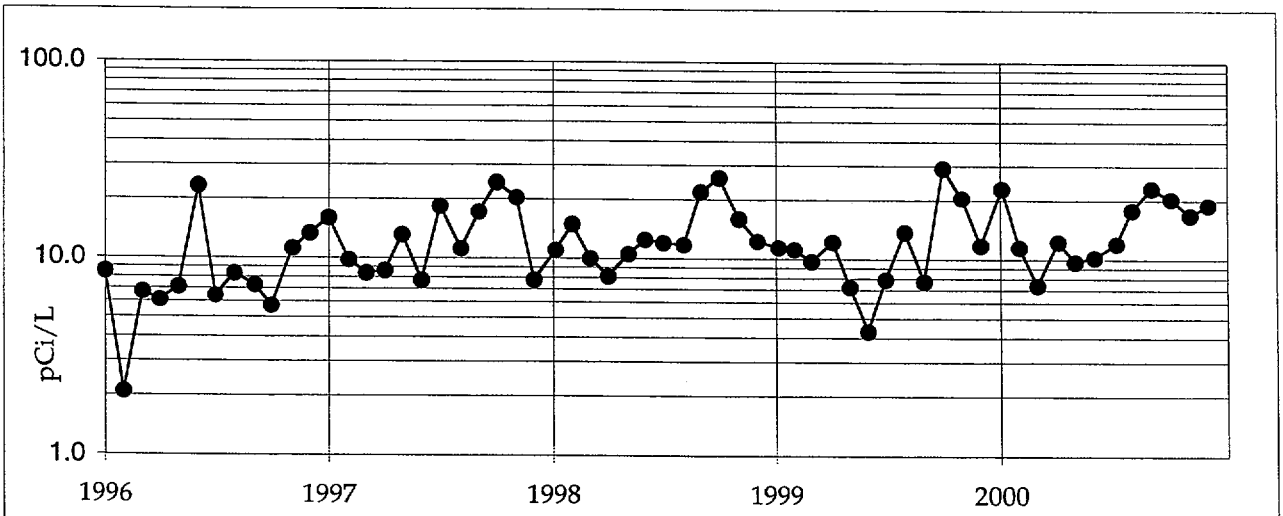

Figure 30. Surface water samples. North Creek, Onsite (K-1a).
Total Residue.

Surface Water - Gross Beta

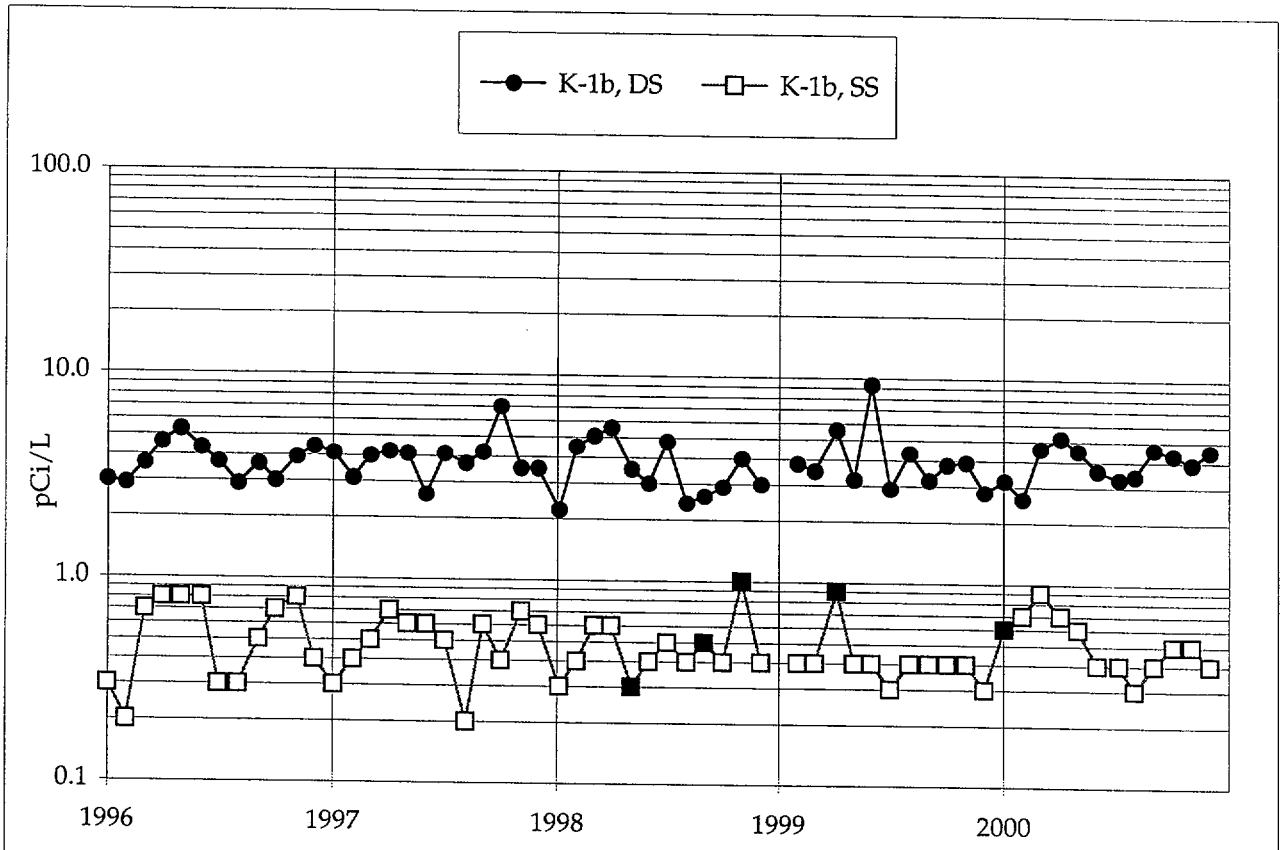

Figure 31. Surface water . Middle Creek, Onsite (K-1b).

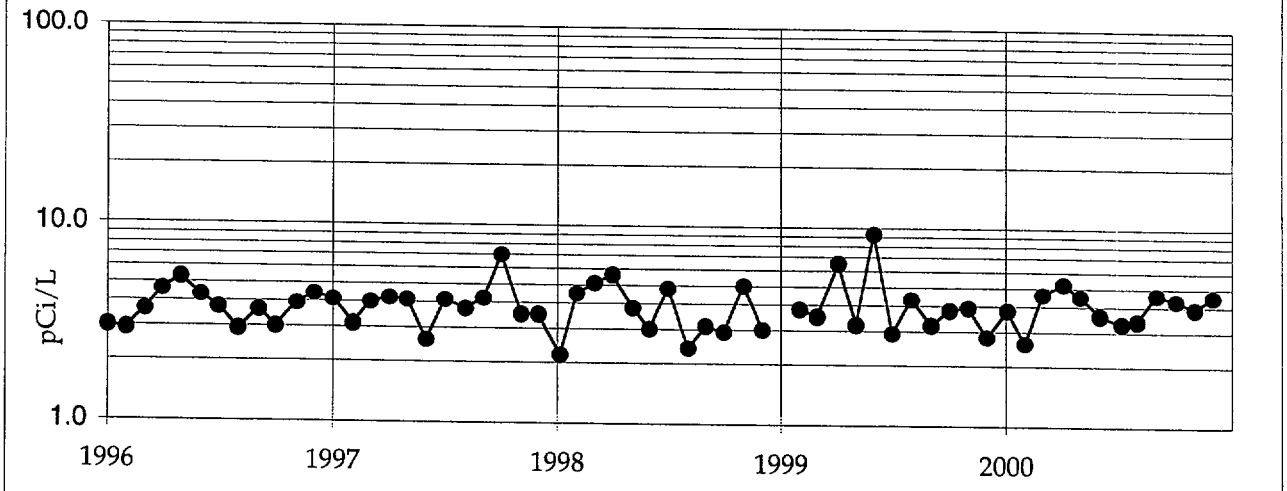

Figure 32. Surface water samples. Middle Creek, Onsite (K-1b).
Total Residue.

Surface Water - Gross Beta

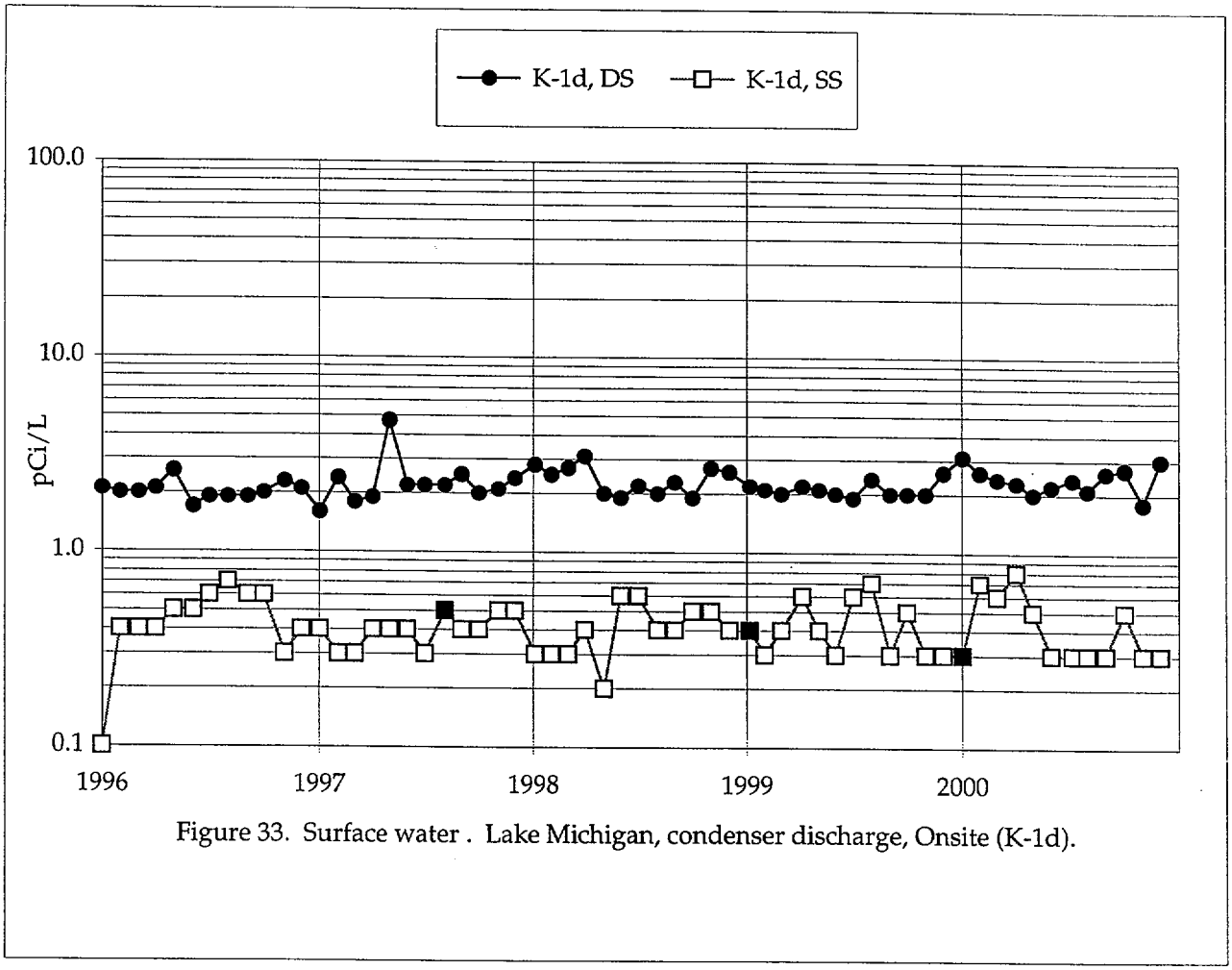

Figure 33. Surface water . Lake Michigan, condenser discharge, Onsite (K-1d).

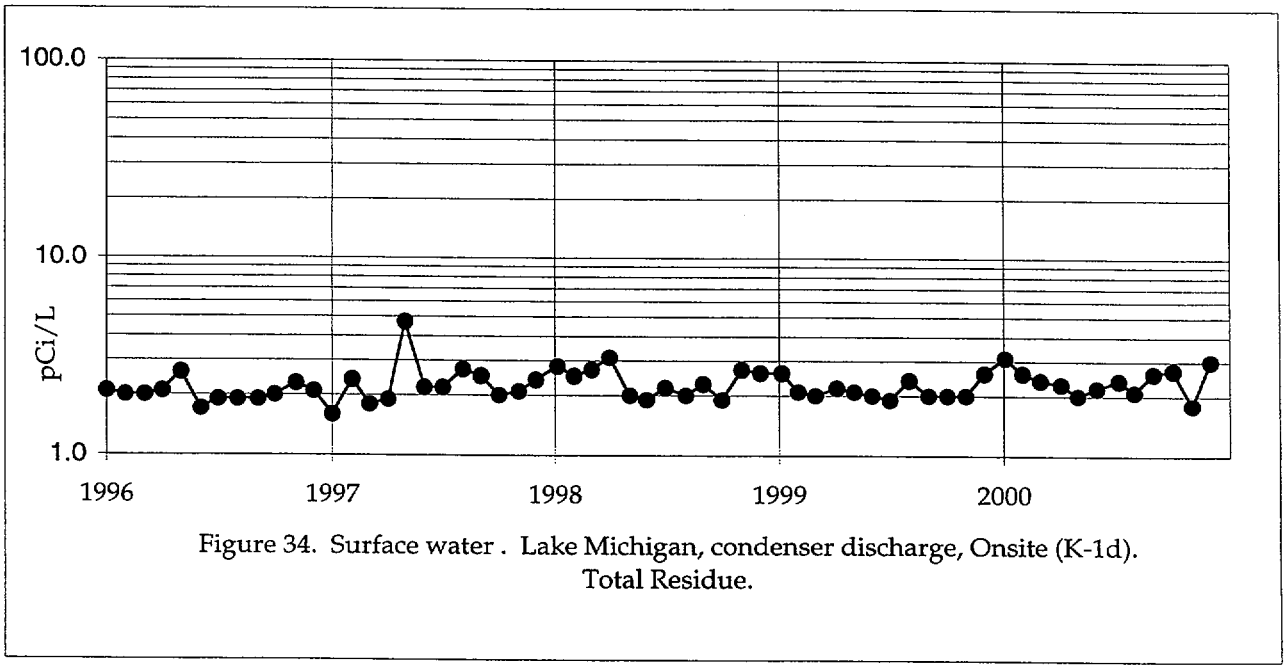

Figure 34. Surface water . Lake Michigan, condenser discharge, Onsite (K-1d).
Total Residue.

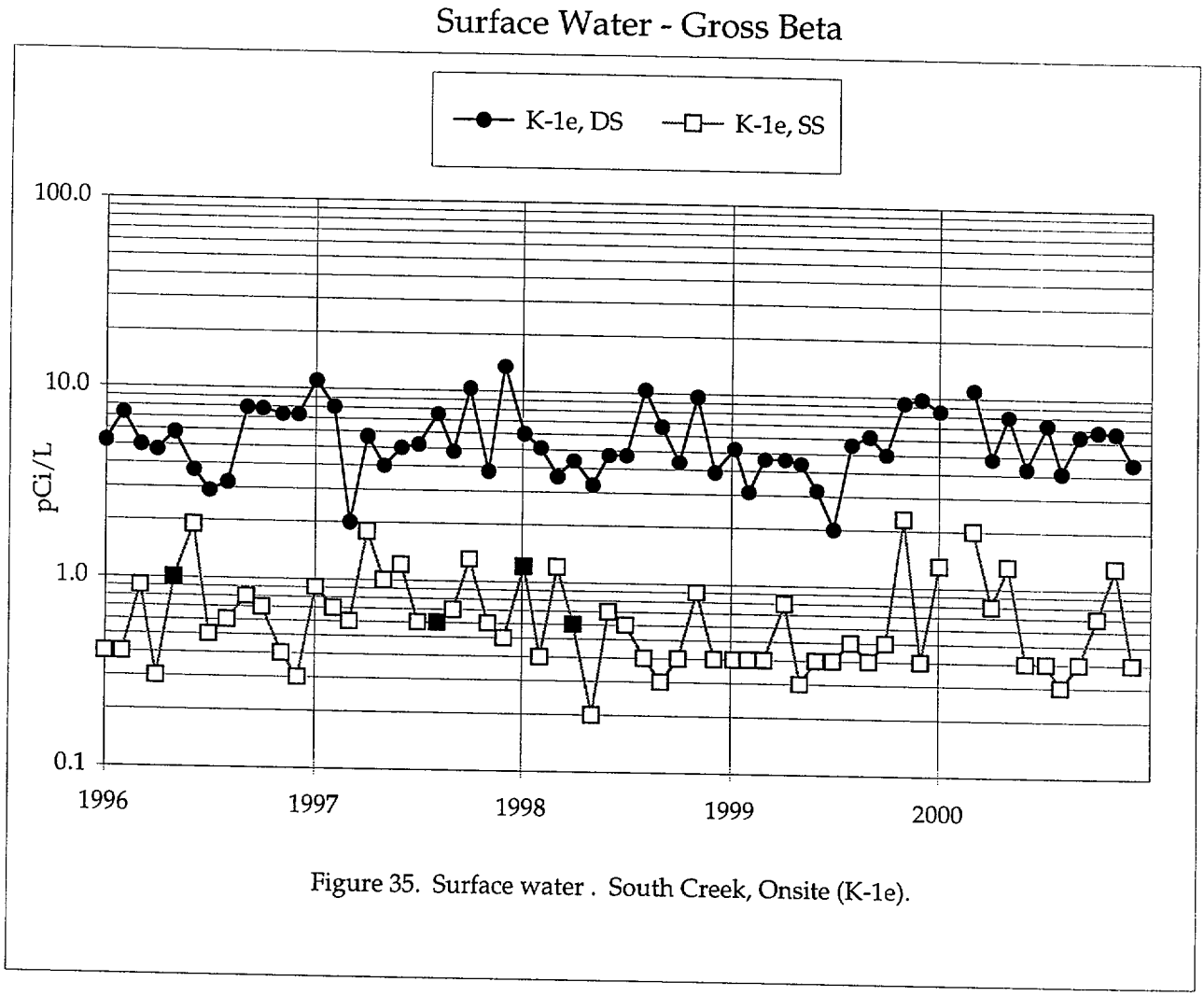

Figure 35. Surface water . South Creek, Onsite (K-1e).

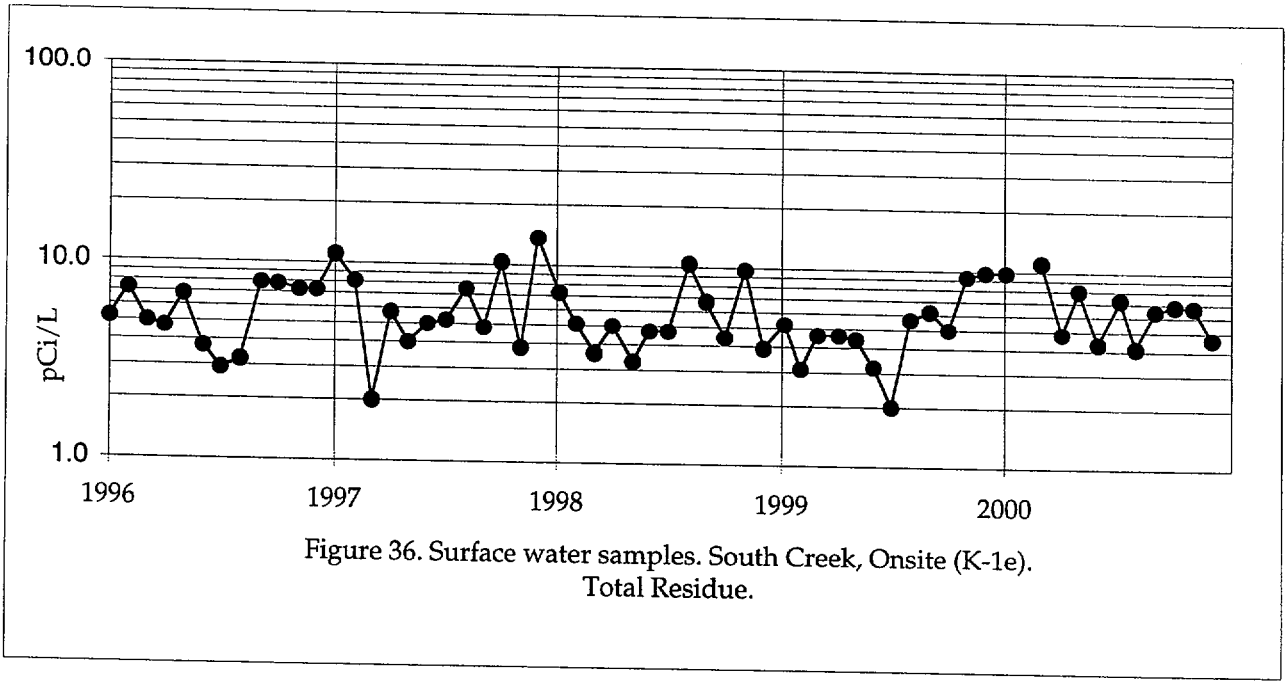

Figure 36. Surface water samples. South Creek, Onsite (K-1e).
Total Residue.

Surface Water - Gross Beta

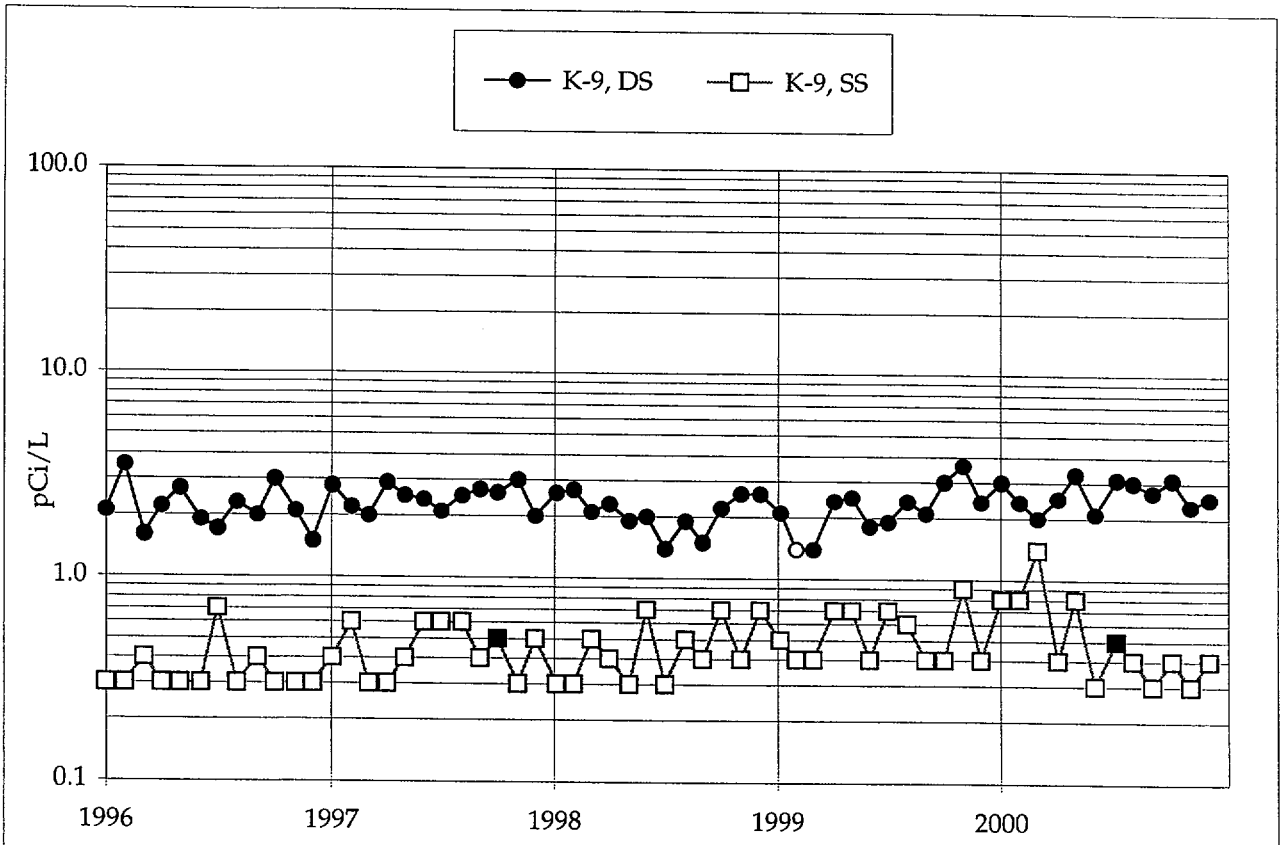

Figure 37. Surface water (raw). Lake Michigan, Rostok Intake (K-9).

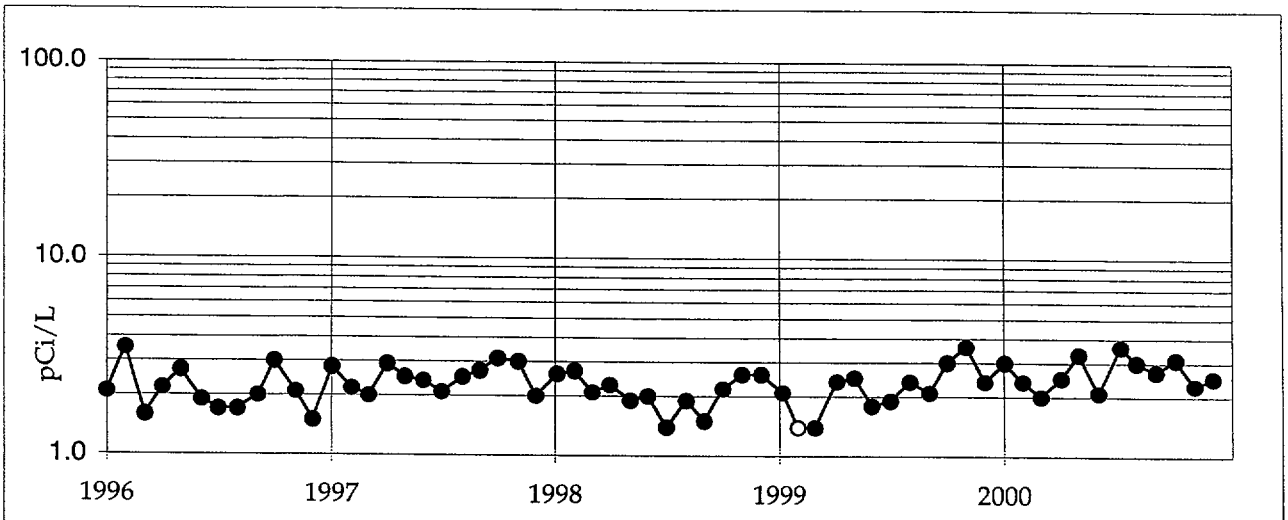

Figure 38. Surface water (raw). Lake Michigan, Rostok Intake (K-9). Total Residue.

Surface Water - Gross Beta

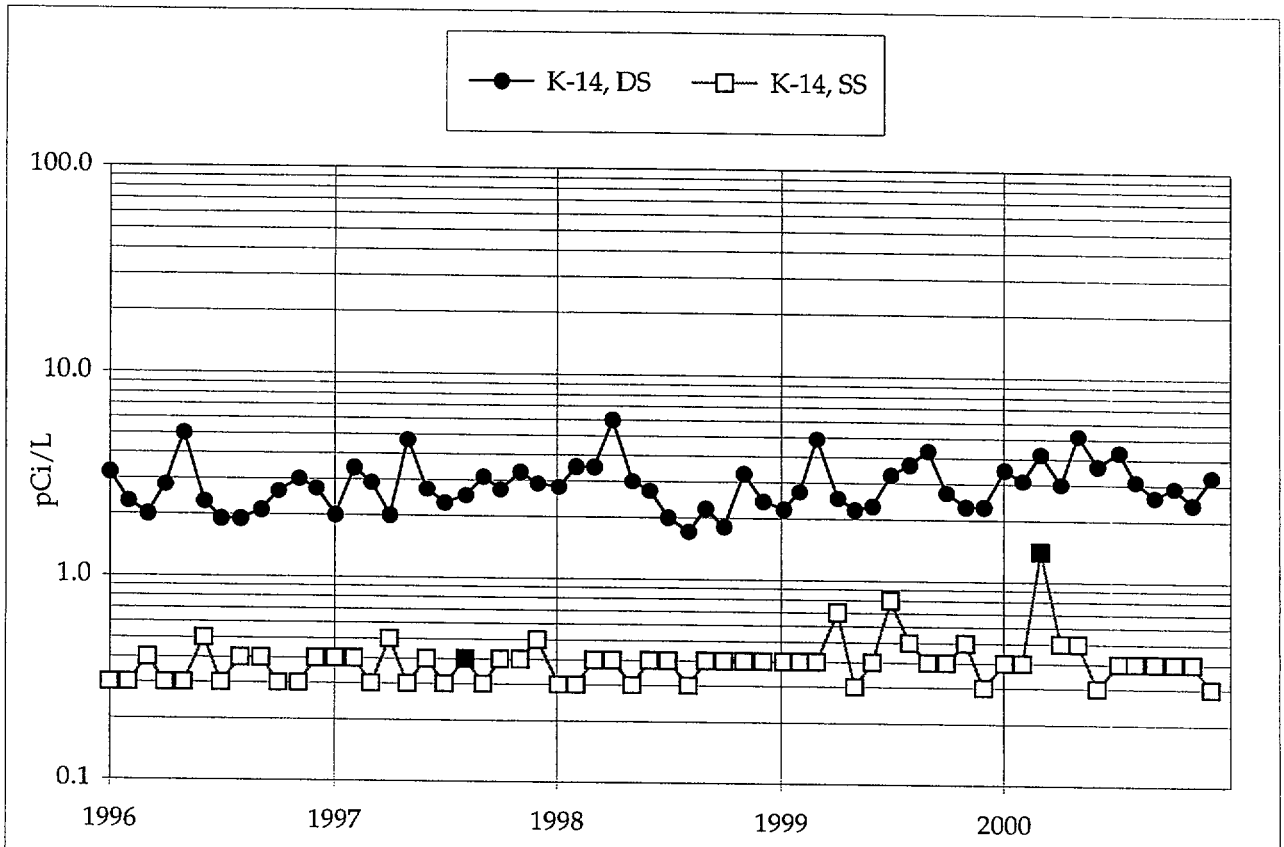

Figure 39. Surface water. Lake Michigan, Two Creeks Park (K-14a).

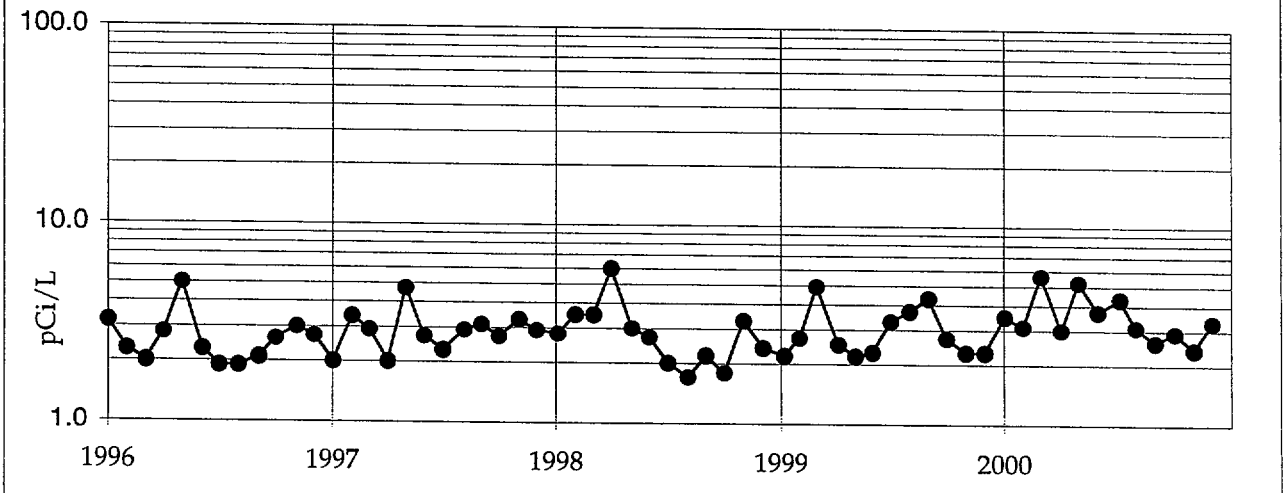

Figure 40. Surface water. Lake Michigan, Two Creeks Park (K-14a).
Total Residue.

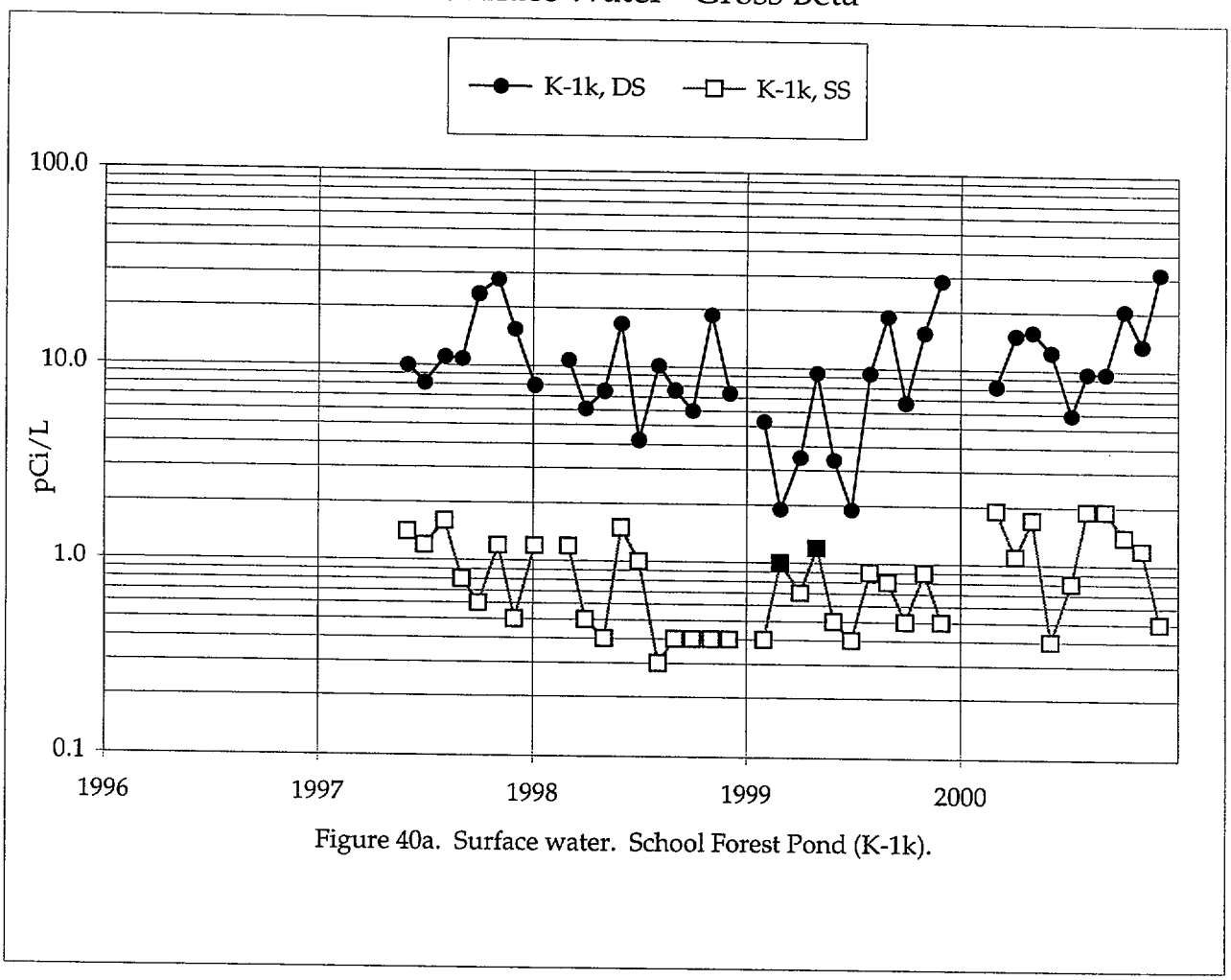

Figure 40a. Surface water. School Forest Pond (K-1k).

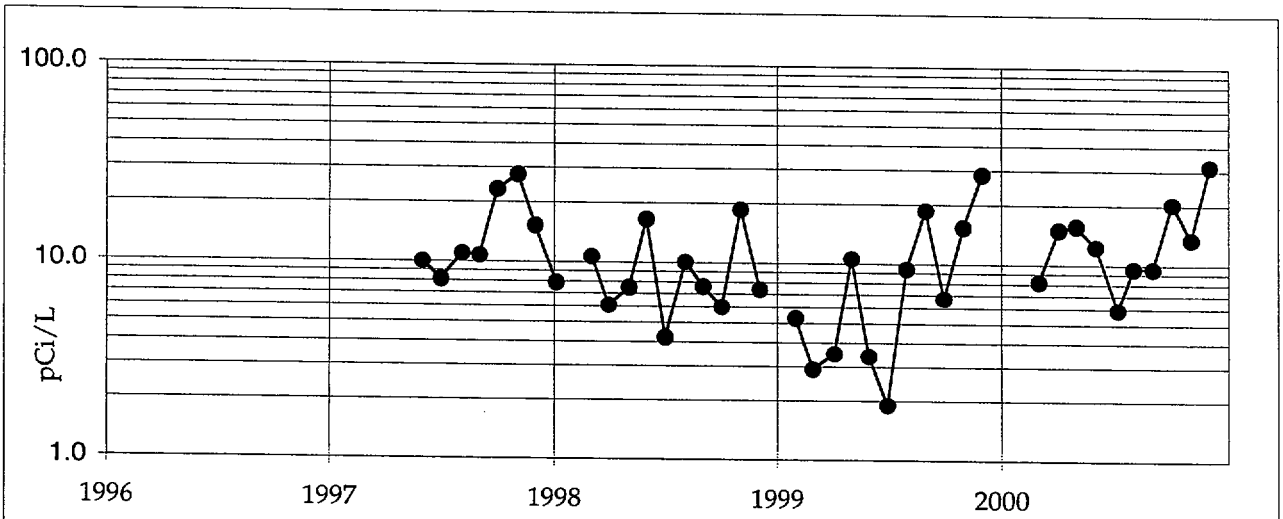

Figure 40b. Surface water. School Forest Pond (K-1k).
Total Residue.

Surface Water - Tritium

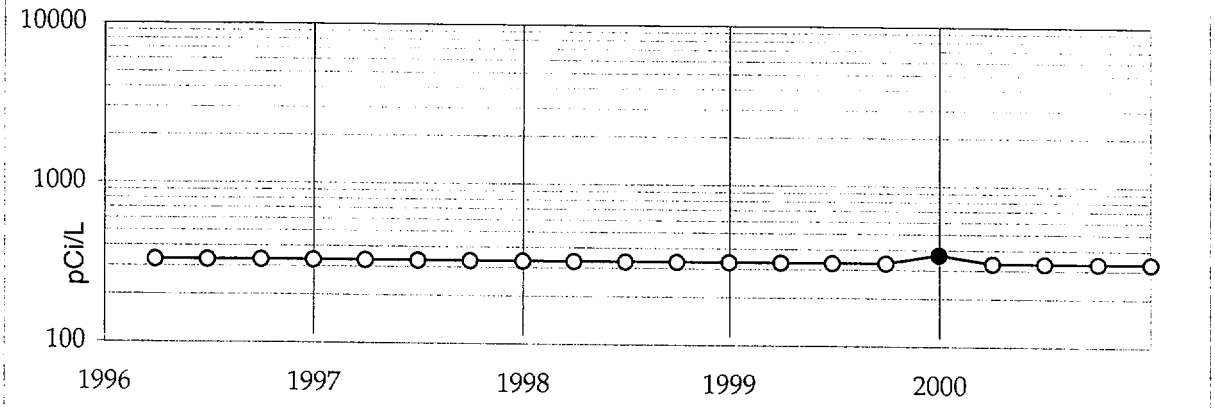

Figure 41. Surface water. Lake Michigan, condenser discharge, K-1d.
Quarterly collection.

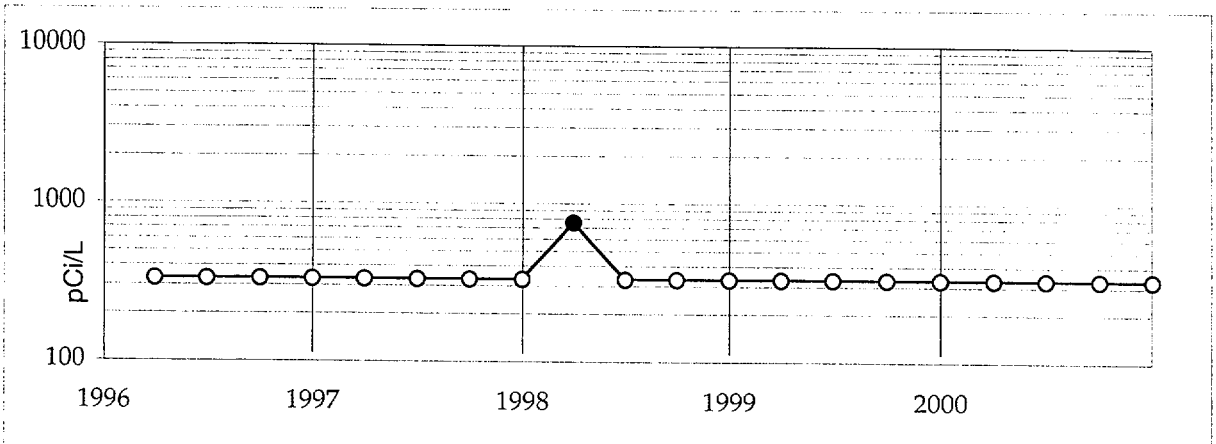

Figure 42. Surface water. Lake Michigan, Two Creeks Park, K-14a.
Quarterly collection.

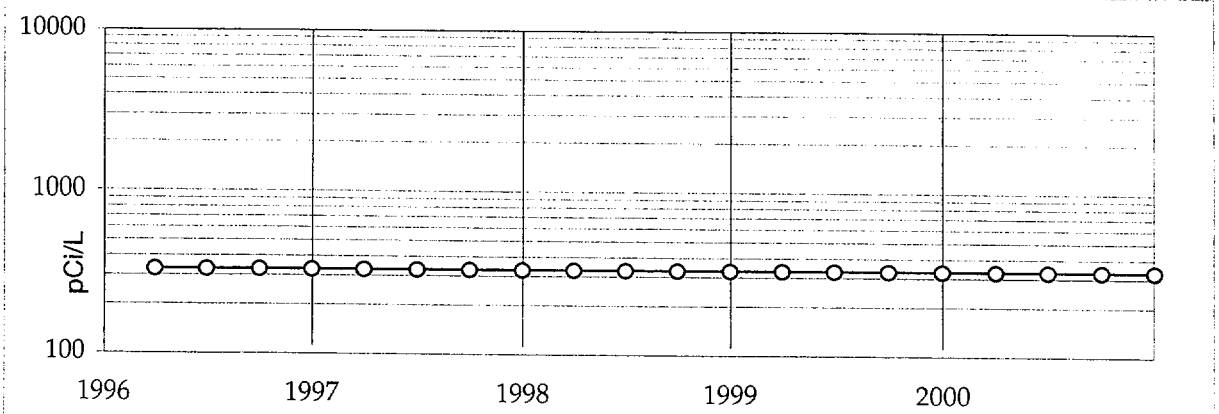

Figure 43. Surface water. Lake Michigan, Rostok Intake, K-9.
Quarterly collection.

6.0 DATA TABULATIONS

Table 4. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131[a].
Location: K-1f
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			0.010
01-04-00	304	0.019 ± 0.004	07-11-00	345	0.012 ± 0.002
01-12-00	347	0.034 ± 0.004	07-18-00	301	0.019 ± 0.003
01-18-00	260	0.019 ± 0.004	07-25-00	307	0.007 ± 0.002
01-25-00	304	0.043 ± 0.004	08-01-00	303	0.026 ± 0.003
01-31-00	262	0.025 ± 0.004			
			08-08-00	305	0.016 ± 0.003
02-08-00	346	0.024 ± 0.004	08-15-00	308	0.015 ± 0.003
02-15-00	304	0.036 ± 0.004	08-22-00	300	0.012 ± 0.003
02-22-00	312	0.040 ± 0.004	08-29-00	311	0.034 ± 0.004
02-28-00	254	0.029 ± 0.004			
			09-05-00	298	0.015 ± 0.003
03-07-00	346	0.025 ± 0.003	09-12-00	302	0.022 ± 0.003
03-14-00	302	0.024 ± 0.003	09-19-00	301	0.020 ± 0.004
03-21-00	307	0.019 ± 0.003	09-26-00	308	0.014 ± 0.003
03-28-00	302	0.017 ± 0.003	10-03-00	305	0.029 ± 0.003
1st Quarter Mean ± s.d.		0.027 ± 0.009	3rd Quarter Mean ± s.d.		0.019 ± 0.008
04-04-00	302	0.018 ± 0.003	10-10-00	305	0.018 ± 0.003
04-11-00	305	0.019 ± 0.003	10-17-00	300	0.030 ± 0.004
04-18-00	307	0.015 ± 0.003	10-24-00	305	0.045 ± 0.004
04-25-00	302	0.028 ± 0.003	10-31-00	306	0.022 ± 0.003
05-02-00	303	0.014 ± 0.003			
			11-07-00	303	0.022 ± 0.004
05-09-00	304	0.021 ± 0.004	11-14-00	312	0.010 ± 0.003
05-16-00	298	0.011 ± 0.003	11-21-00	296	0.029 ± 0.003
05-23-00	309	0.015 ± 0.003	11-28-00	304	0.038 ± 0.004
05-30-00	304	0.010 ± 0.003			
			12-05-00	306	0.016 ± 0.003
06-06-00	305	0.011 ± 0.003	12-12-00	303	0.022 ± 0.003
06-13-00	300	0.019 ± 0.003	12-19-00	308	0.026 ± 0.003
06-20-00	308	0.011 ± 0.002	12-26-00	319	0.021 ± 0.003
06-27-00	303	0.014 ± 0.003	01-02-01	303	0.021 ± 0.003
07-03-00	263	0.019 ± 0.004			
2nd Quarter Mean ± s.d.		0.016 ± 0.005	4th Quarter Mean ± s.d.		0.025 ± 0.009
			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.

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			0.010
01-04-00	305	0.021 ± 0.004	07-11-00	304	0.013 ± 0.003
01-12-00	345	0.036 ± 0.004	07-18-00	251	0.017 ± 0.003
01-18-00	261	0.020 ± 0.004	07-25-00	257	0.010 ± 0.003
01-25-00	330	0.053 ± 0.004	08-01-00	252	0.025 ± 0.004
01-31-00	306	0.029 ± 0.004			
			08-08-00	254	0.015 ± 0.004
02-08-00	346	0.024 ± 0.004	08-15-00	253	0.013 ± 0.004
02-15-00	407	0.034 ± 0.003	08-22-00	252	0.011 ± 0.003
02-22-00	388	0.039 ± 0.003	08-29-00	259	0.034 ± 0.004
02-28-00	267	0.029 ± 0.004			
			09-05-00	249	0.013 ± 0.004
03-07-00	376	0.020 ± 0.003	09-12-00	251	0.018 ± 0.003
03-14-00	343	0.020 ± 0.003	09-19-00	251	0.019 ± 0.004
03-21-00	337	0.021 ± 0.003	09-26-00	257	0.016 ± 0.003
03-28-00	291	0.020 ± 0.003	10-03-00	254	0.025 ± 0.004
1st Quarter Mean ± s.d.		0.028 ± 0.010	3rd Quarter Mean ± s.d.		0.018 ± 0.007
04-04-00	252	0.014 ± 0.003	10-10-00	304	0.015 ± 0.003
04-11-00	254	0.020 ± 0.004	10-17-00	314	0.025 ± 0.003
04-18-00	256	0.015 ± 0.004	10-24-00	329	0.038 ± 0.004
04-25-00	252	0.034 ± 0.004	10-31-00	317	0.023 ± 0.003
05-02-00	257	0.016 ± 0.004			
			11-07-00	303	0.027 ± 0.004
05-09-00	254	0.018 ± 0.004	11-14-00	305	0.012 ± 0.003
05-16-00	249	0.011 ± 0.003	11-21-00	303	0.029 ± 0.003
05-23-00	256	0.012 ± 0.004	11-28-00	304	0.038 ± 0.004
05-30-00	253	0.010 ± 0.003			
			12-05-00	298	0.017 ± 0.003
06-06-00	254	0.008 ± 0.003	12-12-00	303	0.022 ± 0.003
06-13-00	261	0.018 ± 0.003	12-19-00	307	0.027 ± 0.004
06-20-00	266	0.009 ± 0.003	12-26-00	300	0.027 ± 0.004
06-27-00	267	0.013 ± 0.003	01-02-01	303	0.036 ± 0.005
07-03-00	247	0.014 ± 0.004			
2nd Quarter Mean ± s.d.		0.015 ± 0.006	4th Quarter Mean ± s.d.		0.026 ± 0.008
			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.

Table 6. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131[a].
Location: K-7
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			0.010
01-04-00	304	0.026 ± 0.004	07-11-00	347	0.013 ± 0.002
01-12-00	357	0.041 ± 0.004	07-18-00	303	0.018 ± 0.003
01-18-00	261	0.019 ± 0.004	07-25-00	303	0.009 ± 0.002
01-25-00	307	0.055 ± 0.004	08-01-00	310	0.021 ± 0.003
01-31-00	258	0.030 ± 0.004			
			08-08-00	300	0.015 ± 0.003
02-08-00	348	0.024 ± 0.004	08-15-00	291	0.016 ± 0.004
02-15-00	306	0.040 ± 0.004	08-22-00	272	0.013 ± 0.003
02-22-00	311	0.047 ± 0.004	08-29-00	279	0.036 ± 0.004
02-28-00	254	0.028 ± 0.004			
			09-05-00	281	0.014 ± 0.004
03-07-00	344	0.021 ± 0.003	09-12-00	305	0.018 ± 0.003
03-14-00	303	0.019 ± 0.003	09-19-00	298	0.019 ± 0.004
03-21-00	307	0.022 ± 0.003	09-26-00	334	0.013 ± 0.003
03-28-00	305	0.021 ± 0.003	10-03-00	354	0.030 ± 0.003
1st Quarter Mean ± s.d.		0.030 ± 0.012	3rd Quarter Mean ± s.d.		0.018 ± 0.007
04-04-00	303	0.017 ± 0.003	10-10-00	356	0.021 ± 0.003
04-11-00	304	0.021 ± 0.003	10-17-00	349	0.025 ± 0.003
04-18-00	307	0.015 ± 0.003	10-24-00	358	0.043 ± 0.004
04-25-00	302	0.021 ± 0.003	10-31-00	358	0.022 ± 0.003
05-02-00	303	0.014 ± 0.003			
			11-07-00	353	0.027 ± 0.003
05-09-00	305	0.017 ± 0.003	11-14-00	356	0.012 ± 0.003
05-16-00	300	0.014 ± 0.003	11-21-00	353	0.032 ± 0.003
05-23-00	307	0.018 ± 0.003	11-28-00	365	0.041 ± 0.004
05-30-00	304	0.009 ± 0.003			
			12-05-00	395	0.015 ± 0.003
06-06-00	305	0.011 ± 0.003	12-12-00	402	0.019 ± 0.002
06-13-00	303	0.019 ± 0.003	12-19-00	410	0.027 ± 0.003
06-20-00	307	0.011 ± 0.002	12-26-00	400	0.018 ± 0.003
06-27-00	301	0.013 ± 0.003	01-02-01	405	0.031 ± 0.004
07-03-00	261	0.013 ± 0.004			
2nd Quarter Mean ± s.d.		0.015 ± 0.004	4th Quarter Mean ± s.d.		0.026 ± 0.009
			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.

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			0.010
01-04-00	304	0.018 ± 0.004	07-11-00	318	0.013 ± 0.003
01-12-00	347	0.032 ± 0.004	07-18-00	273	0.017 ± 0.003
01-18-00	261	0.019 ± 0.004	07-25-00	273	0.009 ± 0.003
01-25-00	294	0.049 ± 0.004	08-01-00	286	0.023 ± 0.003
01-31-00	244	0.028 ± 0.004			
			08-08-00	253	0.014 ± 0.004
02-08-00	318	0.026 ± 0.004	08-15-00	254	0.014 ± 0.004
02-15-00	290	0.036 ± 0.004	08-22-00	252	0.013 ± 0.003
02-22-00	311	0.040 ± 0.004	08-29-00	259	0.034 ± 0.004
02-28-00	254	0.025 ± 0.004			
			09-05-00	168	0.017 ± 0.006
03-07-00	347	0.023 ± 0.003	09-12-00	252	0.022 ± 0.003
03-14-00	291	0.019 ± 0.003	09-19-00	249	0.020 ± 0.004
03-21-00	286	0.017 ± 0.003	09-26-00	259	0.013 ± 0.003
03-28-00	284	0.019 ± 0.003	10-03-00	263	0.029 ± 0.004
1st Quarter Mean ± s.d.		0.027 ± 0.010	3rd Quarter Mean ± s.d.		0.018 ± 0.007
04-04-00	267	0.017 ± 0.003	10-10-00	309	0.020 ± 0.003
04-11-00	254	0.022 ± 0.004	10-17-00	344	0.028 ± 0.003
04-18-00	255	0.021 ± 0.004	10-24-00	359	0.041 ± 0.004
04-25-00	252	0.024 ± 0.004	10-31-00	357	0.020 ± 0.003
05-02-00	253	0.023 ± 0.004			
			11-07-00	303	0.025 ± 0.004
05-09-00	254	0.018 ± 0.004	11-14-00	305	0.011 ± 0.003
05-16-00	275	0.013 ± 0.003	11-21-00	303	0.025 ± 0.003
05-23-00	307	0.014 ± 0.003	11-28-00	305	0.035 ± 0.004
05-30-00	304	0.007 ± 0.003			
			12-05-00	307	0.016 ± 0.003
06-06-00	278	0.009 ± 0.003	12-12-00	303	0.022 ± 0.003
06-13-00	278	0.020 ± 0.003	12-19-00	307	0.029 ± 0.004
06-20-00	254	0.012 ± 0.003	12-26-00	300	0.023 ± 0.003
06-27-00	270	0.016 ± 0.003	01-02-01	303	0.034 ± 0.005
07-03-00	245	0.016 ± 0.004			
2nd Quarter Mean ± s.d.		0.017 ± 0.005	4th Quarter Mean ± s.d.		0.025 ± 0.008
			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.

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			0.010
01-04-00	304	0.017 ± 0.004	07-11-00	344	0.012 ± 0.002
01-12-00	346	0.020 ± 0.003	07-18-00	290	0.018 ± 0.003
01-18-00	260	0.010 ± 0.004	07-25-00	287	0.008 ± 0.003
01-25-00	305	0.048 ± 0.004	08-01-00	288	0.025 ± 0.003
01-31-00	252	0.026 ± 0.004			
			08-08-00	279	0.015 ± 0.004
02-08-00	323	0.024 ± 0.004	08-15-00	274	0.013 ± 0.004
02-15-00	269	0.038 ± 0.004	08-22-00	272	0.006 ± 0.003
02-22-00	260	0.050 ± 0.005	08-29-00	295	0.033 ± 0.004
02-28-00	212	0.030 ± 0.005			
			09-05-00	299	0.013 ± 0.003
03-07-00	288	0.025 ± 0.004	09-12-00	301	0.019 ± 0.003
03-14-00	252	0.026 ± 0.004	09-19-00	302	0.017 ± 0.003
03-21-00	270	0.021 ± 0.003	09-26-00	307	0.014 ± 0.003
03-28-00	283	0.017 ± 0.003	10-03-00	305	0.027 ± 0.003
1st Quarter Mean ± s.d.		0.027 ± 0.012	3rd Quarter Mean ± s.d.		0.017 ± 0.008
04-04-00	292	0.018 ± 0.003	10-10-00	311	0.018 ± 0.003
04-11-00	304	0.019 ± 0.003	10-17-00	292	0.027 ± 0.003
04-18-00	307	0.015 ± 0.003	10-24-00	309	0.043 ± 0.004
04-25-00	303	0.024 ± 0.003	10-31-00	307	0.025 ± 0.003
05-02-00	303	0.016 ± 0.003			
			11-07-00	302	0.027 ± 0.004
05-09-00	305	0.016 ± 0.003	11-14-00	315	0.010 ± 0.003
05-16-00	305	0.012 ± 0.003	11-21-00	324	0.028 ± 0.003
05-23-00	307	0.015 ± 0.003	11-28-00	315	0.034 ± 0.004
05-30-00	304	0.006 ± 0.003			
			12-05-00	306	0.020 ± 0.003
06-06-00	306	0.012 ± 0.003	12-12-00	328	0.020 ± 0.003
06-13-00	290	0.021 ± 0.003	12-19-00	359	0.023 ± 0.003
06-20-00	287	0.010 ± 0.003	12-26-00	350	0.020 ± 0.003
06-27-00	292	0.015 ± 0.003	01-02-01	354	0.029 ± 0.004
07-03-00	264	0.017 ± 0.004			
2nd Quarter Mean ± s.d.		0.015 ± 0.005	4th Quarter Mean ± s.d.		0.025 ± 0.008
			Cumulative Average		0.021
			Previous Annual Average		0.022

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

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			0.010
01-04-00	304	0.020 ± 0.004	07-10-00	461	0.016 ± 0.002
01-10-00	308	0.031 ± 0.004	07-17-00	446	0.019 ± 0.002
01-17-00	297	0.023 ± 0.004	07-24-00	446	0.009 ± 0.002
01-24-00	292	0.053 ± 0.005	07-31-00	472	0.023 ± 0.002
01-31-00	297	0.035 ± 0.004			
			08-07-00	507	0.014 ± 0.002
02-07-00	291	0.020 ± 0.004	08-14-00	508	0.015 ± 0.002
02-14-00	292	0.038 ± 0.004	08-21-00	508	0.014 ± 0.002
02-21-00	299	0.034 ± 0.004	08-28-00	504	0.034 ± 0.003
02-27-00	304	0.028 ± 0.004			
			09-05-00	582	0.019 ± 0.002
03-06-00	305	0.020 ± 0.003	09-11-00	436	0.024 ± 0.003
03-13-00	305	0.025 ± 0.003	09-18-00	529	0.014 ± 0.002
03-20-00	299	0.025 ± 0.003	09-26-00	533	0.018 ± 0.002
03-27-00	298	0.022 ± 0.003	10-02-00	542	0.025 ± 0.002
1st Quarter Mean ± s.d.		0.029 ± 0.009	3rd Quarter Mean ± s.d.		0.019 ± 0.006
04-03-00	285	0.015 ± 0.003	10-09-00	559	0.018 ± 0.002
04-10-00	263	0.016 ± 0.003	10-16-00	453	0.027 ± 0.003
04-17-00	262	0.017 ± 0.004	10-23-00	329	0.032 ± 0.003
04-24-00	261	0.021 ± 0.004	10-30-00	326	0.031 ± 0.003
05-01-00	262	0.019 ± 0.004			
			11-06-00	324	0.028 ± 0.004
05-08-00	263	0.019 ± 0.004	11-13-00	324	0.015 ± 0.003
05-15-00	275	0.014 ± 0.003	11-20-00	324	0.031 ± 0.003
05-22-00	283	0.016 ± 0.003	11-27-00	330	0.029 ± 0.004
05-29-00	337	0.010 ± 0.003			
			12-04-00	319	0.013 ± 0.003
06-05-00	263	0.010 ± 0.003	12-11-00	305	0.026 ± 0.003
06-12-00	340	0.020 ± 0.003	12-18-00	294	0.029 ± 0.004
06-19-00	374	0.010 ± 0.002	12-27-00	383	0.026 ± 0.003
06-26-00	401	0.018 ± 0.002	01-02-01	257	0.027 ± 0.005
07-03-00	434	0.015 ± 0.002			
2nd Quarter Mean ± s.d.		0.016 ± 0.004	4th Quarter Mean ± s.d.		0.026 ± 0.006
			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.

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

January

Location	Average	Minima	Maxima
Indicators	0.031	0.019	0.055
K-1f	0.028	0.019	0.043
K-7	0.034	0.019	0.055
Controls	0.029	0.010	0.053
K-2	0.032	0.020	0.053
K-8	0.029	0.018	0.049
K-31	0.024	0.010	0.048
K-16	0.032	0.020	0.053

February

Location	Average	Minima	Maxima
Indicators	0.034	0.024	0.047
K-1f	0.032	0.024	0.040
K-7	0.035	0.024	0.047
Controls	0.032	0.020	0.050
K-2	0.032	0.024	0.039
K-8	0.032	0.025	0.040
K-31	0.036	0.024	0.050
K-16	0.030	0.020	0.038

March

Location	Average	Minima	Maxima
Indicators	0.021	0.017	0.025
K-1f	0.021	0.017	0.025
K-7	0.021	0.019	0.022
Controls	0.021	0.017	0.026
K-2	0.020	0.020	0.021
K-8	0.020	0.017	0.023
K-31	0.022	0.017	0.026
K-16	0.023	0.020	0.025

April

Location	Average	Minima	Maxima
Indicators	0.018	0.014	0.028
K-1f	0.019	0.014	0.028
K-7	0.018	0.014	0.021
Controls	0.019	0.014	0.034
K-2	0.020	0.014	0.034
K-8	0.021	0.017	0.024
K-31	0.018	0.015	0.024
K-16	0.018	0.015	0.021

May

Location	Average	Minima	Maxima
Indicators	0.014	0.009	0.021
K-1f	0.014	0.010	0.021
K-7	0.015	0.009	0.018
Controls	0.013	0.006	0.019
K-2	0.013	0.010	0.018
K-8	0.013	0.007	0.018
K-31	0.012	0.006	0.016
K-16	0.015	0.010	0.019

June

Location	Average	Minima	Maxima
Indicators	0.014	0.011	0.019
K-1f	0.015	0.011	0.019
K-7	0.013	0.011	0.019
Controls	0.014	0.008	0.021
K-2	0.012	0.008	0.018
K-8	0.015	0.009	0.020
K-31	0.015	0.010	0.021
K-16	0.015	0.010	0.020

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	0.016	0.007	0.026
K-1f	0.016	0.007	0.026
K-7	0.015	0.009	0.021
Controls	0.016	0.008	0.025
K-2	0.016	0.010	0.025
K-8	0.016	0.009	0.023
K-31	0.016	0.008	0.025
K-16	0.017	0.009	0.023

August

Location	Average	Minima	Maxima
Indicators	0.020	0.012	0.036
K-1f	0.019	0.012	0.034
K-7	0.020	0.013	0.036
Controls	0.018	0.006	0.034
K-2	0.018	0.011	0.034
K-8	0.019	0.013	0.034
K-31	0.017	0.006	0.033
K-16	0.019	0.014	0.034

September

Location	Average	Minima	Maxima
Indicators	0.019	0.013	0.030
K-1f	0.020	0.014	0.029
K-7	0.019	0.013	0.030
Controls	0.019	0.013	0.029
K-2	0.018	0.013	0.025
K-8	0.020	0.013	0.029
K-31	0.018	0.013	0.027
K-16	0.020	0.014	0.025

October

Location	Average	Minima	Maxima
Indicators	0.028	0.018	0.045
K-1f	0.029	0.018	0.045
K-7	0.028	0.021	0.043
Controls	0.027	0.015	0.043
K-2	0.025	0.015	0.038
K-8	0.027	0.020	0.041
K-31	0.028	0.018	0.043
K-16	0.027	0.018	0.032

November

Location	Average	Minima	Maxima
Indicators	0.026	0.010	0.041
K-1f	0.025	0.010	0.038
K-7	0.028	0.012	0.041
Controls	0.025	0.010	0.038
K-2	0.027	0.012	0.038
K-8	0.024	0.011	0.035
K-31	0.025	0.010	0.034
K-16	0.026	0.015	0.031

December

Location	Average	Minima	Maxima
Indicators	0.023	0.015	0.034
K-1f	0.024	0.016	0.034
K-7	0.022	0.015	0.031
Controls	0.024	0.013	0.036
K-2	0.026	0.017	0.036
K-8	0.025	0.016	0.034
K-31	0.022	0.020	0.029
K-16	0.024	0.013	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.

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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-2127	KAP-4725	KAP-7652	KAP-10691
Volume (m^3)	3950	4213	3994	3970
Be-7	0.067 ± 0.012	0.059 ± 0.015	0.066 ± 0.012	0.040 ± 0.012
Nb-95	< 0.0007	< 0.0013	< 0.0008	< 0.0006
Zr-95	< 0.0006	< 0.0016	< 0.0009	< 0.0010
Ru-103	< 0.0008	< 0.0006	< 0.0010	< 0.0008
Ru-106	< 0.0051	< 0.0059	< 0.0059	< 0.0043
Cs-134	< 0.0003	< 0.0008	< 0.0037	< 0.0006
Cs-137	< 0.0007	< 0.0006	< 0.0008	< 0.0005
Ce-141	< 0.0012	< 0.0014	< 0.0014	< 0.0015
Ce-144	< 0.0038	< 0.0030	< 0.0038	< 0.0043
K-7				
Lab Code	KAP-2129	KAP-4727	KAP-7654	KAP-10693
Volume (m^3)	3965	4212	3977	4860
Be-7	0.075 ± 0.010	0.054 ± 0.014	0.061 ± 0.013	0.045 ± 0.013
Nb-95	< 0.0005	< 0.0009	< 0.0009	< 0.0008
Zr-95	< 0.0010	< 0.0011	< 0.0013	< 0.0013
Ru-103	< 0.0007	< 0.0012	< 0.0009	< 0.0004
Ru-106	< 0.0042	< 0.0071	< 0.0033	< 0.0038
Cs-134	< 0.0004	< 0.0006	< 0.0008	< 0.0005
Cs-137	< 0.0006	< 0.0009	< 0.0008	< 0.0004
Ce-141	< 0.0009	< 0.0011	< 0.0013	< 0.0016
Ce-144	< 0.0031	< 0.0035	< 0.0036	< 0.0026

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-2128	KAP-4726	KAP-7653	KAP-10692
Volume (m^3)	4302	3578	3344	3990
Be-7	0.071 ± 0.010	0.058 ± 0.016	0.056 ± 0.014	0.053 ± 0.016
Nb-95	< 0.0006	< 0.0012	< 0.0007	< 0.0006
Zr-95	< 0.0013	< 0.0009	< 0.0008	< 0.0016
Ru-103	< 0.0007	< 0.0005	< 0.0012	< 0.0015
Ru-106	< 0.0029	< 0.0022	< 0.0046	< 0.0047
Cs-134	< 0.0004	< 0.0008	< 0.0007	< 0.0008
Cs-137	< 0.0004	< 0.0008	< 0.0005	< 0.0009
Ce-141	< 0.0012	< 0.0012	< 0.0014	< 0.0018
Ce-144	< 0.0017	< 0.0035	< 0.0055	< 0.0054
K-8				
Lab Code	KAP-2130	KAP-4728	KAP-7655	KAP-10694
Volume (m^3)	3831	3746	3359	4105
Be-7	0.051 ± 0.011	0.051 ± 0.013	0.058 ± 0.012	0.042 ± 0.013
Nb-95	< 0.0012	< 0.0004	< 0.0013	< 0.0010
Zr-95	< 0.0017	< 0.0008	< 0.0008	< 0.0016
Ru-103	< 0.0012	< 0.0005	< 0.0009	< 0.0011
Ru-106	< 0.0033	< 0.0060	< 0.0053	< 0.0050
Cs-134	< 0.0009	< 0.0005	< 0.0007	< 0.0011
Cs-137	< 0.0010	< 0.0005	< 0.0007	< 0.0006
Ce-141	< 0.0021	< 0.0017	< 0.0015	< 0.0010
Ce-144	< 0.0027	< 0.0029	< 0.0026	< 0.0035

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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-2132	KAP-4730	KAP-7657	KAP-10696
Volume (m^3)	3624	4169	3843	4172
Be-7	0.067 ± 0.013	0.054 ± 0.013	0.058 ± 0.011	0.045 ± 0.015
Nb-95	< 0.0004	< 0.0012	< 0.0008	< 0.0008
Zr-95	< 0.0014	< 0.0020	< 0.0011	< 0.0018
Ru-103	< 0.0006	< 0.0008	< 0.0011	< 0.0009
Ru-106	< 0.0045	< 0.0044	< 0.0043	< 0.0035
Cs-134	< 0.0004	< 0.0008	< 0.0007	< 0.0008
Cs-137	< 0.0004	< 0.0004	< 0.0008	< 0.0008
Ce-141	< 0.0016	< 0.0015	< 0.0011	< 0.0011
Ce-144	< 0.0025	< 0.0022	< 0.0049	< 0.0044
K-16				
Lab Code	KAP-2131	KAP-4729	KAP-7656	KAP-10695
Volume (m^3)	3891	4303	6474	4527
Be-7	0.068 ± 0.013	0.055 ± 0.010	0.055 ± 0.009	0.039 ± 0.014
Nb-95	< 0.0009	< 0.0010	< 0.0007	< 0.0009
Zr-95	< 0.0012	< 0.0016	< 0.0006	< 0.0018
Ru-103	< 0.0008	< 0.0008	< 0.0006	< 0.0007
Ru-106	< 0.0046	< 0.0033	< 0.0040	< 0.0037
Cs-134	< 0.0006	< 0.0005	< 0.0005	< 0.0005
Cs-137	< 0.0005	< 0.0006	< 0.0005	< 0.0005
Ce-141	< 0.0017	< 0.0009	< 0.0009	< 0.0010
Ce-144	< 0.0025	< 0.0027	< 0.0021	< 0.0028

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

	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	
Date Placed	01-03-00	04-03-00	07-06-00	10-02-00	
Date Removed	04-03-00	07-06-00	10-02-00	01-03-01	
	mR/91 days[a]				
Indicator					Mean±s.d.
K-1f	17.1 ± 0.2	15.5 ± 0.3	16.3 ± 0.1	16.0 ± 0.1	16.2 ± 0.7
K-4	17.6 ± 0.3	17.0 ± 0.2	NS[b]	-	17.3 ± 0.4
K-5	18.1 ± 0.5	17.1 ± 0.3	19.2 ± 0.4	18.1 ± 0.1	18.1 ± 0.9
K-7	22.1 ± 0.3	21.5 ± 0.2	22.9 ± 0.3	23.3 ± 0.1	22.5 ± 0.8
K-17	21.8 ± 0.3	19.9 ± 0.3	22.9 ± 0.3	20.5 ± 0.1	21.3 ± 1.3
K-25	-	-	-	19.6 ± 0.1 [e]	19.6
K-27	17.6 ± 0.2	15.3 ± 0.1	17.4 ± 0.2	16.1 ± 0.1	16.6 ± 1.1
K-30	19.1 ± 0.1	17.1 ± 0.2	NS[c]	17.4 ± 0.2	17.9 ± 1.1
Mean ± s.d.	19.1 ± 2.1	17.6 ± 2.3	19.7 ± 3.1	18.7 ± 2.6	18.8 ± 0.9
Control					
K-2	15.8 ± 0.2	16.2 ± 0.1	17.0 ± 0.2	17.4 ± 0.2	16.6 ± 0.7
K-3	20.5 ± 0.2	20.1 ± 0.1	21.6 ± 0.1	20.7 ± 0.2	20.7 ± 0.6
K-6	16.3 ± 0.1	16.2 ± 0.4	NS[d]	-	16.3 ± 0.1
K-8	19.0 ± 0.2	19.6 ± 0.1	20.7 ± 0.1	20.1 ± 0.1	19.9 ± 0.7
K-15	18.6 ± 0.1	18.8 ± 0.2	20.1 ± 0.2	18.9 ± 0.2	19.1 ± 0.7
K-16	17.5 ± 0.3	15.9 ± 0.3	18.2 ± 0.3	16.0 ± 0.1	16.9 ± 1.1
K-31	16.3 ± 0.1	14.9 ± 0.4	17.2 ± 0.2	15.5 ± 0.4	16.0 ± 1.0
K-33	-	-	20.6 ± 0.2	-	20.6
K-35	-	-	-	18.9 ± 0.4 [f]	18.9
Mean ± s.d.	17.7 ± 1.7	17.4 ± 2.1	19.3 ± 1.8	18.2 ± 2.0	18.2 ± 0.9

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

[b] NS = No sample; Telephone pole was removed at Stangel Farm; TLD missing.

[c] NS = No sample; TLDs missing.

[d] NS = No sample; K-6 was replaced by K-33 in the third quarter of 2000.

[e] K-25; replaced K-4 in September 2000.

[f] K-35; replaced K-33 in September 2000.

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

Month Collected	Lab Code	H-3	
		pCi/L	T.U. (100 T.U. = 320 pCi/L)
January	KP -140	< 330	< 103
February	-632	< 330	< 103
March	-1189	< 330	< 103
April	-2084	< 330	< 103
May	-3090	< 330	< 103
June	-4069	< 330	< 103
July	-4644	< 330	< 103
August	-5655	< 330	< 103
September	-6540	< 330	< 103
October	-7364	< 330	< 103
November	-8842	< 330	< 103
December	-9728	< 330	< 103

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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-4						
01-04-00	KMI - 11	< 0.5	< 10	< 10	< 15	1389 ± 155
02-02-00	- 546	< 0.5	< 10	< 10	< 15	1348 ± 145
03-01-00	- 1079, 80	< 0.5	< 10	< 10	< 15	1308 ± 106
04-04-00	- 1956	< 0.5	< 10	< 10	< 15	1422 ± 176
05-02-00	- 2808	< 0.5	< 10	< 10	< 15	1306 ± 154
05-15-00	- 3407	< 0.5	< 10	< 10	< 15	1204 ± 158
06-01-00	- 3650	< 0.5	< 10	< 10	< 15	1374 ± 139
06-13-00	- 3974	< 0.5	< 10	< 10	< 15	1301 ± 102
07-07-00	- 4625	< 0.5	< 10	< 10	< 15	1440 ± 94
07-18-00	- 5171	< 0.5	< 10	< 10	< 15	1378 ± 105
08-01-00	- 5528	< 0.5	< 10	< 10	< 15	1309 ± 145
08-15-00	- 5927	< 0.5	< 10	< 10	< 15	1396 ± 168
09-05-00	- 6416	< 0.5	< 10	< 10	< 15	1356 ± 177
09-19-00	NS[a]	-	-	-	-	-
K-25[b]						
10-02-00	- 7229	< 0.5	< 10	< 10	<15[d]	2042 ± 74
10-17-00	- 8078	< 0.5	< 10	< 10	< 15	1356 ± 177
11-01-00	- 8518	< 0.5	< 10	< 10	< 15	1526 ± 120
12-04-00	- 9476	< 0.5	< 10	< 10	< 15	1547 ± 175
K-5						
01-03-00	KMI - 12	< 0.5	< 10	< 10	< 15	1517 ± 167
02-02-00	- 547	< 0.5	< 10	< 10	< 15	1187 ± 145
03-01-00	- 1081	< 0.5	< 10	< 10	< 15	1363 ± 121
04-04-00	- 1957	< 0.5	< 10	< 10	< 15	1332 ± 166
05-02-00	- 2809	< 0.5	< 10	< 10	< 15	1509 ± 110
05-15-00	NS[c]	-	-	-	-	-
06-01-00	- 3651	< 0.5	< 10	< 10	< 15	1389 ± 99
06-13-00	NS[c]	-	-	-	-	-
07-07-00	- 4626	< 0.5	< 10	< 10	< 15	1401 ± 119
07-18-00	NS[c]	-	-	-	-	-
08-01-00	- 5529, 30	< 0.5	< 10	< 10	< 15	1338 ± 78
08-15-00	- 5928	< 0.5	< 10	< 10	< 15	1344 ± 94
09-05-00	- 6417	< 0.5	< 10	< 10	< 15	1368 ± 160
09-19-00	- 6896	< 0.5	< 10	< 10	< 15	1479 ± 121
10-03-00	- 7228	< 0.5	< 10	< 10	< 15	1415 ± 124
10-17-00	- 8077	< 0.5	< 10	< 10	< 15	1288 ± 113
11-02-00	- 8517	< 0.5	< 10	< 10	< 15	1591 ± 203
12-04-00	- 9475	< 0.5	< 10	< 10	< 15	1352 ± 125

[a] No sample; farm no longer in dairy business.
[b] Replaced K-4 on September 26, 2000.
[c] No Sample; Sample not available.
[d] At time of counting.

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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-12						
01-03-00	KMI - 14	< 0.5	< 10	< 10	< 15	1502 ± 182
02-01-00	- 549	< 0.5	< 10	< 10	< 15	1388 ± 150
03-01-00	- 1083	< 0.5	< 10	< 10	< 15	1431 ± 157
04-03-00	- 1958	< 0.5	< 10	< 10	< 15	1533 ± 200
05-01-00	- 2810,1	< 0.5	< 10	< 10	< 15	1312 ± 84
05-15-00	- 3408	< 0.5	< 10	< 10	< 15	1410 ± 161
06-01-00	- 3652	< 0.5	< 10	< 10	< 15	1500 ± 164
06-13-00	- 3975	< 0.5	< 10	< 10	< 15	1415 ± 102
07-06-00	- 4627	< 0.5	< 10	< 10	< 15	1366 ± 112
07-18-00	- 5172	< 0.5	< 10	< 10	< 15	1508 ± 120
08-01-00	- 5531	< 0.5	< 10	< 10	< 15	1516 ± 183
08-15-00	NS[a]	-	-	-	-	-
K-19						
01-04-00	KMI - 15	< 0.5	< 10	< 10	< 15	1371 ± 125
02-01-00	- 550	< 0.5	< 10	< 10	< 15	1382 ± 135
03-02-00	- 1084	< 0.5	< 10	< 10	< 15	1396 ± 142
04-03-00	- 1959	< 0.5	< 10	< 10	< 15	1260 ± 172
05-01-00	NS[b]	-	-	-	-	- -
K-34						
07-07-00	KMI - 4630	< 0.5	< 10	< 10	< 15	1403 ± 154
07-18-00	- 5175	< 0.5	< 10	< 10	< 15	1351 ± 171
08-01-00	- 5534	< 0.5	< 10	< 10	< 15	1484 ± 165
08-15-00	- 5931	< 0.5	< 10	< 10	< 15	1532 ± 189
09-05-00	- 6420	< 0.5	< 10	< 10	< 15	1307 ± 103
09-19-00	- 6899	< 0.5	< 10	< 10	< 15	1369 ± 103
10-03-00	- 7231	< 0.5	< 10	< 10	<15[c]	1741 ± 67
10-17-00	- 8080	< 0.5	< 10	< 10	< 15	1152 ± 108
11-02-00	- 8519	< 0.5	< 10	< 10	< 15	1402 ± 121
12-04-00	- 9478	< 0.5	< 10	< 10	< 15	1527 ± 75

[a] No Sample; Le Captain Farm no longer in dairy business.

[b] No Sample; Paral Farm no longer in dairy business; replaced by Struck Farm (K-34).

[c] At time of counting.

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						
01-04-00	KMI - 10	< 0.5	< 10	< 10	< 15	1431 ± 176
02-02-00	- 545	< 0.5	< 10	< 10	< 15	1300 ± 142
03-02-00	- 1078	< 0.5	< 10	< 10	< 15	1470 ± 78
04-03-00	- 1955	< 0.5	< 10	< 10	< 15	1428 ± 117
05-02-00	- 2807	< 0.5	< 10	< 10	< 15	1484 ± 185
05-15-00	- 3446	< 0.5	< 10	< 10	< 15	1442 ± 121
06-01-00	- 3649	< 0.5	< 10	< 10	< 15	1424 ± 163
06-13-00	- 3973	< 0.5	< 10	< 10	< 15	1485 ± 166
07-07-00	- 4624	< 0.5	< 10	< 10	< 15	1443 ± 122
07-18-00	- 5170	< 0.5	< 10	< 10	< 15	1566 ± 109
08-01-00	- 5527	< 0.5	< 10	< 10	< 15	1477 ± 167
08-15-00	- 5926	< 0.5	< 10	< 10	< 15	1432 ± 115
09-06-00	- 6415	< 0.5	< 10	< 10	< 15	1509 ± 175
09-19-00	- 6895	< 0.5	< 10	< 10	< 15	1410 ± 122
10-03-00	- 7227	< 0.5	< 10	< 10	< 15	1821 ± 40
10-17-00	- 8076	< 0.5	< 10	< 10	< 15	1363 ± 199
11-02-00	- 8516	< 0.5	< 10	< 10	< 15	1472 ± 115
12-05-00	- 9474	< 0.5	< 10	< 10	< 15	1565 ± 121
K-6						
01-03-00	KMI - 13	< 0.5	< 10	< 10	< 15	1242 ± 149
02-02-00	- 548	< 0.5	< 10	< 10	< 15	1312 ± 128
03-01-00	- 1082	< 0.5	< 10	< 10	< 15	1253 ± 170
04-03-00	NS[a]	-	-	-	-	-
K-33[a]						
05-02-00	KMI - 2813	< 0.5	< 10	< 10	< 15	1312 ± 158
05-15-00	- 3410	< 0.5	< 10	< 10	< 15	1360 ± 116
06-01-00	- 3655	< 0.5	< 10	< 10	< 15	1625 ± 171
06-13-00	- 3977	< 0.5	< 10	< 10	< 15	1466 ± 145
07-07-00	- 4629	< 0.5	< 10	< 10	< 15	1620 ± 165
07-18-00	- 5174	< 0.5	< 10	< 10	< 15	1392 ± 120
08-01-00	- 5533	< 0.5	< 10	< 10	< 15	1350 ± 183
08-15-00	- 5930	< 0.5	< 10	< 10	< 15	1404 ± 153
09-06-00	- 6419	< 0.5	< 10	< 10	< 15	1426 ± 170
09-19-00	- 6898	< 0.5	< 10	< 10	< 15	1416 ± 107
K-35[b]						
10-02-00	- 7232	< 0.5	< 10	< 10	<15[c]	1750 ± 41
10-17-00	- 8081	< 0.5	< 10	< 10	< 15	1412 ± 137
11-02-00	- 8520	< 0.5	< 10	< 10	< 15	1317 ± 108
12-04-00	- 9479	< 0.5	< 10	< 10	< 15	1429 ± 124

[a] No Sample; Novitsky Farm no longer in dairy business; replaced by Holly Farm (K-33).

[b] Replaced K-33 on September 26, 2000.

[c] At time of counting.

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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-28						
01-04-00	KMI - 16	< 0.5	< 10	< 10	< 15	1227 ± 150
02-02-00	- 551	< 0.5	< 10	< 10	< 15	1394 ± 98
03-02-00	- 1085	< 0.5	< 10	< 10	< 15	1428 ± 118
04-03-00	- 1960	< 0.5	< 10	< 10	< 15	1448 ± 174
05-02-00	- 2812	< 0.5	< 10	< 10	< 15	1370 ± 182
05-15-00	- 3409	< 0.5	< 10	< 10	< 15	1337 ± 167
06-01-00	- 3653, 4	< 0.5	< 10	< 10	< 15	1398 ± 99
06-13-00	- 3976	< 0.5	< 10	< 10	< 15	1418 ± 137
07-06-00	- 4628	< 0.5	< 10	< 10	< 15	1380 ± 86
07-18-00	- 5173	< 0.5	< 10	< 10	< 15	1345 ± 177
08-01-00	- 5532	< 0.5	< 10	< 10	< 15	1300 ± 101
08-15-00	- 5929	< 0.5	< 10	< 10	< 15	1392 ± 143
09-05-00	- 6418	< 0.5	< 10	< 10	< 15	1292 ± 145
09-19-00	- 6897	< 0.5	< 10	< 10	< 15	1608 ± 184
10-02-00	- 7230	< 0.5	< 10	< 10	<15[a]	1340 ± 53
10-17-00	- 8079	< 0.5	< 10	< 10	< 15	1246 ± 183
11-01-00	- 8527	< 0.5	< 10	< 10	< 15	1414 ± 160
12-04-00	- 9477	< 0.5	< 10	< 10	< 15	1455 ± 78

[a] At time of counting.

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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-4				
January	KMI -11	< 1.0	1.6 ± 0.5	1.61 ± 0.18	1.07	1.50	< 6.23
February	-546	< 0.9	1.2 ± 0.5	1.56 ± 0.17	1.01	1.19	< 6.42
March	-1079, 80	< 0.9	1.3 ± 0.3	1.51 ± 0.12	0.79	1.65	< 6.61
April	-1956	< 0.6	1.3 ± 0.4	1.64 ± 0.20	0.79	1.65	< 6.08
May	-4312	< 0.9	1.2 ± 0.4	1.45 ± 0.13	0.86	1.40	< 6.89
June	-4317	< 0.7	1.1 ± 0.4	1.55 ± 0.10	0.90	1.22	< 6.47
July	-5177	< 0.7	1.5 ± 0.4	1.63 ± 0.06	0.90	1.67	< 6.14
August	-5933, 4	< 0.8	2.5 ± 0.3	1.56 ± 0.13	0.89	2.81	< 6.40
September	-6416	< 1.0	1.8 ± 0.5	1.57 ± 0.20	0.87	2.07	< 6.38
October	NS[a]	-	- -	- -	-	-	-
			K-25				
October	-8084	< 1.2	1.0 ± 0.5	1.96 ± 0.11	0.80	1.25	< 5.09
November	-8518	< 1.1	2.3 ± 0.5	1.76 ± 0.14	0.95	2.42	< 5.67
December	-9476	< 0.8	1.5 ± 0.4	1.79 ± 0.20	0.86	1.74	< 5.59
			K-5				
January	KMI -12	< 0.9	1.0 ± 0.4	1.75 ± 0.19	0.87	1.15	< 5.70
February	-547	< 0.9	1.3 ± 0.5	1.37 ± 0.17	0.86	1.51	< 7.29
March	-1081	< 0.5	1.4 ± 0.6	1.58 ± 0.14	0.87	1.61	< 6.35
April	-1957	< 0.5	1.0 ± 0.4	1.54 ± 0.19	0.88	1.14	< 6.49
May	-2809	< 1.1	1.4 ± 0.4	1.74 ± 0.13	0.92	1.52	< 5.73
June	-3651	< 0.3	1.6 ± 0.2	1.61 ± 0.11	0.86	1.86	< 6.23
July	-4626	< 0.9	1.0 ± 0.4	1.62 ± 0.14	0.78	1.28	< 6.17
August	-5935	< 0.9	1.8 ± 0.4	1.55 ± 0.07	0.86	2.09	< 6.45
September	-6901	< 0.6	1.2 ± 0.4	1.65 ± 0.12	0.85	1.41	< 6.08
October	-8083	< 0.9	0.8 ± 0.3	1.56 ± 0.10	0.76	1.05	< 6.40
November	-8517	< 1.5	1.6 ± 0.5	1.84 ± 0.23	0.84	1.90	< 5.44
December	-9475	< 1.6	0.8 ± 0.4	1.56 ± 0.14	0.84	0.95	< 6.40

[a] No sample. Replaced by K-25 on September 26, 2000.

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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-12				
January	KMI -14	< 1.1	1.2 ± 0.5	1.74 ± 0.21	0.90	1.33	< 5.76
February	-549	< 0.7	1.3 ± 0.4	1.60 ± 0.17	0.89	1.46	< 6.23
March	-1083	< 0.6	1.9 ± 0.5	1.65 ± 0.18	0.84	2.26	< 6.04
April	-1958	< 0.6	1.2 ± 0.4	1.77 ± 0.23	0.81	1.48	< 5.64
May	-4313	< 0.9	1.6 ± 0.4	1.57 ± 0.10	0.88	1.82	< 6.36
June	-4318	< 0.8	1.2 ± 0.4	1.68 ± 0.11	0.88	1.36	< 5.93
July	-5178	< 0.9	1.1 ± 0.5	1.66 ± 0.07	0.72	1.53	< 6.02
August	-5531	<1.3	2.8 ± 0.7	1.75 ± 0.21	0.90	3.11	< 5.71
September	NS[a]	-	-	-	-	-	-
October							
November							
December							
			K-19				
January	KMI -15	< 0.9	1.2 ± 0.4	1.58 ± 0.14	0.92	1.30	< 6.31
February	-550	< 0.8	0.8 ± 0.3	1.60 ± 0.16	0.85	0.94	< 6.26
March	-1084	< 0.5	0.8 ± 0.4	1.61 ± 0.16	0.94	0.85	< 6.20
April	-1959	< 0.5	1.2 ± 0.4	1.46 ± 0.20	0.84	1.43	< 6.87
May	NS[b]	-	-	-	-	-	-
			K-34				
July	KMI -5181	< 0.7	1.0 ± 0.4	1.59 ± 0.13	0.80	1.25	< 6.28
August	-5938	< 0.7	2.0 ± 0.4	1.74 ± 0.15	0.78	2.56	< 5.74
September	-6904	< 0.6	0.7 ± 0.3	1.55 ± 0.08	0.81	0.86	< 6.46
October	-8087	< 0.8	0.5 ± 0.3	1.67 ± 0.07	0.82	0.61	< 5.98
November	-8519	< 1.0	2.0 ± 0.5	1.62 ± 0.14	0.90	2.22	< 6.17
December	-9478	< 0.9	1.4 ± 0.4	1.77 ± 0.09	0.81	1.73	< 5.66

[a] No sample; Le Captain Farm no longer in dairy business.

[b] No sample; Paral Farm no longer in dairy business; replaced by Struck Farm (K-34).

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 -10	< 0.9	1.3 ± 0.4	1.65 ± 0.20	0.88	1.48	< 6.04
February	-545	< 0.6	0.9 ± 0.3	1.50 ± 0.16	0.85	1.06	< 6.65
March	-1078	< 0.6	1.6 ± 0.5	1.70 ± 0.09	0.89	1.80	< 5.88
April	-1955	< 0.5	1.2 ± 0.4	1.65 ± 0.14	0.95	1.26	< 6.06
May	-4311	< 0.9	1.7 ± 0.4	1.69 ± 0.13	0.90	1.89	< 5.91
June	-4316	< 1.0	1.5 ± 0.5	1.68 ± 0.13	0.94	1.60	< 5.95
July	-5176	< 0.8	1.9 ± 0.4	1.74 ± 0.09	0.88	2.16	< 5.75
August	-5932	< 2.0	1.1 ± 0.5	1.68 ± 0.12	0.91	1.21	< 5.95
September	-6900	< 0.7	1.2 ± 0.5	1.69 ± 0.12	0.89	1.35	< 5.93
October	-8082	< 0.9	0.8 ± 0.3	1.84 ± 0.12	0.89	0.90	< 5.43
November	-8516	< 1.2	1.9 ± 0.5	1.70 ± 0.13	0.98	1.94	< 5.88
December	-9474	< 0.9	1.1 ± 0.4	1.81 ± 0.14	0.82	1.34	< 5.53
		K-6					
January	KMI -13	< 0.9	1.0 ± 0.4	1.44 ± 0.17	1.00	1.00	< 6.96
February	-548	< 0.6	1.7 ± 0.4	1.52 ± 0.15	1.06	1.60	< 6.59
March	-1082	< 0.6	1.0 ± 0.4	1.45 ± 0.20	0.97	1.03	< 6.90
April	NS[a]	-	-	-	-	-	-
		K-33					
May	-4315	< 1.0	1.3 ± 0.5	1.54 ± 0.11	0.89	1.46	< 6.47
June	-4320	< 1.2	0.8 ± 0.3	1.79 ± 0.13	0.84	0.95	< 5.60
July	-5180	< 0.7	1.5 ± 0.5	1.74 ± 0.13	0.98	1.53	< 5.74
August	-5937	< 0.8	0.8 ± 0.3	1.59 ± 0.14	0.80	1.00	< 6.28
September	-6903	< 0.7	0.8 ± 0.4	1.64 ± 0.13	0.85	0.94	< 6.11
October	NS[b]	-	-	-	-	-	-
		K-35					
October	-8088	< 1.2	1.1 ± 0.4	1.83 ± 0.08	0.80	1.38	< 5.47
November	-8520	< 1.0	1.3 ± 0.4	1.52 ± 0.12	0.85	1.53	< 6.57
December	-9479	< 0.9	1.4 ± 0.4	1.65 ± 0.14	0.77	1.82	< 6.05

[a] No Sample; Novitsky Farm no longer in dairy business.

[b] No sample; replaced by K-35 on September 26, 2000.

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

Collection Period	Lab Code	Concentration				Ratios	
		Sr-89 (pCi/L)	Sr-90 (pCi/L)	K (g/L)	Ca (g/L)	Sr-90 per gram Ca	Cs-137 per gram K
Control							
		K-28					
January	KMI -16	< 0.9	0.9 ± 0.4	1.42 ± 0.17	0.82	1.10	< 7.05
February	-551	< 0.7	0.9 ± 0.3	1.61 ± 0.11	0.89	1.01	< 6.21
March	-1085	< 0.5	1.0 ± 0.4	1.65 ± 0.14	0.88	1.14	< 6.06
April	-1960	< 0.6	1.5 ± 0.4	1.67 ± 0.20	0.84	1.79	< 5.97
May	-4314	< 1.0	1.4 ± 0.4	1.56 ± 0.14	0.85	1.65	< 6.39
June	-4319	< 0.6	1.0 ± 0.3	1.63 ± 0.10	0.84	1.19	< 6.14
July	-5179	< 0.7	1.0 ± 0.4	1.58 ± 0.11	0.86	1.16	< 6.35
August	-5936	< 0.9	1.1 ± 0.4	1.56 ± 0.10	0.80	1.38	< 6.43
September	-6902	< 0.7	3.0 ± 0.5	1.68 ± 0.14	0.80	3.75	< 5.97
October	8085,6	< 0.8	0.9 ± 0.2	1.49 ± 0.11	0.94	0.96	< 6.69
November	-8527	< 1.2	0.8 ± 0.4	1.63 ± 0.18	0.93	0.86	< 6.12
December	-9477	< 0.9	1.8 ± 0.4	1.68 ± 0.09	0.79	2.28	< 5.95

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Table 16. Well water samples, 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	01-03-00	04-03-00	07-06-00	10-02-00
Lab Code	KWW-17	KWW-1961	KWW-4680	KWW-7349
Gross alpha	5.9 ± 3.0	< 3.4	< 3.7	5.2 ± 2.3
Gross beta	< 4.0	5.3 ± 2.9	< 3.8	4.7 ± 2.1
K-40 (f.p.)	2.85	2.51	2.60	2.60
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	01-03-00	04-03-00	07-06-00	10-02-00
Lab Code	KWW-18	KWW-1962	KWW-4681	KWW-7350
Gross alpha	5.0 ± 2.3	4.4 ± 2.2	2.4 ± 1.5	2.8 ± 1.7
Gross beta	5.5 ± 1.6	3.6 ± 1.9	4.5 ± 1.6	4.7 ± 1.6
K-40 (f.p.)	2.85	2.68	2.60	2.85
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.

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

	Sample Description and Concentration (pCi/L)			
Indicator				
K-10				
Date Collected	01-03-00	04-03-00	07-06-00	10-02-00
Lab Code	KWW-19	KWW-1963	KWW-4682	KWW-7351
Gross beta	< 0.9	< 0.9	1.7 ± 0.6	1.8 ± 0.6
K-40 (f.p.)	1.12	0.87	1.12	1.12
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	01-03-00	04-03-00	07-06-00	10-02-00
Lab Code	KWW-20	KWW-1964	KWW-4683	KWW-7352
Gross beta	1.6 ± 0.6	< 1.0	1.0 ± 0.5	1.4 ± 0.5
K-40 (f.p.)	1.30	0.95	< 0.87	0.95
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

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

	Sample Description and Concentration (pCi/L)			
Indicator (continued)				
K-12				
Date Collected	01-03-00	04-03-00	07-06-00	10-02-00
Lab Code	KWW-21	KWW-1965	KWW-4684	KWW-7353
Gross beta	1.6 ± 0.6	1.3 ± 0.6	1.3 ± 0.5	1.3 ± 0.5
K-40 (f.p.)	1.56	1.21	1.12	1.12
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	01-03-00	04-03-00	07-06-00	10-02-00
Lab Code	KWW-22	KWW-1966	KWW-4685	KWW-7354
Gross beta	1.1 ± 0.5	1.5 ± 0.6	0.9 ± 0.4	1.1 ± 0.5
K-40 (f.p.)	0.95	1.04	0.95	1.04
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

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Table 17. Well water samples 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
01-03-00	KWW - 17	< 149	< 0.8	< 0.4
04-03-00	- 1961	< 180	< 0.5	< 0.4
07-06-00	- 4680	< 178	< 0.7	< 0.5
10-02-00	- 7349	< 176	< 0.8	< 0.5

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

Sample Description and Concentration (pCi/g wet)				
	Indicator			Control
Location	K-24	K-29	K-34	K-32
Date Collected	09-05-00	09-05-00	09-06-00	09-06-00
Lab Code	KME-6395	KME-6396	KME-6745 (Pigeons)	KME-6397
Gross Alpha	< 1.10	< 0.84	< 0.91	< 0.86
Gross Beta	2.70 ± 0.05	3.45 ± 0.04	3.45 ± 0.04	2.50 ± 0.03
Be-7	< 0.52	< 0.33	< 0.14	< 0.20
K-40	2.45 ± 0.79	2.60 ± 0.78	2.69 ± 0.24	2.45 ± 0.40
Nb-95	< 0.11	< 0.051	< 0.007	< 0.034
Zr-95	< 0.086	< 0.060	< 0.038	< 0.023
Ru-103	< 0.11	< 0.067	< 0.022	< 0.032
Ru-106	< 0.38	< 0.36	< 0.058	< 0.13
Cs-134	< 0.042	< 0.042	< 0.011	< 0.009
Cs-137	< 0.057	< 0.025	< 0.008	< 0.009
Ce-141	< 0.11	< 0.15	< 0.037	< 0.029
Ce-144	< 0.18	< 0.22	< 0.093	< 0.060

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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	01-03-00	04-03-00	07-06-00	10-02-00
Lab Code	KE-8	KE-1953	KE-4631	KE-7225
Gross beta	1.22 ± 0.07	1.24 ± 0.06	1.25 ± 0.05	1.38 ± 0.07
Sr-89	< 0.006	< 0.007	< 0.006	< 0.005
Sr-90	< 0.004	< 0.003	< 0.003	0.004 ± 0.002
Be-7	< 0.089	< 0.070	< 0.073	< 0.048
K-40	1.35 ± 0.20	1.31 ± 0.19	1.26 ± 0.17	1.11 ± 0.19
Nb-95	< 0.014	< 0.010	< 0.006	< 0.009
Zr-95	< 0.021	< 0.020	< 0.016	< 0.016
Ru-103	< 0.009	< 0.010	< 0.004	< 0.006
Ru-106	< 0.031	< 0.034	< 0.045	< 0.042
Cs-134	< 0.003	< 0.007	< 0.005	< 0.005
Cs-137	< 0.006	< 0.005	< 0.007	< 0.005
Ce-141	< 0.015	< 0.010	< 0.015	< 0.009
Ce-144	< 0.067	< 0.042	< 0.051	< 0.032

Location	K-32 (C)			
Date Collected	01-04-00	04-04-00	07-06-00	10-02-00
Lab Code	KE-9	KE-1954	KE-4632	KE-7226
Gross beta	1.33 ± 0.07	1.33 ± 0.07	1.28 ± 0.05	1.24 ± 0.06
Sr-89	< 0.006	< 0.007	< 0.006	< 0.006
Sr-90	< 0.003	< 0.002	< 0.003	< 0.003
Be-7	< 0.074	< 0.057	< 0.034	< 0.036
K-40	1.38 ± 0.20	1.33 ± 0.20	1.17 ± 0.14	1.11 ± 0.02
Nb-95	< 0.006	< 0.008	< 0.004	< 0.009
Zr-95	< 0.016	< 0.018	< 0.010	< 0.016
Ru-103	< 0.009	< 0.010	< 0.004	< 0.008
Ru-106	< 0.068	< 0.054	< 0.046	< 0.051
Cs-134	< 0.005	< 0.009	< 0.005	< 0.007
Cs-137	< 0.007	< 0.007	< 0.005	< 0.007
Ce-141	< 0.016	< 0.019	< 0.007	< 0.008
Ce-144	< 0.031	< 0.060	< 0.026	< 0.021

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Table 20. Vegetable and grain samples, analyses for gross beta, strontium-89, strontium-90, and gamma-emitting isotopes.
Collection: Annually

Sample Description and Concentration (pCi/g wet)

	Indicator			Control
Location		K-17		K-26
Date Collected	09-05-00	09-05-00	09-05-00	09-06-00
Lab Code	KVE-6455	KVE-6456	KVE-6457	KVE-6458
Type	Cabbage	Lettuce	Squash	Cabbage
Gross beta	1.54 ± 0.04	3.40 ± 0.09	2.77 ± 0.06	6.04 ± 0.14
Sr-89	< 0.013	< 0.012	< 0.007	< 0.005
Sr-90	< 0.003	0.014 ± 0.006	< 0.005	0.004 ± 0.002
Be-7	< 0.11	0.28 ± 0.10	< 0.036	< 0.088
K-40	1.41 ± 0.26	2.90 ± 0.29	2.67 ± 0.15	2.17 ± 0.28
Nb-95	< 0.009	< 0.008	< 0.003	< 0.009
Zr-95	< 0.010	< 0.025	< 0.005	< 0.016
Ru-103	< 0.006	< 0.010	< 0.004	< 0.010
Ru-106	< 0.024	< 0.091	< 0.029	< 0.057
Cs-134	< 0.008	< 0.007	< 0.004	< 0.011
Cs-137	< 0.005	< 0.012	< 0.004	< 0.008
Ce-141	< 0.010	< 0.018	< 0.007	< 0.017
Ce-144	< 0.057	< 0.062	< 0.030	< 0.051

	Control			
Location		K-26		
Date Collected	09-06-00	09-06-00	09-06-00	10-03-00
Lab Code	KVE-6459	KVE-6460	KVE-6461	KVE-7301
Type	Corn	Cucumbers	Peppers	Pumpkins
Gross beta	2.79 ± 0.06	1.51 ± 0.03	2.03 ± 0.04	2.11 ± 0.04
Sr-89	< 0.005	< 0.004	< 0.008	< 0.007
Sr-90	< 0.002	0.004 ± 0.001	0.008 ± 0.003	0.010 ± 0.003
Be-7	< 0.12	< 0.10	< 0.058	< 0.057
K-40	1.24 ± 0.28	2.27 ± 0.32	2.11 ± 0.21	2.10 ± 0.14
Nb-95	< 0.006	< 0.013	< 0.008	< 0.005
Zr-95	< 0.021	< 0.019	< 0.009	< 0.006
Ru-103	< 0.012	< 0.011	< 0.006	< 0.008
Ru-106	< 0.122	< 0.086	< 0.052	< 0.028
Cs-134	< 0.014	< 0.018	< 0.008	< 0.004
Cs-137	< 0.013	< 0.007	< 0.007	< 0.005
Ce-141	< 0.023	< 0.025	< 0.007	< 0.020
Ce-144	< 0.093	< 0.11	< 0.034	< 0.051

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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)		
	Indicator	
Location	K-23	K-23
Date Collected	08-01-00	08-01-00
Lab Code	KVE-5536	KVE-5537
Type	Clover	Wheat
Gross beta	2.66 ± 0.10	3.24 ± 0.12
Sr-89	< 0.021	< 0.010
Sr-90	0.020 ± 0.006	0.017 ± 0.004
Be-7	0.79 ± 0.18	< 0.62
K-40	2.72 ± 0.42	3.55 ± 0.51
Nb-95	< 0.011	< 0.028
Zr-95	< 0.032	< 0.030
Ru-103	< 0.015	< 0.027
Ru-106	< 0.13	< 0.21
Cs-134	< 0.012	< 0.018
Cs-137	< 0.016	< 0.023
Ce-141	< 0.028	< 0.042
Ce-144	< 0.098	< 0.16

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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	01-04-00	01-04-00
Lab Code	KCF-23, 4	KCF-25
Type	Hay	Silage
Gross beta	12.75 ± 0.26	3.26 ± 0.10
Sr-89	< 0.016	< 0.010
Sr-90	0.010 ± 0.003	0.004 ± 0.002
Be-7	< 0.19	< 0.13
K-40	12.36 ± 0.60	3.71 ± 0.40
Nb-95	< 0.020	< 0.013
Zr-95	< 0.027	< 0.013
Ru-103	< 0.020	< 0.009
Ru-106	< 0.080	< 0.12
Cs-134	< 0.015	< 0.006
Cs-137	< 0.020	< 0.013
Ce-141	< 0.038	< 0.024
Ce-144	< 0.12	< 0.091
Location	K-6	K-6
Date Collected	01-03-00	01-03-00
Lab Code	KCF-30	KCF-31
Type	Hay	Silage
Gross beta	14.04 ± 0.30	6.55 ± 0.15
Sr-89	< 0.019	< 0.018
Sr-90	< 0.007	< 0.007
Be-7	0.70 ± 0.31	0.25 ± 0.12
K-40	15.57 ± 0.72	6.18 ± 0.41
Nb-95	< 0.026	< 0.007
Zr-95	< 0.046	< 0.022
Ru-103	< 0.032	< 0.013
Ru-106	< 0.26	< 0.070
Cs-134	< 0.027	< 0.010
Cs-137	< 0.020	< 0.006
Ce-141	< 0.047	< 0.023
Ce-144	< 0.080	< 0.082

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

Sample Description and Concentration (pCi/g wet)				
	Indicator			
Location	K-4	K-4	K-5	K-5
Date Collected	01-03-00	01-03-00	01-03-00	01-03-00
Lab Code	KCF-26	KCF-27	KCF-28	KCF-29
Type	Hay	Silage	Hay	Silage
Gross beta	16.22 ± 0.49	6.95 ± 0.28	21.23 ± 0.63	10.93 ± 0.36
Sr-89	< 0.027	< 0.013	< 0.055	< 0.037
Sr-90	0.025 ± 0.007	< 0.005	< 0.021	< 0.015
Be-7	0.27 ± 0.08	< 0.18	< 0.15	< 0.15
K-40	17.20 ± 0.40	6.26 ± 0.59	21.45 ± 0.56	7.39 ± 0.50
Nb-95	< 0.007	< 0.020	< 0.019	< 0.016
Zr-95	< 0.024	< 0.028	< 0.040	< 0.027
Ru-103	< 0.010	< 0.010	< 0.011	< 0.014
Ru-106	< 0.078	< 0.076	< 0.14	< 0.10
Cs-134	< 0.012	< 0.016	< 0.020	< 0.016
Cs-137	< 0.009	< 0.013	< 0.014	< 0.012
Ce-141	< 0.021	< 0.018	< 0.033	< 0.016
Ce-144	< 0.040	< 0.10	< 0.099	< 0.094
Location	K-12	K-12	K-19	K-19
Date Collected	01-03-00	01-03-00	01-03-00	01-03-00
Lab Code	KCF-32	KCF-33	KCF-34	KCF-35
Type	Hay	Silage	Hay	Silage
Gross beta	9.61 ± 0.23	1.99 ± 0.05	17.68 ± 0.36	5.69 ± 0.15
Sr-89	< 0.019	< 0.004	< 0.030	< 0.009
Sr-90	0.011 ± 0.004	< 0.002	0.032 ± 0.012	< 0.005
Be-7	< 0.25	0.33 ± 0.11	< 0.35	< 0.16
K-40	10.61 ± 0.69	1.75 ± 0.21	22.41 ± 1.19	5.36 ± 0.57
Nb-95	< 0.026	< 0.012	< 0.052	< 0.012
Zr-95	< 0.054	< 0.016	< 0.071	< 0.036
Ru-103	< 0.027	< 0.004	< 0.020	< 0.015
Ru-106	< 0.17	< 0.090	< 0.27	< 0.10
Cs-134	< 0.027	< 0.014	< 0.048	< 0.013
Cs-137	< 0.019	< 0.011	< 0.041	< 0.013
Ce-141	< 0.035	< 0.022	< 0.078	< 0.028
Ce-144	< 0.17	< 0.046	< 0.16	< 0.090

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

Sample Description and Concentration				
	Indicator			Control
Location	K-1b	K-1f	K-4	K-3
Date Collected	05-01-00	05-01-00	05-01-00	05-01-00
Lab Code	KG-2836	KG-2837	KG-2839	KG-2838
Gross beta	7.06 ± 0.26	6.96 ± 0.26	6.59 ± 0.22	6.68 ± 0.21
Sr-89	< 0.025	< 0.018	< 0.007	< 0.025
Sr-90	< 0.012	0.009 ± 0.004	< 0.003	< 0.014
Be-7	5.88 ± 0.66	3.48 ± 0.50	1.64 ± 0.31	0.76 ± 0.23
K-40	4.89 ± 0.90	6.65 ± 0.81	6.61 ± 0.73	7.73 ± 0.66
Mn-54	< 0.033	< 0.042	< 0.014	< 0.008
Co-58	< 0.041	< 0.024	< 0.014	< 0.021
Co-60	< 0.021	< 0.036	< 0.018	< 0.017
Nb-95	< 0.023	< 0.027	< 0.023	< 0.017
Zr-95	< 0.068	< 0.045	< 0.071	< 0.033
Ru-103	< 0.027	< 0.024	< 0.031	< 0.017
Ru-106	< 0.13	< 0.31	< 0.22	< 0.094
Cs-134	< 0.032	< 0.027	< 0.020	< 0.021
Cs-137	< 0.032	< 0.019	< 0.027	< 0.018
Ce-141	< 0.040	< 0.054	< 0.042	< 0.027
Ce-144	< 0.23	< 0.24	< 0.20	< 0.081
Location	K-5	K-12	K-19	K-33[a]
Date Collected	05-01-00	05-01-00	05-01-00	05-01-00
Lab Code	KG-2840	KG-2841	KG-2842	KG-2843
Gross beta	7.86 ± 0.24	6.66 ± 0.22	7.06 ± 0.23	7.17 ± 0.23
Sr-89	< 0.014	< 0.021	< 0.010	< 0.018
Sr-90	< 0.006	< 0.011	0.004 ± 0.002	0.010 ± 0.006
Be-7	1.07 ± 0.31	0.42 ± 0.20	2.47 ± 0.33	1.14 ± 0.22
K-40	7.76 ± 0.65	6.61 ± 0.79	6.62 ± 0.65	7.16 ± 0.58
Mn-54	< 0.020	< 0.025	< 0.012	< 0.009
Co-58	< 0.022	< 0.013	< 0.013	< 0.017
Co-60	< 0.019	< 0.011	< 0.014	< 0.015
Nb-95	< 0.012	< 0.024	< 0.015	< 0.014
Zr-95	< 0.031	< 0.031	< 0.020	< 0.020
Ru-103	< 0.024	< 0.022	< 0.018	< 0.009
Ru-106	< 0.17	< 0.20	< 0.16	< 0.17
Cs-134	< 0.021	< 0.019	< 0.017	< 0.011
Cs-137	< 0.014	< 0.017	< 0.016	< 0.015
Ce-141	< 0.043	< 0.028	< 0.027	< 0.021
Ce-144	< 0.14	< 0.11	< 0.12	< 0.058

[a] Replaced K-6 in May of 2000.

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

Sample Description and Concentration

	Indicator			Control
Location	K-1b	K-1f	K-4	K-3
Date Collected	07-06-00	07-06-00	07-06-00	07-06-00
Lab Code	KG-4662	KG-4663	KG-4665	KG-4664
Gross beta	4.17 ± 0.10	4.34 ± 0.11	4.50 ± 0.09	5.68 ± 0.11
Sr-89	< 0.007	< 0.070	< 0.018	< 0.031
Sr-90	0.004 ± 0.002	< 0.030	0.011 ± 0.006	< 0.013
Be-7	0.43 ± 0.19	< 0.47	1.61 ± 0.27	0.66 ± 0.18
K-40	4.63 ± 0.45	8.26 ± 0.48	6.81 ± 0.57	8.46 ± 0.60
Mn-54	< 0.011	< 0.014	< 0.015	< 0.020
Co-58	< 0.014	< 0.009	< 0.016	< 0.021
Co-60	< 0.007	< 0.010	< 0.007	< 0.019
Nb-95	< 0.008	< 0.010	< 0.021	< 0.016
Zr-95	< 0.025	< 0.023	< 0.019	< 0.026
Ru-103	< 0.020	< 0.014	< 0.011	< 0.021
Ru-106	< 0.13	< 0.073	< 0.18	< 0.10
Cs-134	< 0.014	< 0.014	< 0.021	< 0.017
Cs-137	< 0.012	< 0.011	< 0.018	< 0.020
Ce-141	< 0.027	< 0.030	< 0.037	< 0.038
Ce-144	< 0.11	< 0.10	< 0.12	< 0.13
Location	K-5	K-12	K-34[a]	K-33
Date Collected	07-06-00	07-06-00	07-06-00	07-06-00
Lab Code	KG-4666	KG-4667, 8	KG-4670	KG-4669
Gross beta	4.75 ± 0.11	6.42 ± 0.10	3.81 ± 0.08	3.48 ± 0.09
Sr-89	< 0.010	< 0.039	< 0.007	< 0.026
Sr-90	< 0.004	< 0.014	0.003 ± 0.002	< 0.010
Be-7	1.52 ± 0.31	0.96 ± 0.18	1.21 ± 0.22	2.08 ± 0.33
K-40	8.09 ± 0.75	8.08 ± 0.49	6.97 ± 0.58	7.43 ± 0.67
Mn-54	< 0.015	< 0.016	< 0.011	< 0.019
Co-58	< 0.019	< 0.015	< 0.017	< 0.019
Co-60	< 0.021	< 0.018	< 0.015	< 0.022
Nb-95	< 0.022	< 0.019	< 0.014	< 0.023
Zr-95	< 0.029	< 0.047	< 0.022	< 0.043
Ru-103	< 0.025	< 0.019	< 0.019	< 0.027
Ru-106	< 0.18	< 0.17	< 0.11	< 0.23
Cs-134	< 0.019	< 0.012	< 0.017	< 0.026
Cs-137	< 0.014	< 0.017	< 0.021	< 0.018
Ce-141	< 0.041	< 0.030	< 0.019	< 0.044
Ce-144	< 0.12	< 0.10	< 0.068	< 0.16

[a] Replaced K-19 in July of 2000.

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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-25[a]	K-3
Date Collected	10-02-00	10-02-00	10-02-00	10-02-00
Lab Code	KG-7286	KG-7287	KG-7291	KG-7288
Gross beta	4.99 ± 0.18	6.56 ± 0.27	9.40 ± 0.33	6.33 ± 0.26
Sr-89	< 0.012	< 0.050	< 0.080	< 0.031
Sr-90	0.010 ± 0.004	< 0.015	< 0.022	< 0.016
Be-7	2.28 ± 0.38	3.97 ± 0.42	2.18 ± 0.18	3.67 ± 0.44
K-40	5.34 ± 0.67	6.07 ± 0.58	8.54 ± 0.35	6.48 ± 0.76
Mn-54	< 0.016	< 0.015	< 0.021	< 0.021
Co-58	< 0.022	< 0.015	< 0.014	< 0.014
Co-60	< 0.022	< 0.021	< 0.016	< 0.016
Nb-95	< 0.014	< 0.030	< 0.023	< 0.023
Zr-95	< 0.047	< 0.052	< 0.023	< 0.023
Ru-103	< 0.022	< 0.026	< 0.023	< 0.023
Ru-106	< 0.28	< 0.17	< 0.22	< 0.22
Cs-134	< 0.031	< 0.029	< 0.026	< 0.026
Cs-137	< 0.016	< 0.017	< 0.017	< 0.017
Ce-141	< 0.046	< 0.053	< 0.037	< 0.037
Ce-144	< 0.20	< 0.19	< 0.17	< 0.17

Location	K-5	K-12	K-34	K-35[b]
Date Collected	10-02-00	10-03-00	10-02-00	10-02-00
Lab Code	KG-7289	KG-7290	KG-7292	KG-7293
Gross beta	9.47 ± 0.29	6.90 ± 0.27	7.39 ± 0.19	9.32 ± 0.19
Sr-89	< 0.033	< 0.022	< 0.020	< 0.018
Sr-90	< 0.015	< 0.012	0.033 ± 0.008	0.018 ± 0.007
Be-7	3.38 ± 0.39	2.34 ± 0.29	4.68 ± 0.33	3.39 ± 0.40
K-40	9.62 ± 0.94	7.01 ± 0.62	7.94 ± 0.60	10.20 ± 0.76
Mn-54	< 0.026	< 0.017	< 0.015	< 0.023
Co-58	< 0.020	< 0.015	< 0.014	< 0.012
Co-60	< 0.024	< 0.012	< 0.016	< 0.015
Nb-95	< 0.014	< 0.011	< 0.010	< 0.019
Zr-95	< 0.032	< 0.016	< 0.021	< 0.023
Ru-103	< 0.018	< 0.020	< 0.017	< 0.014
Ru-106	< 0.19	< 0.094	< 0.16	< 0.18
Cs-134	< 0.026	< 0.021	< 0.014	< 0.016
Cs-137	< 0.018	< 0.013	< 0.019	< 0.024
Ce-141	< 0.037	< 0.029	< 0.022	< 0.037
Ce-144	< 0.11	< 0.14	< 0.091	< 0.21

[a] Replaced K-4 in September, 2000.

[b] Replaced K-33 in September, 2000.

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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-4	K-5
Date Collected	05-01-00	05-01-00	05-01-00
Lab Code	KSO-2846	KSO-2848	KSO-2849
Gross alpha	< 3.48	6.78 ± 3.24	8.81 ± 3.50
Gross beta	26.80 ± 3.15	27.77 ± 2.89	24.40 ± 2.79
Sr-89	< 0.034	< 0.042	< 0.060
Sr-90	< 0.015	< 0.019	0.057 ± 0.017
Be-7	< 0.15	< 0.18	< 0.18
K-40	19.92 ± 0.79	18.70 ± 0.76	16.84 ± 0.77
Nb-95	< 0.014	< 0.027	< 0.026
Zr-95	< 0.019	< 0.016	< 0.040
Ru-103	< 0.017	< 0.017	< 0.019
Ru-106	< 0.16	< 0.073	< 0.17
Cs-134	< 0.023	< 0.016	< 0.021
Cs-137	0.048 ± 0.026	0.096 ± 0.029	0.086 ± 0.020
Ce-141	< 0.048	< 0.046	< 0.040
Ce-144	< 0.11	< 0.11	< 0.11

Location	K-1f	K-25[a]	K-5
Date Collected	10-02-00	10-02-00	10-02-00
Lab Code	KSO-7294	KSO-7298	KSO-7296
Gross alpha	8.67 ± 3.10	8.09 ± 3.00	13.07 ± 3.62
Gross beta	23.87 ± 2.78	13.84 ± 2.25	34.12 ± 3.06
Sr-89	< 0.057	< 0.054	< 0.082
Sr-90	< 0.018	0.045 ± 0.013	0.095 ± 0.019
Be-7	< 0.29	0.48 ± 0.22	< 0.43
K-40	20.44 ± 1.00	13.87 ± 0.70	25.77 ± 1.48
Nb-95	< 0.041	< 0.023	< 0.034
Zr-95	< 0.059	< 0.031	< 0.083
Ru-103	< 0.024	< 0.017	< 0.038
Ru-106	< 0.18	< 0.12	< 0.39
Cs-134	< 0.041	< 0.022	< 0.069
Cs-137	< 0.022	0.109 ± 0.025	< 0.080
Ce-141	< 0.049	< 0.038	< 0.073
Ce-144	< 0.18	< 0.12	< 0.23

[a] Replaced K-4 in September, 2000.

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-12	K-19
Date Collected	05-01-00	05-01-00
Lab Code	KSO-2850	KSO-2851
Gross alpha	8.57 ± 3.35	< 3.91
Gross beta	31.34 ± 3.20	15.91 ± 2.76
Sr-89	< 0.053	< 0.045
Sr-90	0.085 ± 0.019	< 0.019
Be-7	< 0.22	< 0.16
K-40	18.56 ± 0.83	12.53 ± 0.59
Nb-95	< 0.032	< 0.012
Zr-95	< 0.015	< 0.028
Ru-103	< 0.023	< 0.015
Ru-106	< 0.14	< 0.12
Cs-134	< 0.022	< 0.017
Cs-137	0.22 ± 0.027	0.057 ± 0.023
Ce-141	< 0.054	< 0.035
Ce-144	< 0.094	< 0.065

Location	K-12	K-34[a]
Date Collected	10-03-00	10-02-00
Lab Code	KSO-7297	KSO-7299
Gross alpha	5.90 ± 2.61	9.59 ± 3.23
Gross beta	25.72 ± 2.72	30.49 ± 2.97
Sr-89	< 0.066	< 0.057
Sr-90	0.054 ± 0.015	0.089 ± 0.018
Be-7	< 0.26	< 0.21
K-40	18.68 ± 0.97	18.43 ± 0.84
Nb-95	< 0.042	< 0.031
Zr-95	< 0.065	< 0.027
Ru-103	< 0.015	< 0.017
Ru-106	< 0.24	< 0.16
Cs-134	< 0.033	< 0.020
Cs-137	0.23 ± 0.062	0.076 ± 0.023
Ce-141	< 0.055	< 0.039
Ce-144	< 0.17	< 0.14

[a] Replaced K-19 in July, 2000.

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-33
Date Collected	05-01-00	05-01-00
Lab Code	KSO-2847	KSO-2852
Gross alpha	7.12 ± 3.15	7.97 ± 3.23
Gross beta	30.66 ± 3.21	29.74 ± 3.43
Sr-89	< 0.045	< 0.046
Sr-90	0.052 ± 0.014	< 0.019
Be-7	< 0.22	< 0.23
K-40	19.97 ± 0.81	19.52 ± 0.82
Nb-95	< 0.020	< 0.026
Zr-95	< 0.019	< 0.029
Ru-103	< 0.025	< 0.028
Ru-106	< 0.093	< 0.15
Cs-134	< 0.020	< 0.026
Cs-137	0.21 ± 0.030	0.055 ± 0.021
Ce-141	< 0.047	< 0.051
Ce-144	< 0.061	< 0.069

Location	K-3	K-35[a]
Date Collected	10-02-00	10-02-00
Lab Code	KSO-7295	KSO-7300
Gross alpha	8.04 ± 2.84	7.17 ± 2.75
Gross beta	27.55 ± 2.85	25.17 ± 2.97
Sr-89	< 0.099	< 0.078
Sr-90	0.041 ± 0.014	0.053 ± 0.016
Be-7	< 0.31	< 0.37
K-40	19.16 ± 1.00	17.63 ± 0.72
Nb-95	< 0.032	< 0.060
Zr-95	< 0.058	< 0.041
Ru-103	< 0.026	< 0.032
Ru-106	< 0.18	< 0.17
Cs-134	< 0.038	< 0.030
Cs-137	0.20 ± 0.042	0.19 ± 0.025
Ce-141	< 0.042	< 0.11
Ce-144	< 0.13	< 0.15

[a] Replaced K-33 in September, 2000.

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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-1a			
Date Collected	01-03-00	02-01-00	03-01-00
Lab Code	KSW-36	KSW-552	KSW-1163
Gross beta			
Suspended Solids	1.2 ± 0.6	< 0.3	< 1.3
Dissolved Solids	21.8 ± 1.7	11.5 ± 1.3	7.4 ± 1.0
Total Residue	23.0 ± 1.8	11.5 ± 1.3	7.4 ± 1.0
K-40 (f.p.)	18.17	8.65	5.19
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
K-1b			
Date Collected	01-03-00	02-01-00	03-01-00
Lab Code	KSW-37	KSW-553	KSW-1164
Gross beta			
Suspended Solids	0.6 ± 0.2	< 0.7	< 0.9
Dissolved Solids	3.2 ± 0.7	2.6 ± 0.8	4.6 ± 0.8
Total Residue	3.8 ± 0.7	2.6 ± 0.8	4.6 ± 0.8
K-40 (f.p.)	1.73	1.04	3.20
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-1a			
Date Collected	04-03-00	05-01-00	06-01-00
Lab Code	KSW-1967, 8	KSW-2996	KSW-3779
Gross beta			
Suspended Solids	< 0.7	< 0.6	< 0.4
Dissolved Solids	12.3 ± 0.9	9.7 ± 1.1	10.2 ± 1.2
Total Residue	12.3 ± 0.9	9.7 ± 1.1	10.2 ± 1.2
K-40 (f.p.)	7.91	7.79	7.35
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	04-03-00	05-01-00	06-01-00
Lab Code	KSW-1969	KSW-2997	KSW-3780
Gross beta			
Suspended Solids	< 0.7	< 0.6	< 0.4
Dissolved Solids	5.2 ± 0.8	4.5 ± 0.8	3.6 ± 0.7
Total Residue	5.2 ± 0.8	4.5 ± 0.8	3.6 ± 0.7
K-40 (f.p.)	2.68	2.34	2.60
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-1a			
Date Collected	07-06-00	08-01-00	09-05-00
Lab Code	KSW-4671	KSW-5538	KSW-6495
Gross beta			
Suspended Solids	1.8 ± 0.4	< 0.6	< 0.7
Dissolved Solids	10.2 ± 1.2	17.8 ± 1.3	23.1 ± 1.6
Total Residue	12.0 ± 1.3	17.8 ± 1.3	23.1 ± 1.6
K-40 (f.p.)	8.13	15.57	19.03
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	07-06-00	08-01-00	09-05-00
Lab Code	KSW-4672	KSW-5539	KSW-6496
Gross beta			
Suspended Solids	< 0.4	< 0.3	< 0.4
Dissolved Solids	3.3 ± 0.7	3.4 ± 0.6	4.6 ± 0.8
Total Residue	3.3 ± 0.7	3.4 ± 0.6	4.6 ± 0.8
K-40 (f.p.)	2.08	2.08	3.03
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-1a			
Date Collected	10-02-00	11-01-00	12-04-00
Lab Code	KSW-7355	KSW-8806	KSW-9715
Gross beta			
Suspended Solids	< 1.1	< 0.6	< 0.4
Dissolved Solids	20.3 ± 1.4	16.8 ± 1.3	18.9 ± 1.5
Total Residue	20.3 ± 1.4	16.8 ± 1.3	18.9 ± 1.5
K-40 (f.p.)	19.03	14.71	12.98
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	10-02-00	11-01-00	12-04-00
Lab Code	KSW-7356	KSW-8807	KSW-9716
Gross beta			
Suspended Solids	< 0.5	< 0.5	< 0.4
Dissolved Solids	4.3 ± 0.7	3.9 ± 0.6	4.5 ± 0.7
Total Residue	4.3 ± 0.7	3.9 ± 0.6	4.5 ± 0.7
K-40 (f.p.)	2.40	2.51	2.42
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	01-03-00	02-01-00	03-01-00
Lab Code	KSW-38	KSW-554	KSW-1165
Gross beta			
Suspended Solids	< 0.3	< 0.7	< 0.6
Dissolved Solids	3.1 ± 0.5	2.6 ± 0.7	2.4 ± 0.4
Total Residue	3.1 ± 0.5	2.6 ± 0.7	2.4 ± 0.4
K-40 (f.p.)	0.95	1.04	1.82
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	01-03-00	02-01-00	03-01-00
Lab Code	KSW-39	NS[a]	KSW-1166
Gross beta			
Suspended Solids	1.3 ± 0.5	-	< 2.0
Dissolved Solids	8.5 ± 1.5	-	11.0 ± 1.5
Total Residue	9.8 ± 1.6	-	11.0 ± 1.5
K-40 (f.p.)	6.40	-	8.56
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; sample not available; source 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-1d			
Date Collected	04-03-00	05-01-00	06-01-00
Lab Code	KSW-1970	KSW-2998	KSW-3781
Gross beta			
Suspended Solids	< 0.8	< 0.5	< 0.3
Dissolved Solids	2.3 ± 0.5	2.0 ± 0.6	2.2 ± 0.4
Total Residue	2.3 ± 0.5	2.0 ± 0.6	2.2 ± 0.4
K-40 (fp)	1.12	1.04	1.21
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	04-03-00	05-01-00	06-01-00
Lab Code	KSW-1971	KSW-2999	KSW-3782
Gross beta			
Suspended Solids	< 0.8	< 1.3	< 0.4
Dissolved Solids	4.8 ± 1.3	8.0 ± 1.9	4.3 ± 1.2
Total Residue	4.8 ± 1.3	8.0 ± 1.9	4.3 ± 1.2
K-40 (fp)	3.11	6.06	2.68
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	07-06-00	08-01-00	09-05-00
Lab Code	KSW-4673	KSW-5540	KSW-6497
Gross beta			
Suspended Solids	< 0.3	< 0.3	< 0.3
Dissolved Solids	2.4 ± 0.4	2.1 ± 0.4	2.6 ± 0.6
Total Residue	2.4 ± 0.4	2.1 ± 0.4	2.6 ± 0.6
K-40 (f.p.)	1.12	1.30	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-1e			
Date Collected	07-06-00	08-01-00	09-05-00
Lab Code	KSW-4674	KSW-5541	KSW-6498
Gross beta			
Suspended Solids	< 0.4	< 0.3	< 0.4
Dissolved Solids	7.3 ± 1.3	4.1 ± 1.0	6.4 ± 1.3
Total Residue	7.3 ± 1.3	4.1 ± 1.0	6.4 ± 1.3
K-40 (f.p.)	4.84	3.29	4.24
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

Note: Page 75 is intentionally left out.

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	10-02-00	11-01-00	12-04-00
Lab Code	KSW-7357	KSW-8808	KSW-9717
Gross beta			
Suspended Solids	< 0.5	< 0.3	< 0.3
Dissolved Solids	2.7 ± 0.4	1.8 ± 0.4	3.0 ± 0.5
Total Residue	2.7 ± 0.4	1.8 ± 0.4	3.0 ± 0.5
K-40 (f.p.)	1.21	1.21	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-1e			
Date Collected	10-02-00	11-01-00	12-04-00
Lab Code	KSW-7358	KSW-8809	KSW-9718
Gross beta			
Suspended Solids	< 0.7	< 1.3	< 0.4
Dissolved Solids	6.8 ± 1.2	6.7 ± 1.2	4.6 ± 1.3
Total Residue	6.8 ± 1.2	6.7 ± 1.2	4.6 ± 1.3
K-40 (f.p.)	4.15	6.14	2.51
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-1k			
Date Collected	01-03-00	02-01-00	03-01-00
Lab Code	NS[a]	NS[a]	KSW-1167
Gross beta			
Suspended Solids	-	-	< 1.9
Dissolved Solids	-	-	8.2 ± 1.4
Total Residue	-	-	8.2 ± 1.4
K-40 (f.p.)		-	7.09
Mn-54	-	-	< 15
Fe-59	-	-	< 30
Co-58	-	-	< 15
Co-60	-	-	< 15
Zn-65	-	-	< 30
Zr-Nb-95	-	-	< 15
Cs-134	-	-	< 10
Cs-137	-	-	< 10
Ba-La-140	-	-	< 15
Date Collected	04-03-00	05-01-00	06-01-00
Lab Code	KSW-1972	KSW-3000	KSW-3783
Gross beta			
Suspended Solids	< 1.1	< 1.7	< 0.4
Dissolved Solids	15.0 ± 1.7	15.7 ± 2.2	12.4 ± 1.6
Total Residue	15.0 ± 1.7	15.7 ± 2.2	12.4 ± 1.6
K-40 (f.p.)	8.13	9.52	6.92
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

[a] NS= No sample; sample not available; pond frozen.

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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-1k			
Date Collected	07-06-00	08-01-00	09-05-00
Lab Code	KSW-4675	KSW-5542	KSW-6499
Gross beta			
Suspended Solids	< 0.8	< 1.9	< 1.2
Dissolved Solids	5.9 ± 1.2	9.6 ± 1.2	13.0 ± 1.5
Total Residue	5.9 ± 1.2	9.6 ± 1.2	13.0 ± 1.5
K-40 (f.p.)	2.08	3.63	11.25
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
Date Collected	10-02-00	11-01-00	12-04-00
Lab Code	KSW-7359	KSW-8810	KSW-9719
Gross beta			
Suspended Solids	< 1.4	< 1.2	< 0.5
Dissolved Solids	20.4 ± 1.9	13.5 ± 1.6	31.6 ± 2.4 [a]
Total Residue	20.4 ± 1.9	13.5 ± 1.6	31.6 ± 2.4
K-40 (f.p.)	18.17	10.38	11.25
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

[a] Beta repeated; result = 29.4±2.3 pCi/L.

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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)						
Control						
K-9						
Date Collected	01-03-00		02-01-00		03-01-00	
Lab Code	KSW-40 (Raw)	KSW-41 (Tap)	KSW-556 (Raw)	KSW-557 (Tap)	KSW-1168 (Raw)	KSW-1169 (Tap)
Gross beta						
Suspended Solids	< 0.4	< 0.4	< 0.8	< 0.7	< 1.4	< 0.6
Dissolved Solids	3.0 ± 0.8	2.0 ± 0.4	2.4 ± 0.8	1.8 ± 0.7	2.0 ± 0.7	2.7 ± 0.5
Total Residue	3.0 ± 0.8	2.0 ± 0.4	2.4 ± 0.8	1.8 ± 0.7	2.0 ± 0.7	2.7 ± 0.5
K-40 (fp)	0.95	1.04	1.04	1.04	1.21	1.30
Mn-54	< 15	< 15	< 15	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30	< 30	< 30	< 30
Co-58	< 15	< 15	< 15	< 15	< 15	< 15
Co-60	< 15	< 15	< 15	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15	< 15	< 15	< 15
Date Collected	04-03-00		05-01-00		06-01-00	
Lab Code	KSW-1973 (Raw)	KSW-1974 (Tap)	KSW-3001 (Raw)	KSW-3002 (Tap)	KSW-3784 (Raw)	KSW-3785 (Tap)
Gross beta						
Suspended Solids	< 0.4	< 0.4	< 0.8	< 0.5	< 0.3	< 0.4
Dissolved Solids	2.5 ± 0.7	2.1 ± 0.4	3.3 ± 1.2	1.9 ± 0.4	2.1 ± 0.7	1.7 ± 0.4
Total Residue	2.5 ± 0.7	2.1 ± 0.4	3.3 ± 1.2	1.9 ± 0.4	2.1 ± 0.7	1.7 ± 0.4
K-40 (fp)	1.12	1.30	1.04	0.95	1.12	1.12
Mn-54	< 15	< 15	< 15	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30	< 30	< 30	< 30
Co-58	< 15	< 15	< 15	< 15	< 15	< 15
Co-60	< 15	< 15	< 15	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15	< 15	< 15	< 15

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

Sample Description and Concentration (pCi/L)						
Control						
K-9						
Date Collected	07-06-00		08-01-00		09-05-00	
Lab Code	KSW-4676 (Raw)	KSW-4677 (Tap)	KSW-5543 (Raw)	KSW-5544 (Tap)	KSW-6500 (Raw)	KSW-6501 (Tap)
Gross beta						
Suspended Solids	0.5 ± 0.2	< 0.4	< 0.4	< 0.3	< 0.3	< 0.4
Dissolved Solids	3.1 ± 0.8	2.2 ± 0.4	3.0 ± 0.7	2.6 ± 0.4	2.7 ± 0.7	2.6 ± 0.5
Total Residue	3.6 ± 0.8	2.2 ± 0.4	3.0 ± 0.7	2.6 ± 0.4	2.7 ± 0.7	2.6 ± 0.5
K-40 (fp)	1.04	1.12	1.04	1.21	1.12	1.12
Mn-54	< 15	< 15	< 15	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30	< 30	< 30	< 30
Co-58	< 15	< 15	< 15	< 15	< 15	< 15
Co-60	< 15	< 15	< 15	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15	< 15	< 15	< 15
Date Collected	10-02-00		11-01-00		12-04-00	
Lab Code	KSW-7360 (Raw)	KSW-7361 (Tap)	KSW-8811 (Raw)	KSW-8812 (Tap)	KSW-9720 (Raw)	KSW-9721 (Tap)
Gross beta						
Suspended Solids	< 0.4	< 0.4	< 0.3	< 0.4	< 0.4	< 0.4
Dissolved Solids	3.1 ± 0.8	2.2 ± 0.4	2.3 ± 0.7	1.9 ± 0.4	2.5 ± 0.7	2.1 ± 0.4
Total Residue	3.1 ± 0.8	2.2 ± 0.4	2.3 ± 0.7	1.9 ± 0.4	2.5 ± 0.7	2.1 ± 0.4
K-40 (fp)	1.12	1.12	1.21	1.30	1.04	1.21
Mn-54	< 15	< 15	< 15	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30	< 30	< 30	< 30
Co-58	< 15	< 15	< 15	< 15	< 15	< 15
Co-60	< 15	< 15	< 15	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30	< 30	< 30	< 30
Zr-Nb-95	< 15	< 15	< 15	< 15	< 15	< 15
Cs-134	< 10	< 10	< 10	< 10	< 10	< 10
Cs-137	< 10	< 10	< 10	< 10	< 10	< 10
Ba-La-140	< 15	< 15	< 15	< 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	01-03-00	02-01-00	03-01-00
Lab Code	KSW-42	KSW-558	KSW-1170
Gross beta			
Suspended Solids	< 0.4	< 0.8	1.4 ± 0.6
Dissolved Solids	3.5 ± 0.6	3.1 ± 1.0	4.2 ± 0.7
Total Residue	3.5 ± 0.6	3.1 ± 1.0	5.6 ± 0.9
K-40 (fp)	1.04	1.04	3.29
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	01-03-00	02-01-00	03-01-00
Lab Code	KSW-43	KSW-559	KSW-1171
Gross beta			
Suspended Solids	< 0.4	< 0.9	< 1.0
Dissolved Solids	3.3 ± 0.6	3.9 ± 0.9	4.4 ± 0.7
Total Residue	3.3 ± 0.6	3.9 ± 0.9	4.4 ± 0.7
K-40 (fp)	1.12	1.12	3.20
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	04-03-00	05-01-00	06-01-00
Lab Code	KSW-1975	KSW-3003, 4	KSW-3786
Gross beta			
Suspended Solids	< 0.5	< 0.5	< 0.3
Dissolved Solids	3.0 ± 0.7	5.2 ± 0.5	3.7 ± 0.6
Total Residue	3.0 ± 0.7	5.2 ± 0.5	3.7 ± 0.6
K-40 (fp)	1.64	1.08	1.38
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
	< 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	04-03-00	05-01-00	06-01-00
Lab Code	KSW-1976	KSW-3005	KSW-3787
Gross beta			
Suspended Solids	< 0.4	< 1.1	< 0.4
Dissolved Solids	2.6 ± 0.6	4.9 ± 0.8	3.8 ± 0.6
Total Residue	2.6 ± 0.6	4.9 ± 0.8	3.8 ± 0.6
K-40 (fp)	1.64	1.21	1.47
Mn-54	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30
Co-58	< 15	< 15	< 15
Co-60	< 15	< 15	< 15
	< 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	07-06-00	08-01-00	09-05-00
Lab Code	KSW-4678	KSW-5545	KSW-6502
Gross beta			
Suspended Solids	< 0.4	< 0.4	< 0.4
Dissolved Solids	4.3 ± 0.7	3.1 ± 0.6	2.6 ± 0.7
Total Residue	4.3 ± 0.7	3.1 ± 0.6	2.6 ± 0.7
K-40 (fp)	1.21	1.21	1.21
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	07-06-00	08-01-00	09-05-00
Lab Code	KSW-4679	KSW-5546	KSW-6503
Gross beta			
Suspended Solids	< 0.3	< 0.4	< 0.3
Dissolved Solids	3.0 ± 0.6	3.3 ± 0.6	3.5 ± 0.7
Total Residue	3.0 ± 0.6	3.3 ± 0.6	3.5 ± 0.7
K-40 (fp)	1.21	1.12	1.21
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

Note: Page 83 is intentionally left out.

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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	10-02-00	11-01-00	12-04-00
Lab Code	KSW-7362	KSW-8813	KSW-9722
Gross beta			
Suspended Solids	< 0.4	< 0.4	< 0.3
Dissolved Solids	2.9 ± 0.7	2.4 ± 0.6	3.3 ± 0.6
Total Residue	2.9 ± 0.7	2.4 ± 0.6	3.3 ± 0.6
K-40 (fp)	1.21	1.21	1.73
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	10-02-00	11-01-00	12-04-00
Lab Code	KSW-7363	KSW-8814	KSW-9723
Gross beta			
Suspended Solids	< 0.4	< 0.3	< 0.3
Dissolved Solids	2.9 ± 0.7	2.8 ± 0.6	2.3 ± 0.7
Total Residue	2.9 ± 0.7	2.8 ± 0.6	2.3 ± 0.7
K-40 (fp)	1.38	1.38	1.30
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 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	KSW -2466	< 330	< 1.0	0.6 ± 0.3
2nd Quarter	-4612	< 330	< 1.1	0.5 ± 0.3
3rd Quarter	-6504	< 330	< 0.8	< 0.7
4th Quarter	-10411	< 330	< 0.8	< 0.7
Annual mean ± s.d.		< 330	< 1.0	0.6 ± 0.1
K-1b				
1st Quarter	KSW -2467	< 330	< 0.9	0.5 ± 0.3
2nd Quarter	-4613	< 330	< 1.2	0.6 ± 0.3
3rd Quarter	-6505	< 330	< 0.8	< 0.7
4th Quarter	-10412	< 330	< 1.0	< 0.7
Annual mean ± s.d.		< 330	< 0.9	0.6 ± 0.1
K-1d				
1st Quarter	KSW -2468, 9	< 330	< 0.8	0.7 ± 0.3
2nd Quarter	-4614, 5	< 330	< 1.1	0.5 ± 0.2
3rd Quarter	-6506	< 330	< 0.7	< 0.6
4th Quarter	-10413	< 330	< 0.8	< 0.6
Annual mean ± s.d.		< 330	< 0.8	0.6 ± 0.1
K-1e				
1st Quarter	KSW -2470	< 330	< 0.9	< 0.4
2nd Quarter	-4616	< 330	< 1.3	< 0.6
3rd Quarter	-6507	< 330	< 1.4	< 0.5
4th Quarter	-10414	< 330	< 0.8	< 0.6
Annual mean ± s.d.		< 330	< 0.9	< 0.4

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 -2474	< 330	< 1.0	< 0.6
2nd Quarter	-4620	< 330	< 1.3	< 0.5
3rd Quarter	-6511	< 330	< 1.0	< 0.7
4th Quarter	-10418	< 330	< 0.8	< 0.6
Annual mean ± s.d.		< 330		
K-14b				
1st Quarter	KSW -2475	< 330	< 0.9	0.6 ± 0.3
2nd Quarter	-4621	< 330	< 1.4	< 0.6
3rd Quarter	-6512	< 330	< 0.9	< 0.5
4th Quarter	-10419	< 330	< 0.8	< 0.7
Annual mean ± s.d.		< 330	< 1.4	0.6 ± 0.3
K-1k				
1st Quarter	KSW -2471	< 330	< 1.0	< 0.7
2nd Quarter	-4617	< 330	< 1.2	< 0.5
3rd Quarter	-6508	< 330	< 0.9	0.8 ± 0.3
4th Quarter	-10415	< 330	< 0.8	< 0.7
Annual mean ± s.d.		< 330	< 1.2	< 0.7
Control				
K-9				
1st Quarter	KSW -2472 (Raw)	< 330	< 0.9	< 0.5
	-2473 (Tap)	< 330	< 1.0	0.8 ± 0.4
2nd Quarter	KSW -4618 (Raw)	< 330	< 1.1	< 0.5
	-4619 (Tap)	< 330	< 1.1	< 0.5
3rd Quarter	KSW 6509 (Raw)	< 330	< 0.9	< 1.0
	6510 (Tap)	< 330	< 1.0	< 0.6
4th Quarter	KSW 10416 (Raw)	< 330	< 2.2	< 2.0
	10417 (Tap)	< 330	< 1.0	< 1.0

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

Sample Description and Concentration (pCi/g wet)

Date Collected	04-13-00		06-26-00		07-10-00	
Lab Code	KF-2814		KF-4633		KF-5535	
Type	Sucker		Sucker		Burbot	
Portion	Flesh	Bones	Flesh	Bones	Flesh	Bones
Gross beta	2.23 ± 0.08	2.25 ± 0.59	3.71 ± 0.09	0.78 ± 0.24	2.33 ± 0.09	2.58 ± 0.43
Sr-89	NA[a]	< 0.27	NA[a]	< 0.22	NA[a]	< 0.15
Sr-90	NA	0.40 ± 0.09	NA	0.15 ± 0.06	NA	0.28 ± 0.06
K-40	1.74 ± 0.31	NA[a]	3.66 ± 0.37	NA[a]	2.39 ± 0.57	NA[a]
Mn-54	< 0.010	NA	< 0.009	NA	< 0.024	NA
Fe-59	< 0.038	NA	< 0.043	NA	< 0.12	NA
Co-58	< 0.009	NA	< 0.020	NA	< 0.048	NA
Co-60	< 0.007	NA	< 0.013	NA	< 0.024	NA
Cs-134	< 0.008	NA	< 0.009	NA	< 0.020	NA
Cs-137	0.029 ± 0.015	NA	< 0.015	NA	0.12 ± 0.032	NA

Date Collected	08-24-00		10-18-00		10-05-00	
Lab Code	KF-6394		KF-8515		KF-9459	
Type	Rainbow Trout		Salmon		Bullhead	
Portion	Flesh	Bones	Flesh	Bones	Flesh	Bones
Gross beta	3.53 ± 0.22	1.08 ± 0.39	3.23 ± 0.14	0.92 ± 0.30	2.39 ± 0.06	1.34 ± 0.44
Sr-89	NA[a]	< 0.32	NA[a]	< 0.06	NA[a]	< 0.26
Sr-90	NA	0.11 ± 0.03	NA	0.06 ± 0.02	NA	0.59 ± 0.07
K-40	3.12 ± 0.39	NA[a]	3.86 ± 0.41	NA[a]	2.09 ± 0.10	NA[a]
Mn-54	< 0.013	NA	< 0.013	NA	< 0.002	NA
Fe-59	< 0.033	NA	< 0.039	NA	< 0.037	NA
Co-58	< 0.020	NA	< 0.013	NA	< 0.009	NA
Co-60	< 0.006	NA	< 0.009	NA	< 0.005	NA
Cs-134	< 0.007	NA	< 0.019	NA	< 0.005	NA
Cs-137	< 0.016	NA	0.051 ± 0.018	NA	0.052 ± 0.005	NA

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

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

	Sample Description and Concentration			
	Indicators			Control
Location	K-1a	K-1b	K-1d	K-9
Date Collected	06-01-00	06-01-00	05-01-00	06-01-00
Lab Code	KSL-3819	KSL-3820	KSL-2815	KSL-3822
Gross beta	4.76 ± 0.12	4.21 ± 0.13	2.87 ± 0.39	2.33 ± 0.08
Sr-89	< 0.007	< 0.004	< 0.073	< 0.004
Sr-90	< 0.006	0.005 ± 0.002	0.083 ± 0.025	< 0.003
Be-7	< 0.12	0.28 ± 0.13	1.20 ± 0.34	< 0.14
K-40	4.48 ± 0.36	4.83 ± 0.51	1.33 ± 0.37	2.88 ± 0.38
Mn-54	< 0.011	< 0.018	< 0.019	< 0.011
Co-58	< 0.008	< 0.012	< 0.020	< 0.010
Co-60	< 0.003	< 0.015	< 0.020	< 0.012
Nb-95	< 0.013	< 0.009	< 0.020	< 0.011
Zr-95	< 0.011	< 0.026	< 0.017	< 0.022
Ru-103	< 0.007	< 0.018	< 0.025	< 0.009
Ru-106	< 0.058	< 0.14	< 0.15	< 0.083
Cs-134	< 0.011	< 0.013	< 0.019	< 0.009
Cs-137	< 0.008	< 0.020	0.066 ± 0.025	< 0.013
Ce-141	< 0.023	< 0.032	< 0.045	< 0.022
Ce-144	< 0.058	< 0.10	< 0.11	< 0.073
Location	K-1e	K-1k	K-14	K-14
Date Collected	05-01-00	06-01-00	05-01-00	06-01-00
Lab Code	KSL-2816	KSL-3821	KSL-2817	KSL-3823
Gross beta	3.11 ± 0.44	3.81 ± 0.10	3.52 ± 0.49	4.39 ± 0.55
Sr-89	< 0.077	< 0.005	< 0.27	< 0.093
Sr-90	0.19 ± 0.034	0.008 ± 0.003	< 0.086	0.11 ± 0.052
Be-7	< 0.48	< 0.13	< 0.44	< 0.45
K-40	1.65 ± 0.44	3.48 ± 0.43	1.48 ± 0.40	2.69 ± 0.55
Mn-54	< 0.013	< 0.009	< 0.013	< 0.020
Co-58	< 0.023	< 0.007	< 0.020	< 0.020
Co-60	< 0.013	< 0.009	< 0.022	< 0.020
Nb-95	< 0.020	< 0.014	< 0.024	< 0.024
Zr-95	< 0.044	< 0.039	< 0.053	< 0.030
Ru-103	< 0.024	< 0.017	< 0.017	< 0.020
Ru-106	< 0.15	< 0.070	< 0.13	< 0.17
Cs-134	< 0.014	< 0.016	< 0.022	< 0.031
Cs-137	0.035 ± 0.019	< 0.011	0.054 ± 0.019	< 0.033
Ce-141	< 0.031	< 0.035	< 0.036	< 0.026
Ce-144	< 0.066	< 0.12	< 0.066	< 0.064

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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	07-06-00	07-06-00	09-05-00	09-05-00
Lab Code	KSL-4634	KSL-4635	KSL-6453	KSL-6454
Gross beta	4.77 ± 0.11	1.84 ± 0.05	2.54 ± 0.10	2.56 ± 0.07
Sr-89	< 0.007	< 0.008	< 0.020	< 0.007
Sr-90	< 0.004	< 0.005	0.030 ± 0.010	0.016 ± 0.004
Be-7	0.23 ± 0.12	< 0.16	0.39 ± 0.13	< 0.34
K-40	4.84 ± 0.40	2.73 ± 0.25	3.00 ± 0.29	3.10 ± 0.58
Mn-54	< 0.012	< 0.008	< 0.011	< 0.026
Co-58	< 0.011	< 0.012	< 0.009	< 0.017
Co-60	< 0.011	< 0.006	< 0.009	< 0.016
Nb-95	< 0.021	< 0.008	< 0.010	< 0.019
Zr-95	< 0.021	< 0.019	< 0.011	< 0.056
Ru-103	< 0.014	< 0.008	< 0.008	< 0.021
Ru-106	< 0.07	< 0.050	< 0.075	< 0.217
Cs-134	< 0.007	< 0.010	< 0.008	< 0.029
Cs-137	< 0.013	< 0.008	< 0.011	< 0.025
Ce-141	< 0.022	< 0.023	< 0.011	< 0.042
Ce-144	< 0.085	< 0.053	< 0.057	< 0.170

Location	K-1e	K-1k	K-14
Date Collected	07-06-00	07-06-00	07-06-00
Lab Code	KSL-4636, 7	KSL-4638	KSL-4639
Gross beta	2.55 ± 0.23	4.63 ± 0.09	4.27 ± 0.30
Sr-89	< 0.064	< 0.007	< 0.061
Sr-90	0.045 ± 0.017	0.012 ± 0.003	0.040 ± 0.021
Be-7	0.75 ± 0.11	< 0.081	< 0.32
K-40	1.22 ± 0.15	< 0.20	2.07 ± 0.24
Mn-54	< 0.011	< 0.010	< 0.011
Co-58	< 0.012	< 0.006	< 0.016
Co-60	< 0.013	< 0.010	< 0.014
Nb-95	< 0.019	< 0.013	< 0.010
Zr-95	< 0.030	< 0.024	< 0.016
Ru-103	< 0.017	< 0.011	< 0.014
Ru-106	< 0.12	< 0.064	< 0.082
Cs-134	< 0.013	< 0.013	< 0.012
Cs-137	< 0.014	< 0.015	0.052 ± 0.015
Ce-141	< 0.020	< 0.020	< 0.024
Ce-144	< 0.078	< 0.080	< 0.070

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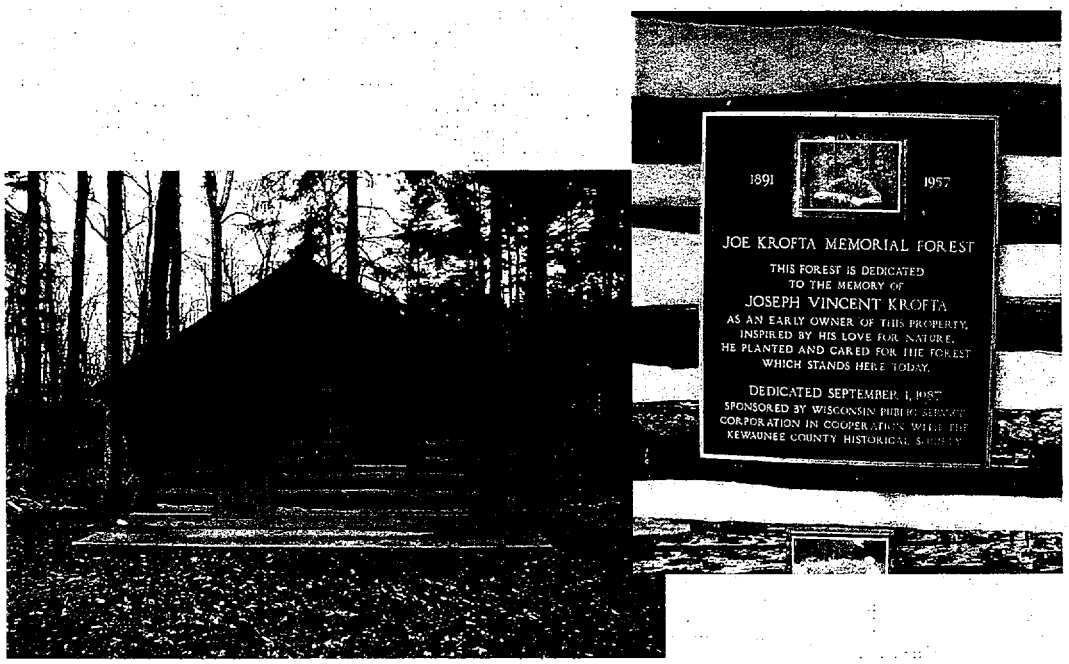
Table 28. Bottom sediment samples, analyses for gross beta, strontium-89, strontium-90, and gamma-emitting isotopes.
Collection: May and November

Sample Description and Concentration (pCi/g dry)

	Indicator				Control
Location	K-1c	K-1d	K-1j	K-14	K-9
Collection Date	05-01-00	05-01-00	05-01-00	05-01-00	05-01-00
Lab Code	KBS-2987	KBS-2988	KBS-2989	KBS-2991	KBS-2990
Gross beta	7.55 ± 1.34	6.06 ± 1.37	12.00 ± 1.42	7.30 ± 1.22	5.84 ± 1.18
Sr-89	< 0.091	< 0.092	< 0.11	< 0.077	< 0.079
Sr-90	0.025 ± 0.010	< 0.014	< 0.019	< 0.014	< 0.015
K-40	6.44 ± 0.41	6.31 ± 0.41	8.66 ± 0.47	7.70 ± 0.43	4.42 ± 0.34
Co-58	< 0.013	< 0.011	< 0.012	< 0.010	< 0.009
Co-60	< 0.012	< 0.012	< 0.013	< 0.013	< 0.010
Cs-134	< 0.012	< 0.010	< 0.008	< 0.010	< 0.012
Cs-137	0.037 ± 0.015	< 0.013	0.025 ± 0.013	0.016 ± 0.008	0.024 ± 0.012
Location	K-1c	K-1d	K-1j	K-14	K-9
Collection Date	11-01-00	11-01-00	11-01-00	11-01-00	11-01-00
Lab Code	KBS-8577	KBS-8578	KBS-8579	KBS-8581	KBS-8580
Gross beta	8.20 ± 1.30	9.41 ± 1.36	8.62 ± 1.27	11.30 ± 1.41	6.54 ± 1.17
Sr-89	< 0.053	< 0.047	< 0.046	< 0.100	< 0.059
Sr-90	< 0.020	< 0.019	< 0.019	< 0.038	< 0.027
K-40	7.56 ± 0.52	6.96 ± 0.32	7.97 ± 0.59	6.12 ± 0.46	5.36 ± 0.46
Co-58	< 0.016	< 0.013	< 0.018	< 0.019	< 0.017
Co-60	< 0.016	< 0.012	< 0.010	< 0.013	< 0.009
Cs-134	< 0.019	< 0.017	< 0.023	< 0.016	< 0.020
Cs-137	0.033 ± 0.014	0.038 ± 0.013	0.041 ± 0.021	< 0.015	< 0.018

ANNUAL REPORT PART III

PROGRAM SELF-ASSESSMENT AND PROGRAM CHANGES



Kewaunee's School Forest and
wetlands restoration project south of the plant

Kewaunee Nuclear Power Plant
Annual Radiological Environmental Monitoring Program

Program Self-Assessment

Section 2.4.1.c of the Kewaunee Radiological Environmental Monitoring Manual (REMM) states in part:

> *"The annual Radiological Environmental Monitoring Report shall include ... discussion of all deviations from the sampling schedule of Table 2.2.1-A ...."*

The following is a brief description of the events that occurred during 2000, which deviated from the requirements of the sampling schedule of Table 2.2.1-A. Also included are those items identified in Kewaunee's Assessment Program (KAP) as deviations, descrepancies, and/or problems encountered in the program as a whole.

NOTE: Part I, pg 6 also includes a list of missed samples identified by Environmental, Inc.

1. On 3/9/2000, K-1f (MET Tower) Environmental Air Monitoring pump motor bearings were failing. The pump was found noisy when running in the field. Maintenance replaced the motor bearings on 3/27/00. The flow as check under procedure HP 7.63. (KAP WO 00-000531-000)

2. Document the loss of three milk sample locations and the acceptability of their replacements until the REMM can be formally revised. In the Spring of 2000, the Novitsky Farm (K-6) retired from farming. The Novitsky Farm (K-6) was replaced by the Holly Farm (K-33). In the Fall of 2000, the Holly farm (K-33) no longer wished to participate and was replaced by the Ducat Farm (K-35). In the Summer of 2000, the Paral Farm (K-19) retired from farming and was replaced by the Struck Farm (K-34). In the Summer of 2000, the Stangel Farm (K-4) was sold and no longer had milking animals. The Stangel farm (K-4) was replaced by the Wotacheck Farm (K-25). The LeCaptain Farm (K-12) also retired from farming. A suitable location for a replacement was not found. Kewaunee's REMM has more sampling locations than what is required by NUREG-0472. The REMM is currently in revision to document the changes and will be included in the 2001 Annual Report. (KAP WO 00-001710-000)

3 During the performance of SP-63-164 on 6/13/2000, Environmental Sample Collections, we could not obtain a milk sample from K-5 (Paplham Farm) because the farm burned down. This sample is required by SP-63-164 but is listed as an alternate in Table 2.2.1-A of the REMM. Minimum required samples as listed in the REMM were met. The farm was subsequently rebuilt and sample collection resumed. (KAP WO 00-002086-000)

4. During performance of SP-63-164 on 7/18/2000, Environmental Sample Collection was performed without a necessary temporary change. A new farm (see item 2 above) K-34 was substituted for K-19. SP-63-164 was not changed to reflect this prior to the procedure being performed. The procedure has been changed. (KAP WO 00-002529-000)

5. On 8/2/2000, A Nuclear Regulatory Commission (NRC) Inspector raised questions in regards to the Environmental Air Sampler Configuration. The KAP was written to evaluate the existing configuratiuon and document acceptance and any changes required. During NRC Inspection 2000-16, Inspectors visited four air sampler stations and found filter assemblies configured differently from what is described in the original manufactures literature. This gave rise to the questions on whether the samplers were providing results representaitve of the actual aiborne environment. Reasons for the change in the sampler configuration were reseaarched and actual sample results from those air samplers were compared to other samplers whose configuration had not been altered. Comparative analysis showed virtually no differences in results between samplers. Therfore it was concluded that the samplers having the changed configuration were indeed collecting representative samples. The quality of the Radiological Environmental Monitoring Program was at no time degraded. NRC Inspection 200-16 was subsequently closed with no findings in the area of environmental air sampling. (KAP WO 00-002675-000)

6. On 8/15/00, the following problems were reported by the Chemistry Technologist assign to take the environmental samples. 1.) Sample location K-12 (LeCaptain Farm) – Unable to collect sample because they are no longer milking. According to the farmer, the herd was sold approximately 2 weeks ago. 2.) Sample location K-5 (Paplham Farm) – The barn has been rebuilt and the farm is milking again. The farm is now operated by the son of the former owner and he stated that it was OK for us to resume sampling. 3.) Sample location K-33 (Holly Farm) – Owner of the farm inquired about who was supposed to give him payment for milk samples and wanted it passed on that he wanted to be paid. Sanple K-12 was removed from the program, sample K-5 was continued in the program, and sample K-33 was replaced by K-35 (See Item 2 above). Also the KNPP implemented a new payment program for the farmers who continued in the milk sampling program. (KAP WO 00-002863-000).

7. On 9/5/2000, the Environmental Air Sampler (K-8) at the Tisch Mills Church was found with it's breaker tripped and not running. The air sampler accumulated 111.3 hours of run time prior to the trip. Investigation revealed that the breaker was tripped by a recent storm in the area. The breaker was reset. The sampler was rechecked on 9/12/00 and was found to be operating properly. (KAP WO 00-003124-000)

8. On 9/19/2000, when attempting to take an Environmental Milk Sample at K-33 (Holly Farm), the Chemistry Technologist was informed that the farmer would not allow us to take milk samples. The farmer did allow the Chemistry Technologist to take the sample he already had for 9/19/2000. K-33 was replaced by K-35, see item 2 above. (KAP WO 00-003271-000).

9. On 9/19/2000, was notified that the Environmental Milk Sample location K-4 (Stangel Farm) has sold his cows and will no longer provide milk samples. K-4 was replaced by K-25, see item 2 above. (KAP WO 00-003272-000)

10. On 11/28/2000 it was identified that the Environmental Air Sampler at K-16 (Green Bay location) was not running. It appeared that the air pump was frozen or the motor was burned out. The bad air sampler was replaced with the in-stock spare following the requirements of procedure PMP 63-01. (KAP WO 00-004090-000).

Program Changes

There were several identified program changes, but do to the timing of the changes and the required review process to change the Radiological Environmental Monitoring Manual (10CFR50.59 Safety Review), the manual was not changed until the calender year 2001. The new updated manual will be included in the 2001 report.