

KEWAUNEE NUCLEAR POWER PLANT

**ANNUAL
ENVIRONMENTAL MONITORING REPORT
JANUARY - DECEMBER 1996**

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**WISCONSIN PUBLIC SERVICE CORPORATION
WISCONSIN POWER & LIGHT COMPANY
MADISON GAS & ELECTRIC COMPANY**



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REPORT TO

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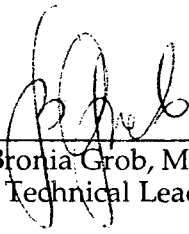
RADIOLOGICAL MONITORING PROGRAM FOR
THE KEWAUNEE NUCLEAR POWER PLANT
KEWAUNEE, WISCONSIN

ANNUAL REPORT - PART I
SUMMARY AND INTERPRETATION
January - December 1996

PREPARED AND SUBMITTED
BY
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PROJECT NO. 8002

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15 April 1997

PREFACE

The staff members of the Teledyne Brown Engineering Environmental Services, Midwest Laboratory (TBESML) were responsible for the acquisition of data presented in this report. Assistance in sample collection was provided by Wisconsin Public Service Corporation personnel. The report was prepared by staff members of Teledyne Brown Engineering Environmental Services, Midwest Laboratory.

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1.0 INTRODUCTION

The Kewaunee Nuclear Power Plant is a 535 megawatt pressurized water reactor located on the Wisconsin shore of Lake Michigan in Kewaunee County. The Kewaunee Nuclear Power 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 1996.

Wisconsin Public Service Corporation, 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. Mark Reinhart, Superintendent of Radiation Protection at (414) 433-2560.

2.0 SUMMARY

Results of sample analyses during the period January - December 1996 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-15 and K-16), and dispatched by mail to TIML for radiometric analysis. The material on the filter is counted for gross beta activity approximately five days after receipt to allow for decay of naturally-occurring short-lived radionuclides.

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

Airborne Iodine

Charcoal filters are located at locations K-1f, K-2, K-7, K-8, K-15 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 air 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 $\text{CaSO}_4:\text{Dy}$ 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 by liquid scintillation.

3.1.2 The Terrestrial Program

Milk

Milk samples are collected semimonthly (one gallon from each location) from May through October, and monthly (two gallons from each location) 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 milk 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 water samples are 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.

Gross beta and gamma spectroscopic analyses are performed on the total residue of 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 also analyzed for gross alpha. Water from one on-site well (K-1g) is also analyzed for tritium, strontium-89 and strontium-90.

Domestic Meat

Domestic meat samples (chickens) are obtained annually (in the third quarter) at locations K-20, K-24, K-27, and K-29. The flesh is separated from the bones, gamma scanned and analyzed for gross alpha and gross beta activities.

Eggs

Eggs are collected quarterly at locations K-24 or K-27. The samples are gamma scanned and analyzed for gross beta, strontium-89 and strontium-90 activities.

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 gamma scanned and analyzed for gross beta, strontium-89 and strontium-90 activities.

Grass and Cattle Feed

Grass samples are 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, strontium-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, that 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. Additionally, 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. Water samples at K-14 are collected and analyzed in duplicate.

The water samples are gamma scanned and analyzed for gross beta activity in the 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. The tritium activity is determined by liquid scintillation technique. Quarterly composites of monthly grab samples are also 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), and from three creek locations (K-1a, K-1b and K-1e), 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. Since it is known that the measured radioactivity per unit mass of sediment increases with decreasing particle size, 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 as described in the preceding sections, with the following exceptions:

No TLD sample was available at location K-27 for the fourth quarter of 1996. The TLD was lost in the field.

No domestic meat sample was available at location K-20 and K-27 during 1996.

3.1.5 Program Modifications

There were no program modifications made in 1996.

3.2 Results and Discussion

The results for the reporting period January to December 1996 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 Isotopes Midwest Laboratory or its predecessor, Hazleton Environmental Sciences.

The tabulated results of all measurements made in 1996 are not included in this section, although references to these results will be made in the discussion. The complete tabulation of the 1996 results is contained in Part II of the 1996 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 reported atmospheric nuclear tests in 1996. The last reported test was conducted by the People's Republic of China on October 16, 1980. The reported yield was in the 200 kiloton to 1 megaton range.

There were no reported accidents at nuclear facilities in 1996.

3.2.2 The Air Environment

Airborne Particulates

In air particulates, the annual gross beta concentration at indicator and control locations measured 0.020 and 0.019 pCi/m³, respectively. These concentrations were equal or slightly lower than in 1988 (0.025 and 0.023 pCi/m³, respectively), in 1989 (0.025 and 0.024 pCi/m³, respectively), in 1990 (0.024 pCi/m³ at both locations), in 1991 and in 1992 (0.018 and 0.019 pCi/m³, respectively), in 1993 (0.020 pCi/m³ at both locations), in 1994 (0.016 and 0.018 pCi/m³, respectively) and in 1995 (0.019 and 0.018 pCi/m³, respectively).

Gamma spectroscopic analyses 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 0.03 pCi/m³ 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.

The quarterly TLDs at the indicator locations measured a mean dose equivalent of $(15.9 \pm 2.3 \text{ mR/91 days})^*$, in agreement with the mean at the control locations of $(14.9 \pm 1.9 \text{ mR/91 days})^*$, and were similar to the means obtained in 1988 (18.0 and 17.4 mR/91 days, respectively), in 1989 (17.5 and 16.9 mR/91 days, respectively), in 1990 (14.4 mR/91 days at both indicator and control locations), in 1991 (13.7 and 12.5 mR/91 days, respectively), in 1992 (15.0 and 13.8 mR/91 days, respectively), in 1993 (15.0 and 13.8 mR/91 days, respectively), in 1994 (14.8 and 13.8 mR/91 days, respectively) and in 1995 (16.7 and 15.6 mR/91 days, respectively). All 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 18.6 mR/91 days, measured at the indicator location K-7.

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

Strontium-89 concentrations were below the LLD level of 2.4 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 (1.6 and 1.5 pCi/L, respectively) and were nearly identical to those in 1989 (1.6 and 1.7 pCi/L, respectively), in 1990 (1.7 and 1.6 pCi/L, respectively), in 1991 (1.6 and 1.7 pCi/L, respectively), in 1992 (1.7 and 1.6 pCi/L, respectively), in 1993 (1.7 and 1.4 pCi/L, respectively), in 1994 (1.7 and 1.5 pCi/L, respectively) and in 1995 (1.6 pCi/L at both indicator and control locations).

Barium-Lanthanum-140 concentrations were below the LLD of 15 pCi/L in all samples. Cesium-137 concentrations were below the LLD of 10 pCi/L in all samples.

Potassium-40 results were similar at both the indicator and control locations (1440 and 1420 pCi/L, respectively), and were essentially identical to the levels observed in 1978 through 1995.

*Unless otherwise indicated, uncertainties of average values are standard deviations of the individual measurements over the period averaged. The uncertainty for each location corresponds to the two-standard deviation error of the average dose of eight dosimeters placed at the location.

Milk (continued)

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-90 in the bones. Consequently, the 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. No statistically significant variations in the ratios were observed. 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 concentration was measured at the two on-site wells, (K-1g and K-1h) and averaged 4.8 pCi/L.

Gross beta concentration in well water averaged 1.4 pCi/L in samples from the control location. The mean value for all indicator locations was 3.6 pCi/L, similar to values observed in 1977 through 1995 (3.3, 3.4, 3.0, 3.0, 3.6, 3.2, 2.9, 2.3, 2.6, 2.5, 2.1, 3.3, 2.5, 2.0, 2.2, 2.6, 2.2, 2.0 and 2.6 pCi/L respectively). The differences between mean gross beta concentrations are not statistically significant because the counting uncertainties of the individual measurements are typically 0.3 to 1.3 pCi/L in all samples.

Tritium concentration in the on-site well (K-1g) was below the LLD of 330 pCi/L in all samples.

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

The concentration of strontium-89 in well water was below the detection limit of 1.1 pCi/L. Low levels of strontium-90 were detected in two of four samples tested and averaged 1.1 pCi/L.

Potassium-40 averages were quite low (under 1.7 pCi/L), in agreement with previously measured values.

Domestic Meat

In meat (chickens), gross alpha concentration was below the LLD level of 0.05 pCi/g wet weight in all samples. Gross beta concentration averaged 3.50 pCi/g wet weight for indicator locations and 3.66 pCi/g wet weight for the control location. The difference is 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 concentration averaged 1.08 pCi/g wet weight, similar to the concentration of the naturally-occurring potassium-40 observed in the samples (1.16 pCi/g). All other gamma-emitting isotopes were below their respective LLDs. The level of strontium-89 was below the LLD of 0.004 pCi/g wet weight in all samples. Strontium-90 was below the LLD level of 0.002 pCi/g wet weight in all samples.

Vegetables

In vegetables, gross beta concentrations were similar at both the indicator and control locations (2.48 pCi/g wet weight and 2.61 pCi/g wet weight, respectively) and was due primarily to potassium-40 activity. Strontium-89 was below the LLD level of 0.005 pCi/g wet weight in all samples. Strontium-90 activity was detected in one sample at a level of 0.009 pCi/g wet.

All other gamma-emitting isotopes were below their respective LLD levels.

In addition to potassium-40, naturally-occurring beryllium-7 was detected in both oats and clover samples. These samples were of similar radioisotopic composition to the vegetables, but the concentration of radionuclides was slightly higher due to the lower water content of oats and clover.

Grass and Cattle Feed

In grass, mean gross beta concentrations were similar at both indicator and control locations (6.26 and 6.56 pCi/g wet weight, 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 LLD's. Strontium-89 was below the LLD of 0.045 pCi/g wet weight in all samples. Strontium-90 activity was below the LLD of 0.012 pCi/g wet weight in all but one sample (0.019 pCi/g wet weight).

For cattlefeed, the mean gross beta concentration was lower at the control locations (7.21 pCi/g wet weight) than at indicator locations (9.92 pCi/g wet weight). The highest average gross beta level was in the samples from the indicator location K-5 (12.19 pCi/g wet weight), and reflected the high potassium-40 level (12.92 pCi/g wet weight) observed in the samples. The pattern was similar to that observed in 1978 through 1995. Strontium-89 levels were below the LLD level of 0.023 pCi/g wet weight in all samples. Strontium-90 activity measured 0.033 pCi/g wet at the indicator locations, similar to that observed in 1995 (0.029 pCi/g wet weight). Measured activity at the control locations was 0.075 pCi/g wet weight, (0.026 pCi/g wet in 1995). The presence of the radiostrontium is attributable to fallout from previous nuclear testing. All other gamma-emitting isotopes were below their respective LLD levels.

Soil

No significant differences were found in gross alpha concentrations between indicator (8.27 pCi/g dry weight) and control (6.53 pCi/g dry weight) in soil samples. Mean gross beta levels were similar at indicator and control locations (25.62 and 24.64 pCi/g dry weight, respectively), and is primarily due to the potassium-40 activity. Strontium-89 was below the LLD level of 0.078 pCi/g dry weight in all samples. Strontium-90 was detected in nine of fourteen samples and levels were slightly higher at the indicator locations than at the control locations (0.070 and 0.044 pCi/g dry weight, respectively). Cesium-137 was detected in thirteen of fourteen samples and was identical at both indicator and control locations (0.17 pCi/g dry weight). Beryllium-7 was detected above the LLD level of 0.23 pCi/g dry weight in one sample collected at location K-1f and measured 0.60 pCi/g dry weight.

Soil (continued)

Potassium-40 was detected in all samples and averaged 20.13 and 19.99 pCi/g dry weight at indicator and control locations, respectively. All other gamma-emitting isotopes were below their respective LLD's. The levels of detected activities were similar to those observed from 1979 through 1995.

3.2.4 The Aquatic Environment

Surface Water

In surface water, mean gross beta activity in suspended solids was below the LLD level of 1.9 pCi/L in all samples. Mean gross beta concentration in dissolved solids was higher at indicator locations (4.3 pCi/L) as compared to the control locations (2.2 pCi/L) and was similar or identical to activities observed in 1978 (5.4 and 2.7 pCi/L), 1979 (5.7 and 2.7 pCi/L), 1980 (5.1 and 2.7 pCi/L), 1981 (4.3 and 2.7 pCi/L), 1982 (4.9 and 2.4 pCi/L), 1983 (5.1 and 2.6 pCi/L), 1984 (5.0 and 2.7 pCi/L), 1985 (5.6 and 2.7 pCi/L), 1986 (4.1 and 2.5 pCi/L), 1987 (5.3 and 2.5 pCi/L) in 1988 (4.8 and 3.6 pCi/L), in 1989 (5.7 and 3.0 pCi/L), in 1990 (4.1 and 2.6 pCi/L), in 1991 (5.1 and 2.2 pCi/L), in 1992 (4.5 and 2.2 pCi/L), in 1993 and 1994 (5.0 and 2.3 pCi/L) and in 1995 (4.3 and 2.2 pCi/L).. 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.

Tritium concentrations were below the LLD level of 330 pCi/L in all samples tested.

Strontium-89 concentration was below the LLD of 2.2 pCi/L in all samples. Strontium-90 was detected in one sample collected from location K-14b and measured 1.2 pCi/L.

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

Fish

In fish samples, the gross beta concentration averaged 3.02 pCi/g wet weight in muscles and 0.96 pCi/g wet weight in bone fractions. In muscle, the gross beta concentration was primarily due to potassium-40 activity. The average beta concentration of 3.02 pCi/g wet weight was lower than the average of the 1973 range of 3.34 to 3.62 pCi/g wet weight. The cesium-137 concentration in muscle averaged 0.055 pCi/g wet weight and was lower than levels observed in 1979 and 1980 (0.12 pCi/g wet weight in both years), 1981 (0.15 pCi/g wet weight), 1982 (0.17 pCi/g wet weight), 1983 (0.14 pCi/g wet weight), 1984 (0.10 pCi/g

Fish (continued)

wet weight), 1985 (0.11 pCi/g wet weight), 1986 (0.11 pCi/g wet weight), 1987 (0.11 pCi/g wet weight), 1988 (0.12 pCi/g wet weight), 1989 (0.11 pCi/g wet weight), 1990 (0.075 pCi/g wet weight), and 1991 (0.11 pCi/g wet weight). The levels were almost identical to those seen in 1992 (0.066 pCi/g wet weight), in 1993 (0.068 pCi/g wet weight), in 1994 (0.067 pCi/g wet weight) and in 1995 (0.056 pCi/g wet weight). The strontium-89 concentration was below the LLD of 0.078 pCi/g wet weight in all samples. Strontium-90 was detected in all bone samples and averaged 0.079 pCi/g wet weight.

Periphyton (Slime)

In periphyton (slime) samples, mean gross beta concentrations were similar at both indicator and control locations (4.49 and 5.00 pCi/g wet weight, respectively). Strontium-89 and strontium-90 concentrations were below their respective LLD levels of 0.098 and 0.058 pCi/g wet weight in all samples. Cs-137 was detected in three of thirteen samples and averaged 0.063 pCi/g wet weight, lower than observed in 1995 (0.079 pCi/g wet weight). All other gamma-emitting isotopes, except naturally-occurring beryllium-7 and potassium-40, were below their respective LLDs.

Bottom Sediments

In bottom sediment samples, the mean gross beta concentration was almost identical at both indicator and control locations, (7.2 and 7.1 pCi/g dry weight, respectively), due primarily to potassium-40.

Cesium-137 was detected in three of ten samples and averaged 0.045 pCi/g dry weight at indicator locations and less than 0.030 pCi/g dry weight at control locations. Cs-134 was below the LLD level of 0.037 pCi/g dry weight in all samples. The cesium-137 level was lower than the levels observed in 1979 (0.12 pCi/g dry weight), in 1980 (0.19 pCi/g dry weight), in 1981 (0.18 pCi/g dry weight), in 1982 (0.13 pCi/g dry weight), in 1983 (0.16 pCi/g dry weight), and in 1984 (0.07 pCi/g dry weight), and similar to concentrations observed in 1985 (0.05 pCi/g dry weight), in 1986 (0.037 pCi/g dry weight), in 1987 (0.038 pCi/g dry weight) and in 1988 (0.049 pCi/g dry weight), in 1989 (0.056 pCi/g dry weight), in 1990 (0.058 pCi/g dry weight), in 1991 (0.057 pCi/g dry weight), in 1992 (0.047 pCi/g dry weight), in 1993 (0.034 pCi/g dry weight) and in both 1994 and 1995 (0.050 pCi/g dry weight).

Levels of Strontium-89 were below their respective LLDs of 0.050 pCi/g dry weight in all samples. Strontium-90 concentrations were below their respective LLDs of 0.017 pCi/g dry weight in all samples.

3.3 Land Use Census

The 1996 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 miles) the location, in each of the 10 meteorological sectors, of the nearest milk animal, the nearest residence and the nearest garden of greater than 50m² (500 ft²) producing broad leaf vegetation.

The 1996 Land Use Census was an annual census conducted in the years between the complete five year census. This census is used to verify that no changes have occurred with the locations of the nearest residence, milk animal or garden. "Drive-bys" were conducted to verify that no changes have occurred over the previous census.

This census is conducted annually during the growing season per Health Physics Procedure HP 1.14.

Table 4.6.1 lists the results of the 1996 census. There were no changes identified from the 1995 five year census.

Table 4.6.2 describes the changes from 1995 to 1996.

The Land Use Census was completed on April 14, 1997 (note that the census was not completed in a timely manner and a complete safety evaluation was performed per 10CFR50.59 and attached in part III of this report titled "Incident Reports").

4.0 FIGURES AND TABLES

KEWAUNEE NUCLEAR POWER PLANT

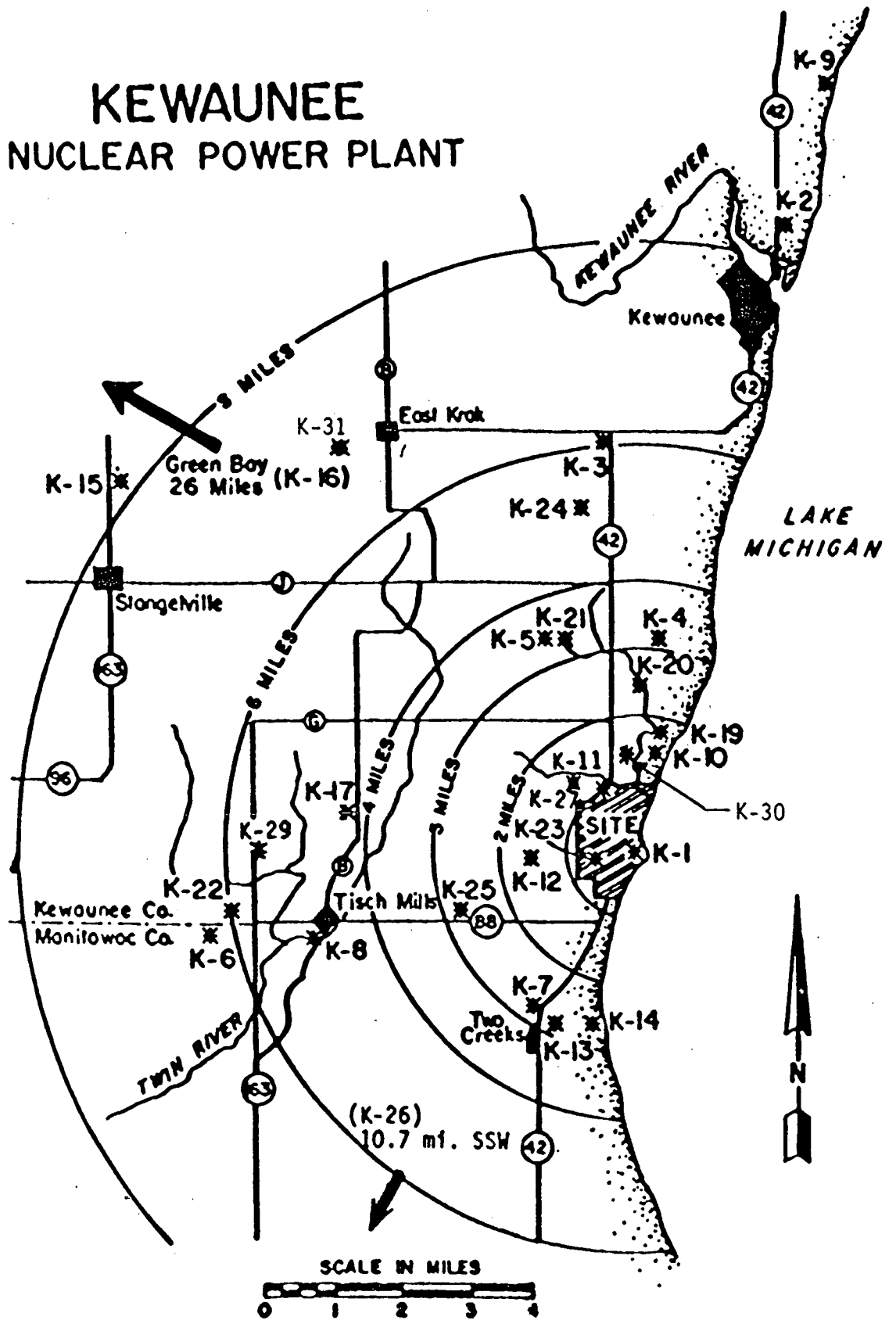


Figure 4-1. Sampling locations, Kewaunee Nuclear Power Plant

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-2	C	9.5 NNE	WPS Operations Building in Kewaunee
K-3	C	6.0 N	Lyle and John Siegmund Farm, Route 1, Kewaunee
K-4	I	3.0 N	Tom Stangel Farm, Route 1, Kewaunee
K-5	I	3.5 NNW	Ed Paplham Farm, Route 1, Kewaunee
K-6	C	6.7 WSW	Novitsky Farm
K-7	I	2.75 SSW	Ron Zimmerman Farm, Route 3, 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
K-12	I	1.5 WSW	Lecaptain Farm, one mile west of site
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, Route 1, Kewaunee
K-19	I	1.75 NNE	Wayne Paral Farm, Route 1, Kewaunee
K-20	I	2.5 N	Carl Struck Farm, Route 1, Kewaunee
K-23	I	0.5 W	0.5 miles west of plant, Kewaunee site
K-24	C	5.45 N	Fectum Farm, Route 1, Kewaunee
K-25	C	2.75 WSW	Wotachek Farm, Route 1, 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, 0.5 miles west of K-11
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	C	6.25 NNW	E. Krok Substation

^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-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	AP	AI		TLD		
K-16	AP	AI		TLD		
K-17				TLD		VE
K-19			MI ^c	GR ^a , CF ^d	SO	
K-20						DM
K-23						GRN
K-24				EG		DM
K-26						VE
K-27				TLD, EG		DM
K-28			MI ^c			
K-29						DM
K-30				TLD		
K-31				TLD		

^a Three times a year, second (April, May, June), third (July, August, September), and fourth (October, November, December) quarters.

^b To be collected in May and November.

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

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

Table 4.3. Sample codes used in Table 4.2.

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

Table 4.4. Sampling Summary, January - December 1996.

Sample Type	Collection Type and Frequency ^a	Number of Locations	Number of Samples Collected	Number of Samples Missed
<u>Air Environment</u>				
Airborne particulates	C/W	6	312	0
Airborne Iodine	C/BW	6	156	0
TLD's	C/Q	14	55	1
Precipitation	C/M	1	12	0
<u>Terrestrial Environment</u>				
Milk (May-Oct)	G/SM	7	84	0
(Nov-Apr)	G/M	7	42	0
Well water	G/Q	6	24	0
Domestic meat	G/A	4	2	2
Eggs	G/Q	1	4	0
Vegetables - 5 varieties	G/A	2	6	0
Grain - oats	G/A	1	1	0
- clover	G/A	1	1	0
Grass	G/TA	8	24	0
Cattle feed	G/A	6	12	0
Soil	G/SA	7	14	0
<u>Aquatic Environment</u>				
Surface water	G/M	7	96	0
Fish	G/TA	1	3	0
Slime	G/SA	6	13	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; SM = semimonthly; M = monthly; Q=quarterly;
 SA = semiannually; TA = three times per year; FA = four times per year; A = annually; BW = bi-weekly.

Table 4.5 Environmental Radiological Monitoring Program Summary.

Name of Facility Kewaunee Nuclear Power Plant Docket No. 50-305
 Location of Facility Kewaunee County, Wisconsin Reporting Period January - December 1996
 (County, State)

Sample Type (Units)	Type and Number of Analyses ^a		LLD ^b	Indicator Locations Mean (F) ^c Range ^c	Location with Highest Annual Mean		Control Locations Mean (F) ^c Range	Number Non-Routine Results ^e	
					Location ^d	Mean (F) ^c Range ^c			
Airborne particulates (pCi/m ³)	GB	312	0.003	0.020 (104/104) (0.006-0.136)	K-1f, Met. Tower 0.12 mi. S	0.022 (52/52) (0.007-0.136)	0.019 (208/208) (0.007-0.045)	0	
	GS	24							
	Be-7		0.010	0.075 (8/8) (0.056-0.092)	K-1f, Met Tower, 0.12 mi. S	0.076 (4/4) (0.056-0.092)	0.072 (16/16) (0.045-0.093)	0	
	Nb-95		0.0014	<LLD	-	-	<LLD	0	
	Zr-95		0.0023	<LLD	-	-	<LLD	0	
	Ru-103		0.0011	<LLD	-	-	<LLD	0	
	Ru-106		0.0089	<LLD	-	-	<LLD	0	
	Cs-134		0.0009	<LLD	-	-	<LLD	0	
	Cs-137		0.0011	<LLD	-	-	<LLD	0	
	Ce-141		0.0020	<LLD	-	-	<LLD	0	
Ce-144		0.0053	<LLD	-	-	<LLD	0		
Airborne Iodine (pCi/m ³)	I-131	156	0.03	<LLD	-	-	<LLD	0	
TLD-Quarterly (mR/91 days)	Gamma	55	1	15.9 (27/27) (11.6-21.5)	K-7, Zimmerman Farm, 2.75 mi SSW	18.6 (4/4) (14.7-21.5)	14.9 (28/28) (12.5-18.9)	0	
Precipitation (pCi/L)	H-3	12	330	<LLD	-	-	None	0	
Milk (pCi/L)	I-131	126	0.5	<LLD	-	-	<LLD	0	
	Sr-89	84	2.4	<LLD	-	-	<LLD	0	
	Sr-90	84	0.5	1.6 (48/48) (0.8-2.9)	K-12, Lecaptain Farm 1.5 mi WSW	2.1 (12/12) (1.2-2.9)	1.5 (36/36) (0.7-2.4)	0	
	GS	126							
	K-40		50	1440 (72/72) (1240-1660)	K-12, Lecaptain Farm 1.5 mi WSW	1480 (18/18) (1300-1620)	1420 (54/54) (1200-1700)	0	
	Cs-134		10	<LLD	-	-	<LLD	0	
	Cs-137		10	<LLD	-	-	<LLD	0	
	Ba-La-140		15	<LLD	-	-	<LLD	0	
	(g/L)	K-stable	84	1.0	1.67 (48/48) (1.43-1.83)	K-12, Lecaptain Farm 1.5 mi WSW	1.72 (12/12) (1.60-1.83)	1.65 (36/36) (1.48-1.83)	0
	(g/L)	Ca	84	0.4	0.94 (48/48) (0.77-1.10)	K-6, Novitsky Farm 6.7 mi WSW	1.04 (12/12) (0.82-1.15)	0.98 (36/36) (0.74-1.20)	0
Well Water (pCi/L)	GA	8	2.6	4.8 (7/8) (2.8-6.5)	K-1h, North Well Onsite, 0.12 mi .NW	6.0 (3/4) (4.5-6.5)	None	0	
	GB	24	1.1	3.6 (13/20) (1.2-6.9)	K-1h, North Well Onsite, 0.12 mi .NW	5.1 (4/4) (3.9-6.9)	1.4 (3/4) (1.3-1.5)	0	
	H-3	4	330	<LLD	-	-	None	0	
	K-40 (flame)	24	0.87	1.79 (14/20) (0.95-2.68)	K-1g, South Well Onsite, 0.06 mi .W	2.36 (4/4) (2.08-2.68)	1.08 (2/4) (0.95-1.21)	0	
	Sr-89	4	1.1	<LLD	-	-	None	0	
	Sr-90	4	0.5	<LLD	K-1g, South Well Onsite, 0.06 mi .W	1.1 (2/4) (0.6-1.6)	None	0	
	CS	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	
	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	

Table 4.5 Environmental Radiological Monitoring Program Summary.

Name of Facility Kewaunee Nuclear Power Plant Docket No. 50-305
 Location of Facility Kewaunee County, Wisconsin Reporting Period January - December 1996
 (County, State)

Sample Type (Units)	Type and Number of Analyses ^a	LLD ^b	Indicator Locations Mean (F) ^c Range ^c	Location with Highest Annual Mean		Control Locations Mean (F) ^c Range	Number Non-Routine Results ^e
				Location ^d	Mean (F) ^c Range ^c		
Domestic Meat (Chickens) (pCi/g wet)	GA 2	0.05	<LLD	-	-	<LLD	0
	GB 2	0.03	3.50 (1/1)	K-24, Fectum Farm 5.45 mi N	3.66 (1/1)	3.66 (1/1)	0
	CS 2						0
	Be-7	0.24	<LLD	-	-	<LLD	0
	K-40	0.5	3.24 (1/1)	K-29, Kunesh Farm 5.75 mi W	3.24 (1/1)	2.60 (1/1)	0
	Nb-95	0.033	<LLD	-	-	<LLD	0
	Zr-95	0.049	<LLD	-	-	<LLD	0
	Ru-103	0.030	<LLD	-	-	<LLD	0
	Ru-106	0.18	<LLD	-	-	<LLD	0
	Cs-134	0.029	<LLD	-	-	<LLD	0
	Cs-137	0.022	<LLD	-	-	<LLD	0
Ce-141	0.029	<LLD	-	-	<LLD	0	
Ce-144	0.13	<LLD	-	-	<LLD	0	
Eggs (pCi/g wet)	GB 4	0.01	None	K-24, Fectum Farm 5.45 mi N	1.08 (4/4) (0.95-1.18)	1.08 (4/4) (0.95-1.18)	0
	Sr-89 4	0.004	None	-	-	<LLD	0
	Sr-90 4	0.002	None	-	-	<LLD	0
	CS						
	Be-7	0.076	None	-	-	<LLD	0
	K-40	0.10		K-24, Fectum Farm 5.45 mi N	1.16 (4/4) (1.02-1.31)	1.16 (4/4) (1.02-1.31)	0
	Nb-95	0.006	None	-	-	<LLD	0
	Zr-95	0.013	None	-	-	<LLD	0
	Ru-103	0.008	None	-	-	<LLD	0
	Ru-106	0.058	None	-	-	<LLD	0
	Cs-134	0.006	None	-	-	<LLD	0
	Cs-137	0.006	None	-	-	<LLD	0
	Ce-141	0.014	None	-	-	<LLD	0
	Ce-144	0.050	None	-	-	<LLD	0
Vegetables (pCi/g wet)	GB 6	0.1	2.48 (2/2) (2.14-2.81)	K-26, Bertler's Fruit Stand, 10.7 mi SSW	2.61 (4/4) (1.39-4.50)	2.61 (4/4) (1.39-4.50)	0
	Sr-89 6	0.005	<LLD	-	-	<LLD	0
	Sr-90 6	0.002	0.009 (1/2)	K-17, Jansky's Farm 4.25 mi W	0.009 (1/2)	<LLD	0
	CS 6						
	Be-7	0.089	<LLD	-	-	<LLD	0
	K-40	0.75	2.83 (2/2) (2.36-3.30)	K-17, Jansky's Farm 4.25 mi W	2.83 (2/2) (2.36-3.30)	2.61 (4/4) (1.80-3.40)	0
	Nb-95	0.014	<LLD	-	-	<LLD	0
	Zr-95	0.021	<LLD	-	-	<LLD	0
	Ru-103	0.010	<LLD	-	-	<LLD	0
	Ru-106	0.062	<LLD	-	-	<LLD	0
	Cs-134	0.011	<LLD	-	-	<LLD	0
	Cs-137	0.014	<LLD	-	-	<LLD	0
	Ce-141	0.026	<LLD	-	-	<LLD	0
	Ce-144	0.097	<LLD	-	-	<LLD	0

Table 4.5 Environmental Radiological Monitoring Program Summary.

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 (County, State)

Sample Type (Units)	Type and Number of Analyses ^a	LLD ^b	Indicator Locations Mean (F) ^c Range ^c	Location with Highest Annual Mean		Control Locations Mean (F) ^c Range	Number Non-Routine Results ^e
				Location ^d	Mean (F) ^c Range ^c		
Grain - Oats & Clover (pCi/g wet)	GB 2	0.10	4.58 (2/2) (4.56-4.59)	K-23, Kewaunee Site 0.5 mi W	4.58 (2/2) (4.56-4.59)	None	0
	Sr-89 2	0.015	<LLD	-	-	None	0
	Sr-90 2	0.007	<LLD	-	-	None	0
	CS 2						
	Be-7 2	0.27	1.21 (2/2) (1.04-1.38)	K-23, Kewaunee Site 0.5 mi	1.21 (2/2) (1.04-1.38)	None	0
	K-40 2	0.10	4.72 (2/2) (3.92-5.52)	K-23, Kewaunee Site 0.5 mi W	4.72 (2/2) (3.92-5.52)	None	0
	Nb-95 2	0.030	<LLD	-	-	None	0
	Zr-95 2	0.038	<LLD	-	-	None	0
	Ru-103 2	0.029	<LLD	-	-	None	0
	Ru-106 2	0.24	<LLD	-	-	None	0
	Cs-134 2	0.025	<LLD	-	-	None	0
	Cs-137 2	0.027	<LLD	-	-	None	0
	Ce-141 2	0.054	<LLD	-	-	None	0
Ce-144 2	0.20	<LLD	-	-	None	0	
Cattlefeed (pCi/g wet)	GB 12	0.1	9.92 (8/8) (2.30-17.98)	K-5, Paplham Farm 3.5 mi NNW	12.19 (2/2) (6.39-17.98)	7.21 (4/4) (2.96-11.04)	0
	Sr-89 12	0.023	<LLD	-	-	<LLD	0
	Sr-90 12	0.007	0.033 (6/8) (0.010-0.051)	K-6, Novitsky Farm 6.7 mi WSW	0.093 (1/2)	0.075 (2/4) (0.056-0.093)	0
	CS 12						
	Be-7 12	0.25	0.41 (3/8) (0.33-0.55)	K-3, Siegmund Farm, 6.0 mi N	0.70 (1/2)	0.55 (2/4) (0.39-0.70)	0
	K-40 12	1.0	10.72 (8/8) (1.99-19.37)	K-5, Paplham Farm 3.5 mi NNW	12.92 (2/2) (6.46-19.37)	7.71 (4/4) (3.16-12.45)	0
	Nb-95 12	0.028	<LLD	-	-	<LLD	0
	Zr-95 12	0.054	<LLD	-	-	<LLD	0
	Ru-103 12	0.022	<LLD	-	-	<LLD	0
	Ru-106 12	0.20	<LLD	-	-	<LLD	0
	Cs-134 12	0.027	<LLD	-	-	<LLD	0
	Cs-137 12	0.026	<LLD	-	-	<LLD	0
	Ce-141 12	0.044	<LLD	-	-	<LLD	0
Ce-144 12	0.18	<LLD	-	-	<LLD	0	
Grass (pCi/g wet)	GB 24	0.1	6.26 (18/18) (4.23-9.80)	K-5, Paplham Farm 3.5 mi NNW	7.35 (3/3) (5.25-9.80)	6.56 (6/6) (4.84-8.10)	0
	Sr-89 24	0.045	<LLD	-	-	<LLD	0
	Sr-90 24	0.012	0.019 (1/18)	K-19, Paral Farm, 1.75 mi NNE	0.019(1/3)	<LLD	0
	CS 24						
	Be-7 24	0.33	2.01 (16/18) (0.40-4.91)	K-6, Novitsky Farm 6.7 mi WSW	4.48 (1/3)	2.47 (4/6) (0.50-4.48)	0
	K-40 24	0.1	6.77 (18/18) (4.60-10.61)	K-12, Lecaptain Farm 1.5 mi WSW	8.02 (3/3) (4.98-10.61)	6.27 (6/6) (4.74-7.98)	0
	Nb-95 24	0.033	<LLD	-	-	<LLD	0
	Zr-95 24	0.063	<LLD	-	-	<LLD	0
	Ru-103 24	0.033	<LLD	-	-	<LLD	0
	Ru-106 24	0.26	<LLD	-	-	<LLD	0
	Cs-134 24	0.031	<LLD	-	-	<LLD	0
	Cs-137 24	0.029	<LLD	-	-	<LLD	0
	Ce-141 24	0.063	<LLD	-	-	<LLD	0
Ce-144 24	0.23	<LLD	-	-	<LLD	0	

Table 4.5 Environmental Radiological Monitoring Program Summary.

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 (County, State)

Sample Type (Units)	Type and Number of Analyses ^a		LLD ^b	Indicator Locations Mean (F) ^c Range ^c	Location with Highest Annual Mean		Control Locations Mean (F) ^c Range	Number Non-Routine Results ^e
					Location ^d	Mean (F) ^c Range ^c		
Soil (pCi/g dry)	GA	14	5.0	8.27 (10/10) (4.79-10.14)	K-4, Stangel Farm, 3.0 mi N	9.29 (2/2) (8.80-9.27)	6.53 (4/4) (4.89-8.50)	0
	GB	14	2.0	25.62 (10/10) (15.64-29.90)	K-5, Paplham Farm 3.5 mi NNW	29.42 (2/2) (29.16-29.68)	24.64 (4/4) (23.22-26.54)	0
	Sr-89	14	0.078	<LLD	-	-	<LLD	0
	Sr-90	14	0.025	0.070 (6/10) (0.031-0.11)	K-12, Lecaptain Farm 1.5 mi WSW	0.11 (1/2)	0.044 (3/4) (0.034-0.061)	0
	GS	14						
	Be-7		0.23	0.60 (1/10)	K-1f, Met. Tower 0.12 mi S	0.60 (1/2)	<LLD	0
	K-40		1.4	20.13 (10/10) (14.97-26.99)	K-5, Paplham Farm 3.5 mi NNW	24.65 (2/2) (22.30-26.99)	19.99 (4/4) (16.68-21.26)	0
	Nb-95		0.023	<LLD	-	-	<LLD	0
	Zr-95		0.043	<LLD	-	-	<LLD	0
	Ru-103		0.025	<LLD	-	-	<LLD	0
	Ru-106		0.18	<LLD	-	-	<LLD	0
	Cs-134		0.048	<LLD	-	-	<LLD	0
	Cs-137		0.018	0.17 (9/10) (0.083-0.27)	K-4, Stangel Farm, 3.0 mi N	0.21 (2/2) (0.14-0.28)	0.17 (4/4) (0.12-0.23)	0
	Ce-141		0.047	<LLD	-	-	<LLD	0
Ce-144		0.15	<LLD	-	-	<LLD	0	
Surface Water (pCi/L)	GB (SS)	96	1.9	<LLD	-	-	<LLD	0
	GB (DS)	96	1.0	4.3 (72/72) (1.3-22.3)	K-1a, North Creek Onsite 0.62 mi N	8.8 (12/12) (2.1-23.3)	2.2 (24/24) (1.6-3.5)	0
	GB (TR)	96	1.0	4.3 (72/72) (1.3-23.3)	K-1a, North Creek Onsite 0.62 mi N	8.8 (12/12) (2.1-23.3)	2.2 (24/24) (1.6-3.5)	0
	GS	96						
	Mn-54	15		<LLD	-	-	<LLD	0
	Fe-59	30		<LLD	-	-	<LLD	0
	Co-58	15		<LLD	-	-	<LLD	0
	Co-60	15		<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	32	330	<LLD	-	-	<LLD	0
	Sr-89	32	2.2	<LLD	-	-	<LLD	0
Sr-90	32	0.9	1.2 (1/24)	K-14b, Two Creeks Park, 2.5 mi. S	1.2 (1/4)	<LLD	0	
K-40 (flame)	96	0.87	2.77 (64/72) (0.95-10.38)	K-1a, North Creek Onsite 0.62 mi N	6.23 (11/12) (1.38-10.38)	1.03 (21/24) (0.95-1.13)	0	
Fish - Muscle (pCi/g wet)	GB	3	0.5	3.02 (3/3) (2.12-4.20)	K-1d, Condenser Discharge, 0.10 mi E	3.02 (3/3) (2.12-4.20)	None	0
	GS	3						
	K-40		0.1	3.21 (3/3) (2.89-3.46)	K-1d, Condenser Discharge, 0.10 mi E	3.21 (3/3) (2.89-3.46)	None	0
	Mn-54		0.015	<LLD	-	-	None	0
	Fe-59		0.082	<LLD	-	-	None	0
	Co-58		0.021	<LLD	-	-	None	0
	Co-60		0.020	<LLD	-	-	None	0
	Cs-134		0.014	<LLD	-	-	None	0
	Cs-137		0.019	0.055 (3/3) (0.038-0.075)	K-1d, Condenser Discharge, 0.10 mi E	0.055 (3/3) (0.038-0.075)	None	0

Table 4.5 Environmental Radiological Monitoring Program Summary.

Name of Facility Kewaunee Nuclear Power Plant Docket No. 50-305
 Location of Facility Kewaunee County, Wisconsin Reporting Period January - December 1996
 (County, State)

Sample Type (Units)	Type and Number of Analyses ^d		LLD ^b	Indicator Locations Mean (F) ^c Range ^c	Location with Highest Annual Mean		Control Locations Mean (F) ^c Range	Number Non-Routine Results ^e
					Location ^d	Mean (F) ^c Range ^c		
Fish - Bones (pCi/g wet)	GB	3	0.1	0.96 (3/3) (0.86-1.03)	K-1d, Condenser Discharge, 0.10 mi E	0.96 (3/3) (0.86-1.03)	None	0
	Sr-89	3	0.052	<LLD		-	-	None
	Sr-90	3	0.026	0.074 (2/3) (0.066-0.081)	K-1d, Condenser Discharge, 0.10 mi E	0.074 (2/3) (0.066-0.081)	None	0
Periphyton (Slime) (pCi/g wet)	GB	13	0.1	4.49 (11/11) (3.18-6.37)	K-1b, Middle Creek 0.12 mi N	5.33 (2/2) (4.29-6.37)	5.00 (2/2) (3.12-6.87)	0
	Sr-89	13	0.098	<LLD	-	-	<LLD	0
	Sr-90	13	0.058	<LLD	-	-	<LLD	0
	CS	13						
	Be-7		0.38	1.05 (6/11) (0.51-2.00)	K-1e, South Creek 0.12 mi S	1.51 (2/2) (1.01-2.00)	1.12 (1/2)	0
	K-40		0.2	3.89 (11/11) (2.42-6.31)	K-1b, Middle Creek 0.12 mi N	5.32 (2/2) (5.08-5.56)	3.00 (2/2) (2.63-3.36)	0
	Mn-54		0.041	<LLD	-	-	<LLD	0
	Co-58		0.043	<LLD	-	-	<LLD	0
	Co-60		0.065	<LLD	-	-	<LLD	0
	Nb-95		0.043	<LLD	-	-	<LLD	0
	Zr-95		0.074	<LLD	-	-	<LLD	0
	Ru-103		0.043	<LLD	-	-	<LLD	0
	Ru-106		0.33	<LLD	-	-	<LLD	0
	Cs-134		0.032	<LLD	-	-	<LLD	0
	Cs-137		0.048	0.063 (2/11) (0.059-0.076)	K-1e, South Creek 0.12 mi S	0.076 (1/2)	0.055 (1/2)	0
Ce-141		0.074	<LLD	-	-	<LLD	0	
Ce-144		0.34	<LLD	-	-	<LLD	0	
Bottom Sediments (pCi/g dry)	GB	10	1.0	7.18 (8/8) (4.87-10.34)	K-1j, Condenser Discharge, 0.10 mi S	9.07 (2/2) (7.80-10.34)	7.08 (2/2) (5.56-8.60)	0
	Sr-89	10	0.050	<LLD	-	-	<LLD	0
	Sr-90	10	0.017	<LLD	-	-	<LLD	0
	CS	10						
	K-40		1.0	6.28 (8/8) (4.54-8.21)	K-1j, Condenser Discharge, 0.10 mi S	7.22 (2/2) (6.22-8.21)	6.50 (2/2) (5.78-7.21)	0
	Co-58		0.026	<LLD	-	-	<LLD	0
	Co-60		0.024	<LLD	-	-	<LLD	0
	Cs-134		0.037	<LLD	-	-	<LLD	0
Cs-137		0.030	0.045 (3/8) (0.033-0.051)	K-1j, Condenser Discharge, 0.10 mi S	0.051 (1/2)	<LLD	0	

^a GA = gross alpha, GB = gross beta, CS = gamma spectroscopy, SS = suspended solids, DS = dissolved solids, TR = total residue.

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

^c Mean based upon detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parentheses (F).

^d Locations are specified by station code (Table 4.1), 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 pre-operational value for the location.

Table 4.6.1 Land Use Census

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

Sector	Township No.	Residence	Garden	Milk Animals	Distance From Plant (miles)	Sample ID
A	24	X	X		1.95	
A	13			X	2.66	
B	24	X			1.20	
B	24			X	1.16	K-19
B	24		X		1.27	K-19
R	26	X	X	X	1.00	K-11
Q	23	X			1.31	
Q	23			X	1.39	
Q	23		X		1.33	K-27
P	26	X			1.33	
P	26		X		1.37	
P	22			X	1.97	
N	35	X			0.95	
N	26		X		1.04	
N	34			X	1.44	K-12
M	35	X	X		1.33	
M	34			X	1.49	
L	35	X			0.85	
L	35		X	X	1.28	
K	35	X	X		0.80	
K	10			X	1.80	
J	11	X	(Note 1)	(Note 1)	2.68	

Note 1.: There were no milk animals or gardens $\geq 500 \text{ ft}^2$ located in Sector J within five miles of the Kewaunee Nuclear Power Plant.

Table 4.6.2 Land Use Census

The following is a sector by sector listing of those changes between the 1995 and 1996 census.

Sector A	No changes
Sector B	No changes
Sector R	No changes
Sector Q	No changes
Sector P	No changes
Sector N	No changes
Sector M	No changes
Sector L	No changes
Sector K	No changes
Sector J	No changes

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APPENDIX A
INTERLABORATORY COMPARISON PROGRAM RESULTS

NOTE: Teledyne's Midwest Laboratory participates in intercomparison studies administered by U.S. EPA Environmental Monitoring Systems Laboratory, Las Vegas, Nevada. The results are reported in Appendix A. Also reported are results of International Intercomparison and Teledyne testing of TLD's, as well as in-house spikes, blanks, duplicates and mixed analyte performance evaluation program. Appendix A is updated four times a year; the complete Appendix is included in March, June, September and December monthly progress reports only. Please refer to March, June, September and December progress reports for information.

January, 1996 through December, 1996

Appendix A

Interlaboratory Comparison Program Results

Teledyne's Midwest Laboratory (formerly Hazleton Environmental Sciences) has participated in interlaboratory comparison (crosscheck) programs since the formulation of its quality control program in December 1971. These programs are operated by agencies which supply environmental type samples (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 the laboratory's analytical procedures and to alert it to 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 is conducted by the U.S. Environmental Protection Agency Intercomparison and Calibration Section, Quality Assurance Branch, Environmental Monitoring and Support Laboratory, Las Vegas, Nevada.

The results in Table A-2 were obtained for Thermoluminescent Dosimeters (TLDs) since 1976 via various International Intercomparisons of Environmental Dosimeters under the sponsorships listed in Table A-2. Teledyne testing results are also listed.

Table A-3 lists results of the analyses on in-house "spiked" samples for the past twelve months. Data for previous years available upon request.

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

Table A-5 lists 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.

12-31-96

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	>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 x (known) ^{0.0933} 10% of known value
Radium-226,-228	<0.1 pCi/liter	15% of known value
Plutonium	0.1 pCi/liter, gram, or sample	10% of known value
Iodine-131, Iodine-129 ^b	≤55 pCi/liter >55 pCi/liter	6.0 pCi/liter 10% of known value
Uranium-238, Nickel-64 ^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 Teledyne limit.

Table A-1. U.S. Environmental Protection Agency's crosscheck program, comparison of EPA and Teledyne's Midwest Laboratory results^a.

Lab Code	Sample Type	Date Collected	Analysis	Concentration in pCi/L ^b		
				Teledyne Results ±2 Sigma ^c	EPA Result ^d 1s, N=1	Control Limits
STW-752	WATER	Jan, 1996	Gr. Alpha	19.5±1.5	12.1±5.0	3.4 - 20.8
STW-752	WATER	Jan, 1996	Gr. Beta	7.9±0.7	7.0±5.0	0.0 - 15.7
STW-753	WATER	Feb, 1996	I-131	70.7±1.5	67.0±7.0	54.9 - 79.1
STW-761	WATER	Mar, 1996	H-3	22,776.7±185.0	22,002.0±2,200.0	18,185.1 - 25,818.9
Results were inadvertently not reported due to administrative error in laboratory.						
STW-762	WATER	Apr, 1996	Gr. Alpha	63.8±2.4	74.8±18.7	42.4 - 107.2
STW-762	WATER	Apr, 1996	Ra-226	2.9±0.1	3.0±0.5	2.1 - 3.9
STW-762	WATER	Apr, 1996	Ra-228	4.6±0.2	5.0±1.3	2.7 - 7.3
STW-762	WATER	Apr, 1996	Uranium	57.9±0.5	58.4±5.8	48.3 - 68.5
STW-763	WATER	Apr, 1996	Co-60	32.7±0.6	31.0±5.0	22.3 - 39.7
STW-763	WATER	Apr, 1996	Cs-134	43.0±1.0	46.0±5.0	37.3 - 54.7
STW-763	WATER	Apr, 1996	Cs-137	52.3±2.1	50.0±5.0	41.3 - 58.7
STW-763	WATER	Apr, 1996	Gr. Beta	154.9±6.8	166.9±25.0	123.5 - 210.3
STW-763	WATER	Apr, 1996	Sr-89	42.0±3.6	43.0±5.0	34.3 - 51.7
STW-763	WATER	Apr, 1996	Sr-90	15.3±2.9	16.0±5.0	7.3 - 24.7
STW-764	WATER	Jun, 1996	Ba-133	745.0±19.5	745.0±75.0	614.9 - 875.1
STW-764	WATER	Jun, 1996	Co-60	97.0±3.6	99.0±5.0	90.3 - 107.7
STW-764	WATER	Jun, 1996	Cs-134	72.3±1.2	79.0±5.0	70.3 - 87.7
STW-764	WATER	Jun, 1996	Cs-137	201.3±2.3	197.0±10.0	179.7 - 214.3
STW-764	WATER	Jun, 1996	Zn-65	298.0±6.2	300.0±30.0	248.0 - 352.0
STW-765	WATER	Jun, 1996	Ra-226	4.8±0.1	4.9±0.7	3.7 - 6.1
STW-765	WATER	Jun, 1996	Ra-228	8.7±0.5	9.0±2.3	5.0 - 13.0
STW-765	WATER	Jun, 1996	Uranium	20.4±0.8	20.2±3.0	15.0 - 25.4
STW-767	WATER	Jul, 1996	Sr-89	24.0±2.0	25.0±5.0	16.3 - 33.7
STW-767	WATER	Jul, 1996	Sr-90	11.3±1.2	12.0±5.0	3.3 - 20.7
STW-768	WATER	Jul, 1996	Gr. Alpha	20.1±2.0	24.4±6.1	13.8 - 35.0
STW-768	WATER	Jul, 1996	Gr. Beta	40.4±3.2	44.8±5.0	36.1 - 53.5
STW-774	WATER	Sep, 1996	Ra-226	13.6±0.4	14.0±2.1	10.4 - 17.6
STW-774	WATER	Sep, 1996	Ra-228	5.4±0.4	4.7±1.2	2.6 - 6.8
STW-774	WATER	Sep, 1996	Uranium	10.0±0.2	10.1±3.0	4.9 - 15.3
STW-775	WATER	Oct, 1996	I-131	26.7±2.3	27.0±6.0	16.6 - 37.4
STW-778	WATER	Oct, 1996	Gr. Alpha	10.2±2.1	10.3±5.0	1.6 - 19.0
STW-778	WATER	Oct, 1996	Gr. Beta	32.0±1.6	34.6±5.0	25.9 - 43.3

Table A-1. U.S. Environmental Protection Agency's crosscheck program, comparison of EPA and Teledyne's Midwest Laboratory results^a.

Lab Code	Sample Type	Date Collected	Analysis	Concentration in pCi/L ^b		
				Teledyne Results ± 2 Sigma ^c	EPA Result ^d 1s, N=1	Control Limits

- ^a Results obtained by Teledyne Brown Engineering Environmental Services Midwest Laboratory as a participant in the environmental sample crosscheck program operated by the Intercomparison and Calibration Section, Quality Assurance Branch, Environmental Monitoring and Support Laboratory, U.S. Environmental Protection Agency (EPA), Las Vegas, Nevada.
- ^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 TBEESML results are given as the mean ± 2 standard deviations for three determinations.
- ^d USEPA results are presented as the known values and expected laboratory precision (1s, 1 determination) and control limits as defined by the EPA.

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

Lab Code	TLD Type	Date	Measurement	mR		
				Teledyne Results ± 2 Sigma	Known Value ± 2 Sigma	Average ± 2 Sigma (All Participants)
<u>2nd International Intercomparison</u>						
115-2	CaF ₂ : Mn Bulb	Apr, 1976	Field	17.0 ± 1.9	17.1	16.4 ± 7.7
115-2	CaF ₂ : Mn Bulb	Apr, 1976	Lab	20.8 ± 4.1	21.3	18.8 ± 7.6
Second International Intercomparison of Environmental Dosimeters conducted in April of 1976 by the Health and Safety Laboratory (HASL), New York, New York, and the School of Public Health of the University of Texas, Houston, Texas.						
<u>3rd International Intercomparison</u>						
115-3	CaF ₂ : Mn Bulb	Jun, 1977	Field	30.7 ± 3.2	34.9 ± 4.8	31.5 ± 3.0
115-3	CaF ₂ : Mn Bulb	Jun, 1977	Lab	89.6 ± 6.4	91.7 ± 14.6	86.2 ± 24.0
Third International Intercomparison of Environmental Dosimeters conducted in the summer of 1977 by Oak Ridge National Laboratory and the School of Public Health of the University of Texas, Houston, Texas.						
<u>4th International Intercomparison</u>						
115-4	CaF ₂ : Mn Bulb	Jun, 1979	Field	14.1 ± 1.1	14.1 ± 1.4	16.0 ± 9.0
115-4	CaF ₂ : Mn Bulb	Jun, 1979	Lab, High	40.4 ± 1.4	45.8 ± 9.2	43.9 ± 13.2
115-4	CaF ₂ : Mn Bulb	Jun, 1979	Lab, Low	9.8 ± 1.3	12.2 ± 2.4	12.0 ± 7.4
Fourth International Intercomparison of Environmental Dosimeters conducted in the summer of 1979 by the School of Public Health of the University of Texas, Houston, Texas.						
<u>5th International Intercomparison</u>						
115-5A	CaF ₂ : Mn Bulb	Oct, 1980	Field	31.4 ± 1.8	30.0 ± 6.0	30.2 ± 14.6
115-5A	CaF ₂ : Mn Bulb	Oct, 1980	Lab, End	96.6 ± 5.8	88.4 ± 8.8	90.7 ± 31.2
115-5A	CaF ₂ : Mn Bulb	Oct, 1980	Lab, Start	77.4 ± 5.8	75.2 ± 7.6	75.8 ± 40.4
Fifth International Intercomparison of Environmental Dosimeters conducted in the fall of 1980 at Idaho Falls, Idaho and sponsored by the School of Public Health of the University of Texas, Houston, Texas and the Environmental Measurements Laboratory, New York, New York, U.S. Department of Energy.						
<u>5th International Intercomparison</u>						
115-5B	LiF-100 Chips	Oct, 1980	Field	30.3 ± 4.8	30.0 ± 6.0	30.2 ± 14.6
115-5B	LiF-100 Chips	Oct, 1980	Lab, End	85.4 ± 11.7	88.4 ± 8.8	90.7 ± 31.2
115-5B	LiF-100 Chips	Oct, 1980	Lab, Start	81.1 ± 7.4	75.2 ± 7.6	75.8 ± 40.4
Fifth International Intercomparison of Environmental Dosimeters conducted in the fall of 1980 at Idaho Falls, Idaho and sponsored by the School of Public Health of the University of Texas, Houston, Texas and the Environmental Measurements Laboratory, New York, New York, U.S. Department of Energy.						
<u>6th International Intercomparison</u>						
115-6						
Teledyne did not participate in the Sixth International Intercomparison of Environmental Dosimeters.						
<u>7th International Intercomparison</u>						
115-7A	LiF-100 Chips	Jun, 1984	Field	75.4 ± 2.6	75.8 ± 6.0	75.1 ± 29.8
115-7A	LiF-100 Chips	Jun, 1984	Lab, Co-60	80.0 ± 3.5	79.9 ± 4.0	77.9 ± 27.6
115-7A	LiF-100 Chips	Jun, 1984	Lab, Cs-137	66.6 ± 2.5	75.0 ± 3.8	73.0 ± 22.2

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

Lab Code	TLD Type	Date	Measurement	mR		
				Teledyne Results ± 2 Sigma	Known Value ± 2 Sigma	Average ± 2 Sigma (All Participants)
Seventh International Intercomparison of Environmental Dosimeters conducted in the spring and summer of 1984 at Las Vegas, Nevada, and sponsored by the U.S. Department of Energy, The Nuclear Regulatory Commission, and the U.S. Environmental Protection Agency.						
<u>7th International Intercomparison</u>						
115-7B	LiF-100 Chips	Jun, 1984	Field	71.5 ± 2.6	75.8 ± 6.0	75.1 ± 29.8
115-7B	LiF-100 Chips	Jun, 1984	Lab, Co-60	84.8 ± 6.4	79.9 ± 4.0	77.9 ± 27.6
115-7B	LiF-100 Chips	Jun, 1984	Lab, Cs-137	78.8 ± 1.6	75.0 ± 3.8	73.0 ± 22.2
Seventh International Intercomparison of Environmental Dosimeters conducted in the spring and summer of 1984 at Las Vegas, Nevada, and sponsored by the U.S. Department of Energy, The Nuclear Regulatory Commission, and the U.S. Environmental Protection Agency.						
<u>7th International Intercomparison</u>						
115-7C	CaSO ₄ : Dy Cards	Jun, 1984	Field	76.8 ± 2.7	75.8 ± 6.0	75.1 ± 29.8
115-7C	CaSO ₄ : Dy Cards	Jun, 1984	Lab, Co-60	82.5 ± 3.7	79.9 ± 4.0	77.9 ± 27.6
115-7C	CaSO ₄ : Dy Cards	Jun, 1984	Lab, Cs-137	79.0 ± 3.2	75.0 ± 3.8	73.0 ± 22.2
Seventh International Intercomparison of Environmental Dosimeters conducted in the spring and summer of 1984 at Las Vegas, Nevada, and sponsored by the U.S. Department of Energy, The Nuclear Regulatory Commission, and the U.S. Environmental Protection Agency.						
<u>8th International Intercomparison</u>						
115-8A	LiF-100 Chips	Jan, 1986	Field, Site 1	29.5 ± 1.4	29.7 ± 1.5	28.9 ± 12.4
115-8A	LiF-100 Chips	Jan, 1986	Field, Site 2	11.3 ± 0.8	10.4 ± 0.5	10.1 ± 9.1
115-8A	LiF-100 Chips	Jan, 1986	Lab, Cs-137	13.7 ± 0.9	17.2 ± 0.9	16.2 ± 6.8
Eighth International Intercomparison of Environmental Dosimeters conducted in the fall and winter of 1985-1986 at New York, New York, and sponsored by the U.S. Department of Energy.						
<u>8th International Intercomparison</u>						
115-8B	LiF-100 Chips	Jan, 1986	Field, Site 1	32.3 ± 1.2	29.7 ± 1.5	28.9 ± 12.4
115-8B	LiF-100 Chips	Jan, 1986	Field, Site 2	9.0 ± 1.0	10.4 ± 0.5	10.1 ± 9.0
115-8B	LiF-100 Chips	Jan, 1986	Lab, Cs-137	15.8 ± 0.9	17.2 ± 0.9	16.2 ± 6.8
Eighth International Intercomparison of Environmental Dosimeters conducted in the fall and winter of 1985-1986 at New York, New York, and sponsored by the U.S. Department of Energy.						
<u>8th International Intercomparison</u>						
115-8C	CaSO ₄ : Dy Cards	Jan, 1986	Field, Site 1	32.2 ± 0.7	29.7 ± 1.5	28.9 ± 12.4
115-8C	CaSO ₄ : Dy Cards	Jan, 1986	Field, Site 2	10.6 ± 0.6	10.4 ± 0.5	10.1 ± 9.0
115-8C	CaSO ₄ : Dy Cards	Jan, 1986	Lab, Cs-137	18.1 ± 0.8	17.2 ± 0.9	16.2 ± 6.8

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

Lab Code	TLD Type	Date	Measurement	mR		
				Teledyne Results ± 2 Sigma	Known Value ± 2 Sigma	Average ± 2 Sigma (All Participants)
115-8C	CaSO ₄ : Dy Cards	Jan, 1986	Field, Site 2	10.6 ± 0.6	10.4 ± 0.5	10.1 ± 9.0
115-8C	CaSO ₄ : Dy Cards	Jan, 1986	Lab, Cs-137	18.1 ± 0.8	17.2 ± 0.9	16.2 ± 6.8

Eighth International Intercomparison of Environmental Dosimeters conducted in the fall and winter of 1985-1986 at New York, New York, and sponsored by the U.S. Department of Energy.

9th International Intercomparison

115-9

The Ninth International Intercomparison of Environmental Dosimeters was not available to Teledyne's Midwest Laboratory.

10th International Intercomparison

115-10A	LiF-100 Chips	Aug, 1993	Field	25.7 ± 1.4	27.0 ± 1.6	26.4 ± 10.2
115-10A	LiF-100 Chips	Aug, 1993	Lab, 1	22.7 ± 1.6	25.9 ± 1.3	25.0 ± 9.4
115-10A	LiF-100 Chips	Aug, 1993	Lab, 2	62.7 ± 2.6	72.7 ± 1.9	69.8 ± 20.3

The Tenth International Intercomparison of Environmental Dosimeters conducted in 1993 at Idaho State University and sponsored by the U.S. Department of Energy and the Idaho State University.

10th International Intercomparison

115-10B	CaSO ₄ : Dy Cards	Aug, 1993	Field	26.0 ± 2.3	27.0 ± 1.6	26.4 ± 10.2
115-10B	CaSO ₄ : Dy Cards	Aug, 1993	Lab, 1	24.1 ± 1.7	25.9 ± 1.3	25.0 ± 9.4
115-10B	CaSO ₄ : Dy Cards	Aug, 1993	Lab, 2	69.2 ± 3.0	72.7 ± 1.9	69.8 ± 20.3

The Tenth International Intercomparison of Environmental Dosimeters conducted in 1993 at Idaho State University and sponsored by the U.S. Department of Energy and the Idaho State University.

Teledyne Testing

89-1	LiF-100 Chips	Sep, 1989	Lab	21.0 ± 0.4	22.4	ND
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ND = No Data; Teledyne Testing was only performed by Teledyne.

Chips were irradiated by Teledyne Isotopes, Inc., Westwood, New Jersey, in September, 1989.

Teledyne Testing

89-2	Teledyne CaSO ₄ : Dy Cards	Nov, 1989	Lab	20.9 ± 1.0	20.3	ND
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ND = No Data; Teledyne Testing was only performed by Teledyne.

Cards were irradiated by Teledyne Isotopes, Inc., Westwood, New Jersey, in June, 1990.

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

Lab Code	TLD Type	Date	Measurement	mR		
				Teledyne Results ± 2 Sigma	Known Value ± 2 Sigma	Average ± 2 Sigma (All Participants)
<u>Teledyne Testing</u>						
90-2	Teledyne CaSo ₄ : Dy Cards	Jun, 1990	Lab	100.8 ± 4.3	100.0	ND
ND = No Data; Teledyne Testing was only performed by Teledyne. Cards were irradiated by Dosimetry Associates, Inc., Northville, MI, in October, 1990.						
<u>Teledyne Testing</u>						
91-1	Teledyne CaSo ₄ : Dy Cards	Oct, 1990	Lab, 1	33.4 ± 2.0	32.0	ND
91-1	Teledyne CaSo ₄ : Dy Cards	Oct, 1990	Lab, 2	55.2 ± 4.7	58.8	ND
91-1	Teledyne CaSo ₄ : Dy Cards	Oct, 1990	Lab, 3	87.8 ± 6.2	85.5	ND
ND = No Data; Teledyne Testing was only performed by Teledyne. Cards were irradiated by Teledyne Isotopes, Inc., Westwood, New Jersey, in October, 1991.						
<u>Teledyne Testing</u>						
92-1	LiF-100 Chips	Feb, 1992	Lab, 1	11.1 ± 0.2	10.7	ND
92-1	LiF-100 Chips	Feb, 1992	Lab, 2	25.6 ± 0.5	25.4	ND
92-1	LiF-100 Chips	Feb, 1992	Lab, 3	46.4 ± 0.5	46.3	ND
ND = No Data; Teledyne Testing was only performed by Teledyne. Chips were irradiated by Teledyne Isotopes, Inc., Westwood, New Jersey, in February, 1992.						
<u>Teledyne Testing</u>						
92-2	Teledyne CaSo ₄ : Dy Cards	Apr, 1992	Reader 1, #1	20.1 ± 0.1	20.1	ND
92-2	Teledyne CaSo ₄ : Dy Cards	Apr, 1992	Reader 1, #2	40.6 ± 0.1	40.0	ND
92-2	Teledyne CaSo ₄ : Dy Cards	Apr, 1992	Reader 1, #3	60.0 ± 1.3	60.3	ND
92-2	Teledyne CaSo ₄ : Dy Cards	Apr, 1992	Reader 2, #1	20.3 ± 0.3	20.1	ND
92-2	Teledyne CaSo ₄ : Dy Cards	Apr, 1992	Reader 2, #2	39.2 ± 0.3	40.0	ND

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

Lab Code	TLD Type	Date	Measurement	mR		
				Teledyne Results ± 2 Sigma	Known Value ± 2 Sigma	Average ± 2 Sigma (All Participants)
92-2	Teledyne CaSO ₄ : Dy Cards	Apr, 1992	Reader 2, #3	60.7 ± 0.4	60.3	ND

ND = No Data; Teledyne Testing was only performed by Teledyne.

Cards were irradiated by Teledyne Isotopes, Inc., Westwood, New Jersey, in April, 1992.

Teledyne Testing

93-1	Teledyne LiF-100 Chips	Mar, 1993	Lab, 1	10.0 ± 1.0	10.2	ND
93-1	Teledyne LiF-100 Chips	Mar, 1993	Lab, 2	25.2 ± 2.2	25.5	ND
93-1	Teledyne LiF-100 Chips	Mar, 1993	Lab, 3	42.7 ± 5.7	45.9	ND

ND = No Data; Teledyne Testing was only performed by Teledyne.

Chips were irradiated by Teledyne Isotopes, Inc., Westwood, New Jersey, in March, 1993. Due to a potential error of 10-12% when cards were irradiated, results of the testing on the cards will not be published. Data is available upon request.

Teledyne Testing

94-1	Teledyne LiF-100 Chips	Nov, 1994	Lab, 1	15.6 ± 0.4	14.9	ND
94-1	Teledyne LiF-100 Chips	Nov, 1994	Lab, 2	30.2 ± 0.4	29.8	ND
94-1	Teledyne LiF-100 Chips	Nov, 1994	Lab, 3	59.2 ± 0.3	59.7	ND
94-1	Teledyne CaSO ₄ : Dy Cards	Nov, 1994	Reader 1, #1	14.9 ± 0.1	14.9	ND
94-1	Teledyne CaSO ₄ : Dy Cards	Nov, 1994	Reader 1, #2	30.8 ± 0.1	29.8	ND
94-1	Teledyne CaSO ₄ : Dy Cards	Nov, 1994	Reader 1, #3	58.9 ± 0.3	59.7	ND
94-1	Teledyne CaSO ₄ : Dy Cards	Nov, 1994	Reader 2, #1	15.4 ± 0.2	14.9	ND
94-1	Teledyne CaSO ₄ : Dy Cards	Nov, 1994	Reader 2, #2	31.4 ± 0.2	29.8	ND
94-1	Teledyne CaSO ₄ : Dy Cards	Nov, 1994	Reader 2, #3	60.1 ± 0.3	59.7	ND

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

Lab Code	TLD Type	Date	Measurement	mR		
				Teledyne Results ± 2 Sigma	Known Value ± 2 Sigma	Average ± 2 Sigma (All Participants)
ND = No Data; Teledyne Testing was only performed by Teledyne. Cards were irradiated by Teledyne Isotopes, Inc., Westwood, New Jersey, in November, 1994.						
<u>Teledyne Testing</u>						
95-1	LiF-100 Chips	Mar, 1995	Lab, 1	16.1 ± 0.2	15.7	
95-1	LiF-100 Chips	Mar, 1995	Lab, 2	31.7 ± 0.1	32.3	
95-1	LiF-100 Chips	Mar, 1995	Lab, 3	59.7 ± 0.6	60.8	
95-1	Teledyne CaSo ₄ : Dy Cards	Mar, 1995	Reader 1, #1	16.4 ± 0.1	15.7	ND
95-1	Teledyne CaSo ₄ : Dy Cards	Mar, 1995	Reader 1, #2	34.9 ± 0.1	32.3	ND
95-1	Teledyne CaSo ₄ : Dy Cards	Mar, 1995	Reader 1, #3	64.4 ± 1.5	60.8	ND
ND = No Data; Teledyne Testing was only performed by Teledyne. Cards and Chips were irradiated by Teledyne Isotopes, Inc., Westwood, New Jersey, in March, 1995.						
<u>Teledyne Testing</u>						
95-2	Teledyne CaSo ₄ : Dy Cards	Mar, 1995	Reader 2, #1	16.4 ± 0.2	15.7	ND
95-2	Teledyne CaSo ₄ : Dy Cards	Mar, 1995	Reader 2, #2	33.9 ± 0.4	32.3	ND
95-2	Teledyne CaSo ₄ : Dy Cards	Mar, 1995	Reader 2, #3	60.5 ± 0.3	60.8	ND
ND = No Data; Teledyne Testing was only performed by Teledyne. Cards and Chips were irradiated by Teledyne Isotopes, Inc., Westwood, New Jersey, in March, 1995.						
<u>Teledyne Testing</u>						
96-1	LiF-100 Chips	Mar, 1996	Lab, 1	15.9 ± 0.3	15.4	
96-1	LiF-100 Chips	Mar, 1996	Lab, 2	29.4 ± 0.3	30.8	
96-1	LiF-100 Chips	Mar, 1996	Lab, 3	62.5 ± 1.3	62.5	
96-1	Teledyne CaSo ₄ : Dy Cards	Mar, 1996	Reader 1, #1	14.4 ± 0.1	15.4	ND
96-1	Teledyne CaSo ₄ : Dy Cards	Mar, 1996	Reader 1, #2	31.8 ± 0.1	30.8	ND

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

Lab Code	TLD Type	Date	Measurement	mR		
				Teledyne Results ± 2 Sigma	Known Value ± 2 Sigma	Average ± 2 Sigma (All Participants)
96-1	Teledyne CaSo ₄ : Dy Cards	Mar, 1996	Reader 1, #3	64.7 \pm 0.4	62.5	ND

ND = No Data; Teledyne Testing was only performed by Teledyne.
Chips and Cards were irradiated by Teledyne Isotopes, Inc., Westwood, New Jersey, in March, 1996.

Teledyne Testing

96-2	Teledyne CaSo ₄ : Dy Cards	Mar, 1996	Reader 2, #1	14.3 \pm 0.4	15.4	ND
96-2	Teledyne CaSo ₄ : Dy Cards	Mar, 1996	Reader 2, #2	31.8 \pm 0.1	30.8	ND
96-2	Teledyne CaSo ₄ : Dy Cards	Mar, 1996	Reader 2, #3	68.6 \pm 0.1	62.5	ND

ND = No Data; Teledyne Testing was only performed by Teledyne.
Chips and Cards were irradiated by Teledyne Isotopes, Inc., Westwood, New Jersey, in March, 1996.

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

Lab Code	Sample Type	Date Collected	Analysis	Concentration in pCi/L ^a		
				Teledyne Results 2s, n=1 ^b	Known Activity	Control ^c Limits
SPCH-607	CHARCOAL CANISTER	Feb, 1996	I-131(g)	0.253 ± 0.013	0.261	0.157 - 0.365
SPAP-609	AIR FILTER	Feb, 1996	Cs-137	2.225 ± 0.015	1.900	1.140 - 2.660
SPAP-611	AIR FILTER	Feb, 1996	Gr. Beta	6.794 ± 0.021	7.990	0.000 - 17.990
SPW-621	WATER	Feb, 1996	I-131	86.153 ± 0.687	95.900	76.720 - 115.080
SPW-621	WATER	Feb, 1996	I-131(g)	96.192 ± 4.740	95.900	57.540 - 105.900
SPW-622	WATER	Feb, 1996	Gr. Alpha	96.358 ± 6.593	82.800	41.400 - 124.200
SPW-622	WATER	Feb, 1996	Gr. Beta	83.716 ± 3.341	85.700	75.700 - 95.700
SPW-623	WATER	Feb, 1996	H-3	18228.692 ± 391.294	17833.000	14266.400 - 21399.600
SPW-624	WATER	Feb, 1996	Co-60	230.950 ± 14.500	239.300	215.370 - 263.230
SPW-624	WATER	Feb, 1996	Cs-137	428.250 ± 24.100	428.300	385.470 - 471.130
SPMI-625	MILK	Feb, 1996	Cs-137	63.088 ± 3.230	53.500	43.500 - 63.500
SPMI-625	MILK	Feb, 1996	I-131	47.780 ± 0.680	47.970	35.970 - 59.970
SPMI-625	MILK	Feb, 1996	I-131(g)	47.999 ± 2.890	48.000	28.800 - 58.000
SPVE-1068	VEGETATION	Feb, 1996	I-131(g)	0.768 ± 0.024	0.780	0.468 - 1.092
SPMI-2217	MILK	Apr, 1996	Cs-134	35.387 ± 2.500	37.100	27.100 - 47.100
SPMI-2217	MILK	Apr, 1996	Cs-137	117.200 ± 5.360	106.600	95.940 - 117.260
SPW-2219	WATER	Apr, 1996	Co-60	25.957 ± 3.360	23.400	13.400 - 33.400
SPW-2219	WATER	Apr, 1996	Cs-134	36.082 ± 2.930	37.100	27.100 - 47.100
SPW-2219	WATER	Apr, 1996	Cs-137	117.100 ± 6.440	106.600	95.940 - 117.260
SPW-2221	WATER	Apr, 1996	Gr. Alpha	76.914 ± 6.092	82.800	41.400 - 124.200
SPW-2221	WATER	Apr, 1996	Gr. Beta	132.317 ± 5.028	136.800	123.120 - 150.480
SPW-2223	WATER	Apr, 1996	H-3	17538.890 ± 354.114	17937.000	14349.600 - 21524.400
SPW-2283	WATER	Apr, 1996	I-129	15.668 ± 1.437	14.940	2.940 - 26.940
SPW-2285	WATER	Apr, 1996	Fe-55	1.221 ± 0.478	1.130	0.000 - 21.130
SPW-2287	WATER	Apr, 1996	Tc-99	70.512 ± 7.922	66.000	46.200 - 85.800
SPW-2289	WATER	Apr, 1996	Am-241	77.430 ± 0.419	82.800	49.680 - 115.920
SPW-2289	WATER	Apr, 1996	Cm-244	37.871 ± 1.708	36.400	21.840 - 50.960
SPW-2291	WATER	Apr, 1996	Th-230	41.596 ± 1.879	45.000	27.000 - 63.000
SPW-2292	WATER	Apr, 1996	U-238	46.230 ± 1.997	45.400	31.780 - 59.020
SPF-3420	FISH	May, 1996	Cs-137	0.093 ± 0.015	0.085	0.051 - 0.119
SPW-3439	WATER	May, 1996	I-131	23.936 ± 0.836	25.300	13.300 - 37.300
SPMI-3441	MILK	May, 1996	I-131	23.451 ± 0.483	25.300	13.300 - 37.300
SPMI - 4054	MILK	Jun, 1996	Cs-134	28.123 ± 2.590	31.300	21.300 - 41.300
SPMI - 4054	MILK	Jun, 1996	Cs-137	46.994 ± 3.660	42.500	32.500 - 52.500
SPMI - 4054	MILK	Jun, 1996	I-131(g)	39.384 ± 3.580	40.400	24.240 - 50.400

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

Lab Code	Sample Type	Date Collected	Analysis	Concentration in pCi/L ^a		
				Teledyne Results 2s, n=1 ^b	Known Activity	Control ^c Limits
SPMI-4054	MILK	Jun, 1996	Cs-134	28.123 ± 2.590	31.300	21.300 - 41.300
SPMI-4054	MILK	Jun, 1996	Cs-137	46.994 ± 3.660	42.500	32.500 - 52.500
SPMI-4054	MILK	Jun, 1996	I-131	35.696 ± 0.591	40.300	28.300 - 52.300
SPMI-4054	MILK	Jun, 1996	I-131(g)	39.384 ± 3.580	40.400	24.240 - 50.400
SPW-4246	WATER	Jun, 1996	Gr. Alpha	70.005 ± 3.593	82.700	41.350 - 124.050
SPW-4246	WATER	Jun, 1996	Gr. Beta	140.532 ± 3.154	136.100	122.490 - 149.710
SPAP-4750	AIR FILTER	Jul, 1996	Cs-137	2.201 ± 0.018	1.900	1.140 - 2.660
SPW-4936	WATER	Jul, 1996	Co-60	105.660 ± 15.400	112.600	101.340 - 123.860
SPW-4936	WATER	Jul, 1996	Cs-134	127.110 ± 10.900	135.200	121.680 - 148.720
SPW-4936	WATER	Jul, 1996	Cs-137	220.210 ± 20.200	211.900	190.710 - 233.090
SPMI-4938	MILK	Jul, 1996	Cs-134	130.400 ± 11.400	135.200	121.680 - 148.720
SPMI-4938	MILK	Jul, 1996	Cs-137	229.240 ± 21.600	211.900	190.710 - 233.090
SPW-4942	WATER	Jul, 1996	Fe-55	1.975 ± 0.537	1.764	0.000 - 21.764
SPF-4996	FISH	Jul, 1996	Cs-137	0.087 ± 0.012	0.077	0.046 - 0.108
SPAP-5669	AIR FILTER	Jul, 1996	Gr. Beta	6.983 ± 0.029	7.810	0.000 - 17.810
SPW-5700	WATER	Aug, 1996	H-3	49589.041 ± 589.495	51058.000	40846.400 - 61269.600
SPMI-7384	MILK	Oct, 1996	I-131	35.003 ± 0.882	39.900	27.900 - 51.900
SPMI-7385	MILK	Oct, 1996	Cs-134	19.488 ± 2.380	21.400	11.400 - 31.400
SPMI-7385	MILK	Oct, 1996	Cs-137	25.987 ± 3.890	24.100	14.100 - 34.100
SPMI-7385	MILK	Oct, 1996	I-131(g)	117.300 ± 6.420	114.100	68.460 - 125.510
SPMI-7444	MILK	Oct, 1996	I-131	64.546 ± 14.428	79.860	63.888 - 95.832
SPW-7444	WATER	Oct, 1996	I-131(g)	82.195 ± 16.200	79.900	47.940 - 89.900
SPMI-7445	MILK	Oct, 1996	I-131	235.455 ± 2.830	199.700	159.760 - 239.640
SPW-7445	WATER	Oct, 1996	I-131(g)	190.860 ± 14.100	199.700	119.820 - 219.670
SPMI-7685	MILK	Oct, 1996	I-131	103.635 ± 1.513	114.100	91.280 - 136.920
SPAP-2	AIR FILTER	Oct, 1996	Gr. Beta	5.972 ± 0.030	5.980	0.000 - 15.980
SPSO-2478	SOIL	Oct, 1996	Cs-134	0.183 ± 0.009	0.167	0.100 - 0.234
SPSO-2478	SOIL	Oct, 1996	Cs-137	0.487 ± 0.019	0.440	0.264 - 0.616
SPCH-7473	CHARCOAL CANISTER	Oct, 1996	I-131(g)	0.378 ± 0.021	0.350	0.210 - 0.490
SPCH-7474	CHARCOAL CANISTER	Oct, 1996	I-131(g)	0.534 ± 0.026	0.530	0.318 - 0.742
SPAP-7476	AIR FILTER	Oct, 1996	Cs-137	2.112 ± 0.023	1.900	1.140 - 2.660
SPW-8734	WATER	Nov, 1996	Co-60	42.448 ± 7.240	43.000	33.000 - 53.000
SPW-8734	WATER	Nov, 1996	Cs-134	29.045 ± 6.550	30.100	20.100 - 40.100
SPW-8734	WATER	Nov, 1996	Cs-137	35.081 ± 9.470	31.500	21.500 - 41.500
SPW-8740	WATER	Nov, 1996	H-3	25383.535 ± 433.492	25075.000	20060.000 - 30090.000

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

Lab Code	Sample Type	Date Collected	Analysis	Concentration in pCi/L ^a		
				Teledyne Results 2s, n=1 ^b	Known Activity	Control ^c Limits

^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 .		
				Teledyne Results (4.66 Sigma)		Acceptance Criteria (4.66 Sigma)
				LLD	Activity ^b	
SPW-7	WATER	Jan 1996	Ra-226	<0.02	0.020 ± 0.132	< 1.000
SPW-2	WATER	Feb 1996	Ra-226	<0.02	0.012 ± 0.015	< 1.000
SPCH-608	CHARCOAL CANISTER	Feb 1996	I-131(g)	<2.7	-0.103 ± 1.626	<9.600
SPAP-610	AIR FILTER	Feb 1996	Co-60	<4.1	3.456 ± 3.392	< 10.000
SPAP-610	AIR FILTER	Feb 1996	Cs-134	<3.6	-0.249 ± 2.941	< 10.000
SPAP-610	AIR FILTER	Feb 1996	Cs-137	<2.4	-0.310 ± 2.531	< 10.000
SPAP-612	AIR FILTER	Feb 1996	Gr. Beta	<0.4	0.320 ± 0.288	< 3.200
SPW-627	WATER	Feb 1996	Co-60	<3.0	1.700 ± 1.600	< 10.000
SPW-627	WATER	Feb 1996	Cs-134	<2.5	-0.363 ± 1.660	< 10.000
SPW-627	WATER	Feb 1996	Cs-137	<3.2	0.332 ± 1.600	< 10.000
SPW-627	WATER	Feb 1996	Gr. Alpha	<1.0	0.199 ± 0.933	< 1.000
SPW-627	WATER	Feb 1996	Gr. Beta	<3.2	2.261 ± 1.762	< 3.200
SPW-627	WATER	Feb 1996	I-131	<0.4	-0.205 ± 0.317	< 0.500
SPW-628	WATER	Feb 1996	Co-60	<2.6	-1.380 ± 2.180	< 10.000
SPW-628	WATER	Feb 1996	Cs-134	<3.1	0.950 ± 2.110	< 10.000
SPW-628	WATER	Feb 1996	Cs-137	<3.8	0.546 ± 2.310	< 10.000
SPW-628	WATER	Feb 1996	I-131	<0.5	-0.176 ± 0.348	< 0.500
SPW-629	WATER	Feb 1996	H-3	<197	-12.471 ± 97.166	< 200.000
SPMI-630	MILK	Feb 1996	Co-60	<3.5	1.260 ± 1.790	< 10.000
SPMI-630	MILK	Feb 1996	Cs-134	<2.5	-0.115 ± 1.530	< 10.000
SPMI-630	MILK	Feb 1996	Cs-137	<2.6	0.218 ± 1.440	< 10.000
SPMI-630	MILK	Feb 1996	I-131	<0.3	-0.070 ± 0.242	< 0.500
SPMI-630	MILK	Feb 1996	Sr-89	<0.9	-0.200 ± 1.272	< 5.000
SPMI-630	MILK	Feb 1996	Sr-90	N/A	1.484 ± 0.398	< 1.000
Low level of Sr-90 concentration in milk (1-5 pCi/L) is not unusual.						
SPVE-1069	VEGETATION	Feb 1996	I-131(g)	<0.012	0.001 ± 0.006	< 20.000
SPW-3	WATER	Mar 1996	Ra-226	<0.08	-0.001 ± 0.037	< 1.000
SPW-3	WATER	Mar 1996	Ra-228	<0.9	0.466 ± 0.747	< 1.000
SPW-4	WATER	Apr 1996	Ra-226	<0.06	0.086 ± 0.039	< 1.000
SPMI-2218	MILK	Apr 1996	Cs-134	<4.8	2.520 ± 2.620	< 10.000
SPMI-2218	MILK	Apr 1996	Cs-137	<5.4	4.420 ± 3.000	< 10.000
SPW-2220	WATER	Apr 1996	Co-60	<2.9	0.952 ± 1.580	< 10.000
SPW-2220	WATER	Apr 1996	Cs-134	<2.7	1.470 ± 1.640	< 10.000
SPW-2220	WATER	Apr 1996	Cs-137	<1.9	-1.280 ± 1.720	< 10.000
SPW-2222	WATER	Apr 1996	Gr. Alpha	<0.2	-0.208 ± 0.973	< 1.000

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

Lab Code	Sample Type	Sample Date	Analysis	Concentration pCi/L ^a		
				Teledyne Results (4.66 Sigma)		Acceptance Criteria (4.66 Sigma)
				LLD	Activity ^b	
SPW-2222	WATER	Apr 1996	Gr. Beta	<2.8	2.258 ± 1.573	<3.200
SPW-2224	WATER	Apr 1996	H-3	<151	-101.302 ± 70.183	<200.000
SPW-2284	WATER	Apr 1996	I-129	<1.4	0.215 ± 0.844	<1.500
SPW-2286	WATER	Apr 1996	Fe-55	<0.7	-0.075 ± 0.431	<1000.000
SPW-2288	WATER	Apr 1996	Tc-99	<4.2	0.549 ± 2.292	<10.000
SPF-3421	FISH	May 1996	Co-60	<0.010	0.001 ± 0.008	<10.000
SPF-3421	FISH	May 1996	Cs-134	<0.014	-0.003 ± 0.009	<10.000
SPF-3421	FISH	May 1996	Cs-137	<0.015	0.006 ± 0.008	<10.000
SPW-3440	WATER	May 1996	I-131	<0.1	0.041 ± 0.202	<0.500
SPMI-3442	MILK	May 1996	I-131	<0.1	-0.065 ± 0.196	<0.500
SPW-6	WATER	Jun 1996	Ra-228	<1.0	0.730 ± 1.053	<1.000
SPMI-4055	MILK	Jun 1996	Co-60	<8.7	2.510 ± 4.510	<10.000
SPMI-4055	MILK	Jun 1996	Cs-134	<6.1	1.870 ± 3.370	<10.000
SPMI-4055	MILK	Jun 1996	Cs-137	<5.3	1.820 ± 11.800	<10.000
SPMI-4055	MILK	Jun 1996	I-131	<0.3	0.213 ± 0.242	<0.500
SPMI-4055	MILK	Jun 1996	Sr-89	<0.8	0.567 ± 1.829	<5.000
SPMI-4055	MILK	Jun 1996	Sr-90	N/A	1.486 ± 0.438	<1.000
Low level of Sr-90 concentration in milk (1-5 pCi/L) is not unusual.						
SPW-7	WATER	Jul 1996	Ra-228	<0.8	-0.046 ± 0.701	<1.000
SPAP-4751	AIR FILTER	Jul 1996	Co-60	<2.7	1.264 ± 1.440	<10.000
SPAP-4751	AIR FILTER	Jul 1996	Cs-134	<4.8	1.498 ± 1.798	<10.000
SPAP-4751	AIR FILTER	Jul 1996	Cs-137	<2.4	0.630 ± 1.491	<10.000
SPW-4937	WATER	Jul 1996	Co-60	<4.5	-0.248 ± 3.270	<10.000
SPW-4937	WATER	Jul 1996	Cs-134	<5.5	0.340 ± 3.390	<10.000
SPW-4937	WATER	Jul 1996	Cs-137	<5.7	-0.348 ± 3.430	<10.000
SPMI-4939	MILK	Jul 1996	Co-60	<8.0	1.130 ± 4.730	<10.000
SPMI-4939	MILK	Jul 1996	Cs-134	<7.2	1.800 ± 5.180	<10.000
SPMI-4939	MILK	Jul 1996	Cs-137	<5.8	1.040 ± 3.770	<10.000
SPW-4943	WATER	Jul 1996	Fe-55	<0.6	0.182 ± 0.349	<1000.000
SPF-4997	FISH	Jul 1996	Co-60	<0.006	0.002 ± 0.004	<10.000
SPF-4997	FISH	Jul 1996	Cs-134	<0.006	-0.002 ± 0.006	<10.000
SPF-4997	FISH	Jul 1996	Cs-137	<0.009	0.005 ± 0.005	<10.000
SPAP-5670	AIR FILTER	Jul 1996	Gr. Beta	<0.4	0.800 ± 0.320	<3.200
SPW-8	WATER	Aug 1996	Ra-226	<0.04	0.158 ± 0.031	<1.000
SPW-8	WATER	Aug 1996	Ra-228	<1.0	0.443 ± 0.785	<1.000
SPW-9	WATER	Sep 1996	Ra-226	<0.05	0.008 ± 0.032	<1.000

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

Lab Code	Sample Type	Sample Date	Analysis	Concentration pCi/L ^a .		
				Teledyne Results (4.66 Sigma)		Acceptance Criteria (4.66 Sigma)
				LLD	Activity ^b	
SPW-7013	WATER	Sep 1996	Sr-89	<1.8	-0.730 ± 1.099	< 5.000
SPW-7013	WATER	Sep 1996	Sr-90	<0.5	-0.045 ± 0.208	< 1.000
SPW-10	WATER	Oct 1996	Ra-228	<1.0	0.797 ± 0.572	< 1.000
SPMI-7382	MILK	Oct 1996	Cs-134	<3.1	-0.251 ± 2.620	< 10.000
SPMI-7382	MILK	Oct 1996	Cs-137	<4.8	0.146 ± 2.680	< 10.000
SPMI-7382	MILK	Oct 1996	I-131(g)	<3.7	-1.610 ± 3.280	< 20.000
SPMI-7383	MILK	Oct 1996	Cs-134	<5.7	0.284 ± 3.680	< 10.000
SPMI-7383	MILK	Oct 1996	Cs-137	<4.1	-1.830 ± 3.630	< 10.000
SPMI-7383	MILK	Oct 1996	I-131	<0.4	0.180 ± 0.234	< 0.500
SPMI-7383	MILK	Oct 1996	I-131(g)	<6.8	1.190 ± 4.080	< 20.000
SPMI-7443	MILK	Oct 1996	I-131	<0.4	-0.076 ± 0.173	< 0.500
SPCH-7475	CHARCOAL CANISTER	Oct 1996	I-131(g)	<2.8	-1.576 ± 12.736	< 9.600
SPAP-7477	AIR FILTER	Oct 1996	Cs-137	<2.2	0.000 ± 0.001	< 10.000
SPSO-7479	SOIL	Oct 1996	Cs-134	<0.011	0.002 ± 0.004	< 10.000
SPSO-7479	SOIL	Oct 1996	Cs-137	<0.007	0.001 ± 0.004	< 10.000
SPAP-7527	AIR FILTER	Oct 1996	Gr. Beta	<0.7	0.096 ± 0.448	< 3.200
SPF-7505	FISH	Oct 1996	Co-60	<0.016	-0.000 ± 0.010	< 10.000
SPF-7505	FISH	Oct 1996	Cs-134	<0.017	-0.005 ± 0.038	< 10.000
SPF-7505	FISH	Oct 1996	Cs-137	<0.016	-0.002 ± 0.011	< 10.000
SPW-8735	WATER	Nov 1996	Co-60	<6.0	-0.139 ± 0.100	< 10.000
SPW-8735	WATER	Nov 1996	Cs-134	<4.7	-0.528 ± 7.690	< 10.000
SPW-8735	WATER	Nov 1996	Cs-137	<8.2	2.090 ± 4.630	< 10.000
SPW-8735	WATER	Nov 1996	Gr. Alpha	<0.3	0.153 ± 0.208	< 1.000
SPW-8735	WATER	Nov 1996	Gr. Beta	<0.8	-0.408 ± 0.524	< 3.200
SPW-8739	WATER	Nov 1996	H-3	<158	104.987 ± 82.930	< 200.000

^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 ^b	Sample Date	Analysis	Concentration in pCi/L ^a		
			First Result	Second Result	Averaged Result
CF - 20, 21	Jan, 1996	Gr. Beta	7.1423 ± 0.2477	6.8880 ± 0.1339	7.0152 ± 0.1408
CF - 20, 21	Jan, 1996	K-40	3.6750 ± 0.3680	3.6536 ± 0.1270	3.6643 ± 0.1946
CF - 20, 21	Jan, 1996	Sr-89	-0.0115 ± 0.0138	0.0042 ± 0.0097	-0.0037 ± 0.0085
CF - 20, 21	Jan, 1996	Sr-90	0.0057 ± 0.0034	0.0045 ± 0.0021	0.0051 ± 0.0020
MI - 47, 48	Jan, 1996	Cs-137	-1.6700 ± 4.1200	2.7900 ± 3.3500	0.5600 ± 2.6550
MI - 47, 48	Jan, 1996	I-131	0.0511 ± 0.2159	0.0763 ± 0.2005	0.0637 ± 0.1473
LW - 103, 104	Jan, 1996	Co-60	0.2690 ± 1.6500	1.0900 ± 2.2400	0.6795 ± 1.3911
LW - 103, 104	Jan, 1996	Cs-134	0.4450 ± 1.5400	1.0400 ± 2.3800	0.7425 ± 1.4174
LW - 103, 104	Jan, 1996	Cs-137	0.6930 ± 1.5800	0.2970 ± 2.2200	0.4950 ± 1.3624
LW - 103, 104	Jan, 1996	Gr. Beta	2.2440 ± 0.5110	2.2050 ± 0.5678	2.2245 ± 0.3819
LW - 103, 104	Jan, 1996	I-131	0.0550 ± 0.2332	0.0721 ± 0.2983	0.0635 ± 0.1893
LW - 103, 104	Jan, 1996	I-131(g)	-3.9100 ± 6.2600	1.3800 ± 12.0000	-1.2650 ± 6.7673
LW - 103, 104	Jan, 1996	K-40	78.6450 ± 35.3000	99.3760 ± 48.5000	89.0105 ± 29.9931
CW - 132, 133	Jan, 1996	Gr. Beta	1.7043 ± 1.2727	-0.2699 ± 1.1417	0.7172 ± 0.8549
CW - 132, 133	Jan, 1996	Gr. Beta	5.5009 ± 1.6811	3.8880 ± 1.5639	4.6944 ± 1.1480
MI - 70, 71	Jan, 1996	Co-60	1.2400 ± 4.2600	1.6800 ± 4.0900	1.4600 ± 2.9528
MI - 70, 71	Jan, 1996	Cs-137	0.3210 ± 3.2700	2.3700 ± 3.4200	1.3455 ± 2.3659
MI - 154, 155	Jan, 1996	Co-60	1.5700 ± 2.5500	-0.4590 ± 3.2500	0.5555 ± 2.0655
MI - 154, 155	Jan, 1996	Cs-134	0.1120 ± 2.1800	-2.3100 ± 2.5900	-1.0990 ± 1.6927
MI - 154, 155	Jan, 1996	Cs-137	-0.7350 ± 2.0100	0.6920 ± 2.8500	-0.0215 ± 1.7437
MI - 154, 155	Jan, 1996	I-131	0.0429 ± 0.2521	0.0326 ± 0.2410	0.0377 ± 0.1744
MI - 154, 155	Jan, 1996	I-131(g)	1.2400 ± 3.4000	0.0793 ± 3.8500	0.6597 ± 2.5682
MI - 154, 155	Jan, 1996	K-40	1,521.1000 ± 89.3000	1,628.4000 ± 122.0000	1,574.7500 ± 75.5951
MI - 154, 155	Jan, 1996	Sr-89	-0.5282 ± 0.8162	-0.6568 ± 0.8029	-0.5925 ± 0.5724
MI - 154, 155	Jan, 1996	Sr-90	0.8201 ± 0.3348	0.9595 ± 0.3294	0.8898 ± 0.2348
WW - 180, 181	Jan, 1996	I-131	0.0000 ± 0.1940	-0.0631 ± 0.2130	-0.0315 ± 0.1440
MI - 298, 299	Jan, 1996	I-131	0.1096 ± 0.2108	0.2322 ± 0.2760	0.1709 ± 0.1737
MI - 298, 299	Jan, 1996	K-40	1,579.0000 ± 177.0000	1,551.7000 ± 168.0000	1,565.3500 ± 122.0174
CW - 355, 356	Jan, 1996	Gr. Beta	0.0868 ± 0.9590	-0.3493 ± 0.9041	-0.1312 ± 0.6590
CW - 355, 356	Jan, 1996	Gr. Beta	2.3816 ± 1.2727	2.0620 ± 1.2550	2.2218 ± 0.8937
SW - 436, 437	Jan, 1996	Co-60	0.1360 ± 1.0900	0.6880 ± 1.8700	0.4120 ± 1.0822
SW - 436, 437	Jan, 1996	Cs-137	0.0782 ± 1.2000	1.6100 ± 1.8700	0.8441 ± 1.1110
WW - 500, 501	Jan, 1996	H-3	21,035.5732 ± 418.5372	20,597.1409 ± 414.3977	20,816.3571 ± 294.4906
SWT - 554, 555	Jan, 1996	Gr. Beta	2.8534 ± 0.5402	3.1179 ± 0.5254	2.9857 ± 0.3768
SW - 841, 842	Jan, 1996	K-40	65.0260 ± 28.3000	118.9000 ± 57.7000	91.9630 ± 32.1332
SW - 479, 480	Feb, 1996	Gr. Beta	6.7187 ± 1.0111	7.8142 ± 1.3095	7.2665 ± 0.8272
MI - 521, 522	Feb, 1996	Co-60	-1.0500 ± 2.9400	0.0602 ± 5.0000	-0.4949 ± 2.9002

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

Lab Codes ^b	Sample Date	Analysis	Concentration in pCi/L ^a		
			First Result	Second Result	Averaged Result
MI - 521, 522	Feb, 1996	Cs-137	-0.7930 ± 2.8100	-0.3920 ± 3.4400	-0.5925 ± 2.2209
MI - 521, 522	Feb, 1996	I-131	0.1131 ± 0.3229	0.2232 ± 0.2998	0.1682 ± 0.2203
MI - 580, 581	Feb, 1996	Co-60	-0.7660 ± 2.7300	1.7200 ± 1.4800	0.4770 ± 1.5527
MI - 580, 581	Feb, 1996	Cs-137	0.5780 ± 2.2900	0.4440 ± 1.2600	0.5110 ± 1.3069
LW - 709, 710	Feb, 1996	Gr. Alpha	0.0692 ± 0.3694	0.4866 ± 0.3667	0.2779 ± 0.2603
LW - 709, 710	Feb, 1996	Gr. Beta	1.6911 ± 0.4163	1.9519 ± 0.4187	1.8215 ± 0.2952
LW - 709, 710	Feb, 1996	H-3	37.4444 ± 74.3195	84.3897 ± 76.4083	60.9171 ± 53.2954
MI - 603, 604	Feb, 1996	I-131	-0.8566 ± 0.4141	-0.2433 ± 0.2580	-0.5499 ± 0.2440
MI - 603, 604	Feb, 1996	K-40	1,382.9000 ± 115.0000	1,335.3000 ± 175.0000	1,359.1000 ± 104.7020
WW - 648, 649	Feb, 1996	I-131	-0.0626 ± 0.2685	-0.0926 ± 0.2831	-0.0776 ± 0.1951
MI - 674, 675	Feb, 1996	I-131	-0.8334 ± 0.4012	-0.1217 ± 0.3926	-0.4776 ± 0.2807
MI - 674, 675	Feb, 1996	K-40	1,390.4000 ± 174.0000	1,493.6000 ± 166.0000	1,442.0000 ± 120.2414
WW - 865, 866	Feb, 1996	I-131	0.1291 ± 0.2170	0.0820 ± 0.2136	0.1056 ± 0.1522
PW - 932, 933	Feb, 1996	Co-60	0.5120 ± 1.4900	0.3780 ± 2.3900	0.4450 ± 1.4082
PW - 932, 933	Feb, 1996	Cs-137	0.0738 ± 1.6600	0.7260 ± 3.0400	0.3999 ± 1.7318
SW - 911, 912	Feb, 1996	Co-60	-1.7600 ± 3.3100	1.0300 ± 1.5400	-0.3650 ± 1.8254
SW - 911, 912	Feb, 1996	Cs-137	-0.2630 ± 3.6000	-0.8940 ± 1.7500	-0.5785 ± 2.0014
SWT - 953, 954	Feb, 1996	Gr. Beta	2.5439 ± 0.5217	2.2467 ± 0.5131	2.3953 ± 0.3659
LW - 1037, 1038	Feb, 1996	Gr. Beta	2.7972 ± 0.5293	3.0691 ± 0.5242	2.9331 ± 0.3725
LW - 1037, 1038	Feb, 1996	H-3	36.5277 ± 94.7223	116.7583 ± 97.9812	76.6430 ± 68.1407
CW - 977, 978	Mar, 1996	Gr. Beta	0.7188 ± 1.1771	-0.1223 ± 1.0275	0.2983 ± 0.7812
CW - 977, 978	Mar, 1996	Gr. Beta	3.9324 ± 1.5560	3.1466 ± 1.5001	3.5395 ± 1.0807
SW - 1467, 1468	Mar, 1996	H-3	130.3215 ± 81.1431	130.3215 ± 81.1431	130.3215 ± 57.3768
SW - 1467, 1468	Mar, 1996	Sr-89	-0.0970 ± 1.9887	-1.0924 ± 1.9042	-0.5947 ± 1.3767
SW - 1467, 1468	Mar, 1996	Sr-90	0.5674 ± 0.3439	0.8920 ± 0.3422	0.7297 ± 0.2426
MI - 1058, 1059	Mar, 1996	I-131	-0.3095 ± 0.4284	-0.0360 ± 0.4053	-0.1728 ± 0.2949
MI - 1058, 1059	Mar, 1996	K-40	1,500.0000 ± 157.0000	1,549.0000 ± 156.0000	1,524.5000 ± 110.6628
MI - 1058, 1059	Mar, 1996	Sr-89	0.5701 ± 0.9417	-1.5144 ± 1.2855	-0.4721 ± 0.7967
MI - 1058, 1059	Mar, 1996	Sr-90	1.5357 ± 0.3610	2.3692 ± 0.5498	1.9525 ± 0.3288
MI - 1152, 1153	Mar, 1996	I-131	0.4478 ± 0.6285	0.1991 ± 0.5613	0.3235 ± 0.4213
MI - 1152, 1153	Mar, 1996	K-40	1,524.3000 ± 157.0000	1,358.8000 ± 172.0000	1,441.5500 ± 116.4399
P - 1175, 1176	Mar, 1996	H-3	160.7848 ± 82.4671	151.8191 ± 82.0762	156.3020 ± 58.1750
LW - 1213, 1214	Mar, 1996	Gr. Beta	2.2980 ± 0.5989	2.6667 ± 0.6178	2.4823 ± 0.4302
LW - 1213, 1214	Mar, 1996	H-3	92.3600 ± 97.1490	29.4770 ± 94.5700	60.9185 ± 67.7890
SW - 1282, 1283	Mar, 1996	H-3	82.3522 ± 96.2415	36.8938 ± 94.3559	59.6230 ± 67.3896
LW - 1309, 1310	Mar, 1996	Co-60	2.9800 ± 4.7000	4.1400 ± 2.4800	3.5600 ± 2.6571
LW - 1309, 1310	Mar, 1996	Cs-134	-0.1740 ± 3.5700	2.2000 ± 4.4100	1.0130 ± 2.8369

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

Lab Codes ^b	Sample Date	Analysis	Concentration in pCi/L ^a		
			First Result	Second Result	Averaged Result
LW - 1309, 1310	Mar, 1996	Cs-137	-4.7600 ± 3.9000	-1.0800 ± 4.2200	-2.9200 ± 2.8731
LW - 1309, 1310	Mar, 1996	Gr. Beta	2.5861 ± 0.5296	2.8938 ± 0.5364	2.7400 ± 0.3769
LW - 1309, 1310	Mar, 1996	I-131	0.4437 ± 0.5347	0.1485 ± 0.5179	0.2961 ± 0.3722
LW - 1309, 1310	Mar, 1996	I-131(g)	0.9870 ± 5.4900	-0.6760 ± 5.3400	0.1555 ± 3.8294
LW - 1309, 1310	Mar, 1996	K-40	104.7400 ± 51.7000	85.6000 ± 56.5000	95.1700 ± 38.2921
LW - 1362, 1363	Mar, 1996	H-3	162.9285 ± 99.8622	107.9647 ± 97.6775	135.4466 ± 69.8451
LW - 1362, 1363	Mar, 1996	Sr-89	-1.0161 ± 0.8768	0.2819 ± 1.3918	-0.3671 ± 0.8225
LW - 1362, 1363	Mar, 1996	Sr-90	0.7296 ± 0.3269	0.0477 ± 0.5074	0.3886 ± 0.3018
F - 1446, 1447	Mar, 1996	Co-60	0.0011 ± 0.0096	-0.0021 ± 0.0136	-0.0005 ± 0.0083
F - 1446, 1447	Mar, 1996	Cs-134	0.0003 ± 0.0080	0.0026 ± 0.0132	0.0015 ± 0.0077
F - 1446, 1447	Mar, 1996	Cs-137	0.0193 ± 0.0100	0.0114 ± 0.0119	0.0154 ± 0.0078
F - 1446, 1447	Mar, 1996	Gr. Beta	1.9680 ± 0.0709	1.8487 ± 0.0640	1.9084 ± 0.0478
F - 1446, 1447	Mar, 1996	I-131(g)	-0.0619 ± 0.3550	-0.6810 ± 0.5450	-0.3715 ± 0.3252
F - 1446, 1447	Mar, 1996	K-40	1.9652 ± 0.3080	2.0371 ± 0.3800	2.0012 ± 0.2446
SW - 1537, 1538	Mar, 1996	H-3	141.6453 ± 96.7270	175.2449 ± 98.0905	158.4451 ± 68.8801
LW - 1612, 1613	Mar, 1996	Co-60	3.5000 ± 3.0800	0.6920 ± 1.6200	2.0960 ± 1.7400
LW - 1612, 1613	Mar, 1996	Cs-134	1.4000 ± 2.6700	1.5800 ± 1.9600	1.4900 ± 1.6561
LW - 1612, 1613	Mar, 1996	Cs-137	4.7100 ± 3.0200	1.3100 ± 2.4100	3.0100 ± 1.9319
LW - 1612, 1613	Mar, 1996	Gr. Beta	2.6122 ± 0.5460	3.0068 ± 0.5285	2.8095 ± 0.3799
LW - 1612, 1613	Mar, 1996	I-131	0.2556 ± 0.1548	0.0982 ± 0.1470	0.1769 ± 0.1067
LW - 1612, 1613	Mar, 1996	I-131(g)	0.2750 ± 3.7100	0.7110 ± 2.8600	0.4930 ± 2.3422
LW - 1612, 1613	Mar, 1996	K-40	61.2000 ± 33.1000	98.3000 ± 31.4000	79.7500 ± 22.8121
CW - 1709, 1710	Mar, 1996	Gr. Beta	4.4929 ± 1.6917	3.5791 ± 1.6536	4.0360 ± 1.1828
CW - 1709, 1710	Mar, 1996	Gr. Beta	0.4362 ± 1.4668	0.2828 ± 1.4589	0.3595 ± 1.0344
AP - 2140, 2141	Mar, 1996	Sr-89	0.0001 ± 0.0007	-0.0002 ± 0.0007	-0.0001 ± 0.0005
AP - 2140, 2141	Mar, 1996	Sr-90	0.0000 ± 0.0002	0.0001 ± 0.0002	0.0001 ± 0.0001
WW - 1659, 1660	Mar, 1996	Co-60	0.1960 ± 3.2100	2.2100 ± 2.5200	1.2030 ± 2.0405
WW - 1659, 1660	Mar, 1996	Cs-137	-1.8700 ± 3.2800	2.2600 ± 2.4400	0.1950 ± 2.0440
WW - 1659, 1660	Mar, 1996	H-3	995.7658 ± 117.5351	1,115.3290 ± 121.1114	1,055.5474 ± 84.3838
PW - 1757, 1758	Mar, 1996	H-3	88.5534 ± 119.6998	68.8749 ± 119.0511	78.7141 ± 84.4115
AP - 2547, 2548	Mar, 1996	Co-60	0.0004 ± 0.0006	-0.0002 ± 0.0006	0.0001 ± 0.0004
AP - 2547, 2548	Mar, 1996	Cs-137	-0.0001 ± 0.0006	0.0000 ± 0.0006	-0.0000 ± 0.0004
AP - 2568, 2569	Mar, 1996	Co-60	0.0005 ± 0.0005	0.0000 ± 0.0004	0.0003 ± 0.0003
AP - 2568, 2569	Mar, 1996	Cs-137	-0.0004 ± 0.0005	-0.0002 ± 0.0004	-0.0003 ± 0.0003
MI - 1778, 1779	Apr, 1996	I-131	0.1746 ± 0.2116	0.0752 ± 0.1924	0.1249 ± 0.1430
MI - 1778, 1779	Apr, 1996	K-40	1,390.4000 ± 98.1000	1,426.0000 ± 144.0000	1,408.2000 ± 87.1200
MI - 1778, 1779	Apr, 1996	Sr-89	-3.0921 ± 2.1421	-1.3987 ± 1.9624	-2.2454 ± 1.4526

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

Lab Codes ^b	Sample Date	Analysis	Concentration in pCi/L ^a		
			First Result	Second Result	Averaged Result
MI - 1778, 1779	Apr, 1996	Sr-90	2.2153 ± 0.5049	1.9830 ± 0.4425	2.0991 ± 0.3357
MI - 1799, 1800	Apr, 1996	Co-60	0.1740 ± 2.6900	1.8900 ± 4.5800	1.0320 ± 2.6558
MI - 1799, 1800	Apr, 1996	Cs-137	2.0500 ± 2.4200	1.7500 ± 3.1500	1.9000 ± 1.9861
MI - 1799, 1800	Apr, 1996	I-131	0.1298 ± 0.2421	0.1053 ± 0.2114	0.1176 ± 0.1607
MI - 1843, 1844	Apr, 1996	I-131	0.0149 ± 0.2136	0.0570 ± 0.2205	0.0359 ± 0.1535
MI - 1843, 1844	Apr, 1996	K-40	1,429.1000 ± 93.2000	1,630.3000 ± 143.0000	1,529.7000 ± 85.3452
LW - 1913, 1914	Apr, 1996	Co-60	2.2100 ± 0.7960	1.1500 ± 3.2300	1.6800 ± 1.6633
LW - 1913, 1914	Apr, 1996	Cs-134	0.4140 ± 0.8110	-0.7650 ± 3.0700	-0.1755 ± 1.5877
LW - 1913, 1914	Apr, 1996	Cs-137	0.5290 ± 0.8890	0.5070 ± 3.0900	0.5180 ± 1.6077
LW - 1913, 1914	Apr, 1996	Gr. Beta	3.0335 ± 0.5464	2.6622 ± 0.5491	2.8478 ± 0.3873
LW - 1913, 1914	Apr, 1996	I-131	0.0606 ± 0.2364	0.0603 ± 0.2573	0.0605 ± 0.1747
LW - 1913, 1914	Apr, 1996	I-131(g)	-0.2280 ± 1.7100	-1.6800 ± 5.3900	-0.9540 ± 2.8274
LW - 1913, 1914	Apr, 1996	K-40	39.4200 ± 17.4000	86.9000 ± 43.4000	63.1600 ± 23.3791
SO - 1946, 1947	Apr, 1996	Cs-137	0.1859 ± 0.0270	0.1768 ± 0.0201	0.1813 ± 0.0168
SO - 1946, 1947	Apr, 1996	K-40	10.4690 ± 0.4820	10.4630 ± 0.3570	10.4660 ± 0.2999
CW - 1991, 1992	Apr, 1996	Gr. Beta	3.8508 ± 1.6711	4.6034 ± 1.7163	4.2271 ± 1.1977
CW - 1991, 1992	Apr, 1996	Gr. Beta	-0.2825 ± 1.4171	0.2820 ± 1.4546	-0.0003 ± 1.0154
WW - 1890, 1891	Apr, 1996	Co-60	1.6200 ± 1.7500	0.1810 ± 2.2000	0.9005 ± 1.4056
WW - 1890, 1891	Apr, 1996	Cs-137	-0.5890 ± 1.6900	0.1370 ± 2.5100	-0.2260 ± 1.5130
WW - 1890, 1891	Apr, 1996	H-3	538.1625 ± 97.1244	601.3381 ± 99.3811	569.7503 ± 69.4798
WW - 2063, 2064	Apr, 1996	Gr. Beta	6.3139 ± 0.7737	6.2909 ± 0.8290	6.3024 ± 0.5670
WW - 2063, 2064	Apr, 1996	H-3	69.4957 ± 78.1213	26.7729 ± 76.2293	48.1343 ± 54.5753
MI - 2089, 2090	Apr, 1996	I-131	0.1583 ± 0.2546	0.1536 ± 0.2311	0.1559 ± 0.1719
MI - 2089, 2090	Apr, 1996	K-40	1,338.3000 ± 180.0000	1,456.5000 ± 160.0000	1,397.4000 ± 120.4159
LW - 2303, 2304	Apr, 1996	Co-60	1.9400 ± 2.9500	1.4800 ± 3.0400	1.7100 ± 2.1180
LW - 2303, 2304	Apr, 1996	Cs-137	0.8050 ± 2.7200	0.9610 ± 3.0000	0.8830 ± 2.0247
LW - 2303, 2304	Apr, 1996	Gr. Beta	3.7252 ± 1.2629	4.0921 ± 1.3004	3.9087 ± 0.9063
MI - 2418, 2419	Apr, 1996	I-131	0.1925 ± 0.4050	0.2006 ± 0.2588	0.1966 ± 0.2403
MI - 2418, 2419	Apr, 1996	K-40	1,418.9000 ± 120.0000	1,477.3000 ± 182.0000	1,448.1000 ± 109.0000
SS - 2442, 2443	Apr, 1996	Gr. Alpha	3.5711 ± 3.9146	0.3459 ± 2.7237	1.9585 ± 2.3845
SS - 2442, 2443	Apr, 1996	Gr. Beta	5.5419 ± 3.0734	8.6149 ± 3.2661	7.0784 ± 2.2424
SS - 2442, 2443	Apr, 1996	K-40	7.5398 ± 0.2470	7.8097 ± 0.2680	7.6748 ± 0.1822
SS - 2442, 2443	Apr, 1996	Sr-90	0.0110 ± 0.0097	0.0030 ± 0.0042	0.0070 ± 0.0053
SL - 2589, 2590	Apr, 1996	Cs-137	0.0527 ± 0.0297	0.0626 ± 0.0358	0.0577 ± 0.0233
SL - 2589, 2590	Apr, 1996	K-40	4.1139 ± 0.4900	3.2858 ± 0.5080	3.6999 ± 0.3529
WW - 2700, 2701	Apr, 1996	H-3	-13.8536 ± 73.4156	-31.1707 ± 72.5940	-22.5122 ± 51.6230
SW - 2675, 2676	Apr, 1996	Co-60	-1.9100 ± 1.9100	-1.1500 ± 2.8600	-1.5300 ± 1.7196

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

Lab Codes ^b	Sample Date	Analysis	Concentration in pCi/L ^a		
			First Result	Second Result	Averaged Result
SW - 2675, 2676	Apr, 1996	Cs-137	-1.0100 ± 2.2000	3.0100 ± 2.5900	1.0000 ± 1.6991
SW - 2503, 2504	Apr, 1996	K-40	95.8880 ± 47.8000	71.0460 ± 36.8000	83.4670 ± 30.1624
LW - 2777, 2778	Apr, 1996	Co-60	3.1300 ± 3.7000	1.8900 ± 2.7700	2.5100 ± 2.3110
LW - 2777, 2778	Apr, 1996	Cs-134	-1.0500 ± 2.5100	-1.4600 ± 2.5400	-1.2550 ± 1.7855
LW - 2777, 2778	Apr, 1996	Cs-137	0.3840 ± 3.2600	2.4900 ± 3.1300	1.4370 ± 2.2597
LW - 2777, 2778	Apr, 1996	Gr. Beta	2.7205 ± 0.6414	2.2112 ± 0.6169	2.4658 ± 0.4449
LW - 2777, 2778	Apr, 1996	I-131	0.1973 ± 0.2628	-0.1244 ± 0.4231	0.0365 ± 0.2490
LW - 2777, 2778	Apr, 1996	I-131(g)	2.0800 ± 10.3000	-1.7600 ± 11.5000	0.1600 ± 7.7191
LW - 2777, 2778	Apr, 1996	K-40	91.0650 ± 43.2000	59.7000 ± 37.0000	75.3825 ± 28.4396
F - 2612, 2613	May, 1996	Co-60	0.0020 ± 0.0070	0.0031 ± 0.0137	0.0026 ± 0.0077
F - 2612, 2613	May, 1996	Cs-137	0.0004 ± 0.0059	0.0082 ± 0.0128	0.0043 ± 0.0071
BS - 2654, 2655	May, 1996	Gr. Beta	4.6997 ± 1.7758	5.9663 ± 1.8980	5.3330 ± 1.2996
BS - 2654, 2655	May, 1996	K-40	6.4406 ± 0.4180	6.6513 ± 0.3510	6.5460 ± 0.2729
BS - 2654, 2655	May, 1996	Sr-89	0.0115 ± 0.0275	0.0076 ± 0.0247	0.0096 ± 0.0185
BS - 2654, 2655	May, 1996	Sr-90	0.0021 ± 0.0058	0.0010 ± 0.0053	0.0015 ± 0.0039
F - 2633, 2634	May, 1996	Co-60	0.0077 ± 0.0135	0.0041 ± 0.0068	0.0059 ± 0.0076
F - 2633, 2634	May, 1996	Cs-137	0.0075 ± 0.0079	0.0025 ± 0.0064	0.0050 ± 0.0051
MI - 2742, 2743	May, 1996	Co-60	-1.6100 ± 3.2100	0.2250 ± 2.7200	-0.6925 ± 2.1037
MI - 2742, 2743	May, 1996	Cs-137	0.6880 ± 2.6100	-0.5110 ± 2.3400	0.0885 ± 1.7527
MI - 2742, 2743	May, 1996	I-131	-0.0263 ± 0.2140	0.2399 ± 0.2578	0.1068 ± 0.1675
MI - 2841, 2842	May, 1996	Co-60	2.0600 ± 3.3400	0.4630 ± 3.6400	1.2615 ± 2.4701
MI - 2841, 2842	May, 1996	Cs-137	0.4460 ± 2.7600	3.3300 ± 3.4000	1.8880 ± 2.1896
MI - 2841, 2842	May, 1996	I-131	0.3926 ± 0.2720	-0.0419 ± 0.2320	0.1754 ± 0.1788
WW - 2866, 2867	May, 1996	Gr. Beta	6.8885 ± 1.3446	6.9243 ± 1.3471	6.9064 ± 0.9517
WW - 2866, 2867	May, 1996	H-3	178.3372 ± 87.5017	133.7529 ± 85.5877	156.0450 ± 61.2001
LW - 2981, 2982	May, 1996	Co-60	1.9400 ± 2.4500	0.7540 ± 1.9900	1.3470 ± 1.5782
LW - 2981, 2982	May, 1996	Cs-134	0.8040 ± 2.3500	0.1660 ± 1.9900	0.4850 ± 1.5397
LW - 2981, 2982	May, 1996	Cs-137	2.2400 ± 2.6900	-0.7880 ± 2.1600	0.7260 ± 1.7249
LW - 2981, 2982	May, 1996	Gr. Beta	3.7095 ± 0.6063	2.5867 ± 0.5678	3.1481 ± 0.4153
LW - 2981, 2982	May, 1996	I-131	-0.0178 ± 0.2116	0.0518 ± 0.2280	0.0170 ± 0.1555
LW - 2981, 2982	May, 1996	I-131(g)	1.9100 ± 8.8900	-2.9600 ± 7.2900	-0.5250 ± 5.7484
LW - 2981, 2982	May, 1996	K-40	121.0000 ± 38.6000	150.7000 ± 23.3000	135.8500 ± 22.5436
F - 2887, 2888	May, 1996	Co-60	0.0025 ± 0.0074	-0.0067 ± 0.0107	-0.0021 ± 0.0065
F - 2887, 2888	May, 1996	Cs-137	-0.0003 ± 0.0054	0.0092 ± 0.0083	0.0045 ± 0.0050
WW - 3032, 3033	May, 1996	Gr. Beta	3.5731 ± 0.8840	2.5437 ± 0.5356	3.0584 ± 0.5168
WW - 3032, 3033	May, 1996	H-3	32.0189 ± 83.8864	133.6172 ± 88.2476	82.8181 ± 60.8781
SS - 2931, 2932	May, 1996	Cs-137	0.2016 ± 0.0948	0.1473 ± 0.0352	0.1745 ± 0.0506

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

Lab Codes ^b	Sample Date	Analysis	Concentration in pCi/L ^a		
			First Result	Second Result	Averaged Result
SS - 2931, 2932	May, 1996	K-40	21.4470 ± 1.7600	18.8680 ± 0.9850	20.1575 ± 1.0084
CW - 2955, 2956	May, 1996	Gr. Beta	2.6457 ± 1.5687	3.6434 ± 1.6186	3.1445 ± 1.1270
CW - 2955, 2956	May, 1996	Gr. Beta	-0.3404 ± 1.1161	-0.4374 ± 1.1068	-0.3889 ± 0.7859
MI - 3053, 3054	May, 1996	Sr-89	0.5734 ± 1.5144	-0.5940 ± 1.9757	-0.0103 ± 1.2447
MI - 3053, 3054	May, 1996	Sr-90	1.3596 ± 0.4076	1.9168 ± 0.5433	1.6382 ± 0.3396
MI - 3099, 3100	May, 1996	Co-60	0.3260 ± 2.6800	0.3250 ± 4.3100	0.3255 ± 2.5376
MI - 3099, 3100	May, 1996	Cs-137	-0.5550 ± 2.5400	-0.8250 ± 3.6300	-0.6900 ± 2.2152
MI - 3099, 3100	May, 1996	I-131	0.0000 ± 0.2849	0.1521 ± 0.2367	0.0761 ± 0.1852
F - 3251, 3252	May, 1996	K-40	2.6265 ± 0.3740	2.7477 ± 0.2620	2.6871 ± 0.2283
BS - 3230, 3231	May, 1996	Cs-137	0.5908 ± 0.0415	0.6314 ± 0.0479	0.6111 ± 0.0317
BS - 3230, 3231	May, 1996	K-40	22.4440 ± 0.8280	21.8090 ± 0.8310	22.1265 ± 0.5865
MI - 3344, 3345	May, 1996	I-131	0.1825 ± 0.2236	0.1735 ± 0.2762	0.1780 ± 0.1777
MI - 3344, 3345	May, 1996	K-40	1,611.2000 ± 190.0000	1,409.5000 ± 157.0000	1,510.3500 ± 123.2366
VE - 3381, 3382	May, 1996	Gr. Alpha	0.4453 ± 0.1729	0.4370 ± 0.1764	0.4411 ± 0.1235
VE - 3381, 3382	May, 1996	Gr. Beta	4.2583 ± 0.2415	4.0142 ± 0.2465	4.1363 ± 0.1725
VE - 3381, 3382	May, 1996	K-40	4.5676 ± 0.2820	4.1093 ± 0.3490	4.3385 ± 0.2243
SWU - 3404, 3405	May, 1996	Gr. Beta	2.5210 ± 0.5256	3.1121 ± 0.5527	2.8165 ± 0.3814
SWU - 3404, 3405	May, 1996	H-3	197.5959 ± 88.4614	188.3624 ± 88.0751	192.9792 ± 62.4152
SW - 3677, 3678	May, 1996	Co-60	0.4910 ± 2.4000	0.1600 ± 1.7800	0.3255 ± 1.4940
SW - 3677, 3678	May, 1996	Cs-137	1.1600 ± 3.4000	-0.6680 ± 2.1900	0.2460 ± 2.0221
SW - 3677, 3678	May, 1996	Gr. Beta	5.3891 ± 1.3033	6.0224 ± 1.2717	5.7057 ± 0.9105
DW - 3551, 3552	May, 1996	Gr. Beta	2.7774 ± 0.5358	1.8916 ± 0.4948	2.3345 ± 0.3647
DW - 3551, 3552	May, 1996	I-131	0.3093 ± 0.3725	0.0000 ± 0.3989	0.1547 ± 0.2729
DW - 3551, 3552	May, 1996	K-40	113.1400 ± 47.8000	131.5000 ± 74.9000	122.3200 ± 44.4265
WW - 3506, 3507	May, 1996	H-3	3.0953 ± 81.2184	-32.1916 ± 79.5882	-14.5481 ± 56.8566
PW - 3700, 3701	May, 1996	Co-60	0.8910 ± 2.2100	-0.4110 ± 3.0700	0.2400 ± 1.8914
PW - 3700, 3701	May, 1996	Cs-137	-1.6500 ± 2.5300	0.2960 ± 3.1700	-0.6770 ± 2.0279
MI - 3447, 3448	Jun, 1996	Co-60	-0.5800 ± 4.8900	-1.2600 ± 4.7500	-0.9200 ± 3.4086
MI - 3447, 3448	Jun, 1996	Cs-137	0.7550 ± 3.5900	2.6200 ± 3.9300	1.6875 ± 2.6614
MI - 3447, 3448	Jun, 1996	I-131	-0.0354 ± 0.1423	-0.0708 ± 0.2845	-0.0531 ± 0.1590
G - 3530, 3531	Jun, 1996	Gr. Beta	4.7514 ± 0.0978	4.9200 ± 0.0996	4.8357 ± 0.0698
G - 3530, 3531	Jun, 1996	K-40	4.9488 ± 0.5170	4.5401 ± 0.4480	4.7445 ± 0.3421
G - 3530, 3531	Jun, 1996	Sr-89	0.0041 ± 0.0056	-0.0006 ± 0.0057	0.0017 ± 0.0040
G - 3530, 3531	Jun, 1996	Sr-90	0.0000 ± 0.0013	0.0009 ± 0.0014	0.0005 ± 0.0009
WW - 3597, 3598	Jun, 1996	Gr. Beta	2.6521 ± 0.7188	1.6547 ± 0.6666	2.1534 ± 0.4902
WW - 3597, 3598	Jun, 1996	H-3	114.9457 ± 80.8320	107.8722 ± 80.5219	111.4089 ± 57.0473
G - 3621, 3622	Jun, 1996	K-40	5.5191 ± 0.1840	5.6649 ± 0.2200	5.5920 ± 0.1434

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

Lab Codes ^b	Sample Date	Analysis	Concentration in pCi/L ^a		
			First Result	Second Result	Averaged Result
MI - 3642, 3643	Jun, 1996	I-131	-0.2191 ± 0.3434	0.2403 ± 0.3137	0.0106 ± 0.2326
F - 4452, 4453	Jun, 1996	Cs-137	0.0147 ± 0.0058	0.0120 ± 0.0047	0.0133 ± 0.0037
F - 4452, 4453	Jun, 1996	Cs-137	0.0147 ± 0.0058	0.0120 ± 0.0047	0.0133 ± 0.0037
F - 4452, 4453	Jun, 1996	Gr. Beta	2.1435 ± 0.1120	2.1090 ± 0.1050	2.1262 ± 0.0767
F - 4452, 4453	Jun, 1996	Gr. Beta	2.1435 ± 0.1120	2.1090 ± 0.1050	2.1262 ± 0.0767
F - 4452, 4453	Jun, 1996	K-40	1.9188 ± 0.1070	2.0107 ± 0.1060	1.9648 ± 0.0753
F - 4452, 4453	Jun, 1996	K-40	1.9188 ± 0.1070	2.0107 ± 0.1060	1.9648 ± 0.0753
MI - 3830, 3831	Jun, 1996	I-131	0.0373 ± 0.4959	0.1570 ± 0.4625	0.0972 ± 0.3391
MI - 3830, 3831	Jun, 1996	K-40	1,544.7000 ± 111.0000	1,447.1000 ± 159.0000	1,495.9000 ± 96.9562
MI - 3773, 3774	Jun, 1996	Co-60	1.3400 ± 2.9800	2.5300 ± 3.1800	1.9350 ± 2.1790
MI - 3773, 3774	Jun, 1996	Cs-137	3.7800 ± 2.6400	-0.3320 ± 2.6000	1.7240 ± 1.8527
MI - 3773, 3774	Jun, 1996	I-131	0.1664 ± 0.3100	-0.1240 ± 0.4621	0.0212 ± 0.2782
MI - 3874, 3875	Jun, 1996	Sr-89	-2.1430 ± 1.8964	-1.3467 ± 1.9330	-1.7448 ± 1.3540
MI - 3874, 3875	Jun, 1996	Sr-90	2.3113 ± 0.5587	2.3694 ± 0.5928	2.3403 ± 0.4073
G - 3918, 3919	Jun, 1996	K-40	6.6922 ± 0.2270	7.1444 ± 0.2770	6.9183 ± 0.1791
G - 4045, 4046	Jun, 1996	K-40	4.7112 ± 0.5300	5.1352 ± 0.3330	4.9232 ± 0.3130
SWU - 4092, 4093	Jun, 1996	Gr. Beta	2.3788 ± 0.6583	1.9279 ± 0.6369	2.1533 ± 0.4580
SWU - 4092, 4093	Jun, 1996	H-3	208.0150 ± 84.7681	223.9706 ± 85.4329	215.9928 ± 60.1756
MI - 4071, 4072	Jun, 1996	I-131	-0.1101 ± 0.5660	-0.1326 ± 0.5298	-0.1214 ± 0.3876
MI - 4071, 4072	Jun, 1996	K-40	1,229.3000 ± 142.0000	1,512.1000 ± 143.0000	1,370.7000 ± 100.7633
MI - 4071, 4072	Jun, 1996	Sr-89	0.2841 ± 1.0223	-0.4201 ± 1.2371	-0.0680 ± 0.8024
MI - 4071, 4072	Jun, 1996	Sr-90	0.9516 ± 0.3157	1.2585 ± 0.3851	1.1050 ± 0.2490
WW - 4113, 4114	Jun, 1996	I-131	0.0777 ± 0.5375	0.2762 ± 0.5142	0.1770 ± 0.3719
SW - 4162, 4163	Jun, 1996	H-3	13.3915 ± 75.3848	6.2494 ± 75.0457	9.8205 ± 53.1853
PW - 4215, 4216	Jun, 1996	H-3	58.4305 ± 80.8304	104.2785 ± 79.1202	81.3545 ± 56.5543
LW - 4259, 4260	Jun, 1996	H-3	195.8174 ± 86.1367	215.2812 ± 86.9327	205.5493 ± 61.1899
PW - 4549, 4550	Jun, 1996	Co-60	-0.4630 ± 1.4000	-0.3690 ± 1.5300	-0.4160 ± 1.0369
PW - 4549, 4550	Jun, 1996	Cs-137	-1.1200 ± 1.7200	-0.6960 ± 1.9900	-0.9080 ± 1.3152
SW - 4406, 4407	Jun, 1996	Co-60	-0.9280 ± 1.9500	-0.2850 ± 2.6100	-0.6065 ± 1.6290
SW - 4406, 4407	Jun, 1996	Cs-137	-0.3900 ± 2.4300	2.5700 ± 2.9300	1.0900 ± 1.9033
E - 4284, 4285	Jul, 1996	Gr. Beta	1.0430 ± 0.0595	1.1245 ± 0.0648	1.0837 ± 0.0440
E - 4284, 4285	Jul, 1996	K-40	1.1372 ± 0.1830	1.1588 ± 0.1160	1.1480 ± 0.1083
E - 4284, 4285	Jul, 1996	Sr-89	0.0019 ± 0.0044	0.0016 ± 0.0045	0.0017 ± 0.0032
E - 4284, 4285	Jul, 1996	Sr-90	-0.0001 ± 0.0011	0.0003 ± 0.0010	0.0001 ± 0.0007
WW - 4305, 4306	Jul, 1996	Gr. Beta	1.1828 ± 0.3499	1.2369 ± 0.3447	1.2098 ± 0.2456
MI - 4326, 4327	Jul, 1996	Co-60	-0.1700 ± 2.9800	-1.0600 ± 3.4400	-0.6150 ± 2.2756
MI - 4326, 4327	Jul, 1996	Cs-137	-0.0644 ± 2.6300	2.0100 ± 2.9700	0.9728 ± 1.9835

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

Lab Codes ^b	Sample Date	Analysis	Concentration in pCi/L ^a		
			First Result	Second Result	Averaged Result
P - 4431, 4432	Jul, 1996	H-3	24.8404 ± 71.8799	110.9537 ± 75.7439	67.8970 ± 52.2108
AP - 4595, 4596	Jul, 1996	Sr-89	0.0015 ± 0.0029	-0.0022 ± 0.0030	-0.0004 ± 0.0021
AP - 4595, 4596	Jul, 1996	Sr-90	0.0008 ± 0.0006	0.0002 ± 0.0007	0.0005 ± 0.0004
WW - 4375, 4376	Jul, 1996	Co-60	1.3000 ± 2.1300	1.1800 ± 2.4300	1.2400 ± 1.6157
WW - 4375, 4376	Jul, 1996	Cs-137	1.1100 ± 2.2700	1.0200 ± 2.8700	1.0650 ± 1.8296
WW - 4375, 4376	Jul, 1996	H-3	-30.7552 ± 76.9153	-25.4322 ± 77.1605	-28.0937 ± 54.4741
MI - 4503, 4504	Jul, 1996	I-131	-0.0390 ± 0.2814	0.1693 ± 0.2869	0.0652 ± 0.2009
MI - 4503, 4504	Jul, 1996	K-40	1,287.1000 ± 161.0000	1,188.3000 ± 136.0000	1,237.7000 ± 105.3767
MI - 4503, 4504	Jul, 1996	Sr-89	-1.4974 ± 0.9605	-1.7702 ± 1.2061	-1.6338 ± 0.7709
MI - 4503, 4504	Jul, 1996	Sr-90	1.5658 ± 0.5270	2.4509 ± 0.5124	2.0084 ± 0.3675
MI - 4527, 4528	Jul, 1996	Co-60	2.3600 ± 2.5400	-1.2100 ± 2.6300	0.5750 ± 1.8281
MI - 4527, 4528	Jul, 1996	Cs-134	0.7910 ± 1.9100	1.9000 ± 2.5500	1.3455 ± 1.5930
MI - 4527, 4528	Jul, 1996	Cs-137	-0.6890 ± 2.0300	0.0613 ± 2.2900	-0.3139 ± 1.5301
MI - 4527, 4528	Jul, 1996	I-131	0.1910 ± 0.4532	0.0901 ± 0.4519	0.1406 ± 0.3200
MI - 4527, 4528	Jul, 1996	I-131(g)	-0.0570 ± 2.8300	0.1290 ± 3.5800	0.0360 ± 2.2817
MI - 4527, 4528	Jul, 1996	K-40	1,419.1000 ± 91.3000	1,408.6000 ± 107.0000	1,413.8500 ± 70.3290
MI - 4527, 4528	Jul, 1996	Sr-89	-0.3720 ± 1.0231	-1.4605 ± 1.1500	-0.9162 ± 0.7696
MI - 4527, 4528	Jul, 1996	Sr-90	1.0524 ± 0.2303	1.3388 ± 0.2716	1.1956 ± 0.1780
WW - 4684, 4685	Jul, 1996	H-3	-30.7174 ± 76.8208	-12.9958 ± 77.6342	-21.8566 ± 54.6088
WW - 4808, 4809	Jul, 1996	Gr. Beta	0.9983 ± 1.2558	0.8849 ± 1.2477	0.9416 ± 0.8852
WW - 4808, 4809	Jul, 1996	H-3	-15.0491 ± 82.3946	-30.4456 ± 72.7801	-22.7473 ± 54.9677
G - 4762, 4763	Jul, 1996	K-40	6.9707 ± 0.3420	7.2772 ± 0.2280	7.1240 ± 0.2055
LW - 4832, 4833	Jul, 1996	Co-60	-1.1600 ± 1.6700	1.1600 ± 1.8600	0.0000 ± 1.2498
LW - 4832, 4833	Jul, 1996	Cs-137	1.0200 ± 1.6300	1.6900 ± 2.2400	1.3550 ± 1.3851
LW - 4832, 4833	Jul, 1996	Gr. Beta	3.4602 ± 0.7027	3.3545 ± 0.6948	3.4074 ± 0.4941
LW - 4832, 4833	Jul, 1996	Gr. Beta	3.4602 ± 0.7027	3.3545 ± 0.6948	3.4074 ± 0.4941
LW - 5014, 5015	Jul, 1996	Gr. Beta	2.0107 ± 0.6109	2.0288 ± 0.6093	2.0197 ± 0.4314
F - 5515, 5516	Jul, 1996	Cs-137	0.0534 ± 0.0171	0.0522 ± 0.0182	0.0528 ± 0.0125
F - 5515, 5516	Jul, 1996	Gr. Beta	2.5113 ± 0.0911	2.4617 ± 0.0908	2.4865 ± 0.0643
F - 5515, 5516	Jul, 1996	K-40	2.4049 ± 0.2870	2.6688 ± 0.3560	2.5369 ± 0.2286
CW - 4956, 4957	Jul, 1996	Gr. Beta	2.1830 ± 1.4513	3.9669 ± 1.5535	3.0749 ± 1.0630
CW - 4956, 4957	Jul, 1996	Gr. Beta	0.5827 ± 1.2131	0.2749 ± 0.8554	0.4288 ± 0.7422
SW - 5248, 5249	Jul, 1996	Co-60	-1.0000 ± 1.9100	0.1870 ± 1.8700	-0.4065 ± 1.3365
SW - 5248, 5249	Jul, 1996	Cs-137	0.7590 ± 2.2800	-0.5680 ± 2.4400	0.0955 ± 1.6697
WW - 5215, 5216	Jul, 1996	H-3	183.4121 ± 90.9893	317.9144 ± 96.0148	250.6632 ± 66.1398
MI - 5081, 5082	Jul, 1996	Co-60	1.1900 ± 3.0700	-1.7100 ± 4.1800	-0.2600 ± 2.5931
MI - 5081, 5082	Jul, 1996	Cs-137	0.4920 ± 2.6000	-2.8800 ± 3.3400	-1.1940 ± 2.1163

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

Lab Codes ^b	Sample Date	Analysis	Concentration in pCi/L ^a		
			First Result	Second Result	Averaged Result
MI - 5081, 5082	Jul, 1996	I-131	0.1808 ± 0.5572	0.5417 ± 0.6704	0.3613 ± 0.4359
MI - 5081, 5082	Jul, 1996	I-131	0.1808 ± 0.5572	0.3699 ± 0.6986	0.2754 ± 0.4468
SWU - 5125, 5126	Jul, 1996	Gr. Beta	4.1217 ± 2.0543	5.5300 ± 2.3022	4.8258 ± 1.5427
SWU - 5125, 5126	Jul, 1996	H-3	176.3979 ± 90.7067	125.7490 ± 88.7348	151.0734 ± 63.4460
VE - 5146, 5147	Jul, 1996	Gr. Beta	3.1394 ± 0.1026	3.0940 ± 0.0683	3.1167 ± 0.0616
VE - 5146, 5147	Jul, 1996	K-40	3.3818 ± 0.1400	3.4692 ± 0.1430	3.4255 ± 0.1001
DW - 5269, 5270	Jul, 1996	Gr. Beta	6.4711 ± 1.3831	5.9871 ± 1.2673	6.2291 ± 0.9379
DW - 5269, 5270	Jul, 1996	I-131	0.2126 ± 0.3519	0.0404 ± 0.3202	0.1265 ± 0.2379
MI - 5168, 5169	Aug, 1996	I-131	-0.0474 ± 0.4432	-0.6129 ± 0.5327	-0.3302 ± 0.3465
MI - 5168, 5169	Aug, 1996	K-40	1,585.8000 ± 123.0000	1,534.4000 ± 162.0000	1,560.1000 ± 101.7018
MI - 5289, 5290	Aug, 1996	I-131	-0.0550 ± 0.5085	-0.3445 ± 0.5937	-0.1998 ± 0.3909
MI - 5190, 5191	Aug, 1996	Co-60	-1.6400 ± 2.7500	-0.1890 ± 4.0300	-0.9145 ± 2.4394
MI - 5190, 5191	Aug, 1996	Cs-137	0.1550 ± 3.1400	0.6150 ± 3.3900	0.3850 ± 2.3104
MI - 5190, 5191	Aug, 1996	I-131	0.2155 ± 0.4940	0.4414 ± 0.4691	0.3285 ± 0.3406
SL - 5424, 5425	Aug, 1996	Co-60	0.0012 ± 0.0107	0.0083 ± 0.0085	0.0047 ± 0.0068
SL - 5424, 5425	Aug, 1996	Cs-134	0.0089 ± 0.0094	0.0054 ± 0.0084	0.0071 ± 0.0063
SL - 5424, 5425	Aug, 1996	Cs-137	0.0328 ± 0.0171	0.0365 ± 0.0149	0.0347 ± 0.0113
SL - 5424, 5425	Aug, 1996	I-131(g)	0.0005 ± 0.0304	-0.0166 ± 0.0275	-0.0081 ± 0.0205
SL - 5424, 5425	Aug, 1996	K-40	1.5677 ± 0.2530	1.6391 ± 0.2110	1.6034 ± 0.1647
MI - 5386, 5387	Aug, 1996	Co-60	0.7970 ± 3.1900	-3.4000 ± 4.8300	-1.3015 ± 2.8942
MI - 5386, 5387	Aug, 1996	Cs-137	1.1400 ± 2.6400	1.7500 ± 3.4900	1.4450 ± 2.1880
MI - 5386, 5387	Aug, 1996	I-131	0.0065 ± 0.1987	-0.0211 ± 0.2171	-0.0073 ± 0.1472
MI - 5386, 5387	Aug, 1996	I-131	0.0065 ± 0.1987	-0.0271 ± 0.2797	-0.0103 ± 0.1716
SWU - 5905, 5906	Aug, 1996	Gr. Beta	1.4815 ± 0.6624	2.4356 ± 0.5278	1.9586 ± 0.4235
SWU - 5905, 5906	Aug, 1996	H-3	257.1759 ± 84.2902	306.5672 ± 86.2631	281.8715 ± 60.3037
MI - 5582, 5583	Aug, 1996	I-131	0.2361 ± 0.5705	-0.0245 ± 0.5563	0.1058 ± 0.3984
MI - 5582, 5583	Aug, 1996	K-40	1,473.6000 ± 180.0000	1,459.0000 ± 152.0000	1,466.3000 ± 117.7964
LW - 5606, 5607	Aug, 1996	Co-60	0.7330 ± 1.8200	-0.8030 ± 1.5400	-0.0350 ± 1.1921
LW - 5606, 5607	Aug, 1996	Cs-137	0.4970 ± 1.8900	-0.8750 ± 2.5900	-0.1890 ± 1.6031
LW - 5606, 5607	Aug, 1996	Gr. Beta	5.4236 ± 1.2712	5.3355 ± 1.2524	5.3795 ± 0.8923
SL - 5667, 5668	Aug, 1996	Cs-137	0.0316 ± 0.0139	0.0289 ± 0.0152	0.0303 ± 0.0103
SL - 5667, 5668	Aug, 1996	K-40	2.4446 ± 0.2910	2.6982 ± 0.2670	2.5714 ± 0.1975
CW - 5759, 5760	Aug, 1996	Gr. Beta	3.7309 ± 1.4739	4.5529 ± 1.5367	4.1419 ± 1.0646
CW - 5759, 5760	Aug, 1996	Gr. Beta	0.6563 ± 1.1139	0.6561 ± 1.1136	0.6562 ± 0.7876
MI - 5817, 5818	Aug, 1996	Co-60	-4.3400 ± 4.6000	3.7100 ± 4.8200	-0.3150 ± 3.3314
MI - 5817, 5818	Aug, 1996	Cs-137	-0.6750 ± 4.2000	1.3900 ± 3.5700	0.3575 ± 2.7561
MI - 5817, 5818	Aug, 1996	I-131	0.0287 ± 0.0732	0.0522 ± 0.0769	0.0405 ± 0.0531

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

Lab Codes ^b	Sample Date	Analysis	Concentration in pCi/L ^a		
			First Result	Second Result	Averaged Result
SWT - 5884, 5885	Aug, 1996	Gr. Beta	2.7135 ± 0.7709	2.8640 ± 0.7248	2.7888 ± 0.5290
SW - 5925, 5926	Aug, 1996	Gr. Beta	3.5571 ± 0.6476	3.7970 ± 0.9008	3.6770 ± 0.5547
MI - 5978, 5979	Aug, 1996	I-131	-0.1138 ± 0.5079	0.3728 ± 0.4119	0.1295 ± 0.3270
MI - 5978, 5979	Aug, 1996	K-40	1,468.4000 ± 179.0000	1,560.8000 ± 173.0000	1,514.6000 ± 124.4689
VE - 5950, 5951	Aug, 1996	Co-60	0.0006 ± 0.0062	0.0028 ± 0.0058	0.0017 ± 0.0043
VE - 5950, 5951	Aug, 1996	Cs-137	-0.0006 ± 0.0048	0.0003 ± 0.0047	-0.0002 ± 0.0034
VE - 6031, 6032	Sep, 1996	Gr. Beta	2.9014 ± 0.0919	2.7239 ± 0.1833	2.8126 ± 0.1025
VE - 6031, 6032	Sep, 1996	K-40	3.2199 ± 0.1950	3.3724 ± 0.3060	3.2962 ± 0.1814
VE - 6031, 6032	Sep, 1996	Sr-89	0.0018 ± 0.0024	-0.0004 ± 0.0021	0.0007 ± 0.0016
VE - 6031, 6032	Sep, 1996	Sr-90	0.0002 ± 0.0007	0.0009 ± 0.0007	0.0006 ± 0.0005
LW - 6052, 6053	Sep, 1996	Co-60	0.9250 ± 1.0500	-0.5060 ± 1.5400	0.2095 ± 0.9319
LW - 6052, 6053	Sep, 1996	Cs-134	0.3430 ± 1.3200	0.8910 ± 2.3000	0.6170 ± 1.3259
LW - 6052, 6053	Sep, 1996	Cs-137	0.0211 ± 1.2900	-0.1280 ± 1.8600	-0.0535 ± 1.1318
LW - 6052, 6053	Sep, 1996	Gr. Beta	2.1334 ± 0.7031	3.0766 ± 0.5583	2.6050 ± 0.4489
LW - 6052, 6053	Sep, 1996	I-131	-0.4089 ± 0.3821	0.0180 ± 0.3249	-0.1955 ± 0.2508
LW - 6052, 6053	Sep, 1996	I-131(g)	1.2200 ± 6.0300	1.7000 ± 10.1000	1.4600 ± 5.8816
LW - 6052, 6053	Sep, 1996	K-40	66.8250 ± 30.1000	43.6000 ± 27.1000	55.2125 ± 20.2510
WW - 6181, 6182	Sep, 1996	Gr. Beta	1.6248 ± 0.6211	1.0281 ± 0.6056	1.3264 ± 0.4337
WW - 6181, 6182	Sep, 1996	H-3	5.3932 ± 82.7475	62.9204 ± 85.2105	34.1568 ± 59.3885
MI - 6006, 6007	Sep, 1996	I-131	0.0780 ± 0.3076	0.0130 ± 0.3110	0.0455 ± 0.2187
MI - 6006, 6007	Sep, 1996	K-40	1,472.0000 ± 166.0000	1,502.9000 ± 110.0000	1,487.4500 ± 99.5691
CW - 6128, 6129	Sep, 1996	Gr. Beta	4.6340 ± 1.6130	4.5894 ± 1.6139	4.6117 ± 1.1409
CW - 6128, 6129	Sep, 1996	Gr. Beta	4.6340 ± 1.6130	4.5894 ± 1.6139	4.6117 ± 1.1409
CW - 6128, 6129	Sep, 1996	Gr. Beta	0.2285 ± 1.1265	0.3197 ± 1.1117	0.2741 ± 0.7913
SW - 6204, 6205	Sep, 1996	H-3	113.2802 ± 85.3728	61.4098 ± 83.1710	87.3450 ± 59.5943
MI - 6225, 6226	Sep, 1996	Co-60	1.9300 ± 2.8500	-0.5880 ± 2.5900	0.6710 ± 1.9255
MI - 6225, 6226	Sep, 1996	Cs-137	2.7700 ± 2.7200	-0.2550 ± 2.4700	1.2575 ± 1.8371
MI - 6225, 6226	Sep, 1996	I-131	-0.2584 ± 0.4450	0.2718 ± 0.3680	0.0067 ± 0.2887
VE - 6270, 6271	Sep, 1996	K-40	2.2202 ± 0.2730	2.0725 ± 0.2780	2.1464 ± 0.1948
WW - 6331, 6332	Sep, 1996	H-3	16,801.2285 ± 999.6339	17,111.8829 ± 1,006.0494	16,956.5557 ± 709.1198
CW - 6294, 6295	Sep, 1996	Gr. Beta	4.7742 ± 1.1613	3.9486 ± 1.6377	4.3614 ± 1.0038
CW - 6294, 6295	Sep, 1996	Gr. Beta	1.0482 ± 1.2275	-0.3383 ± 1.0818	0.3550 ± 0.8181
VE - 6379, 6380	Sep, 1996	K-40	1.7000 ± 0.2860	1.8440 ± 0.1800	1.7720 ± 0.1690
VE - 6379, 6380	Sep, 1996	Sr-89	-0.0018 ± 0.0018	-0.0009 ± 0.0014	-0.0013 ± 0.0012
VE - 6379, 6380	Sep, 1996	Sr-90	0.0012 ± 0.0006	0.0005 ± 0.0005	0.0008 ± 0.0004
CW - 6432, 6433	Sep, 1996	Gr. Beta	3.1975 ± 1.5496	3.2345 ± 1.4740	3.2160 ± 1.0694
VE - 6481, 6482	Sep, 1996	Gr. Beta	2.8412 ± 0.0780	2.8390 ± 0.0736	2.8401 ± 0.0536

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

Lab Codes ^b	Sample Date	Analysis	Concentration in pCi/L ^a		
			First Result	Second Result	Averaged Result
VE - 6481, 6482	Sep, 1996	K-40	3.3857 ± 0.2370	3.5694 ± 0.1540	3.4776 ± 0.1413
SW - 6524, 6525	Sep, 1996	H-3	223.5203 ± 90.7888	151.2226 ± 87.8631	187.3714 ± 63.1715
SWT - 6545, 6546	Sep, 1996	Gr. Beta	2.7317 ± 0.5235	2.1160 ± 0.4971	2.4238 ± 0.3610
AP - 7220, 7221	Sep, 1996	Co-60	0.0006 ± 0.0007	0.0001 ± 0.0011	0.0003 ± 0.0006
AP - 7220, 7221	Sep, 1996	Cs-134	-0.0001 ± 0.0006	0.0001 ± 0.0007	-0.0000 ± 0.0004
AP - 7220, 7221	Sep, 1996	Cs-137	-0.0002 ± 0.0006	0.0009 ± 0.0008	0.0004 ± 0.0005
AP - 7220, 7221	Sep, 1996	I-131(g)	0.0013 ± 0.0041	0.0004 ± 0.0063	0.0008 ± 0.0038
AP - 7220, 7221	Sep, 1996	K-40	0.0193 ± 0.0100	0.0297 ± 0.0160	0.0245 ± 0.0094
DW - 6572, 6573	Sep, 1996	Gr. Alpha	1.0283 ± 0.6412	0.2799 ± 0.3100	0.6541 ± 0.3561
DW - 6572, 6573	Sep, 1996	Gr. Beta	2.8779 ± 0.8307	2.4510 ± 0.2702	2.6645 ± 0.4368
SW - 6593, 6594	Sep, 1996	H-3	58.2259 ± 80.0303	89.9855 ± 81.4187	74.1057 ± 57.0830
CW - 6616, 6617	Sep, 1996	Gr. Beta	3.1242 ± 1.6295	4.9871 ± 1.7193	4.0556 ± 1.1844
CW - 6616, 6617	Sep, 1996	Gr. Beta	0.2660 ± 1.0617	-0.2956 ± 1.0299	-0.0148 ± 0.7396
PW - 6675, 6676	Sep, 1996	H-3	21.6674 ± 80.1010	88.4752 ± 83.0584	55.0713 ± 57.6950
AP - 7537, 7538	Sep, 1996	Co-60	0.0003 ± 0.0005	-0.0000 ± 0.0007	0.0001 ± 0.0005
AP - 7537, 7538	Sep, 1996	Cs-137	0.0002 ± 0.0004	0.0002 ± 0.0007	0.0002 ± 0.0004
VE - 6654, 6655	Sep, 1996	Co-60	-0.0057 ± 0.0156	0.0022 ± 0.0147	-0.0018 ± 0.0107
VE - 6654, 6655	Sep, 1996	Cs-137	0.0128 ± 0.0133	0.0131 ± 0.0110	0.0130 ± 0.0086
CW - 6719, 6720	Sep, 1996	Gr. Beta	2.9910 ± 1.4044	2.1008 ± 1.5104	2.5459 ± 1.0312
CW - 6719, 6720	Sep, 1996	Gr. Beta	-0.3107 ± 1.0842	1.1119 ± 1.1700	0.4006 ± 0.7976
AP - 7558, 7559	Sep, 1996	Co-60	0.0003 ± 0.0004	0.0008 ± 0.0007	0.0006 ± 0.0004
AP - 7558, 7559	Sep, 1996	Co-60	0.0003 ± 0.0004	0.0008 ± 0.0007	0.0006 ± 0.0004
AP - 7558, 7559	Sep, 1996	Cs-137	-0.0001 ± 0.0004	0.0002 ± 0.0007	0.0001 ± 0.0004
AP - 7558, 7559	Sep, 1996	Cs-137	-0.0001 ± 0.0004	0.0002 ± 0.0007	0.0001 ± 0.0004
WW - 6696, 6697	Sep, 1996	H-3	313.7207 ± 98.9677	302.7129 ± 98.5588	308.2168 ± 69.8363
LW - 7118, 7119	Sep, 1996	Gr. Alpha	0.0448 ± 0.4053	-0.1825 ± 0.3885	-0.0688 ± 0.2807
LW - 7118, 7119	Sep, 1996	Gr. Beta	2.0623 ± 0.4378	1.5831 ± 0.5835	1.8227 ± 0.3647
LW - 7118, 7119	Sep, 1996	H-3	89.2546 ± 81.1237	92.8011 ± 81.2786	91.0279 ± 57.4179
E - 6783, 6784	Oct, 1996	Gr. Beta	0.9337 ± 0.0331	0.9578 ± 0.0317	0.9457 ± 0.0229
E - 6783, 6784	Oct, 1996	K-40	0.8969 ± 0.1320	1.1090 ± 0.1530	1.0029 ± 0.1010
E - 6783, 6784	Oct, 1996	Sr-89	-0.0002 ± 0.0032	-0.0009 ± 0.0029	-0.0006 ± 0.0022
E - 6783, 6784	Oct, 1996	Sr-90	0.0005 ± 0.0013	0.0005 ± 0.0012	0.0005 ± 0.0009
SW - 6877, 6878	Oct, 1996	H-3	1,223.4684 ± 119.5914	1,320.2432 ± 122.4059	1,271.8558 ± 85.5647
AP - 7199, 7200	Oct, 1996	Sr-89	-0.0006 ± 0.0015	0.0005 ± 0.0020	-0.0001 ± 0.0013
AP - 7199, 7200	Oct, 1996	Sr-90	0.0004 ± 0.0006	0.0006 ± 0.0008	0.0005 ± 0.0005
MI - 6746, 6747	Oct, 1996	I-131	-0.0925 ± 0.2640	0.1078 ± 0.2514	0.0077 ± 0.1823
MI - 6746, 6747	Oct, 1996	K-40	1,427.9000 ± 180.0000	1,425.3000 ± 208.0000	1,426.6000 ± 137.5354

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

Lab Codes ^b	Sample Date	Analysis	Concentration in pCi/L ^a		
			First Result	Second Result	Averaged Result
F - 6824, 6825	Oct, 1996	Co-60	0.0164 ± 0.0108	0.0030 ± 0.0057	0.0097 ± 0.0061
F - 6824, 6825	Oct, 1996	Cs-137	0.0087 ± 0.0073	0.0039 ± 0.0051	0.0063 ± 0.0044
WW - 6926, 6927	Oct, 1996	Co-60	0.8880 ± 1.3900	-0.4140 ± 2.7800	0.2370 ± 1.5541
WW - 6926, 6927	Oct, 1996	Cs-137	1.2900 ± 1.5000	1.8300 ± 3.2300	1.5600 ± 1.7807
WW - 6926, 6927	Oct, 1996	H-3	7.0861 ± 78.2685	-3.5430 ± 77.7859	1.7715 ± 55.1738
G - 7001, 7002	Oct, 1996	Co-60	0.0072 ± 0.0247	0.0046 ± 0.0099	0.0059 ± 0.0133
G - 7001, 7002	Oct, 1996	Cs-134	0.0101 ± 0.0188	0.0043 ± 0.0099	0.0072 ± 0.0106
G - 7001, 7002	Oct, 1996	Cs-137	-0.0068 ± 0.0204	-0.0042 ± 0.0093	-0.0055 ± 0.0112
G - 7001, 7002	Oct, 1996	Gr. Beta	5.2080 ± 0.2600	5.1980 ± 0.2600	5.2030 ± 0.1838
G - 7001, 7002	Oct, 1996	I-131(g)	-0.0137 ± 0.0372	0.0141 ± 0.0183	0.0002 ± 0.0207
G - 7001, 7002	Oct, 1996	K-40	6.1948 ± 0.7170	5.5229 ± 0.4170	5.8589 ± 0.4147
SS - 7024, 7025	Oct, 1996	Cs-137	0.0141 ± 0.0132	0.0248 ± 0.0125	0.0195 ± 0.0091
SS - 7024, 7025	Oct, 1996	Gr. Beta	7.6523 ± 2.0292	6.4672 ± 1.8437	7.0597 ± 1.3708
SS - 7024, 7025	Oct, 1996	K-40	7.1780 ± 0.5510	6.9053 ± 0.4040	7.0417 ± 0.3416
LW - 7045, 7046	Oct, 1996	Co-60	1.6200 ± 3.1100	-0.7530 ± 2.9100	0.4335 ± 2.1296
LW - 7045, 7046	Oct, 1996	Cs-134	-0.0246 ± 3.0400	-1.9300 ± 3.0500	-0.9773 ± 2.1531
LW - 7045, 7046	Oct, 1996	Cs-137	-0.9830 ± 2.8500	1.9300 ± 2.9700	0.4735 ± 2.0581
LW - 7045, 7046	Oct, 1996	Gr. Beta	2.8219 ± 0.7438	2.8922 ± 0.5347	2.8571 ± 0.4580
LW - 7045, 7046	Oct, 1996	I-131	0.2410 ± 0.3690	-0.2043 ± 0.4541	0.0184 ± 0.2926
LW - 7045, 7046	Oct, 1996	I-131(g)	-5.1500 ± 29.9000	5.8000 ± 27.7000	0.3250 ± 20.3795
LW - 7045, 7046	Oct, 1996	K-40	51.3000 ± 37.9000	34.5000 ± 33.8000	42.9000 ± 25.3912
F - 6952, 6953	Oct, 1996	K-40	2.7927 ± 0.1670	2.7243 ± 0.1020	2.7585 ± 0.0978
MI - 6853, 6854	Oct, 1996	Co-60	-0.7610 ± 4.7900	1.8000 ± 2.8100	0.5195 ± 2.7767
MI - 6853, 6854	Oct, 1996	Cs-137	1.5500 ± 3.5900	-0.8890 ± 2.4000	0.3305 ± 2.1592
MI - 6853, 6854	Oct, 1996	I-131	-0.1047 ± 0.2745	0.2027 ± 0.2586	0.0490 ± 0.1886
MI - 6854, 6855	Oct, 1996	Co-60	1.8000 ± 2.8100	0.4510 ± 4.9000	1.1255 ± 2.8243
MI - 6854, 6855	Oct, 1996	Co-60	1.8000 ± 2.8100	0.4510 ± 4.9000	1.1255 ± 2.8243
MI - 6854, 6855	Oct, 1996	Cs-137	-0.8890 ± 2.4000	1.5900 ± 3.2700	0.3505 ± 2.0281
MI - 6854, 6855	Oct, 1996	Cs-137	-0.8890 ± 2.4000	1.5900 ± 3.2700	0.3505 ± 2.0281
MI - 6854, 6855	Oct, 1996	I-131	0.0490 ± 0.1886	-0.1840 ± 0.2910	-0.0675 ± 0.1734
MI - 6854, 6855	Oct, 1996	I-131	0.2000 ± 0.2600	-0.1837 ± 0.2904	0.0082 ± 0.1949
MI - 6854, 6855	Oct, 1996	I-131	0.2027 ± 0.2586	-0.1840 ± 0.2910	0.0094 ± 0.1946
BS - 7138, 7139	Oct, 1996	Gr. Beta	9.5648 ± 2.4583	7.9345 ± 2.3466	8.7497 ± 1.6993
BS - 7138, 7139	Oct, 1996	K-40	7.2366 ± 0.4030	7.1729 ± 0.5230	7.2048 ± 0.3301
SO - 7306, 7307	Oct, 1996	Cs-137	0.2375 ± 0.0250	0.2243 ± 0.0437	0.2309 ± 0.0252
SO - 7306, 7307	Oct, 1996	K-40	9.4591 ± 0.4680	9.4848 ± 0.7300	9.4720 ± 0.4336
BO - 7747, 7748	Oct, 1996	Gr. Beta	1.6819 ± 0.3193	1.4542 ± 0.3070	1.5681 ± 0.2215

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

Lab Codes ^b	Sample Date	Analysis	Concentration in pCi/L ^a		
			First Result	Second Result	Averaged Result
BO - 7747, 7748	Oct, 1996	K-40	0.7271 ± 0.1770	0.5964 ± 0.1430	0.6617 ± 0.1138
F - 7328, 7329	Oct, 1996	K-40	2.0975 ± 0.4500	1.7161 ± 0.3850	1.9068 ± 0.2961
MI - 7285, 7286	Oct, 1996	I-131	-0.1241 ± 0.2405	-0.0565 ± 0.2463	-0.0903 ± 0.1721
CW - 7176, 7177	Oct, 1996	Gr. Beta	3.1350 ± 1.0492	2.2278 ± 0.9950	2.6814 ± 0.7230
MI - 7351, 7352	Oct, 1996	Sr-89	-0.4959 ± 1.3277	-2.6954 ± 1.1984	-1.5956 ± 0.8943
MI - 7351, 7352	Oct, 1996	Sr-90	1.6216 ± 0.4003	1.5659 ± 0.3840	1.5938 ± 0.2774
VE - 7425, 7426	Oct, 1996	K-40	1.9203 ± 0.2360	1.7284 ± 0.2700	1.8244 ± 0.1793
MI - 7514, 7515	Oct, 1996	Co-60	2.1800 ± 5.1000	5.8600 ± 5.3900	4.0200 ± 3.7102
MI - 7514, 7515	Oct, 1996	Co-60	2.1800 ± 5.1000	5.8600 ± 5.3900	4.0200 ± 3.7102
MI - 7514, 7515	Oct, 1996	Cs-137	0.2630 ± 3.4000	1.3400 ± 4.3000	0.8015 ± 2.7409
MI - 7514, 7515	Oct, 1996	Cs-137	0.2630 ± 3.4000	1.3400 ± 4.3000	0.8015 ± 2.7409
MI - 7514, 7515	Oct, 1996	I-131	-0.0367 ± 0.2747	0.0170 ± 0.2780	-0.0098 ± 0.1954
F - 7584, 7585	Oct, 1996	Co-60	0.0051 ± 0.0115	0.0050 ± 0.0119	0.0051 ± 0.0083
F - 7584, 7585	Oct, 1996	Cs-137	0.0048 ± 0.0087	0.0006 ± 0.0094	0.0027 ± 0.0064
WW - 7653, 7654	Oct, 1996	Co-60	0.5440 ± 1.7200	-3.0500 ± 2.8000	-1.2530 ± 1.6430
WW - 7653, 7654	Oct, 1996	Co-60	0.5440 ± 1.7200	-3.0500 ± 2.8000	-1.2530 ± 1.6430
WW - 7653, 7654	Oct, 1996	Cs-137	-0.3090 ± 1.9800	-1.3700 ± 3.5700	-0.8395 ± 2.0412
WW - 7653, 7654	Oct, 1996	Cs-137	-0.3090 ± 1.9800	-1.3700 ± 3.5700	-0.8395 ± 2.0412
WW - 7653, 7654	Oct, 1996	H-3	-20.6120 ± 75.8854	27.0900 ± 78.0749	3.2390 ± 54.4387
SS - 8040, 8041	Oct, 1996	K-40	22.2090 ± 0.8210	23.4780 ± 0.8550	22.8435 ± 0.5927
SWT - 7972, 7973	Oct, 1996	Gr. Beta	2.7320 ± 0.5059	2.1353 ± 0.5134	2.4337 ± 0.3604
CW - 7794, 7795	Oct, 1996	Gr. Beta	1.2200 ± 1.7000	2.3526 ± 1.7822	1.7863 ± 1.2315
DW - 7994, 7995	Oct, 1996	Gr. Beta	1.6467 ± 0.4826	1.8357 ± 0.4589	1.7412 ± 0.3330
DW - 7994, 7995	Oct, 1996	H-3	64.0848 ± 81.6689	29.6241 ± 80.1237	46.8545 ± 57.2049
WW - 8121, 8122	Nov, 1996	Gr. Beta	5.2418 ± 0.7885	4.8908 ± 0.7351	5.0663 ± 0.5390
WW - 8121, 8122	Nov, 1996	H-3	49.1914 ± 78.3272	25.7955 ± 77.2446	37.4935 ± 55.0042
CW - 8089, 8090	Nov, 1996	Gr. Beta	2.0590 ± 1.7640	-0.0624 ± 1.6065	0.9983 ± 1.1930
CW - 8089, 8090	Nov, 1996	Gr. Beta	-0.3253 ± 1.5458	0.0296 ± 1.5731	-0.1479 ± 1.1027
SWU - 8213, 8214	Nov, 1996	Gr. Beta	2.5755 ± 0.5930	1.9537 ± 0.5962	2.2646 ± 0.4204
SWU - 8213, 8214	Nov, 1996	H-3	257.8646 ± 86.6697	234.9041 ± 85.7288	246.3843 ± 60.9530
SWU - 8213, 8214	Nov, 1996	K-40	109.2500 ± 41.2000	97.1440 ± 52.0000	103.1970 ± 33.1717
CW - 8302, 8303	Nov, 1996	Gr. Beta	0.9444 ± 1.4135	2.1017 ± 1.4184	1.5230 ± 1.0012
MI - 8337, 8338	Nov, 1996	I-131	-0.0286 ± 0.2146	0.0724 ± 0.2406	0.0219 ± 0.1612
MI - 8337, 8338	Nov, 1996	K-40	1,454.6000 ± 91.6000	1,365.5000 ± 193.0000	1,410.0500 ± 106.8171
WW - 8561, 8562	Nov, 1996	H-3	4,719.0000 ± 197.0000	4,718.8773 ± 197.2068	4,718.9387 ± 139.3732
SW - 8581, 8582	Nov, 1996	Gr. Beta	3.1780 ± 0.6522	2.4547 ± 0.6458	2.8164 ± 0.4589
WW - 8681, 8682	Nov, 1996	Gr. Alpha	0.1083 ± 1.7623	-1.6686 ± 1.5384	-0.7802 ± 1.1697

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

Lab Codes ^b	Sample Date	Analysis	Concentration in pCi/L ^a		
			First Result	Second Result	Averaged Result
WW - 8681, 8682	Nov, 1996	Gr. Beta	2.7636 ± 1.6718	1.2914 ± 1.6711	2.0275 ± 1.1819
CW - 8612, 8613	Nov, 1996	Gr. Beta	2.5959 ± 1.4986	1.9085 ± 1.4277	2.2522 ± 1.0349
CW - 8612, 8613	Nov, 1996	Gr. Beta	0.0730 ± 1.0631	-0.7679 ± 1.0588	-0.3474 ± 0.7502
CW - 9219, 9220	Nov, 1996	Co-60	0.4990 ± 1.9100	-0.2780 ± 1.6600	0.1105 ± 1.2653
CW - 9219, 9220	Nov, 1996	Cs-137	1.3800 ± 2.0100	0.1520 ± 1.6300	0.7660 ± 1.2939
CW - 9219, 9220	Nov, 1996	H-3	2,091.6585 ± 147.0922	2,206.2783 ± 149.9008	2,148.9684 ± 105.0076
CW - 8830, 8831	Nov, 1996	Gr. Alpha	0.1864 ± 0.3044	0.4130 ± 0.3037	0.2997 ± 0.2150
CW - 8830, 8831	Nov, 1996	Gr. Beta	11.0773 ± 0.6482	10.2141 ± 0.5784	10.6457 ± 0.4344
CW - 8830, 8831	Nov, 1996	H-3	2,053.4722 ± 144.0356	2,112.1937 ± 145.4793	2,082.8329 ± 102.3603
CW - 8830, 8831	Nov, 1996	Sr-89	-0.2648 ± 0.5335	-0.2665 ± 0.6325	-0.2656 ± 0.4137
CW - 8830, 8831	Nov, 1996	Sr-90	0.2880 ± 0.3295	0.2980 ± 0.3905	0.2930 ± 0.2555
SW - 8635, 8636	Dec, 1996	Gr. Beta	2.4968 ± 0.8037	3.0769 ± 0.7797	2.7869 ± 0.5599
SW - 8635, 8636	Dec, 1996	K-40	90.1230 ± 52.8000	90.4480 ± 51.9000	90.2855 ± 37.0184
DW - 8660, 8661	Dec, 1996	Gr. Beta	2.1325 ± 0.5706	1.8680 ± 0.5881	2.0003 ± 0.4097
DW - 8660, 8661	Dec, 1996	H-3	110.0746 ± 83.6820	117.3323 ± 83.9962	113.7035 ± 59.2833
MI - 8704, 8705	Dec, 1996	I-131	-0.2720 ± 0.2656	-0.2978 ± 0.2604	-0.2849 ± 0.1860
MI - 8704, 8705	Dec, 1996	K-40	1,301.2000 ± 141.0000	1,342.9000 ± 150.0000	1,322.0500 ± 102.9332
MI - 8725, 8726	Dec, 1996	Co-60	0.4980 ± 2.7500	0.4080 ± 4.4400	0.4530 ± 2.6113
MI - 8725, 8726	Dec, 1996	Cs-134	1.2300 ± 2.3300	-0.6450 ± 3.8000	0.2925 ± 2.2287
MI - 8725, 8726	Dec, 1996	Cs-137	1.7600 ± 2.5400	1.1100 ± 3.3900	1.4350 ± 2.1180
MI - 8725, 8726	Dec, 1996	I-131	-0.1756 ± 0.1896	-0.1739 ± 0.2108	-0.1747 ± 0.1418
MI - 8725, 8726	Dec, 1996	I-131(g)	-0.9720 ± 3.4000	4.5100 ± 4.8700	1.7690 ± 2.9697
MI - 8725, 8726	Dec, 1996	K-40	1,402.2000 ± 111.0000	1,297.5000 ± 150.0000	1,349.8500 ± 93.3019
MI - 8725, 8726	Dec, 1996	Sr-89	-1.0624 ± 1.0291	-1.0463 ± 1.0044	-1.0543 ± 0.7190
MI - 8725, 8726	Dec, 1996	Sr-90	1.3308 ± 0.3709	1.1232 ± 0.3625	1.2270 ± 0.2593
SO - 8802, 8803	Dec, 1996	Cs-137	0.4670 ± 0.0419	0.4514 ± 0.0374	0.4592 ± 0.0281
SO - 8802, 8803	Dec, 1996	Gr. Alpha	14.0253 ± 4.2670	13.8640 ± 4.0228	13.9447 ± 2.9322
SO - 8802, 8803	Dec, 1996	Gr. Beta	21.4173 ± 3.1354	21.4610 ± 2.8794	21.4391 ± 2.1285
SO - 8802, 8803	Dec, 1996	K-40	11.0890 ± 0.6640	10.8030 ± 0.6130	10.9460 ± 0.4518
SWU - 9540, 9541	Dec, 1996	Gr. Beta	7.5204 ± 0.8776	5.9562 ± 0.8260	6.7383 ± 0.6026
SWU - 9540, 9541	Dec, 1996	H-3	90.1991 ± 86.7053	86.5424 ± 86.5510	88.3707 ± 61.2554
F - 9040, 9041	Dec, 1996	Co-60	-0.0006 ± 0.0144	-0.0002 ± 0.0150	-0.0004 ± 0.0104
F - 9040, 9041	Dec, 1996	Cs-134	-0.0015 ± 0.0103	0.0005 ± 0.0120	-0.0005 ± 0.0079
F - 9040, 9041	Dec, 1996	Cs-137	0.0371 ± 0.0163	0.0428 ± 0.0186	0.0400 ± 0.0124
F - 9040, 9041	Dec, 1996	Gr. Beta	3.5649 ± 0.0939	3.5230 ± 0.0939	3.5440 ± 0.0664
F - 9040, 9041	Dec, 1996	I-131(g)	0.0008 ± 0.0151	-0.0004 ± 0.0153	0.0002 ± 0.0107
F - 9040, 9041	Dec, 1996	K-40	3.2987 ± 0.4720	3.0073 ± 0.4330	3.1530 ± 0.3203

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

Lab Codes ^b	Sample Date	Analysis	Concentration in pCi/L ^a		
			First Result	Second Result	Averaged Result
CW - 9109, 9110	Dec, 1996	Gr. Beta	4.1495 ± 1.2265	1.9601 ± 1.5457	3.0548 ± 0.9866
CW - 9109, 9110	Dec, 1996	Gr. Beta	-0.8681 ± 1.3230	-1.1056 ± 1.3024	-0.9869 ± 0.9282
MI - 9197, 9198	Dec, 1996	I-131	0.0738 ± 0.3589	-0.1464 ± 0.3804	-0.0363 ± 0.2615
MI - 9197, 9198	Dec, 1996	K-40	1,462.6000 ± 143.0000	1,381.2000 ± 149.0000	1,421.9000 ± 103.2594
WW - 9269, 9270	Dec, 1996	Co-60	-1.1100 ± 2.3300	-0.2890 ± 2.6000	-0.6995 ± 1.7456
WW - 9269, 9270	Dec, 1996	Cs-137	-1.2100 ± 2.2100	0.2210 ± 2.5500	-0.4945 ± 1.6872
WW - 9269, 9270	Dec, 1996	H-3	1,051.0538 ± 116.7594	1,126.1290 ± 119.0359	1,088.5914 ± 83.3701
LW - 9291, 9292	Dec, 1996	Co-60	-0.2250 ± 2.0000	1.2400 ± 2.3400	0.5075 ± 1.5391
LW - 9291, 9292	Dec, 1996	Cs-137	4.0400 ± 2.1800	0.1930 ± 2.8300	2.1165 ± 1.7861
LW - 9291, 9292	Dec, 1996	Gr. Beta	4.8680 ± 1.3409	7.3432 ± 1.4448	6.1056 ± 0.9856
SW - 9743, 9744	Dec, 1996	H-3	1.2426 ± 89.7614	51.5686 ± 91.8276	26.4056 ± 64.2056
SW - 9414, 9415	Dec, 1996	Gr. Beta	3.9527 ± 0.6945	4.6396 ± 0.7606	4.2961 ± 0.5150
DW - 9520, 9521	Dec, 1996	Gr. Beta	6.1588 ± 1.3500	5.6935 ± 1.2445	5.9261 ± 0.9180
DW - 9520, 9521	Dec, 1996	I-131	0.3470 ± 0.4182	0.2339 ± 0.4184	0.2905 ± 0.2958
CW - 9383, 9384	Dec, 1996	Gr. Beta	4.7813 ± 1.7392	4.5942 ± 1.5609	4.6877 ± 1.1685
CW - 9383, 9384	Dec, 1996	Gr. Beta	0.6113 ± 1.4866	0.4335 ± 1.4715	0.5224 ± 1.0459
SW - 9433, 9434	Dec, 1996	H-3	309.2956 ± 91.1018	247.0810 ± 88.6407	278.1883 ± 63.5545
SW - 9497, 9498	Dec, 1996	H-3	241.0070 ± 91.8990	126.5590 ± 87.2570	183.7830 ± 63.3625
DW - 9564, 9565	Dec, 1996	Gr. Beta	2.0290 ± 0.5925	2.1508 ± 0.5749	2.0899 ± 0.4128
DW - 9564, 9565	Dec, 1996	H-3	120.7999 ± 83.3742	94.1528 ± 82.2309	107.4763 ± 58.5516

^a All concentrations are reported in pCi/liter, except solid samples, which are reported in pCi/gram.

^b Lab codes are comprised of the sample media and the sample numbers. Client codes have been eliminated to protect client anonymity.

Table A-6. Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP), comparison of MAPEP and Teledyne's Midwest Laboratory results for various sample media^a.

Lab Code	Sample Type	Date Collected	Analysis	Concentration in Bq/kg ^b		
				Teledyne Results ±Standard Deviation ^c	MAPEP Result ^d 1s, N=1	Control Limits
STSO-776	SOIL	Sep, 1996	Am-241	27.000	28.700 ± 2.830	20.900 - 37.310
Standard deviation for three determinations not reported in Mixed Analyte Performance Evaluation Program Summary Report.						
STSO-776	SOIL	Sep, 1996	Co-60	879.000	812.000 ± 83.500	568.400 - 1,055.600
Standard deviation for three determinations not reported in Mixed Analyte Performance Evaluation Program Summary Report.						
STSO-776	SOIL	Sep, 1996	Cs-137	1,716.000	1,531.000 ± 193.420	1,071.700 - 1,990.300
Standard deviation for three determinations not reported in Mixed Analyte Performance Evaluation Program Summary Report.						
STSO-776	SOIL	Sep, 1996	Pu-238	13.000	15.900 ± 1.770	11.130 - 20.670
Standard deviation for three determinations not reported in Mixed Analyte Performance Evaluation Program Summary Report.						
STSO-776	SOIL	Sep, 1996	Pu-239/240	18.000	19.700 ± 1.960	13.790 - 25.610
Standard deviation for three determinations not reported in Mixed Analyte Performance Evaluation Program Summary Report.						
STSO-776	SOIL	Sep, 1996	Sr-90	441.000	536.000 ± 57.110	375.200 - 696.800
Standard deviation for three determinations not reported in Mixed Analyte Performance Evaluation Program Summary Report.						
STSO-776	SOIL	Sep, 1996	U-234/233	59.000	63.900 ± 7.270	44.730 - 83.070
Standard deviation for three determinations not reported in Mixed Analyte Performance Evaluation Program Summary Report.						
STSO-776	SOIL	Sep, 1996	U-238	60.000	64.000 ± 6.360	44.800 - 83.200
Standard deviation for three determinations not reported in Mixed Analyte Performance Evaluation Program Summary Report.						

^a Results obtained by Teledyne Brown Engineering Environmental Services 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 becquerels per kilogram as requested by the Department of Energy.

^c Unless otherwise indicated, the TBESML results are given as the mean ± 1 standard deviations for three determinations.

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

Table A-7. Environmental Measurements Laboratory Quality Assessment Program (EML), comparison of EML and Teledyne's Midwest Laboratory results for various sample media^a.

Lab Code	Sample Type	Date Collected	Analysis	Concentration in Bq/L ^b		Control Limits ^c
				Teledyne Result ^e	EML Result ^d	
STAF-759	AIR FILTER	Mar, 1996	Am-241	0.270 ± 0.040	0.189 ± 0.007	0.620 - 1.930
STAF-759	AIR FILTER	Mar, 1996	Ce-144	23.200 ± 1.020	33.300 ± 3.300	0.610 - 1.310
STAF-759	AIR FILTER	Mar, 1996	Co-57	6.050 ± 0.130	8.900 ± 0.900	0.630 - 1.290
STAF-759	AIR FILTER	Mar, 1996	Co-60	26.500 ± 0.430	29.500 ± 2.900	0.740 - 1.250
STAF-759	AIR FILTER	Mar, 1996	Cs-134	12.900 ± 0.280	14.700 ± 1.460	0.700 - 1.210
STAF-759	AIR FILTER	Mar, 1996	Cs-137	6.200 ± 0.900	6.640 ± 0.700	0.720 - 1.320
STAF-760	AIR FILTER	Mar, 1996	Gr. Alpha	2.210 ± 0.050	1.620 ± 0.150	0.820 - 1.580
STAF-760	AIR FILTER	Mar, 1996	Gr. Beta	1.950 ± 0.040	1.770 ± 0.150	0.750 - 1.940
STAF-759	AIR FILTER	Mar, 1996	Mn-54	3.270 ± 0.350	3.440 ± 0.380	0.760 - 1.330
STAF-759	AIR FILTER	Mar, 1996	Pu-238	0.080 ± 0.020	0.096 ± 0.002	0.610 - 1.550
STAF-759	AIR FILTER	Mar, 1996	Pu-239	0.090 ± 0.020	0.093 ± 0.003	0.670 - 1.580
STAF-759	AIR FILTER	Mar, 1996	Ru-106	10.200 ± 1.850	11.600 ± 1.440	0.540 - 1.590
STAF-759	AIR FILTER	Mar, 1996	Sb-125	10.100 ± 0.750	9.780 ± 1.030	0.350 - 1.400
STAF-759	AIR FILTER	Mar, 1996	Sr-90	1.070 ± 0.230	1.060 ± 0.037	0.620 - 2.260
STAF-759	AIR FILTER	Mar, 1996	Uranium	0.118 ± 0.020	0.107 ± 0.003	0.790 - 2.880
STSO-757	SOIL	Mar, 1996	Am-241	6.230 ± 2.880	3.690 ± 0.454	0.520 - 2.410
STSO-757	SOIL	Mar, 1996	Cs-137	404.000 ± 0.150	359.000 ± 10.000	0.740 - 1.400
STSO-757	SOIL	Mar, 1996	K-40	525.000 ± 23.300	465.000 ± 30.000	0.700 - 1.590
STSO-757	SOIL	Mar, 1996	Pu-238	42.300 ± 1.590	43.000 ± 2.440	0.220 - 1.990
STSO-757	SOIL	Mar, 1996	Pu-239	9.000 ± 0.700	9.230 ± 0.346	0.620 - 1.990
STSO-757	SOIL	Mar, 1996	Sr-90	1,200.000 ± 32.300	1,340.000 ± 113.000	0.580 - 2.960
STSO-757	SOIL	Mar, 1996	Uranium	68.200 ± 2.400	71.700 ± 4.150	0.270 - 1.480
STVE-758	VEGETATION	Mar, 1996	Am-241	6.100 ± 1.300	5.600 ± 0.184	0.580 - 2.860
STVE-758	VEGETATION	Mar, 1996	Cm-244	6.000 ± 1.200	4.440 ± 0.202	0.400 - 1.870
STVE-758	VEGETATION	Mar, 1996	Co-60	65.600 ± 4.000	59.700 ± 0.963	0.640 - 1.490
STVE-758	VEGETATION	Mar, 1996	Cs-137	1,100.000 ± 12.600	944.000 ± 16.200	0.750 - 1.480
STVE-758	VEGETATION	Mar, 1996	K-40	1,190.000 ± 61.600	1,030.000 ± 33.000	0.450 - 1.510
STVE-758	VEGETATION	Mar, 1996	Pu-239	9.200 ± 1.300	9.820 ± 1.220	0.600 - 1.980
STVE-758	VEGETATION	Mar, 1996	Sr-90	1,210.000 ± 32.200	1,300.000 ± 52.400	0.500 - 1.370
STW-755	WATER	Mar, 1996	Am-241	0.800 ± 0.100	0.766 ± 0.013	0.660 - 1.560
STW-755	WATER	Mar, 1996	Co-60	33.600 ± 1.000	32.800 ± 0.580	0.870 - 1.170
STW-755	WATER	Mar, 1996	Cs-137	42.800 ± 1.300	38.300 ± 0.881	0.900 - 1.250
STW-755	WATER	Mar, 1996	Fe-55	109.000 ± 21.700	83.000 ± 3.440	0.270 - 1.620
STW-756	WATER	Mar, 1996	Gr. Alpha	2,180.000 ± 53.500	1,850.000 ± 185.000	0.550 - 1.310
STW-756	WATER	Mar, 1996	Gr. Beta	872.000 ± 27.000	744.000 ± 74.000	0.750 - 1.650
STW-755	WATER	Mar, 1996	H-3	434.000 ± 34.100	251.000 ± 11.400	0.690 - 1.910
STW-755	WATER	Mar, 1996	Mn-54	41.900 ± 1.400	38.400 ± 1.160	0.880 - 1.210
STW-755	WATER	Mar, 1996	Pu-238	0.900 ± 0.100	0.982 ± 0.074	0.680 - 1.330

Table A-7. Environmental Measurements Laboratory Quality Assessment Program (EML), comparison of EML and Teledyne's Midwest Laboratory results for various sample media^a.

Lab Code	Sample Type	Date Collected	Analysis	Concentration in Bq/L ^b		
				Teledyne Result ^c	EML Result ^d	Control Limits ^e
STW-755	WATER	Mar, 1996	Pu-239	0.700 ± 0.100	0.772 ± 0.056	0.620 - 1.380
STW-755	WATER	Mar, 1996	Sr-90	2.200 ± 0.700	1.450 ± 0.034	0.730 - 1.650
STAP-773	AIR FILTER	Sep, 1996	Co-60	9.230 ± 0.402	8.640 ± 0.431	0.740 - 1.240
STAP-773	AIR FILTER	Sep, 1996	Co-57	11.800 ± 0.296	14.800 ± 0.814	0.620 - 1.220
STAP-773	AIR FILTER	Sep, 1996	Cs-134	9.620 ± 0.376	10.800 ± 0.392	0.720 - 1.210
STAP-773	AIR FILTER	Sep, 1996	Cs-137	8.720 ± 0.403	8.520 ± 0.366	0.720 - 1.320
STAP-773	AIR FILTER	Sep, 1996	Gr. Alpha	0.731 ± 0.037	1.150 ± 0.110	0.830 - 1.550
An investigation was conducted and a transcription error while calculating the result was discovered. The recalculated value is 1.15 ± 0.01 Bq/filter. No further action is planned.						
STAP-773	AIR FILTER	Sep, 1996	Gr. Beta	0.540 ± 0.037	0.500 ± 0.050	0.730 - 1.840
STAP-773	AIR FILTER	Sep, 1996	Mn-54	7.060 ± 0.472	6.350 ± 0.270	0.750 - 1.270
STAP-773	AIR FILTER	Sep, 1996	Ru-106	11.500 ± 3.190	10.800 ± 1.140	0.580 - 1.300
STAP-773	AIR FILTER	Sep, 1996	Sb-125	12.400 ± 0.965	10.800 ± 0.540	0.600 - 1.390
STSO-771	SOIL	Sep, 1996	Am-241	15.600 ± 3.830	13.500 ± 0.510	0.520 - 2.650
STSO-771	SOIL	Sep, 1996	Co-60	4.030 ± 2.500	2.920 ± 0.210	0.500 - 1.500
STSO-771	SOIL	Sep, 1996	Cs-137	1,750.000 ± 24.400	1,550.000 ± 22.200	0.800 - 1.340
STSO-771	SOIL	Sep, 1996	K-40	369.000 ± 59.500	300.000 ± 25.000	0.730 - 1.670
STSO-771	SOIL	Sep, 1996	Pu-238	0.770 ± 0.360	1.130 ± 0.240	0.400 - 1.900
STSO-771	SOIL	Sep, 1996	Pu-239	24.000 ± 1.940	21.800 ± 1.080	0.660 - 1.930
STSO-771	SOIL	Sep, 1996	Sr-90	63.600 ± 3.950	69.900 ± 5.100	0.460 - 2.840
STSO-771	SOIL	Sep, 1996	U-234	37.200 ± 3.750	39.200 ± 2.440	0.380 - 1.260
STSO-771	SOIL	Sep, 1996	U-238	40.800 ± 3.980	41.600 ± 0.610	0.350 - 1.550
STVE-772	VEGETATION	Sep, 1996	Am-241	1.530 ± 0.884	1.230 ± 0.410	0.680 - 2.780
STVE-772	VEGETATION	Sep, 1996	Cm-244	0.612 ± 0.495	0.830 ± 0.120	0.490 - 1.690
STVE-772	VEGETATION	Sep, 1996	Co-60	14.000 ± 4.420	10.900 ± 0.710	0.620 - 1.420
STVE-772	VEGETATION	Sep, 1996	Cs-137	219.000 ± 10.100	190.000 ± 6.680	0.810 - 1.450
STVE-772	VEGETATION	Sep, 1996	K-40	1,160.000 ± 99.400	992.000 ± 29.000	0.790 - 1.500
STVE-772	VEGETATION	Sep, 1996	Sr-90	1,420.000 ± 35.100	1,390.000 ± 12.000	0.480 - 1.290
STW-770	WATER	Sep, 1996	Am-241	1.300 ± 0.200	1.080 ± 0.040	0.640 - 1.730
STW-770	WATER	Sep, 1996	Co-60	65.000 ± 2.210	61.100 ± 0.730	0.920 - 1.180
STW-770	WATER	Sep, 1996	Cs-137	96.100 ± 3.010	89.500 ± 1.360	0.900 - 1.280
STW-770	WATER	Sep, 1996	Gr. Alpha	993.000 ± 12.200	1,210.000 ± 121.000	0.500 - 1.290
STW-770	WATER	Sep, 1996	Gr. Beta	579.000 ± 8.070	540.000 ± 54.000	0.600 - 1.640
STW-770	WATER	Sep, 1996	H-3	488.000 ± 34.600	587.000 ± 58.000	0.650 - 1.910
STW-770	WATER	Sep, 1996	Mn-54	65.000 ± 2.960	60.500 ± 0.550	0.870 - 1.220
STW-770	WATER	Sep, 1996	Pu-238	1.320 ± 0.333	1.910 ± 0.070	0.740 - 1.270

An investigation was conducted. No errors in calculations or transcription were noted. The analysis was repeated in duplicate under the observation of the Technical Lead. No discrepancies were noted in the performance of the procedure. The result of the reanalysis was 2.14 ± 0.11 Bq/L. No further action is planned.

Table A-7. Environmental Measurements Laboratory Quality Assessment Program (EML), comparison of EML and Teledyne's Midwest Laboratory results for various sample media^a.

Lab Code	Sample Type	Date Collected	Analysis	Concentration in Bq/L ^b		Control Limits ^e
				Teledyne Result ^c	EML Result ^d	
STW-770	WATER	Sep, 1996	Pu-239	0.698 ± 0.247	0.840 ± 0.030	0.780 - 1.420
STW-770	WATER	Sep, 1996	Sr-90	3.600 ± 0.700	2.710 ± 0.240	0.720 - 1.660
STW-770	WATER	Sep, 1996	U-234	0.517 ± 0.196	0.480 ± 0.040	0.770 - 1.530
STW-770	WATER	Sep, 1996	U-238	0.416 ± 0.118	0.480 ± 0.370	0.770 - 1.350

^a The Environmental Measurements Laboratory provides the following nuclear species : Air Filters, Soil, Tissue, Vegetation and Water. Teledyne does not participate in the Tissue program.

^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. The results of elemental Uranium are reported in ug/filter, g, or ml.

^c Teledyne 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 and are established from percentiles of historic data distributions (1982-1992). The evaluation of this historic data and the development of the control limits is presented in DOE report EML-564.

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;

$$s = 2\sigma \text{ counting uncertainty (corresponding to the 95\% confidence level).}$$

In cases where the activity is found to be below the lower limit of detection L it is reported as

$$<L$$

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

3.0. Duplicate analyses

3.1 Individual results: $x_1 \pm s_1$
 $x_2 \pm s_2$

Reported result: $x \pm s$

where $x = (1/2)(x_1 + x_2)$

$$s = (1/2) \sqrt{s_1^2 + s_2^2}$$

3.2. Individual results: $<L_1$
 $<L_2$

Reported result: $<L$

where L = lower of L_1 and L_2

3.3. Individual results: $x \pm s$

$$<L$$

Reported result: $x \pm s$ if $x \geq L$;

$<L$ otherwise

4.0. Computation of Averages and Standard Deviations

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

$$\bar{x} = \frac{1}{n} \sum x$$

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

- 4.2 Values below the highest lower limit of detection are not included in the average.
- 4.3 If all of the 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		Water	
Gross alpha	3 pCi/m ³	Strontium-89	3,000 pCi/L
Gross beta	100 pCi/m ³	Strontium-90	300 pCi/L
Iodine-131 ^b	0.14 pCi/m ³	Cesium-137	20,000 pCi/L
		Barium-140	20,000 pCi/L
		Iodine-131	300 pCi/L
		Potassium-40 ^c	3,000 pCi/L
		Gross alpha	30 pCi/L
		Gross beta	100 pCi/L
		Tritium	3 x 10 ⁶ pCi/L

^a Taken from Table II of Appendix B to Code of Federal Regulations Title 10, Part 20.1-20.601, and appropriate footnotes. Concentrations may be averaged over a period not greater than one year.

^b From 10 CFR 20.1-20.601 but adjusted by a factor of 700 to reduce the dose resulting from the air-grass-cow-milk-child pathway.

^c A natural radionuclide.

50-305

KEWAUNEE

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RADIOLOGICAL MONITORING PROGRAM

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REPORT TO

WISCONSIN PUBLIC SERVICE CORPORATION
WISCONSIN POWER AND LIGHT COMPANY
MADISON GAS AND ELECTRIC COMPANY

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

ANNUAL REPORT - PART II
DATA TABULATIONS AND ANALYSES
January - December 1996

PREPARED AND SUBMITTED
BY
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES
MIDWEST LABORATORY

PROJECT NO. 8002

Approved by: _____


Bronia Grob, M.S.
Technical Lead

15 April 1997

PREFACE

The staff members of the Teledyne Brown Engineering Environmental Services, Midwest Laboratory (TBEESML) were responsible for the acquisition of data presented in this report. Samples were collected by the personnel of TBEESML and Wisconsin Public Service Corporation.

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1.0 INTRODUCTION

The following constitutes Part II of the final report for the 1996 Radiological Monitoring Program conducted at the Kewaunee Nuclear Power Plant (KNPP), Kewaunee, Wisconsin. Included are tabulations of data for all samples collected in 1996, statistical analyses of the data, 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 1996 Annual Report on the Radiological Monitoring Program for the Kewaunee Nuclear Power Plant.

NOTE: Page 2 is intentionally left out.

KEWAUNEE NUCLEAR POWER PLANT

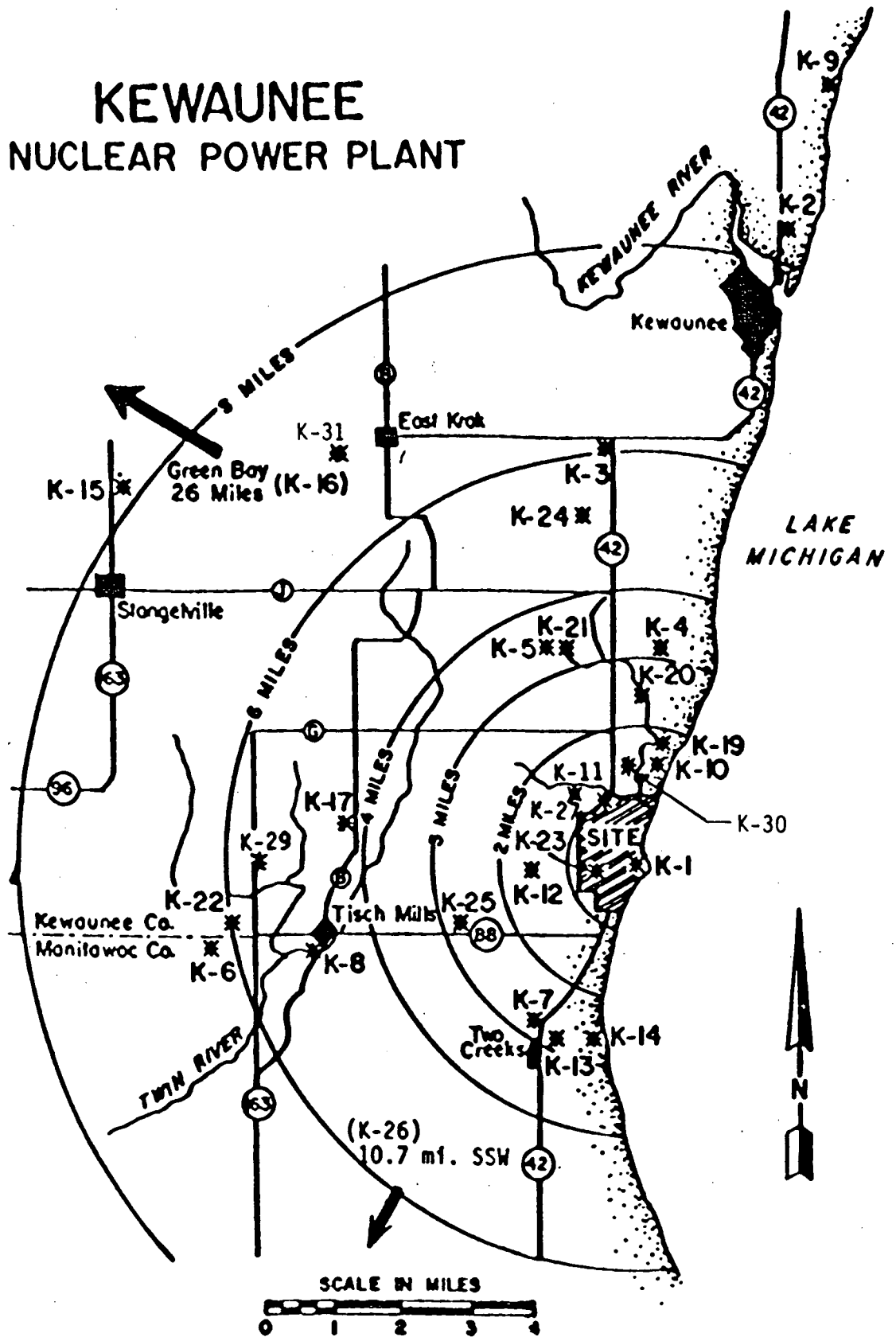


Figure 1. Sampling locations, Kewaunee Nuclear Power Plant

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-2	C	9.5 NNE	WPS Operations Building in Kewaunee
K-3	C	6.0 N	Lyle and John Siegmund Farm, Route 1, Kewaunee
K-4	I	3.0 N	Tom Stangel Farm, Route 1, Kewaunee
K-5	I	3.5 NNW	Ed Paplham Farm, Route 1, Kewaunee
K-6	C	6.7 WSW	Novitsky Farm
K-7	I	2.75 SSW	Ron Zimmerman Farm, Route 3, 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
K-12	I	1.5 WSW	Lecaptain Farm, one mile west of site
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, Route 1, Kewaunee
K-19	I	1.75 NNE	Wayne Paral Farm, Route 1, Kewaunee
K-20	I	2.5 N	Carl Struck Farm, Route 1, Kewaunee
K-23	I	0.5 W	0.5 miles west of plant, Kewaunee site
K-24	C	5.45 N	Fectum Farm, Route 1, Kewaunee
K-25	C	2.75 WSW	Wotachek Farm, Route 1, 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, 0.5 miles west of K-11
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	C	6.25 NNW	E. Krok Substation

^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-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	AP	AI		TLD		
K-16	AP	AI		TLD		
K-17				TLD		VE
K-19			MI ^c	GR ^a , CF ^d	SO	
K-20						DM
K-23						GRN
K-24				EG		DM
K-25						DM
K-26						VE
K-27				TLD, EG ^e		DM
K-28			MI ^c			
K-29						DM
K-30				TLD		
K-31				TLD		

^a Three times a year, second (April, May, June), third (July, August, September), and fourth (October, November, December) 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.

^e First (January, February, March), second (April, May, June), third (July, August, September) quarters 1996 only.

Table 3. Sample codes used in Table 2.

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

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5.0 GRAPHS OF DATA TRENDS

GROSS BETA

—●— 1996 K-1f

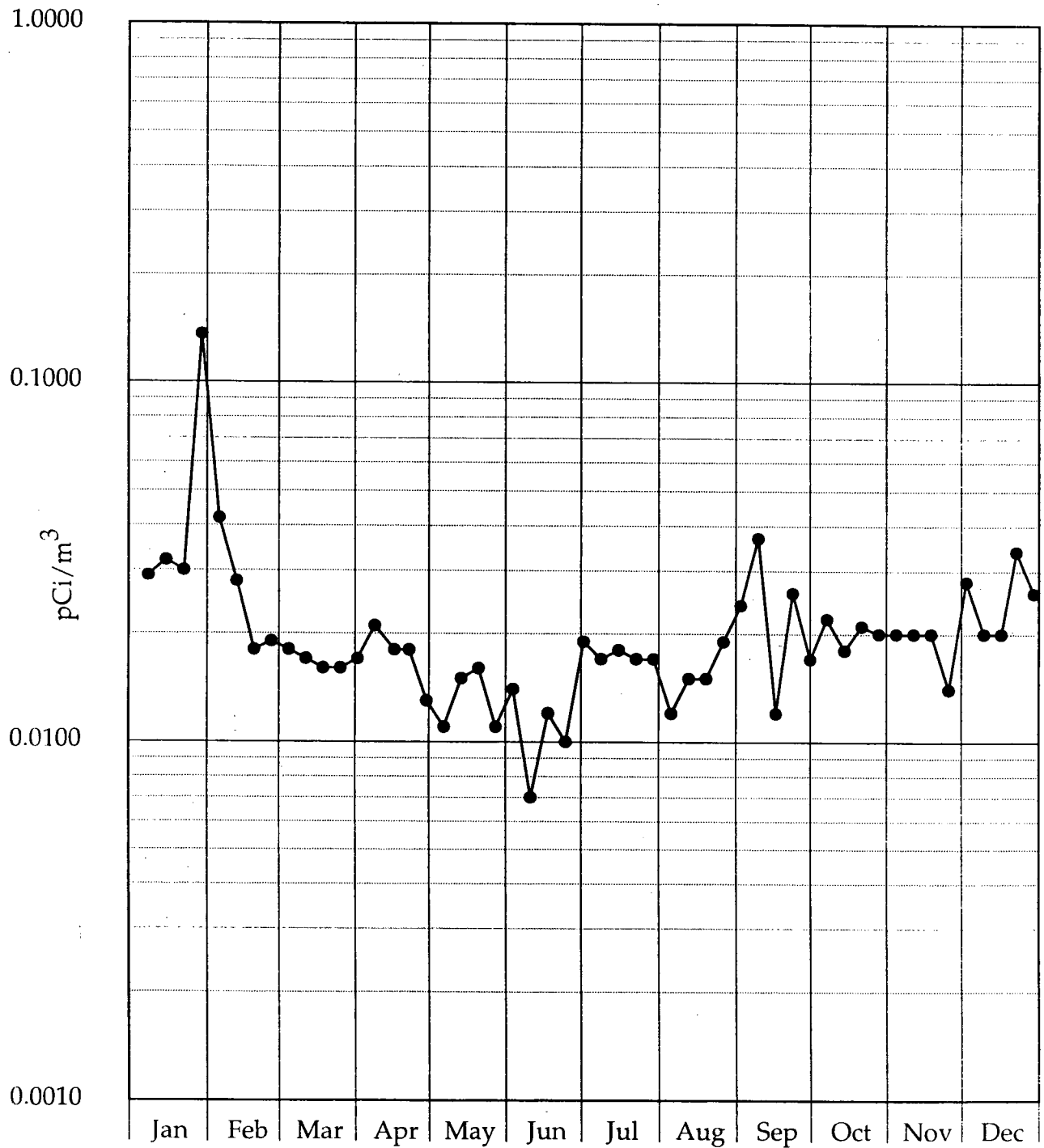


Figure 2. Airborne particulates. Location K-1f (weekly averages). A dashed line indicates missing data.

GROSS BETA

● 1996 K-2

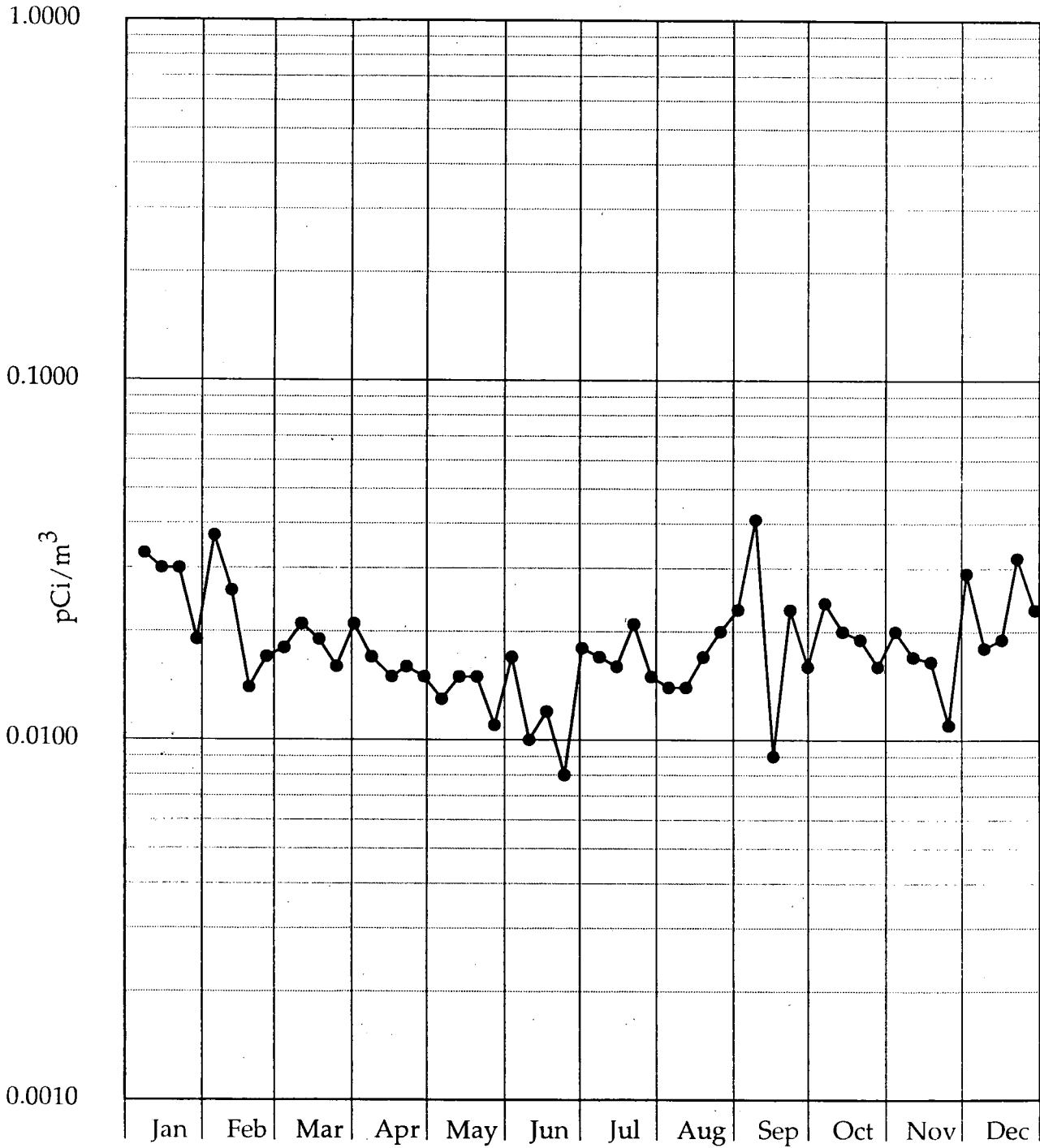


Figure 3. Airborne particulates. Location K-2 (weekly Averages). A dashed line indicates missing data.

KEWAUNEE

GROSS BETA

—●— 1996 K-7

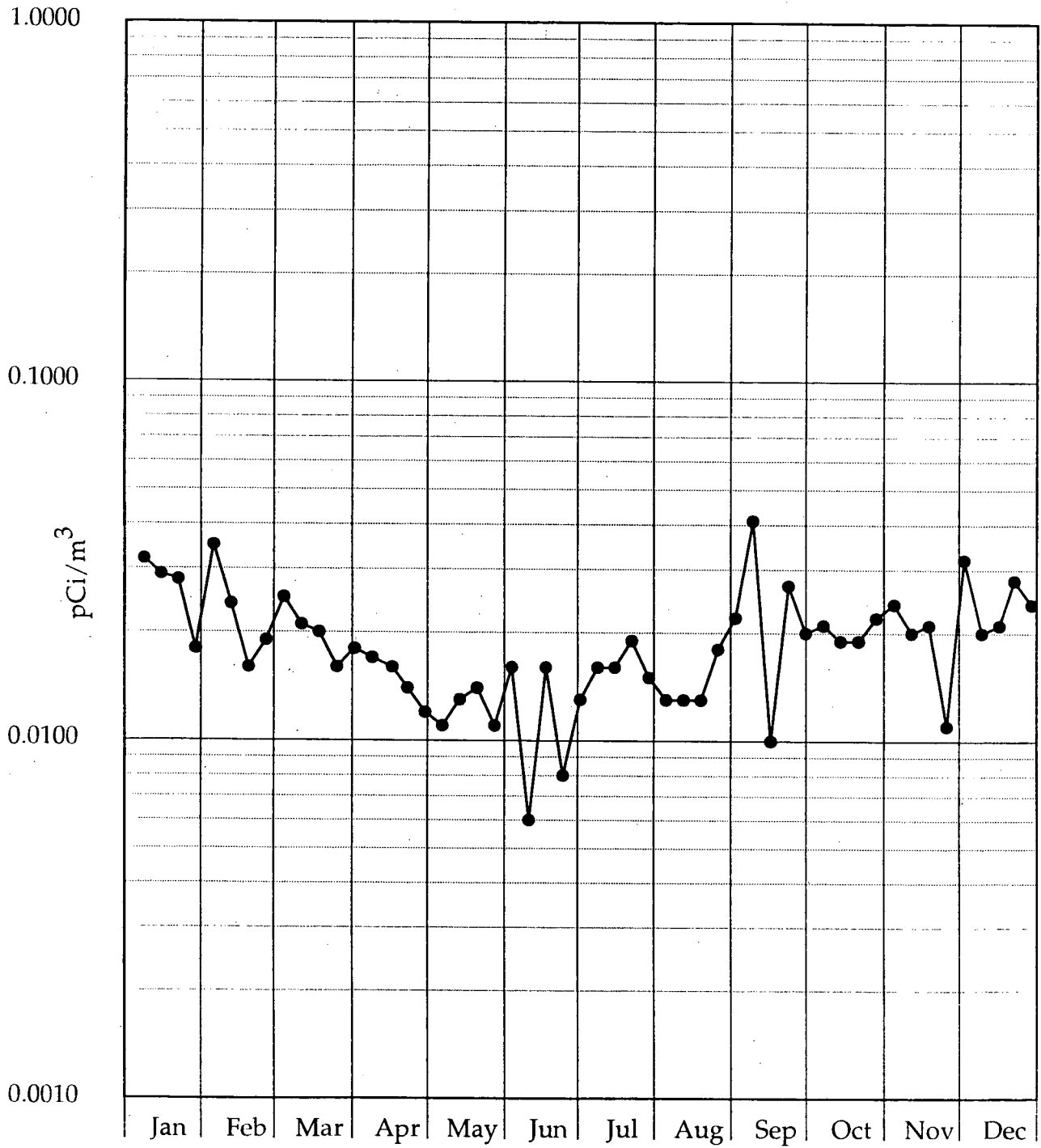


Figure 4. Airborne particulates. Location K-7 (weekly averages). A dashed line indicates missing data.

KEWAUNEE

GROSS BETA

—●— 1996 K-8

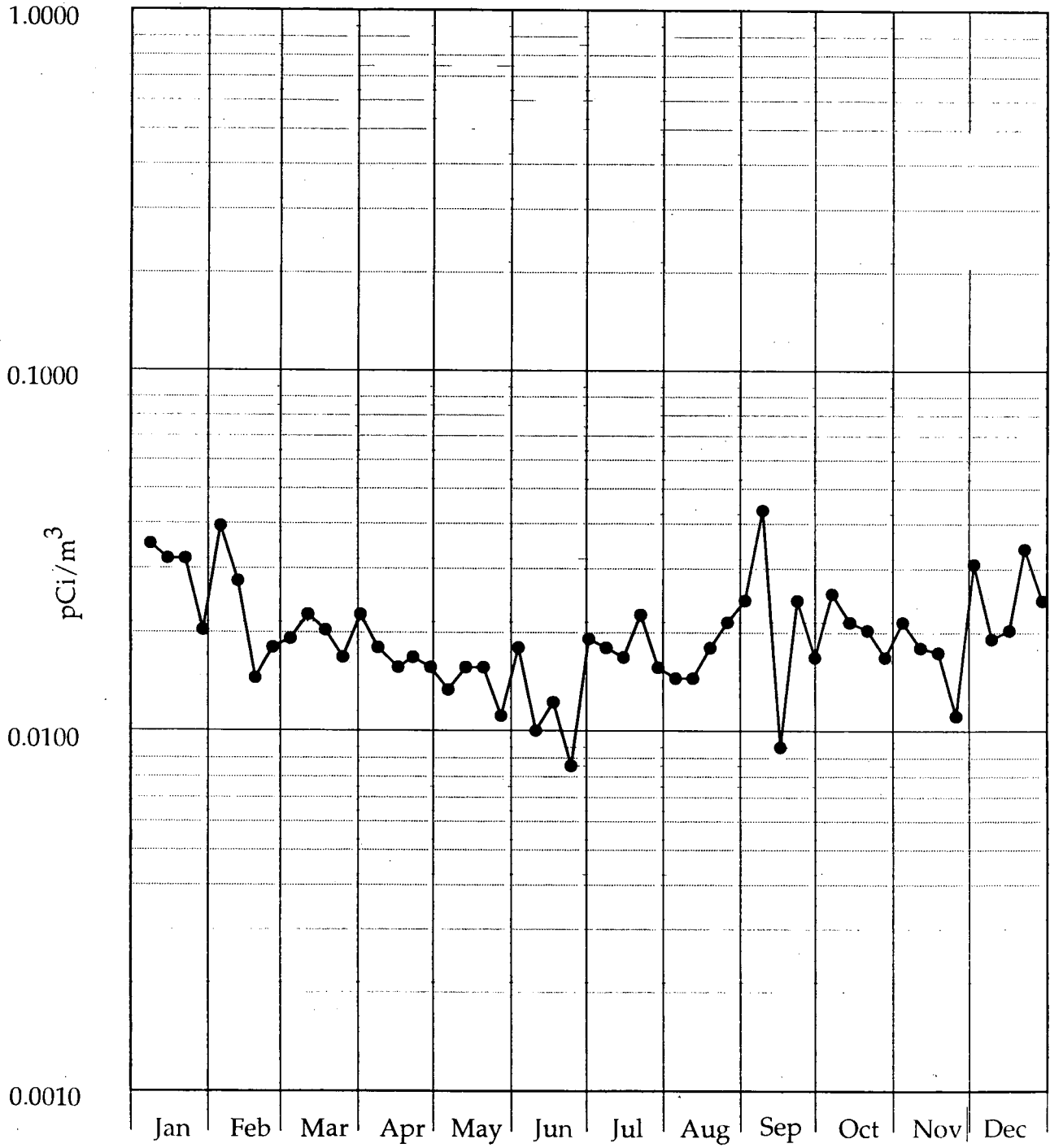


Figure 5. Airborne particulates. Location K-8 (weekly averages). A dashed line indicates missing data.

KEWAUNEE

GROSS BETA

—●— 1996 K-15

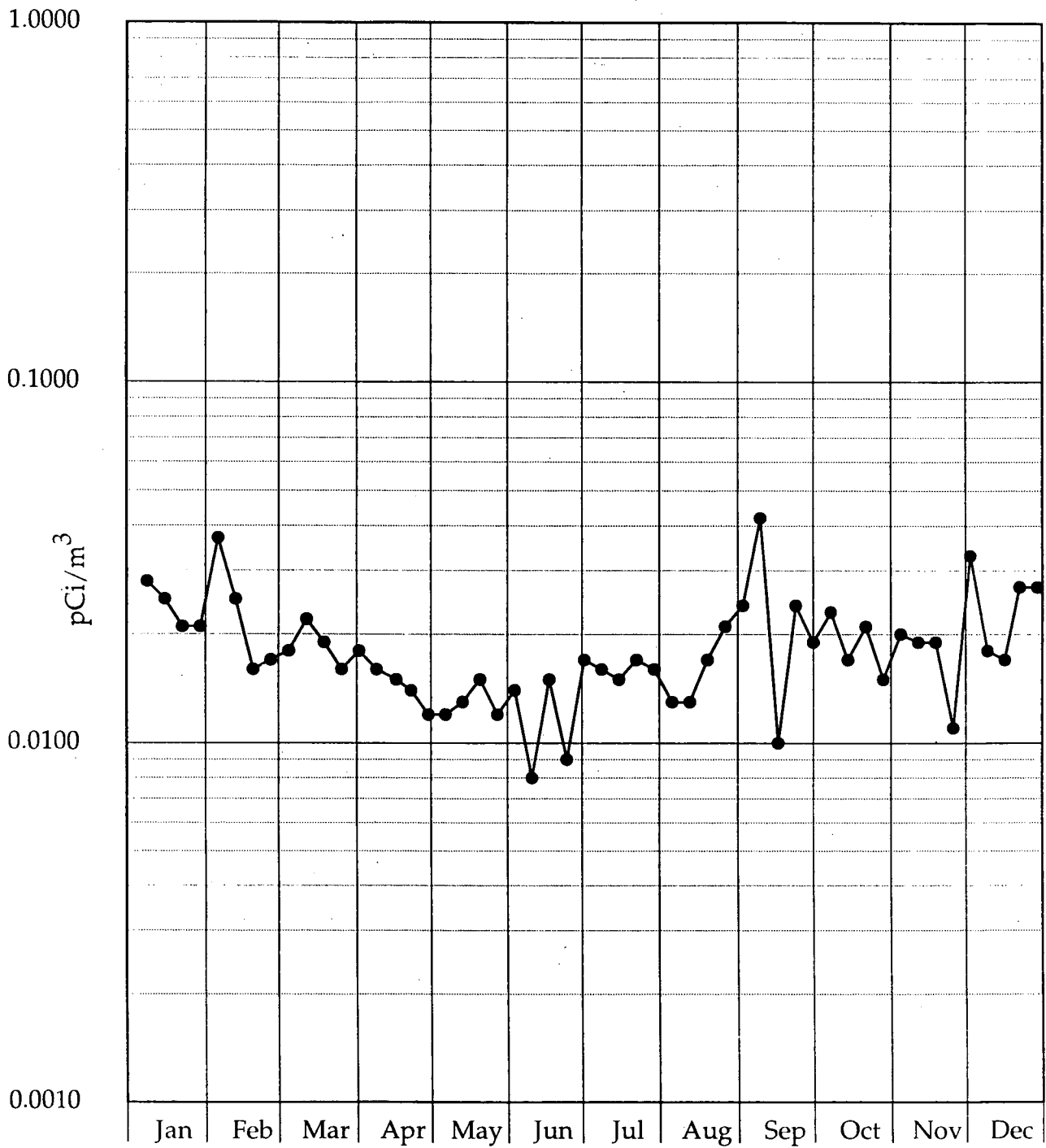


Figure 6. Airborne particulates. Location K-15 (weekly averages). A dashed line indicates missing data.

GROSS BETA

● 1992-1996 K-1f

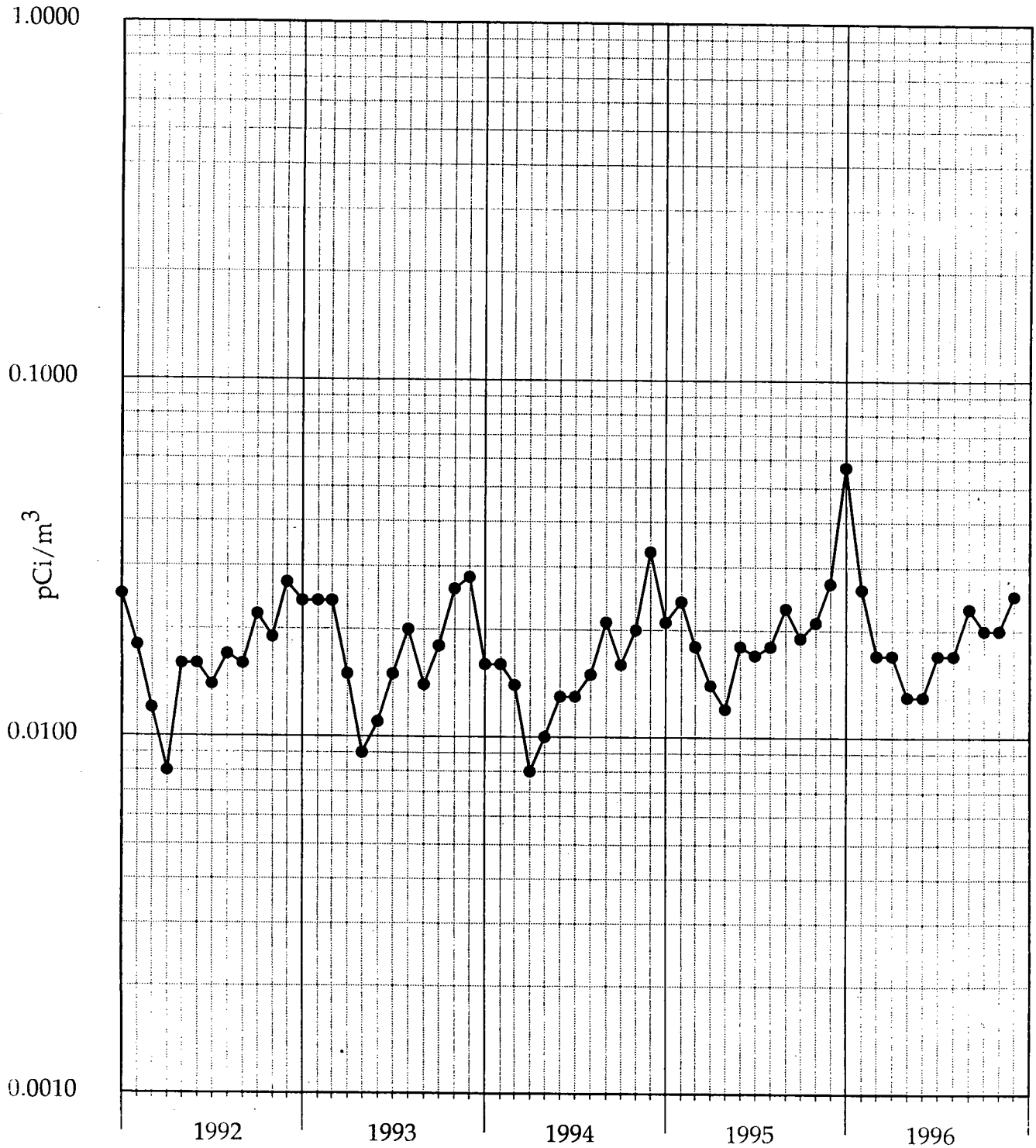


Figure 8. Monthly averages of airborne particulates collected weekly at location K-1f. A dashed line indicates missing data.

GROSS BETA

—●— 1992-1996 K-2

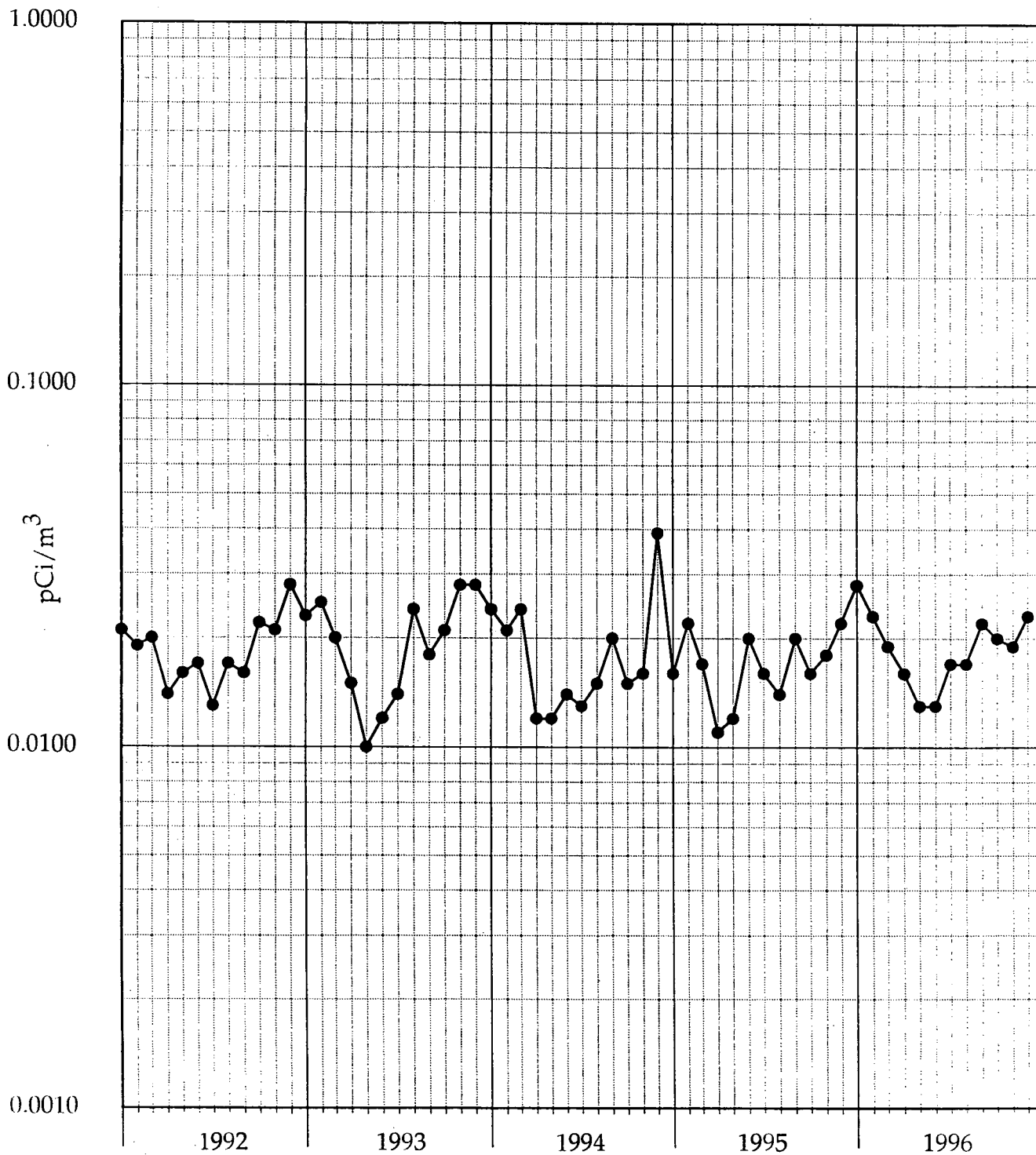


Figure 9. Monthly averages of airborne particulates collected weekly at location K-2. A dashed line indicates missing data.

GROSS BETA

● 1992-1996 K-7

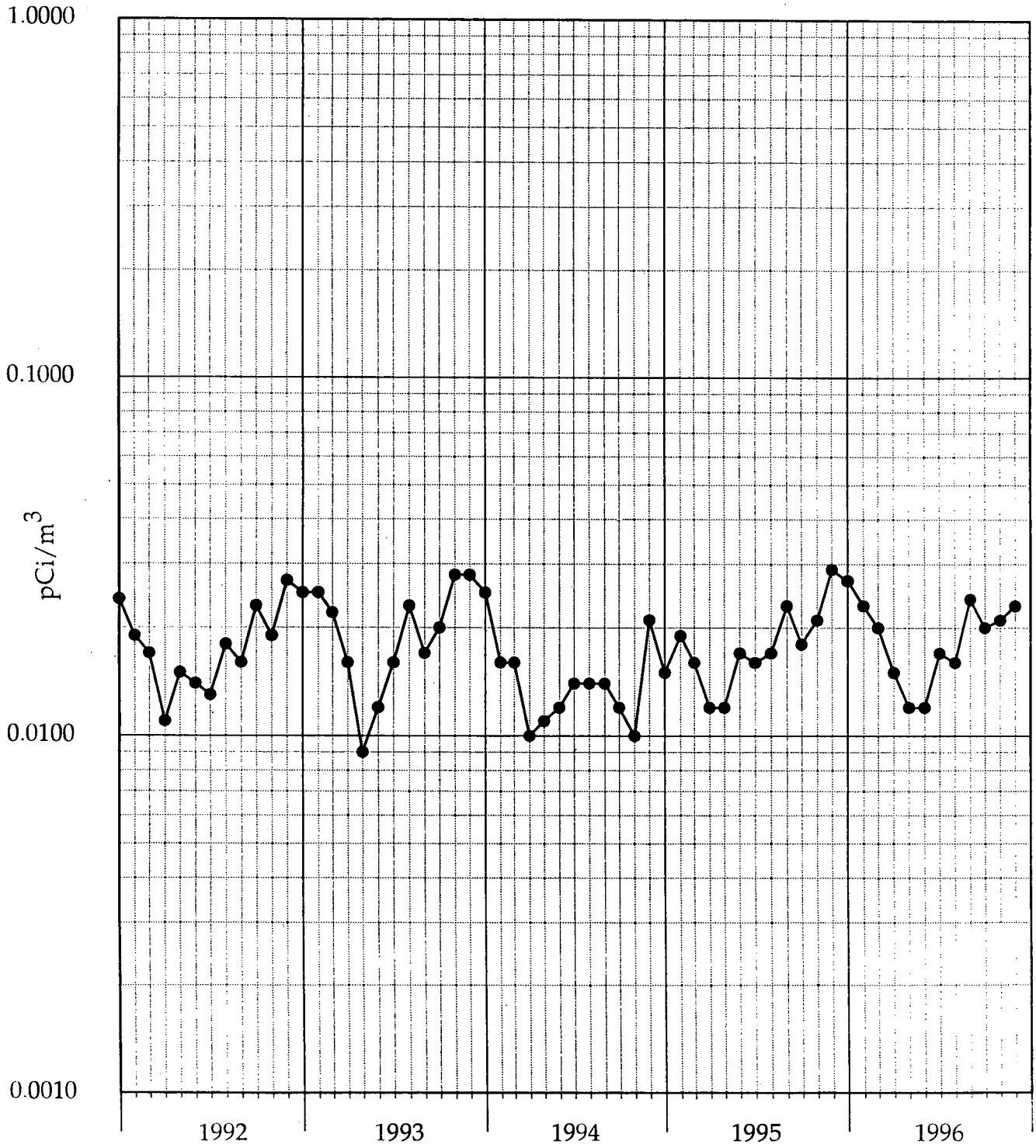


Figure 10. Monthly averages of airborne particulates collected weekly at location K-7. A dashed line indicates missing data.

GROSS BETA

—●— 1992-1996 K-8

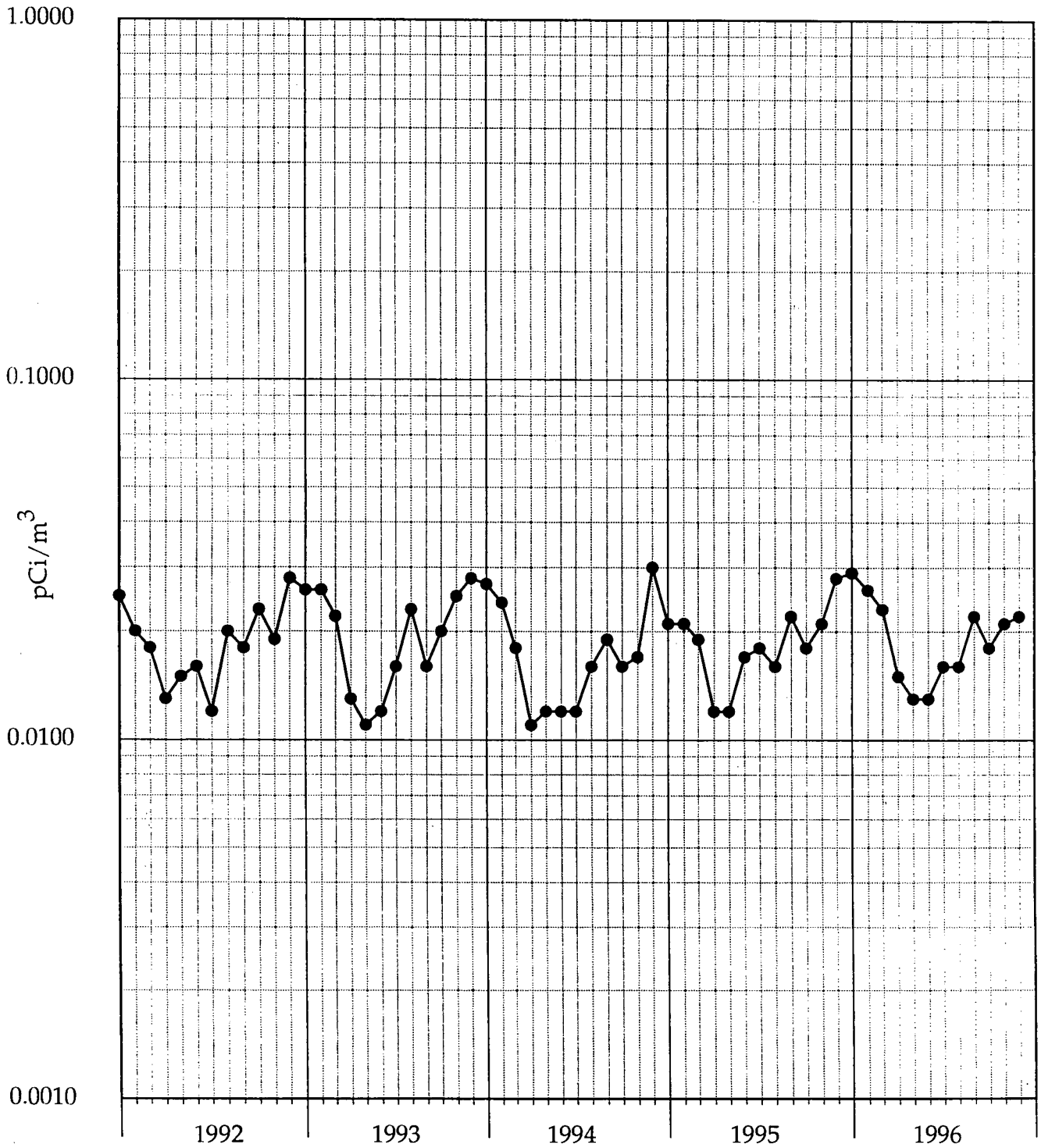


Figure 11. Monthly averages of airborne particulates collected weekly at location K-8. A dashed line indicates missing data.

GROSS BETA

● 1992-1996 K-15

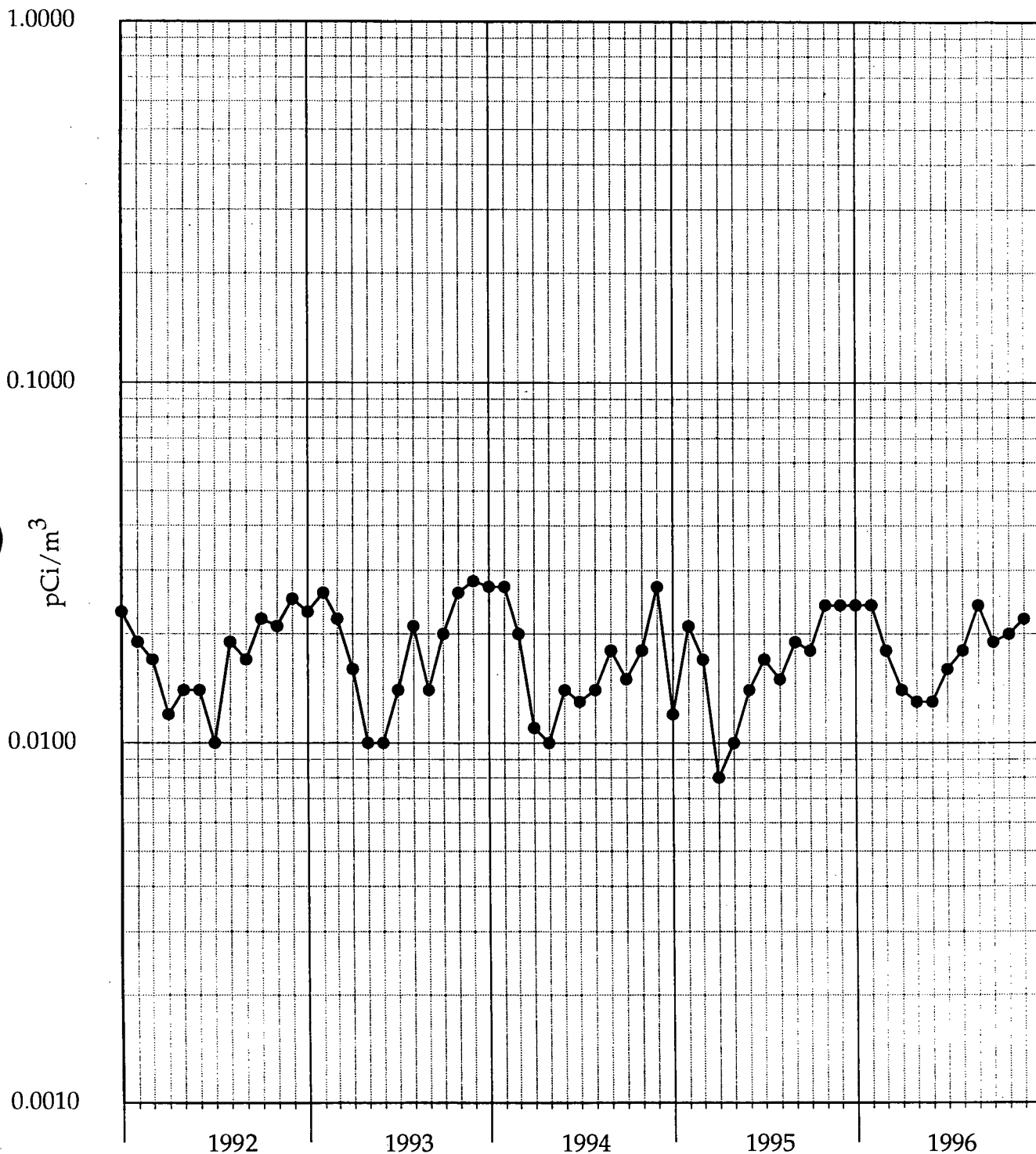


Figure 12. Monthly averages of airborne particulates collected weekly at location K-15. A dashed line indicates missing data.

GROSS BETA

—●— 1992-1996 K-16

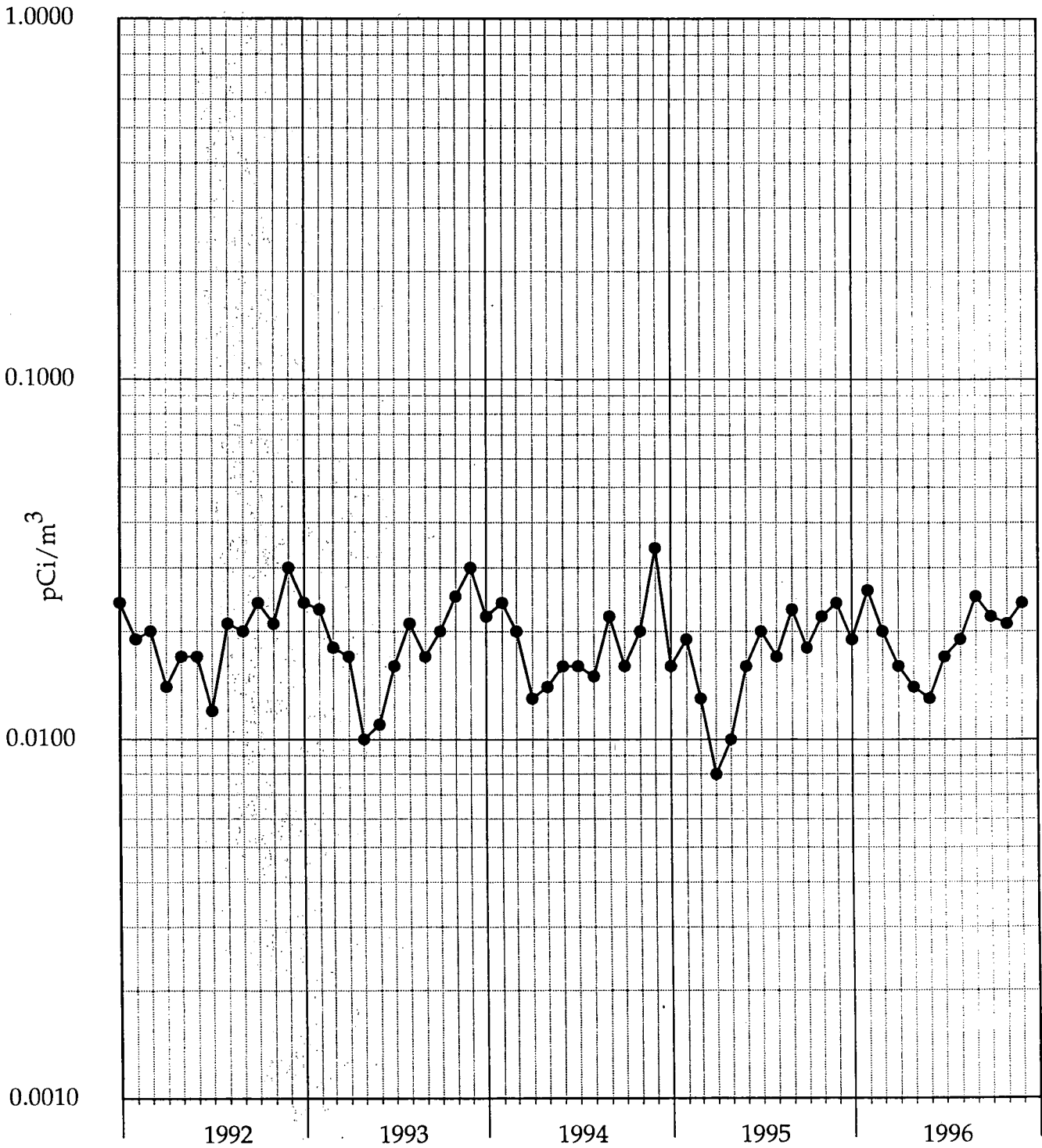


Figure 13. Monthly averages of airborne particulates collected weekly at location K-16. A dashed line indicates missing data.

KEWAUNEE

GROSS ALPHA

—●— 1992-1996 K-1g

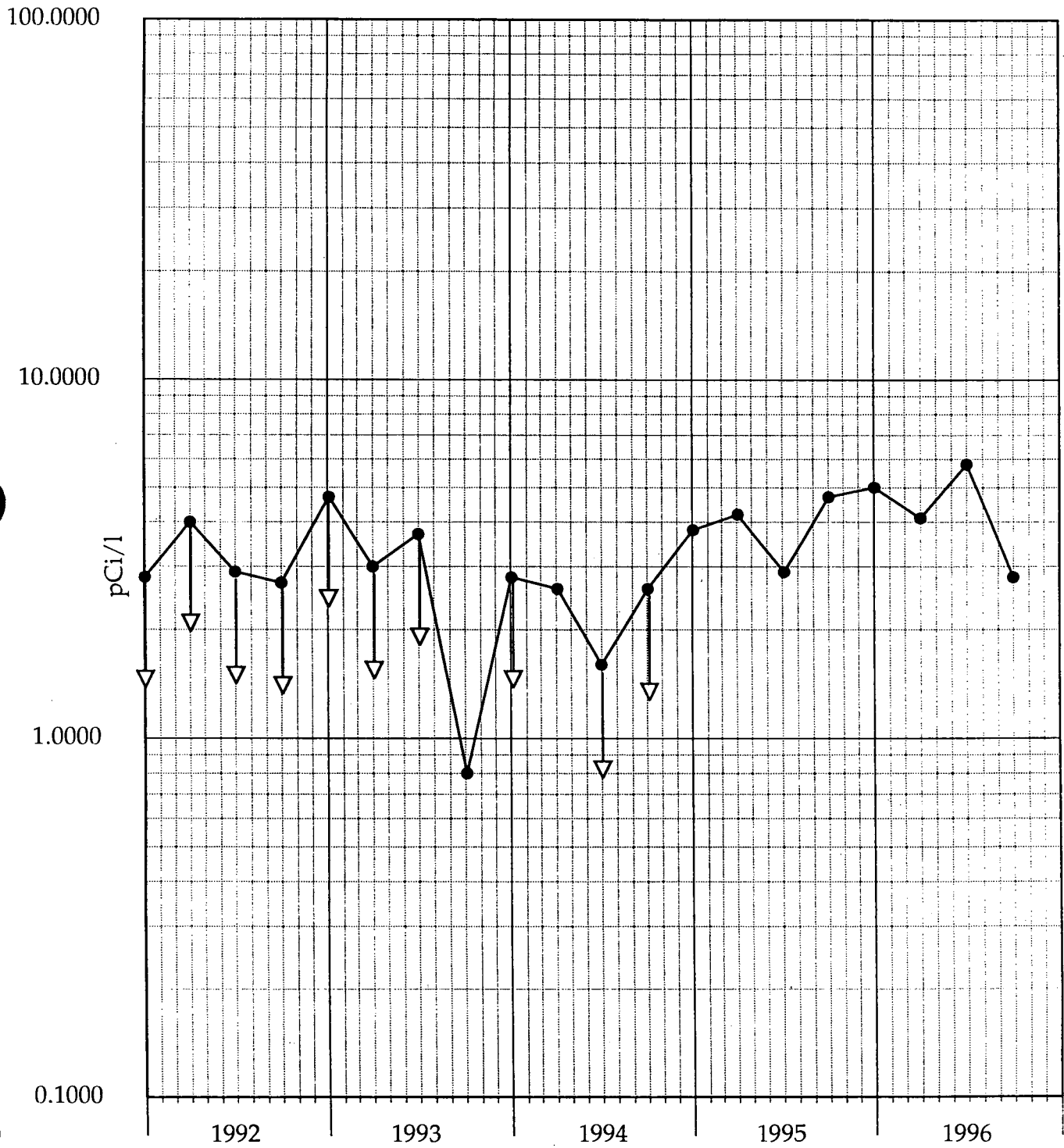


Figure 14. Well water samples. Location K-1g. (Total residue)

GROSS ALPHA

● 1992-1996 K-1h

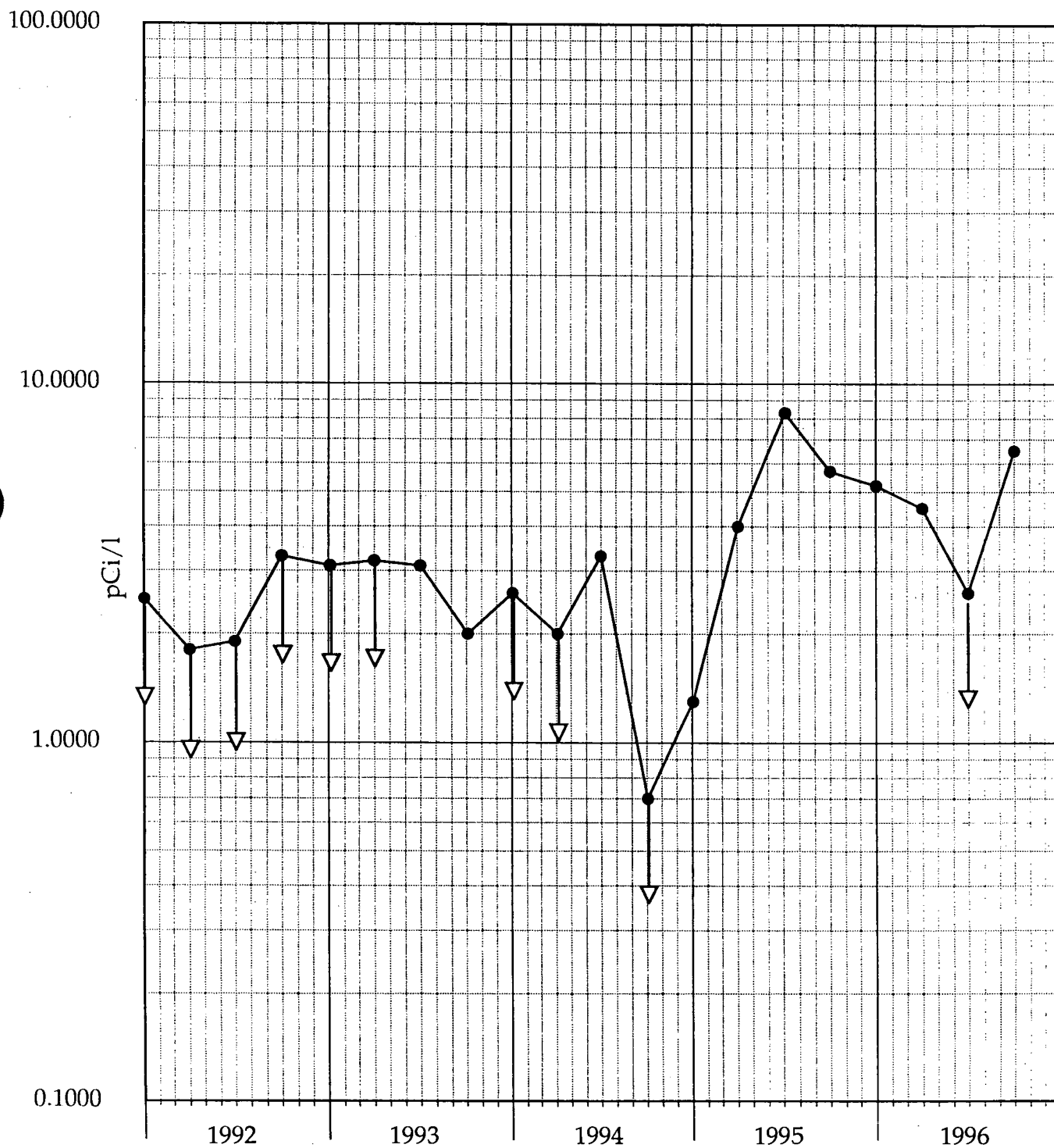


Figure 15. Well water samples. Location K-1h. (Total residue)

KEWAUNEE

GROSS BETA

—●— 1992-1996 K-1g

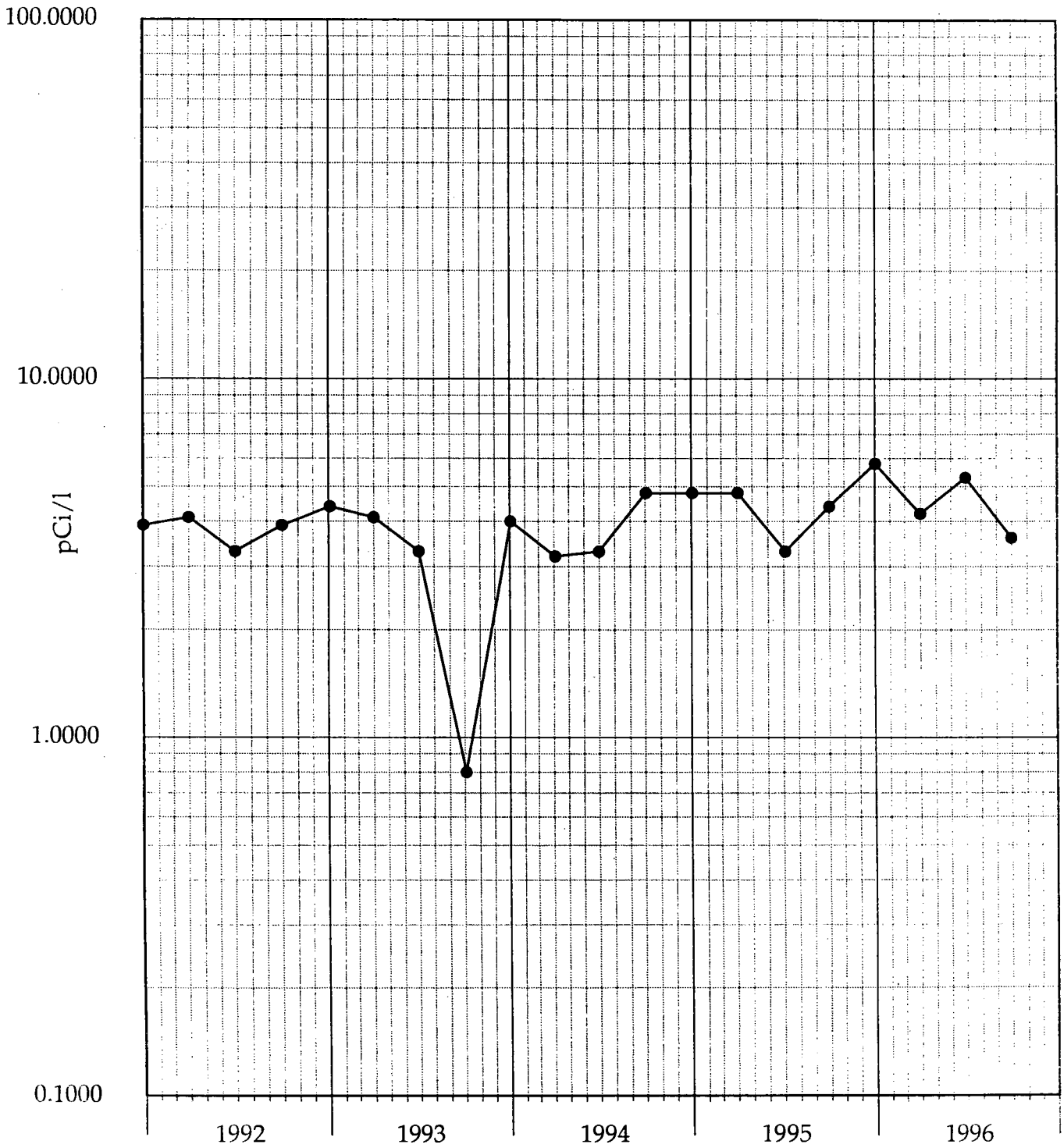


Figure 16. Well water samples. Location K-1g. (Total residue).

GROSS BETA

—●— 1992-1996 K-1h

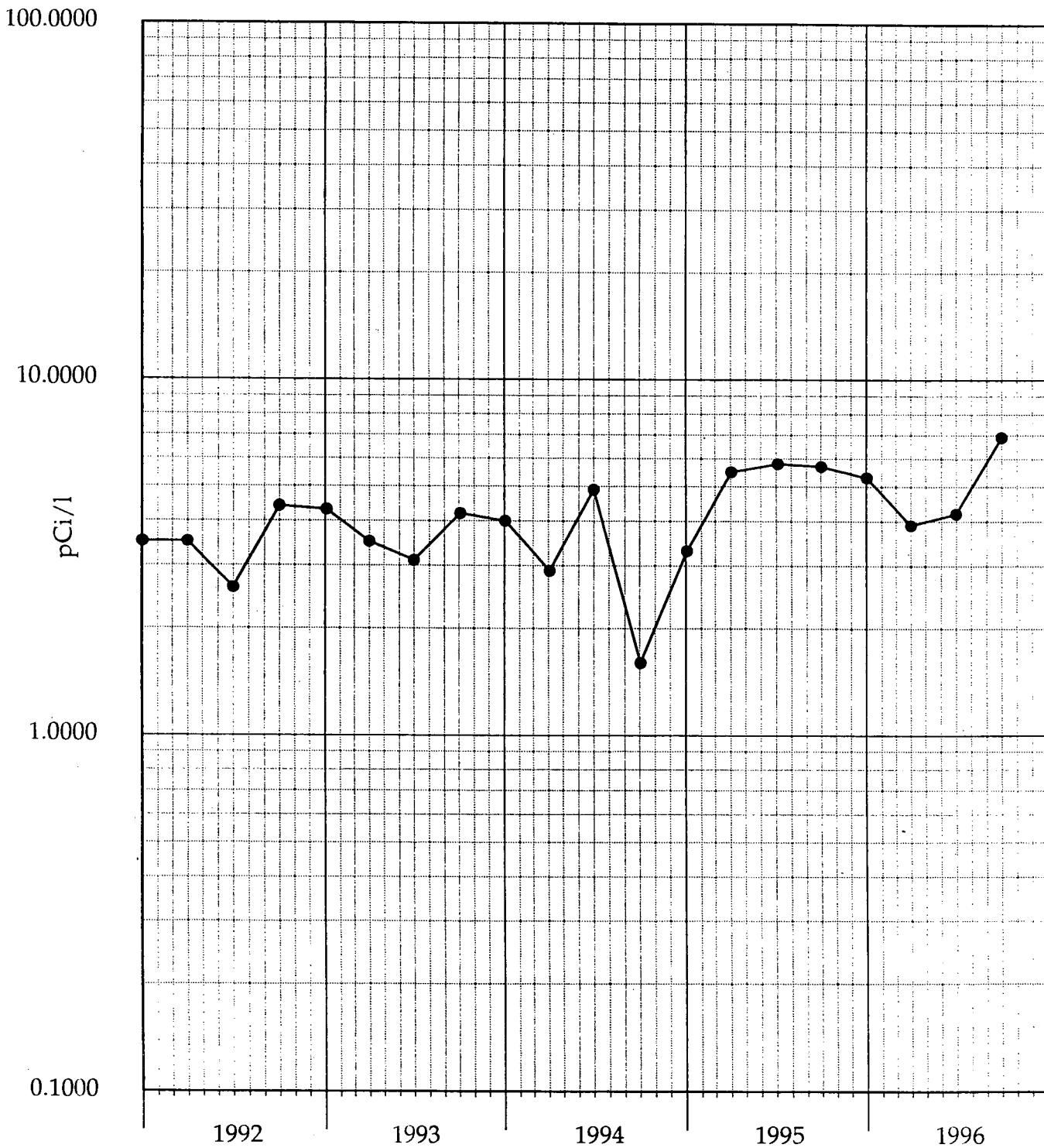


Figure 17. Well water samples. Location K-1h. (Total residue)

KEWAUNEE

GROSS BETA

—●— 1992-1996 K-10

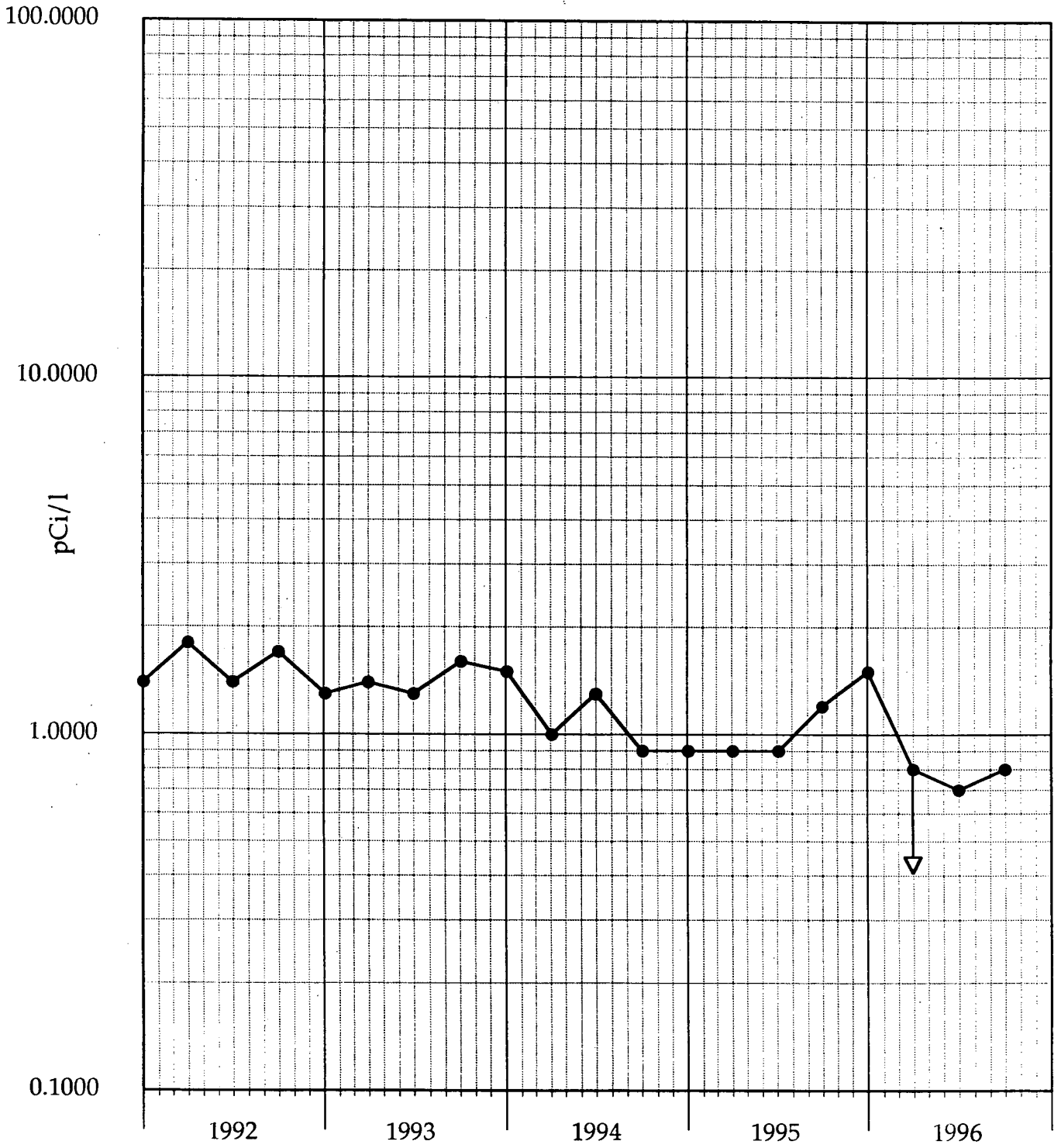


Figure 18. Well water samples. Location K-10. (Total residue)

KEWAUNEE

GROSS BETA

—●— 1992-1996 K-11

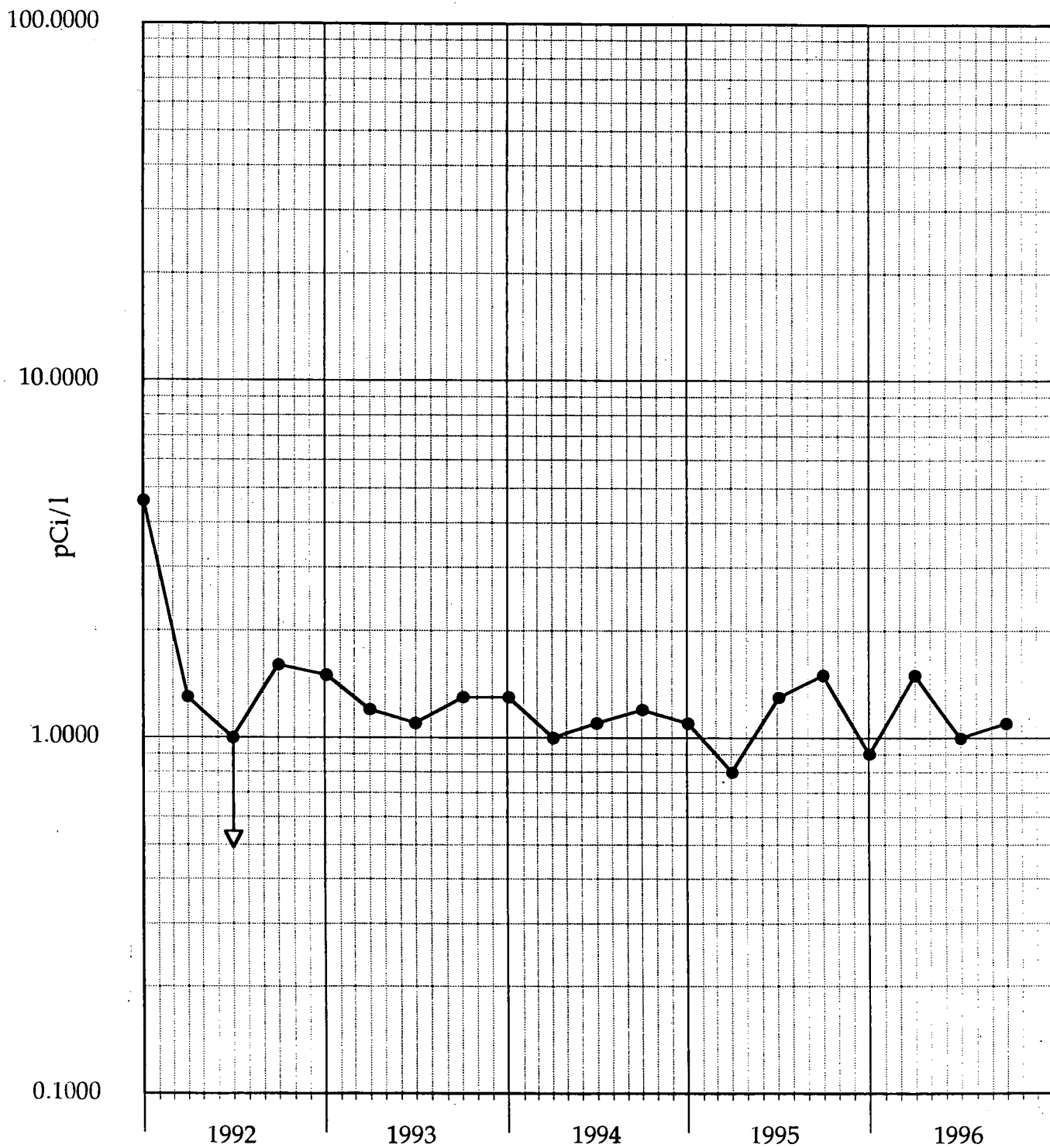


Figure 19. Well water samples. Location K-11. (Total residue)

KEWAUNEE

GROSS BETA

—●— 1992-1996 K-12

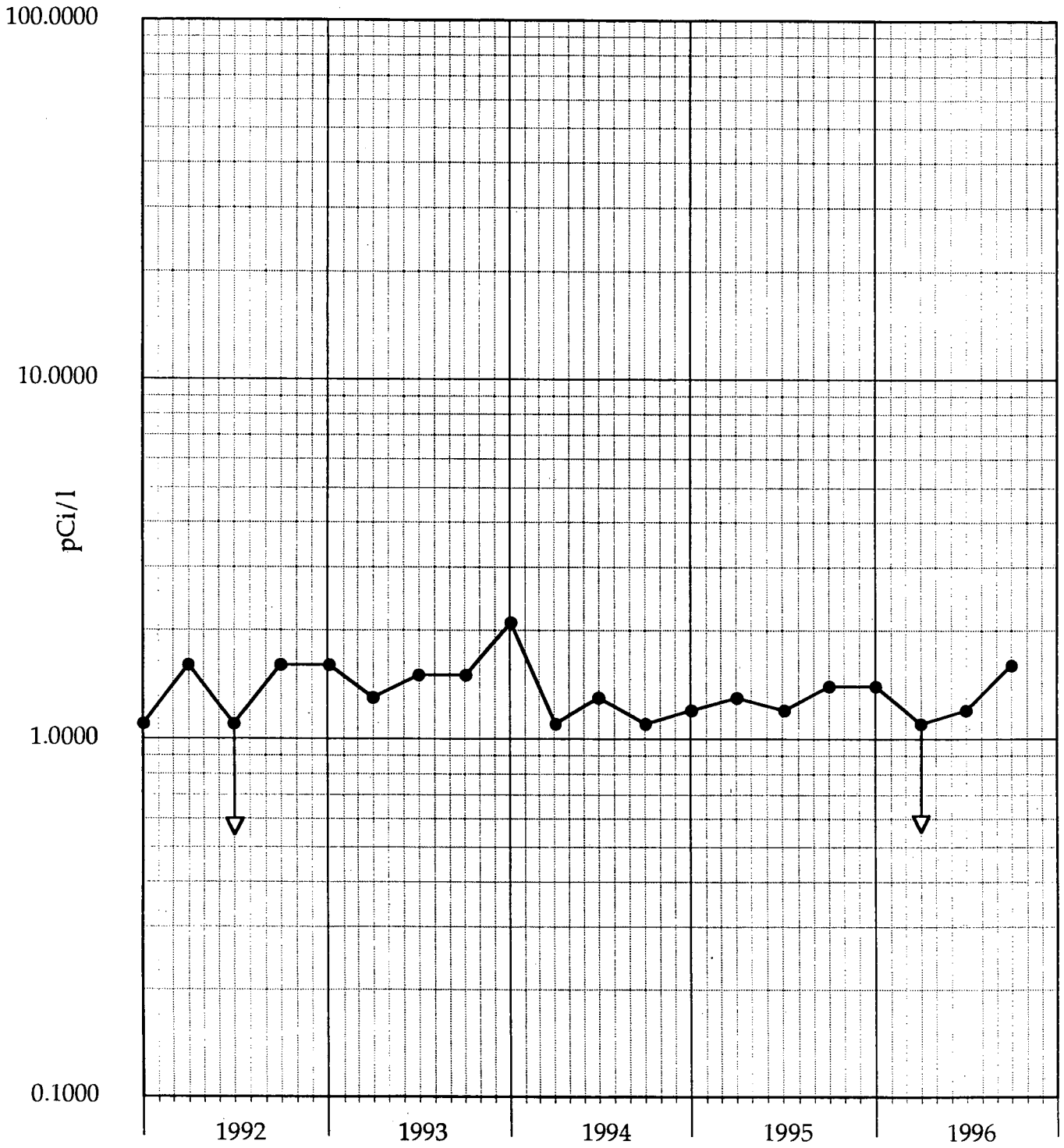


Figure 20. Well water samples. Location K-12. (Total residue)

KEWAUNEE

GROSS BETA

● 1992-1996 K-13

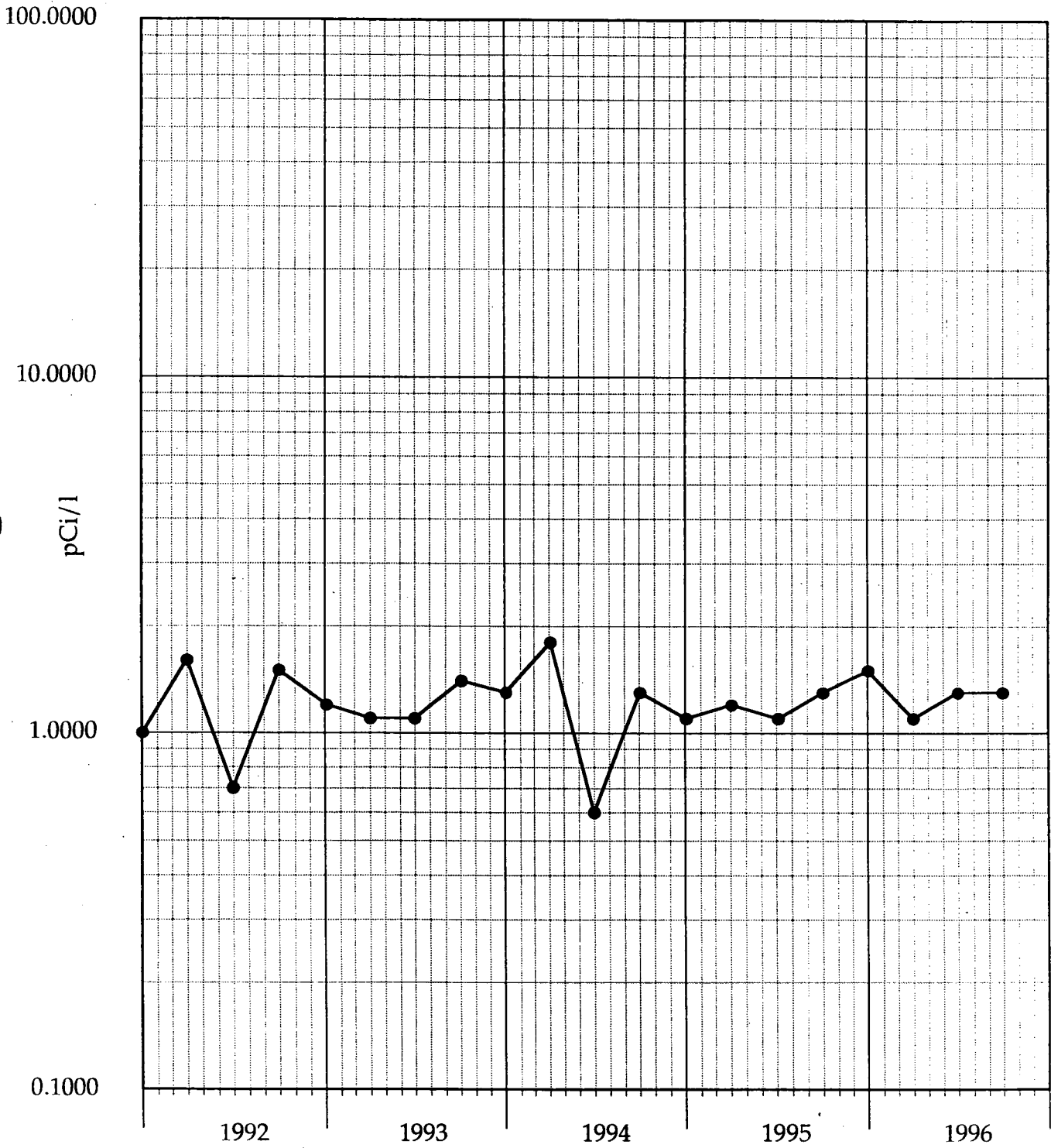


Figure 21. Well water samples. Location K-13. (Total residue)

STRONTIUM-90

—●— 1992-1996 K-3

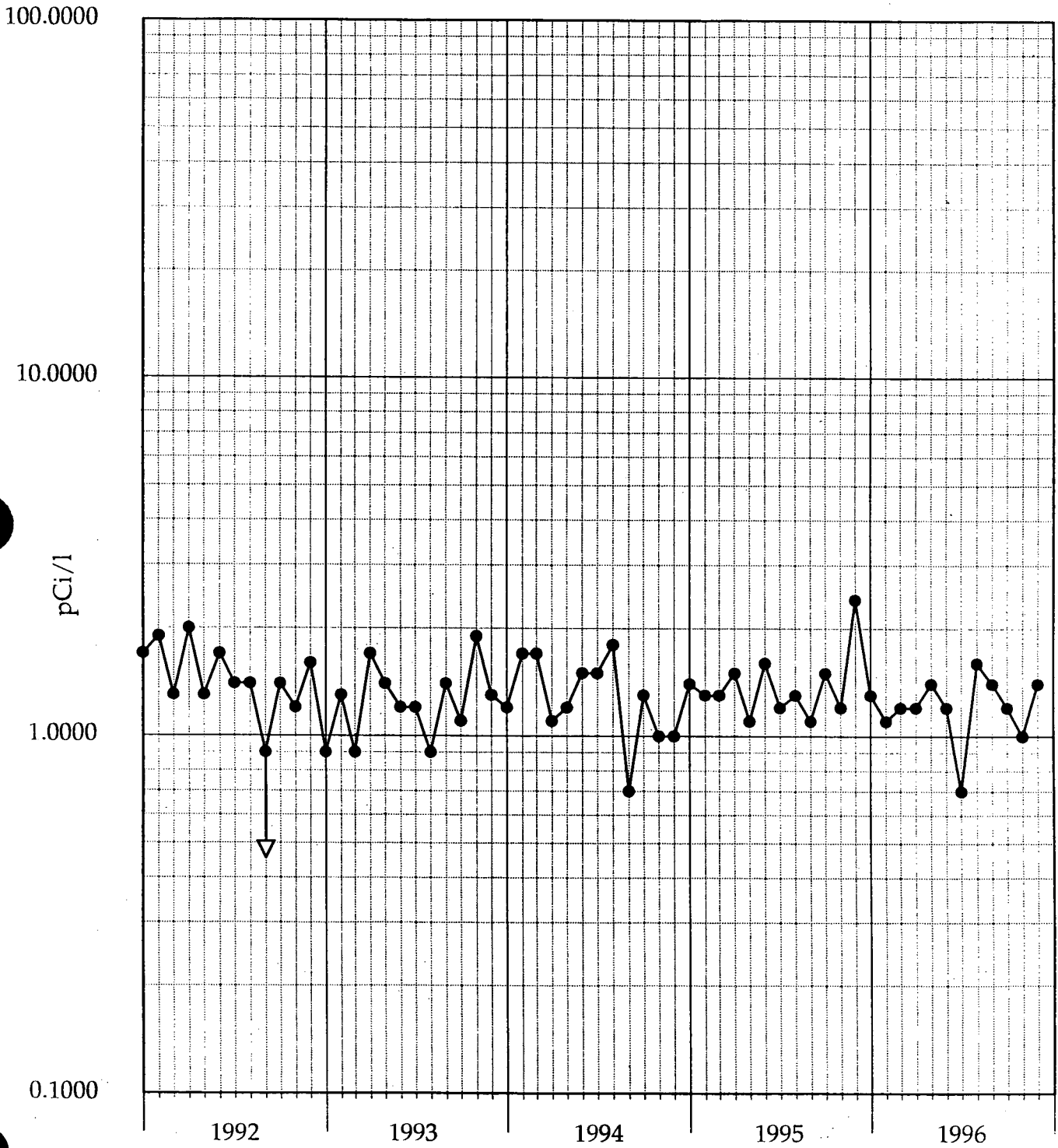


Figure 22. Milk samples. (Location K-3)

KEWAUNEE

STRONTIUM-90

—●— 1992-1996 K-4

100.0000

10.0000

pCi/l

1.0000

0.1000

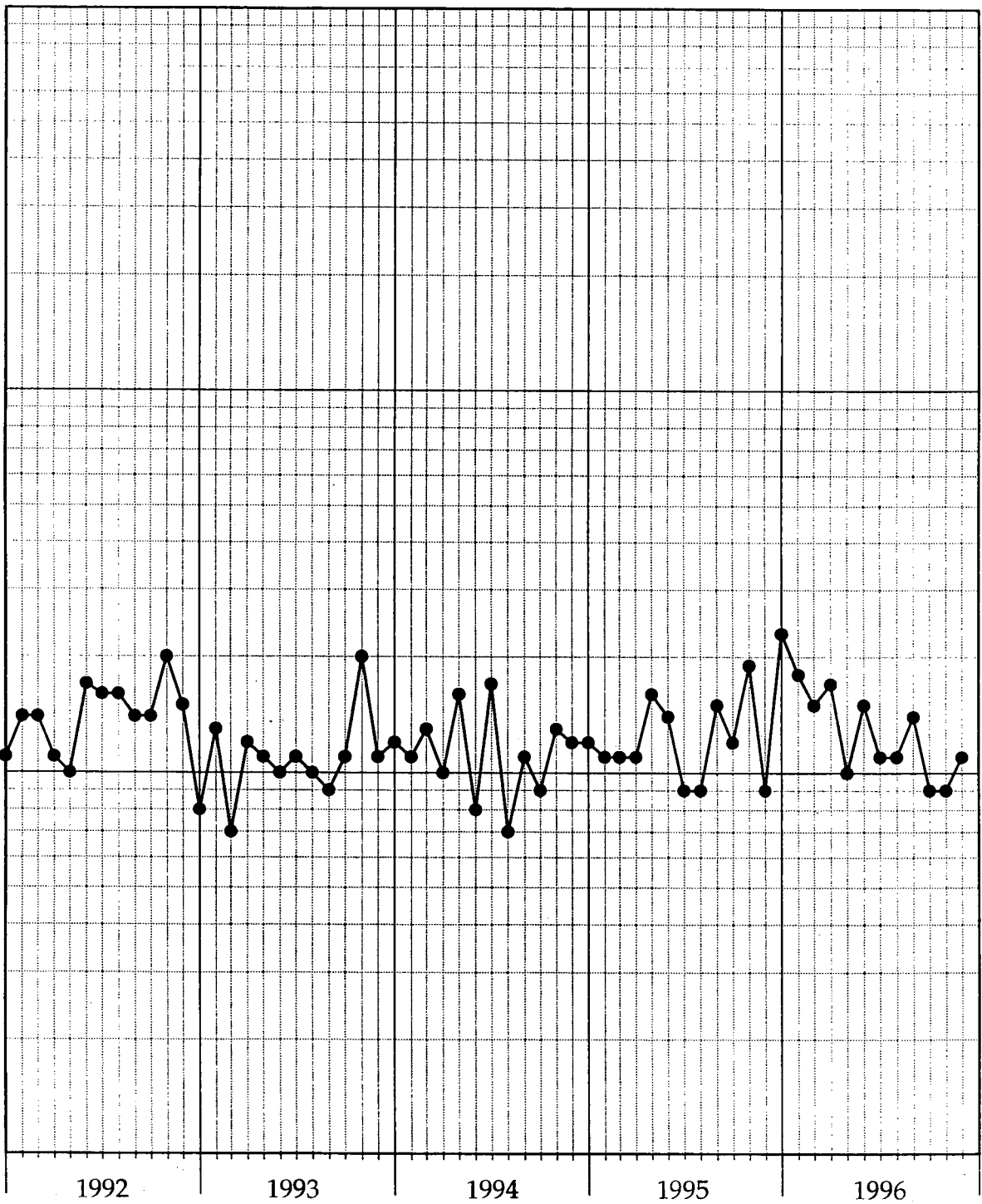


Figure 23. Milk samples. (Location K-4)

STRONTIUM-90

—●— 1992-1996 K-5

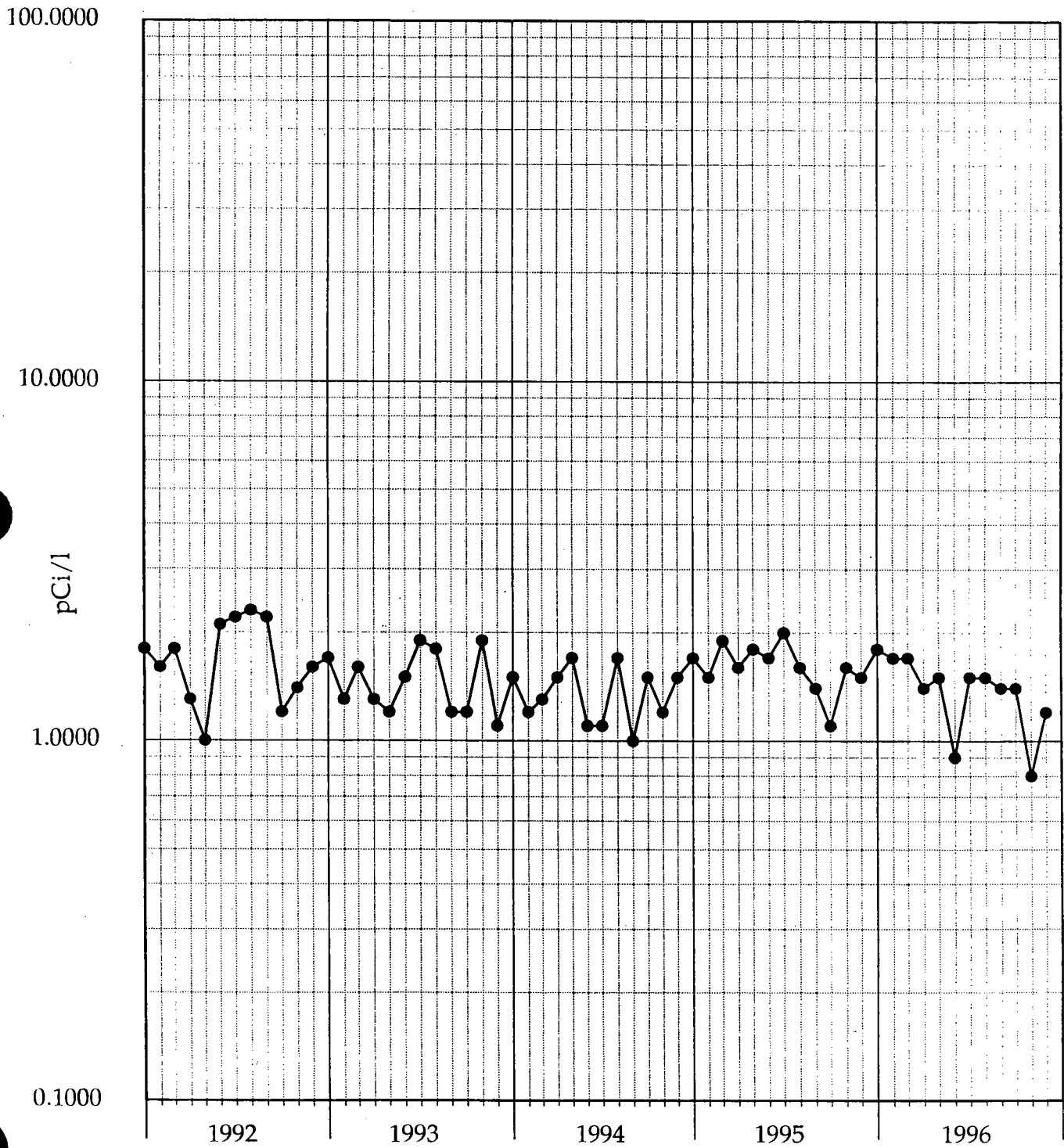


Figure 24. Milk samples. (Location K-5)

KEWAUNEE

STRONTIUM-90

—●— 1992-1996 K-6

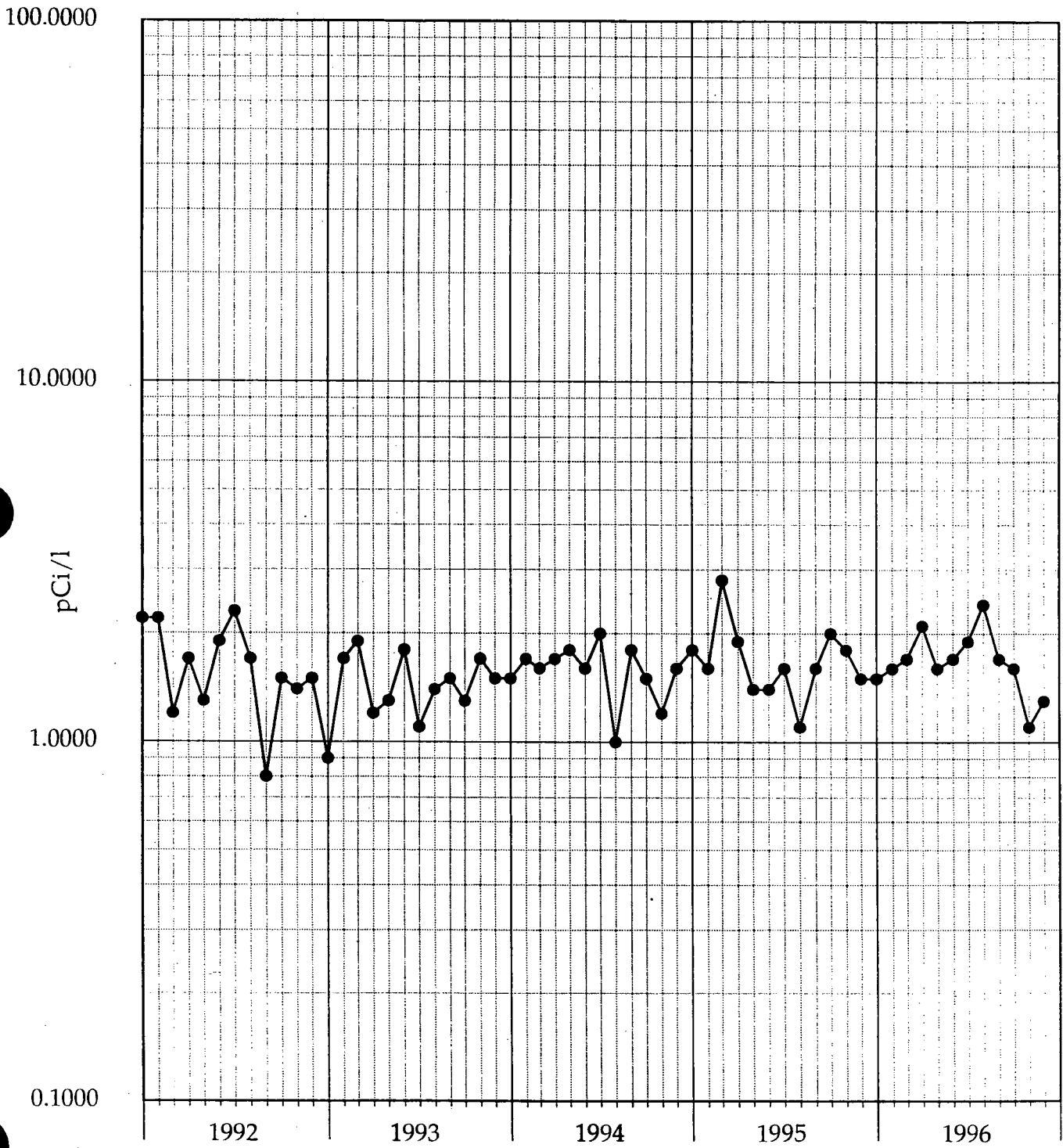


Figure 25. Milk samples. (Location K-6)

KEWAUNEE

STRONTIUM-90

—●— 1992-1996 K-12

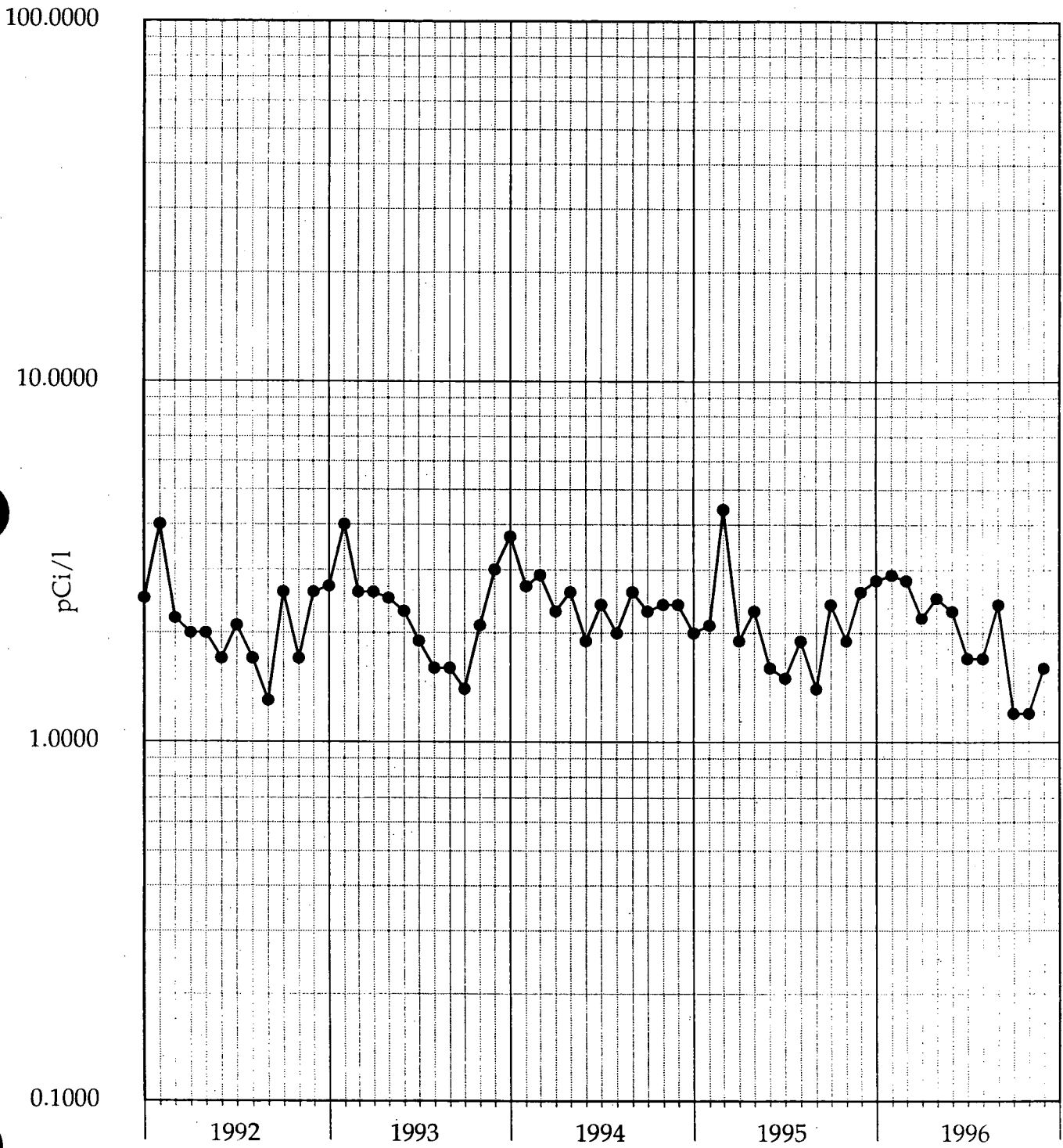


Figure 26. Milk samples. (Location K-12)

KEWAUNEE

STRONTIUM-90

—●— 1992-1996 K-19

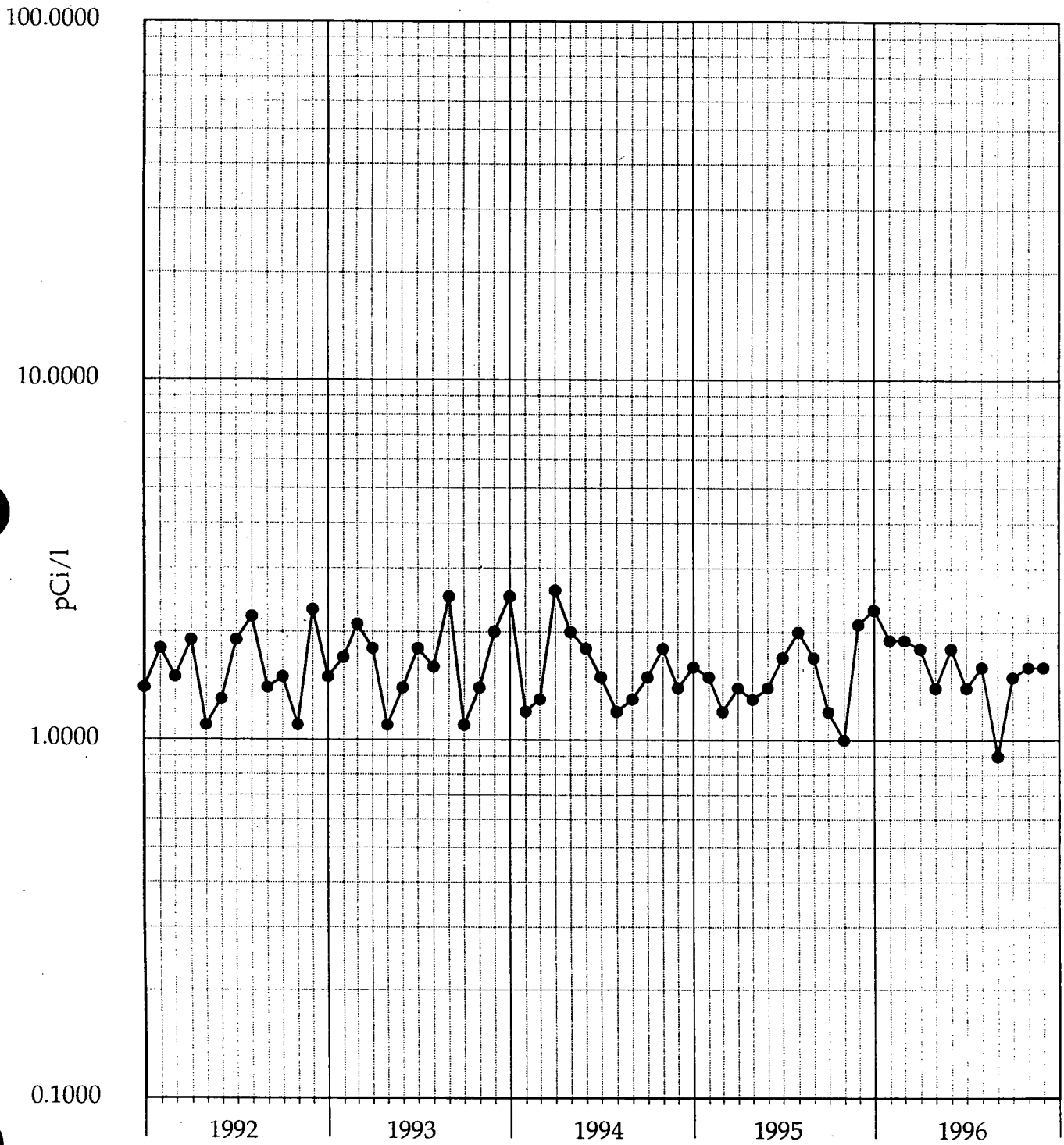


Figure 27. Milk samples. (Location K-19)

STRONTIUM-90

● 1992-1996 K-28

100.0000

10.0000

pCi/l

1.0000

0.1000

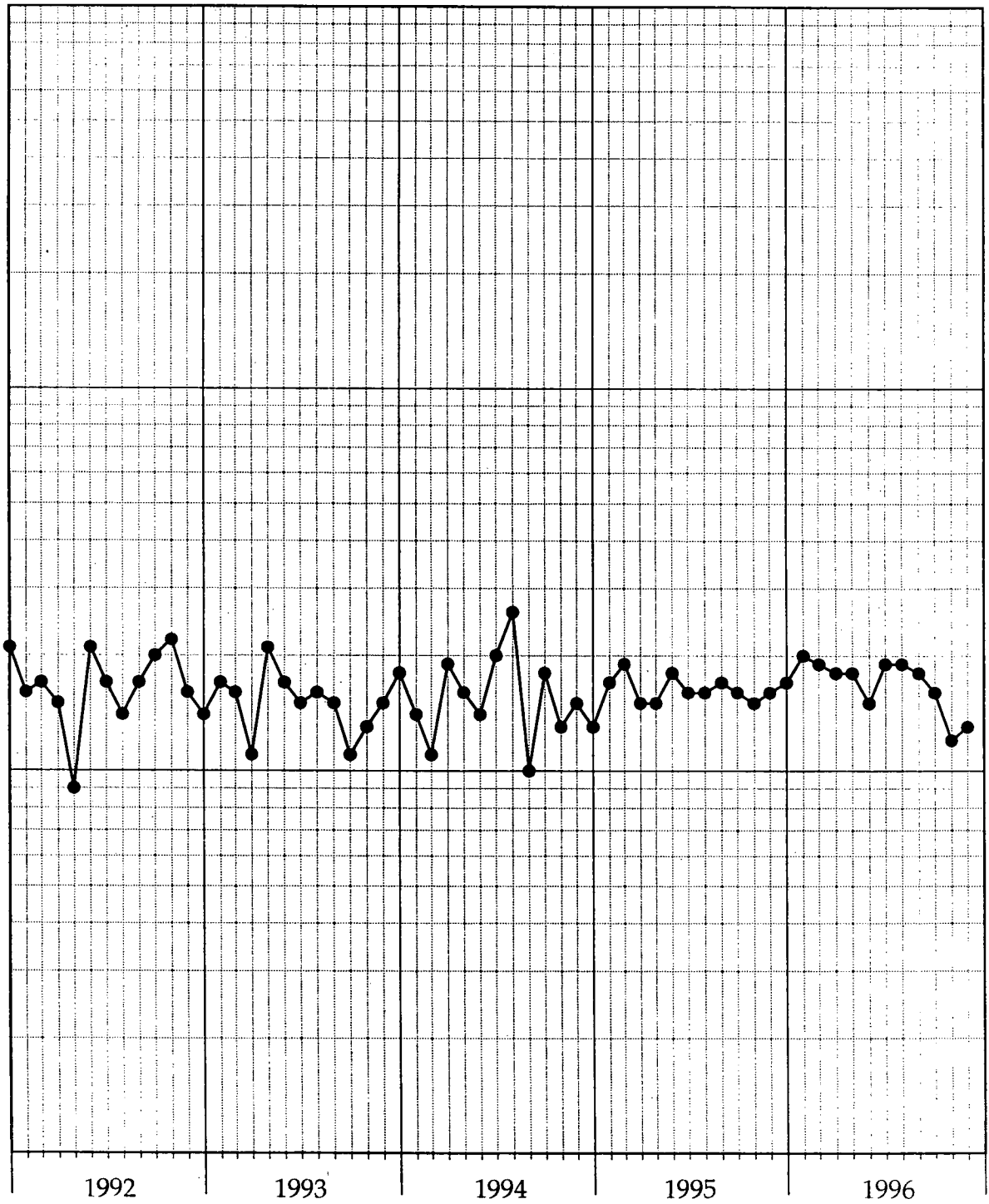


Figure 28. Milk samples. (Location K-28)

GROSS BETA

- 1992-1996 K-1a DS
- 1992-1996 K-1a SS

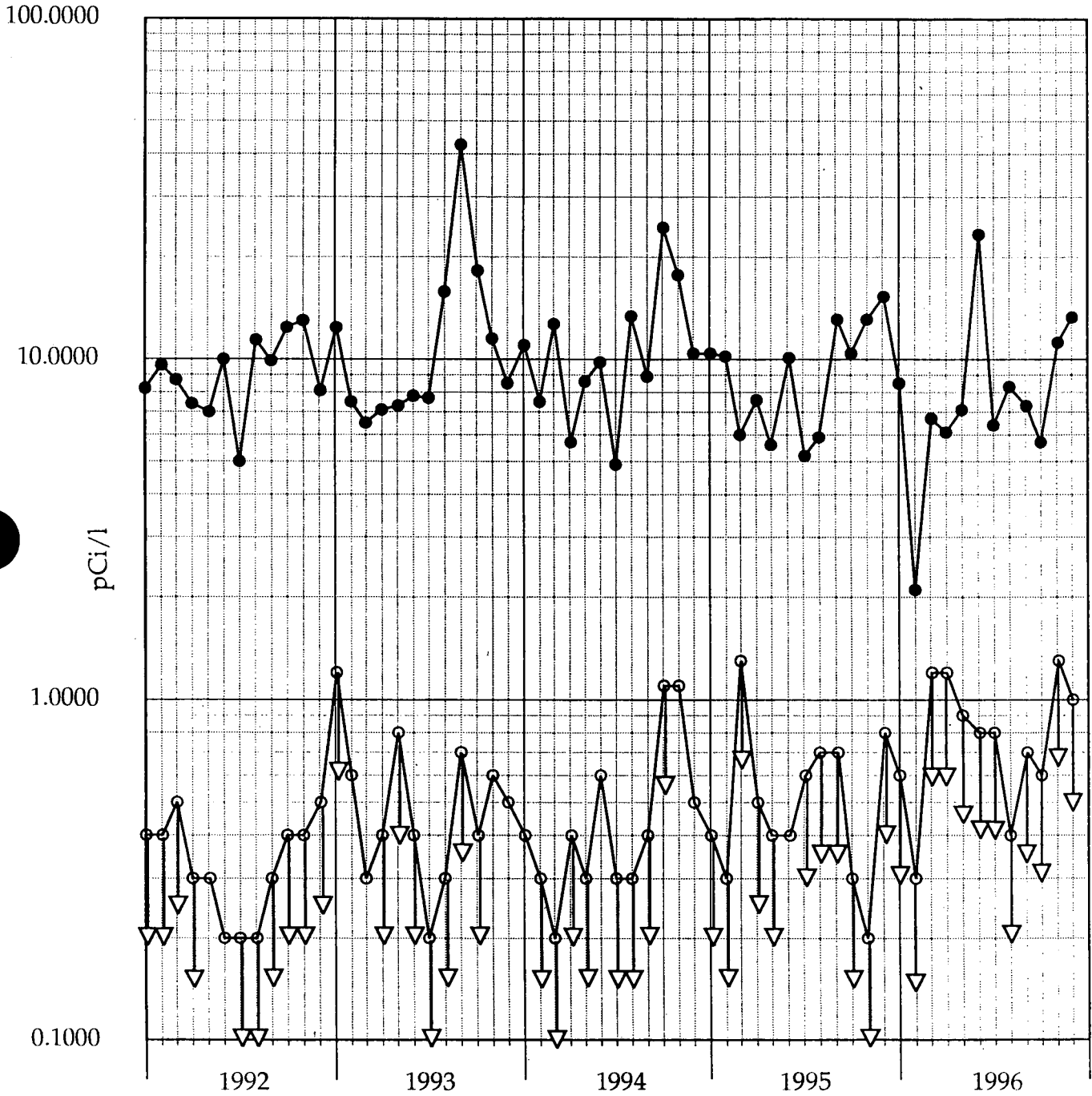


Figure 29. Surface water samples. Collected at North Creek onsite.
(Location K-1a)

KEWAUNEE

GROSS BETA

● 1992-1996 K-1a

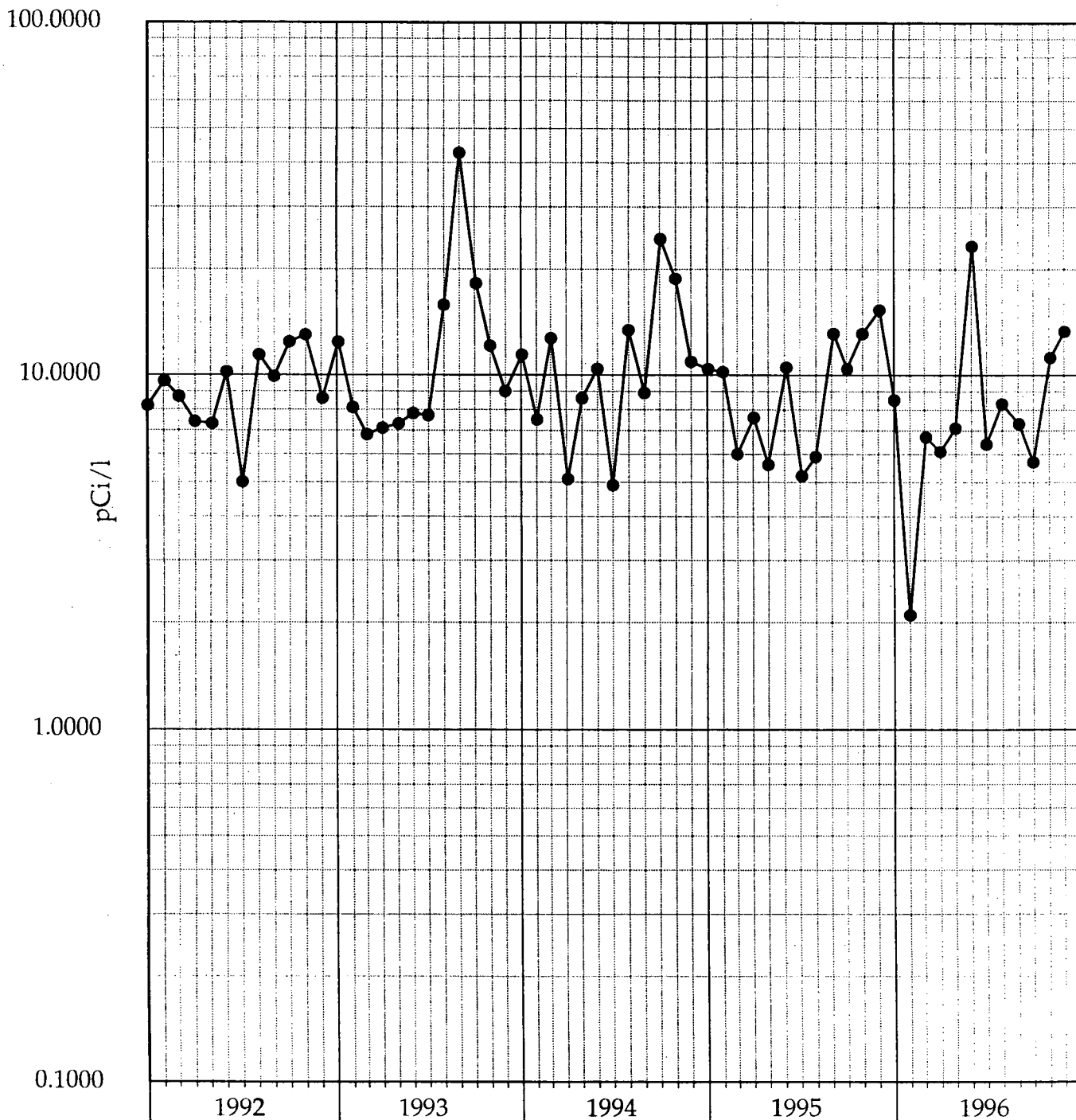


Figure 30. Surface water samples. Collected at North Creek onsite. Total Residue. (Location K-1a)

GROSS BETA

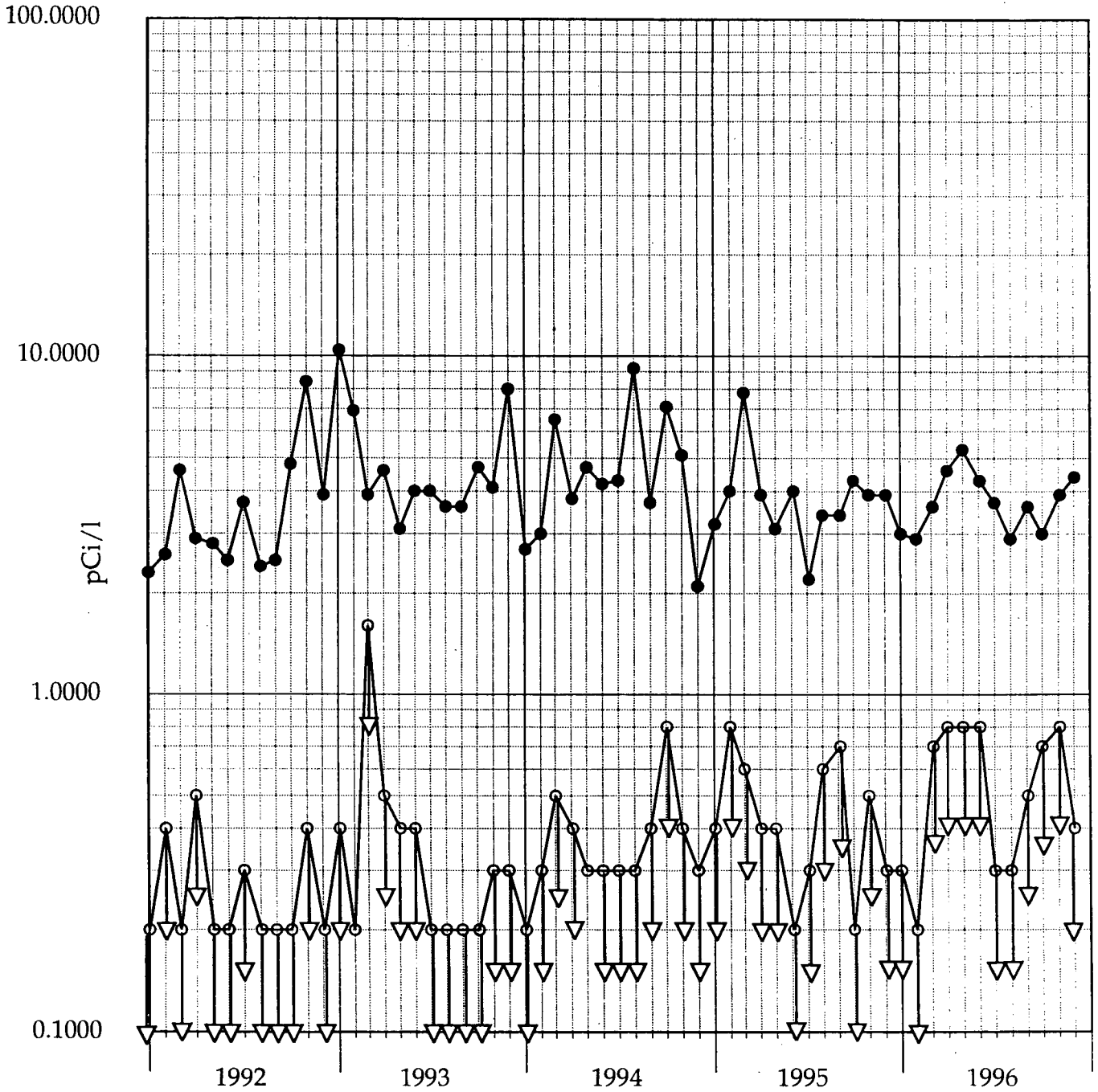
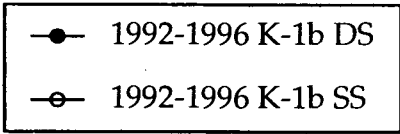


Figure 31. Surface water samples. Collected at Middle Creek onsite.
(Location K-1b).

KEWAUNEE

GROSS BETA

—○— 1992-1996 K-1b

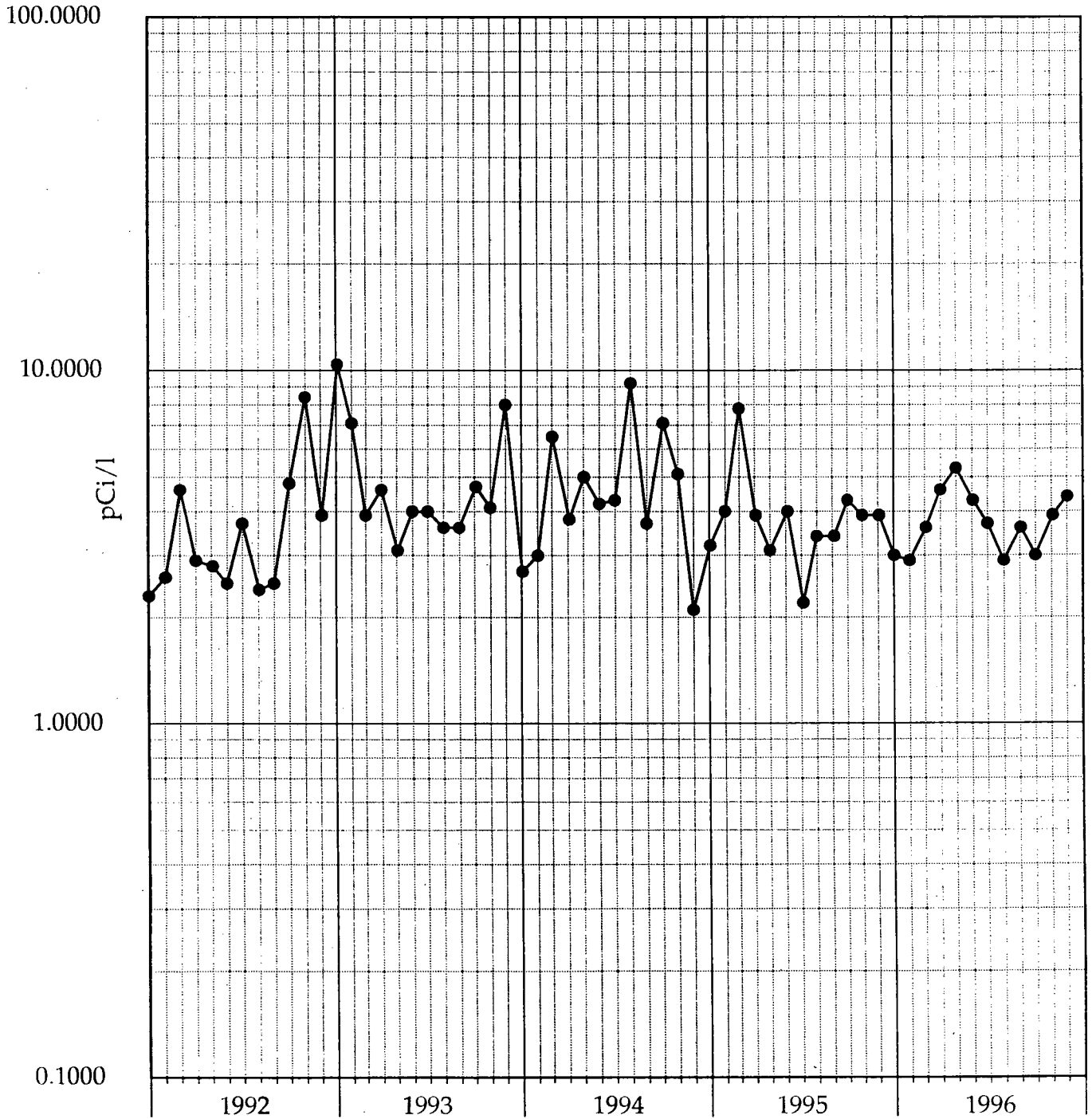


Figure 32. Surface water samples. Collected at Middle Creek onsite. Total residue. (Location K-1b)

GROSS BETA

- 1992-1996 K-1d DS
- 1992-1996 K-1d SS

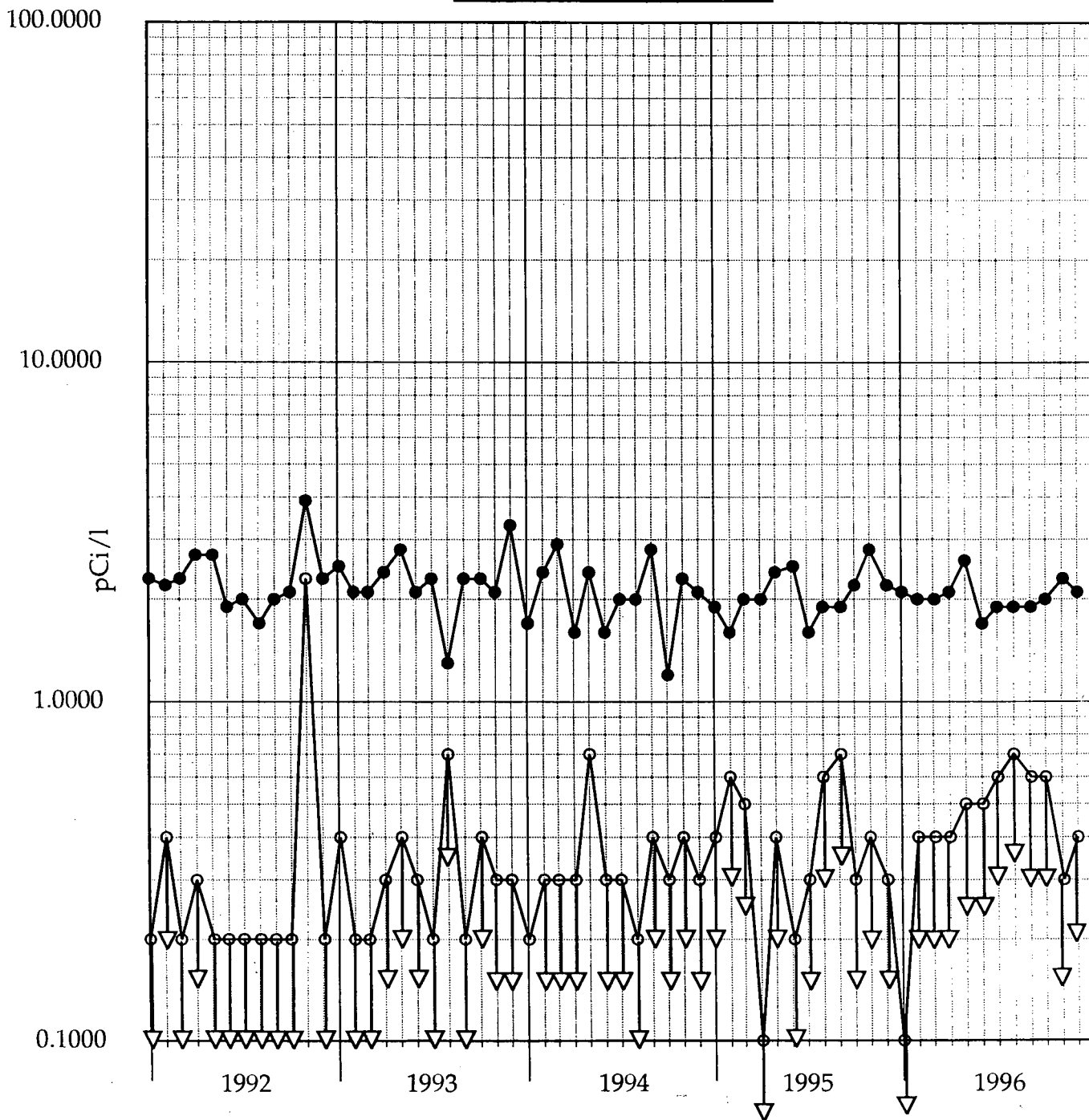


Figure 33. Surface water samples. Collected at the Lake Michigan condenser discharge onsite. (Location K-1d)

November 1992 activity due to sample container having a leak; suspect some sediment due to low volume.

GROSS BETA

—○— 1992-1996 K-1e DS
—○— 1992-1996 K-1e SS

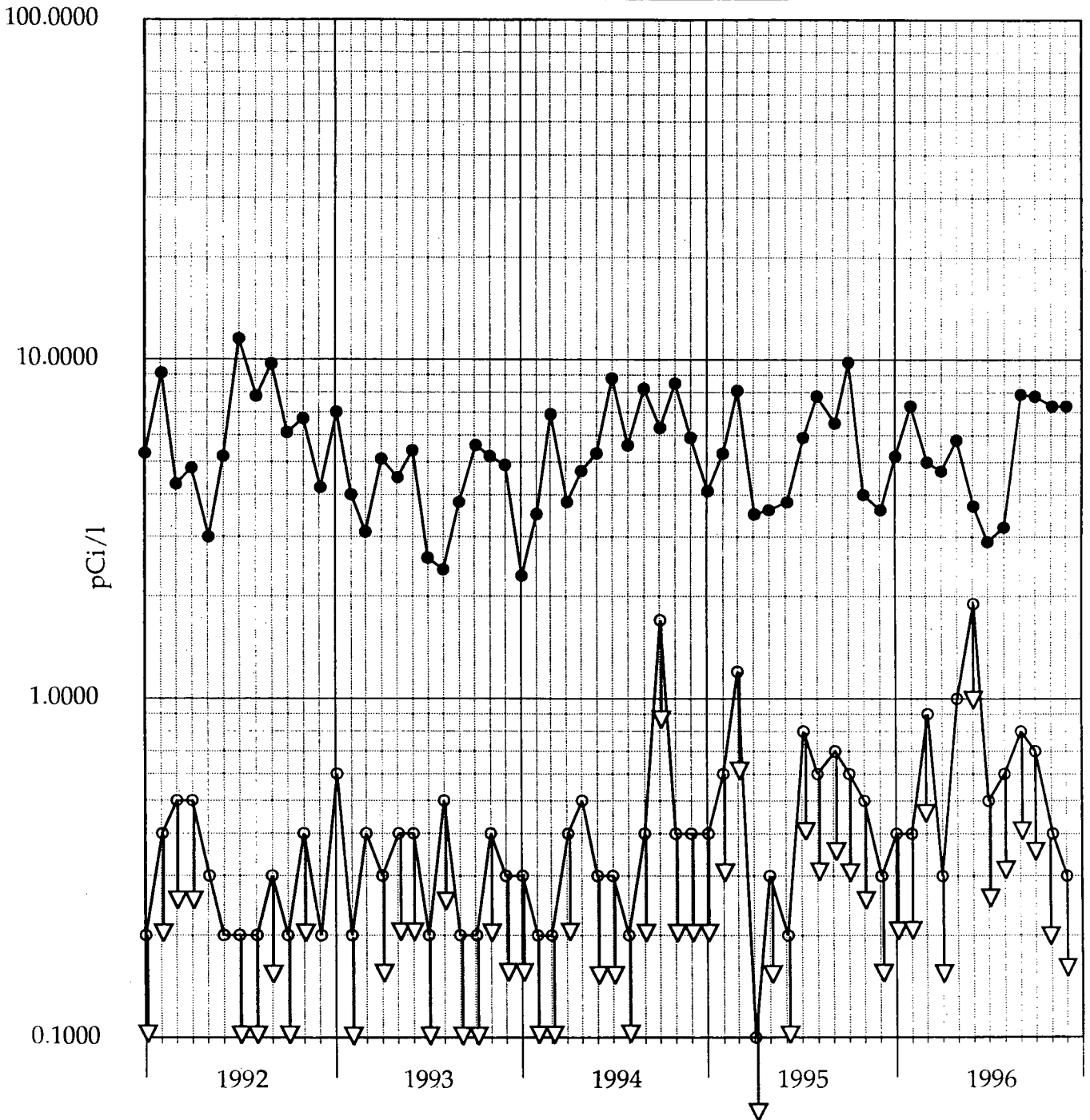


Figure 35. Surface water samples. Collected at South Creek onsite. (Location K-1e).

KEWAUNEE

GROSS BETA

—●— 1992-1996 K-1e

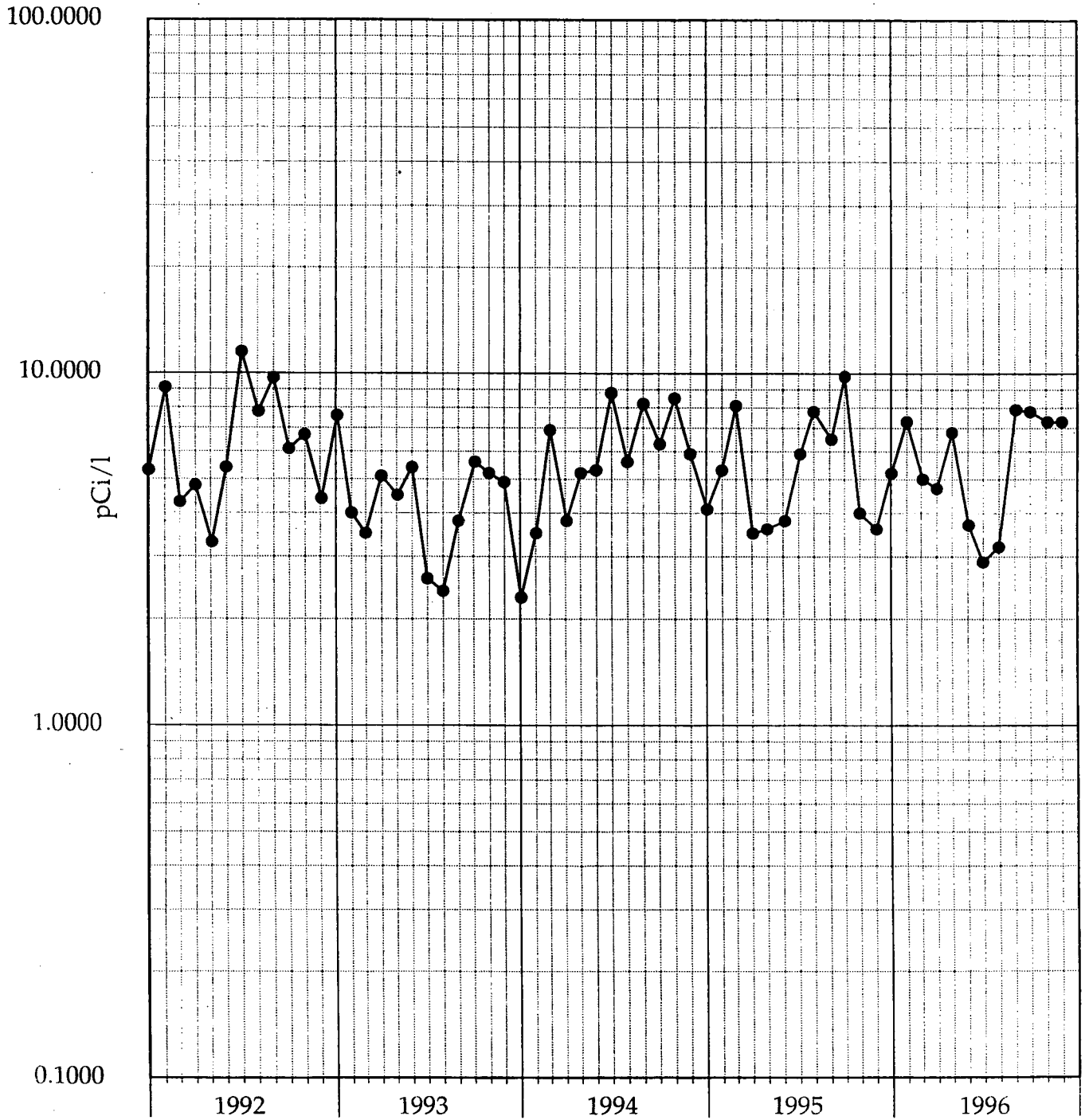


Figure 36. Surface water samples. Collected at South Creek onsite. Total residue (Location K-1e).

GROSS BETA

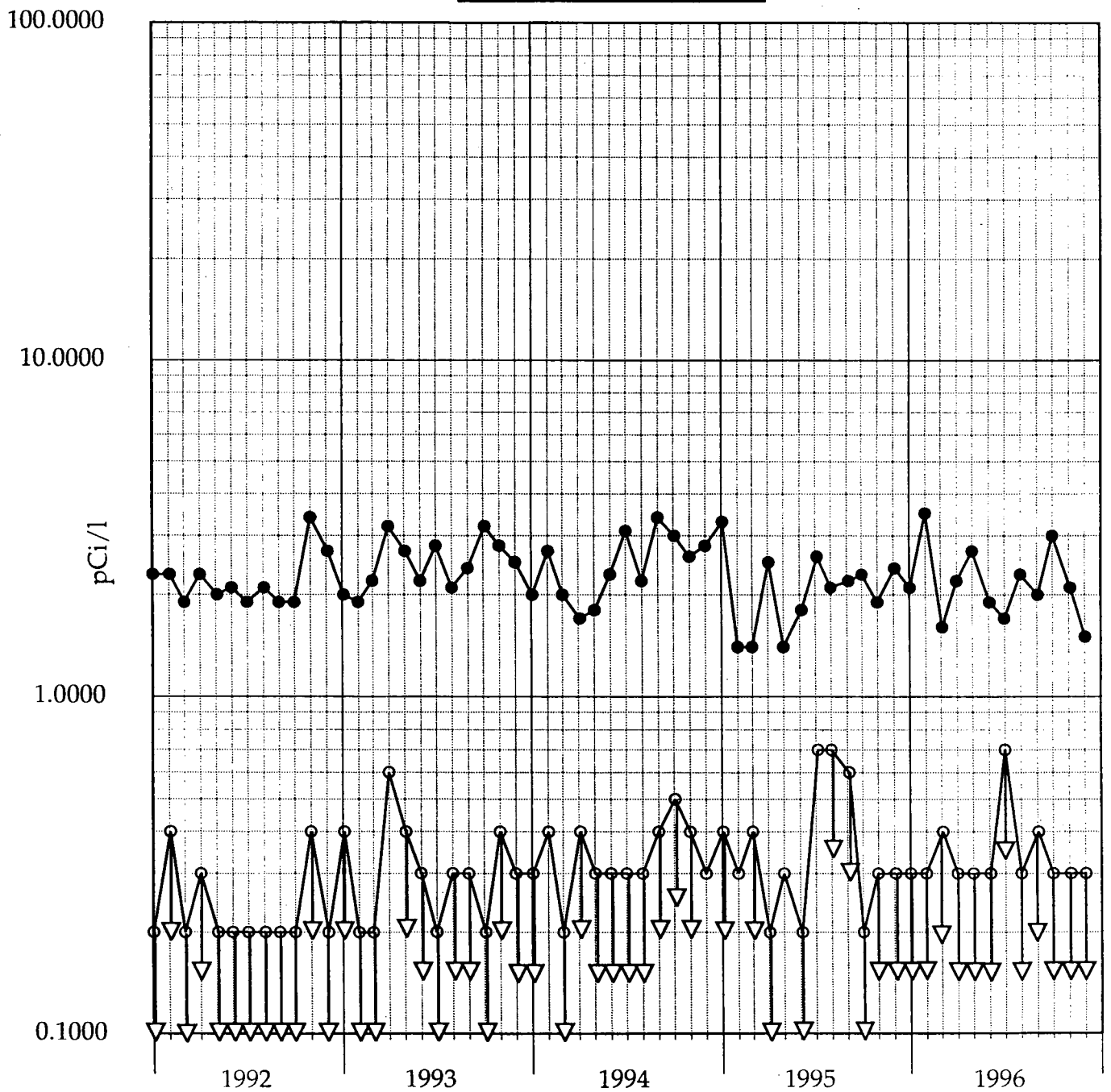
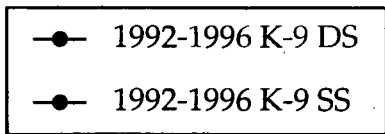


Figure 37. Surface water (raw) samples. Collected at Lake Michigan Rostok intake. (Location K-9)

KEWAUNEE

GROSS BETA

● 1992-1996 K-9

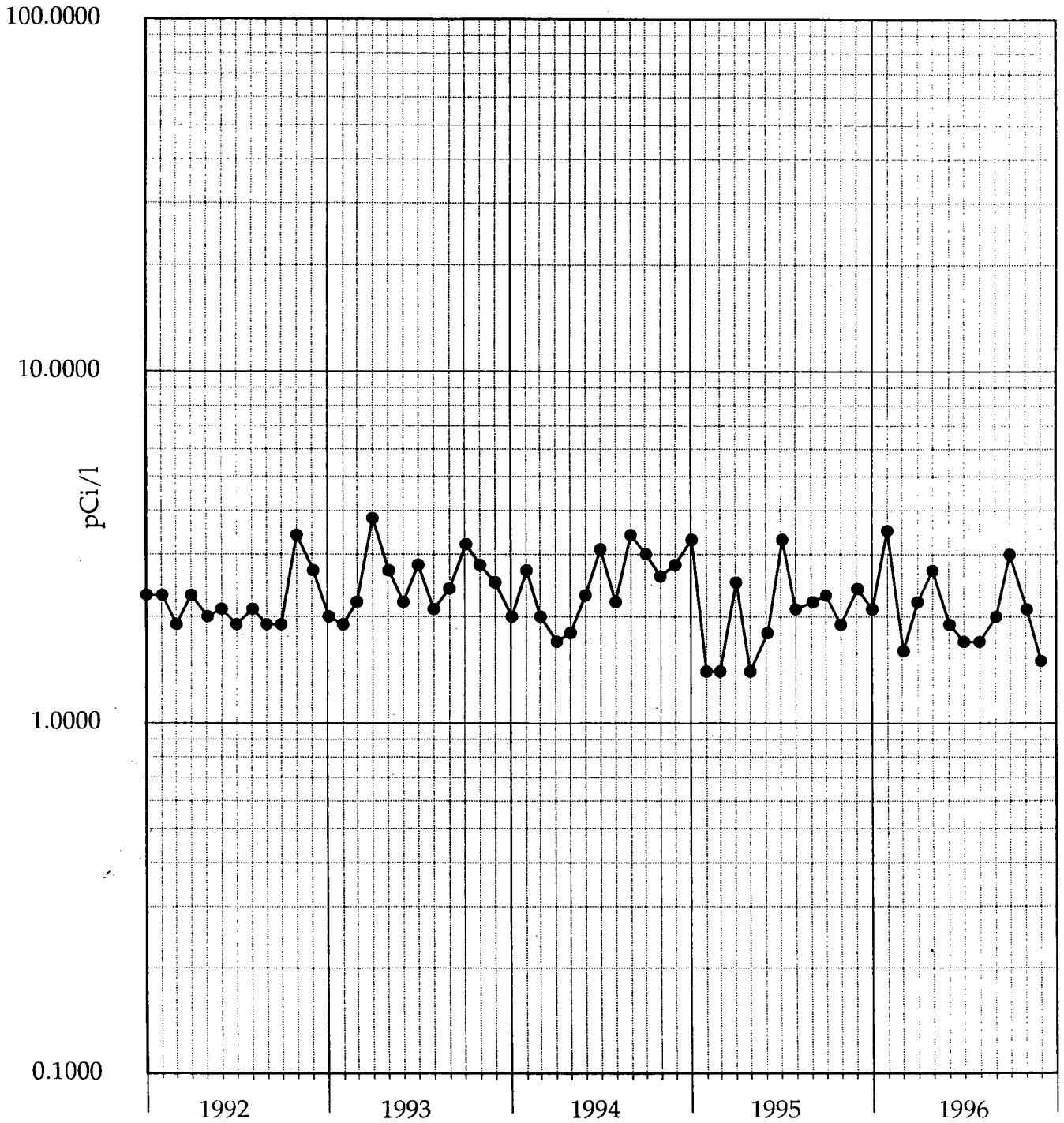


Figure 38. Surface water (raw) samples. Collected at the Lake Michigan Rostok intake. Total residue (Location K-9).

GROSS BETA

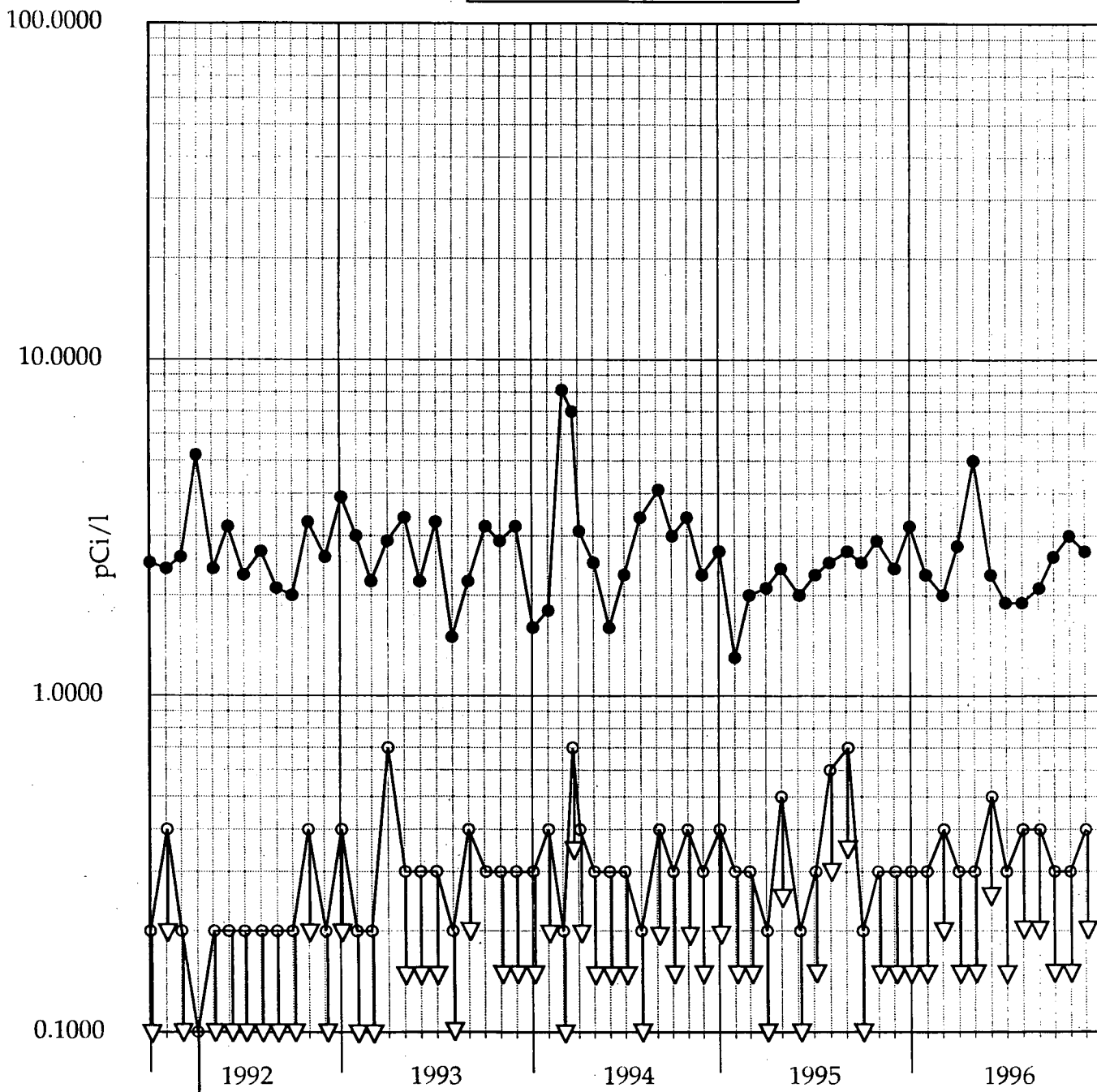
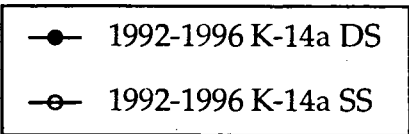


Figure 39. Surface water samples. Collected at Lake Michigan Two Creeks Park. (Location K-14a).

KEWAUNEE

GROSS BETA

—●— 1992-1996 K-14a

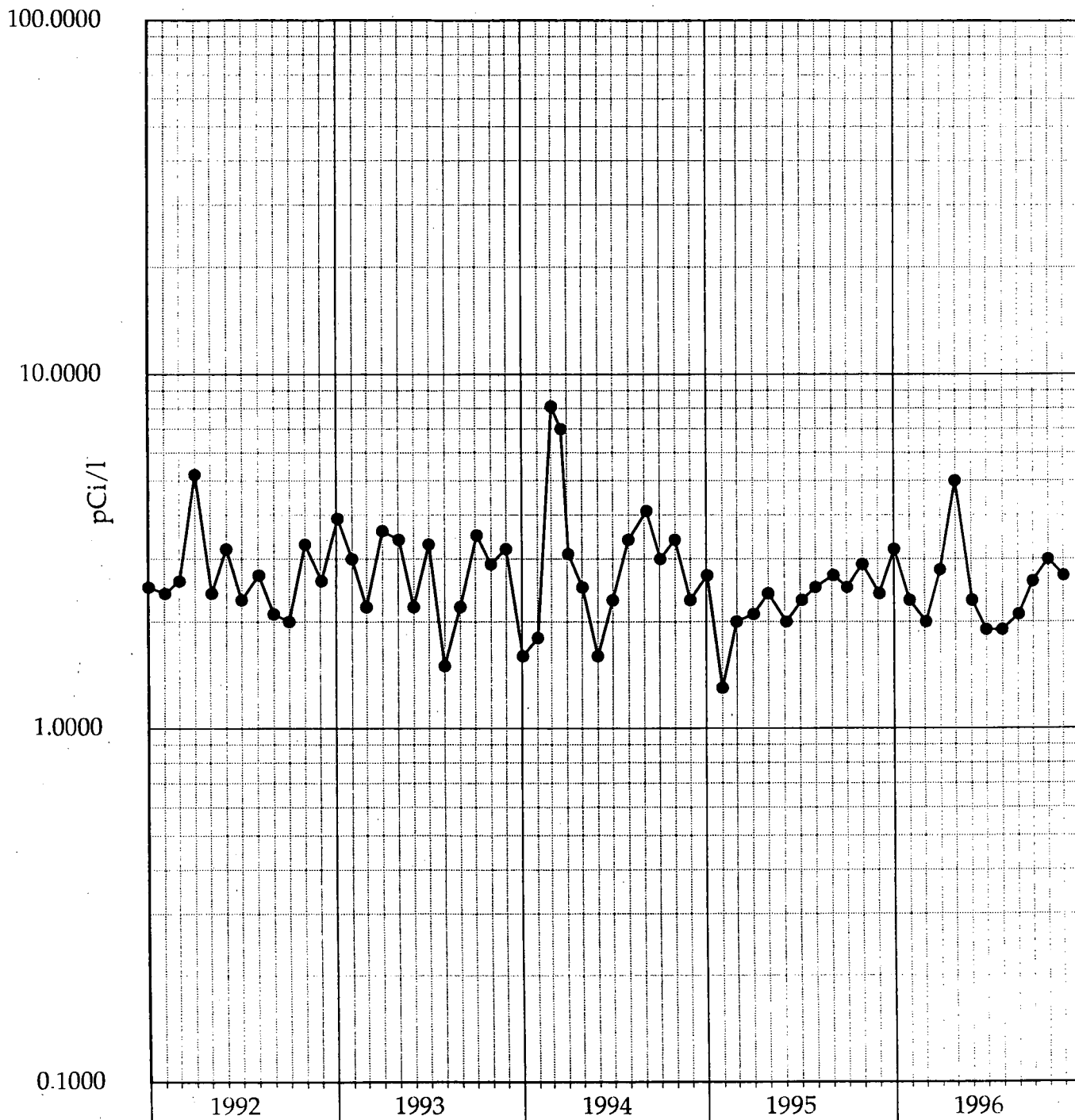


Figure 40. Surface water samples. Collected at the Lake Michigan Two Creeks Park. Total residue (Location K-14a).

KEWAUNEE

TRITIUM

● 1992-1996 K-1d

100000.0000

10000.0000

pCi/l

1000.0000

100.0000

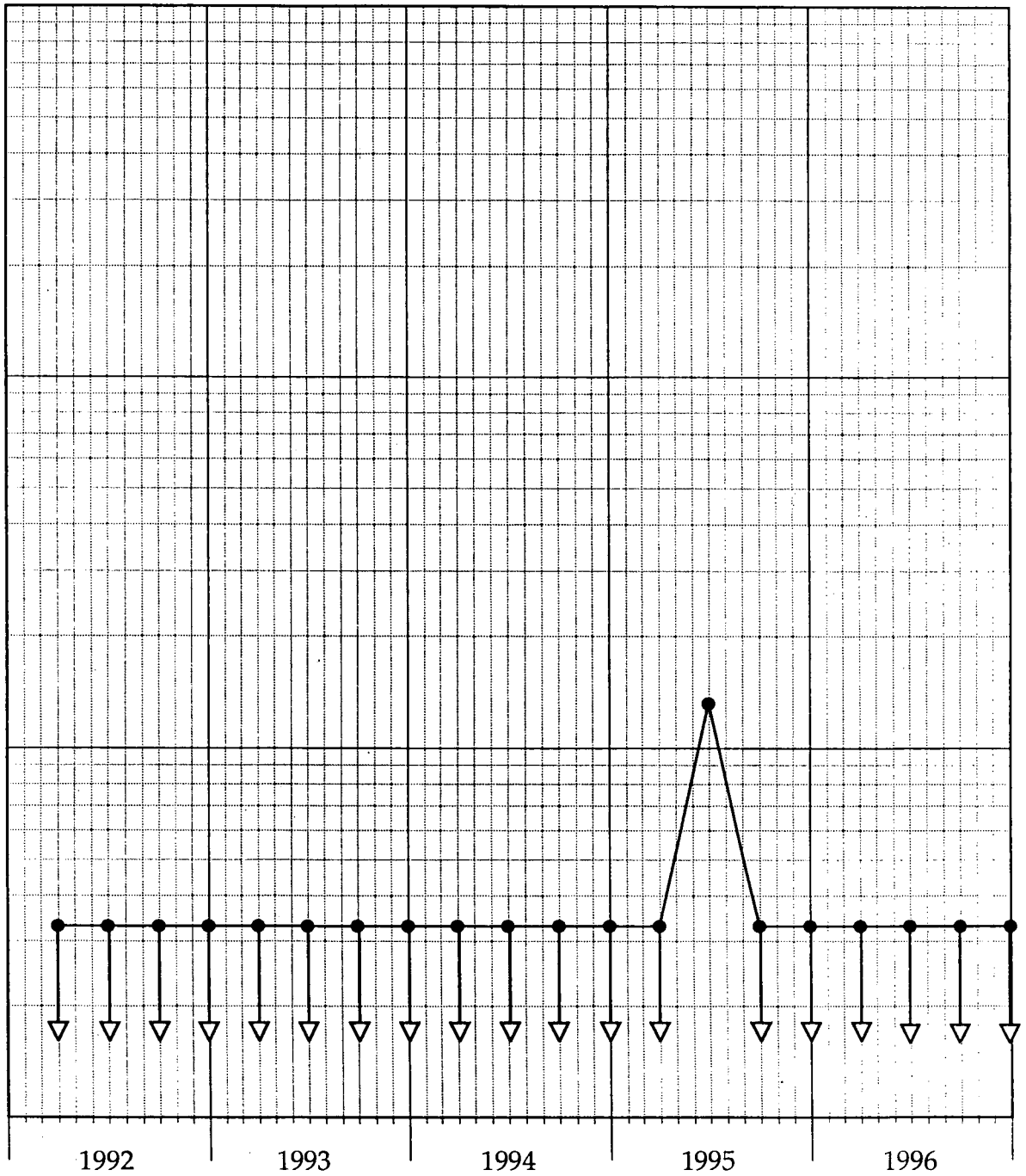


Figure 41. Surface water samples. Collected at the Lake Michigan condenser discharge onsite. (Location K-1d).

KEWAUNEE

TRITIUM

● 1992-1996 K-14a

100000.0000

10000.0000

pCi/l

1000.0000

100.0000

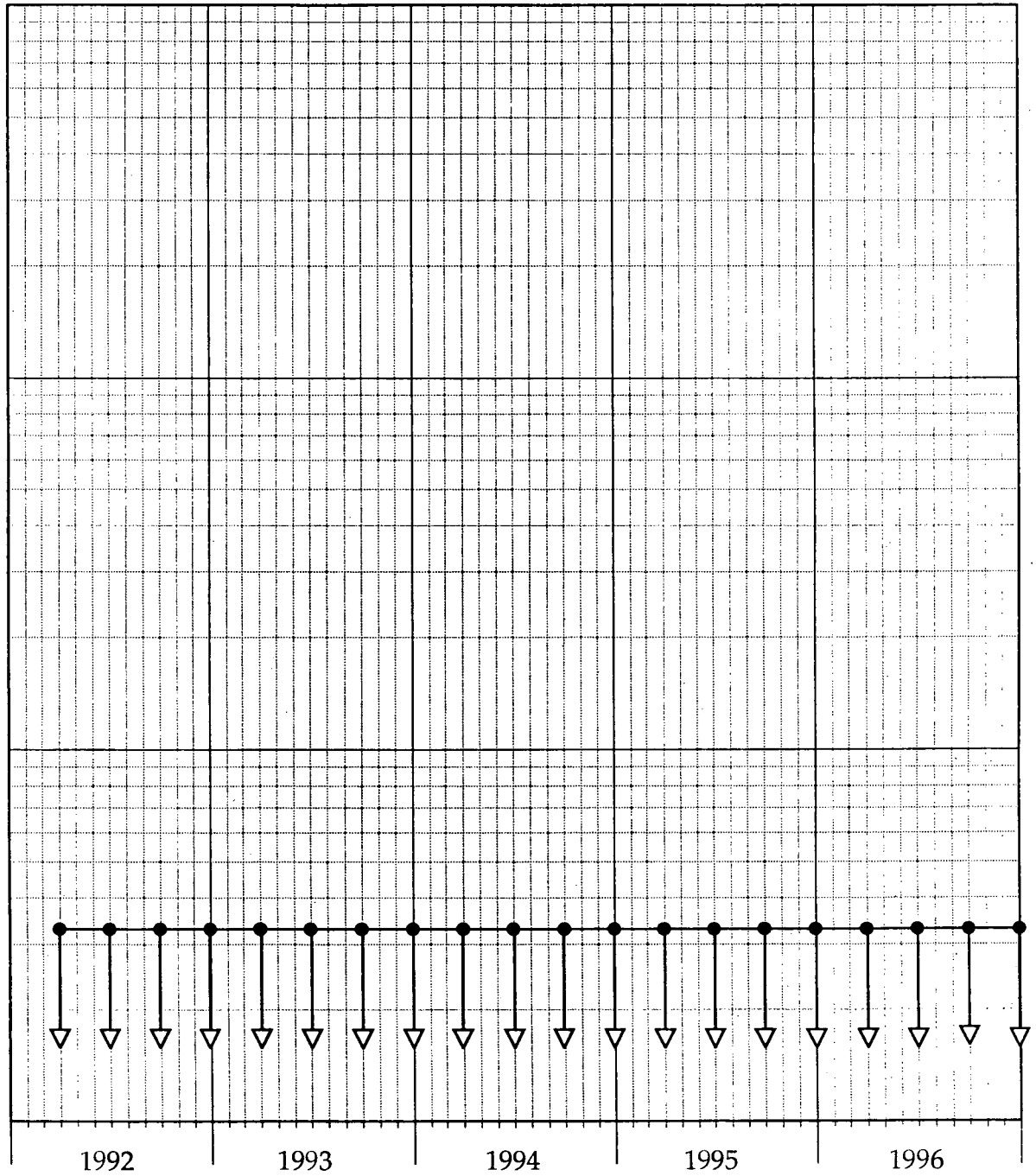


Figure 42. Surface water samples. Collected at Lake Michigan Two Creeks Park. (Location K-14a).

KEWAUNEE

TRITIUM

● 1992-1996 K-9

100000.0000

10000.0000

pCi/l

1000.0000

100.0000

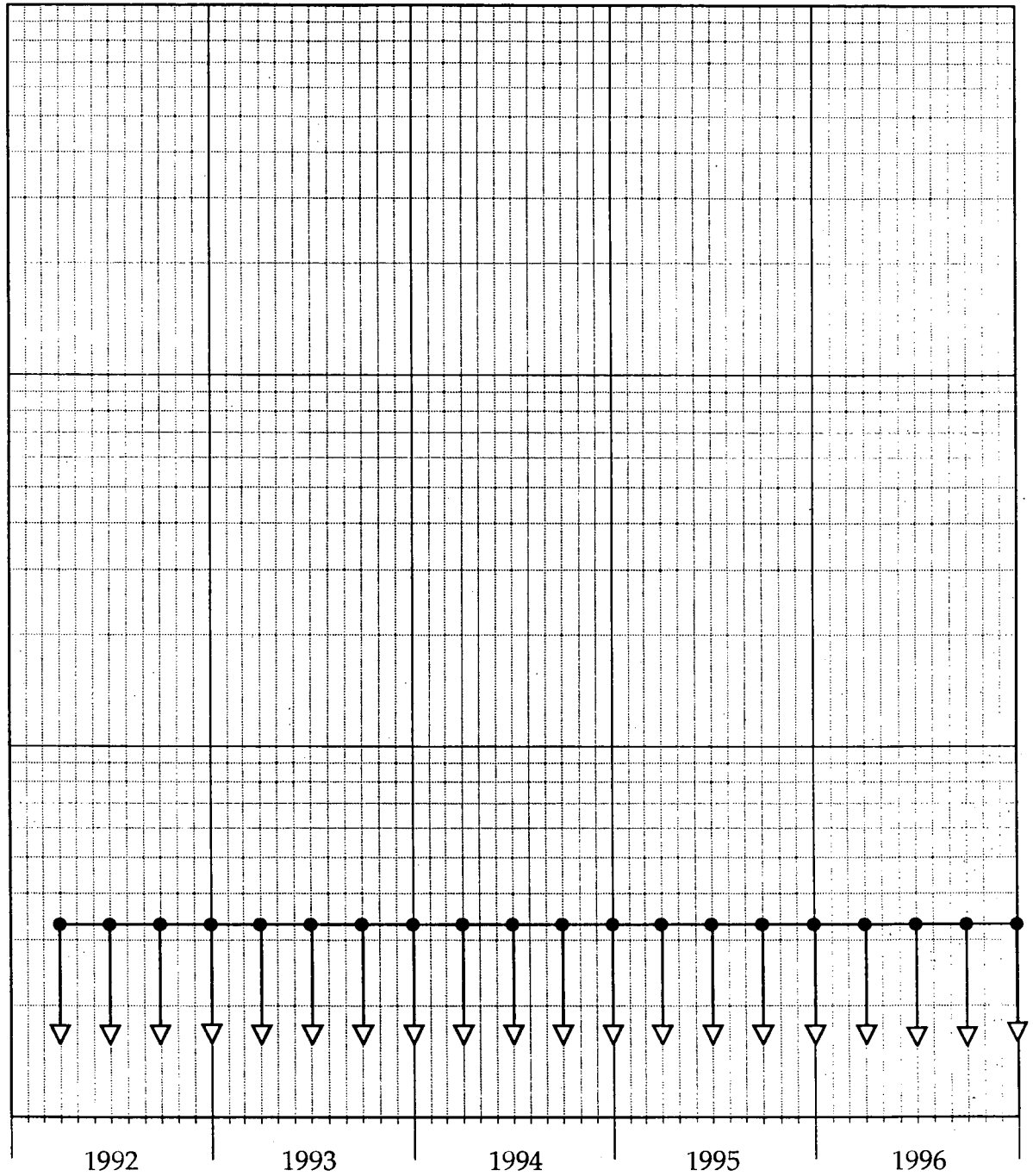


Figure 43. Surface water (raw) samples. Collected at Lake Michigan Rostok intake. (Location K-9).

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6.0 DATA TABULATIONS

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

Location: K-1f

Units: pCi/m³

Collection: Continuous, weekly exchange.

Date Collected	Volume (m ³)	Gross Beta	Date Collected	Volume (m ³)	Gross Beta
Required LLD		<u>0.010</u>			<u>0.010</u>
01-09-96	305	0.029 ± 0.003	07-09-96	252	0.017 ± 0.003
01-16-96	254	0.032 ± 0.004	07-16-96	250	0.018 ± 0.003
01-23-96	257	0.030 ± 0.004	07-23-96	258	0.017 ± 0.003
01-30-96	249 ^b	0.136 ± 0.007	07-30-96	248	0.017 ± 0.003
02-06-96	253	0.042 ± 0.004	08-06-96	258	0.012 ± 0.003
02-13-96	253	0.028 ± 0.003	08-13-96	255	0.015 ± 0.003
02-20-96	254	0.018 ± 0.003	08-20-96	252	0.015 ± 0.003
02-27-96	284	0.019 ± 0.003	08-27-96	254	0.019 ± 0.003
03-05-96	298	0.018 ± 0.003	09-03-96	253	0.024 ± 0.003
03-12-96	304	0.017 ± 0.003	09-10-96	254	0.037 ± 0.004
03-19-96	303	0.016 ± 0.003	09-17-96	250	0.012 ± 0.003
03-26-96	304	0.016 ± 0.003	09-24-96	256	0.026 ± 0.003
04-02-96	279	0.017 ± 0.003	10-01-96	254	0.017 ± 0.003
1st Quarter Meant±s.d.		<u>0.032 ± 0.032</u>	3rd Quarter Meant±s.d.		<u>0.019 ± 0.007</u>
04-09-96	253	0.021 ± 0.003	10-08-96	253	0.022 ± 0.003
04-17-96	290	0.018 ± 0.003	10-15-96	255	0.018 ± 0.003
04-23-96	217	0.018 ± 0.003	10-22-96	252	0.021 ± 0.003
04-30-96	253	0.013 ± 0.003	10-29-96	255	0.020 ± 0.004
05-07-96	252	0.011 ± 0.003	11-05-96	253	0.020 ± 0.003
05-14-96	250	0.015 ± 0.003	11-12-96	253	0.020 ± 0.003
05-21-96	257	0.016 ± 0.003	11-19-96	280	0.020 ± 0.003
05-28-96	254	0.011 ± 0.003	11-26-96	294	0.014 ± 0.003
06-04-96	254	0.014 ± 0.003	12-03-96	278	0.028 ± 0.003
06-11-96	278	0.007 ± 0.003	12-10-96	263	0.020 ± 0.003
06-18-96	274	0.012 ± 0.003	12-17-96	254	0.020 ± 0.003
06-25-96	259	0.010 ± 0.003	12-23-96	218	0.034 ± 0.004
07-02-96	252	0.019 ± 0.003	12-30-96	253	0.026 ± 0.004
2nd Quarter Meant±s.d.		<u>0.014 ± 0.004</u>	4th Quarter Meant±s.d.		<u>0.022 ± 0.005</u>
Cumulative Average:					0.022
Previous Annual Average:					0.019

^a Iodine-131 is sampled biweekly. Concentrations are <0.03 pCi/m³ unless otherwise noted.

^b Sample was recounted for gross beta; result of recount is 0.081±0.006 pCi/m³.

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Table 5. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131^a.
 Location: K-2
 Units: pCi/m³
 Collection: Continuous, weekly exchange.

Date Collected	Volume (m ³)	Gross Beta	Date Collected	Volume (m ³)	Gross Beta
<u>Required LLD</u>		<u>0.010</u>		<u>0.010</u>	
01-09-96	244	0.033 ± 0.004	07-09-96	304	0.017 ± 0.003
01-16-96	271	0.030 ± 0.003	07-16-96	278	0.016 ± 0.003
01-23-96	257	0.030 ± 0.004	07-23-96	255	0.021 ± 0.003
01-30-96	273	0.019 ± 0.003	07-30-96	296	0.015 ± 0.003
02-06-96	304	0.037 ± 0.003	08-06-96	333	0.014 ± 0.003
02-13-96	304	0.026 ± 0.003	08-13-96	331	0.014 ± 0.002
02-20-96	294	0.014 ± 0.003	08-20-96	322	0.017 ± 0.003
02-27-96	299	0.017 ± 0.003	08-27-96	304	0.020 ± 0.003
03-05-96	300	0.018 ± 0.003	09-03-96	305	0.023 ± 0.003
03-12-96	303	0.021 ± 0.003	09-10-96	305	0.041 ± 0.004
03-19-96	303	0.019 ± 0.003	09-17-96	300	0.009 ± 0.002
03-26-96	303	0.016 ± 0.003	09-24-96	307	0.023 ± 0.003
04-02-96	295	0.021 ± 0.003	10-01-96	294	0.016 ± 0.003
1st Quarter Meant±.d.		<u>0.023 ± 0.007</u>	3rd Quarter Meant±.d.		<u>0.019 ± 0.008</u>
04-09-96	292	0.017 ± 0.003	10-08-96	283	0.024 ± 0.003
04-17-96	349	0.015 ± 0.002	10-15-96	281	0.020 ± 0.003
04-23-96	238	0.016 ± 0.003	10-22-96	287	0.019 ± 0.003
04-30-96	253	0.015 ± 0.003	10-29-96	295	0.016 ± 0.003
05-07-96	252	0.013 ± 0.003	11-05-96	304	0.020 ± 0.003
05-14-96	253	0.015 ± 0.003	11-12-96	304	0.017 ± 0.003
05-21-96	254	0.015 ± 0.003	11-19-96	305	0.017 ± 0.003
05-28-96	254	0.011 ± 0.003	11-26-96	294	0.011 ± 0.003
06-04-96	254	0.017 ± 0.003	12-03-96	279	0.029 ± 0.003
06-11-96	278	0.010 ± 0.003	12-10-96	263	0.018 ± 0.003
06-18-96	304	0.012 ± 0.003	12-17-96	254	0.019 ± 0.003
06-25-96	280	0.008 ± 0.002	12-23-96	219	0.032 ± 0.004
07-02-96	277	0.018 ± 0.003	12-30-96	253	0.023 ± 0.004
2nd Quarter Meant±.d.		<u>0.014 ± 0.003</u>	4th Quarter Meant±.d.		<u>0.020 ± 0.006</u>
Cumulative Average:					0.019
Previous Annual Average:					0.017

^a Iodine-131 is sampled biweekly. Concentrations are <0.03 pCi/m³ unless otherwise noted.

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

Location: K-7

Units: pCi/m³

Collection: Continuous, weekly exchange.

Date Collected	Volume (m ³)	Gross Beta	Date Collected	Volume (m ³)	Gross Beta
<u>Required LLD</u>		<u>0.010</u>		<u>0.010</u>	
01-09-96	331	0.032 ± 0.003	07-09-96	301	0.016 ± 0.003
01-16-96	303	0.029 ± 0.003	07-16-96	285	0.016 ± 0.003
01-23-96	308	0.028 ± 0.003	07-23-96	270	0.019 ± 0.003
01-30-96	301	0.018 ± 0.003	07-30-96	264	0.015 ± 0.003
02-06-96	302	0.035 ± 0.003	08-06-96	290	0.013 ± 0.003
02-13-96	302	0.024 ± 0.003	08-13-96	288	0.013 ± 0.003
02-20-96	307	0.016 ± 0.003	08-20-96	297	0.013 ± 0.003
02-27-96	310	0.019 ± 0.003	08-27-96	307	0.018 ± 0.003
03-05-96	297	0.025 ± 0.003	09-03-96	302	0.022 ± 0.003
03-12-96	305	0.021 ± 0.003	09-10-96	305	0.041 ± 0.004
03-19-96	301	0.020 ± 0.003	09-17-96	279	0.010 ± 0.002
03-26-96	306	0.016 ± 0.003	09-24-96	254	0.027 ± 0.003
04-02-96	305	0.018 ± 0.003	10-01-96	254	0.020 ± 0.003
1st Quarter Mean ± s.d.		<u>0.023 ± 0.006</u>	3rd Quarter Mean ± s.d.		<u>0.019 ± 0.008</u>
04-09-96	302	0.017 ± 0.003	10-08-96	253	0.021 ± 0.003
04-17-96	346	0.016 ± 0.002	10-15-96	252	0.019 ± 0.003
04-23-96	262	0.014 ± 0.003	10-22-96	254	0.019 ± 0.003
04-30-96	304	0.012 ± 0.003	10-29-96	255	0.022 ± 0.004
05-07-96	303	0.011 ± 0.002	11-05-96	253	0.024 ± 0.003
05-14-96	298	0.013 ± 0.003	11-12-96	253	0.020 ± 0.003
05-21-96	311	0.014 ± 0.003	11-19-96	270	0.021 ± 0.003
05-28-96	294	0.011 ± 0.003	11-26-96	269	0.011 ± 0.003
06-04-96	285	0.016 ± 0.003	12-03-96	253	0.032 ± 0.004
06-11-96	292	0.006 ± 0.002	12-10-96	253	0.020 ± 0.003
06-18-96	297	0.016 ± 0.003	12-17-96	254	0.021 ± 0.003
06-25-96	312	0.008 ± 0.002	12-23-96	218	0.028 ± 0.004
07-02-96	303	0.013 ± 0.003	12-30-96	253	0.024 ± 0.004
2nd Quarter Mean ± s.d.		<u>0.013 ± 0.003</u>	4th Quarter Mean ± s.d.		<u>0.022 ± 0.005</u>
Cumulative Average:					0.019
Previous Annual Average:					0.018

^a Iodine-131 is sampled biweekly. Concentrations are <0.03 pCi/m³ unless otherwise noted.

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

Location: K-8

Units: pCi/m³

Collection: Continuous, weekly exchange.

Date Collected	Volume (m ³)	Gross Beta	Date Collected	Volume (m ³)	Gross Beta
<u>Required LLD</u>		<u>0.010</u>			<u>0.010</u>
01-09-96	305	0.028 ± 0.003	07-09-96	301	0.017 ± 0.003
01-16-96	303	0.032 ± 0.003	07-16-96	300	0.016 ± 0.003
01-23-96	309	0.030 ± 0.003	07-23-96	311	0.017 ± 0.003
01-30-96	301	0.026 ± 0.003	07-30-96	314	0.013 ± 0.002
02-06-96	302	0.041 ± 0.004	08-06-96	324	0.012 ± 0.002
02-13-96	302	0.028 ± 0.003	08-13-96	314	0.013 ± 0.003
02-20-96	332	0.017 ± 0.003	08-20-96	303	0.017 ± 0.003
02-27-96	336	0.018 ± 0.002	08-27-96	306	0.018 ± 0.003
03-05-96	298	0.023 ± 0.003	09-03-96	302	0.022 ± 0.003
03-12-96	305	0.025 ± 0.003	09-10-96	305	0.037 ± 0.003
03-19-96	301	0.022 ± 0.003	09-17-96	279	0.009 ± 0.002
03-26-96	305	0.024 ± 0.003	09-24-96	254	0.026 ± 0.003
04-02-96	224 ^b	0.023 ± 0.004	10-01-96	254	0.018 ± 0.003
1st Quarter Meant±s.d.		<u>0.026 ± 0.006</u>	3rd Quarter Meant±s.d.		<u>0.018 ± 0.007</u>
04-09-96	352	0.018 ± 0.003	10-08-96	253	0.022 ± 0.003
04-17-96	405	0.016 ± 0.002	10-15-96	252	0.016 ± 0.003
04-23-96	306	0.014 ± 0.003	10-22-96	254	0.021 ± 0.003
04-30-96	354	0.012 ± 0.002	10-29-96	255	0.015 ± 0.003
05-07-96	353	0.011 ± 0.002	11-05-96	253	0.020 ± 0.003
05-14-96	349	0.013 ± 0.002	11-12-96	253	0.019 ± 0.003
05-21-96	362	0.016 ± 0.002	11-19-96	270	0.021 ± 0.003
05-28-96	355	0.012 ± 0.002	11-26-96	269	0.012 ± 0.003
06-04-96	356	0.015 ± 0.002	12-03-96	253	0.032 ± 0.004
06-11-96	328	0.010 ± 0.002	12-10-96	253	0.018 ± 0.003
06-18-96	308	0.015 ± 0.003	12-17-96	254	0.018 ± 0.003
06-25-96	322	0.010 ± 0.002	12-23-96	218	0.030 ± 0.004
07-02-96	303	0.018 ± 0.003	12-30-96	253	0.023 ± 0.004
2nd Quarter Meant±s.d.		<u>0.014 ± 0.003</u>	4th Quarter Meant±s.d.		<u>0.020 ± 0.006</u>
Cumulative Average:					0.020
Previous Annual Average:					0.019

^a Iodine-131 is sampled biweekly. Concentrations are <0.03 pCi/m³ unless otherwise noted.

^b Low volume due to pump tripped for 54 hours. Power was restored.

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

Location: K-15

Units: pCi/m³

Collection: Continuous, weekly exchange.

Date Collected	Volume (m ³)	Gross Beta	Date Collected	Volume (m ³)	Gross Beta
Required LLD		<u>0.010</u>			<u>0.010</u>
01-09-96	356	0.028 ± 0.003	07-09-96	302	0.016 ± 0.003
01-16-96	353	0.025 ± 0.003	07-16-96	279	0.015 ± 0.003
01-23-96	359	0.021 ± 0.003	07-23-96	255	0.017 ± 0.003
01-30-96	301	0.021 ± 0.003	07-30-96	254	0.016 ± 0.003
02-06-96	302	0.037 ± 0.003	08-06-96	252	0.013 ± 0.003
02-13-96	303	0.025 ± 0.003	08-13-96	251	0.013 ± 0.003
02-20-96	305	0.016 ± 0.003	08-20-96	255	0.017 ± 0.003
02-27-96	310	0.017 ± 0.003	08-27-96	254	0.021 ± 0.003
03-05-96	298	0.018 ± 0.003	09-03-96	253	0.024 ± 0.003
03-12-96	304	0.022 ± 0.003	09-10-96	254	0.042 ± 0.004
03-19-96	302	0.019 ± 0.003	09-17-96	251	0.010 ± 0.003
03-26-96	304	0.016 ± 0.003	09-24-96	255	0.024 ± 0.003
04-02-96	305	0.018 ± 0.003	10-01-96	254	0.019 ± 0.003
1st Quarter Mean ± s.d.		<u>0.022 ± 0.006</u>	3rd Quarter Mean ± s.d.		<u>0.019 ± 0.008</u>
04-09-96	302	0.016 ± 0.003	10-08-96	253	0.023 ± 0.003
04-17-96	348	0.015 ± 0.002	10-15-96	251	0.017 ± 0.003
04-23-96	261	0.014 ± 0.003	10-22-96	256	0.021 ± 0.003
04-30-96	304	0.012 ± 0.003	10-29-96	255	0.015 ± 0.003
05-07-96	311	0.012 ± 0.002	11-05-96	253	0.020 ± 0.003
05-14-96	295	0.013 ± 0.003	11-12-96	253	0.019 ± 0.003
05-21-96	305	0.015 ± 0.003	11-19-96	270	0.019 ± 0.003
05-28-96	305	0.012 ± 0.002	11-26-96	268	0.011 ± 0.003
06-04-96	305	0.014 ± 0.003	12-03-96	253	0.033 ± 0.004
06-11-96	303	0.008 ± 0.002	12-10-96	253	0.018 ± 0.003
06-18-96	305	0.015 ± 0.003	12-17-96	254	0.017 ± 0.003
06-25-96	305	0.009 ± 0.002	12-23-96	218	0.027 ± 0.004
07-02-96	303	0.017 ± 0.003	12-30-96	253	0.027 ± 0.004
2nd Quarter Mean ± s.d.		<u>0.013 ± 0.003</u>	4th Quarter Mean ± s.d.		<u>0.020 ± 0.006</u>
Cumulative Average:					0.019
Previous Annual Average:					0.017

* Iodine-131 is sampled biweekly. Concentrations are <0.03 pCi/m³ unless otherwise noted.

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Table 9. Airborne particulates and charcoal canisters, analyses for gross beta and iodine-131^a.
 Location: K-16
 Units: pCi/m³
 Collection: Continuous, weekly exchange.

Date Collected	Volume (m ³)	Gross Beta	Date Collected	Volume (m ³)	Gross Beta
<u>Required LLD</u>		<u>0.010</u>			<u>0.010</u>
01-08-96	257	0.010 ± 0.003	07-08-96	232	0.020 ± 0.004
01-15-96	304	0.016 ± 0.002	07-15-96	233	0.016 ± 0.003
01-22-96	285	0.029 ± 0.003	07-23-96	233	0.017 ± 0.003
01-29-96	302	0.021 ± 0.003	07-29-96	228	0.014 ± 0.003
02-05-96	292	0.037 ± 0.003	08-05-96	223	0.015 ± 0.003
02-12-96	294	0.030 ± 0.003	08-12-96	268	0.016 ± 0.003
02-19-96	288	0.016 ± 0.003	08-19-96	294	0.018 ± 0.003
02-26-96	284	0.021 ± 0.003	08-26-96	294	0.023 ± 0.003
03-04-96	284	0.022 ± 0.003	09-03-96	335	0.025 ± 0.003
03-11-96	277	0.020 ± 0.003	09-09-96	253	0.045 ± 0.004
03-18-96	274	0.019 ± 0.003	09-16-96	294	0.012 ± 0.002
03-25-96	269	0.020 ± 0.003	09-23-96	294	0.022 ± 0.003
04-01-96	273	0.021 ± 0.003	09-30-96	295	0.019 ± 0.003
1st Quarter Mean±s.d.		<u>0.022 ± 0.007</u>	3rd Quarter Mean±s.d.		<u>0.020 ± 0.008</u>
04-09-96	294	0.018 ± 0.003	10-07-96	289	0.025 ± 0.003
04-15-96	303	0.016 ± 0.003	10-14-96	284	0.020 ± 0.003
04-22-96	278	0.014 ± 0.003	10-21-96	284	0.025 ± 0.003
04-29-96	253	0.016 ± 0.003	10-28-96	284	0.017 ± 0.003
05-06-96	254	0.012 ± 0.003	11-04-96	283	0.018 ± 0.003
05-13-96	254	0.014 ± 0.003	11-11-96	281	0.023 ± 0.003
05-20-96	254	0.017 ± 0.003	11-18-96	279	0.015 ± 0.003
05-28-96	289	0.015 ± 0.003	11-25-96	278	0.014 ± 0.003
06-03-96	218	0.019 ± 0.003	12-03-96	279	0.033 ± 0.004
06-10-96	252	0.007 ± 0.003	12-10-96	283	0.021 ± 0.003
06-17-96	250	0.018 ± 0.003	12-17-96	284	0.021 ± 0.003
06-24-96	243	0.011 ± 0.003	12-23-96	278	0.029 ± 0.003
07-01-96	238	0.017 ± 0.004	12-30-96	279	0.027 ± 0.004
2nd Quarter Mean±s.d.		<u>0.015 ± 0.003</u>	4th Quarter Mean±s.d.		<u>0.022 ± 0.006</u>
Cumulative Average:					0.020
Previous Annual Average:					0.017

^a Iodine-131 is sampled biweekly. Concentrations are <0.03 pCi/m³ unless otherwise noted.

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

January				April			
Location	Average	Minima	Maxima	Location	Average	Minima	Maxima
Control	0.025	0.010	0.033	Control	0.015	0.012	0.018
K-2	0.028	0.019	0.033	K-2	0.016	0.015	0.017
K-8	0.029	0.026	0.032	K-8	0.015	0.012	0.018
K-15	0.024	0.021	0.028	K-15	0.014	0.012	0.016
K-16	0.019	0.010	0.029	K-16	0.016	0.014	0.018
Indicator	0.042	0.018	0.136	Indicator	0.016	0.012	0.021
K-1F	0.057	0.029	0.136	K-1F	0.017	0.013	0.021
K-7	0.027	0.018	0.032	K-7	0.015	0.012	0.017

February				May			
Location	Average	Minima	Maxima	Location	Average	Minima	Maxima
Control	0.025	0.014	0.041	Control	0.014	0.011	0.019
K-2	0.023	0.014	0.037	K-2	0.013	0.011	0.015
K-8	0.026	0.017	0.041	K-8	0.013	0.011	0.016
K-15	0.024	0.016	0.037	K-15	0.013	0.012	0.015
K-16	0.026	0.016	0.037	K-16	0.015	0.012	0.019
Indicator	0.025	0.016	0.042	Indicator	0.013	0.011	0.016
K-1F	0.026	0.018	0.042	K-1F	0.013	0.011	0.016
K-7	0.023	0.016	0.035	K-7	0.012	0.011	0.014

March				June			
Location	Average	Minima	Maxima	Location	Average	Minima	Maxima
Control	0.020	0.016	0.025	Control	0.013	0.007	0.018
K-2	0.019	0.016	0.021	K-2	0.013	0.008	0.018
K-8	0.023	0.022	0.025	K-8	0.013	0.010	0.018
K-15	0.018	0.016	0.022	K-15	0.013	0.008	0.017
K-16	0.020	0.019	0.022	K-16	0.013	0.007	0.018
Indicator	0.018	0.016	0.025	Indicator	0.012	0.006	0.019
K-1F	0.017	0.016	0.018	K-1F	0.013	0.007	0.019
K-7	0.020	0.016	0.025	K-7	0.012	0.006	0.016

NOTE 1: 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 10. Airborne particulate data, gross beta analyses, monthly averages, minima and maxima.

July				October			
Location	Average	Minima	Maxima	Location	Average	Minima	Maxima
Control	0.016	0.013	0.021	Control	0.020	0.015	0.025
K-2	0.017	0.015	0.021	K-2	0.020	0.016	0.024
K-8	0.016	0.013	0.017	K-8	0.018	0.015	0.022
K-15	0.016	0.015	0.017	K-15	0.019	0.015	0.023
K-16	0.017	0.014	0.020	K-16	0.022	0.017	0.025
Indicator	0.017	0.015	0.019	Indicator	0.020	0.018	0.022
K-1F	0.017	0.017	0.018	K-1F	0.020	0.018	0.022
K-7	0.017	0.015	0.019	K-7	0.020	0.019	0.022
August				November			
Location	Average	Minima	Maxima	Location	Average	Minima	Maxima
Control	0.018	0.012	0.025	Control	0.020	0.011	0.033
K-2	0.017	0.014	0.023	K-2	0.019	0.011	0.029
K-8	0.016	0.012	0.022	K-8	0.021	0.012	0.032
K-15	0.018	0.013	0.024	K-15	0.020	0.011	0.033
K-16	0.019	0.015	0.025	K-16	0.021	0.014	0.033
Indicator	0.017	0.012	0.024	Indicator	0.021	0.011	0.032
K-1F	0.017	0.012	0.024	K-1F	0.020	0.014	0.028
K-7	0.016	0.013	0.022	K-7	0.021	0.011	0.032
September				December			
Location	Average	Minima	Maxima	Location	Average	Minima	Maxima
Control	0.023	0.009	0.045	Control	0.023	0.017	0.032
K-2	0.022	0.009	0.041	K-2	0.023	0.018	0.032
K-8	0.022	0.009	0.037	K-8	0.022	0.018	0.030
K-15	0.024	0.010	0.042	K-15	0.022	0.017	0.027
K-16	0.025	0.012	0.045	K-16	0.024	0.021	0.029
Indicator	0.024	0.010	0.041	Indicator	0.024	0.020	0.034
K-1F	0.023	0.012	0.037	K-1F	0.025	0.020	0.034
K-7	0.024	0.010	0.041	K-7	0.023	0.020	0.028

NOTE 1: 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, 1996.

Indicator	Sample Description and Concentration (pCi/m ³)			
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
K-1f				
Lab Code	KAP-2158	KAP-4604	KAP-7207	KAP-9659
Volume (m ³)	3597	3343	3294	3361
Be-7	0.077 ± 0.013	0.080 ± 0.011	0.092 ± 0.016	0.056 ± 0.013
Nb-95	<0.0005	< 0.0010	< 0.0008	< 0.0014
Zr-95	<0.0013	< 0.0010	< 0.0012	< 0.0011
Ru-103	<0.0005	<0.0005	< 0.0008	< 0.0007
Ru-106	<0.0041	< 0.0066	< 0.0067	< 0.0086
Cs-134	<0.0007	< 0.0008	< 0.0007	< 0.0007
Cs-137	<0.0007	< 0.0004	< 0.0002	< 0.0009
Ce-141	<0.0010	< 0.0009	< 0.0020	< 0.0016
Ce-144	<0.0036	< 0.0016	< 0.0050	< 0.0044
K-7				
Lab Code	KAP-2160	KAP-4606	KAP-7208	KAP-9660
Volume (m ³)	3978	3909	3934	3621
Be-7	0.080 ± 0.011	0.071 ± 0.009	0.083 ± 0.015	0.058 ± 0.011
Nb-95	< 0.0005	< 0.0010	< 0.0009	< 0.0010
Zr-95	< 0.0009	< 0.0018	< 0.0004	< 0.0015
Ru-103	< 0.0005	< 0.0007	< 0.0004	< 0.0008
Ru-106	< 0.0052	< 0.0058	< 0.0060	< 0.0057
Cs-134	< 0.0005	< 0.0007	< 0.0004	< 0.0006
Cs-137	< 0.0007	< 0.0004	< 0.0005	< 0.0004
Ce-141	< 0.0008	< 0.0013	< 0.0007	< 0.0011
Ce-144	< 0.0028	< 0.0025	< 0.0053	< 0.0040

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Table 11. Airborne particulate samples, quarterly composites of weekly samples, analysis for gamma-emitting isotopes, 1996 (continued).

	Sample Description and Concentration (pCi/m ³)			
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Control				
K-2				
Lab Code	KAP-2159	KAP-4605	KAP-7209	KAP-9661
Volume (m ³)	3750	3538	3696	3290
Be-7	0.080 ± 0.011	0.081 ± 0.017	0.078 ± 0.015	0.055 ± 0.011
Nb-95	< 0.0007	< 0.0012	< 0.0007	< 0.0008
Zr-95	< 0.0010	< 0.0023	< 0.0004	< 0.0014
Ru-103	< 0.0009	< 0.0009	< 0.0004	< 0.0008
Ru-106	< 0.0043	< 0.0089	< 0.0027	< 0.0059
Cs-134	< 0.0009	< 0.0008	< 0.0007	< 0.0007
Cs-137	< 0.0008	< 0.0011	< 0.0007	< 0.0011
Ce-141	< 0.0017	< 0.0017	< 0.0009	< 0.0013
Ce-144	< 0.0027	< 0.0046	< 0.0028	< 0.0030
K-8				
Lab Code	KAP-2161	KAP-4607	KAP-7210	KAP-9662
Volume (m ³)	3923	4453	3867	3290
Be-7	0.093 ± 0.011	0.074 ± 0.009	0.078 ± 0.017	0.049 ± 0.012
Nb-95	< 0.0005	< 0.0004	< 0.0007	< 0.0011
Zr-95	< 0.0013	< 0.0012	< 0.0009	< 0.0017
Ru-103	< 0.0006	< 0.0004	< 0.0006	< 0.0007
Ru-106	< 0.0048	< 0.0027	< 0.0057	< 0.0077
Cs-134	< 0.0003	< 0.0003	< 0.0003	< 0.0005
Cs-137	< 0.0006	< 0.0003	< 0.0004	< 0.0007
Ce-141	< 0.0008	< 0.0008	< 0.0009	< 0.0016
Ce-144	< 0.0018	< 0.0025	< 0.0022	< 0.0031

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Table 11. Airborne particulate samples, quarterly composites of weekly samples, analysis for gamma-emitting isotopes, 1996 (continued).

	Sample Description and Concentration (pCi/m ³)			
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Control				
K-15				
Lab Code	KAP-2162	KAP-4608	KAP-7211	KAP-9663
Volume (m ³)	4102	3952	3369	3290
Be-7	0.075 ± 0.012	0.076 ± 0.013	0.089 ± 0.014	0.045 ± 0.013
Nb-95	< 0.0008	< 0.0007	< 0.0010	< 0.0009
Zr-95	< 0.0014	< 0.0016	< 0.0003	< 0.0013
Ru-103	< 0.0005	< 0.0009	< 0.0006	< 0.0010
Ru-106	< 0.0051	< 0.0051	< 0.0029	< 0.0086
Cs-134	< 0.0004	< 0.0008	< 0.0006	< 0.0007
Cs-137	< 0.0004	< 0.0009	< 0.0003	< 0.0004
Ce-141	< 0.0012	< 0.0008	< 0.0020	< 0.0012
Ce-144	< 0.0030	< 0.0049	< 0.0034	< 0.0018
K-16				
Lab Code	KAP-2163	KAP-4609	KAP-7212	KAP-9664
Volume (m ³)	3683	3308	3476	3665
Be-7	0.078 ± 0.011	0.085 ± 0.012	0.071 ± 0.012	0.049 ± 0.014
Nb-95	< 0.0006	< 0.0005	< 0.0007	< 0.0008
Zr-95	< 0.0019	< 0.0017	< 0.0010	< 0.0011
Ru-103	< 0.0010	< 0.0006	< 0.0007	< 0.0011
Ru-106	< 0.0042	< 0.0040	< 0.0031	< 0.0079
Cs-134	< 0.0006	< 0.0008	< 0.0006	< 0.0009
Cs-137	< 0.0006	< 0.0004	< 0.0005	< 0.0009
Ce-141	< 0.0016	< 0.0009	< 0.0009	< 0.0018
Ce-144	< 0.0023	< 0.0020	< 0.0046	< 0.0052

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Table 12. Ambient gamma radiation (TLD), quarterly exposure, 1996.

	1st. Qtr.	2nd. Qtr.	3rd. Qtr.	4th. Qtr.	
Date Placed	01-02-96	04-01-96	07-01-96	10-01-96	
Date Removed	04-01-96	07-01-96	10-01-96	01-02-97	Mean ± s.d.
mR/91 days ^a					
<u>Indicator</u>					
K-1f	12.9 ± 0.2	13.0 ± 0.2	15.3 ± 0.1	15.1 ± 0.2	14.1 ± 1.3
K-4	13.8 ± 0.3	13.7 ± 0.2	15.8 ± 0.1	15.1 ± 0.1	14.6 ± 1.0
K-5	11.6 ± 0.7	15.2 ± 0.1	16.3 ± 0.5	16.4 ± 0.1	14.9 ± 2.3
K-7	14.7 ± 0.1	18.0 ± 0.2	21.5 ± 0.2	20.1 ± 0.1	18.6 ± 3.0
K-17	15.8 ± 0.2	16.5 ± 0.1	21.2 ± 0.3	17.7 ± 0.2	17.8 ± 2.4
K-27	13.5 ± 0.2	13.4 ± 0.3	15.4 ± 0.2	ND ^b	14.1 ± 1.1
K-30	16.0 ± 0.2	15.5 ± 0.2	18.5 ± 0.3	17.4 ± 0.2	16.9 ± 1.4
Mean ± s.d.	14.0 ± 1.6	15.0 ± 1.8	17.7 ± 2.7	17.0 ± 1.9	15.9 ± 1.7
<u>Control</u>					
K-2	12.0 ± 0.1	12.5 ± 0.2	14.8 ± 0.1	14.5 ± 0.1	13.5 ± 1.4
K-3	16.3 ± 0.2	16.9 ± 0.1	18.8 ± 0.2	17.9 ± 0.2	17.5 ± 1.1
K-6	13.7 ± 0.2	13.6 ± 0.1	15.9 ± 0.2	14.5 ± 0.2	14.4 ± 1.1
K-8	14.7 ± 0.2	15.1 ± 0.1	18.9 ± 0.2	17.0 ± 0.1	16.4 ± 1.9
K-15	12.8 ± 0.2	13.6 ± 0.1	16.5 ± 0.3	15.0 ± 0.2	14.5 ± 1.6
K-16	14.3 ± 0.3	12.3 ± 0.2	15.1 ± 0.1	13.8 ± 0.1	13.9 ± 1.2
K-31	13.0 ± 0.3	13.1 ± 0.1	16.0 ± 0.1	15.1 ± 0.1	14.3 ± 1.5
Mean ± s.d.	13.8 ± 1.4	13.9 ± 1.6	16.6 ± 1.7	15.4 ± 1.5	14.9 ± 1.3

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

^b ND=No data; TLD lost in the field.

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Table 13. Precipitation samples collected at Location K-11; analysis for tritium, January through December, 1996.

Month Collected	Lab Code	H-3	
		pCi/L	T.U. (100 T.U. = 320 pCi/L)
January	KP - 0127	< 330	< 103
February	- 0601	< 330	< 103
March	- 1175, 6	< 330	< 103
April	- 1857	< 330	< 103
May	- 3000	< 330	< 103
June	- 3619	< 330	< 103
July	- 4431, 2	< 330	< 103
August	- 5259	< 330	< 103
September	- 6084	< 330	< 103
October	- 6933	< 330	< 103
November	- 8181	< 330	< 103
December	- 8837	< 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						
01-02-96	KMI - 5	< 0.5	< 10	< 10	< 15	1510 ± 170
02-02-96	- 470	< 0.5	< 10	< 10	< 15	1580 ± 200
03-05-96	- 1053	< 0.5	< 10	< 10	< 15	1440 ± 120
04-02-96	- 1776	< 0.5	< 10	< 10	< 15	1430 ± 150
05-02-96	- 2644	< 0.5	< 10	< 10	< 15	1370 ± 160
05-14-96	- 3044	< 0.5	< 10	< 10	< 15	1420 ± 170
06-03-96	- 3522	< 0.5	< 10	< 10	< 15	1410 ± 180
06-18-96	- 3864	< 0.5	< 10	< 10	< 15	1410 ± 70
07-02-96	- 4287	< 0.5	< 10	< 10	< 15	1360 ± 160
07-16-96	- 4769	< 0.5	< 10	< 10	< 15	1410 ± 130
08-01-96	- 5170	< 0.5	< 10	< 10	< 15	1530 ± 170
08-13-96	- 5530	< 0.5	< 10	< 10	< 15	1440 ± 150
09-04-96	- 6008	< 0.5	< 10	< 10	< 15	1420 ± 150
09-17-96	- 6365	< 0.5	< 10	< 10	< 15	1440 ± 140
10-02-96	- 6745	< 0.5	< 10	< 10	< 15	1420 ± 160
10-15-96	- 7339	< 0.5	< 10	< 10	< 15	1380 ± 180
11-05-96	- 7848	< 0.5	< 10	< 10	< 15	1420 ± 140
12-03-96	- 8625	< 0.5	< 10	< 10	< 15	1240 ± 150
K-5						
01-03-96	KMI - 6	< 0.5	< 10	< 10	< 15	1370 ± 130
02-02-96	- 471	< 0.5	< 10	< 10	< 15	1450 ± 150
03-04-96	- 1054	< 0.5	< 10	< 10	< 15	1520 ± 150
04-01-96	- 1777	< 0.5	< 10	< 10	< 15	1480 ± 150
05-01-96	- 2645	< 0.5	< 10	< 10	< 15	1480 ± 100
05-14-96	- 3045	< 0.5	< 10	< 10	< 15	1290 ± 160
06-03-96	- 3523	< 0.5	< 10	< 10	< 15	1490 ± 190
06-18-96	- 3865	< 0.5	< 10	< 10	< 15	1440 ± 90
07-02-96	- 4288	< 0.5	< 10	< 10	< 15	1520 ± 160
07-16-96	- 4770	< 0.5	< 10	< 10	< 15	1480 ± 170
08-01-96	- 5171	< 0.5	< 10	< 10	< 15	1500 ± 190
08-13-96	- 5531	< 0.5	< 10	< 10	< 15	1660 ± 160
09-04-96	- 6009	< 0.5	< 10	< 10	< 15	1560 ± 120
09-17-96	- 6366	< 0.5	< 10	< 10	< 15	1420 ± 110
10-02-96	- 6746, 7	< 0.5	< 10	< 10	< 15	1430 ± 140
10-15-96	- 7340	< 0.5	< 10	< 10	< 15	1380 ± 120
11-05-96	- 7849	< 0.5	< 10	< 10	< 15	1520 ± 160
12-03-96	- 8626	< 0.5	< 10	< 10	< 15	1490 ± 140

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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
<u>Indicators</u>						
<u>K-12</u>						
01-02-96	KMI - 8	< 0.5	< 10	< 10	< 15	1510 ± 180
02-01-96	- 473	< 0.5	< 10	< 10	< 15	1570 ± 200
03-04-96	- 1056	< 0.5	< 10	< 10	< 15	1510 ± 110
04-01-96	- 1780	< 0.5	< 10	< 10	< 15	1560 ± 160
05-01-96	- 2647	< 0.5	< 10	< 10	< 15	1500 ± 100
05-14-96	- 3047	< 0.5	< 10	< 10	< 15	1300 ± 160
06-03-96	- 3525	< 0.5	< 10	< 10	< 15	1410 ± 170
06-18-96	- 3867	< 0.5	< 10	< 10	< 15	1380 ± 100
07-01-96	- 4290	< 0.5	< 10	< 10	< 15	1550 ± 160
07-16-96	- 4772	< 0.5	< 10	< 10	< 15	1620 ± 190
08-01-96	- 5173	< 0.5	< 10	< 10	< 15	1350 ± 110
08-13-96	- 5533	< 0.5	< 10	< 10	< 15	1460 ± 170
09-04-96	- 6011	< 0.5	< 10	< 10	< 15	1490 ± 170
09-17-96	- 6368	< 0.5	< 10	< 10	< 15	1550 ± 170
10-01-96	- 6749	< 0.5	< 10	< 10	< 15	1560 ± 180
10-15-96	- 7342	< 0.5	< 10	< 10	< 15	1390 ± 120
11-04-96	- 7851	< 0.5	< 10	< 10	< 15	1430 ± 190
12-02-96	- 8628	< 0.5	< 10	< 10	< 15	1470 ± 150
<u>K-19</u>						
01-03-96	KMI - 9	< 0.5	< 10	< 10	< 15	1480 ± 160
02-02-96	- 474	< 0.5	< 10	< 10	< 15	1380 ± 150
03-05-96	- 1057	< 0.5	< 10	< 10	< 15	1440 ± 130
04-01-96	- 1781	< 0.5	< 10	< 10	< 15	1380 ± 130
05-02-96	- 2648	< 0.5	< 10	< 10	< 15	1350 ± 140
05-14-96	- 3048	< 0.5	< 10	< 10	< 15	1430 ± 130
06-03-96	- 3526	< 0.5	< 10	< 10	< 15	1410 ± 160
06-18-96	- 3868	< 0.5	< 10	< 10	< 15	1310 ± 90
07-01-96	- 4291	< 0.5	< 10	< 10	< 15	1250 ± 150
07-16-96	- 4773	< 0.5	< 10	< 10	< 15	1370 ± 160
08-02-96	- 5174	< 0.5	< 10	< 10	< 15	1420 ± 170
08-13-96	- 5534	< 0.5	< 10	< 10	< 15	1330 ± 160
09-03-96	- 6012	< 0.5	< 10	< 10	< 15	1560 ± 120
09-17-96	- 6369	< 0.5	< 10	< 10	< 15	1400 ± 150
10-02-96	- 6750	< 0.5	< 10	< 10	< 15	1360 ± 150
10-15-96	- 7343	< 0.5	< 10	< 10	< 15	1510 ± 160
11-04-96	- 7852	< 0.5	< 10	< 10	< 15	1270 ± 170
12-02-96	- 8629	< 0.5	< 10	< 10	< 15	1320 ± 150

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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
<u>Control</u>						
<u>K-3</u>						
01-03-96	KMI - 4	< 0.5	< 10	< 10	< 15	1490 ± 170
02-02-96	- 469	< 0.5	< 10	< 10	< 15	1460 ± 180
03-05-96	- 1052	< 0.5	< 10	< 10	< 15	1580 ± 160
04-02-96	- 1775	< 0.5	< 10	< 10	< 15	1430 ± 140
05-02-96	- 2643	< 0.5	< 10	< 10	< 15	1380 ± 160
05-14-96	- 3043	< 0.5	< 10	< 10	< 15	1520 ± 130
06-03-96	- 3521	< 0.5	< 10	< 10	< 15	1650 ± 180
06-18-96	- 3863	< 0.5	< 10	< 10	< 15	1440 ± 70
07-02-96	- 4286	< 0.5	< 10	< 10	< 15	1340 ± 140
07-16-96	- 4768	< 0.5	< 10	< 10	< 15	1400 ± 110
08-02-96	- 5168, 9	< 0.5	< 10	< 10	< 15	1560 ± 100
08-13-96	- 5529	< 0.5	< 10	< 10	< 15	1470 ± 120
09-04-96	- 6006, 7	< 0.5	< 10	< 10	< 15	1490 ± 100
09-17-96	- 6364	< 0.5	< 10	< 10	< 15	1350 ± 150
10-02-96	- 6744	< 0.5	< 10	< 10	< 15	1370 ± 170
10-15-96	- 7338	< 0.5	< 10	< 10	< 15	1490 ± 140
11-05-96	- 7846, 7	< 0.5	< 10	< 10	< 15	1490 ± 110
12-03-96	- 8624	< 0.5	< 10	< 10	< 15	1450 ± 130
<u>K-6</u>						
01-02-96	KMI - 7	< 0.5	< 10	< 10	< 15	1320 ± 170
02-01-96	- 472	< 0.5	< 10	< 10	< 15	1330 ± 160
03-05-96	- 1055	< 0.5	< 10	< 10	< 15	1400 ± 120
04-01-96	- 1778, 9	< 0.5	< 10	< 10	< 15	1410 ± 90
05-01-96	- 2646	< 0.5	< 10	< 10	< 15	1290 ± 140
05-14-96	- 3046	< 0.5	< 10	< 10	< 15	1380 ± 200
06-03-96	- 3524	< 0.5	< 10	< 10	< 15	1310 ± 150
06-18-96	- 3866	< 0.5	< 10	< 10	< 15	1310 ± 90
07-01-96	- 4289	< 0.5	< 10	< 10	< 15	1200 ± 180
07-16-96	- 4771	< 0.5	< 10	< 10	< 15	1360 ± 160
08-01-96	- 5172	< 0.5	< 10	< 10	< 15	1310 ± 160
08-13-96	- 5532	< 0.5	< 10	< 10	< 15	1290 ± 110
09-03-96	- 6010	< 0.5	< 10	< 10	< 15	1440 ± 170
09-17-96	- 6367	< 0.5	< 10	< 10	< 15	1380 ± 190
10-01-96	- 6748	< 0.5	< 10	< 10	< 15	1330 ± 190
10-15-96	- 7341	< 0.5	< 10	< 10	< 15	1280 ± 180
11-04-96	- 7850	< 0.5	< 10	< 10	< 15	1320 ± 130
12-02-96	- 8627	< 0.5	< 10	< 10	< 15	1430 ± 110

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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
<u>Control</u>						
<u>K-28</u>						
01-03-96	KMI - 10	< 0.5	< 10	< 10	< 15	1520 ± 170
02-01-96	- 475	< 0.5	< 10	< 10	< 15	1390 ± 160
03-05-96	- 1058, 9	< 0.5	< 10	< 10	< 15	1520 ± 110
04-02-96	- 1782	< 0.5	< 10	< 10	< 15	1450 ± 170
05-01-96	- 2649	< 0.5	< 10	< 10	< 15	1420 ± 90
05-14-96	- 3049	< 0.5	< 10	< 10	< 15	1540 ± 120
06-03-96	- 3527	< 0.5	< 10	< 10	< 15	1440 ± 150
06-18-96	- 3869	< 0.5	< 10	< 10	< 15	1270 ± 100
07-02-96	- 4292	< 0.5	< 10	< 10	< 15	1400 ± 120
07-16-96	- 4774	< 0.5	< 10	< 10	< 15	1520 ± 120
08-02-96	- 5175	< 0.5	< 10	< 10	< 15	1350 ± 160
08-13-96	- 5535	< 0.5	< 10	< 10	< 15	1400 ± 140
09-04-96	- 6013	< 0.5	< 10	< 10	< 15	1380 ± 150
09-17-96	- 6370	< 0.5	< 10	< 10	< 15	1700 ± 200
10-01-96	- 6751	< 0.5	< 10	< 10	< 15	1450 ± 160
10-15-96	- 7344	< 0.5	< 10	< 10	< 15	1440 ± 110
11-05-96	- 7853	< 0.5	< 10	< 10	< 15	1470 ± 150
12-03-97	- 8630	< 0.5	< 10	< 10	< 15	1410 ± 170

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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.

1996 Collection Period	Lab Code	Concentration			Ca (g/L)	Ratios	
		Sr-89 (pCi/L)	Sr-90 (pCi/L)	K (g/L)		Sr-90 (pCi/L) per gram Ca	Cs-137 (pCi/L) per gram K
<u>Indicators</u>							
K-4							
January	KMI - 5	<0.8	2.3 ± 0.5	1.75 ± 0.20	0.94	2.45	<5.73
February	- 470	<0.9	1.8 ± 0.6	1.83 ± 0.23	1.10	1.64	<5.47
March	- 1053	<0.6	1.5 ± 0.4	1.66 ± 0.14	0.87	1.72	<6.01
April	- 1776	<1.0	1.7 ± 0.5	1.65 ± 0.17	0.88	1.93	<6.05
May	- 3051	<0.9	1.0 ± 0.4	1.61 ± 0.13	0.89	1.12	<6.20
June	- 3871	<0.9	1.5 ± 0.4	1.63 ± 0.11	1.07	1.40	<6.13
July	- 4776	<0.7	1.1 ± 0.3	1.60 ± 0.08	0.83	1.33	<6.25
August	- 5589	<1.0	1.1 ± 0.3	1.72 ± 0.13	0.93	1.18	<5.82
September	- 6372	<1.3	1.4 ± 0.4	1.65 ± 0.12	0.83	1.69	<6.05
October	- 7346	<1.1	0.9 ± 0.3	1.64 ± 0.18	1.00	0.90	<6.09
November	- 7848	<1.3	0.9 ± 0.3	1.64 ± 0.16	1.10	0.82	<6.09
December	- 8625	<1.0	1.1 ± 0.4	1.43 ± 0.17	1.07	1.03	<6.98
K-5							
January	KMI - 6	<0.7	1.8 ± 0.4	1.58 ± 0.15	0.89	2.02	<6.31
February	- 471	<0.6	1.7 ± 0.4	1.68 ± 0.17	0.83	2.05	<5.97
March	- 1054	<0.8	1.7 ± 0.4	1.76 ± 0.17	0.95	1.79	<5.69
April	- 1777	<1.0	1.4 ± 0.5	1.71 ± 0.17	1.08	1.30	<5.84
May	- 3052	<1.0	1.5 ± 0.5	1.60 ± 0.08	0.97	1.55	<6.25
June	- 3872	<0.6	0.9 ± 0.3	1.69 ± 0.12	0.97	0.93	<5.90
July	- 4777	<0.9	1.5 ± 0.3	1.73 ± 0.13	0.88	1.70	<5.77
August	- 5590	<1.3	1.5 ± 0.4	1.83 ± 0.14	0.84	1.79	<5.47
September	- 6373	<1.3	1.4 ± 0.4	1.72 ± 0.09	0.77	1.82	<5.81
October	- 7347	<1.1	1.4 ± 0.4	1.62 ± 0.11	0.99	1.41	<6.16
November	- 7849	<1.3	0.8 ± 0.3	1.76 ± 0.18	1.05	0.76	<5.69
December	- 8626	<1.2	1.2 ± 0.5	1.72 ± 0.16	0.80	1.50	<5.81

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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).

1996 Collection Period	Lab Code	Concentration			Ca (g/L)	Ratios	
		Sr-89 (pCi/L)	Sr-90 (pCi/L)	K (g/L)		Sr-90 (pCi/L) per gram Ca	Cs-137 (pCi/L) per gram K
<u>Indicators</u>							
K-12							
January	KMI - 8	< 0.8	2.8 ± 0.5	1.75 ± 0.21	0.96	2.92	< 5.73
February	- 473	< 0.8	2.9 ± 0.5	1.82 ± 0.23	0.97	2.99	< 5.51
March	- 1056	< 0.6	2.8 ± 0.5	1.75 ± 0.13	0.94	2.98	< 5.73
April	- 1780	< 1.0	2.2 ± 0.5	1.80 ± 0.18	1.01	2.18	< 5.54
May	- 3055	< 0.8	2.5 ± 0.5	1.62 ± 0.11	1.00	2.50	< 6.18
June	- 3874, 5	< 0.9	2.3 ± 0.4	1.61 ± 0.11	0.97	2.37	< 6.20
July	- 4779	< 0.8	1.7 ± 0.3	1.83 ± 0.11	0.94	1.81	< 5.46
August	- 5592	< 1.1	1.7 ± 0.4	1.62 ± 0.12	0.88	1.93	< 6.16
September	- 6375	< 1.6	2.4 ± 0.6	1.76 ± 0.14	0.91	2.64	< 5.69
October	- 7349	< 0.9	1.2 ± 0.3	1.71 ± 0.13	0.99	1.21	< 5.86
November	- 7851	< 1.4	1.2 ± 0.4	1.65 ± 0.22	1.03	1.17	< 6.05
December	- 8628	< 1.0	1.6 ± 0.5	1.70 ± 0.17	0.81	1.98	< 5.88
K-19							
January	KMI - 9	< 0.9	2.3 ± 0.6	1.71 ± 0.18	0.97	2.37	< 5.84
February	- 474	< 1.0	1.9 ± 0.4	1.60 ± 0.17	0.84	2.26	< 6.27
March	- 1057	< 0.6	1.9 ± 0.4	1.66 ± 0.15	0.96	1.98	< 6.01
April	- 1781	< 1.2	1.8 ± 0.5	1.60 ± 0.15	0.93	1.94	< 6.27
May	- 3056	< 0.8	1.4 ± 0.4	1.61 ± 0.11	0.97	1.44	< 6.22
June	- 3876	< 0.9	1.8 ± 0.4	1.57 ± 0.11	0.91	1.98	< 6.36
July	- 4780	< 0.8	1.4 ± 0.3	1.51 ± 0.13	0.91	1.54	< 6.60
August	- 5593	< 1.1	1.6 ± 0.4	1.59 ± 0.13	0.90	1.78	< 6.29
September	- 6376	< 1.1	0.9 ± 0.3	1.71 ± 0.11	0.96	0.94	< 5.84
October	- 7350	< 1.1	1.5 ± 0.4	1.66 ± 0.13	0.97	1.55	< 6.03
November	- 7852	< 1.7	1.6 ± 0.4	1.47 ± 0.20	0.93	1.72	< 6.81
December	- 8629	< 1.0	1.6 ± 0.4	1.53 ± 0.17	0.98	1.63	< 6.55

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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).

1996 Collection Period	Lab Code	Concentration			Ca (g/L)	Ratios	
		Sr-89 (pCi/L)	Sr-90 (pCi/L)	K (g/L)		Sr-90 (pCi/L) per gram Ca	Cs-137 (pCi/L) per gram K
<u>Control</u>							
K-3							
January	KMI - 4	<0.8	1.3 ± 0.4	1.72 ± 0.20	0.95	1.37	<5.81
February	- 469	<0.8	1.1 ± 0.4	1.69 ± 0.21	0.93	1.18	<5.92
March	- 1052	<0.5	1.2 ± 0.3	1.83 ± 0.18	0.96	1.25	<5.47
April	- 1775	<1.1	1.2 ± 0.4	1.65 ± 0.16	0.89	1.35	<6.05
May	- 3050	<0.9	1.4 ± 0.4	1.68 ± 0.12	0.96	1.46	<5.97
June	- 3870	<0.9	1.2 ± 0.4	1.79 ± 0.11	1.07	1.12	<5.60
July	- 4775	<1.3	0.7 ± 0.3	1.58 ± 0.10	1.05	0.67	<6.31
August	- 5588	<1.7	1.6 ± 0.5	1.75 ± 0.09	0.91	1.76	<5.71
September	- 6371	<1.3	1.4 ± 0.4	1.64 ± 0.10	0.93	1.51	<6.09
October	- 7345	<1.2	1.3 ± 0.4	1.65 ± 0.13	0.97	1.34	<6.05
November	- 7846, 7	<1.3	1.0 ± 0.2	1.72 ± 0.13	1.20	0.83	<5.81
December	- 8624	<1.0	1.4 ± 0.4	1.68 ± 0.15	0.90	1.56	<5.97
K-6							
January	KMI - 7	<0.9	1.5 ± 0.4	1.53 ± 0.20	1.07	1.40	<6.55
February	- 472	<1.0	1.6 ± 0.4	1.54 ± 0.18	1.06	1.51	<6.50
March	- 1055	<0.7	1.7 ± 0.4	1.62 ± 0.14	1.03	1.65	<6.18
April	- 1778, 9	<0.9	2.1 ± 0.3	1.63 ± 0.10	1.06	1.98	<6.13
May	- 3053, 4	<0.8	1.6 ± 0.3	1.54 ± 0.14	1.05	1.52	<6.48
June	- 3873	<0.9	1.7 ± 0.4	1.51 ± 0.10	1.09	1.56	<6.60
July	- 4778	<0.9	1.9 ± 0.3	1.48 ± 0.14	0.99	1.92	<6.76
August	- 5591	<1.2	2.4 ± 0.5	1.50 ± 0.13	1.01	2.38	<6.65
September	- 6374	<1.2	1.7 ± 0.4	1.63 ± 0.15	1.14	1.49	<6.13
October	- 7348	<1.1	1.6 ± 0.4	1.51 ± 0.15	1.01	1.58	<6.63
November	- 7850	<1.3	1.1 ± 0.3	1.53 ± 0.15	1.15	0.96	<6.55
December	- 8627	<1.0	1.3 ± 0.5	1.65 ± 0.13	0.82	1.59	<6.05

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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).

1996 Collection Period	Lab Code	Concentration			Ca (g/L)	Ratios	
		Sr-89 (pCi/L)	Sr-90 (pCi/L)	K (g/L)		Sr-90 (pCi/L) per gram Ca	Cs-137 (pCi/L) per gram K
<u>Control</u>							
K-28							
January	KMI - 10	<0.7	1.7 ±0.4	1.76 ± 0.20	0.87	1.95	<5.69
February	- 475	< 0.6	2.0 ±0.5	1.61 ± 0.18	1.02	1.96	<6.22
March	- 1058, 9	< 0.6	1.9 ± 0.3	1.76 ± 0.13	0.87	2.18	<5.69
April	- 1782	< 1.0	1.8 ± 0.5	1.68 ± 0.20	0.74	2.43	<5.97
May	- 3057	< 0.8	1.8 ± 0.5	1.71 ± 0.09	0.93	1.94	<5.84
June	- 3877	< 0.9	1.5 ± 0.4	1.57 ± 0.10	0.90	1.67	<6.38
July	- 4781	< 2.4	1.9 ± 0.7	1.69 ± 0.10	0.86	2.21	<5.92
August	- 5594	< 1.1	1.9 ± 0.4	1.59 ± 0.12	0.90	2.11	<6.29
September	- 6377	< 1.3	1.8 ± 0.4	1.78 ± 0.14	0.92	1.96	<5.62
October	- 7351, 2	< 1.1	1.6 ± 0.3	1.67 ± 0.11	0.95	1.68	<5.99
November	- 7853	< 1.3	1.2 ± 0.4	1.70 ± 0.17	1.03	1.17	<5.88
December	- 8630	< 0.9	1.3 ± 0.4	1.63 ± 0.20	0.89	1.46	<6.13

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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)				
<u>Indicator</u>				
<u>K-1g</u>				
Date Collected	01-02-96	04-01-96	07-01-96	10-01-96
Lab Code	KWW-32	KWW-1792	KWW-4301	KWW-6757
Gross alpha	5.0 ± 2.4	4.1±2.3	5.8±2.2	2.8 ± 2.1
Gross beta	5.8 ± 2.7	4.2±2.6	5.3±2.4	3.6 ± 1.4
K-40 (flame photometry)	2.08	2.42	2.68	2.25
Mn-54	<15	<15	<15	<15
Fe-59	<30	<30	<30	<30
Co-58	<15	<15	<15	<15
Co-60	<15	<15	<15	<15
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
<u>K-1h</u>				
Date Collected	01-02-96	04-01-96	07-01-96	10-01-96
Lab Code	KWW-33	KWW-1793	KWW-4302	KWW-6758
Gross alpha	5.2 ± 2.4	4.5 ± 2.2	<2.6	6.5 ± 2.3
Gross beta	5.3 ± 2.4	3.9 ± 2.5	4.2±2.6	6.9 ± 1.6
K-40 (flame photometry)	2.34	1.99	2.68	2.34
Mn-54	<15	<15	<15	<15
Fe-59	<30	<30	<30	<30
Co-58	<15	<15	<15	<15
Co-60	<15	<15	<15	<15
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)				
<u>Indicator</u>				
<u>K-10</u>				
Date Collected	01-02-96	04-01-96	07-01-96	10-01-96
Lab Code	KWW-34	KWW-1794	KWW-4303	KWW-6761
Gross beta	1.5 ± 0.3	<0.8	0.7 ± 0.3	0.8 ± 0.3
K-40 (flame photometry)	1.04	<0.87	<0.87	<0.87
Mn-54	<15	<15	<15	<15
Fe-59	<30	<30	<30	<30
Co-58	<15	<15	<15	<15
Co-60	<15	<15	<15	<15
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
<u>K-11</u>				
Date Collected	01-02-96	04-01-96	07-01-96	10-01-96
Lab Code	KWW-35	KWW-1795	KWW-4304	KWW-6762
Gross beta	0.9 ± 0.3	1.5 ± 0.5	1.0 ± 0.3	1.1 ± 0.3
K-40 (flame photometry)	<0.87	<0.87	0.95	<0.87
Mn-54	<15	<15	<15	<15
Fe-59	<30	<30	<30	<30
Co-58	<15	<15	<15	<15
Co-60	<15	<15	<15	<15
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 16. Well water samples, analyses for gross alpha, gross beta, potassium-40, and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/L)				
<u>Indicator (continued)</u>				
<u>K-12</u>				
Date Collected	01-02-96	04-01-96	07-01-96	10-01-96
Lab Code	KWW-36	KWW-1796	KWW-4305, 6	KWW-6763
Gross beta	1.4 ± 0.3	<1.1	1.2 ± 0.2	1.6 ± 0.5
K-40 (flame photometry)	1.04	0.95	1.21	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
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
<u>Control</u>				
<u>K-13</u>				
Date Collected	01-02-96	04-01-96	07-01-96	10-01-96
Lab Code	KWW-37	KWW-1797	KWW-4307	KWW-6764
Gross beta	1.5 ± 0.4	1.1 ± 0.4	1.3 ± 0.2	1.3 ± 0.3
K-40 (flame photometry)	0.95	<0.87	1.21	<0.87
Mn-54	<15	<15	<15	<15
Fe-59	<30	<30	<30	<30
Co-58	<15	<15	<15	<15
Co-60	<15	<15	<15	<15
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
01-02-96	KWW -32	<330	<0.8	1.6±0.4
04-01-96	-1792	<330	<0.9	0.6±0.3
07-01-96	-4301	<330	<1.1	<0.5
10-01-96	-6757	<330	<0.6	<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.

Location	Indicator			Control
	K-20	K-27	K-29	K-24
Date Collected	NS ^a	NS ^a	09-02-96	09-02-96
Lab Code	-	-	KME-6024	KME-6023
Gross Alpha	-	-	<0.05	<0.05
Gross beta	-	-	3.50±0.10	3.66±0.12
Be-7	-	-	<0.18	<0.24
K-40	-	-	3.24±0.59	2.60±0.36
Nb-95	-	-	<0.033	<0.022
Zr-95	-	-	<0.044	<0.049
Ru-103	-	-	<0.015	<0.030
Ru-106	-	-	<0.090	<0.18
Cs-134	-	-	<0.029	<0.017
Cs-137	-	-	<0.022	<0.018
Ce-141	-	-	<0.029	<0.029
Ce-144	-	-	<0.071	<0.13

^a NS = No sample; sample not available from this location.

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Table 19. Egg samples collected from Pectum Farm (K-24), analyses for gross beta, strontium-89, strontium-90, and gamma-emitting isotopes.
Collection: Quarterly.

Sample Description and Concentration (pCi/g wet)				
Date Collected Lab Code	01-02-96 KE-3	04-01-96 KE-1783	07-01-96 KE-4284, 5	10-01-96 KE-6783, 4
Gross beta	1.11 ± 0.03	1.18 ± 0.04	1.08 ± 0.04	0.95 ± 0.02
Sr-89	<0.004	<0.003	<0.004	<0.004
Sr-90	<0.002	<0.002	<0.001	<0.002
Be-7	<0.076	<0.030	<0.045	<0.038
K-40	1.16±0.23	1.31±0.15	1.15±0.11	1.02±0.10
Nb-95	<0.005	<0.006	<0.006	<0.006
Zr-95	<0.011	<0.013	<0.011	<0.006
Ru-103	<0.008	<0.004	<0.006	<0.005
Ru-106	<0.058	<0.027	<0.021	<0.040
Cs-134	<0.004	<0.006	<0.005	<0.003
Cs-137	<0.008	<0.006	<0.006	<0.003
Ce-141	<0.014	<0.007	<0.012	<0.010
Ce-144	<0.050	<0.045	<0.023	<0.040

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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			
Location	K-17	K-17			
Date Collected	09-03-96	09-03-96			
Lab Code	KVE-6030	KVE-6031, 2			
Type	Cabbage	Squash			
Gross beta	2.14 ± 0.14	2.81±0.06			
Sr-89	<0.005	<0.002			
Sr-90	0.009±0.002	<0.001			
Be-7	0.44±0.14	<0.041			
K-40	2.36±0.29	3.30±0.18			
Nb-95	<0.014	<0.005			
Zr-95	<0.018	<0.007			
Ru-103	<0.009	<0.003			
Ru-106	<0.062	<0.045			
Cs-134	<0.009	<0.007			
Cs-137	<0.014	<0.005			
Ce-141	<0.020	<0.011			
Ce-144	<0.064	<0.035			
		Control			
Location	K-26	K-26	K-26	K-26	
Date Collected	09-04-96	09-04-96	09-04-96	09-04-96	
Lab Code	KVE-6033	KVE-6034	KVE-6035	KVE-6036	
Type	Cabbage	Brussel Sprouts	Cauliflower	Corn	
Gross beta	1.39±0.04	4.50±0.14	2.49±0.07	2.07±0.06	
Sr-89	<0.002	<0.003	<0.002	<0.004	
Sr-90	<0.001	<0.001	<0.001	<0.002	
Be-7	<0.083	<0.076	<0.078	<0.050	
K-40	1.80±0.25	3.40±0.25	2.14±0.24	1.96±0.29	
Nb-95	<0.012	<0.004	<0.009	<0.011	
Zr-95	<0.021	<0.008	<0.019	<0.013	
Ru-103	<0.007	<0.006	<0.009	<0.010	
Ru-106	<0.12	<0.040	<0.036	<0.062	
Cs-134	<0.010	<0.009	<0.005	<0.011	
Cs-137	<0.010	<0.010	<0.008	<0.011	
Ce-141	<0.026	<0.009	<0.015	<0.016	
Ce-144	<0.097	<0.056	<0.061	<0.069	

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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	
	K-23	K-23
Location	K-23	K-23
Date Collected	08-01-96	08-01-96
Lab Code	KVE-5178	KVE-5179
Type	Clover	Oats
Gross beta	4.56 ± 0.23	4.59 ± 0.19
Sr-89	<0.015	<0.013
Sr-90	<0.007	<0.006
Be-7	1.38 ± 0.26	1.04 ± 0.41
K-40	5.52 ± 0.59	3.92 ± 0.53
Nb-95	< 0.012	< 0.030
Zr-95	< 0.028	< 0.038
Ru-103	< 0.012	< 0.029
Ru-106	< 0.097	< 0.24
Cs-134	< 0.010	< 0.025
Cs-137	< 0.027	< 0.024
Ce-141	< 0.047	< 0.054
Ce-144	< 0.16	< 0.20
Location		
Date Collected		
Lab Code		
Type		
Gross beta		
Sr-89		
Sr-90		
Be-7		
K-40		
Nb-95		
Zr-95		
Ru-103		
Ru-106		
Cs-134		
Cs-137		
Ce-141		
Ce-144		

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Table 21. Cattlefeed samples, analyses for gross beta, strontium-89, strontium-90, and gamma-emitting isotopes.
Collection: First Quarter.

Sample Description and Concentration (pCi/g wet)		
	Control	
Location	K-3	K-3
Date Collected	01-03-96	01-03-96
Lab Code	KCF-17	KCF-11
Type	Silage	Hay
Gross beta	2.96 ± 0.11	11.04 ± 0.36
Sr-89	<0.006	<0.013
Sr-90	0.003±0.001	0.056±0.007
Be-7	0.70±0.20	<0.139
K-40	3.16±0.38	11.56±0.65
Nb-95	<0.012	<0.017
Zr-95	<0.036	<0.044
Ru-103	<0.016	<0.014
Ru-106	<0.084	<0.083
Cs-134	<0.010	<0.010
Cs-137	<0.011	<0.009
Ce-141	<0.025	<0.026
Ce-144	<0.10	<0.092
Location	K-6	K-6
Date Collected	01-02-96	01-02-96
Lab Code	KCF-20, 1	KCF-14
Type	Silage	Hay
Gross beta	3.87 ± 0.10	10.98 ± 0.40
Sr-89	<0.009	<0.023
Sr-90	0.005±0.002	0.093±0.013
Be-7	0.39±0.08	<0.23
K-40	3.67±0.20	12.45±0.55
Nb-95	<0.007	<0.019
Zr-95	<0.008	<0.029
Ru-103	<0.007	<0.016
Ru-106	<0.027	<0.15
Cs-134	<0.003	<0.022
Cs-137	<0.005	<0.020
Ce-141	<0.020	<0.043
Ce-144	<0.025	<0.17

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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			
	K-4	K-4	K-5	K-5
Location				
Date Collected	01-02-96	01-02-96	01-02-96	01-02-96
Lab Code	KCF-18	KCF-12	KCF-19	KCF-13
Type	Silage	Hay	Silage	Hay
Gross beta	6.41 ± 0.21	10.97 ± 0.22	6.39 ± 0.22	17.98 ± 0.29
Sr-89	<0.006	<0.014	<0.016	<0.019
Sr-90	0.010±0.002	0.029±0.006	<0.007	0.051±0.010
Be-7	0.33±0.14	<0.19	<0.18	<0.24
K-40	6.93±0.52	12.92±0.45	6.46±0.51	19.37±0.64
Nb-95	<0.014	<0.023	<0.015	<0.022
Zr-95	<0.034	<0.033	<0.040	<0.054
Ru-103	<0.008	<0.021	<0.018	<0.017
Ru-106	<0.079	<0.079	<0.16	<0.20
Cs-134	<0.020	<0.018	<0.008	<0.026
Cs-137	<0.010	<0.020	<0.019	<0.026
Ce-141	<0.028	<0.037	<0.028	<0.044
Ce-144	<0.093	<0.12	<0.15	<0.18
Location				
Date Collected	01-02-96	01-02-96	01-02-96	01-02-96
Lab Code	KCF-22	KCF-15	KCF-23	KCF-16
Type	Silage	Hay	Silage	Hay
Gross beta	2.30 ± 0.09	12.23 ± 0.38	7.84 ± 0.28	15.23 ± 0.50
Sr-89	<0.012	<0.016	<0.011	<0.021
Sr-90	<0.005	0.021±0.006	0.035±0.006	0.050±0.010
Be-7	0.34±0.14	<0.19	<0.25	0.55±0.18
K-40	1.99±0.29	13.26±0.57	8.93±0.62	15.90±0.55
Nb-95	<0.007	<0.028	<0.012	<0.013
Zr-95	<0.027	<0.049	<0.034	<0.038
Ru-103	<0.016	<0.020	<0.022	<0.011
Ru-106	<0.089	<0.17	<0.14	<0.086
Cs-134	<0.012	<0.027	<0.022	<0.016
Cs-137	<0.016	<0.013	<0.015	<0.018
Ce-141	<0.012	<0.035	<0.037	<0.029
Ce-144	<0.067	<0.085	<0.17	<0.11

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Table 22. Grass samples, analyses for gross beta, strontium-89, strontium-90, and gamma-emitting isotopes.
Collection: Quarterly, April through December

Sample Description and Concentration (pCi/g wet)				
Location	Indicator			Control
	K-1b	K-1f	K-4	K-3
Date Collected	06-03-96	06-03-96	06-03-96	06-03-96
Lab Code	KG-3528	KG-3529	KG-3532	KG-3530, 1
Gross beta	4.40 ± 0.10	5.00 ± 0.13	4.87 ± 0.11	4.84 ± 0.70
Sr-89	<0.012	<0.007	<0.005	<0.005
Sr-90	<0.005	<0.002	<0.002	<0.002
Be-7	0.40 ± 0.18	1.32 ± 0.29	1.13 ± 0.23	0.50 ± 0.12
K-40	5.48 ± 0.55	5.96 ± 0.56	5.26 ± 0.54	4.74 ± 0.34
Nb-95	< 0.022	< 0.024	< 0.022	< 0.013
Zr-95	< 0.052	< 0.023	< 0.045	< 0.017
Ru-103	< 0.020	< 0.021	< 0.016	< 0.009
Ru-106	< 0.12	< 0.090	< 0.17	< 0.15
Cs-134	< 0.013	< 0.019	< 0.018	< 0.017
Cs-137	< 0.021	< 0.020	< 0.021	< 0.009
Ce-141	< 0.036	< 0.039	< 0.038	< 0.019
Ce-144	< 0.15	< 0.11	< 0.13	< 0.094
Location	K-5	K-12	K-19	K-6
Date Collected	06-03-96	06-03-96	06-03-96	06-03-96
Lab Code	KG-3533	KG-3535	KG-3536	KG-3534
Gross beta	5.25 ± 0.13	5.17 ± 0.12	4.23 ± 1.00	5.84 ± 0.12
Sr-89	<0.008	<0.011	<0.005	<0.007
Sr-90	<0.003	<0.006	<0.002	<0.003
Be-7	0.28 ± 0.12	< 0.18	0.95 ± 0.25	< 0.18
K-40	6.21 ± 0.44	4.98 ± 0.48	5.42 ± 0.57	5.44 ± 0.56
Nb-95	< 0.008	< 0.012	< 0.019	< 0.024
Zr-95	< 0.015	< 0.020	< 0.056	< 0.046
Ru-103	< 0.016	< 0.017	< 0.027	< 0.009
Ru-106	< 0.12	< 0.077	< 0.23	< 0.18
Cs-134	< 0.007	< 0.015	< 0.030	< 0.026
Cs-137	< 0.014	< 0.014	< 0.023	< 0.015
Ce-141	< 0.030	< 0.025	< 0.063	< 0.024
Ce-144	< 0.084	< 0.058	< 0.20	< 0.17

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

Location	Indicator			Control
	K-1b	K-1f	K-4	K-3
Date Collected	08-01-96	08-01-96	08-01-96	08-01-96
Lab Code	KG-5180	KG-5181	KG-5183	KG-5182
Gross beta	5.12 ± 0.19	6.72 ± 0.26	6.55 ± 0.23	8.10 ± 0.37
Sr-89	<0.004	<0.006	<0.009	<0.012
Sr-90	<0.002	<0.003	<0.004	0.009±0.003
Be-7	0.66 ± 0.21	2.03 ± 0.31	2.10 ± 0.33	1.03 ± 0.20
K-40	5.13 ± 0.46	6.70 ± 0.66	6.56 ± 0.69	7.98 ± 0.52
Nb-95	< 0.018	< 0.026	< 0.018	< 0.019
Zr-95	< 0.031	< 0.046	< 0.032	< 0.027
Ru-103	< 0.015	< 0.024	< 0.014	< 0.013
Ru-106	< 0.093	< 0.19	< 0.12	< 0.13
Cs-134	< 0.013	< 0.016	< 0.015	< 0.018
Cs-137	< 0.017	< 0.025	< 0.029	< 0.014
Ce-141	< 0.026	< 0.045	< 0.030	< 0.021
Ce-144	< 0.14	< 0.19	< 0.11	< 0.095
Location	K-5	K-12	K-19	K-6
Date Collected	08-01-96	08-01-96	08-01-96	08-01-96
Lab Code	KG-5184	KG-5186	KG-5187	KG-5185
Gross beta	6.99 ± 0.29	8.05 ± 0.25	5.33 ± 0.20	7.19 ± 0.17
Sr-89	<0.013	<0.004	<0.009	<0.004
Sr-90	0.006±0.003	<0.002	0.004±0.002	<0.002
Be-7	2.75 ± 0.38	1.06 ± 0.23	1.44 ± 0.20	<0.33
K-40	8.04 ± 0.72	8.47 ± 0.68	5.74 ± 0.44	6.75 ± 0.73
Nb-95	< 0.033	< 0.015	< 0.016	< 0.031
Zr-95	< 0.059	< 0.043	< 0.029	< 0.063
Ru-103	< 0.027	< 0.011	< 0.018	< 0.033
Ru-106	< 0.23	< 0.16	< 0.085	< 0.26
Cs-134	< 0.027	< 0.028	< 0.018	< 0.031
Cs-137	< 0.015	< 0.014	< 0.016	< 0.023
Ce-141	< 0.038	< 0.030	< 0.020	< 0.062
Ce-144	< 0.18	< 0.081	< 0.12	< 0.23

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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)				
Location	Indicator			Control
	K-1b	K-1f	K-4	K-3
Date Collected	10-01-96	10-01-96	10-01-96	10-01-96
Lab Code	KG-6967, 8	KG-6769	KG-6771	KG-6770
Gross beta	4.97 ± 0.17	6.68 ± 0.32	7.26 ± 0.24	6.28 ± 0.25
Sr-89	<0.022	<0.045	<0.022	<0.018
Sr-90	<0.006	<0.012	<0.007	0.010±0.003
Be-7	2.16 ± 0.26	3.22 ± 0.30	4.91 ± 0.25	3.88 ± 0.20
K-40	4.60 ± 0.43	6.40 ± 0.59	9.61 ± 0.41	6.56 ± 0.39
Nb-95	< 0.021	< 0.031	< 0.019	< 0.019
Zr-95	< 0.019	< 0.059	< 0.039	< 0.018
Ru-103	< 0.009	< 0.027	< 0.011	< 0.008
Ru-106	< 0.14	< 0.21	< 0.13	< 0.16
Cs-134	< 0.017	< 0.027	< 0.019	< 0.019
Cs-137	< 0.016	< 0.027	< 0.018	< 0.019
Ce-141	< 0.033	< 0.024	< 0.019	< 0.026
Ce-144	< 0.15	< 0.17	< 0.120	< 0.10
Location	K-5	K-12	K-19	K-6
Date Collected	10-01-96	10-01-96	10-01-96	10-01-96
Lab Code	KG-6772	KG-6774	KG-6775	KG-6773
Gross beta	9.80 ± 0.32	8.51 ± 0.29	7.65 ± 0.27	7.10 ± 0.26
Sr-89	<0.013	<0.024	<0.036	<0.026
Sr-90	0.010±0.005	<0.005	0.019±0.007	<0.007
Be-7	4.03 ± 0.35	2.69 ± 0.35	1.36 ± 0.27	4.48 ± 0.25
K-40	8.83 ± 0.63	10.61 ± 0.70	7.77 ± 0.62	6.16 ± 0.41
Nb-95	< 0.011	< 0.013	< 0.020	< 0.019
Zr-95	< 0.031	< 0.056	< 0.033	< 0.024
Ru-103	< 0.016	< 0.011	< 0.011	< 0.016
Ru-106	< 0.099	< 0.23	< 0.097	< 0.12
Cs-134	< 0.021	< 0.022	< 0.024	< 0.018
Cs-137	< 0.022	< 0.022	< 0.020	< 0.019
Ce-141	< 0.047	< 0.047	< 0.023	< 0.021
Ce-144	< 0.084	< 0.094	< 0.13	< 0.090

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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)			
Location	Indicator		
	K-1f	K-4	K-5
Date Collected	05-01-96	05-01-96	05-01-96
Lab Code	KSO-2656	KSO-2658	KSO-2659
Gross alpha	8.02 ± 3.65	9.77 ± 3.69	8.10 ± 3.60
Gross beta	24.51 ± 3.45	29.16 ± 3.44	29.16 ± 3.37
Sr-89	<0.035	<0.041	<0.033
Sr-90	<0.011	0.015±0.010	0.031±0.009
Be-7	< 0.16	< 0.18	< 0.17
K-40	20.10 ± 0.69	22.95 ± 0.77	26.99 ± 0.81
Nb-95	< 0.022	< 0.016	< 0.015
Zr-95	< 0.035	< 0.043	< 0.038
Ru-103	< 0.007	< 0.021	< 0.017
Ru-106	< 0.09	< 0.11	< 0.15
Cs-134	< 0.041	< 0.044	< 0.046
Cs-137	< 0.018	0.14 ± 0.025	0.16 ± 0.025
Ce-141	< 0.020	< 0.039	< 0.037
Ce-144	< 0.062	< 0.14	< 0.13
Location	K-1f	K-4	K-5
Date Collected	10-01-96	10-01-96	10-01-96
Lab Code	KSO-6776	KSO-6778	KSO-6779
Gross alpha	8.54 ± 3.60	8.80 ± 3.73	8.89 ± 3.65
Gross beta	24.68 ± 3.27	22.68 ± 3.13	29.68 ± 3.38
Sr-89	<0.066	<0.036	<0.051
Sr-90	0.061±0.017	0.11±0.014	0.077±0.015
Be-7	0.60 ± 0.23	< 0.18	<0.17
K-40	15.18 ± 0.60	14.97 ± 0.63	22.30 ± 0.79
Nb-95	< 0.013	< 0.016	< 0.020
Zr-95	< 0.019	< 0.013	< 0.031
Ru-103	< 0.020	< 0.020	< 0.025
Ru-106	< 0.14	< 0.14	< 0.18
Cs-134	< 0.015	< 0.017	< 0.013
Cs-137	0.19 ± 0.024	0.27 ± 0.032	0.16 ± 0.032
Ce-141	< 0.043	< 0.019	< 0.046
Ce-144	< 0.13	< 0.07	< 0.11

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

	Indicator	
	K-12	K-19
Location	K-12	K-19
Date Collected	05-01-96	05-01-96
Lab Code	KSO-2661	KSO-2662
Gross alpha	10.14 ± 4.07	6.14 ± 2.23
Gross beta	24.20 ± 3.39	15.64 ± 1.90
Sr-89	<0.058	<0.071
Sr-90	<0.017	<0.025
Be-7	< 0.17	< 0.15
K-40	20.39 ± 0.73	16.63 ± 0.67
Nb-95	< 0.016	< 0.012
Zr-95	< 0.016	< 0.033
Ru-103	< 0.019	< 0.011
Ru-106	< 0.14	< 0.16
Cs-134	< 0.042	< 0.039
Cs-137	0.12 ± 0.024	0.27 ± 0.026
Ce-141	< 0.043	< 0.038
Ce-144	< 0.15	< 0.058
Location	K-12	K-19
Date Collected	10-01-96	10-01-96
Lab Code	KSO-6781	KSO-6782
Gross alpha	4.79 ± 3.33	9.50 ± 3.80
Gross beta	26.59 ± 3.27	29.90 ± 3.37
Sr-89	<0.078	<0.067
Sr-90	0.103 ± 0.020	0.035 ± 0.013
Be-7	<0.23	<0.21
K-40	19.72 ± 0.78	22.04 ± 0.80
Nb-95	< 0.017	< 0.017
Zr-95	< 0.036	< 0.038
Ru-103	< 0.016	< 0.013
Ru-106	< 0.17	< 0.18
Cs-134	< 0.025	< 0.023
Cs-137	0.083 ± 0.024	0.094 ± 0.029
Ce-141	< 0.044	< 0.047
Ce-144	< 0.093	< 0.072

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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	
	K-3	K-6
Location	K-3	K-6
Date Collected	05-01-96	05-01-96
Lab Code	KSO-2657	KSO-2660
Gross alpha	5.29 ± 3.03	8.50 ± 3.87
Gross beta	24.73 ± 3.19	23.22 ± 3.30
Sr-89	<0.023	<0.034
Sr-90	0.038±0.009	0.061±0.014
Be-7	< 0.18	< 0.16
K-40	21.26 ± 0.73	20.92 ± 0.76
Nb-95	< 0.017	< 0.021
Zr-95	< 0.039	< 0.037
Ru-103	< 0.019	< 0.009
Ru-106	< 0.14	< 0.12
Cs-134	< 0.040	< 0.048
Cs-137	0.23 ± 0.028	0.17 ± 0.025
Ce-141	< 0.041	< 0.019
Ce-144	< 0.11	< 0.11
Location	K-3	K-6
Date Collected	10-01-96	10-01-96
Lab Code	KSO-6777	KSO-6780
Gross alpha	4.89 ± 3.03	7.45 ± 3.61
Gross beta	26.54 ± 3.09	24.07 ± 3.03
Sr-89	<0.045	<0.054
Sr-90	0.034±0.011	0.015±0.022
Be-7	<0.20	<0.17
K-40	21.11 ± 0.76	16.68 ± 0.67
Nb-95	< 0.011	< 0.023
Zr-95	< 0.039	< 0.037
Ru-103	< 0.014	< 0.016
Ru-106	< 0.092	< 0.11
Cs-134	< 0.022	< 0.022
Cs-137	0.12 ± 0.025	0.16 ± 0.026
Ce-141	< 0.026	< 0.043
Ce-144	< 0.066	< 0.11

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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	01-02-96	02-01-96	03-04-96
Lab Code	KSW-24	KSW-476	KSW-1060
Gross beta			
Suspended Solids	<0.6	<0.3	<1.2
Dissolved Solids	8.5 ± 1.1	2.1 ± 0.7	6.7 ± 1.1
Total Residue	8.5 ± 1.1	2.1 ± 0.7	6.7 ± 1.1
K-40 (flame photometry)	5.02	1.38	6.83
Mn-54	<15	<15	<15
Fe-59	<30	<30	<30
Co-58	<15	<15	<15
Co-60	<15	<15	<15
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	01-02-96	02-01-96	03-04-96
Lab Code	KSW-25	KSW-477	KSW-1061
Gross beta			
Suspended Solids	<0.3	<0.2	<0.7
Dissolved Solids	3.0 ± 0.7	2.9 ± 0.6	3.6 ± 0.7
Total Residue	3.0 ± 0.7	2.9 ± 0.6	3.6 ± 0.7
K-40 (flame photometry)	1.56	1.04	3.63
Mn-54	<15	<15	<15
Fe-59	<30	<30	<30
Co-58	<15	<15	<15
Co-60	<15	<15	<15
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	04-01-96	05-01-96	06-03-96
Lab Code	KSW-1784	KSW-2663	KSW-3558
Gross beta			
Suspended Solids	<1.2	<0.9	<0.8
Dissolved Solids	6.1 ± 1.0	7.1 ± 1.0	23.3 ± 2.2
Total Residue	6.1 ± 1.0	7.1 ± 1.0	23.3 ± 2.2
K-40 (flame photometry)	6.57	6.66	0.87
Mn-54	<15	<15	<15
Fe-59	<30	<30	<30
Co-58	<15	<15	<15
Co-60	<15	<15	<15
Zr-Nb-95	<15	<15	<15
Cs-134	<10	<10	<10
Cs-137	<10	<10	<10
Ba-La-140	<15	<15	<15
K-1b			
Date Collected	04-01-96	05-01-96	06-03-96
Lab Code	KSW-1785	KSW-2664	KSW-3559
Gross beta			
Suspended Solids	<0.8	<0.8	<0.8
Dissolved Solids	4.6 ± 0.7	5.3 ± 0.8	4.3 ± 0.7
Total Residue	4.6 ± 0.7	5.3 ± 0.8	4.3 ± 0.7
K-40 (flame photometry)	3.03	2.60	2.77
Mn-54	<15	<15	<15
Fe-59	<30	<30	<30
Co-58	<15	<15	<15
Co-60	<15	<15	<15
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	07-01-96	08-01-96	09-03-96
Lab Code	KSW-4293	KSW-5251	KSW-6037
Gross beta			
Suspended Solids	<0.8	<0.4	<0.7
Dissolved Solids	6.4 ± 1.0	8.3 ± 1.1	7.3 ± 1.1
Total Residue	6.4 ± 1.0	8.3 ± 1.1	7.3 ± 1.1
K-40 (flame photometry)	6.92	5.71	5.54
Mn-54	<15	<15	<15
Fe-59	<30	<30	<30
Co-58	<15	<15	<15
Co-60	<15	<15	<15
Zr-Nb-95	<15	<15	<15
Cs-134	<10	<10	<10
Cs-137	<10	<10	<10
Ba-La-140	<15	<15	<15
K-1b			
Date Collected	07-01-96	08-01-96	09-03-96
Lab Code	KSW-4394	KSW-5252	KSW-6038
Gross beta			
Suspended Solids	<0.3	<0.3	<0.5
Dissolved Solids	3.7 ± 0.7	2.9 ± 0.7	3.6 ± 0.7
Total Residue	3.7 ± 0.7	2.9 ± 0.7	3.6 ± 0.7
K-40 (flame photometry)	2.42	1.47	1.99
Mn-54	<15	<15	<15
Fe-59	<30	<30	<30
Co-58	<15	<15	<15
Co-60	<15	<15	<15
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	10-01-96	11-04-96	12-02-96
Lab Code	KSW-6753	KSW-8000	KSW-8631
Gross beta			
Suspended Solids	<0.6	<1.3	<1.0
Dissolved Solids	5.7 ± 0.8	11.2 ± 1.2	13.3 ± 1.4
Total Residue	5.7 ± 0.8	11.2 ± 1.2	13.3 ± 1.4
K-40 (flame photometry)	3.98	9.52	10.38
Mn-54	<15	<15	<15
Fe-59	<30	<30	<30
Co-58	<15	<15	<15
Co-60	<15	<15	<15
Zr-Nb-95	<15	<15	<15
Cs-134	<10	<10	<10
Cs-137	<10	<10	<10
Ba-La-140	<15	<15	<15
K-1b			
Date Collected	10-01-96	11-04-96	12-02-96
Lab Code	KSW-6754	KSW-8001	KSW-8632
Gross beta			
Suspended Solids	<0.7	<0.8	<0.4
Dissolved Solids	3.0 ± 0.5	3.9 ± 0.7	4.4 ± 0.7
Total Residue	3.0 ± 0.5	3.9 ± 0.7	4.4 ± 0.7
K-40 (flame photometry)	1.56	3.98	2.60
Mn-54	<15	<15	<15
Fe-59	<30	<30	<30
Co-58	<15	<15	<15
Co-60	<15	<15	<15
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)			
<u>Indicator</u>			
<u>K-1d</u>			
Date Collected	01-02-96	02-01-96	03-04-96
Lab Code	KSW-26	KSW-478	KSW-1062
Gross beta			
Suspended Solids	<0.1	<0.4	<0.4
Dissolved Solids	2.1 ± 0.5	2.0 ± 0.4	2.0 ± 0.4
Total Residue	2.1 ± 0.5	2.0 ± 0.4	2.0 ± 0.4
K-40 (flame photometry)	1.12	<0.87	1.21
Mn-54	<15	<15	<15
Fe-59	<30	<30	<30
Co-58	<15	<15	<15
Co-60	<15	<15	<15
Zr-Nb-95	<15	<15	<15
Cs-134	<10	<10	<10
Cs-137	<10	<10	<10
Ba-La-140	<15	<15	<15
<u>K-1e</u>			
Date Collected	01-02-96	02-01-96	03-04-96
Lab Code	KSW-27	KSW-479, 80	KSW-1063
Gross beta			
Suspended Solids	<0.4	<0.4	<0.9
Dissolved Solids	5.2 ± 1.3	7.3 ± 0.8	5.0 ± 1.3
Total Residue	5.2 ± 1.3	7.3 ± 0.8	5.0 ± 1.3
K-40 (flame photometry)	3.46	2.34	3.89
Mn-54	<15	<15	<15
Fe-59	<30	<30	<30
Co-58	<15	<15	<15
Co-60	<15	<15	<15
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)			
<u>Indicator</u>			
<u>K-1d</u>			
Date Collected	04-01-96	05-01-96	06-03-96
Lab Code	KSW-1786	KSW-2665	KSW-3560
Gross beta			
Suspended Solids	<0.4	<0.5	<0.5
Dissolved Solids	2.1 ± 0.4	2.6 ± 0.5	1.7 ± 0.4
Total Residue	2.1 ± 0.4	2.6 ± 0.5	1.7 ± 0.4
K-40 (flame photometry)	1.12	1.12	1.12
Mn-54	<15	<15	<15
Fe-59	<30	<30	<30
Co-58	<15	<15	<15
Co-60	<15	<15	<15
Zr-Nb-95	<15	<15	<15
Cs-134	<10	<10	<10
Cs-137	<10	<10	<10
Ba-La-140	<15	<15	<15
<u>K-1e</u>			
Date Collected	04-01-96	05-01-96	06-03-96
Lab Code	KSW-1787	KSW-2666	KSW-3561
Gross beta			
Suspended Solids	<0.3	1.0 ± 0.5	<1.9
Dissolved Solids	4.7 ± 1.2	5.8 ± 1.4	3.7 ± 1.2
Total Residue	4.7 ± 1.2	6.8 ± 1.5	3.7 ± 1.2
K-40 (flame photometry)	3.03	2.16	2.51
Mn-54	<15	<15	<15
Fe-59	<30	<30	<30
Co-58	<15	<15	<15
Co-60	<15	<15	<15
Zr-Nb-95	<15	<15	<15
Cs-134	<10	<10	<10
Cs-137	<10	<10	<10
Ba-La-140	<15	<15	<15

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

Sample Description and Concentration (pCi/L)			
Indicator			
K-1d			
Date Collected	07-01-96	08-01-96	09-03-96
Lab Code	KSW-4295	KSW-5253	KSW-6039
Gross beta			
Suspended Solids	<0.6	<0.7	<0.6
Dissolved Solids	1.9 ± 0.4	1.9 ± 0.5	1.9 ± 0.4
Total Residue	1.9 ± 0.4	1.9 ± 0.5	1.9 ± 0.4
K-40 (flame photometry)	1.21	0.95	0.95
Mn-54	<15	<15	<15
Fe-59	<30	<30	<30
Co-58	<15	<15	<15
Co-60	<15	<15	<15
Zr-Nb-95	<15	<15	<15
Cs-134	<10	<10	<10
Cs-137	<10	<10	<10
Ba-La-140	<15	<15	<15
K-1e			
Date Collected	07-01-96	08-01-96	09-03-96
Lab Code	KSW-4296	KSW-5254	KSW-6040
Gross beta			
Suspended Solids	<0.5	<0.6	<0.8
Dissolved Solids	2.9 ± 1.1	3.2 ± 1.1	7.9 ± 1.5
Total Residue	2.9 ± 1.1	3.2 ± 1.1	7.9 ± 1.5
K-40 (flame photometry)	1.73	1.56	6.57
Mn-54	<15	<15	<15
Fe-59	<30	<30	<30
Co-58	<15	<15	<15
Co-60	<15	<15	<15
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	10-01-96	11-04-96	12-02-96
Lab Code	KSW-6755	KSW-8002	KSW-8633
Gross beta			
Suspended Solids	<0.6	<0.3	<0.4
Dissolved Solids	2.0 ± 0.5	2.3 ± 0.5	2.1 ± 0.5
Total Residue	2.0 ± 0.5	2.3 ± 0.5	2.1 ± 0.5
K-40 (flame photometry)	1.04	1.13	1.04
Mn-54	<15	<15	<15
Fe-59	<30	<30	<30
Co-58	<15	<15	<15
Co-60	<15	<15	<15
Zr-Nb-95	<15	<15	<15
Cs-134	<10	<10	<10
Cs-137	<10	<10	<10
Ba-La-140	<15	<15	<15
K-1e			
Date Collected	10-01-96	11-04-96	12-02-96
Lab Code	KSW-6756	KSW-8003	KSW-8634
Gross beta			
Suspended Solids	<0.7	<0.4	<0.3
Dissolved Solids	7.8 ± 1.5	7.3 ± 1.5	7.3 ± 1.4
Total Residue	7.8 ± 1.5	7.3 ± 1.5	7.3 ± 1.4
K-40 (flame photometry)	5.62	7.01	4.84
Mn-54	<15	<15	<15
Fe-59	<30	<30	<30
Co-58	<15	<15	<15
Co-60	<15	<15	<15
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)			
<u>Indicator</u>			
<u>K-14a</u>			
Date Collected	01-02-96	02-01-96	03-04-96
Lab Code	KSW-30	KSW-483	KSW-1066
Gross beta			
Suspended Solids	<0.3	<0.3	<0.4
Dissolved Solids	3.2 ± 0.6	2.3 ± 0.6	2.0 ± 0.6
Total Residue	3.2 ± 0.6	2.3 ± 0.6	2.0 ± 0.6
K-40 (flame photometry)	<0.87	<0.87	1.21
Mn-54	<15	<15	<15
Fe-59	<30	<30	<30
Co-58	<15	<15	<15
Co-60	<15	<15	<15
Zr-Nb-95	<15	<15	<15
Cs-134	<10	<10	<10
Cs-137	<10	<10	<10
Ba-La-140	<15	<15	<15
<u>K-14b</u>			
Date Collected	01-02-96	02-01-96	03-04-96
Lab Code	KSW-31	KSW-484	KSW-1067
Gross beta			
Suspended Solids	0.7 ± 0.3	<0.3	<0.4
Dissolved Solids	3.2 ± 0.6	2.1 ± 0.6	2.2 ± 0.6
Total Residue	3.9 ± 0.7	2.1 ± 0.6	2.2 ± 0.6
K-40 (flame photometry)	1.04	<0.87	1.21
Mn-54	<15	<15	<15
Fe-59	<30	<30	<30
Co-58	<15	<15	<15
Co-60	<15	<15	<15
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)			
<u>Indicator</u>			
<u>K-14a</u>			
Date Collected	04-01-96	05-01-96	06-03-96
Lab Code	KSW-1790	KSW-2669	KSW-3564
Gross beta			
Suspended Solids	<0.3	<0.3	<0.5
Dissolved Solids	2.8 ± 0.6	5.0 ± 0.8	2.3 ± 0.6
Total Residue	2.8 ± 0.6	5.0 ± 0.8	2.3 ± 0.6
K-40 (flame photometry)	1.73	2.51	1.3
Mn-54	<15	<15	<15
Fe-59	<30	<30	<30
Co-58	<15	<15	<15
Co-60	<15	<15	<15
Zr-Nb-95	<15	<15	<15
Cs-134	<10	<10	<10
Cs-137	<10	<10	<10
Ba-La-140	<15	<15	<15
<u>K-14b</u>			
Date Collected	04-01-96	05-01-96	06-03-96
Lab Code	KSW-1791	KSW-2670	KSW-3565
Gross beta			
Suspended Solids	<0.4	<0.3	<0.6
Dissolved Solids	2.5 ± 0.6	4.8 ± 0.8	3.5 ± 0.7
Total Residue	2.5 ± 0.6	4.8 ± 0.8	3.5 ± 0.7
K-40 (flame photometry)	1.73	2.60	1.21
Mn-54	<15	<15	<15
Fe-59	<30	<30	<30
Co-58	<15	<15	<15
Co-60	<15	<15	<15
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-14a			
Date Collected	07-01-96	08-01-96	09-03-96
Lab Code	KSW-4299	KSW-5257	KSW-6043
Gross beta			
Suspended Solids	<0.3	<0.4	<0.4
Dissolved Solids	1.9 ± 0.6	1.9 ± 0.6	2.1 ± 0.6
Total Residue	1.9 ± 0.6	1.9 ± 0.6	2.1 ± 0.6
K-40 (flame photometry)	1.13	0.95	0.95
Mn-54	<15	<15	<15
Fe-59	<30	<30	<30
Co-58	<15	<15	<15
Co-60	<15	<15	<15
Zr-Nb-95	<15	<15	<15
Cs-134	<10	<10	<10
Cs-137	<10	<10	<10
Ba-La-140	<15	<15	<15
K-14b			
Date Collected	07-01-96	08-01-96	09-03-96
Lab Code	KSW-4300	KSW-5258	KSW-6044
Gross beta			
Suspended Solids	<0.3	<0.3	<0.3
Dissolved Solids	2.0 ± 0.6	1.6 ± 0.7	1.8 ± 0.6
Total Residue	2.0 ± 0.6	1.6 ± 0.7	1.8 ± 0.6
K-40 (flame photometry)	1.13	0.95	0.87
Mn-54	<15	<15	<15
Fe-59	<30	<30	<30
Co-58	<15	<15	<15
Co-60	<15	<15	<15
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-14a			
Date Collected	10-01-96	11-04-96	12-02-96
Lab Code	KSW-6765	KSW-8007	KSW-8638
Gross beta			
Suspended Solids	<0.3	<0.3	<0.4
Dissolved Solids	2.6 ± 0.7	3.0 ± 0.6	2.7 ± 0.6
Total Residue	2.6 ± 0.7	3.0 ± 0.6	2.7 ± 0.6
K-40 (flame photometry)	0.87	0.95	1.04
Mn-54	<15	<15	<15
Fe-59	<30	<30	<30
Co-58	<15	<15	<15
Co-60	<15	<15	<15
Zr-Nb-95	<15	<15	<15
Cs-134	<10	<10	<10
Cs-137	<10	<10	<10
Ba-La-140	<15	<15	<15
K-14b			
Date Collected	10-01-96	11-04-96	12-02-96
Lab Code	KSW-6766	KSW-8007	KSW-8639
Gross beta			
Suspended Solids	<0.3	<0.3	<0.3
Dissolved Solids	2.9 ± 0.6	2.7 ± 0.7	2.1 ± 0.6
Total Residue	2.9 ± 0.6	2.7 ± 0.7	2.1 ± 0.6
K-40 (flame photometry)	0.87	0.95	1.04
Mn-54	<15	<15	<15
Fe-59	<30	<30	<30
Co-58	<15	<15	<15
Co-60	<15	<15	<15
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)						
<u>Control</u>						
<u>K-9</u>						
Date Collected	01-02-96		02-01-96		03-04-96	
Lab Code	KSW-28	KSW-29	KSW-481	KSW-482	KSW-1064	KSW-1065
	(Raw)	(Tap)	(Raw)	(Tap)	(Raw)	(Tap)
Gross beta						
Suspended Solids	<0.3	<0.3	<0.3	<0.2	<0.4	<0.4
Dissolved Solids	2.1 ± 0.7	1.9 ± 0.4	3.5 ± 0.8	2.1 ± 0.4	1.6 ± 0.7	2.0 ± 0.4
Total Residue	2.1 ± 0.7	1.9 ± 0.4	3.5 ± 0.8	2.1 ± 0.4	1.6 ± 0.7	2.0 ± 0.4
K-40 (flame photometry)	0.95	1.12	<0.87	<0.87	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
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
<u>K-9</u>						
Date Collected	04-01-96		05-01-96		06-03-96	
Lab Code	KSW-1788	KSW-1789	KSW-2667	KSW-2668	KSW-3562	KSW-3563
	(Raw)	(Tap)	(Raw)	(Tap)	(Raw)	(Tap)
Gross beta						
Suspended Solids	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Dissolved Solids	2.2 ± 0.8	2.0 ± 0.8	2.7 ± 0.9	2.7 ± 0.5	1.9 ± 0.8	2.0 ± 0.5
Total Residue	2.2 ± 0.8	2.0 ± 0.8	2.7 ± 0.9	2.7 ± 0.5	1.9 ± 0.8	2.0 ± 0.5
K-40 (flame photometry)	1.04	1.04	1.03	1.03	1.04	1.04
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
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 samples, analyses for gross beta, potassium-40, and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/L)						
Control						
K-9						
Date Collected	07-01-96		08-01-96		09-03-96	
Lab Code	KSW-4297	KSW-4298	KSW-5255	KSW-5256	KSW-6041	KSW-6042
	(Raw)	(Tap)	(Raw)	(Tap)	(Raw)	(Tap)
Gross beta						
Suspended Solids	<0.7	<0.3	<0.3	<0.3	<0.3	<0.4
Dissolved Solids	1.7 ± 0.7	2.3 ± 0.5	2.3 ± 0.9	2.3 ± 0.5	2.0 ± 0.7	2.4 ± 0.4
Total Residue	1.7 ± 0.7	2.3 ± 0.5	2.3 ± 0.9	2.3 ± 0.5	2.0 ± 0.7	2.4 ± 0.4
K-40 (flame photometry)	1.13	1.13	0.95	0.95	0.95	0.95
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
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
K-9						
Date Collected	10-01-96		11-04-96		12-02-96	
Lab Code	KSW-6760	KSW-6759	KSW-8004	KSW-8005	KSW-8635, 6	KSW-8637
	(Raw)	(Tap)	(Raw)	(Tap)	(Raw)	(Tap)
Gross beta						
Suspended Solids	<0.3	<0.4	<0.3	<0.3	<0.3	<0.4
Dissolved Solids	3.0 ± 0.8	2.2 ± 0.4	2.1 ± 0.7	1.9 ± 0.5	1.5 ± 0.6	1.8 ± 0.4
Total Residue	3.0 ± 0.8	2.2 ± 0.4	2.1 ± 0.7	1.9 ± 0.5	1.5 ± 0.6	1.8 ± 0.4
K-40 (flame photometry)	1.04	<0.87	0.95	1.10	1.00	0.95
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
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 25. Surface water samples, analyses for tritium, strontium-89 and strontium-90.
Collection: Quarterly composites of monthly samples.

Location and Collection Period, 1996	Lab Code	Concentration pCi/L		
		H-3	Sr-89	Sr-90
Indicator				
K-1a				
1st Quarter	KSW -1462	< 330	<0.9	0.9±0.4
2nd Quarter	-4145	< 330	<1.1	<0.5
3rd Quarter	-6916	< 330	<0.8	0.7±0.3
4th Quarter	-9721	< 330	< 0.9	0.9±0.3
Annual mean ± s.d.		< 330	<1.1	0.8±0.1
K-1b				
1st Quarter	KSW -1463	< 330	<1.2	<0.4
2nd Quarter	-4146	< 330	<0.8	0.7±0.3
3rd Quarter	-6917	< 330	<1.7	0.6±0.3
4th Quarter	-9722	< 330	< 0.9	< 0.5
Annual mean ± s.d.		< 330	<1.7	0.7±0.1
K-1d				
1st Quarter	KSW -1464	< 330	<0.8	0.5±0.3
2nd Quarter	-4147	< 330	<0.6	0.8±0.3
3rd Quarter	-6918	< 330	<0.9	0.6±0.3
4th Quarter	-9723, 4	< 330	<0.9	0.6±0.2
Annual mean ± s.d.		< 330	<0.9	0.6±0.1
K-1e				
1st Quarter	KSW -1465	< 330	<0.9	<0.5
2nd Quarter	-4148	< 330	<0.8	<0.5
3rd Quarter	-6919	< 330	<1.2	0.9±0.3
4th Quarter	-9725	< 330	< 0.8	< 0.5
Annual mean ± s.d.		< 330	<1.2	0.9±0.0

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

Location and Collection Period, 1996		Concentration pCi/L		
		H-3	Sr-89	Sr-90
Indicator				
K-14a				
1st Quarter	KSW -1469	< 330	<1.5	0.7±0.3
2nd Quarter	-4151	< 330	<0.6	0.5±0.3
3rd Quarter	-6922	< 330	<1.0	0.5±0.3
4th Quarter	-9728	< 330	<0.9	0.8±0.4
Annual mean ± s.d.		< 330	<1.5	0.6±0.2
K-14b				
1st Quarter	KSW -1470	< 330	<1.4	0.7±0.3
2nd Quarter	-4152	< 330	<0.8	0.5±0.3
3rd Quarter	-6923	< 330	<2.2	1.2±0.7
4th Quarter	-9729	< 330	<1.6	<0.9
Annual mean ± s.d.		< 330	<2.2	0.8±0.4
Control				
K-9				
1st Quarter	KSW -1466 (Raw)	< 330	<1.6	0.5±0.3
	-1467, 8 (Tap)	< 330	<1.0	0.8±0.2
2nd Quarter	-4149(Raw)	< 330	<0.7	0.7±0.3
	-4150(Tap)	< 330	< 1.1	0.6±0.3
3rd Quarter	-6921(Raw)	< 330	<1.1	0.8±0.3
	-6920(Tap)	< 330	<0.9	0.7±0.3
4th Quarter	-9726(Raw)	< 330	< 0.9	0.8±0.4
	-9727(Tap)	< 330	< 1.0	< 0.6
Annual mean ± s.d.		< 330	<1.6	0.7±0.1

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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	04-21-96		07-09-96		11-09-96	
Lab Code	KF-2597		KF-6022		KF-9545	
Type	Salmon		Brown Trout		Brown Trout	
Portion	Flesh	Bones	Flesh	Bones	Flesh	Bones
Gross beta	2.75 ± 0.09	1.03 ± 0.19	2.12 ± 0.07	0.86 ± 0.36	4.20 ± 0.09	0.99 ± 0.22
Sr-89	NA ^a	< 0.052	NA ^a	< 0.080	NA ^a	< 0.080
Sr-90	NA	< 0.026	NA	0.081 ± 0.016	NA	0.066 ± 0.024
K-40	2.89 ± 0.33	NA ^a	3.28 ± 0.32	NA ^a	3.46 ± 0.39	NA ^a
Mn-54	< 0.005	NA	< 0.005	NA	< 0.015	NA
Fe-59	< 0.035	NA	< 0.082	NA	< 0.066	NA
Co-58	< 0.018	NA	< 0.021	NA	< 0.021	NA
Co-60	< 0.020	NA	< 0.011	NA	< 0.017	NA
Cs-134	< 0.012	NA	< 0.013	NA	< 0.014	NA
Cs-137	0.051 ± 0.018	NA	0.075 ± 0.016	NA	0.038 ± 0.015	NA
Date Collected						
Lab Code						
Type						
Portion						
Gross beta						
Sr-89						
Sr-90						
K-40						
Mn-54						
Fe-59						
Co-58						
Co-60						
Cs-134						
Cs-137						

^a NA = Not analyzed; analyses not required.

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

Sample Description and Concentration (pCi/g wet)				
Location	Indicator			
	K-1a	K-1b	K-1d	
Date Collected	06-03-96	06-03-96	06-03-96	
Lab Code	KSL-3537	KSL-3538	KSL-3539	
Gross beta	4.30 ± 0.10	6.37 ± 0.17	4.46 ± 0.13	
Sr-89	<0.010	<0.008	<0.011	
Sr-90	<0.005	<0.003	<0.004	
Be-7	0.26 ± 0.12	<0.19	0.66 ± 0.36	
K-40	4.82 ± 0.36	5.08 ± 0.51	6.31 ± 1.01	
Mn-54	<0.006	<0.019	<0.041	
Co-58	<0.011	<0.008	<0.043	
Co-60	<0.016	<0.015	<0.065	
Nb-95	<0.015	<0.015	<0.043	
Zr-95	<0.019	<0.028	<0.074	
Ru-103	<0.013	<0.009	<0.043	
Ru-106	<0.13	<0.18	<0.33	
Cs-134	<0.012	<0.017	<0.032	
Cs-137	<0.014	<0.012	<0.048	
Ce-141	<0.026	<0.032	<0.074	
Ce-144	<0.10	<0.12	<0.34	
Location	K-1a	K-1a	K-1b	K-1d
Date Collected	08-01-96	09-03-96	09-03-96	09-03-96
Lab Code	KSL-5176	KSL-6025	KSL-6026	KSL-6027
Gross beta	4.05 ± 0.13	4.38 ± 0.15	4.29 ± 0.19	4.24 ± 0.48
Sr-89	<0.006	<0.003	<0.014	<0.041
Sr-90	0.006±0.002	0.004±0.001	<0.007	0.041±0.014
Be-7	<0.16	<0.22	<0.38	0.96 ± 0.24
K-40	3.48 ± 0.42	3.66 ± 0.45	5.56 ± 0.69	2.63 ± 0.41
Mn-54	<0.015	<0.015	<0.029	<0.016
Co-58	<0.008	<0.009	<0.012	<0.009
Co-60	<0.016	<0.022	<0.020	<0.024
Nb-95	<0.017	<0.016	<0.037	<0.015
Zr-95	<0.042	<0.042	<0.029	<0.030
Ru-103	<0.020	<0.023	<0.040	<0.023
Ru-106	<0.14	<0.20	<0.27	<0.11
Cs-134	<0.011	<0.020	<0.034	<0.018
Cs-137	<0.011	<0.012	<0.018	0.059 ± 0.029
Ce-141	<0.032	<0.036	<0.055	<0.026
Ce-144	<0.14	<0.21	<0.13	<0.066

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Table 27. Slime samples, analyses for gross beta, strontium-89, strontium-90, and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/g wet)			
Location	Indicator		Control
	K-1e	K-14	K-9
Date Collected	06-03-96	06-03-96	06-03-96
Lab Code	KSL-3540	KSL-3542	KSL-3541
Gross beta	4.45 ± 0.41	6.01 ± 0.33	3.12 ± 0.07
Sr-89	<0.054	<0.038	<0.003
Sr-90	0.054±0.022	0.018±0.011	<0.001
Be-7	2.00 ± 0.19	1.15 ± 0.19	<0.14
K-40	2.42 ± 0.35	3.16 ± 0.40	3.36 ± 0.36
Mn-54	< 0.010	< 0.011	< 0.007
Co-58	< 0.010	< 0.013	< 0.009
Co-60	< 0.018	< 0.020	< 0.018
Nb-95	< 0.016	< 0.012	< 0.008
Zr-95	< 0.014	< 0.025	< 0.028
Ru-103	< 0.011	< 0.011	< 0.013
Ru-106	< 0.097	< 0.11	< 0.090
Cs-134	< 0.008	< 0.015	< 0.011
Cs-137	0.076 ± 0.023	0.040 ± 0.016	< 0.006
Ce-141	< 0.022	< 0.012	< 0.023
Ce-144	< 0.10	< 0.054	< 0.047
Location	K-1e	K-14	K-9
Date Collected	08-01-96	09-03-96	09-03-96
Lab Code	KSL-5177	KSL-6028	KSL-6029
Gross beta	3.63 ± 0.38	3.18 ± 0.13	6.87 ± 0.69 ^a
Sr-89	<0.012	<0.008	<0.098
Sr-90	<0.021	<0.004	<0.058
Be-7	1.01 ± 0.17	0.51 ± 0.17	1.12 ± 0.21
K-40	2.58 ± 0.40	3.14 ± 0.37	2.63 ± 0.36
Mn-54	< 0.006	< 0.015	< 0.011
Co-58	< 0.010	< 0.018	< 0.009
Co-60	< 0.019	< 0.009	< 0.025
Nb-95	< 0.017	< 0.017	< 0.022
Zr-95	< 0.031	< 0.049	< 0.021
Ru-103	< 0.006	< 0.020	< 0.013
Ru-106	< 0.070	< 0.07	< 0.12
Cs-134	< 0.019	< 0.019	< 0.016
Cs-137	0.036 ± 0.019	< 0.018	0.055 ± 0.021
Ce-141	< 0.020	< 0.035	< 0.024
Ce-144	< 0.061	< 0.13	< 0.05

^a Analysis was repeated; result of reanalysis is 6.07±0.67 pCi/g wet.

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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
	K-1c	K-1d	K-1j	K-14	K-9
Location					
Collection Date	05-01-96	05-01-96	05-01-96	05-01-96	05-01-96
Lab Code	KBS-2650	KBS-2651	KBS-2652	KBS-2654, 5	KBS-2653
Gross beta	8.30 ± 2.07	4.87 ± 1.71	10.34 ± 2.19	5.33 ± 1.30	8.60 ± 1.97
Sr-89	<0.026	<0.024	<0.028	<0.025	<0.032
Sr-90	<0.008	<0.013	<0.012	<0.008	<0.010
K-40	8.21 ± 0.40	6.26 ± 0.61	8.21 ± 0.46	6.55 ± 0.27	7.21 ± 0.39
Co-58	< 0.009	< 0.026	< 0.018	< 0.014	< 0.013
Co-60	< 0.012	< 0.024	< 0.016	< 0.010	< 0.010
Cs-134	< 0.022	< 0.037	< 0.026	< 0.018	< 0.023
Cs-137	0.029 ± 0.011	< 0.030	0.023 ± 0.012	< 0.016	0.022 ± 0.012
Location					
Collection Date	11-04-96	11-04-96	11-04-96	11-04-96	11-04-96
Lab Code	KBS-8008	KBS-8009	KBS-8010	KBS-8012	KBS-8011
Gross beta	7.36 ± 1.88	7.01 ± 1.98	7.80 ± 2.02	6.46 ± 1.93	5.56 ± 1.79
Sr-89	<0.039	<0.045	<0.050	<0.036	<0.038
Sr-90	<0.015	<0.017	<0.017	<0.015	<0.015
K-40	4.54 ± 0.30	4.76 ± 0.31	6.22 ± 0.34	5.47 ± 0.32	5.78 ± 0.33
Co-58	< 0.016	< 0.016	< 0.014	< 0.011	< 0.012
Co-60	< 0.008	< 0.010	< 0.012	< 0.012	< 0.010
Cs-134	< 0.007	< 0.013	< 0.009	< 0.013	< 0.013
Cs-137	0.050 ± 0.018	0.033 ± 0.012	0.051 ± 0.015	0.026 ± 0.012	< 0.012

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7.0 STATISTICAL ANALYSES

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Table 29. Air particulate samples, gross beta, quarterly and annual means and standard deviations, January - December, 1996.

Location	Gross Beta (pCi/m ³)				
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual
<u>Indicator</u>					
K-1f	0.032±0.034	0.014±0.004	0.019±0.007	0.022±0.005	0.022±0.018
K-7	0.023±0.006	0.013±0.003	0.019±0.008	0.022±0.005	0.019±0.007
Mean ± s.d.	0.027±0.024	0.014±0.004	0.019±0.007	0.022±0.005	0.020±0.013
<u>Control</u>					
K-2	0.022±0.007	0.014±0.003	0.019±0.008	0.020±0.006	0.019±0.007
K-8	0.026±0.006	0.014±0.003	0.018±0.007	0.020±0.006	0.020±0.007
K-15	0.022±0.006	0.013±0.003	0.019±0.008	0.020±0.006	0.019±0.007
K-16	0.022±0.007	0.015±0.003	0.020±0.008	0.022±0.006	0.020±0.007
Mean ± s.d.	0.023±0.007	0.014±0.003	0.019±0.008	0.021±0.006	0.019±0.007

NOTE: All means and standard deviations are calculated by using individual results.

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Table 30. Milk samples, strontium-90, quarterly and annual means and standard deviations, January - December, 1996.

Location	Strontium-90 (pCi/L)				Annual
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	
<u>Indicator</u>					
K-4	1.9 ± 0.4	1.4 ± 0.4	1.2 ± 0.2	1.0 ± 0.1	1.4 ± 0.4
K-5	1.7 ± 0.1	1.3 ± 0.3	1.5 ± 0.1	1.1 ± 0.3	1.4 ± 0.3
K-12	2.8 ± 0.1	2.3 ± 0.2	1.9 ± 0.4	1.3 ± 0.2	2.1 ± 0.6
K-19	2.0 ± 0.2	1.7 ± 0.2	1.3 ± 0.4	1.6 ± 0.1	1.6 ± 0.3
Mean ± s.d.	2.1 ± 0.5	1.7 ± 0.5	1.5 ± 0.4	1.3 ± 0.3	1.6 ± 0.5
<u>Control</u>					
K-3	1.2 ± 0.1	1.3 ± 0.1	1.2 ± 0.5	1.2 ± 0.2	1.2 ± 0.2
K-6	1.6 ± 0.1	1.8 ± 0.3	2.0 ± 0.4	1.3 ± 0.3	1.7 ± 0.3
K-28	1.9 ± 0.2	1.7 ± 0.2	1.9 ± 0.1	1.4 ± 0.2	1.7 ± 0.3
Mean ± s.d.	1.6 ± 0.3	1.6 ± 0.3	1.7 ± 0.5	1.3 ± 0.2	1.5 ± 0.3

NOTE: All means and standard deviations are calculated by using individual results.

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Table 31. Milk samples, potassium-40, quarterly and annual means and standard deviations, January - December, 1996.

Location	Potassium 40 (pCi/L)				
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual
<u>Indicator</u>					
K-4	1,510 ± 70	1,408 ± 23	1,433 ± 56	1,407 ± 23	1,435 ± 57
K-5	1,447 ± 75	1,436 ± 84	1,523 ± 81	1,443 ± 71	1,470 ± 83
K-12	1,530 ± 35	1,430 ± 102	1,503 ± 93	1,460 ± 89	1,479 ± 89
K-19	1,433 ± 50	1,376 ± 48	1,388 ± 103	1,380 ± 121	1,391 ± 81
Mean ± s.d.	1,480 ± 66	1,413 ± 70	1,461 ± 94	1,423 ± 79	1,444 ± 84
<u>Control</u>					
K-3	1,510 ± 62	1,484 ± 105	1,435 ± 86	1,450 ± 69	1,465 ± 84
K-6	1,350 ± 44	1,340 ± 52	1,330 ± 83	1,310 ± 26	1,333 ± 58
K-28	1,477 ± 75	1,424 ± 98	1,458 ± 132	1,453 ± 15	1,451 ± 94
Mean ± s.d.	1,446 ± 91	1,416 ± 102	1,408 ± 112	1,404 ± 80	1,416 ± 99

NOTE 1: All means and standard deviations are calculated by using individual results.

NOTE 2: Pages 111 and 112 are intentionally left out.

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Table 32. Grass samples, gross beta, potassium-40 and strontium-90, annual means and standard deviations, January - December, 1996.

Location	Concentration (pCi/L)		
	Gross Beta	Potassium-40	Strontium-90
<u>Indicator</u>			
K-1b	4.83 ± 0.38	5.07 ± 0.44	< 0.006
K-1f	6.13 ± 0.98	6.35 ± 0.37	< 0.012
K-4	6.23 ± 1.23	7.14 ± 2.23	< 0.007
K-5	7.35 ± 2.30	7.69 ± 1.34	0.008 ± 0.002
K-12	7.24 ± 1.81	8.02 ± 2.84	< 0.006
K-19	5.74 ± 1.75	6.31 ± 1.27	0.012 ± 0.008
Mean ± s.d.	6.25 ± 1.57	6.77 ± 1.73	0.010 ± 0.007
<u>Control</u>			
K-3	6.41 ± 1.63	6.43 ± 1.62	0.010 ± 0.001
K-6	6.71 ± 0.75	6.12 ± 0.66	< 0.007
Mean ± s.d.	6.56 ± 1.15	6.27 ± 1.12	0.010 ± 0.001

NOTE: All means and standard deviations are calculated by using individual results.

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Table 33. Soil samples, gross alpha, gross beta, potassium-40, strontium-90 and cesium-137, annual means and standard deviations, January - December, 1996.

Location	Concentration (pCi/L)				
	gross alpha	gross beta	potassium-40	strontium-90	cesium-137
<u>Indicator</u>					
K-1f	8.28 ± 0.37	24.60 ± 0.12	17.64 ± 3.48	0.061 ± 0.017	0.19 ± 0.02
K-4	9.29 ± 0.69	25.92 ± 4.58	18.96 ± 5.64	0.067 ± 0.067	0.21 ± 0.09
K-5	8.50 ± 0.56	29.42 ± 0.37	24.65 ± 3.32	0.054 ± 0.033	0.16 ± 0.00
K-12	7.47 ± 3.78	25.40 ± 1.69	20.06 ± 0.47	0.103 ± 0.000	0.10 ± 0.03
K-19	7.82 ± 2.38	22.77 ± 10.08	19.34 ± 3.83	0.035 ± 0.000	0.18 ± 0.12
Mean ± s.d.	8.27 ± 1.66	25.62 ± 4.39	20.13 ± 3.76	0.062 ± 0.037	0.17 ± 0.07
<u>Control</u>					
K-3	5.09 ± 0.28	25.64 ± 1.28	21.19 ± 0.11	0.036 ± 0.002	0.18 ± 0.08
K-6	7.98 ± 0.74	23.65 ± 0.60	18.80 ± 3.00	0.038 ± 0.033	0.17 ± 0.01
Mean ± s.d.	6.53 ± 1.73	24.64 ± 1.41	19.99 ± 2.21	0.037 ± 0.019	0.17 ± 0.05

NOTE: All means and standard deviations are calculated by using individual results.

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Table 34. Surface water samples, gross beta in total residue, quarterly and annual means and standard deviations, January - December, 1996.

Location	pCi/L				
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Annual
<u>Indicator</u>					
K1a	5.8 ± 3.3	12.2 ± 9.7	7.3 ± 1.0	10.1 ± 3.9	8.8 ± 5.3
K1b	3.2 ± 0.4	4.7 ± 0.5	3.4 ± 0.4	3.8 ± 0.7	3.8 ± 0.8
K-1d	2.0 ± 0.1	2.1 ± 0.5	1.9 ± 0.0	2.1 ± 0.2	2.1 ± 0.2
K-1e	5.8 ± 1.3	5.1 ± 1.6	4.7 ± 2.8	7.5 ± 0.3	5.8 ± 1.9
K-14a	1.9 ± 1.3	3.4 ± 1.4	2.0 ± 0.1	2.8 ± 0.2	2.5 ± 1.0
K-14b	2.2 ± 1.7	3.7 ± 1.6	1.8 ± 0.2	2.6 ± 0.4	2.6 ± 1.1
Mean ± s.d.	3.5 ± 2.2	5.2 ± 4.8	3.5 ± 2.3	4.8 ± 3.3	6.3 ± 4.5
<u>Control</u>					
K-9 (Raw)	2.4 ± 1.0	2.3 ± 0.4	2.0 ± 0.3	1.8 ± 1.8	2.1 ± 0.8
(Tap)	2.0 ± 0.1	2.2 ± 0.2	2.3 ± 0.1	5.9 ± 0.2	2.2 ± 0.2

NOTE 1: All means and standard deviations are calculated by using individual results.

NOTE 2: Page 114 is intentionally left out.

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Table 35. Bottom sediment samples, gross beta, potassium-40, and cesium-137, annual means and standard deviations, January - December, 1996.

Location	pCi/g dry		
	gross beta	potassium-40	cesium-137
<u>Indicator</u>			
K-1c	7.80 ± 0.66	6.37 ± 2.60	0.040 ± 0.015
K-1d	5.94 ± 1.51	5.51 ± 1.06	0.033 ± 0.000
K-1j	9.07 ± 1.80	7.22 ± 1.41	0.037 ± 0.020
K-14	5.90 ± 0.80	6.01 ± 0.76	0.026 ± 0.000
Mean ± s.d.	7.18 ± 1.73	6.28 ± 1.39	0.035 ± 0.012
<u>Control</u>			
K-9	7.08 ± 2.15	6.50 ± 1.01	0.022 ± 0.000
Mean ± s.d.	7.08 ± 2.15	6.50 ± 1.01	0.022 ± 0.000

NOTE: All means and standard deviations are calculated by using individual results.

ANNUAL REPORT - PART III
INCIDENT REPORTS
January - December 1996

Kewaunee Assessment Process

Evaluation Attachment to KAP # 0744

Preliminary

Title : 1996 Land Use Census was not performed in a timely manner per Radiological Environmental Monitoring Manual (REMM), Section 2.2.2 and Health Physics Procedure HP 1.14.

Abstract : On April 7, 1997, with the plant in an extended refueling shutdown, it was discovered that the annual land use census was not performed during 1996 growing season as required by REMM Section 2.3.2.

A land use census was immediately performed by visual survey methods. No changes were noted from the 1995 door-to-door 5 year survey.

Cause : The cause of the missed census was mis-communication of expectations to the vendor who performs the sample collecting.

The program requires that KNPP perform a door-to-door survey every 5 years. KNPP also uses this survey to collect data on customer expectations within a 5 mile radius of the plant. Since this survey involves customer contact, KNPP personnel perform the census. This complete census was last performed in 1995.

During those years in between, the program only requires that the census verify that no changes have occurred with the locations of the nearest residence, milk animal, or garden. This is done by visual survey methods.

In order to minimize man-hours and improve the process, KNPP personnel elected to exercise an option with the vendor who performs the environmental sampling. The vendor would verify any changes during sample collection at no extra cost to KNPP. This was not clearly communicated to the vendor by KNPP personnel.

Safety Implications There were no safety implications. The subsequent survey didn't identify any changes to the previous years results.

Half of the 5 mile radius around KNPP is bounded by Lake Michigan. The other half is rural communities and agriculture which hasn't change dramatically in the last 50 years.

The basis for the Land Use Census program is 10CFR50, APP. I, Section IV.B.3. This section states "Identify changes in the use of unrestricted areas (e.g. for agricultural purposes) to permit modifications in monitoring programs for evaluating doses to individuals from principal pathways of exposure."

Reportability This event will be documented in the Annual Radiological Environmental Monitoring Report, in accordance with SP63-280, "Annual Environmental Reports".

Corrective Actions The census was performed as soon as it was identified to be not completed. KNPP will draft a letter to the vendor clearly stating our expectations in regards to who and when the Land Use Census is performed. The letter will be sent by May 31, 1997.

Prepared by Brad Gauger - Plant Health Physicist