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PRAIRIE ISLAND NUCLEAR GENERATING PLANT
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ANNUAL REPORT
to the
UNITED STATES NUCLEAR REGULATORY COMMISSION

Radiation Environmental Monitoring Program
January 1, 1995 to December 31, 1995
Project No. 8010

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PREFACE

The staff of Teledyne Isotopes Midwest Laboratory was responsible for the acquisition of data presented in this report. Samples were collected by members of the staff of the Prairie Island Nuclear Generating Plant, Northern States Power Company. The report was prepared by L. G. Huebner, Manager, Teledyne Isotopes Midwest Laboratory. He was assisted in the report preparation by other staff members of this laboratory.

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1.0 INTRODUCTION

This report summarizes and interprets results of the Radiation Environmental Monitoring Program (REMP) conducted by Teledyne Isotopes Midwest Laboratory at the Prairie Island Nuclear Generating Plant, Red Wing, Minnesota, during the period January - December, 1995. This program monitors the levels of radioactivity in the air, terrestrial, and aquatic environments in order to assess the impact of the plant on its surroundings.

Tabulations of the individual analyses made during the year are not included in this report. These data are included in a reference document (Teledyne Isotopes Midwest Laboratory, 1996b) available at Northern States Power Company, Prairie Island Nuclear Generating Plant.

Prairie Island Nuclear Generating Plant is located on the Mississippi River in Goodhue County, Minnesota, and operated by Northern States Power Company. The plant has two 550 MWe pressurized water reactors. Unit 1 achieved initial criticality on 1 December 1973. Commercial operation at full power began on 16 December 1973. Unit 2 achieved initial criticality on 17 December 1974. Commercial operation at full power began on 21 December 1974.

2.0 SUMMARY

The Radiation Environmental Monitoring Program (REMP) required by the U.S. Nuclear Regulatory Commission (NRC) Technical Specifications for the Prairie Island Nuclear Generating Plant and the Independent Spent Fuel Storage Installation (ISFSI) is described. Results for 1995 are summarized and discussed.

Program findings show background levels of radioactivity in the environmental samples collected in the vicinity of the Prairie Island Nuclear Generating Plant.

3.0 RADIATION ENVIRONMENTAL MONITORING PROGRAM (REMP)

3.1 Program Design and Data Interpretation

The purpose of the Radiation Environmental Monitoring Program (REMP) at the Prairie Island Nuclear Generating Plant is to assess the impact of the plant on its environment. For this purpose, samples are collected from the air, terrestrial, and aquatic environments and analyzed for radioactive content. In addition, ambient gamma radiation levels are monitored by thermoluminescent dosimeters (TLDs).

Sources of environmental radiation include the following:

(1) Natural background radiation arising from cosmic rays and primordial radionuclides;

(2) Fallout from atmospheric nuclear detonations;

(3) Releases from nuclear power plants;

(4) Industrial and medical radioactive waste; and

(5) Fallout from nuclear accidents.

In interpreting the data, effects due to the plant must be distinguished from those due to other sources.

A major interpretive aid in assessment of these effects is the design of the monitoring program at the Prairie Island Plant which is based on the indicator-control concept Most types of samples are collected both at indicator locations (nearby, downwind, or downstream) and at control locations (distant, upwind, or upstream). A plant effect would be indicated if the radiation level at an indicator location was significantly larger than that at the control location. The difference would have to be greater than could be accounted for by typical fluctuations in radiation levels arising from other sources.

An additional interpretive technique involves analyses for specific radionuclides present in the environmental samples collected from the plant site. The plant's monitoring program includes analyses for tritium and iodine-131. Most samples are also analyzed for gamma-emitting isotopes with results for the following groups quantified: zirconium-95, cesium-137, cerium-144, beryllium-7, and potassium-40. The first three gamma-emitting isotopes were selected as radiological impact indicators because of the different characteristic proportions in which they appear in the fission product mix produced by a nuclear reactor and that produced by a nuclear detonation. Each of the three isotopes is produced in roughly equivalent amounts by a reactor: each constitutes about 10% of the total activity of fission products 10 days after reactor shutdown. On the other hand, 10 days after a nuclear explosion, the contributions of zirconium-95, cerium-144, and cesium-137 to the activity of the resulting debris are in the approximate ratio 4:1:0.03 (Eisenbud, 1963). Beryllium-7 is of cosmogenic origin and potassium-40 is a naturally-occurring isotope. They were chosen as calibration monitors and should not be considered radiological impact indicators.

The other group quantified consists of niobium-95, ruthenium-103 and -106, cesium-134, barium-lanthanum-140, and cerium-141. These isotopes are released in small quantities by nuclear power plants, but to date their major source of injection into the general

3.1 Program Design and Data Interpretation (continued)

environment has been atmospheric nuclear testing. Nuclides of the final group, manganese-54, iron-59, cobalt-58 and -60, and zinc-65, are activation products and arise from activation of corrosion products. They are typical components of a nuclear power plant's effluents, but are not produced in significant quantities by nuclear detonations.

Other means of distinguishing sources of environmental radiation are employed in interpreting the data. Current radiation levels are compared with previous levels, including those measured before the Plant became operational. Results of the plant's monitoring program can be related to those obtained in other parts of the world. Finally, results can be related to events known to cause elevated levels of radiation in the environment, e.g., atmospheric nuclear detonations.

3.2 Program Description

The sampling and analysis schedule for the radiation environmental monitoring program at Prairie Island is summarized in Table 5.1 and briefly reviewed below. Table 5.2 defines the sampling location codes used in Table 5.1 and specifies for each location its type (indicator or control) and its distance, direction, and sector relative to the reactor site or ISFSI facility, as appropriate. To assure that sampling is carried out in a reproducible manner, detailed sampling procedures have been prescribed (Prairie Island Nuclear Generating Plant, 19). Maps of fixed sampling locations are included in Appendix E.

To monitor the air environment, airborne particulates are collected on membrane filters by continuous pumping at five locations. Also, airborne iodine is collected by continuous pumping through charcoal filters at all of these locations. Filters are changed and counted weekly. Particulate filters are analyzed for gross beta activity and charcoal filters for iodine-131. A quarterly composite of the particulate filters from each location is gamma-scanned on an HP Ge or Ge(Li) detector. One of the five locations is a control (P-1), and four are indicators (P-2, P-3, P-4, and P-6).

Ambient gamma radiation is monitored at fifty-four (54) locations, using $CaSO_4$:Dy dosimeters with four sensitive areas at each location: ten (10) in an inner ring in the general area of the site boundary, fifteen (15) in the outer ring within a 4-5 mile radius, eight (8) at special interest locations, twenty (20) in the area of the Independent Spent Fuel Storage Installation (ISFSI), and one control location, 11.1 miles distant from the plant. They are replaced and measured quarterly. Also, a complete emergency set of TLDs for the inner ring, outer ring and special interest locations are placed in the field at the same time as regular sets. The emergency set is returned to TIML quarterly for annealing and repackaging.

Milk samples are collected monthly from six farms (five indicator and one control). The milk is collected biweekly during the growing season (May - October), because the milk animals may be on pasture. All samples are analyzed for iodine-131 and gamma-emitting isotopes.

For additional monitoring of the terrestrial environment, green leafy vegetables (cabbage) are collected annually from the highest D/Q garden and a control location (P-38) and analyzed for iodine-131. Corn is collected annually only if fields are irrigated with river water and analyzed for gamma-emitting isotopes. Well water and ground water are

3.2 Program Description (continued)

collected quarterly from three locations near the plant and analyzed for tritium and gamma-emitting isotopes. River water is collected weekly at two locations, one upstream of the plant (P-5) and one downstream (P-6, Lock and Dam No.3). Monthly composites are analyzed for gamma-emitting isotopes. Quarterly composites are analyzed for tritium.

Drinking water is collected weekly from the City of Red Wing well. Monthly composites are analyzed for gross beta, iodine-131, and gamma-emitting isotopes. Quarterly composites are analyzed for tritium.

The aquatic environment is also monitored by semi-annual upstream and downstream collections of fish, periphyton or invertebrates, and bottom sediments. Shoreline sediment is collected semi-annually from one location. All samples are analyzed for gamma-emitting isotopes.

Due to detectable levels of tritium in a well south of the plant in 1989, special tritium sampling has been implemented. A summary of the special tritium sampling of ground and well water is included in Appendix D.

3.3 Program Execution

The Program was executed as described in the preceding section with the following exceptions:

> Approximately 9.3 hours of sampling time were lost from the air particulate/air iodine sample location (P-6) the week ending January 18,1995 due to a brief power outage.
>
> No milk samples were available from location P-36 after March,1995. The Dosdall dairy farm quit milking operations.
>
> No milk samples were available from location P-39 for the months of January, February, March, November and December, 1995. The goats were not producing milk.

Deviations from the program are summarized in Table 5.3.

3.4 Laboratory Procedures

All iodine-131 analyses in milk and drinking water were made by using a sensitive radiochemical procedure which involves separation of the element by use of an ion-exchange resin and subsequent beta counting. All gamma-spectroscopic analyses were performed with an HP Ge or Ge(Li) detector. Levels of iodine-131 in cabbage were determined by HPGe or Ge(Li) spectrometry. Levels of airborne iodine-131 in charcoal samples were measured by HPGe or Ge(Li) spectrometry.

Tritium levels were determined by liquid scintillation technique.

Analytical procedures used by the Teledyne Isotopes Midwest Laboratory are on file and are available for inspection. Procedures are based on those prescribed by the National Center for Radiological Health of the U. S. Public Health Service (U. S. Public

3.4 Laboratory Procedures (continued)

Health Service, 1967) and by the Health and Safety Laboratory of the U. S. Atomic Energy Commission (U. S. Atomic Energy Commission, 1972).

Teledyne Isotopes Midwest Laboratory has a comprehensive quality control/quality assurance program designed to assure the reliability of data obtained. Details of TIML's Quality Assurance Program are presented elsewhere (Teledyne Isotopes Midwest Laboratory, 1992). The TIML Quality Assurance Program includes participation in Interlaboratory Comparison (Crosscheck) Programs. Results obtained in crosscheck programs are presented in Appendix A.

3.5 Program Modifications

Four new special ISFSI TLD locations (P-01IX, P-02IX, P-03IX, P-04IX) were added to the program in the second quarter of 1995. The Dosdall dairy quit milking operations and was removed from the program. No new dairy has been added since sampling continues at the highest D/Q milk location per Technical Specification requirements.

3.6 Land Use Census

In accordance with Technical Specification 4.10, paragraph B1, a land use census is conducted in order to identify the location of the nearest milk animal, the nearest residence, and the nearest garden of greater than 500 ft^2 producing fresh leafy vegetables in each of the 16 meteorological sectors within a distance of 5 miles. This census is conducted at least once per 12 months between the dates of May 1 and October 31. If new locations yield a calculated dose or dose equivalent (via the same exposure pathway) twenty percent greater than the required locations per Plant Technical Specifications, then the new locations are added to the radiation environmental monitoring program within 30 days, and sampling locations having lower calculated doses or a lower dose commitment may be deleted from this monitoring program after October 31 of the year in which the land use census was conducted.

This land use census insures the updating of the radiation environmental monitoring program should sampling locations change within the 5 mile radius from the plant.

The 1995 Land Use Census was completed on October 6, 1995 and included the following changes:

1. The Born dairy farm (P-39) was included in the milk sampling survey.

2. The Dosdall dairy farm quit milking operations and was removed from the sampling program.

No downstream irrigation of corn was discovered within 5 miles of the Prairie Island Plant. Therefore, no corn samples were collected for analysis.

There were no changes in any of the highest D/Q locations for dairy, nearest residence, or garden sites in 1995. The critical receptor location did not change in 1995 due to the requirements of the land use census.

4.0 RESULTS AND DISCUSSION

All of the scheduled collections and analyses were made except those listed in Table 5.3.

All results are summarized in Table 5.4 in a format recommended by the Nuclear Regulatory Commission in Regulatory Guide 4.8. For each type of analysis of each sampled medium, this table lists the mean and range for all indicator locations and for all control locations. The locations with the highest mean and range are also shown.

4.1 Atmospheric Nuclear Detonations and Nuclear Accidents

There were no reported atmospheric nuclear tests in 1995. The last reported test was conducted on October 16, 1980 by the People's Republic of China. The reported yield was in the 200 kiloton to 1 megaton range.

There were no reported accidents at nuclear reactor facilities in 1995.

4.2 Summary of Preoperational Data

The following constitutes a summary of preoperational studies conducted at the Prairie Island Nuclear Power Plant during the years 1970 to 1973, to determine background levels expected in the environment, and provided, where applicable, as a means for comparison with present day levels. Strict comparisons, however, are difficult, since background levels of radiation were much higher in these years due to radioactive fallout from the atmosphere. Gross beta measurements in fallout declined yearly from a level of 12,167 pCi/m^2 to 1,020 pCi/m^2, and these declining values are reflected throughout the various media tested.

In the air environment, ambient gamma radiation (TLDs) averaged 9.4 mR/4 weeks during preoperational studies. Gross beta in air particulates declined from levels of 0.38 to 0.037 pCi/m^3. Average present day levels have stabilized at around 0.025 pCi/m^3. Airborne radioiodine remained below detection levels.

In the terrestrial environment of 1970 to 1973, milk, agricultural crops, and soil were monitored. In milk samples, low levels of Cs-137, I-131, and Sr-90 were detected. Cs-137 levels declined from 16.5 to 8.6 pCi/L. Present day measurements for both Cs-137 and I-131 are below detection levels. Agricultural crop measurements averaged 57.7 pCi/g for gross beta and 0.47 pCi/g for Cs-137. Gross beta measured in soil averaged 52 pCi/g .

The aqueous environment was monitored by testing of river , well and lake waters, bottom sediments, fish , aquatic vegetation and periphyton. Specific location comparison of drinking, river and well water concentrations for tritium and gross beta are not possible. However, tritium background levels, measured at eight separate locations, declined steadily from an average concentration of 1020 pCi/L to 490 pCi/L. Present day environmental levels of tritium are below detection levels, with the exception of the special tritium sampling described in Appendix D. Values for gross beta, measured from 1970 to 1973 , averaged 9.9 pCi/L in downstream Mississippi River water, 8.2 pCi/L for well waters, and 11.0 pCi/L for lake waters. Gamma emitters were below the lower limit of detection (LLD). In bottom sediments, gross beta background levels were determined at 51.0 pCi/g. Cs-137 activity during preoperational studies in 1973 measured 0.25 pCi/g upstream and 0.21 pCi/g downstream. The lower levels occasionally observed today can still be attributed to residual activity from atmospheric fallout. Gross beta in fish, measured in both flesh and skeletal samples, averaged 7.3 and 11.7 pCi/g, respectively. Gross beta

4.2 Summary of Preoperational Data (continued).

background levels in aquatic vegetation, algae and periphyton samples measured 76.0 pCi/g , 46.0 pCi/g, and 13.6 pCi/g, respectively.

4.3 Program Findings

Results obtained show background levels of radioactivity in the environmental samples collected in the vicinity of the Prairie Island Nuclear Generating Plant in 1995.

Offsite Ambient Radiation (TLDs)

Ambient radiation was measured in the general area of the site boundary, at the outer ring 4 - 5 mi distant from the Plant, at special interest areas and at one control location. The means ranged from 14.4 mR/91 days at inner ring locations to 16.4 mR/91 days at outer ring locations. The mean at special locations was 16.7 mR/91 days and 16.6 mR/91 days at the control location. The dose rates measured at the inner and outer ring locations and the control location were similar to those observed in 1984 (15.0 and 15.4 mR/91 days, respectively); in 1985 (14.0 and 15.3 mR/91 days, respectively); in 1986 (17.1 and 17.3 mR/91 days, respectively); in 1987 (16.9 and 17.0 mR/91 days, respectively) in 1988 (15.4 and 16.0 mR/91 days, respectively); in 1989 (16.5 and 16.7 mR/91 days, respectively); in 1990 (15.9 and 16.3 mR/91 days, respectively); in 1991 (14.9 and 14.5 mR/91 days, respectively); in 1992 (16.3 and 14.8 mR/91 days); in 1993 (15.9 and 14.8 mR/91 days, respectively) and in 1994 (15.2 and 16.0 mR/91 days, respectively). No plant effect on ambient gamma radiation was indicated (Figure 5-1).

ISFSI Ambient Radiation (TLDs)

Ambient radiation was measured inside the ISFSI earth berm, outside the ISFSI earth berm and at two special locations between the plant ISFSI and the Prairie Island Indian Community. The mean dose rates measured 18.6 mR/91 days inside the ISFSI earth berm and 16.2 mR/91 days outside the ISFSI earth berm. A total of three casks, loaded with spent nuclear fuel, were placed on the ISFSI pad during 1995 on the dates of May 24, November 13 and December 21, 1995. The slightly higher ambient radiation levels inside the earth berm are expected due to the loaded spent fuel casks being in direct line-of-sight from the TLDs. The ambient radiation levels measured outside the earth berm show no significant difference from the other offsite dose rates around the plant. The two special Prairie Island Indian Community TLDs measured 15.2 and 15.0 mR/91 days. No spent fuel storage effect on ambient gamma radiation outside the ISFSI earth berm was indicated.

Airborne Particulates

The average annual gross beta concentration in airborne particulates was identical at both indicator and control locations (0.022 pCi/m^3), and was similar to or slightly lower than the average means observed in 1984 (0.025 and 0.027 pCi/m^3, respectively), 1985 (0.025 pCi/m^3), 1986 (0.024 and 0.029 pCi/m^3, respectively), 1987 (0.024 and 0.023 pCi/m^3, respectively), in 1988 (0.030 pCi/m^3), in 1989 (0.028 and 0.027 pCi/m^3, respectively), in 1990 (0.024 and 0.023 pCi/m^3, respectively), in 1991 (0.025 pCi/m^3), in 1992 (0.023 and 0.021 pCi/m^3, respectively), in 1993 (0.022 and 0.019 pCi/m^3, respectively) and in 1994 (0.022 pCi/m^3). The data for 1986 does not include the results from May 19 to June 9, 1986, which were influenced by the accident at Chernobyl. (Figure 5-2).

Airborne Particulates (continued)

A spring peak in beta activity had been observed almost annually for many years (Wilson et al., 1969). It had been attributed to fallout of nuclides from the stratosphere (Gold et al., 1964). It was pronounced in 1981, occurred to a lesser degree in 1982, and has not occured since 1983 . In 1986, a spring peak could not be identified because it was overshadowed by releases of radioactivity from Chernobyl. The highest averages for gross beta were seen in the months of January and December. The increase of beta activity during the winter months was also observed in 1983 through 1995, (exclusive of the period between May 19, 1986 and June 9, 1986).

Two pieces of evidence indicate conclusively that the elevated activity observed during the winter months was not attributable to the Plant operation. In the first place, elevated activity of similar size occurred simultaneously at both indicator and control locations. Secondly, an identical pattern was observed at the Monticello Nuclear Generating Plant, about 100 miles distant from the Prairie Island Nuclear Generating Plant (Northern States Power Company, 1996a).

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

Airborne Iodine

Weekly levels of airborne iodine-131 were below the lower limit of detection (LLD) of 0.07 pCi/m^3 in all samples. There was no indication of a plant effect.

Milk

Iodine-131 results were below the detection limit of 1.0 pCi/L in all samples. Cs-137 results were below the LLD level of 15 pCi/L in all samples. No other gamma-emitting isotopes, except naturally-occurring potassium-40, were detected in any milk samples. This is consistent with the findings of the National Center for Radiological Health that most radiocontaminants in feed do not find their way into milk due to the selective metabolism of the cow. The common exceptions are radioisotopes of potassium, cesium, strontium, barium, and iodine (National Center for Radiological Health, 1968).

In summary, the milk data for 1995 show no radiological effects of the plant operation.

Drinking Water

In drinking water from the City of Red Wing well, tritium activity was below the LLD level of 170 pCi/L in all samples. As with the other well water samples, all analyses for gamma-emitting isotopes yielded results below detection limits. Gross beta averaged 3.9 pCi/L and was lower than levels observed in 1982 (8.9 pCi/L), 1983 (8.0 pCi/L), 1984 (7.9 pCi/L), 1985 (7.1 pCi/L), 1986 (6.8 pCi/L), 1987 (7.9 pCi/L), 1988 (8.0 pCi/L),1989 (7.0 pCi/L), 1990 (7.0 pCi/L), 1991 (8.0 pCi/L), 1992 (7.6 pCi/L) in 1993 (7.5 pCi/L) and in 1994 (5.8 pCi/L).

In summary, drinking water data for 1995 showed no effects of the plant operation.

River Water

At the upstream and downstream collection sites, quarterly composite tritium levels were below the LLD level of 170 pCi/L in all samples but one. The third quarter composite for the downstream location, P-6, Lock and Dam No. 3 showed a slight positive activity of 183 pCi/L. The result is not statistically significant.

River water was also analyzed for gamma-emitting isotopes. All gamma-emitting isotopes were below their respective detection limits. There was no indication of a plant effect.

Well Water

At the control well P-25, Rohl Farm and three indicator wells (P-8, Community Center; P-6, Lock and Dam No. 3; and P-9, Plant Well No. 2) no tritium was detected above the LLD level of 172 pCi/L in all samples.

Gamma-emitting isotopes were below detection limits in all samples.

In summary, well water data for 1995 show no radiological effects of the plant operation.

Crops

Two samples of cabbage were collected in August and analyzed for I-131. The I-131 level was below 0.021 pCi/g wet weight in both samples. There was no indication of a plant effect.

The field sampling personnel conducted an annual land use survey and found that there was no river water taken for irrigation into fields within 5 miles downstream from the Prairie Island Plant. Therefore, it was not necessary to collect and analyze corn samples.

Fish

Fish samples were collected in May and October, 1995, and analyzed for gamma emitting isotopes. Only naturally-occurring potassium-40 was detected, and there was no significant difference between upstream and downstream results. There was no indication of a plant effect.

Aquatic Insects or Periphyton

Aquatic insects (invertebrates) or periphyton were collected in May and September, 1995. The samples were analyzed for gamma-emitting isotopes.

All gamma-emitting isotopes were below their respective detection limits. There was no indication of any plant effect.

Bottom and Shoreline Sediments

Sediment collections were made in May and October, 1995 and analyzed for gamma-emitting isotopes. All gamma-emitting isotopes, except naturally-occurring potassium-40, were below their respective LLDs. No plant effect was indicated.

5.0 FIGURES AND TABLES

Table 5.1. Sample collection and analysis program, Prairie Island Nuclear Generating Plant, 1995.

Medium	Locations Number	Locations Codes (and Type)[a]	Collection Type and Frequency[b]	Analysis Type and Frequency[c]
Ambient radiation (TLD's)	54	P-01A - P-10A P-01B - P-15B P-01S - P-08S P-01IA - P-08IA P-01IB - P-08IB P-01IX - P-04IX P-01C	C/Q	Ambient gamma
Airborne particulates	5	P-1(C), P-2, P-3, P-4, P-6	C/W	GB, GS (QC of each location)
Airborne Iodine	5	P-1(C), P-2, P-3, P-4, P-6	C/W	I-131
Milk	5	P-14, P-18, P-25(C), P-36, P-37	G/M[d]	I-131, GS
	1	P-39	G/M	I-131, GS
River water	2	P-5(C), P-6	G/W	GS(MC), H-3(QC)
Drinking water	1	P-11	G/W	GB(MC), I-131(MC) GS(MC), H-3(QC)
Well Water	4	P-25(C), P-6, P-8, P-9	G/Q	H-3, GS
Edible cultivated crops - leafy green vegetables	2	P-38(C), P-24	G/A	I-131
Fish (one species,edible portion)	2	P-19(C), P-13	G/SA	GS
Periphyton or invertebrates	2	P-40(C), P-6	G/SA	GS
Bottom Sediment	2	P-20(C), P-6	G/SA	GS
Shoreline sediment	1	P-12	G/SA	GS

[a] Location codes are defined in Table D-2. Control stations are indicated by (C). All other stations are indicators.

[b] Collection type is coded as follows: C/ = continuous, G/ = grab. Collection frequency is coded as follows: W= weekly, M = monthly, Q = quarterly, SA = semiannually, A = annually.

[c] Analysis type is coded as follows: GB = gross beta, GS = gamma spectroscopy, H-3 = tritium, I-131 = iodine 131. Analysis frequency is coded as follows: MC = monthly composite, QC = quarterly composite.

[d] Milk is collected biweekly during the grazing season (May - October).

Table 5.2. Sampling locations, Prairie Island Nuclear Generating Plant, 1995.

Code	Type[a]	Collection Site	Type of Sample[b]	Distance and Direction from Site Stack
P-1	C	Air Station P-1	AP, AI	11.8 mi @ 316°/NNW
P-2		Air Station P-2	AP, AI	0.5 mi @ 294°/WNW
P-3		Air Station P-3	AP, AI	0.8 mi @ 313°/NW
P-4		Air Station P-4	AP, AI	0.4 mi @ 359°/N
P-5	C	Upstream of Plant	RW	1.8 mi @ 11°/N
P-6		Lock & Dam #3 & Air Station P-6	AP, AI, RW, WW, BS, BO[c]	1.6 mi @ 129°/SE
P-8		Community Center	WW	1.0 mi @ 321°/WNW
P-9		Plant Well #2	WW	0.3 mi @ 306°/NW
P-11		Red Wing Service Center	DW	3.3 mi @ 158°/SSE
P-12		Downstream of Plant	SS	3.0 mi @ 116°/ESE
P-13		Downstream of Plant	F[c]	3.5 mi @ 113°/ESE
P-14		Gustafson Farm	M	2.3 mi @ 173°/S
P-18		Christiansen Farm	M	3.8 mi @ 88°/E
P-19	C	Upstream of Plant	F[c]	1.3 mi @ 0°/N
P-20	C	Upstream of Plant	BS	0.9 mi @ 45°/NE
P-24		Suter Residence	VE	0.6 mi @ 158°/SSE
P-25	C	Rohl Farm	M, WW	12.9 mi @ 352°/N
P-36		Dosdall Farm	M	3.8 mi @ 9°/N
P-37		Welsch Farm	M	4.1 mi @ 87°/E
P-38	C	Cain Residence	VE	14.2 mi @ 359°/N
P-39		Born Farm	M	2.8 mi @ 239°/WSW
P-40	C	Upstream of Plant	BO[c]	0.4 mi @ 0°/N
General Area of the Site Boundary				
P-01A		Property Line	TLD	0.4 mi @ 359°/N
P-02A		Property Line	TLD	0.3 mi @ 10°/N
P-03A		Property Line	TLD	0.5 mi @ 183°/S
P-04A		Property Line	TLD	0.4 mi @ 204°/SSW
P-05A		Property Line	TLD	0.4 mi @ 225°/SW
P-06A		Property Line	TLD	0.4 mi @ 249°/WSW
P-07A		Property Line	TLD	0.4 mi @ 268°/W
P-08A		Property Line	TLD	0.4 mi @ 291°/WNW
P-09A		Property Line	TLD	0.7 mi @ 317°/NW
P-10A		Property Line	TLD	0.5 mi @ 333°/NNW

Table 5.2. Sampling locations, Prairie Island Nuclear Generating Plant, 1995 (continued).

Code	Type[a]	Collection Site	Type of Sample[b]	Distance and Direction from Site Stack
Approximately 4 to 5 miles Distant from the Plant				
P-01B		Thomas Killian Residence	TLD	4.7 mi @ 355°/N
P-02B		Roy Kinneman Farm	TLD	4.8 mi @ 17°/NNE
P-03B		Wayne Anderson Farm	TLD	4.9 mi @ 46°/NE
P-04B		Nelson Drive (Road)	TLD	4.2 mi @ 61°/ENE
P-05B		County Road E and Coulee	TLD	4.1 mi @ 102°/ESE
P-06B		William Hauschiblt Residence	TLD	4.4 mi @ 112°/ESE
P-07B		Red Wing Public Works	TLD	4.7 mi @ 140°/SE
P-08B		David Wnuk Residence	TLD	4.1 mi @ 165°/SSE
P-09B		Highway 19 South	TLD	4.2 mi @ 187°/S
P-10B		Cannondale Farm	TLD	4.9 mi @ 200°/SSW
P-11B		Wallace Weberg Farm	TLD	4.5 mi @ 221°/SW
P-12B		Ray Gergen Farm	TLD	4.5 mi @ 247°/WSW
P-13B		Thomas O'Rourke Farm	TLD	4.4 mi @ 270°/W
P-14B		David J. Anderson Farm	TLD	4.9 mi @ 306°/NW
P-15B		Holst Farms	TLD	4.2 mi @ 347°/NNW
Special Interest Locations				
P-01S		Federal Lock & Dam #3	TLD	1.6 mi @ 129°/SE
P-02S		Charles Suter Residence	TLD	0.5 mi @ 155°/SSE
P-03S		Carl Gustafson Farm	TLD	2.2 mi @ 173°/S
P-04S		Richard Burt Residence	TLD	2.0 mi @ 202°/SSW
P-05S		Kinney Store	TLD	2.0 mi @ 270°/W
P-06S		Earl Flynn Farm	TLD	2.5 mi @ 299°/WNW
P-07S		Indian Community	TLD	0.7 mi @ 271°/W
P-08S		Indian Community	TLD	0.7 mi @ 287°/NWW
P-01C	C	Robert Kinneman Farm	TLD	11.1 mi @ 331°/NNW

Table 5.2. Sampling locations, Prairie Island Nuclear Generating Plant, 1995 (continued).

Code	Type[a]	Collection Site	Type of Sample[b]	Distance and Direction from ISFSI Center
ISFSI Area Inside Earth Berm				
P-01IA		ISFSI Nuisance Fence	TLD	190' @ 45°/NE
P-02IA		ISFSI Nuisance Fence	TLD	360' @ 82°/E
P-03IA		ISFSI Nuisance Fence	TLD	370' @ 100°/E
P-04IA		ISFSI Nuisance Fence	TLD	200' @ 134°/SE
P-05IA		ISFSI Nuisance Fence	TLD	180' @ 219°/SW
P-06IA		ISFSI Nuisance Fence	TLD	320' @ 258°/WSW
P-07IA		ISFSI Nuisance Fence	TLD	320' @ 281°/WNW
P-08IA		ISFSI Nuisance Fence	TLD	190' @ 318°/NW
P-01IX		ISFSI Nuisance Fence	TLD	140' @ 180°/S
P-02IX		ISFSI Nuisance Fence	TLD	310' @ 270°/W
P-03IX		ISFSI Nuisance Fence	TLD	140 @ 0°/N
P-04IX		ISFSI Nuisance Fence	TLD	360' @ 90°/E
ISFSI Area Outside Earth Berm				
P-01IB		ISFSI Berm Area	TLD	340' @ 3°/N
P-02IB		ISFSI Berm Area	TLD	380' @ 28°/NNE
P-03IB		ISFSI Berm Area	TLD	560' @ 85°/E
P-04IB		ISFSI Berm Area	TLD	590' @ 165°/SSE
P-05IB		ISFSI Berm Area	TLD	690' @ 186°/S
P-06IB		ISFSI Berm Area	TLD	720' @ 201°/SSW
P-07IB		ISFSI Berm Area	TLD	610' @ 271°/W
P-08IB		ISFSI Berm Area	TLD	360' @ 332°/NNW

[a] "C" denotes control location. All other locations are indicators.

[b] Sample Codes:

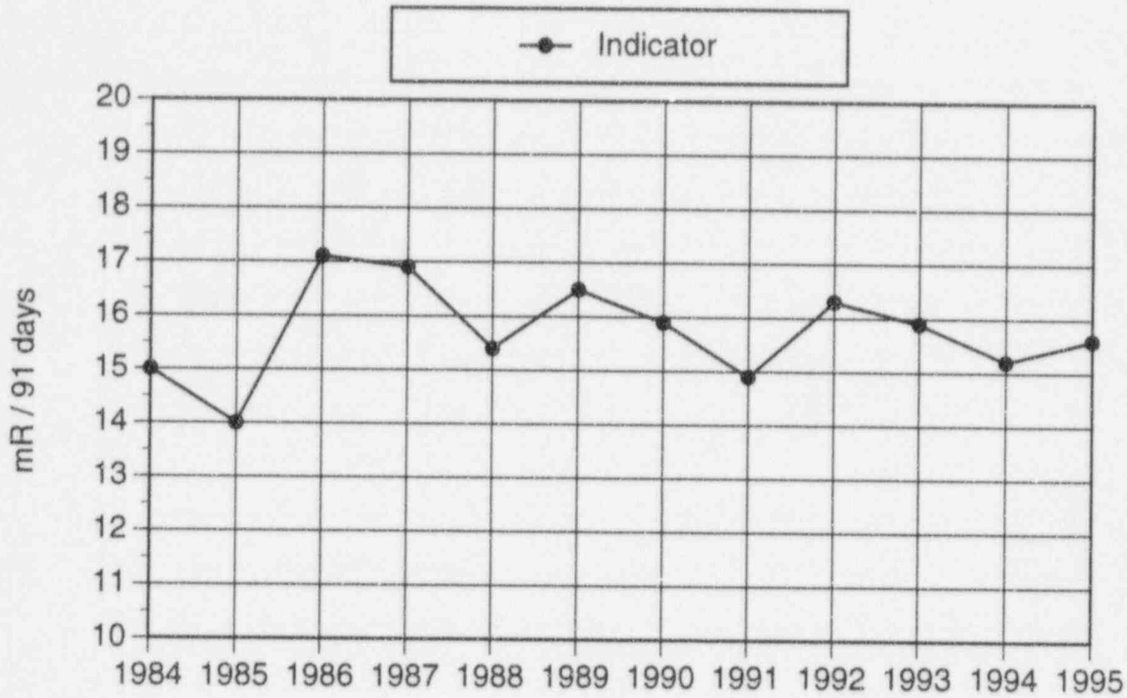
AP = Airborne particulates
AI = Airborne Iodine
M = Milk
VE = Vegetation/vegetables
DW = Drinking water
RW = River water
WW = Well water
BS = Bottom (river) sediments
SS = Shoreline Sediments
BO = Bottom organisms (periphyton or macroinvertebrates)
F = Fish

[c] Distance and direction data for fish and bottom organisms are approximate because availability of sample specimen may vary at any one location.

Table 5.3. Missed collections and analyses, 1995. Prairie Island Nuclear Generating Plant. All required samples were collected and analyzed as scheduled except the following:

Sample Type	Analysis	Location	Collection Period	Reason for not Conducting REMP as Required	Plan for Preventing Recurrence
AP/AI	Gross beta, I-131	P-6	January 18, 1995	Approximately 9.3 hours of sample not collected due to loss of power during line repair.	None deemed necessary.
Milk	I-131, GS	P-36	April, 1995	Sample not available	Dairy Farm out of business.
Milk	I-131, GS	P-39	January, February, March, November, December, 1995	Samples not available	Will sample when goats are producing milk.

Figure 5-1. Offsite Ambient Radiation (TLDs); average of inner and outer ring indicator locations versus control location.



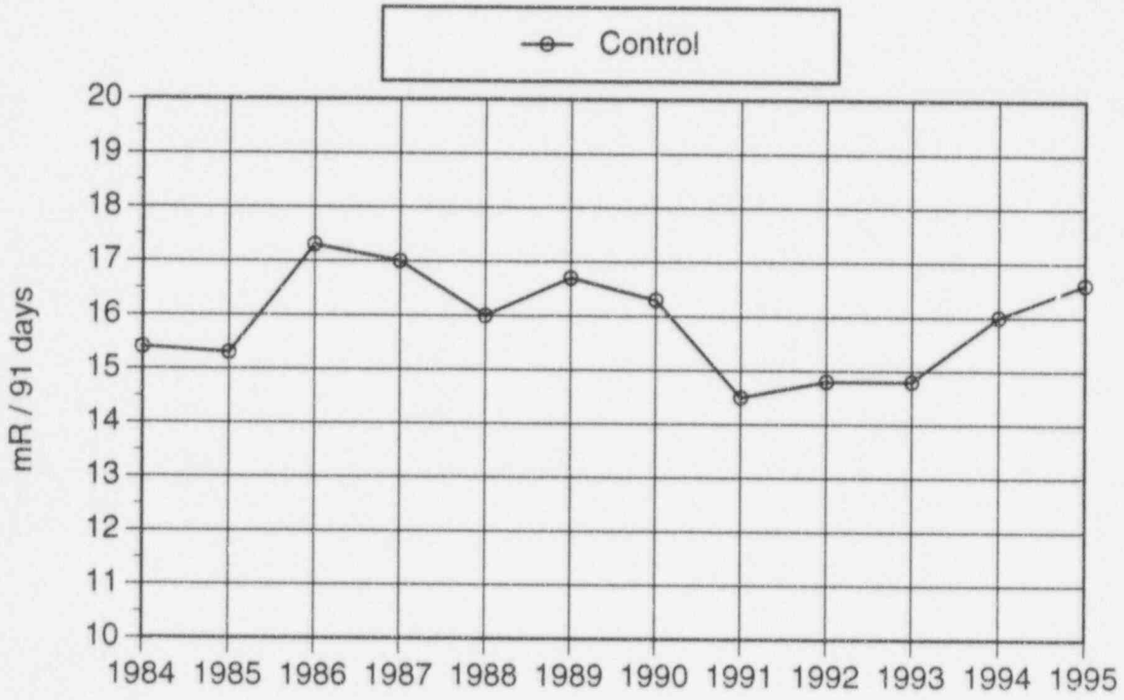


Figure 5-2. Airborne Particulates; analysis for gross beta, average mean of all indicator locations versus control location.

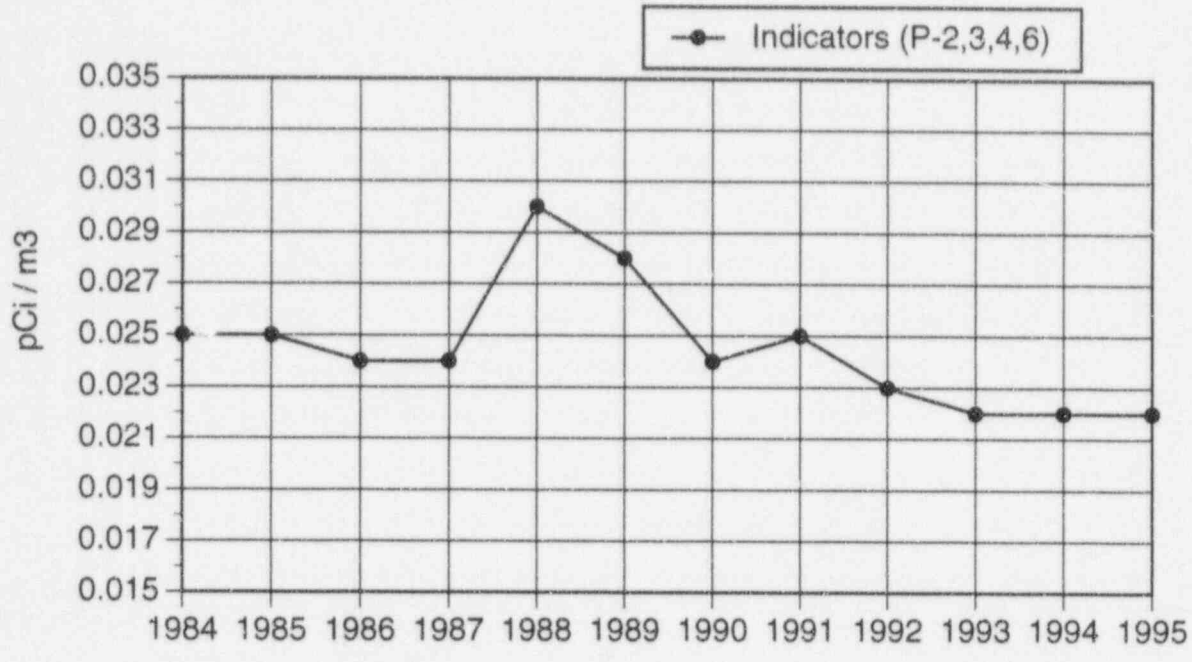


Table 5.4. Radiation Environmental Monitoring Program Summary.

Name of Facility Prairie Island Nuclear Power Station — Docket No. 50-282, 50-306
Location of Facility Goodhue, Minnesota (County, State) — Reporting Period January - December 1995

Sample Type (Units)	Type and Number of Analyses[a]	LLD[b]	Indicator Locations Mean (F)[c] Range[c]	Location with Highest Quarterly Mean: Location[d]	Location with Highest Quarterly Mean: Mean (F)[c] Range[c]	Control Locations Mean (F)[c] Range	Number Non-Routine Results[e]
TLD (mR/91 days) (Inner Ring, Area at Site Boundary)	Gamma 40	3.0	14.4 (40/40) (12.2-16.9)	P-03A, P-04A 0.5 mi @ 183° /S, 0.4 mi @ 204° /SWW	15.0 (8/8) (13.6-16.9)	(See Control below.)	0
TLD (mR/91 days) (Outer Ring, 4 - 5 miles distant)	Gamma 60	3.0	16.4 (60/60) (12.1-20.4)	P-03B, Anderson Farm, 4.9 mi @ 46°/NE	18.5 (4/4) (16.6-20.3)	(See Control below.)	0
TLD (mR/91 days) (Special Interest Areas)	Gamma 32	3.0	15.7 (30/30) (12.3-20.4)	P-04S, R. Burt Residence, 2.0mi @ 202°/SSW	17.8 (4/4) (14.9-20.4)	(See Control below.)	0
TLD (mR/91 days) ISFSI Area Inside EarthBerm	Gamma 44	3.0	18.6 (44/44) (12.1-37.0)	P-01IX, 140' @ 180°/S,	27.8 (3/3) (18.5-37.0)	(See Control below.)	0
TLD (mR/91 days) ISFSI Area Outside Earth Berm	Gamma 32	3.0	16.2 (32/32) (13.8-21.0)	P-03IB, 559' @ 85°/E	18.8 (4/4) (17.3-20.5)	(See Control below.)	0
TLD (mR/91 days)(Control)	Gamma 4	3.0	None	P-1, R. Kinneman Farm, 11.1 mi @ 331°/NNW	16.6 (4/4) (15.3-17.8)	16.6 (4/4) (15.3-17.8)	0
Airborne Particulates (pCi/m^3)	GB 265	0.002	0.022 (212/212) (0.006-0.049)	P-2, P-6 0.5 mi @ 294° /WNW, 1.6 mi @ 129° /SE	0.023 (106/106) (0.006-0.049)	0.022 (53/53) (0.007-0.043)	0
	GS 20						
	Be-7	0.022	0.080 (16/16) (0.043-0.147)	P-2 , Air Station 0.5 mi @ 294° /WNW	0.088 (4/4) (0.050-0.147)	0.073 (4/4) (0.053-0.106)	0
	Mn-54	0.0012	<LLD	-	-	<LLD	0
	Co-58	0.0009	<LLD	-	-	<LLD	0
	Co-60	0.0014	<LLD	-	-	<LLD	0
	Zn-65	0.0025	<LLD	-	-	<LLD	0
	Zr-Nb-95	0.0019	<LLD	-	-	<LLD	0
	Ru-103	0.0021	<LLD	-	-	<LLD	0
	Ru-106	0.012	<LLD	-	-	<LLD	0
	Cs-134	0.0011	<LLD	-	-	<LLD	0
	Cs-137	0.0015	<LLD	-	-	<LLD	0
	Ba-La-140	0.0050	<LLD	-	-	<LLD	0
	Ce-141	0.0031	<LLD	-	-	<LLD	0
	Ce-144	0.0074	<LLD	-	-	<LLD	0

Table 5.4. Radiation Environmental Monitoring Program Summary.

Name of Facility Prairie Island Nuclear Power Station — Docket No. 50-282, 50-306
Location of Facility Goodhue, Minnesota (County, State) — Reporting Period January - December 1995

Sample Type (Units)	Type and Number of Analyses[a]	LLD[b]	Indicator Locations Mean (F)[c] Range[c]	Location with Highest Quarterly Mean Location[d]	Mean (F)[c] Range[c]	Control Locations Mean (F)[c] Range	Number Non-Routine Results[e]
Airborne Iodine (pCi/m^3)	I-131 265	0.07	<LLD	-	-	<LLD	0
Milk, (pCi/L)	I-131 83	1.0	<LLD	-	-	<LLD	0
	GS 83						
	K-40	200	1520 (65/65) (1230-1910)	P-39, Born Farm 2.8 mi @ 239°/WSW	1780 (8/8) (1480-1990)	1460 (18/18) (1310-1600)	0
	Cs-134	15	<LLD	-	-	<LLD	0
	Cs-137	15	<LLD	-	-	<LLD	0
	Other gammas	15	<LLD	-	-	<LLD	0
River Water (pCi/L)	H-3 8	170	183 (1/8)	P-6, Lock and Dam #3 1.6 mi @ 129°/SE	183 (1/8)	<LLD	0
	GS 24						
	Mn-54	15	<LLD	-	-	<LLD	0
	Fe-59	30	<LLD	-	-	<LLD	0
	Co-58	15	<LLD	-	-	<LLD	0
	Co-60	15	<LLD	-	-	<LLD	0
	Zn-65	30	<LLD	-	-	<LLD	0
	Zr-Nb-95	15	<LLD	-	-	<LLD	0
	Cs-134	15	<LLD	-	-	<LLD	0
	Cs-137	18	<LLD	-	-	<LLD	0
	Ba-La-140	15	<LLD	-	-	<LLD	0
	Ce-144	70	<LLD	-	-	<LLD	0

Table 5.4. Radiation Environmental Monitoring Program Summary.

Name of Facility Prairie Island Nuclear Power Station — Docket No. 50-282, 50-306
Location of Facility Goodhue, Minnesota (County, State) — Reporting Period January - December 1995

Sample Type (Units)	Type and Number of Analyses[a]	LLD[b]	Indicator Locations Mean (F)[c] Range[c]	Location with Highest Quarterly Mean Location[d]	Location with Highest Quarterly Mean Mean (F)[c] Range[c]	Control Locations Mean (F)[c] Range	Number Non-Routine Results[e]
Drinking Water (pCi/L)	GB 12	1.0	3.9 (12/12) (1.7-6.4)	P-11, Red Wing Service Center 3.3 mi @ 158°/SSE	3.9 (12/12) (1.7-6.4)	None	0
	I-131 12	1.0	<LLD	-	-	None	0
	H-3 4	170	<LLD	-	-	None	0
	GS 12						
	Mn-54	15	<LLD	-	-	None	0
	Fe-59	30	<LLD	-	-	None	0
	Co-58	15	<LLD	-	-	None	0
	Co-60	15	<LLD	-	-	None	0
	Zn-65	30	<LLD	-	-	None	0
	Zr-Nb-95	15	<LLD	-	-	None	0
	Cs-134	10	<LLD	-	-	None	0
	Cs-137	10	<LLD	-	-	None	0
	Ba-La-140	15	<LLD	-	-	None	0
	Ce-144	52	<LLD	-	-	None	0
Well Water (pCi/L)	H-3 16	172	<LLD	-		<LLD	0
	GS 16						
	Mn-54	15	<LLD	-	-	<LLD	0
	Fe-59	30	<LLD	-	-	<LLD	0
	Co-58	15	<LLD	-	-	<LLD	0
	Co-60	15	<LLD	-	-	<LLD	0
	Zn-65	30	<LLD	-	-	<LLD	0
	Zr-Nb-95	15	<LLD	-	-	<LLD	0
	Cs-134	15	<LLD	-	-	<LLD	0
	Cs-137	18	<LLD	-	-	<LLD	0
	Ba-La-140	15	<LLD	-	-	<LLD	0
	Ce-144	60	<LLD	-	-	<LLD	0
Crops - Cabbage (pCi/g wet)	I-131 2	0.021	<LLD	-	-	<LLD	0

Table 5.4. Radiation Environmental Monitoring Program Summary.

Name of Facility Prairie Island Nuclear Power Station — Docket No. 50-282, 50-306
Location of Facility Goodhue, Minnesota (County, State) — Reporting Period January - December 1995

Sample Type (Units)	Type and Number of Analyses[a]	LLD[b]	Indicator Locations Mean (F)[c] Range[c]	Location with Highest Quarterly Mean Location[d]	Location with Highest Quarterly Mean Mean (F)[c] Range[c]	Control Locations Mean (F)[c] Range	Number Non-Routine Results[e]
Fish-Flesh (pCi/g wet)	GS 4						
	K-40	0.1	3.12 (2/2) (2.75-3.49)	P-19, Upstream of Plant, 1.3 mi @ 0°/N	3.36 (2/2) (3.35-3.36)	3.36 (2/2) (3.35-3.36)	0
	Mn-54	0.009	<LLD	-	-	<LLD	0
	Fe-59	0.087	<LLD	-	-	<LLD	0
	Co-58	0.020	<LLD	-	-	<LLD	0
	Co-60	0.018	<LLD	-	-	<LLD	0
	Zn-65	0.043	<LLD	-	-	<LLD	0
	Zr-Nb-95	0.046	<LLD	-	-	<LLD	0
	Cs-134	0.013	<LLD	-	-	<LLD	0
	Cs-137	0.019	<LLD	-	-	<LLD	0
	Ba-La-140	0.086	<LLD	-	-	<LLD	0
Invertebrates (pCi/g wet)	GS 4						
	Be-7	0.85	0.95 (1/2)	P-6, Lock and Dam #3 1.6 mi @ 129°/SE	0.95 (1/2)	<LLD	0
	K-40	1.85	<LLD	-	-	<LLD	0
	Mn-54	0.074	<LLD	-	-	<LLD	0
	Co-58	0.092	<LLD	-	-	<LLD	0
	Co-60	0.11	<LLD	-	-	<LLD	0
	Zn-65	0.23	<LLD	-	-	<LLD	0
	Zr-Nb-95	0.11	<LLD	-	-	<LLD	0
	Ru-103	0.10	<LLD	-	-	<LLD	0
	Ru-106	0.79	<LLD	-	-	<LLD	0
	Cs-134	0.068	<LLD	-	-	<LLD	0
	Cs-137	0.085	<LLD	-	-	<LLD	0
	Ba-La-140	0.17	LLD	-	-	<LLD	0
	Ce-141	0.12	<LLD	-	-	<LLD	0
	Ce-144	0.34	<LLD	-	-	<LLD	0

Table 5.4. Radiation Environmental Monitoring Program Summary.

Name of Facility Prairie Island Nuclear Power Station — Docket No. 50-282, 50-306
Location of Facility Goodhue, Minnesota (County, State) — Reporting Period January - December 1995

Sample Type (Units)	Type and Number of Analyses[a]	LLD[b]	Indicator Locations Mean (F)[c] Range[c]	Location with Highest Quarterly Mean Location[d]	Location with Highest Quarterly Mean Mean (F)[c] Range[c]	Control Locations Mean (F)[c] Range	Number Non-Routine Results[e]
Bottom and Shoreline Sediments (pCi/g dry)	GS 6						
	Be-7	0.35	<LLD	-	-	<LLD	0
	K-40	0.5	8.88 (4/4) (8.09-10.46)	P-20, Upstream of Plant, 0.9 mi. @ 45°/NE	9.48 (2/2) (9.30-9.67)	9.48 (2/2) (9.30-9.67)	0
	Mn-54	0.017	<LLD	-	-	<LLD	0
	Co-58	0.039	<LLD	-	-	<LLD	0
	Co-60	0.027	<LLD	-	-	<LLD	0
	Zn-65	0.12	<LLD	-	-	<LLD	0
	Zr-Nb-95	0.050	<LLD	-	-	<LLD	0
	Ru-103	0.037	<LLD	-	-	<LLD	0
	Ru-106	0.14	<LLD	-	-	<LLD	0
	Cs-134	0.049	<LLD	-	-	<LLD	0
	Cs-137	0.029	<LLD	-	-	<LLD	0
	Ba-La-140	0.12	<LLD	-	-	<LLD	0
	Ce-141	0.069	<LLD	-	-	<LLD	0
	Ce-144	0.14	<LLD	-	-	<LLD	0

a GB = Gross beta; GS = gamma scan.

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

c Mean and range are based on detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parentheses (F).

d Locations are specified: (1) by name, and code (Table 2) and (2) by distance, direction and sector 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 typical pre-operational value for the medium or location.

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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 and duplicates. 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, 1995 through December, 1995

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 it's quality control program in December 1971. These programs are operated by agencies which supply environmental type samples (e.g., milk or water) containing concentrations of radionuclides known to the issuing agency but not to participant laboratories. The purpose of such a program is to provide an independent check on 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. Also Teledyne testing results are 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 list results of the in-house "duplicate" program for the past twelve months. Acceptance is based on the difference of the results being less than the sum of the errors. Data for previous years available upon request.

Attachment A lists acceptance criteria for "spiked" samples.

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

Table A-1. U.S. Environmental Protection Agency's crosscheck program, comparison of EPA and Teledyne's Midwest Laboratory results for various sample media[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-723	WATER	Jan, 1995	Sr-89	17.7 ± 1.5	20.0 ± 5.0	11.3 - 28.7
STW-723	WATER	Jan, 1995	Sr-90	13.7 ± 0.6	15.0 ± 5.0	6.3 - 23.7
STW-724	WATER	Jan, 1995	Gr. Alpha	4.3 ± 0.6	5.0 ± 5.0	0.0 - 13.7
STW-724	WATER	Jan, 1995	Gr. Beta	4.7 ± 0.6	5.0 ± 5.0	0.0 - 13.7
STW-725	WATER	Feb, 1995	I-131	99.0 ± 4.4	100.0 ± 10.0	82.7 - 117.3
STW-726	WATER	Feb, 1995	Ra-226	19.2 ± 0.4	19.1 ± 2.9	14.1 - 24.1
STW-726	WATER	Feb, 1995	Ra-228	19.2 ± 2.0	20.0 ± 5.0	11.3 - 28.7
STW-726	WATER	Feb, 1995	Uranium	24.9 ± 0.2	25.5 ± 3.0	20.3 - 30.7
STW-727	WATER	Mar, 1995	H-3	7,460.0 ± 87.2	7,435.0 ± 744.0	6,144.2 - 8,725.8
STW-728	WATER	Mar, 1995	Pu-239	11.0 ± 0.6	11.1 ± 1.1	9.2 - 13.0
STW-729	WATER	Apr, 1995	Gr. Alpha	41.7 ± 0.6	47.5 ± 11.9	26.9 - 68.1
STW-729	WATER	Apr, 1995	Ra-226	13.4 ± 0.5	14.9 ± 2.2	11.1 - 18.7
STW-729	WATER	Apr, 1995	Ra-228	13.1 ± 2.4	15.8 ± 4.0	8.9 - 22.7
STW-729	WATER	Apr, 1995	Uranium	9.5 ± 0.6	10.0 ± 3.0	4.8 - 15.2
STW-730	WATER	Apr, 1995	Co-60	29.0 ± 1.7	29.0 ± 5.0	20.3 - 37.7
STW-730	WATER	Apr, 1995	Cs-134	17.3 ± 1.2	20.0 ± 5.0	11.3 - 28.7
STW-730	WATER	Apr, 1995	Cs-137	11.0 ± 1.0	11.0 ± 5.0	2.3 - 19.7
STW-730	WATER	Apr, 1995	Gr. Beta	74.8 ± 3.2	86.6 ± 10.0	69.3 - 103.9
STW-730	WATER	Apr, 1995	Sr-89	17.0 ± 0.0	20.0 ± 5.0	11.3 - 28.7
STW-730	WATER	Apr, 1995	Sr-90	12.7 ± 1.2	15.0 ± 5.0	6.3 - 23.7
STW-732	WATER	Jun, 1995	Ra-226	14.7 ± 0.3	14.8 ± 2.2	11.0 - 18.6
STW-732	WATER	Jun, 1995	Ra-228	11.9 ± 0.6	15.0 ± 3.8	8.4 - 21.6
STW-732	WATER	Jun, 1995	Uranium	13.9 ± 0.3	15.2 ± 3.0	10.0 - 20.4
STW-735	WATER	Jul, 1995	Gr. Alpha	16.4 ± 2.4	27.5 ± 6.9	15.5 - 39.5
STW-735	WATER	Jul, 1995	Gr. Beta	16.8 ± 1.0	19.4 ± 5.0	10.7 - 28.1
STW-736	WATER	Aug, 1995	H-3	4,773.7 ± 49.9	4,872.0 ± 487.0	4,027.1 - 5,716.9

[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, Neveda.

[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	mR: Known Value ± 2 Sigma	mR: Average ± 2 Sigma (All Participants)
2nd International Intercomparison						
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.						
3rd International Intercomparison						
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.						
4th International Intercomparison						
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.						
5th International Intercomparison						
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.						
5th International Intercomparison						
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.						
6th International Intercomparison						
115-6						
Teledyne did not participate in the Sixth International Intercomparison of Environmental Dosimeters.						
7th International Intercomparison						
115-7A	LiF-100 Chips	Jun, 1984	Field	75.4 ± 2.6	75.8 ± 6.0	75.1 ± 29.8

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

Lab Code	TLD Type	Date	Measurement	mR: Teledyne Results ± 2 Sigma	mR: Known Value ± 2 Sigma	mR: Average ± 2 Sigma (All Participants)
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
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.						
7th International Intercomparison						
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.						
7th International Intercomparison						
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.						
8th International Intercomparison						
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.						
8th International Intercomparison						
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.						
8th International Intercomparison						
115-8C	$CaSO_4$: Dy Cards	Jan, 1986	Field, Site 1	32.2 ± 0.7	29.7 ± 1.5	28.9 ± 12.4

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

Lab Code	TLD Type	Date	Measurement	mR: Teledyne Results ± 2 Sigma	mR: Known Value ± 2 Sigma	mR: 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

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

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).

				mR		
Lab Code	TLD Type	Date	Measurement	Teledyne Results ± 2 Sigma	Known Value ± 2 Sigma	Average ± 2 Sigma (All Participants)
Teledyne Testing						
90-1	Teledyne $CaSo_4$: Dy Cards	Jun, 1990	Lab	20.6 ± 1.4	19.6	ND
ND = No Data; Teledyne Testing was only performed by Teledyne. Cards were irradiated by Teledyne Isotopes, Inc., Westwood, New Jersey, in June, 1990.						
Teledyne Testing						
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 Asssociates, Inc., Northville, MI, in October, 1990.						
Teledyne Testing						
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.						
Teledyne Testing						
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.						
Teledyne Testing						
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

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

Lab Code	TLD Type	Date	Measurement	mR: Teledyne Results ± 2 Sigma	mR: Known Value ± 2 Sigma	mR: Average ± 2 Sigma (All Participants)
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
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 where 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

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

				mR		
Lab Code	TLD Type	Date	Measurement	Teledyne Results ± 2 Sigma	Known Value ± 2 Sigma	Average ± 2 Sigma (All Participants)
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

ND = No Data; Teledyne Testing was only performed by Teledyne.
Cards were irradiated by Teledyne Isotopes, Inc., Westwood, New Jersey, in November, 1994.

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-205	MILK	Jan, 1995	Cs-137	51.2 ± 7.5	49.4	39.4 - 59.4
SPMI-205	MILK	Jan, 1995	Sr-89	19.4 ± 3.4	23.1	13.1 - 33.1
SPMI-205	MILK	Jan, 1995	Sr-90	26.2 ± 1.3	28.1	18.1 - 38.1
SPAP-284	AIR FILTER	Jan, 1995	Cs-137	2.2 ± 0.0	1.9	1.2 - 2.7
SPAP-284	AIR FILTER	Jan, 1995	I-131(g)	2.2 ± 0.0	1.9	1.2 - 2.7
SPW-286	WATER	Jan, 1995	H-3	40929.9 ± 5594.5	40871.0	32696.8 - 49045.2
SPW-289	WATER	Jan, 1995	Co-60	250.5 ± 14.1	247.5	222.8 - 272.3
SPW-289	WATER	Jan, 1995	Cs-134	290.5 ± 14.4	321.3	289.2 - 353.4
SPW-289	WATER	Jan, 1995	Cs-137	387.7 ± 21.2	394.3	354.9 - 433.7
SPAP-408	AIR FILTER	Jan, 1995	Gr. Beta	7.5 ± 0.0	8.1	0.0 - 18.1
SPMI-707	MILK	Jan, 1995	I-131	80.3 ± 1.4	86.0	68.8 - 103.2
SPMI-707	MILK	Jan, 1995	I-131(g)	84.8 ± 10.4	86.0	51.6 - 96.0
SPCH-717	CHARCOAL CANISTER	Jan, 1995	I-131(g)	2.9 ± 0.1	2.5	1.5 - 3.4
SPVE-729	VEGETATION	Feb, 1995	I-131(g)	1.9 ± 0.1	1.9	1.1 - 2.6
SPW-1204	WATER	Feb, 1995	Ra-226	6.9 ± 0.1	6.9	4.8 - 9.0
SPW-1790	WATER	Mar, 1995	Sr-89	0.9 ± 3.9	42.7	32.7 - 52.7
The raw data was reviewed and found to be free of errors. The sample was repeated with similar results.An Investigation was conducted to determine the cause of this deviation. No apparent cause was found for this discrepancy. It was determined the "spike" was prepared improperly. Another "spike" was prepared and analyzed (See SPW-6388). No further action is planned.						
SPW-1790	WATER	Mar, 1995	Sr-90	31.4 ± 1.8	39.1	31.3 - 46.9
The raw data was reviewed and found to be free of errors. The sample was repeated with similar results.An Investigation was conducted to determine the cause of this deviation. No apparent cause was found for this discrepancy. It was determined the "spike" was prepared improperly. Another "spike" was prepared and analyzed (See SPW-6388). No further action is planned.						
SPW-3051	WATER	Mar, 1995	Gr. Alpha	88.5 ± 3.7	82.9	41.5 - 124.4
SPW-3051	WATER	Mar, 1995	Gr. Beta	83.0 ± 2.3	87.2	77.2 - 97.2
SPAP-2513	AIR FILTER	Apr, 1995	Gr. Beta	7.5 ± 0.0	8.1	0.0 - 18.1
SPAP-2542	AIR FILTER	Apr, 1995	Cs-137	2.3 ± 2.1	1.9	1.2 - 2.7
SPW-2544	WATER	Apr, 1995	H-3	9656.2 ± 291.8	9333.0	7466.4 - 11199.6
SPW-2652	WATER	Apr, 1995	Co-60	23.8 ± 2.4	24.8	14.8 - 34.8
SPW-2652	WATER	Apr, 1995	Cs-134	29.3 ± 2.3	30.8	20.8 - 40.8
SPW-2652	WATER	Apr, 1995	Cs-137	42.3 ± 3.9	40.9	30.9 - 50.9
SPMI-2988	MILK	Apr, 1995	Cs-134	37.0 ± 1.8	40.7	30.7 - 50.7
SPMI-2988	MILK	Apr, 1995	Cs-137	62.4 ± 3.1	54.5	44.5 - 64.5
SPMI-2988	MILK	Apr, 1995	Sr-89	32.6 ± 3.3	36.5	26.5 - 46.5

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-2988	MILK	Apr, 1995	Sr-90	25.6 ± 1.6	24.9	14.9 - 34.9
SPW-3051	WATER	Apr, 1995	Gr. Alpha	88.0 ± 3.8	82.9	41.5 - 124.4
SPW-3051	WATER	Apr, 1995	Gr. Beta	79.6 ± 2.3	87.2	77.2 - 97.2
SPW-3589	WATER	May, 1995	Fe-55	2033.7 ± 500.2	2274.0	1819.2 - 2728.8
SPF-3708	FISH	May, 1995	Cs-134	0.1 ± 0.0	0.1	0.1 - 0.2
SPF-3708	FISH	May, 1995	Cs-137	0.2 ± 0.0	0.2	0.1 - 0.2
SPW-6008	WATER	May, 1995	Gr. Alpha	17.3 ± 1.4	20.7	10.4 - 31.1
SPW-6008	WATER	May, 1995	Gr. Beta	21.2 ± 1.0	21.8	11.8 - 31.8
SPSO-5130	SOIL	May, 1995	Cs-134	0.3 ± 0.0	0.3	0.2 - 0.4
SPSO-5130	SOIL	May, 1995	Cs-137	0.5 ± 0.0	0.5	0.3 - 0.7
SPW-6388	WATER	May, 1995	Sr-89	18.7 ± 2.4	21.2	11.2 - 31.2
SPW-6388	WATER	May, 1995	Sr-90	21.2 ± 1.1	23.2	13.2 - 33.2
SPW-6398	WATER	May, 1995	Sr-89	18.7 ± 2.4	21.2	11.2 - 31.2
SPW-6398	WATER	May, 1995	Sr-90	21.2 ± 1.1	23.2	13.2 - 33.2
SPW-5608	WATER	Jun, 1995	I-131	78.8 ± 2.3	85.5	68.4 - 102.6
SPCH-5964	CHARCOAL CANISTER	Jun, 1995	I-131(g)	2.2 ± 0.1	2.3	1.4 - 3.3
SPW-6005	WATER	Jun, 1995	I-131	48.2 ± 1.9	46.8	34.8 - 58.8
SPVE-6006	VEGETATION	Jun, 1995	I-131(g)	0.6 ± 0.0	0.5	0.3 - 0.8
SPMI-6838	MILK	Jun, 1995	I-131	38.5 ± 0.5	39.6	27.6 - 51.6
SPW-6839	WATER	Jun, 1995	I-131	34.9 ± 0.5	39.5	27.5 - 51.5
SPVE-7190	VEGETATION	Jul, 1995	I-131(g)	1.1 ± 0.0	1.0	0.6 - 1.4
SPMI-7525	MILK	Jul, 1995	Cs-134	31.5 ± 2.5	34.4	24.4 - 44.4
SPMI-7525	MILK	Jul, 1995	Cs-137	50.2 ± 4.0	43.4	33.4 - 53.4
SPMI-7525	MILK	Jul, 1995	I-131(g)	44.7 ± 5.4	45.6	27.4 - 55.6
SPMI-7525	MILK	Jul, 1995	Sr-90	28.0 ± 1.4	27.9	17.9 - 37.9
SPAP-7554	AIR FILTER	Jul, 1995	Gr. Beta	7.3 ± 0.0	8.1	0.0 - 18.1
SPAP-7557	AIR FILTER	Jul, 1995	Cs-137	2.3 ± 0.0	1.9	1.2 - 2.7
SPW-7569	WATER	Jul, 1995	H-3	25806.9 ± 447.7	26669.0	21335.2 - 32002.8
SPW-8179	WATER	Jul, 1995	Fe-55	2.3 ± 0.4	2.1	0.0 - 22.1
SPW-9981	WATER	Sep, 1995	Sr-89	34.6 ± 4.9	39.0	29.0 - 49.0
SPW-9981	WATER	Sep, 1995	Sr-90	20.3 ± 1.3	20.0	10.0 - 30.0
SPMI-10919	MILK	Oct, 1995	Cs-134	27.9 ± 3.9	27.8	17.8 - 37.8
SPMI-10919	MILK	Oct, 1995	Cs-137	52.3 ± 6.9	43.1	33.1 - 53.1
SPMI-10919	MILK	Oct, 1995	I-131	70.9 ± 0.8	73.4	58.7 - 88.0

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-10919	MILK	Oct, 1995	I-131(g)	77.1 ± 7.9	73.4	44.0 - 83.4
SPF-10921	FISH	Oct, 1995	Co-60	0.7 ± 0.0	0.8	0.5 - 1.1
SPF-10921	FISH	Oct, 1995	Cs-134	0.5 ± 0.0	0.6	0.3 - 0.8
SPF-10921	FISH	Oct, 1995	Cs-137	0.9 ± 0.1	0.9	0.5 - 1.2
SPCH-11238	CHARCOAL CANISTER	Oct, 1995	I-131(g)	0.8 ± 0.0	0.8	0.5 - 1.1
SPAP-10967	AIR FILTER	Nov, 1995	Gr. Beta	7.3 ± 0.0	8.0	0.0 - 18.0
SPW-12079	WATER	Nov, 1995	H-3	27963.4 ± 445.5	29315.0	23452.0 - 35178.0
SPW-12081	WATER	Nov, 1995	Co-60	22.0 ± 1.9	23.0	13.0 - 33.0
SPW-12081	WATER	Nov, 1995	Cs-134	38.1 ± 2.0	41.7	31.7 - 51.7
SPW-12081	WATER	Nov, 1995	Cs-137	27.2 ± 3.0	24.3	14.3 - 34.3
SPW-12084	WATER	Nov, 1995	Gr. Alpha	75.3 ± 3.2	82.8	41.4 - 124.2
SPW-12084	WATER	Nov, 1995	Gr. Beta	86.9 ± 2.5	86.3	76.3 - 96.3
SPW-12809	WATER	Dec, 1995	Gr. Alpha	19.6 ± 3.0	20.7	10.4 - 31.1
SPW-12809	WATER	Dec, 1995	Gr. Beta	21.0 ± 1.8	21.6	11.6 - 31.6

[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) LLD	Teledyne Results (4.66 Sigma) Activity[b]	Acceptance Criteria (4.66 Sigma)
SPM-204	MILK	Jan 1995	Co-60	<5.3	0.41 ± 3.48	< 10.0
SPM-204	MILK	Jan 1995	Cs-134	<4.4	-0.07 ± 2.05	< 10.0
SPM-204	MILK	Jan 1995	Cs-137	<4.3	1.32 ± 2.53	< 10.0
SPM-204	MILK	Jan 1995	I-131	<0.5	-0.03 ± 0.22	< 0.5
SPM-204	MILK	Jan 1995	Sr-89	<0.8	0.14 ± 1.08	< 5.0
SPM-204	MILK	Jan 1995	Sr-90	N/A	1.46 ± 0.48	< 1.0
Low level of Sr-90 concentration in milk (1-5 pCi/L) is not unusual.						
SPAP-283	AIR FILTER	Jan 1995	Co-60	<2.7	-0.36 ± 1.40	< 10.0
SPAP-283	AIR FILTER	Jan 1995	Cs-134	<1.5	-0.67 ± 1.33	< 10.0
SPAP-283	AIR FILTER	Jan 1995	Cs-137	<2.4	0.46 ± 1.33	< 10.0
SPW-285	WATER	Jan 1995	H-3	<165.0	-48.53 ± 84.76	< 200.0
SPCH-287	CHARCOAL CANISTER	Jan 1995	I-131(g)	<2.3	-1.98 ± 3.12	< 9.6
SPW-288	WATER	Jan 1995	Co-60	<2.3	-0.11 ± 2.02	< 10.0
SPW-288	WATER	Jan 1995	Cs-134	<3.5	-0.19 ± 2.61	< 10.0
SPW-288	WATER	Jan 1995	Cs-137	<4.7	0.98 ± 2.54	< 10.0
SPAP-409	AIR FILTER	Jan 1995	Gr. Beta	<0.5	0.02 ± 0.28	< 3.2
SPVE-728	VEGETATION	Jan 1995	I-131(g)	<12.0	2.33 ± 7.54	< 20.0
SPW-957	WATER	Feb 1995	Co-60	<3.7	-1.25 ± 3.02	< 10.0
SPW-957	WATER	Feb 1995	Cs-134	<5.2	0.76 ± 2.77	< 10.0
SPW-957	WATER	Feb 1995	Cs-137	<3.6	-1.38 ± 2.65	< 10.0
SPW-1106	WATER	Feb 1995	Ni-63	<12.0	0.25 ± 6.31	< 20.0
SPW-3052	WATER	Mar 1995	Gr. Alpha	<0.6	0.49 ± 0.43	< 1.0
SPW-3052	WATER	Mar 1995	Gr. Beta	<1.4	3.05 ± 0.98	< 3.2
SPAP-2514	AIR FILTER	Apr 1995	Gr. Beta	<0.3	0.03 ± 0.25	< 3.2
SPAP-2543	AIR FILTER	Apr 1995	Co-60	<4.4	0.39 ± 2.20	< 10.0
SPAP-2543	AIR FILTER	Apr 1995	Cs-134	<1.9	0.05 ± 2.11	< 10.0
SPAP-2543	AIR FILTER	Apr 1995	Cs-137	<1.1	-1.24 ± 1.83	< 10.0
SPW-2545	WATER	Apr 1995	H-3	<169	97.76 ± 88.37	< 200.0
SPW-2651	WATER	Apr 1995	Co-60	<3.17	-1.08 ± 2.45	< 10.0
SPW-2651	WATER	Apr 1995	Cs-134	<3.32	0.29 ± 2.57	< 10.0
SPW-2651	WATER	Apr 1995	Cs-137	<3.56	-0.92 ± 2.64	< 10.0
SPMI-2987	MILK	Apr 1995	Cs-134	<3.4	0.37 ± 1.89	< 10.0
SPMI-2987	MILK	Apr 1995	Cs-137	<3.3	1.29 ± 1.75	< 10.0
SPMI-2987	MILK	Apr 1995	Sr-89	<0.4	0.06 ± 0.62	< 5.0

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

Lab Code	Sample Type	Sample Date	Analysis	Concentration pCi/L[a]. Teledyne Results (4.66 Sigma) LLD	Teledyne Results (4.66 Sigma) Activity[b]	Acceptance Criteria (4.66 Sigma)
SPMI-2987	MILK	Apr 1995	Sr-90	N/A	1.47 ± 0.38	< 1.0
Low level of Sr-90 concentration in milk (1-5 pCi/L) is not unusual.						
SPW-3052	WATER	Apr 1995	Gr. Alpha	<0.7	0.23 ± 0.47	< 1.0
SPW-3052	WATER	Apr 1995	Gr. Beta	<1.7	-0.02 ± 1.09	< 3.2
SPW-3590	WATER	May 1995	Fe-55	<602.0	0.00 ± 365.40	< 1000.0
SPF-3709	FISH	May 1995	Co-60	<8.4	2.21 ± 5.97	< 10.0
SPF-3709	FISH	May 1995	Cs-134	<1.3	6.79 ± 8.55	< 10.0
SPF-3709	FISH	May 1995	Cs-137	<1.3	3.61 ± 7.81	< 10.0
SPSO-5131	SOIL	May 1995	Cs-134	<0.034	0.01 ± 0.01	< 10.0
SPSO-5131	SOIL	May 1995	Cs-137	<0.012	0.00 ± 0.01	< 10.0
SPCH-5975	CHARCOAL CANISTER	Jun 1995	I-131(g)	<3.0	-0.71 ± 2.68	< 9.6
SPVE-6007	VEGETATION	Jun 1995	I-131(g)	<0.009	0.00 ± 0.01	< 20.0
SPW-6011	WATER	Jun 1995	I-131	<0.4	-0.03 ± 0.19	< 0.5
SPVE-7191	VEGETATION	Jul 1995	I-131(g)	<0.005	-0.00 ± 0.00	< 20.0
SPMI-7526	MILK	Jul 1995	Co-60	<5.8	1.19 ± 3.34	< 10.0
SPMI-7526	MILK	Jul 1995	Cs-134	<5.1	0.48 ± 2.76	< 10.0
SPMI-7526	MILK	Jul 1995	Cs-137	<3.7	0.98 ± 2.39	< 10.0
SPMI-7526	MILK	Jul 1995	I-131	<0.5	0.00 ± 0.23	< 0.5
SPMI-7526	MILK	Jul 1995	Sr-89	<0.6	-0.19 ± 0.82	< 5.0
SPMI-7526	MILK	Jul 1995	Sr-90	N/A	1.35 ± 0.36	< 1.0
Low level of Sr-90 concentration in milk (1-5 pCi/L) is not unusual.						
SPAP-7556	AIR FILTER	Jul 1995	Gr. Beta	<1.0	0.06 ± 0.55	< 3.2
SPAP-7558	AIR FILTER	Jul 1995	Co-60	<4.2	0.39 ± 3.06	< 10.0
SPAP-7558	AIR FILTER	Jul 1995	Co-60	<4.2	0.04 ± 3.07	< 10.0
SPAP-7558	AIR FILTER	Jul 1995	Cs-134	<3.0	-1.23 ± 2.45	< 10.0
SPAP-7558	AIR FILTER	Jul 1995	Cs-137	<3.5	1.18 ± 2.04	< 10.0
SPW-7570	WATER	Jul 1995	H-3	<164	51.58 ± 83.71	< 200.0
SPW-8180	WATER	Jul 1995	Fe-55	<0.4	0.00 ± 0.27	< 1000.0
SPW-8931	WATER	Aug 1995	Ra-228	<1.0	0.58 ± 0.61	< 1.0
SPW-9982	WATER	Sep 1995	Sr-89	<0.8	0.52 ± 0.76	< 5.0
SPW-9982	WATER	Sep 1995	Sr-90	<0.4	0.21 ± 0.21	< 1.0
SPMI-10920	MILK	Oct 1995	Co-60	<3.8	-0.45 ± 5.05	< 10.0
SPMI-10920	MILK	Oct 1995	Cs-134	<3.5	-2.79 ± 4.35	< 10.0
SPMI-10920	MILK	Oct 1995	Cs-137	<6.0	1.55 ± 4.13	< 10.0

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

Lab Code	Sample Type	Sample Date	Analysis	Concentration pCi/L[a]. Teledyne Results (4.66 Sigma) LLD	Teledyne Results (4.66 Sigma) Activity[b]	Acceptance Criteria (4.66 Sigma)
SPMI-10920	MILK	Oct 1995	I-131	<0.4	0.10 ± 0.19	< 0.5
SPF-10922	FISH	Oct 1995	Co-60	<5.4	5.74 ± 4.70	< 10.0
SPF-10922	FISH	Oct 1995	Cs-134	<8.9	2.47 ± 5.44	< 10.0
SPF-10922	FISH	Oct 1995	Cs-137	<5.4	-2.44 ± 5.08	< 10.0
SPSO-11225	SOIL	Oct 1995	Cs-134	<0.034	0.00 ± 0.02	< 10.0
SPSO-11225	SOIL	Oct 1995	Cs-137	<0.019	-0.00 ± 0.01	< 10.0
SPCH-11238	CHARCOAL CANISTER	Oct 1995	I-131(g)	<1.9	-0.00 ± 0.01	< 9.6
SPAP-10968	AIR FILTER	Nov 1995	Gr. Beta	<0.4	0.61 ± 0.26	< 3.2
SPW-12080	WATER	Nov 1995	H-3	<149	23.01 ± 74.94	< 200.0
SPW-12082	WATER	Nov 1995	Co-60	<2.1	0.62 ± 1.13	< 10.0
SPW-12082	WATER	Nov 1995	Cs-134	<1.9	0.02 ± 1.28	< 10.0
SPW-12082	WATER	Nov 1995	Cs-137	<2.4	1.53 ± 1.22	< 10.0
SPW-12082	WATER	Nov 1995	Gr. Alpha	<0.6	0.19 ± 0.43	< 1.0
SPW-12082	WATER	Nov 1995	Gr. Beta	<1.7	0.06 ± 1.11	< 3.2
SPW-12808	WATER	Dec 1995	Gr. Alpha	<1.0	0.08 ± 0.49	< 1.0
SPW-12808	WATER	Dec 1995	Gr. Beta	<1.6	-0.53 ± 0.78	< 3.2

[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
WW-62, 63	Jan, 1995	Gr. Beta	1.4160 ± 0.4220	1.2900 ± 0.4000	1.3530 ± 0.2907
WW-62, 63	Jan, 1995	H-3	22.5635 ± 80.8891	18.8029 ± 80.7140	20.6832 ± 57.1354
WW-41, 42	Jan, 1995	Gr. Alpha	5.0970 ± 2.5260	2.4790 ± 2.1920	3.7880 ± 1.6722
WW-41, 42	Jan, 1995	Gr. Beta	4.6720 ± 0.8260	4.9650 ± 0.8770	4.8185 ± 0.6024
WW-41, 42	Jan, 1995	H-3	30.0800 ± 81.2250	-47.0000 ± 77.7750	-8.4600 ± 56.2282
WW-41, 42	Jan, 1995	K-40	1.3840 ± 0.2076	1.7300 ± 0.2595	1.5570 ± 0.1662
WW-41, 42	Jan, 1995	Sr-89	-0.3474 ± 0.5730	-0.0685 ± 0.5382	-0.2079 ± 0.3931
WW-41, 42	Jan, 1995	Sr-90	0.2017 ± 0.2519	0.1389 ± 0.2174	0.1703 ± 0.1664
CF-20, 21	Jan, 1995	Be-7	0.4327 ± 0.1200	0.4741 ± 0.1250	0.4534 ± 0.0866
CF-20, 21	Jan, 1995	Gr. Beta	2.9120 ± 0.0930	2.9920 ± 0.0920	2.9520 ± 0.0654
CF-20, 21	Jan, 1995	K-40	4.0808 ± 0.3060	3.7714 ± 0.3050	3.9261 ± 0.2160
CF-20, 21	Jan, 1995	Sr-89	0.0013 ± 0.0043	0.0000 ± 0.0058	0.0007 ± 0.0036
CF-20, 21	Jan, 1995	Sr-90	0.0017 ± 0.0011	0.0026 ± 0.0015	0.0021 ± 0.0009
CW-105, 106	Jan, 1995	Gr. Beta	5.4370 ± 0.9970	6.1900 ± 1.0260	5.8135 ± 0.7153
CW-105, 106	Jan, 1995	Gr. Beta	0.0490 ± 0.4360	0.0590 ± 0.4360	0.0540 ± 0.3083
MI-83, 84	Jan, 1995	Co-60	-0.3330 ± 2.5300	0.6530 ± 2.1700	0.1600 ± 1.6666
MI-83, 84	Jan, 1995	Cs-137	-1.1400 ± 2.2700	0.0761 ± 1.8700	-0.5320 ± 1.4705
MI-83, 84	Jan, 1995	I-131(G)	-1.9100 ± 3.2000	1.4700 ± 2.4700	-0.2200 ± 2.0212
MI-187, 188	Jan, 1995	I-131	0.1496 ± 0.2574	0.2682 ± 0.3828	0.2089 ± 0.2306
MI-187, 188	Jan, 1995	K-40	1,573.0000 ± 138.0000	1,426.0000 ± 177.0000	1,499.5000 ± 112.2197
SW-213, 214	Jan, 1995	H-3	5,939.6340 ± 241.2390	6,091.2412 ± 232.8063	6,015.4376 ± 167.6269
WW-240, 241	Jan, 1995	H-3	39.8030 ± 80.3410	9.9510 ± 78.9420	24.8770 ± 56.3172
WW-316, 317	Jan, 1995	H-3	17,618.0000 ± 377.0000	17,390.0000 ± 381.0000	17,504.0000 ± 267.9972
MI-295, 296	Jan, 1995	Co-60	-1.0900 ± 2.3700	0.2510 ± 2.8000	-0.4195 ± 1.8342
MI-295, 296	Jan, 1995	Cs-134	-0.6360 ± 1.8100	0.7830 ± 2.4400	0.0735 ± 1.5190
MI-295, 296	Jan, 1995	Cs-137	0.5200 ± 1.8200	1.2900 ± 2.6800	0.9050 ± 1.6198
MI-295, 296	Jan, 1995	I-131	0.1300 ± 0.2600	0.2300 ± 0.3400	0.1800 ± 0.2140
MI-295, 296	Jan, 1995	I-131(g)	-0.3970 ± 2.3600	-0.0386 ± 4.3000	-0.2178 ± 2.4525
MI-295, 296	Jan, 1995	K-40	1,449.1000 ± 91.2000	1,311.8000 ± 108.0000	1,380.4500 ± 70.6779
MI-295, 296	Jan, 1995	La-140	0.6220 ± 1.6900	-1.1800 ± 2.5000	-0.2790 ± 1.5088
MI-295, 296	Jan, 1995	Sr-89	0.2267 ± 0.7985	0.1552 ± 0.9326	0.1909 ± 0.6139
MI-295, 296	Jan, 1995	Sr-90	1.3813 ± 0.3839	1.6174 ± 0.4296	1.4993 ± 0.2881
LW-609, 610	Jan, 1995	Gr. Beta	2.6380 ± 0.7310	1.6940 ± 0.6930	2.1660 ± 0.5036
LW-344, 345	Jan, 1995	Co-60	-0.1680 ± 1.8700	1.5200 ± 3.1100	0.6760 ± 1.8145
LW-344, 345	Jan, 1995	Cs-137	0.3820 ± 1.9200	-0.1570 ± 2.9500	0.1125 ± 1.7599
LW-344, 345	Jan, 1995	Gr. Beta	3.2810 ± 0.9440	3.3500 ± 0.9390	3.3155 ± 0.6657

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-374, 375	Jan, 1995	I-131	-0.0572 ± 0.2162	-0.0743 ± 0.2780	-0.0658 ± 0.1761
MI-374, 375	Jan, 1995	K-40	1,250.0000 ± 150.0000	1,286.5000 ± 141.0000	1,268.2500 ± 102.9332
SW-463, 464	Jan, 1995	Gr. Beta	1.8970 ± 0.5970	1.9470 ± 0.6020	1.9220 ± 0.4239
SW-463, 464	Jan, 1995	H-3	35.5580 ± 80.3070	7.4860 ± 78.9880	21.5220 ± 56.3212
WWU-860, 861	Jan, 1995	Gr. Alpha	0.3000 ± 0.6000	0.2000 ± 0.3000	0.2500 ± 0.3354
WWU-860, 861	Jan, 1995	Gr. Beta	0.8450 ± 1.3200	1.7600 ± 1.3500	1.3025 ± 0.9440
WWU-860, 861	Jan, 1995	K-40	61.8050 ± 32.9000	70.9860 ± 36.2000	66.3955 ± 24.4584
SW-586, 587	Jan, 1995	Co-60	-2.1600 ± 2.2900	1.9400 ± 2.7500	-0.1100 ± 1.7893
SW-586, 587	Jan, 1995	Cs-137	0.5590 ± 2.3400	1.5000 ± 2.8800	1.0295 ± 1.8554
WW-547, 548	Jan, 1995	H-3	602.5630 ± 102.9290	619.5980 ± 103.5540	611.0805 ± 73.0031
SWT-715, 716	Jan, 1995	Gr. Beta	2.3000 ± 0.6000	2.3000 ± 0.5000	2.3000 ± 0.3905
SW-694, 695	Feb, 1995	Gr. Beta	3.9100 ± 0.7450	4.1790 ± 0.7550	4.0445 ± 0.5303
WW-736, 737	Feb, 1995	H-3	9,951.8722 ± 284.2655	10,200.7626 ± 287.5238	10,076.3174 ± 202.1613
WW-763, 764	Feb, 1995	H-3	584.4290 ± 101.0550	707.1020 ± 105.5380	645.7655 ± 73.0589
MI-881, 882	Feb, 1995	I-131	0.1760 ± 0.2567	0.1552 ± 0.2852	0.1656 ± 0.1919
MI-881, 882	Feb, 1995	K-40	1,340.4000 ± 164.0000	1,492.0000 ± 101.0000	1,416.2000 ± 96.3029
MI-838, 839	Feb, 1995	Co-60	0.9670 ± 2.6500	-0.4760 ± 3.8100	0.2455 ± 2.3205
MI-838, 839	Feb, 1995	Cs-134	-0.0557 ± 2.2800	-1.4200 ± 3.0900	-0.7379 ± 1.9201
MI-838, 839	Feb, 1995	Cs-137	-0.4380 ± 2.5500	-0.4370 ± 3.0900	-0.4375 ± 2.0032
MI-838, 839	Feb, 1995	I-131	0.1283 ± 0.1951	0.0880 ± 0.1984	0.1081 ± 0.1391
MI-838, 839	Feb, 1995	I-131(g)	-0.2560 ± 2.5800	-0.5630 ± 3.1800	-0.4095 ± 2.0475
MI-838, 839	Feb, 1995	K-40	1,298.6000 ± 99.4000	1,232.5000 ± 125.0000	1,265.5500 ± 79.8520
MI-838, 839	Feb, 1995	Sr-89	0.5302 ± 0.5774	0.5000 ± 0.6000	0.5151 ± 0.4164
MI-838, 839	Feb, 1995	Sr-90	0.8186 ± 0.2809	0.8000 ± 0.3000	0.8093 ± 0.2055
MI-937, 938	Feb, 1995	I-131	-0.0083 ± 0.1800	-0.0270 ± 0.1800	-0.0177 ± 0.1273
MI-937, 938	Feb, 1995	K-40	1,451.8000 ± 69.6000	1,456.6000 ± 141.0000	1,454.2000 ± 78.6212
SW-904, 905	Feb, 1995	H-3	640.3425 ± 104.5679	597.4040 ± 103.0233	618.8733 ± 73.3966
MI-1216, 1217	Feb, 1995	I-131	0.2640 ± 0.2740	0.1160 ± 0.2600	0.1900 ± 0.1889
MI-1216, 1217	Feb, 1995	K-40	1,583.0000 ± 131.0000	1,493.6000 ± 174.0000	1,538.3000 ± 108.9002
SW-1237, 1238	Feb, 1995	H-3	55.3942 ± 97.3964	4.8591 ± 95.3581	30.1267 ± 68.1528
SW-1264, 1265	Feb, 1995	H-3	67.0910 ± 81.1760	109.2630 ± 83.1440	88.1770 ± 58.1001
G-1343, 1344	Feb, 1995	Be-7	11.4490 ± 0.2850	11.8800 ± 0.2560	11.6645 ± 0.1915
G-1343, 1344	Feb, 1995	K-40	2.9844 ± 0.2420	3.0269 ± 0.2250	3.0057 ± 0.1652
SW-1494, 1495	Feb, 1995	Co-60	-2.1900 ± 4.1200	0.0565 ± 3.4400	-1.0668 ± 2.6837
SW-1494, 1495	Feb, 1995	Cs-137	3.4500 ± 3.6600	0.2430 ± 3.5700	1.8465 ± 2.5564
SW-1367, 1368	Feb, 1995	H-3	560.3183 ± 103.1109	606.1104 ± 104.7919	583.2144 ± 73.5072

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-1394, 1395	Feb, 1995	H-3	47.8810 ± 80.1790	-24.8930 ± 76.6250	11.4940 ± 55.4528
SWT-1515, 1516	Feb, 1995	Gr. Beta	2.4460 ± 0.5250	1.6920 ± 0.5000	2.0690 ± 0.3625
WW-1536, 1537	Feb, 1995	H-3	2,874.3025 ± 167.5000	2,924.0574 ± 168.6330	2,899.1800 ± 118.8416
WW-1563, 1564	Mar, 1995	H-3	33.5160 ± 82.6640	39.5490 ± 82.9570	36.5325 ± 58.5560
WW-1618, 1619	Mar, 1995	Co-60	2.8000 ± 1.5000	2.2000 ± 4.6000	2.5000 ± 2.4192
WW-1618, 1619	Mar, 1995	Cs-137	-0.9000 ± 1.7000	-2.5000 ± 3.2000	-1.7000 ± 1.8118
WW-1618, 1619	Mar, 1995	H-3	4,333.0000 ± 204.0000	4,457.0000 ± 206.0000	4,395.0000 ± 144.9586
MI-1663, 1664	Mar, 1995	Co-60	1.9500 ± 3.2400	-1.5300 ± 2.7200	0.2100 ± 2.1152
MI-1663, 1664	Mar, 1995	Cs-134	0.1690 ± 2.7700	-1.1300 ± 2.0500	-0.4805 ± 1.7230
MI-1663, 1664	Mar, 1995	Cs-137	-0.0737 ± 2.7400	0.9210 ± 2.4100	0.4237 ± 1.8245
MI-1663, 1664	Mar, 1995	I-131	0.1226 ± 0.2720	0.2261 ± 0.3010	0.1744 ± 0.2028
MI-1663, 1664	Mar, 1995	I-131(g)	-0.4090 ± 3.7100	0.1220 ± 3.4200	-0.1435 ± 2.5229
MI-1663, 1664	Mar, 1995	K-40	1,592.1000 ± 124.0000	1,555.6000 ± 118.0000	1,573.8500 ± 85.5862
MI-1663, 1664	Mar, 1995	La-140	-1.6500 ± 3.1000	-0.2240 ± 2.6800	-0.9370 ± 2.0489
MI-1663, 1664	Mar, 1995	Sr-89	0.5984 ± 0.6672	0.5889 ± 0.7467	0.5937 ± 0.5007
MI-1663, 1664	Mar, 1995	Sr-90	1.3624 ± 0.3718	1.5034 ± 0.4517	1.4329 ± 0.2925
WW-1684, 1685	Mar, 1995	Gr. Beta	4.9280 ± 0.7420	5.0100 ± 0.7400	4.9690 ± 0.5240
WW-1684, 1685	Mar, 1995	H-3	81.7160 ± 84.9140	85.7340 ± 85.1040	83.7250 ± 60.1105
LW-1707, 1708	Mar, 1995	Co-58	0.4070 ± 3.0300	0.0486 ± 2.8500	0.2278 ± 2.0799
LW-1707, 1708	Mar, 1995	Co-60	1.0600 ± 2.8900	1.5000 ± 2.7000	1.2800 ± 1.9775
LW-1707, 1708	Mar, 1995	Cs-134	-1.8600 ± 3.0500	-1.5400 ± 2.8300	-1.7000 ± 2.0803
LW-1707, 1708	Mar, 1995	Cs-137	2.5900 ± 2.9600	-1.3700 ± 2.5100	0.6100 ± 1.9405
LW-1707, 1708	Mar, 1995	Fe-59	5.5200 ± 6.1500	-6.6900 ± 6.1500	-0.5850 ± 4.3487
LW-1707, 1708	Mar, 1995	Gr. Beta	1.9570 ± 0.4850	2.1270 ± 0.4760	2.0420 ± 0.3398
LW-1707, 1708	Mar, 1995	I-131	0.2350 ± 0.2925	-0.0500 ± 0.2859	0.0925 ± 0.2045
LW-1707, 1708	Mar, 1995	I-131(g)	-0.6900 ± 6.6800	-0.6210 ± 6.2000	-0.6555 ± 4.5569
LW-1707, 1708	Mar, 1995	K-40	79.3000 ± 42.8000	75.3000 ± 39.2000	77.3000 ± 29.0193
LW-1707, 1708	Mar, 1995	La-140	-3.5900 ± 5.0900	1.2800 ± 4.5800	-1.1550 ± 3.4236
LW-1707, 1708	Mar, 1995	Mn-54	-1.9300 ± 3.1200	0.7640 ± 2.5200	-0.5830 ± 2.0053
LW-1707, 1708	Mar, 1995	Ru-103	-0.1320 ± 3.3400	-0.7770 ± 2.9700	-0.4545 ± 2.2348
LW-1707, 1708	Mar, 1995	Zn-65	-2.6700 ± 6.4700	-1.7400 ± 5.7700	-2.2050 ± 4.3346
LW-1707, 1708	Mar, 1995	Zr-Nb-95	-0.2680 ± 3.0600	-3.2400 ± 2.7200	-1.7540 ± 2.0471
SW-1762, 1763	Mar, 1995	H-3	104.4150 ± 89.3960	92.2110 ± 88.8390	98.3130 ± 63.0159
SO-1861, 1862	Mar, 1995	Cs-137	0.2587 ± 0.0414	0.2481 ± 0.0248	0.2534 ± 0.0241
SO-1861, 1862	Mar, 1995	K-40	11.7290 ± 0.5530	11.2500 ± 0.4990	11.4895 ± 0.3724
SO-1861, 1862	Mar, 1995	Ra-226	1.6890 ± 0.3970	1.5274 ± 0.2730	1.6082 ± 0.2409

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-1919, 1920	Mar, 1995	H-3	-9.1230 ± 85.2000	66.6680 ± 88.8670	28.7725 ± 61.5556
SW-1919, 1920	Mar, 1995	H-3	-9.1230 ± 85.2005	66.6679 ± 88.8672	28.7725 ± 61.5559
WWU-2031, 2032	Mar, 1995	Gr. Alpha	1.9830 ± 2.2510	3.0330 ± 2.4400	2.5080 ± 1.6599
WWU-2031, 2032	Mar, 1995	Gr. Beta	1.2540 ± 1.9270	2.1120 ± 1.9680	1.6830 ± 1.3772
CW-1997, 1998	Mar, 1995	Gr. Beta	2.6670 ± 0.9880	2.3100 ± 1.3570	2.4885 ± 0.8393
CW-1997, 1998	Mar, 1995	Gr. Beta	-0.5301 ± 0.9521	0.6351 ± 1.1355	0.0525 ± 0.7409
AP-2784, 2785	Mar, 1995	Co-60	-0.0004 ± 0.0006	-0.0003 ± 0.0005	-0.0003 ± 0.0004
AP-2784, 2785	Mar, 1995	Cs-137	-0.0003 ± 0.0006	0.0001 ± 0.0004	-0.0001 ± 0.0004
MI-2083, 2084	Mar, 1995	I-131	0.0210 ± 0.1920	0.0150 ± 0.1850	0.0180 ± 0.1333
MI-2083, 2084	Mar, 1995	K-40	1,273.9000 ± 69.7000	1,328.9000 ± 59.8000	1,301.4000 ± 45.9188
MI-2083, 2084	Mar, 1995	Sr-90	1.5850 ± 0.4530	1.8040 ± 0.5520	1.6945 ± 0.3570
SW-2104, 2105	Mar, 1995	Gr. Beta	1.6690 ± 0.5320	1.7090 ± 0.5640	1.6890 ± 0.3877
SW-2200, 2201	Mar, 1995	H-3	33.7710 ± 85.6270	54.0340 ± 86.5810	43.9025 ± 60.8857
SW-2355, 2356	Mar, 1995	Co-60	0.6430 ± 1.5100	0.8670 ± 1.5800	0.7550 ± 1.0928
SW-2355, 2356	Mar, 1995	Cs-137	2.2000 ± 1.5400	0.0533 ± 1.8500	1.1267 ± 1.2035
AP-2453, 2454	Mar, 1995	Sr-89	0.0002 ± 0.0006	-0.0001 ± 0.0006	0.0000 ± 0.0004
AP-2453, 2454	Mar, 1995	Sr-90	0.0000 ± 0.0002	0.0001 ± 0.0003	0.0001 ± 0.0002
AP-2805, 2806	Mar, 1995	Co-60	-0.0001 ± 0.0004	0.0002 ± 0.0003	0.0000 ± 0.0002
AP-2805, 2806	Mar, 1995	Cs-137	0.0002 ± 0.0004	0.0000 ± 0.0004	0.0001 ± 0.0003
SW-2221, 2222	Mar, 1995	K-40	149.6900 ± 74.4000	119.3800 ± 46.7000	134.5350 ± 43.9211
PW-2248, 2249	Mar, 1995	H-3	154.6240 ± 91.0610	164.7520 ± 91.5110	159.6880 ± 64.5491
PW-2271, 2272	Mar, 1995	Co-60	-0.4760 ± 1.9800	-1.2100 ± 2.8900	-0.8430 ± 1.7516
PW-2271, 2272	Mar, 1995	Cs-137	0.9590 ± 2.0500	0.8750 ± 3.4600	0.9170 ± 2.0109
MI-2149, 2150	Apr, 1995	Co-60	-1.2100 ± 2.2200	0.6560 ± 2.6900	-0.2770 ± 1.7439
MI-2149, 2150	Apr, 1995	Cs-137	0.1650 ± 2.0400	2.3100 ± 2.2200	1.2375 ± 1.5075
MI-2149, 2150	Apr, 1995	I-131(G)	0.0888 ± 2.2200	0.3000 ± 2.5100	0.1944 ± 1.6754
WW-2313, 2314	Apr, 1995	Gr. Beta	0.5850 ± 0.4990	0.9810 ± 0.5230	0.7830 ± 0.3614
CW-2401, 2402	Apr, 1995	Gr. Beta	1.7069 ± 1.2973	3.4661 ± 1.4515	2.5865 ± 0.9734
CW-2401, 2402	Apr, 1995	Gr. Beta	0.0096 ± 1.1238	0.4760 ± 1.1031	0.2428 ± 0.7874
SL-2567, 2568	Apr, 1995	K-40	1.4123 ± 0.4360	1.7225 ± 0.3760	1.5674 ± 0.2879
WW-2432, 2433	Apr, 1995	H-3	-21.5803 ± 82.7489	2.6975 ± 83.9276	-9.4414 ± 58.9305
WW-2659, 2660	Apr, 1995	Gr. Beta	0.5450 ± 0.6040	0.3970 ± 0.4440	0.4710 ± 0.3748
WW-2659, 2660	Apr, 1995	H-3	38.3900 ± 87.4520	133.3540 ± 91.7350	85.8720 ± 63.3703
MI-2713, 2714	Apr, 1995	I-131	0.3870 ± 0.5277	0.1686 ± 0.2430	0.2778 ± 0.2905
MI-2713, 2714	Apr, 1995	K-40	1,420.9000 ± 137.0000	1,420.0000 ± 137.0000	1,420.4500 ± 96.8736
CW-2739, 2740	Apr, 1995	Gr. Beta	13.7987 ± 2.0770	14.3132 ± 2.1038	14.0560 ± 1.4782

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-2739, 2740	Apr, 1995	Gr. Beta	5.0526 ± 1.5206	2.2742 ± 1.3431	3.6634 ± 1.0144
SW-2686, 2687	Apr, 1995	H-3	52.6753 ± 86.9675	2.0260 ± 84.5748	27.3506 ± 60.6552
WW-3447, 3448	Apr, 1995	Gr. Alpha	-0.2920 ± 1.6860	-1.4650 ± 1.6480	-0.8785 ± 1.1788
WW-3447, 3448	Apr, 1995	Gr. Beta	1.2340 ± 1.7000	3.1840 ± 1.8140	2.2090 ± 1.2430
CW-2835, 2836	Apr, 1995	Gr. Beta	1.9571 ± 1.4080	2.7378 ± 1.4641	2.3474 ± 1.0157
CW-2835, 2836	Apr, 1995	Gr. Beta	0.1817 ± 1.1916	0.8185 ± 1.2403	0.5001 ± 0.8600
CW-2918, 2919	Apr, 1995	Gr. Beta	5.3065 ± 1.6254	4.2821 ± 1.5611	4.7943 ± 1.1268
CW-2918, 2919	Apr, 1995	Gr. Beta	2.0988 ± 1.3349	0.7752 ± 1.2404	1.4370 ± 0.9111
F-3552, 3553	Apr, 1995	K-40	3.1142 ± 0.4410	2.8860 ± 0.2410	3.0001 ± 0.2513
F-3552, 3553	Apr, 1995	Sr-89	-0.0061 ± 0.0064	0.0011 ± 0.0080	-0.0025 ± 0.0051
F-3552, 3553	Apr, 1995	Sr-90	0.0023 ± 0.0029	0.0005 ± 0.0036	0.0014 ± 0.0023
SWT-3343, 3344	Apr, 1995	Gr. Beta	2.3310 ± 0.5190	2.9830 ± 0.4800	2.6570 ± 0.3535
G-3133, 3134	Apr, 1995	K-40	6.5000 ± 0.1740	6.0532 ± 0.3120	6.2766 ± 0.1786
SW-3403, 3404	Apr, 1995	H-3	159.5512 ± 90.5914	72.7069 ± 86.6327	116.1290 ± 62.6738
WW-3424, 3425	Apr, 1995	H-3	442.5093 ± 116.7309	430.4409 ± 116.3142	436.4751 ± 82.3940
LW-3682, 3683	Apr, 1995	Gr. Beta	2.0500 ± 0.5760	1.5240 ± 0.5500	1.7870 ± 0.3982
LW-3682, 3683	Apr, 1995	Gr. Beta	2.0501 ± 0.6760	1.5244 ± 0.5500	1.7872 ± 0.4358
LW-3682, 3683	Apr, 1995	H-3	139.9350 ± 91.1490	75.0380 ± 88.2140	107.4865 ± 63.4229
LW-3682, 3683	Apr, 1995	H-3	75.0378 ± 88.2143	139.9353 ± 91.1494	107.4865 ± 63.4231
SO-3531, 3532	May, 1995	Cs-137	0.1624 ± 0.0246	0.1418 ± 0.0306	0.1521 ± 0.0196
SO-3531, 3532	May, 1995	Gr. Alpha	6.8662 ± 3.5751	9.2164 ± 3.8687	8.0413 ± 2.6338
SO-3531, 3532	May, 1995	Gr. Beta	17.0973 ± 3.0829	18.8034 ± 3.1329	17.9503 ± 2.1977
SO-3531, 3532	May, 1995	K-40	25.0380 ± 0.7710	23.8180 ± 0.6600	24.4280 ± 0.5075
SO-3531, 3532	May, 1995	Sr-89	-0.0129 ± 0.0215	0.0014 ± 0.0202	-0.0057 ± 0.0147
SO-3531, 3532	May, 1995	Sr-90	0.0261 ± 0.0109	0.0122 ± 0.0093	0.0191 ± 0.0072
WW-3577, 3578	May, 1995	Co-60	-0.2530 ± 2.2200	0.5410 ± 2.5800	0.1440 ± 1.7018
WW-3577, 3578	May, 1995	Cs-137	1.1500 ± 2.2000	-1.6400 ± 2.9200	-0.2450 ± 1.8280
WW-3577, 3578	May, 1995	H-3	33.5750 ± 90.9827	58.7563 ± 92.0487	46.1657 ± 64.7125
MI-3598, 3599	May, 1995	I-131	0.2288 ± 0.3515	0.2122 ± 0.3043	0.2205 ± 0.2324
MI-3598, 3599	May, 1995	K-40	1,349.0000 ± 112.0000	1,297.4000 ± 151.0000	1,323.2000 ± 94.0013
MI-3809, 3810	May, 1995	Co-60	-0.3700 ± 2.9600	0.1820 ± 2.9600	-0.0940 ± 2.0930
MI-3809, 3810	May, 1995	Cs-137	0.9060 ± 2.5000	0.1380 ± 2.3600	0.5220 ± 1.7190
MI-3809, 3810	May, 1995	I-131	0.1445 ± 0.1573	0.1738 ± 0.2057	0.1592 ± 0.1295
CW-3838, 3839	May, 1995	Gr. Beta	1.9922 ± 1.3549	3.4291 ± 1.4650	2.7106 ± 0.9977
CW-3838, 3839	May, 1995	Gr. Beta	-0.7347 ± 1.2274	-1.0782 ± 1.2004	-0.9064 ± 0.8584
F-4309, 4310	May, 1995	Co-60	-0.0017 ± 0.0093	-0.0032 ± 0.0166	-0.0024 ± 0.0095

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-4309, 4310	May, 1995	Cs-137	0.0028 ± 0.0089	0.0012 ± 0.0133	0.0020 ± 0.0080
F-4288, 4289	May, 1995	Co-60	0.0038 ± 0.0097	0.0012 ± 0.0088	0.0025 ± 0.0065
F-4288, 4289	May, 1995	Cs-137	0.0002 ± 0.0067	0.0022 ± 0.0062	0.0012 ± 0.0045
F-4330, 4331	May, 1995	Co-60	0.0018 ± 0.0046	0.0031 ± 0.0050	0.0024 ± 0.0034
F-4330, 4331	May, 1995	Cs-137	0.0001 ± 0.0042	-0.0007 ± 0.0038	-0.0003 ± 0.0028
MI-4377, 4378	May, 1995	Co-60	0.9480 ± 1.7400	2.2200 ± 2.6600	1.5840 ± 1.5893
MI-4377, 4378	May, 1995	Cs-134	0.7830 ± 1.4900	-0.2080 ± 2.3000	0.2875 ± 1.3702
MI-4377, 4378	May, 1995	Cs-137	0.8740 ± 1.3800	0.6430 ± 2.1400	0.7585 ± 1.2732
MI-4377, 4378	May, 1995	I-131	-0.0785 ± 0.1490	-0.0420 ± 0.1498	-0.0602 ± 0.1056
MI-4377, 4378	May, 1995	I-131(g)	0.1700 ± 1.3000	-1.1200 ± 2.6200	-0.4750 ± 1.4624
MI-4377, 4378	May, 1995	K-40	1,385.1000 ± 63.2000	1,344.3000 ± 92.5000	1,364.7000 ± 56.0145
MI-4377, 4378	May, 1995	Sr-89	-0.0069 ± 0.7313	0.0069 ± 1.1490	0.0000 ± 0.6810
MI-4377, 4378	May, 1995	Sr-90	1.2729 ± 0.4414	1.3229 ± 0.6414	1.2979 ± 0.3893
MI-4544, 4545	May, 1995	I-131	0.0524 ± 0.2867	0.0574 ± 0.2367	0.0549 ± 0.1859
MI-4544, 4545	May, 1995	K-40	1,410.0000 ± 72.3000	1,359.0000 ± 65.7000	1,384.5000 ± 48.8461
MI-4544, 4545	May, 1995	Sr-90	2.1444 ± 0.5153	1.2741 ± 0.4112	1.7093 ± 0.3296
G-4604, 4605	May, 1995	Be-7	1.9338 ± 0.3520	1.7467 ± 0.3580	1.8403 ± 0.2510
G-4604, 4605	May, 1995	Co-60	-0.0112 ± 0.0217	-0.0175 ± 0.0189	-0.0144 ± 0.0144
G-4604, 4605	May, 1995	Cs-134	0.0076 ± 0.0165	0.0079 ± 0.0163	0.0078 ± 0.0116
G-4604, 4605	May, 1995	Cs-137	0.1303 ± 0.0332	0.1283 ± 0.0420	0.1293 ± 0.0268
G-4604, 4605	May, 1995	Gr. Beta	3.9523 ± 0.1425	3.9500 ± 0.1562	3.9512 ± 0.1057
G-4604, 4605	May, 1995	I-131(g)	0.0101 ± 0.0227	0.0055 ± 0.0263	0.0078 ± 0.0174
G-4604, 4605	May, 1995	K-40	5.1487 ± 0.6580	5.1002 ± 0.6970	5.1245 ± 0.4793
CW-4575, 4576	May, 1995	Gr. Beta	1.9783 ± 1.1888	2.8278 ± 1.2558	2.4030 ± 0.8646
CW-4575, 4576	May, 1995	Gr. Beta	-0.2059 ± 1.0000	-0.5589 ± 0.9721	-0.3824 ± 0.6973
MI-4695, 4696	May, 1995	I-131	0.1049 ± 0.1737	0.0942 ± 0.1607	0.0995 ± 0.1183
MI-4695, 4696	May, 1995	K-40	1,568.8000 ± 114.0000	1,573.1000 ± 50.1000	1,570.9500 ± 62.2616
MI-4716, 4717	May, 1995	Sr-89	-0.2701 ± 0.7584	-0.0499 ± 0.8752	-0.1600 ± 0.5790
MI-4716, 4717	May, 1995	Sr-90	1.1720 ± 0.4391	1.6280 ± 0.4432	1.4000 ± 0.3119
G-4814, 4815	May, 1995	Be-7	0.6081 ± 0.2520	0.5837 ± 0.1750	0.5959 ± 0.1534
G-4814, 4815	May, 1995	K-40	5.8319 ± 0.6100	5.1295 ± 0.5050	5.4807 ± 0.3960
WW-4784, 4785	May, 1995	H-3	18,665.3086 ± 390.2155	18,274.9314 ± 386.3294	18,470.1200 ± 274.5535
SW-4759, 4760	May, 1995	H-3	3,679.8217 ± 213.9409	3,817.7847 ± 217.0401	3,748.8032 ± 152.3787
SO-5178, 5179	May, 1995	Cs-137	0.8481 ± 0.0691	0.8110 ± 0.0710	0.8296 ± 0.0495
SO-5178, 5179	May, 1995	K-40	19.9200 ± 1.0800	22.0860 ± 1.1800	21.0030 ± 0.7998
SWU-5663, 5664	May, 1995	Gr. Beta	2.4654 ± 0.6199	2.5106 ± 0.6258	2.4880 ± 0.4404

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

Lab Codes[b]	Sample Date	Analysis	Concentration in pCi/L[a] First Result	Second Result	Averaged Result
SWU-5663, 5664	May, 1995	H-3	867.2182 ± 104.9067	865.5032 ± 104.8506	866.3607 ± 74.1604
BS - 6983, 6984	May, 1995	Gr. Beta	7.3555 ± 1.2333	8.0347 ± 1.4183	7.6951 ± 0.9397
BS - 6983, 6984	May, 1995	Gr. Beta	7.3555 ± 1.2333	8.0347 ± 1.4183	7.6951 ± 0.9397
BS - 6983, 6984	May, 1995	K-40	8.3490 ± 0.3090	8.5309 ± 0.0683	8.4400 ± 0.1582
BS - 6983, 6984	May, 1995	K-40	8.3490 ± 0.3090	8.5309 ± 0.0683	8.4400 ± 0.1582
BS-6983, 6984	May, 1995	Cs-137	0.0074 ± 0.0008	0.0094 ± 0.0024	0.0084 ± 0.0013
BS-6983, 6984	May, 1995	Gr. Beta	7.3555 ± 1.2333	8.0347 ± 1.4183	7.6951 ± 0.9397
BS-6983, 6984	May, 1995	K-40	8.3490 ± 0.3090	8.5309 ± 0.0683	8.4400 ± 0.1582
BS - 5494, 5495	May, 1995	Cs-137	0.5929 ± 0.0319	0.5876 ± 0.0378	0.5903 ± 0.0247
BS - 5494, 5495	May, 1995	Cs-137	0.5929 ± 0.0319	0.5876 ± 0.0378	0.5903 ± 0.0247
BS - 5494, 5495	May, 1995	K-40	21.0920 ± 0.6570	21.3050 ± 0.7070	21.1985 ± 0.4826
BS - 5494, 5495	May, 1995	K-40	21.0920 ± 0.6570	21.3050 ± 0.7070	21.1985 ± 0.4826
BS-5494, 5495	May, 1995	Cs-137	0.5929 ± 0.0319	0.5876 ± 0.0378	0.5903 ± 0.0247
BS-5494, 5495	May, 1995	K-40	21.0920 ± 0.6570	21.3050 ± 0.7070	21.1985 ± 0.4826
F-5025, 5026	May, 1995	Co-60	0.0024 ± 0.0064	0.0028 ± 0.0077	0.0026 ± 0.0050
F-5025, 5026	May, 1995	Cs-137	-0.0006 ± 0.0050	-0.0038 ± 0.0063	-0.0022 ± 0.0040
F-5385, 5386	May, 1995	K-40	2.5044 ± 0.3450	2.5992 ± 0.3830	2.5518 ± 0.2577
F-5046, 5047	May, 1995	Co-60	0.0012 ± 0.0067	-0.0021 ± 0.0073	-0.0004 ± 0.0049
F-5046, 5047	May, 1995	Cs-137	0.0018 ± 0.0053	-0.0003 ± 0.0046	0.0007 ± 0.0035
WW-5244, 5245	May, 1995	H-3	608.3574 ± 96.3200	463.5639 ± 91.1176	535.9606 ± 66.2947
SW-6013, 6014	May, 1995	Co-60	0.8080 ± 2.2000	1.5300 ± 3.0300	1.1690 ± 1.8722
SW-6013, 6014	May, 1995	Cs-137	-0.6750 ± 2.3000	0.4560 ± 2.3200	-0.1095 ± 1.6334
MI-5620, 5621	May, 1995	I-131	0.1589 ± 0.1736	0.0147 ± 0.1644	0.0868 ± 0.1196
MI-5620, 5621	May, 1995	K-40	1,526.2000 ± 119.0000	1,449.3000 ± 162.0000	1,487.7500 ± 100.5050
WW - 5642, 5643	May, 1995	Gr. Alpha	2.3120 ± 2.3250	2.3120 ± 2.3250	2.3120 ± 1.6440
WW - 5642, 5643	May, 1995	Gr. Beta	2.3120 ± 3.2540	2.3120 ± 3.2540	2.3120 ± 2.3009
WW - 5642, 5643	May, 1995	K-40	94.3550 ± 19.8000	58.9910 ± 29.5000	76.6730 ± 17.7644
DW-5738, 5739	May, 1995	Gr. Beta	2.5151 ± 1.1685	3.5614 ± 1.2103	3.0383 ± 0.8411
DW-5738, 5739	May, 1995	I-131	-0.0458 ± 0.1650	-0.0284 ± 0.1486	-0.0371 ± 0.1110
LW-6327, 6328	May, 1995	Gr. Beta	6.4501 ± 1.0293	6.6100 ± 1.0327	6.5300 ± 0.7290
W-6398, 6399	May, 1995	Sr-89	15.1044 ± 3.8169	18.1475 ± 2.7239	16.6259 ± 2.3446
W-6398, 6399	May, 1995	Sr-90	25.0828 ± 1.8532	24.4207 ± 1.3058	24.7518 ± 1.1335
WW-6184, 6185	Jun, 1995	Gr. Beta	6.0148 ± 1.1147	7.4613 ± 1.3560	6.7380 ± 0.8777
WW-6184, 6185	Jun, 1995	H-3	86.1439 ± 78.3469	106.9572 ± 79.2631	96.5505 ± 55.7245
MI-5684, 5685	Jun, 1995	Co-60	0.0976 ± 2.9600	0.4260 ± 4.6300	0.2618 ± 2.7477
MI-5684, 5685	Jun, 1995	Cs-137	1.8400 ± 2.6500	-0.9210 ± 3.2400	0.4595 ± 2.0929

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-5684, 5685	Jun, 1995	I-131	0.0829 ± 0.1477	-0.0025 ± 0.1466	0.0402 ± 0.1041
CW-5713, 5714	Jun, 1995	Gr. Beta	3.1068 ± 1.4397	3.2557 ± 1.4487	3.1812 ± 1.0212
CW-5713, 5714	Jun, 1995	Gr. Beta	0.0491 ± 1.4849	0.3925 ± 1.5076	0.2208 ± 1.0580
SL-5832, 5833	Jun, 1995	Co-60	0.0410 ± 0.0114	0.0585 ± 0.0182	0.0498 ± 0.0107
SL-5832, 5833	Jun, 1995	Cs-137	0.0550 ± 0.0124	0.0499 ± 0.0215	0.0525 ± 0.0124
SL-5832, 5833	Jun, 1995	Gr. Beta	4.6800 ± 0.4800	4.6800 ± 0.4800	4.6800 ± 0.3394
SL-5832, 5833	Jun, 1995	K-40	2.9035 ± 0.2750	2.4429 ± 0.3290	2.6732 ± 0.2144
SL-5832, 5833	Jun, 1995	Sr-89	0.0106 ± 0.0261	0.0048 ± 0.0336	0.0077 ± 0.0213
SL-5832, 5833	Jun, 1995	Sr-90	0.0102 ± 0.0114	0.0164 ± 0.0148	0.0133 ± 0.0093
WW-5992, 5993	Jun, 1995	Co-60	0.3950 ± 1.2200	0.9060 ± 2.6500	0.6505 ± 1.4587
WW-5992, 5993	Jun, 1995	Cs-137	-1.4000 ± 1.3800	-1.4400 ± 3.0300	-1.4200 ± 1.6647
WW-5992, 5993	Jun, 1995	H-3	67.0084 ± 76.1576	94.0370 ± 77.3473	80.5227 ± 54.2738
SL-6205, 6206	Jun, 1995	Co-60	0.0029 ± 0.0088	0.0111 ± 0.0120	0.0070 ± 0.0074
SL-6205, 6206	Jun, 1995	Cs-134	0.0033 ± 0.0070	0.0002 ± 0.0096	0.0018 ± 0.0059
SL-6205, 6206	Jun, 1995	Cs-137	0.0138 ± 0.0091	0.0174 ± 0.0104	0.0156 ± 0.0069
SL-6205, 6206	Jun, 1995	Gr. Beta	3.3400 ± 0.1000	3.3400 ± 0.1000	3.3400 ± 0.0707
SL-6205, 6206	Jun, 1995	I-131(g)	-0.0060 ± 0.0135	-0.0003 ± 0.0197	-0.0031 ± 0.0119
SL-6205, 6206	Jun, 1995	K-40	3.3386 ± 0.3100	3.3294 ± 0.3780	3.3340 ± 0.2444
SW-6256, 6257	Jun, 1995	H-3	423.9034 ± 92.0134	585.0329 ± 97.8935	504.4682 ± 67.1744
MI-6277, 6278	Jun, 1995	I-131	0.0926 ± 0.1619	0.0532 ± 0.2284	0.0729 ± 0.1400
MI-6277, 6278	Jun, 1995	K-40	1,285.5000 ± 152.0000	1,355.2000 ± 114.0000	1,320.3500 ± 95.0000
SW-6232, 6233	Jun, 1995	H-3	68.3732 ± 79.4680	136.7465 ± 82.4296	102.5599 ± 57.2490
VE-6348, 6349	Jun, 1995	Gr. Alpha	0.3230 ± 0.0990	0.1780 ± 0.0520	0.2505 ± 0.0559
VE-6348, 6349	Jun, 1995	Gr. Beta	3.2970 ± 0.1410	3.4170 ± 0.0920	3.3570 ± 0.0842
VE-6348, 6349	Jun, 1995	K-40	3.1425 ± 0.3310	2.9775 ± 0.3350	3.0600 ± 0.2355
MI-6419, 6420	Jun, 1995	I-131	0.1154 ± 0.1633	0.1197 ± 0.1806	0.1175 ± 0.1217
MI-6419, 6420	Jun, 1995	K-40	1,457.2000 ± 175.0000	1,339.3000 ± 150.0000	1,398.2500 ± 115.2443
MI-6521, 6522	Jun, 1995	I-131	0.0534 ± 0.1511	0.0344 ± 0.1784	0.0439 ± 0.1169
MI-6521, 6522	Jun, 1995	K-40	1,475.4000 ± 123.0000	1,274.6000 ± 160.0000	1,375.0000 ± 100.9071
SL-6500, 6501	Jun, 1995	K-40	1.8001 ± 0.4550	2.1667 ± 0.5460	1.9834 ± 0.3554
MI-6446, 6447	Jun, 1995	Co-60	0.1640 ± 4.8700	0.4440 ± 2.8200	0.3040 ± 2.8138
MI-6446, 6447	Jun, 1995	Cs-137	1.3000 ± 3.3600	0.0563 ± 2.1800	0.6782 ± 2.0026
MI-6446, 6447	Jun, 1995	I-131	-0.0433 ± 0.2077	0.0000 ± 0.2377	-0.0217 ± 0.1578
CW-6474, 6475	Jun, 1995	Gr. Beta	2.8423 ± 1.4039	3.1674 ± 1.4145	3.0049 ± 0.9965
CW-6474, 6475	Jun, 1995	Gr. Beta	0.0000 ± 1.1519	0.0909 ± 1.1588	0.0455 ± 0.8170
MI-6564, 6565	Jun, 1995	I-131	0.2460 ± 0.2607	0.0948 ± 0.2353	0.1704 ± 0.1756

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

Lab Codes[b]	Sample Date	Analysis	Concentration in pCi/L[a] First Result	Second Result	Averaged Result
BS-6960, 6961	Jun, 1995	Cs-137	0.0752 ± 0.0292	0.0475 ± 0.0274	0.0613 ± 0.0200
BS-6960, 6961	Jun, 1995	K-40	17.6680 ± 0.8700	17.0190 ± 1.0600	17.3435 ± 0.6857
WW-6861, 6862	Jun, 1995	H-3	1,422.4460 ± 128.0232	1,505.1361 ± 130.2761	1,463.7910 ± 91.3261
MI-6840, 6841	Jun, 1995	I-131	0.1583 ± 0.2131	0.0509 ± 0.1801	0.1046 ± 0.1395
LW-6889, 6890	Jun, 1995	Co-60	-2.4000 ± 3.4100	1.4300 ± 1.7400	-0.4850 ± 1.9141
LW-6889, 6890	Jun, 1995	Cs-137	-0.5210 ± 3.0300	0.1410 ± 2.1900	-0.1900 ± 1.8693
LW-6889, 6890	Jun, 1995	Gr. Beta	3.0131 ± 0.8315	3.0285 ± 0.8358	3.0208 ± 0.5895
SW-7053, 7054	Jun, 1995	H-3	73.2226 ± 75.6858	126.8001 ± 78.1734	100.0114 ± 54.4046
SW-7011, 7012	Jun, 1995	H-3	203.5633 ± 81.5943	226.7766 ± 82.6041	215.1699 ± 58.0540
MI-7032, 7033	Jun, 1995	I-131	0.2720 ± 0.2879	-0.0925 ± 0.2629	0.0897 ± 0.1949
MI-7032, 7033	Jun, 1995	K-40	1,577.6000 ± 127.0000	1,522.8000 ± 164.0000	1,550.2000 ± 103.7123
SWU-7101, 7102	Jun, 1995	Gr. Beta	1.9679 ± 0.4592	2.1339 ± 0.5061	2.0509 ± 0.3417
SWU-7101, 7102	Jun, 1995	H-3	118.5873 ± 85.7967	92.6463 ± 84.6688	105.6168 ± 60.2700
SWU - 7828, 7829	Jun, 1995	Sr-89	0.5896 ± 0.7987	0.0977 ± 0.6691	0.3436 ± 0.5210
SWU - 7828, 7829	Jun, 1995	Sr-90	0.2398 ± 0.3028	0.1937 ± 0.2742	0.2168 ± 0.2042
SWU - 7828, 7829	Jun, 1995	Sr-90	0.2398 ± 0.3028	0.1937 ± 0.2742	0.2168 ± 0.2042
SWU-7828, 7829	Jun, 1995	Sr-89	0.5896 ± 0.7987	0.0977 ± 0.6691	0.3436 ± 0.5210
SWU-7828, 7829	Jun, 1995	Sr-89	0.5896 ± 0.7987	0.0977 ± 0.6691	0.3436 ± 0.5210
SWU-7828, 7829	Jun, 1995	Sr-89	0.5896 ± 0.7987	0.0977 ± 0.6691	0.3436 ± 0.5210
SWU-7828, 7829	Jun, 1995	Sr-89	0.5896 ± 0.7987	0.0977 ± 0.6691	0.3436 ± 0.5210
SWU-7828, 7829	Jun, 1995	Sr-90	0.2398 ± 0.3028	0.1937 ± 0.2742	0.2168 ± 0.2042
SWU-7828, 7829	Jun, 1995	Sr-90	0.2398 ± 0.3028	0.1937 ± 0.2742	0.2168 ± 0.2042
SWU-7828, 7829	Jun, 1995	Sr-90	0.2398 ± 0.3028	0.1937 ± 0.2742	0.2168 ± 0.2042
SWU-7828, 7829	Jun, 1995	Sr-90	0.2398 ± 0.3028	0.1937 ± 0.2742	0.2168 ± 0.2042
AP-8111, 8112	Jun, 1995	Co-60	-0.0002 ± 0.0007	0.0004 ± 0.0007	0.0001 ± 0.0005
AP-8111, 8112	Jun, 1995	Cs-137	-0.0002 ± 0.0007	0.0004 ± 0.0005	0.0001 ± 0.0004
SW-7080, 7081	Jun, 1995	Gr. Beta	2.3011 ± 0.5921	2.6708 ± 0.6113	2.4860 ± 0.4255
SW-7080, 7081	Jun, 1995	K-40	61.2620 ± 28.3000	95.4390 ± 26.0000	78.3505 ± 19.2152
WWT-7122, 7123	Jun, 1995	H-3	3.8386 ± 81.4299	-13.4353 ± 80.6115	-4.7983 ± 57.2910
LW-7239, 7240	Jun, 1995	Gr. Beta	2.5177 ± 0.0580	2.4081 ± 0.6061	2.4629 ± 0.3044
WW-7143, 7144	Jun, 1995	H-3	539.1386 ± 103.3228	436.4159 ± 99.5398	487.7772 ± 71.7352
PW-7174, 7175	Jun, 1995	H-3	144.0732 ± 84.2861	121.4242 ± 83.2655	132.7487 ± 59.2395
SW-7216, 7217	Jun, 1995	H-3	20.3728 ± 81.4069	62.9704 ± 83.3227	41.6716 ± 58.2446
WW-7281, 7282	Jun, 1995	Gr. Beta	1.8051 ± 0.3271	2.1056 ± 0.5796	1.9553 ± 0.3328
WW-7281, 7282	Jun, 1995	H-3	-24.3250 ± 75.1716	10.3381 ± 76.8357	-6.9934 ± 53.7459
SW-7387, 7388	Jul, 1995	Co-60	1.0200 ± 1.9000	0.1530 ± 1.6700	0.5865 ± 1.2648

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-7387, 7388	Jul, 1995	Cs-137	0.5600 ± 2.3400	-0.8650 ± 2.0400	-0.1525 ± 1.5522
AP-8133, 8134	Jul, 1995	Co-60	-0.0000 ± 0.0005	0.0003 ± 0.0006	0.0001 ± 0.0004
AP-8133, 8134	Jul, 1995	Cs-137	-0.0001 ± 0.0004	0.0000 ± 0.0005	-0.0001 ± 0.0003
AP-7600, 7601	Jul, 1995	Sr-89	0.0008 ± 0.0008	0.0010 ± 0.0008	0.0009 ± 0.0005
AP-7600, 7601	Jul, 1995	Sr-90	-0.0001 ± 0.0003	0.0005 ± 0.0003	0.0002 ± 0.0002
MI-7260, 7261	Jul, 1995	Co-60	0.3390 ± 2.9100	0.5630 ± 5.2400	0.4510 ± 2.9969
MI-7260, 7261	Jul, 1995	Cs-137	1.6600 ± 2.5900	-1.4600 ± 3.3700	0.1000 ± 2.1251
MI-7260, 7261	Jul, 1995	I-131	0.1745 ± 0.1944	0.1004 ± 0.1792	0.1374 ± 0.1322
WW-7454, 7455	Jul, 1995	H-3	7,142.7529 ± 243.6211	6,985.4236 ± 241.2186	7,064.0882 ± 171.4188
LW - 7487, 7488	Jul, 1995	K-40	48.0000 ± 14.4000	95.7520 ± 39.9000	71.8760 ± 21.2095
LW - 7487, 7488	Jul, 1995	K-40	48.0000 ± 14.4000	95.7520 ± 39.9000	71.8760 ± 21.2095
LW-7487, 7488	Jul, 1995	Co-60	0.4460 ± 1.0700	0.3830 ± 3.0000	0.4145 ± 1.5926
LW-7487, 7488	Jul, 1995	Cs-134	0.1230 ± 1.0600	-2.3900 ± 3.0100	-1.1335 ± 1.5956
LW-7487, 7488	Jul, 1995	Cs-137	0.4920 ± 1.1000	-2.2200 ± 2.8400	-0.8640 ± 1.5228
LW-7487, 7488	Jul, 1995	Gr. Beta	2.1095 ± 0.4725	1.8520 ± 0.4810	1.9807 ± 0.3371
LW-7487, 7488	Jul, 1995	I-131	0.2323 ± 0.2677	-0.0343 ± 0.2508	0.0990 ± 0.1834
LW-7487, 7488	Jul, 1995	I-131(g)	0.3390 ± 2.4400	0.9230 ± 10.5000	0.6310 ± 5.3899
LW-7487, 7488	Jul, 1995	K-40	48.0000 ± 14.4000	95.7520 ± 39.9000	71.8760 ± 21.2095
LW-7487, 7488	Jul, 1995	K-40	48.0000 ± 14.4000	95.7520 ± 39.9000	71.8760 ± 21.2095
LW-7487, 7488	Jul, 1995	K-40	48.0000 ± 14.4000	95.7520 ± 39.9000	71.8760 ± 21.2095
LW-7487, 7488	Jul, 1995	K-40	48.0000 ± 14.4000	95.7520 ± 39.9000	71.8760 ± 21.2095
SW-7323, 7324	Jul, 1995	Gr. Beta	2.3224 ± 0.7511	2.5774 ± 0.7631	2.4499 ± 0.5354
SW-7323, 7324	Jul, 1995	H-3	77.8879 ± 83.9931	48.4345 ± 82.6045	63.1612 ± 58.9032
F-7366, 7367	Jul, 1995	Co-60	0.0092 ± 0.0141	0.0061 ± 0.0119	0.0076 ± 0.0092
F-7366, 7367	Jul, 1995	Cs-137	0.0115 ± 0.0108	0.0019 ± 0.0111	0.0067 ± 0.0077
MI-7510, 7511	Jul, 1995	I-131	0.3443 ± 0.3987	0.1361 ± 0.3508	0.2402 ± 0.2655
F-7344, 7345	Jul, 1995	Co-60	0.0037 ± 0.0077	-0.0071 ± 0.0119	-0.0017 ± 0.0071
F-7344, 7345	Jul, 1995	Cs-137	0.0023 ± 0.0057	0.0024 ± 0.0097	0.0023 ± 0.0056
MI-7429, 7430	Jul, 1995	I-131	-0.1525 ± 0.3171	0.1594 ± 0.2283	0.0035 ± 0.1953
F-8154, 8155	Jul, 1995	Gr. Beta	2.3081 ± 0.0743	2.2522 ± 0.0730	2.2802 ± 0.0521
F-8154, 8155	Jul, 1995	K-40	2.2313 ± 0.2640	2.1161 ± 0.4420	2.1737 ± 0.2574
MI-7575, 7576	Jul, 1995	Co-60	-1.0000 ± 2.8600	1.6000 ± 3.1700	0.3000 ± 2.1347
MI-7575, 7576	Jul, 1995	Cs-134	1.7300 ± 2.4200	-0.6220 ± 2.3600	0.5540 ± 1.6901
MI-7575, 7576	Jul, 1995	Cs-137	-0.7550 ± 2.5100	1.2800 ± 2.3800	0.2625 ± 1.7295
MI-7575, 7576	Jul, 1995	I-131	0.1795 ± 0.2309	0.0704 ± 0.2260	0.1250 ± 0.1616
MI-7575, 7576	Jul, 1995	I-131(g)	0.8570 ± 2.2400	0.8540 ± 2.4400	0.8555 ± 1.6561

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-7575, 7576	Jul, 1995	K-40	1,481.9000 ± 111.0000	1,398.8000 ± 106.0000	1,440.3500 ± 76.7414
MI-7575, 7576	Jul, 1995	Sr-89	0.6192 ± 0.9862	-0.5435 ± 0.9244	0.0378 ± 0.6758
MI-7575, 7576	Jul, 1995	Sr-90	1.2363 ± 0.4155	1.7902 ± 0.4124	1.5133 ± 0.2927
WWT-7621, 7622	Jul, 1995	I-131	0.0940 ± 0.2062	0.0628 ± 0.2223	0.0784 ± 0.1516
MI-7739, 7740	Jul, 1995	Co-60	0.8900 ± 4.9100	-0.5720 ± 4.5800	0.1590 ± 3.3572
MI-7739, 7740	Jul, 1995	Cs-137	0.8600 ± 3.7300	-0.4130 ± 3.1400	0.2235 ± 2.4379
MI-7739, 7740	Jul, 1995	I-131	0.1928 ± 0.2674	-0.0475 ± 0.2351	0.0727 ± 0.1780
G-7805, 7806	Jul, 1995	Co-60	-0.0049 ± 0.0159	0.0015 ± 0.0156	-0.0017 ± 0.0111
G-7805, 7806	Jul, 1995	Cs-134	-0.0076 ± 0.0157	0.0025 ± 0.0094	-0.0025 ± 0.0091
G-7805, 7806	Jul, 1995	Cs-137	0.0045 ± 0.0140	0.0006 ± 0.0118	0.0026 ± 0.0092
G-7805, 7806	Jul, 1995	Gr. Beta	5.0973 ± 0.1994	5.1127 ± 0.2103	5.1050 ± 0.1449
G-7805, 7806	Jul, 1995	I-131(g)	-0.0048 ± 0.0205	-0.0183 ± 0.0205	-0.0115 ± 0.0145
G-7805, 7806	Jul, 1995	K-40	6.0481 ± 0.5610	5.8484 ± 0.5100	5.9483 ± 0.3791
CW-7648, 7649	Jul, 1995	Gr. Beta	6.6883 ± 1.7265	6.7478 ± 1.7419	6.7181 ± 1.2263
CW-7648, 7649	Jul, 1995	Gr. Beta	0.7444 ± 1.2623	0.2325 ± 1.2230	0.4885 ± 0.8788
CW-7648, 7649	Jul, 1995	H-3	-64.4182 ± 97.4643	-70.1870 ± 97.2364	-67.3026 ± 68.8371
WW-7673, 7674	Jul, 1995	Gr. Beta	14.1451 ± 2.2254	14.2212 ± 2.2315	14.1831 ± 1.5757
WW-7673, 7674	Jul, 1995	H-3	15.3145 ± 81.7571	36.3720 ± 82.7373	25.8432 ± 58.1586
MI-7896, 7897	Jul, 1995	Sr-89	0.3508 ± 0.9697	0.1856 ± 0.8702	0.2682 ± 0.6514
MI-7896, 7897	Jul, 1995	Sr-90	1.7110 ± 0.4271	1.2961 ± 0.3929	1.5036 ± 0.2902
WW-7967, 7968	Jul, 1995	H-3	109.4679 ± 84.6270	70.8322 ± 82.8444	90.1500 ± 59.2134
MI-7922, 7923	Jul, 1995	Co-60	0.5680 ± 3.1300	-1.0500 ± 4.4600	-0.2410 ± 2.7244
MI-7922, 7923	Jul, 1995	Cs-137	1.2100 ± 2.8600	-0.5040 ± 3.4200	0.3530 ± 2.2291
MI-7922, 7923	Jul, 1995	I-131	0.0502 ± 0.1932	0.0416 ± 0.2336	0.0459 ± 0.1516
LW-7944, 7945	Jul, 1995	Co-60	0.0830 ± 2.2000	1.3000 ± 1.8900	0.6915 ± 1.4502
LW-7944, 7945	Jul, 1995	Cs-137	0.6400 ± 2.2200	-1.3800 ± 1.8200	-0.3700 ± 1.4353
LW-7944, 7945	Jul, 1995	Gr. Beta	4.1332 ± 0.9251	3.9971 ± 0.9393	4.0652 ± 0.6592
SW-8704, 8705	Jul, 1995	Co-60	0.1830 ± 2.4900	0.9840 ± 1.7900	0.5835 ± 1.5333
SW-8704, 8705	Jul, 1995	Cs-137	0.2640 ± 3.4500	-0.6630 ± 1.9100	-0.1995 ± 1.9717
WW-8196, 8197	Jul, 1995	H-3	51.4226 ± 87.9172	176.0234 ± 93.3551	113.7230 ± 64.1183
SWU-8318, 8319	Jul, 1995	Gr. Beta	1.9584 ± 0.4714	1.9228 ± 0.4731	1.9406 ± 0.3340
SWU-8318, 8319	Jul, 1995	H-3	102.7030 ± 103.6806	35.5141 ± 101.1620	69.1086 ± 72.4283
SWU-8318, 8319	Jul, 1995	K-40	93.2530 ± 39.7000	99.7420 ± 49.1000	96.4975 ± 31.5710
SP-8540, 8541	Jul, 1995	Gr. Alpha	5.1903 ± 1.3072	3.8567 ± 1.0701	4.5235 ± 0.8447
SP-8540, 8541	Jul, 1995	Sr-89	1,443.0886 ± 42.0809	1,419.4750 ± 35.3491	1,431.2818 ± 27.4789
SP-8540, 8541	Jul, 1995	Sr-90	15.7496 ± 3.7553	19.4328 ± 4.1309	17.5912 ± 2.7914

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-8090, 8091	Jul, 1995	Gr. Beta	2.3819 ± 0.0781	2.3059 ± 0.0779	2.3439 ± 0.0552
VE-8090, 8091	Jul, 1995	K-40	2.8208 ± 0.1170	2.7639 ± 0.1330	2.7924 ± 0.0886
SW-8175, 8176	Jul, 1995	Gr. Alpha	0.5000 ± 0.6000	0.6583 ± 0.8198	0.5791 ± 0.5080
SW-8175, 8176	Jul, 1995	Gr. Beta	0.8100 ± 1.1000	0.8265 ± 1.0847	0.8182 ± 0.7724
SW-8175, 8176	Jul, 1995	K-40	89.8150 ± 23.8000	67.3590 ± 39.3000	78.5870 ± 22.9724
SW-8251, 8252	Jul, 1995	H-3	86.7952 ± 78.8856	43.9921 ± 76.9259	65.3937 ± 55.0921
SW-8606, 8607	Jul, 1995	Co-60	0.1320 ± 1.7100	-0.2180 ± 2.6000	-0.0430 ± 1.5560
SW-8606, 8607	Jul, 1995	Cs-137	-1.0400 ± 2.0400	-0.6580 ± 2.2400	-0.8490 ± 1.5149
G - 8272, 8273	Aug, 1995	K-40	6.7487 ± 0.6490	6.6636 ± 0.9730	6.7062 ± 0.5848
G - 8272, 8273	Aug, 1995	Sr-89	0.0014 ± 0.0091	-0.0007 ± 0.0029	0.0004 ± 0.0048
G - 8272, 8273	Aug, 1995	Sr-90	0.0053 ± 0.0029	0.0016 ± 0.0012	0.0034 ± 0.0016
G-8272, 8273	Aug, 1995	Gr. Beta	6.2167 ± 0.2594	5.9667 ± 0.2551	6.0917 ± 0.1819
MI-8293, 8294	Aug, 1995	I-131	-0.1058 ± 0.1908	0.0093 ± 0.2009	-0.0483 ± 0.1385
MI-8389, 8390	Aug, 1995	I-131	-0.0127 ± 0.1267	0.1153 ± 0.1318	0.0513 ± 0.0914
MI-8389, 8390	Aug, 1995	K-40	1,543.8000 ± 120.0000	1,369.6000 ± 162.0000	1,456.7000 ± 100.8018
MI-8413, 8414	Aug, 1995	Co-60	0.2940 ± 3.1400	-2.3500 ± 5.2200	-1.0280 ± 3.0458
MI-8413, 8414	Aug, 1995	Cs-137	-0.7370 ± 2.8900	-1.3600 ± 3.3100	-1.0485 ± 2.1971
MI-8413, 8414	Aug, 1995	I-131	0.1142 ± 0.2124	0.0598 ± 0.2344	0.0870 ± 0.1581
LW-8440, 8441	Aug, 1995	Co-60	0.1030 ± 2.3800	1.0300 ± 1.8100	0.5665 ± 1.4950
LW-8440, 8441	Aug, 1995	Cs-137	0.7760 ± 1.9900	-0.3890 ± 2.0500	0.1935 ± 1.4285
LW-8440, 8441	Aug, 1995	Gr. Beta	3.3064 ± 1.1388	4.6623 ± 1.2154	3.9844 ± 0.8327
WW-8518, 8519	Aug, 1995	Co-60	1.4700 ± 3.1400	-1.8100 ± 2.9800	-0.1700 ± 2.1645
WW-8518, 8519	Aug, 1995	Cs-137	1.7100 ± 2.8700	0.4430 ± 2.7700	1.0765 ± 1.9944
WW-8518, 8519	Aug, 1995	H-3	10.6795 ± 74.0469	-19.5791 ± 72.5777	-4.4498 ± 51.8422
VE-8564, 8565	Aug, 1995	Co-60	0.0053 ± 0.0122	0.0054 ± 0.0128	0.0053 ± 0.0088
VE-8564, 8565	Aug, 1995	Cs-137	0.0038 ± 0.0093	-0.0003 ± 0.0082	0.0018 ± 0.0062
MI-8585, 8586	Aug, 1995	Co-60	-0.4810 ± 4.0600	1.8800 ± 2.5900	0.6995 ± 2.4079
MI-8585, 8586	Aug, 1995	Cs-134	0.1220 ± 3.5000	0.9370 ± 2.2700	0.5295 ± 2.0858
MI-8585, 8586	Aug, 1995	Cs-137	1.7700 ± 3.6400	0.2160 ± 2.0700	0.9930 ± 2.0937
MI-8585, 8586	Aug, 1995	I-131	-0.2002 ± 0.2079	0.0732 ± 0.1900	-0.0635 ± 0.1408
MI-8585, 8586	Aug, 1995	I-131(g)	0.1360 ± 9.0300	2.4300 ± 6.8100	1.2830 ± 5.6550
MI-8585, 8586	Aug, 1995	K-40	1,454.6000 ± 150.0000	1,478.2000 ± 104.0000	1,466.4000 ± 91.2634
MI-8585, 8586	Aug, 1995	Sr-89	0.1158 ± 1.1111	-0.0833 ± 0.9491	0.0162 ± 0.7306
MI-8585, 8586	Aug, 1995	Sr-90	1.9078 ± 0.4296	1.6029 ± 0.3807	1.7553 ± 0.2870
MI-8674, 8675	Aug, 1995	Co-60	-0.7910 ± 3.2300	0.4890 ± 3.3400	-0.1510 ± 2.3232
MI-8674, 8675	Aug, 1995	Cs-137	0.7690 ± 2.4300	0.4160 ± 2.4000	0.5925 ± 1.7077

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-8674, 8675	Aug, 1995	I-131	0.1471 ± 0.2525	-0.0869 ± 0.2167	0.0301 ± 0.1664
SW-8648, 8649	Aug, 1995	H-3	35.5546 ± 75.1429	21.3328 ± 74.4670	28.4437 ± 52.8956
F-8754, 8755	Aug, 1995	Co-60	0.0009 ± 0.0110	0.0031 ± 0.0106	0.0020 ± 0.0076
F-8754, 8755	Aug, 1995	Cs-134	-0.0026 ± 0.0090	-0.0022 ± 0.0087	-0.0024 ± 0.0063
F-8754, 8755	Aug, 1995	Cs-137	0.0528 ± 0.0207	0.0563 ± 0.0171	0.0546 ± 0.0134
F-8754, 8755	Aug, 1995	Gr. Beta	13.1178 ± 0.3041	12.6488 ± 0.2780	12.8833 ± 0.2060
F-8754, 8755	Aug, 1995	I-131(g)	0.0026 ± 0.0139	0.0013 ± 0.0121	0.0019 ± 0.0092
F-8754, 8755	Aug, 1995	K-40	2.8119 ± 0.3670	3.2605 ± 0.3670	3.0362 ± 0.2595
VE-8946, 8947	Aug, 1995	Gr. Alpha	0.2000 ± 0.0800	0.2018 ± 0.0786	0.2009 ± 0.0561
VE-8946, 8947	Aug, 1995	Gr. Beta	4.3000 ± 0.1500	4.3179 ± 0.1511	4.3089 ± 0.1065
VE-8946, 8947	Aug, 1995	K-40	3.9615 ± 0.2670	4.0418 ± 0.3300	4.0017 ± 0.2122
VE - 8802, 8803	Aug, 1995	Sr-89	-0.0001 ± 0.0018	-0.0004 ± 0.0022	-0.0002 ± 0.0014
VE - 8802, 8803	Aug, 1995	Sr-90	0.0011 ± 0.0006	0.0013 ± 0.0007	0.0012 ± 0.0005
VE-8802, 8803	Aug, 1995	K-40	2.3052 ± 0.2360	2.3039 ± 0.3070	2.3046 ± 0.1936
MI-8845, 8846	Aug, 1995	I-131	0.0098 ± 0.1785	0.0835 ± 0.1740	0.0467 ± 0.1246
CW-8873, 8874	Aug, 1995	Gr. Beta	1.8586 ± 1.3992	4.2592 ± 1.5511	3.0589 ± 1.0445
CW-8873, 8874	Aug, 1995	Gr. Beta	-0.6043 ± 1.1348	-0.0465 ± 1.1799	-0.3254 ± 0.8185
MI-8902, 8903	Aug, 1995	I-131	-0.0387 ± 0.2325	0.1320 ± 0.3198	0.0466 ± 0.1977
VE-9035, 9036	Aug, 1995	K-40	2.1934 ± 0.2790	2.3847 ± 0.3380	2.2891 ± 0.2191
SW-9056, 9057	Aug, 1995	H-3	140.7425 ± 79.5937	55.2281 ± 75.6687	97.9853 ± 54.9111
MI-9113, 9114	Aug, 1995	I-131	0.2205 ± 0.3289	0.2711 ± 0.2835	0.2458 ± 0.2171
LW-9079, 9080	Aug, 1995	Co-60	0.8410 ± 2.8400	0.1630 ± 2.9900	0.5020 ± 2.0619
LW-9079, 9080	Aug, 1995	Cs-137	0.7700 ± 2.7700	-0.5330 ± 2.6700	0.1185 ± 1.9237
LW-9079, 9080	Aug, 1995	Gr. Beta	2.7566 ± 0.8607	2.6961 ± 0.8549	2.7264 ± 0.6065
SW-9183, 9184	Aug, 1995	Co-60	-0.3280 ± 3.0000	2.2200 ± 4.0400	0.9460 ± 2.5160
SW-9183, 9184	Aug, 1995	Cs-137	0.8200 ± 3.4400	0.2580 ± 4.3700	0.5390 ± 2.7808
SWU-9162, 9163	Aug, 1995	Gr. Beta	2.5000 ± 0.5000	2.5094 ± 0.5480	2.5047 ± 0.3709
SWU-9162, 9163	Aug, 1995	H-3	152.0000 ± 88.0000	157.4341 ± 83.7394	154.7170 ± 60.7377
WW-9276, 9277	Aug, 1995	H-3	1,636.0299 ± 130.9904	1,680.8118 ± 132.2095	1,658.4209 ± 93.0562
VE-9210, 9211	Aug, 1995	Gr. Beta	4.1000 ± 0.2000	4.0920 ± 0.1675	4.0960 ± 0.1304
VE-9210, 9211	Aug, 1995	K-40	4.6449 ± 0.1090	4.6203 ± 0.1150	4.6326 ± 0.0792
DW-9371, 9372	Aug, 1995	Gr. Beta	4.9900 ± 1.1960	4.5327 ± 1.1679	4.7613 ± 0.8358
DW-9371, 9372	Aug, 1995	I-131	0.1312 ± 0.2093	0.1381 ± 0.1961	0.1346 ± 0.1434
MI-9297, 9298	Aug, 1995	I-131	0.0434 ± 0.1996	0.0510 ± 0.2134	0.0472 ± 0.1461
MI-9297, 9298	Aug, 1995	K-40	1,727.8000 ± 180.0000	1,602.7000 ± 172.0000	1,665.2500 ± 124.4829
WW-9252, 9253	Sep, 1995	H-3	530.8948 ± 98.7085	538.0449 ± 98.9671	534.4698 ± 69.8889

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-9327, 9328	Sep, 1995	I-131	0.1442 ± 0.1680	0.0972 ± 0.1575	0.1207 ± 0.1151
WW-9396, 9397	Sep, 1995	Co-60	2.0600 ± 2.4700	0.6870 ± 2.9500	1.3735 ± 1.9238
WW-9396, 9397	Sep, 1995	Cs-137	2.6700 ± 2.7300	0.7790 ± 2.5900	1.7245 ± 1.8816
WW-9396, 9397	Sep, 1995	Gr. Beta	0.6947 ± 1.3597	1.7640 ± 1.3095	1.2293 ± 0.9439
WW-9396, 9397	Sep, 1995	H-3	14.9063 ± 76.6085	48.8927 ± 78.1795	31.8995 ± 54.7287
SW - 10075, 10076	Sep, 1995	H-3	262.0954 ± 87.9940	265.6857 ± 88.1404	263.8905 ± 62.2730
SW - 10075, 10076	Sep, 1995	Sr-89	-1.1140 ± 0.9865	0.7627 ± 0.9505	-0.1756 ± 0.6849
SW - 10075, 10076	Sep, 1995	Sr-90	0.6409 ± 0.2630	0.3425 ± 0.2113	0.4917 ± 0.1687
MI-9350, 9351	Sep, 1995	I-131	-0.0990 ± 0.1565	0.0745 ± 0.1638	-0.0123 ± 0.1133
MI-9350, 9351	Sep, 1995	K-40	1,335.3000 ± 163.0000	1,521.4000 ± 179.0000	1,428.3500 ± 121.0475
MI - 9463, 9464	Sep, 1995	I-131	0.1059 ± 0.1889	0.0550 ± 0.1695	0.0804 ± 0.1269
MI-9463, 9464	Sep, 1995	K-40	1,814.9000 ± 139.0000	1,743.1000 ± 180.0000	1,779.0000 ± 113.7113
BS - 9710, 9711	Sep, 1995	K-40	8.3415 ± 0.3890	8.7853 ± 0.3190	8.5634 ± 0.2515
CW - 9486, 9487	Sep, 1995	Gr. Beta	0.3695 ± 1.1728	-0.8827 ± 1.4122	-0.2566 ± 0.9179
CW-9486, 9487	Sep, 1995	Gr. Beta	3.1540 ± 1.5156	3.4306 ± 1.5908	3.2923 ± 1.0986
SO - 9562, 9563	Sep, 1995	Cs-137	0.4189 ± 0.0216	0.4786 ± 0.0443	0.4488 ± 0.0246
SO - 9562, 9563	Sep, 1995	K-40	14.9730 ± 0.4070	15.6780 ± 0.6540	15.3255 ± 0.3852
VE-9515, 9516	Sep, 1995	Co-60	-0.0018 ± 0.0107	-0.0046 ± 0.0074	-0.0032 ± 0.0065
VE-9515, 9516	Sep, 1995	Cs-137	-0.0003 ± 0.0080	-0.0017 ± 0.0071	-0.0010 ± 0.0054
MI-9611, 9612	Sep, 1995	I-131	0.1395 ± 0.2011	0.0905 ± 0.2020	0.1150 ± 0.1425
MI-9611, 9612	Sep, 1995	K-40	1,463.6000 ± 163.0000	1,381.6000 ± 117.0000	1,422.6000 ± 100.3220
SW-9583, 9584	Sep, 1995	H-3	191.7867 ± 84.3836	59.5611 ± 78.5845	125.6739 ± 57.6544
LW - 9632, 9633	Sep, 1995	Gr. Beta	4.9397 ± 0.8738	4.1679 ± 0.7956	4.5538 ± 0.5909
LW-9632, 9633	Sep, 1995	Co-60	0.2420 ± 2.5400	0.6900 ± 1.8800	0.4660 ± 1.5800
LW-9632, 9633	Sep, 1995	Cs-134	-0.9850 ± 2.5000	0.2670 ± 2.3000	-0.3590 ± 1.6985
LW-9632, 9633	Sep, 1995	Cs-137	0.7330 ± 2.7300	1.9600 ± 2.0000	1.3465 ± 1.6921
LW-9632, 9633	Sep, 1995	I-131	-0.0233 ± 0.1923	0.1754 ± 0.2465	0.0761 ± 0.1563
LW-9632, 9633	Sep, 1995	I-131(g)	-1.2000 ± 7.8600	-1.7800 ± 6.9200	-1.4900 ± 5.2361
LW-9632, 9633	Sep, 1995	K-40	73.2000 ± 35.1000	84.4840 ± 38.9000	78.8420 ± 26.1974
MI-9677, 9678	Sep, 1995	I-131	0.1492 ± 0.1575	-0.0782 ± 0.2124	0.0355 ± 0.1322
MI-9677, 9678	Sep, 1995	K-40	1,579.6000 ± 149.0000	1,387.5000 ± 150.0000	1,483.5500 ± 105.7131
CW-9654, 9655	Sep, 1995	Gr. Beta	3.8956 ± 1.4702	4.0324 ± 1.4561	3.9640 ± 1.0346
CW-9654, 9655	Sep, 1995	Gr. Beta	-0.4258 ± 1.0721	0.1637 ± 1.0778	-0.1311 ± 0.7601
MI-9758, 9759	Sep, 1995	Co-60	0.0531 ± 2.3000	-1.0600 ± 5.6200	-0.5035 ± 3.0362
MI-9758, 9759	Sep, 1995	Cs-137	0.1530 ± 2.1000	3.3300 ± 4.1300	1.7415 ± 2.3166
MI-9758, 9759	Sep, 1995	I-131	0.0357 ± 0.1262	0.1303 ± 0.1374	0.0830 ± 0.0933

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-9781, 9782	Sep, 1995	K-40	3.6858 ± 0.3040	3.8621 ± 0.3830	3.7740 ± 0.2445
WW - 9917, 9918	Sep, 1995	Gr. Alpha	1.0000 ± 1.2000	0.1895 ± 1.3470	0.5948 ± 0.9020
WW - 9917, 9918	Sep, 1995	Gr. Beta	2.0000 ± 1.6000	1.4626 ± 1.5372	1.7313 ± 1.1094
WW - 9917, 9918	Sep, 1995	K-40	61.5990 ± 27.2000	55.4580 ± 30.1000	58.5285 ± 20.2845
SWU - 10054, 10055	Sep, 1995	Gr. Beta	2.8699 ± 0.6506	2.9815 ± 0.6273	2.9257 ± 0.4519
SWU - 10054, 10055	Sep, 1995	H-3	272.2258 ± 86.5578	186.8216 ± 82.9725	229.5237 ± 59.9514
CW-9848, 9849	Sep, 1995	Gr. Beta	10.0958 ± 2.0529	10.6091 ± 2.0035	10.3525 ± 1.4343
CW-9848, 9849	Sep, 1995	Gr. Beta	0.6483 ± 1.1139	0.0874 ± 1.0548	0.3678 ± 0.7670
CW-9848, 9849	Sep, 1995	H-3	2.3592 ± 75.6414	-2.9490 ± 75.3926	-0.2949 ± 53.3987
MI-9873, 9874	Sep, 1995	I-131	0.1317 ± 0.1666	0.2502 ± 0.2503	0.1909 ± 0.1503
SW - 10174, 10175	Sep, 1995	Co-60	-0.2100 ± 1.9300	0.0995 ± 3.2500	-0.0553 ± 1.8899
SW - 10174, 10175	Sep, 1995	Cs-137	-0.0756 ± 2.9100	-0.1070 ± 2.8500	-0.0913 ± 2.0366
WW-9988, 9989	Sep, 1995	H-3	126.1391 ± 81.1795	18.2725 ± 76.3358	72.2058 ± 55.7164
SWT - 10033, 10034	Sep, 1995	Gr. Beta	1.7710 ± 0.4680	1.9280 ± 0.4610	1.8495 ± 0.3285
P-10216, 10217	Sep, 1995	H-3	76.4356 ± 78.6697	74.6580 ± 78.5893	75.5468 ± 55.5994
SW-10261, 10262	Sep, 1995	H-3	279.1447 ± 88.4376	300.6173 ± 89.3023	289.8810 ± 62.8413
VE - 10012, 10013	Sep, 1995	Gr. Beta	5.6577 ± 0.3023	5.0000 ± 0.4415	5.3288 ± 0.2675
MI-10120, 10121	Sep, 1995	I-131	0.1055 ± 0.1292	0.0027 ± 0.1196	0.0541 ± 0.0880
MI-10120, 10121	Sep, 1995	K-40	1,446.6000 ± 163.0000	1,300.9000 ± 145.0000	1,373.7500 ± 109.0802
SW-10195, 10196	Sep, 1995	H-3	-19.5632 ± 74.6957	103.1512 ± 80.3270	41.7940 ± 54.8450
CW - 10240, 10241	Sep, 1995	Gr. Beta	2.7919 ± 1.4430	3.6514 ± 1.5144	3.2216 ± 1.0459
CW - 10240, 10241	Sep, 1995	Gr. Beta	0.5909 ± 1.1545	2.4180 ± 1.3151	1.5045 ± 0.8750
SW-10150, 10151	Sep, 1995	H-3	119.1208 ± 81.0078	129.7884 ± 81.4747	124.4546 ± 57.4465
SW - 10282, 10283	Oct, 1995	Gr. Beta	2.1771 ± 0.4791	1.8939 ± 0.4661	2.0355 ± 0.3342
WW - 10349, 10350	Oct, 1995	H-3	64.9002 ± 80.1767	47.3596 ± 79.4055	56.1299 ± 56.4215
WW-10349, 10350	Oct, 1995	Co-60	0.0850 ± 1.2400	1.4900 ± 2.0900	0.7875 ± 1.2151
WW-10349, 10350	Oct, 1995	Cs-137	0.7540 ± 1.1500	0.0703 ± 2.2400	0.4122 ± 1.2590
VE-10370, 10371	Oct, 1995	K-40	3.3443 ± 0.4620	3.2897 ± 0.4770	3.3170 ± 0.3320
F-10491, 10492	Oct, 1995	Co-60	-0.0087 ± 0.0120	0.0051 ± 0.0078	-0.0018 ± 0.0072
F-10491, 10492	Oct, 1995	Cs-137	-0.0053 ± 0.0105	-0.0009 ± 0.0056	-0.0031 ± 0.0059
AP - 10752, 10753	Oct, 1995	Co-60	-0.0006 ± 0.0006	-0.0007 ± 0.0005	-0.0007 ± 0.0004
AP - 10752, 10753	Oct, 1995	Cs-134	0.0007 ± 0.0004	0.0003 ± 0.0007	0.0005 ± 0.0004
AP - 10752, 10753	Oct, 1995	Cs-137	-0.0004 ± 0.0005	0.0000 ± 0.0005	-0.0002 ± 0.0003
AP - 10752, 10753	Oct, 1995	I-131(g)	0.0016 ± 0.0034	-0.0005 ± 0.0047	0.0005 ± 0.0029
AP - 10752, 10753	Oct, 1995	K-40	0.0344 ± 0.0103	0.0436 ± 0.0113	0.0390 ± 0.0076
AP - 11141, 11142	Oct, 1995	Co-60	0.0001 ± 0.0004	0.0002 ± 0.0002	0.0001 ± 0.0002

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

Lab Codes[b]	Sample Date	Analysis	Concentration in pCi/L[a] First Result	Second Result	Averaged Result
AP - 11141, 11142	Oct, 1995	Cs-137	0.0000 ± 0.0003	0.0003 ± 0.0004	0.0002 ± 0.0002
MI - 10324, 10325	Oct, 1995	Co-60	0.3420 ± 2.2000	-1.0200 ± 3.2000	-0.3390 ± 1.9416
MI - 10324, 10325	Oct, 1995	Cs-134	1.4400 ± 1.9300	-1.0300 ± 2.5800	0.2050 ± 1.6110
MI - 10324, 10325	Oct, 1995	Cs-137	0.3320 ± 2.0800	0.9930 ± 2.5600	0.6625 ± 1.6492
MI - 10324, 10325	Oct, 1995	I-131	0.1255 ± 0.1379	0.0629 ± 0.2061	0.0942 ± 0.1240
MI - 10324, 10325	Oct, 1995	I-131(g)	-0.8920 ± 2.6900	1.1700 ± 3.2900	0.1390 ± 2.1249
MI - 10324, 10325	Oct, 1995	K-40	1,440.7000 ± 88.9000	1,432.5000 ± 120.0000	1,436.6000 ± 74.6713
MI - 10324, 10325	Oct, 1995	Sr-89	-0.4912 ± 0.9456	-1.3268 ± 0.8823	-0.9090 ± 0.6466
MI - 10324, 10325	Oct, 1995	Sr-90	1.6952 ± 0.3864	1.7252 ± 0.3803	1.7102 ± 0.2711
WWU-10392, 10393	Oct, 1995	I-131	0.0442 ± 0.1674	0.0223 ± 0.1698	0.0333 ± 0.1192
F-10470, 10471	Oct, 1995	Co-60	0.0049 ± 0.0063	0.0037 ± 0.0052	0.0043 ± 0.0041
F-10470, 10471	Oct, 1995	Cs-137	0.0003 ± 0.0050	0.0020 ± 0.0037	0.0011 ± 0.0031
SW - 10413, 10414	Oct, 1995	H-3	41.1376 ± 77.3777	62.2941 ± 78.3358	51.7159 ± 55.0541
WW-10437, 10438	Oct, 1995	H-3	81.6446 ± 78.1486	-10.6493 ± 73.8374	35.4977 ± 53.7568
MI - 10512, 10513	Oct, 1995	I-131	0.0662 ± 0.1335	0.0996 ± 0.1517	0.0829 ± 0.1010
SO - 10577, 10578	Oct, 1995	Co-60	0.0033 ± 0.0117	0.0032 ± 0.0142	0.0033 ± 0.0092
SO - 10577, 10578	Oct, 1995	Cs-134	0.0204 ± 0.0110	0.0277 ± 0.0128	0.0241 ± 0.0084
SO - 10577, 10578	Oct, 1995	Cs-137	0.1528 ± 0.0249	0.1687 ± 0.0241	0.1608 ± 0.0173
SO - 10577, 10578	Oct, 1995	Gr. Beta	18.4120 ± 3.0080	20.0560 ± 3.0020	19.2340 ± 2.1249
SO - 10577, 10578	Oct, 1995	K-40	19.0300 ± 0.3920	18.4690 ± 0.6160	18.7495 ± 0.4272
MI - 10598, 10599	Oct, 1995	I-131	0.0233 ± 0.1528	-0.1143 ± 0.1290	-0.0455 ± 0.1000
F - 10666, 10667	Oct, 1995	Co-60	-0.0011 ± 0.0149	0.0022 ± 0.0134	0.0005 ± 0.0100
F - 10666, 10667	Oct, 1995	Cs-137	0.0062 ± 0.0109	0.0088 ± 0.0102	0.0075 ± 0.0075
WW - 11206, 11207	Oct, 1995	H-3	144.1480 ± 82.0522	298.7082 ± 106.1128	221.4281 ± 67 0681
F - 10687, 10688	Oct, 1995	Co-60	-0.0056 ± 0.0092	0.0052 ± 0.0111	-0.0002 ± 0.0072
F - 10687, 10688	Oct, 1995	Cs-137	0.0051 ± 0.0081	-0.0007 ± 0.0102	0.0022 ± 0.0065
MI - 10710, 10711	Oct, 1995	I-131	-0.0702 ± 0.1760	0.0060 ± 0.1746	-0.0321 ± 0.1240
WW - 10797, 10798	Oct, 1995	H-3	255.7388 ± 88.0244	190.9283 ± 85.4061	223.3336 ± 61.3239
F - 10882, 10883	Oct, 1995	K-40	2.4355 ± 0.2770	2.3158 ± 0.4530	2.3757 ± 0.2655
CW - 10826, 10827	Oct, 1995	Gr. Beta	1.9841 ± 1.3273	1.1082 ± 1.2551	1.5461 ± 0.9134
SWU - 10923, 10924	Oct, 1995	Gr. Beta	2.3790 ± 0.5752	2.7204 ± 0.5897	2.5497 ± 0.4119
SWU - 10923, 10924	Oct, 1995	H-3	908.5097 ± 108.7289	878.3050 ± 107.7372	893.4074 ± 76.5331
F - 10969, 10970	Oct, 1995	Cs-137	0.0391 ± 0.0173	0.0589 ± 0.0281	0.0490 ± 0.0165
F - 10969, 10970	Oct, 1995	Gr. Beta	2.3088 ± 0.0750	2.1970 ± 0.0758	2.2529 ± 0.0533
F - 10969, 10970	Oct, 1995	K-40	2.1279 ± 0.3500	1.8750 ± 0.4010	2.0015 ± 0.2661
CW - 10773, 10774	Oct, 1995	Gr. Beta	8.4208 ± 1.8580	9.9060 ± 2.0352	9.1634 ± 1.3779

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 - 10773, 10774	Oct, 1995	Gr. Beta	-0.2668 ± 1.0986	0.8745 ± 1.1142	0.3039 ± 0.7824
CW - 10773, 10774	Oct, 1995	H-3	51.6603 ± 77.7745	67.5106 ± 78.4891	59.5854 ± 55.2481
CW - 10858, 10859	Oct, 1995	Gr. Beta	3.8461 ± 1.5209	5.5313 ± 1.6346	4.6887 ± 1.1163
CW - 10858, 10859	Oct, 1995	Gr. Beta	0.1646 ± 1.1055	-0.2698 ± 1.0572	-0.0526 ± 0.7648
BS - 11056, 11057	Oct, 1995	Cs-137	0.3037 ± 0.0214	0.3183 ± 0.0167	0.3110 ± 0.0136
BS - 11056, 11057	Oct, 1995	K-40	18.5050 ± 0.4060	18.2890 ± 0.3850	18.3970 ± 0.2798
F - 11078, 11079	Oct, 1995	K-40	2.6694 ± 0.1700	2.7062 ± 0.1140	2.6878 ± 0.1023
CW - 11261, 11262	Oct, 1995	Gr. Beta	3.4182 ± 1.5101	3.8050 ± 1.4573	3.6116 ± 1.0493
CW - 11261, 11262	Oct, 1995	Gr. Beta	-0.9607 ± 0.9909	-0.1199 ± 1.1241	-0.5403 ± 0.7492
MI - 11162, 11163	Oct, 1995	I-131	0.2163 ± 0.2174	0.0872 ± 0.2019	0.1517 ± 0.1483
LW - 11185, 11186	Oct, 1995	Co-60	0.2560 ± 2.0000	0.0639 ± 3.9000	0.1600 ± 2.1915
LW - 11185, 11186	Oct, 1995	Cs-137	0.9690 ± 1.9600	1.3800 ± 3.2600	1.1745 ± 1.9019
LW - 11185, 11186	Oct, 1995	Gr. Beta	7.9276 ± 1.3579	6.7150 ± 1.2839	7.3213 ± 0.9344
MI - 11284, 11285	Oct, 1995	I-131	0.1805 ± 0.2626	0.1868 ± 0.2352	0.1837 ± 0.1763
MI - 11284, 11285	Oct, 1995	K-40	1,759.4000 ± 182.0000	1,581.9000 ± 164.0000	1,670.6500 ± 122.4949
DW - 11565, 11566	Oct, 1995	Gr. Beta	2.3856 ± 0.4715	2.6159 ± 0.5003	2.5008 ± 0.3437
DW - 11565, 11566	Oct, 1995	I-131	-0.1047 ± 0.3170	0.1835 ± 0.2833	0.0394 ± 0.2126
SW - 11309, 11310	Oct, 1995	Gr. Alpha	0.5829 ± 0.5262	1.1580 ± 0.6097	0.8705 ± 0.4027
SW - 11309, 11310	Oct, 1995	Gr. Beta	3.1323 ± 0.6596	2.5628 ± 0.6351	2.8475 ± 0.4579
MI - 11351, 11352	Oct, 1995	I-131	0.0319 ± 0.2455	0.0097 ± 0.2195	0.0208 ± 0.1647
MI - 11351, 11352	Oct, 1995	K-40	1,492.6000 ± 166.0000	1,431.8000 ± 160.0000	1,462.2000 ± 115.2779
SW - 11330, 11331	Oct, 1995	H-3	83.4709 ± 77.8239	106.3960 ± 78.8560	94.9335 ± 55.3959
MI - 11407, 11408	Oct, 1995	I-131	-0.1272 ± 0.1871	0.1059 ± 0.1876	-0.0106 ± 0.1325
MI - 11433, 11434	Nov, 1995	I-131	-0.0607 ± 0.1789	0.1317 ± 0.1462	0.0355 ± 0.1155
MI - 11433, 11434	Nov, 1995	K-40	1,446.0000 ± 167.0000	1,450.8000 ± 119.0000	1,448.4000 ± 102.5305
MI - 11433, 11434	Nov, 1995	Sr-89	-0.0542 ± 1.2560	-0.0961 ± 1.1700	-0.0752 ± 0.8583
MI - 11433, 11434	Nov, 1995	Sr-90	1.9383 ± 0.4889	1.8933 ± 0.4555	1.9158 ± 0.3341
BS - 11453, 11454	Nov, 1995	Gr. Beta	8.3022 ± 1.4598	7.0981 ± 1.3963	7.7002 ± 1.0100
BS - 11453, 11454	Nov, 1995	K-40	13.4130 ± 0.6950	14.3840 ± 1.0200	13.8985 ± 0.6171
MI - 11476, 11477	Nov, 1995	I-131	-0.0379 ± 0.1804	0.0878 ± 0.2013	0.0250 ± 0.1352
MI - 11476, 11477	Nov, 1995	K-40	1,425.6000 ± 155.0000	1,379.5000 ± 93.1000	1,402.5500 ± 90.4055
MI - 11476, 11477	Nov, 1995	Sr-89	0.1529 ± 1.5801	0.6656 ± 1.1518	0.4092 ± 0.9777
MI - 11476, 11477	Nov, 1995	Sr-90	1.5845 ± 0.6297	0.7492 ± 0.4308	1.1668 ± 0.3815
WW - 11657, 11658	Nov, 1995	Gr. Beta	0.3756 ± 0.4690	0.4697 ± 0.5060	0.4226 ± 0.3450
WW - 11657, 11658	Nov, 1995	H-3	110.2042 ± 79.0344	172.1940 ± 81.6909	141.1991 ± 56.8327
SW - 11519, 11520	Nov, 1995	H-3	86.0705 ± 77.9529	10.3285 ± 74.5326	48.1995 ± 53.9253

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 - 11837, 11838	Nov, 1995	Co-60	0.6630 ± 1.5100	0.0996 ± 3.2500	0.3813 ± 1.7918
WW - 11837, 11838	Nov, 1995	Cs-137	0.0882 ± 1.6800	-0.5360 ± 2.9800	-0.2239 ± 1.7105
MI - 11588, 11589	Nov, 1995	K-40	1,282.9000 ± 161.0000	1,390.4000 ± 145.0000	1,336.6500 ± 108.3351
MI - 11611, 11612	Nov, 1995	I-131	0.0368 ± 0.2007	0.1136 ± 0.2056	0.0752 ± 0.1437
MI - 11611, 11612	Nov, 1995	K-40	1,368.1000 ± 112.0000	1,291.1000 ± 158.0000	1,329.6000 ± 96.8349
CW - 11678, 11679	Nov, 1995	Gr. Beta	2.6565 ± 1.5123	2.0599 ± 1.3520	2.3582 ± 1.0143
MI - 11786, 11787	Nov, 1995	I-131	0.0519 ± 0.1914	-0.0830 ± 0.1791	-0.0156 ± 0.1311
MI - 11786, 11787	Nov, 1995	K-40	1,493.0000 ± 100.0000	1,459.1000 ± 170.0000	1,476.0500 ± 98.6154
CW - 11865, 11866	Nov, 1995	Gr. Beta	1.9803 ± 1.4093	1.1128 ± 1.3439	1.5466 ± 0.9737
LW - 11926, 11927	Nov, 1995	Co-60	-0.6990 ± 2.1700	-1.3700 ± 3.3200	-1.0345 ± 1.9831
LW - 11926, 11927	Nov, 1995	Cs-137	1.3600 ± 2.0100	1.6800 ± 2.6800	1.5200 ± 1.6750
LW - 11926, 11927	Nov, 1995	Gr. Beta	3.5794 ± 0.9059	4.2705 ± 0.9513	3.9250 ± 0.6568
PW - 12451, 12452	Nov, 1995	Co-60	0.1370 ± 1.6200	1.5900 ± 2.0000	0.8635 ± 1.2869
PW - 12451, 12452	Nov, 1995	Cs-137	-1.0900 ± 1.7200	0.8750 ± 2.5000	-0.1075 ± 1.5173
WW - 12659, 12660	Nov, 1995	H-3	10,454.1364 ± 283.5019	10,315.0095 ± 281.7458	10,384.5729 ± 199.8462
G - 12184, 12185	Nov, 1995	K-40	7.1257 ± 0.4820	7.2496 ± 0.5540	7.1877 ± 0.3672
DW - 12229, 12230	Nov, 1995	Gr. Beta	1.4868 ± 0.4353	1.5192 ± 0.4562	1.5030 ± 0.3153
DW - 12229, 12230	Nov, 1995	H-3	48.3898 ± 76.5630	70.8565 ± 77.5707	59.6232 ± 54.4957
SO - 12430, 12431	Dec, 1995	Cs-137	0.2060 ± 0.0696	0.1746 ± 0.0629	0.1903 ± 0.0469
SO - 12430, 12431	Dec, 1995	Gr. Alpha	15.7026 ± 4.4545	10.9075 ± 4.1010	13.3051 ± 3.0274
SO - 12430, 12431	Dec, 1995	Gr. Beta	22.3778 ± 2.8536	23.0769 ± 2.9630	22.7273 ± 2.0568
SO - 12430, 12431	Dec, 1995	K-40	16.6990 ± 1.3000	17.6620 ± 1.3500	17.1805 ± 0.9371
LW - 12152, 12153	Dec, 1995	Co-60	1.4300 ± 3.3200	3.3800 ± 2.1000	2.4050 ± 1.9642
LW - 12152, 12153	Dec, 1995	Cs-137	-0.1400 ± 3.1900	0.3640 ± 2.8500	0.1120 ± 2.1388
LW - 12152, 12153	Dec, 1995	Gr. Beta	5.1509 ± 1.3079	4.8804 ± 1.1924	5.0157 ± 0.8849
MI - 12250, 12251	Dec, 1995	I-131	0.1190 ± 0.1943	0.1981 ± 0.2178	0.1586 ± 0.1460
MI - 12250, 12251	Dec, 1995	K-40	1,470.3000 ± 163.0000	1,386.6000 ± 126.0000	1,428.4500 ± 103.0109
WW - 12298, 12299	Dec, 1995	Co-60	0.4210 ± 2.3800	0.1770 ± 4.0900	0.2990 ± 2.3660
WW - 12298, 12299	Dec, 1995	Cs-137	0.1580 ± 2.0500	1.5200 ± 2.7700	0.8390 ± 1.7230
WW - 12298, 12299	Dec, 1995	H-3	42.7622 ± 77.9643	99.7786 ± 80.5282	71.2704 ± 56.0429
LW - 12380, 12381	Dec, 1995	Co-60	1.2700 ± 2.4400	2.2300 ± 2.2300	1.7500 ± 1.6528
LW - 12380, 12381	Dec, 1995	Cs-134	0.5120 ± 2.1300	1.9500 ± 2.2200	1.2310 ± 1.5383
LW - 12380, 12381	Dec, 1995	Cs-137	0.8060 ± 2.5100	1.2200 ± 2.4400	1.0130 ± 1.7503
LW - 12380, 12381	Dec, 1995	I-131	0.0861 ± 0.1243	0.1222 ± 0.2055	0.1041 ± 0.1201
LW - 12380, 12381	Dec, 1995	I-131(g)	-7.3600 ± 13.8000	4.7100 ± 13.4000	-1.3250 ± 9.6177
LW - 12380, 12381	Dec, 1995	K-40	129.0000 ± 41.2000	133.0000 ± 34.7000	131.0000 ± 26.9329

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 - 12325, 12326	Dec, 1995	I-131	-0.1263 ± 0.2456	0.1598 ± 0.2063	0.0167 ± 0.1604
MI - 12325, 12326	Dec, 1995	K-40	1,409.0000 ± 172.0000	1,438.6000 ± 169.0000	1,423.8000 ± 120.5664
WW - 12347, 12348	Dec, 1995	H-3	77.2534 ± 78.8630	87.6308 ± 79.3168	82.4421 ± 55.9252
F - 12688, 12689	Dec, 1995	Co-60	0.0009 ± 0.0117	0.0011 ± 0.0141	0.0010 ± 0.0092
F - 12688, 12689	Dec, 1995	Cs-134	0.0044 ± 0.0094	-0.0069 ± 0.0138	-0.0013 ± 0.0084
F - 12688, 12689	Dec, 1995	Cs-137	0.0366 ± 0.0179	0.0266 ± 0.0149	0.0316 ± 0.0116
F - 12688, 12689	Dec, 1995	I-131(g)	-0.0050 ± 0.0244	0.0254 ± 0.0422	0.0102 ± 0.0244
F - 12688, 12689	Dec, 1995	K-40	2.4139 ± 0.3400	2.5180 ± 0.3700	2.4660 ± 0.2512
PW - 12945, 12946	Dec, 1995	Co-60	0.2950 ± 2.7700	1.4000 ± 1.9600	0.8475 ± 1.6967
PW - 12945, 12946	Dec, 1995	Cs-137	1.4900 ± 2.5600	0.1240 ± 2.1900	0.8070 ± 1.6845

[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.

12-31-95

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	4.0 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) = $169.85 \times (\text{known})^{0.0933}$ 10% of known value
Radium-226,-228	<0.1 pCi/liter	15% of known value
Plutonium	0.1 pCi/liter, gram, or sample	10% of known value
Iodine-131, Iodine-129[b]	≤55 pCi/liter >55 pCi/liter	6.0 pCi/liter 10% of known value
Uranium-238, Nickel-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.

APPENDIX B

DATA REPORTING CONVENTIONS

Data Reporting Conventions

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

2.0. Single Measurements

Each single measurement is reported as follows:

$$x \pm s$$

where x = value of the measurement;

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

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

$$< L$$

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

3.0. Duplicate analyses

3.1 Individual results: $x_1 \pm s_1$

$x_1 \pm s_2$

Reported result: $x \pm s$

where $x = (1/2)\ (x_1 \pm x_2)$

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

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 x and standard deviation(s) of a set of n numbers $x_1, x_2 \ldots x_n$ are defined as follows:

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

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

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	3×10^6 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.

APPENDIX D

Special Ground

and Well Water Samples

1.0 INTRODUCTION

This appendix to the Radiation Environmental Monitoring Program Annual Report to the United States Regulatory Commission summarizes and interprets results of the special well and seepage water samples taken at the Prairie Island Nuclear Generating Plant, Red Wing, Minnesota, during the period January - December, 1995. This supplemental special sampling program was established in December of 1989 when higher than expected levels of tritium were detected in a nearby residence well sample.

Tabulations of the special sampling program individual analyses made during the year are included in this appendix. A summary table of tritium analyses is also included in this appendix.

2.0 SUMMARY

This special sampling program was established following the detection of tritium in a residence well water sample south of the PINGP during 1989. This program is described and the results for 1995 are summarized and discussed.

Program findings for 1995 detect low levels of tritium in nearby residence wells and some ground water seepage samples at or near the expected natural background levels. The 1995 sample results ranged from 15 pCi/L to 110 pCi/L. All tritium results are far below the Environmental Protection Agency's drinking water standard of 20,000 pCi/L and present no harm to any members of the public.

3.0 Special Tritium Sampling Program

3.1 Program Design and Data Interpretation

The purpose of this sampling program is to assess the impact of any tritium leaching into the environment (ground water system) from the PINGP discharge canal. For this purpose, special water samples are collected and analyzed for radioactive content.

3.2 Program Description

The sampling and analysis schedule for the special water sampling program is summarized in Table 4.1 and briefly reviewed below. Table 4.2 defines the additional sample locations and codes for the special water sampling program.

Special well and ground water samples were collected semi-annually at eight locations: one sample from the PINGP Environmental Laboratory (P-30); one from the nearest residence deep well (P-24d, Suter residence); two ground water seepages from near Birch Lake (P-31 and P-32); well water from the Prairie Island Training Center (P-26); and three other nearby residences (P-27, Nauer residence; P-28, Allyn (Perkins) residence; P-29, Childs residence). The Rohl farm well (part of the quarterly REMP sampling) is used as a control location for these special samples.

In order to detect low levels of tritium at or below natural background levels, analyses of the samples have been contracted to a laboratory (University of Waterloo Laboratories) capable of detecting tritium concentrations down to 6 pCi/L.

3.3 Program Execution

The special water sampling was executed as described in the preceding section.

3.4 Program Modifications

There were no program modifications during 1995.

3.5 Results and Discussion

Results obtained show tritium in well water and ground water samples at or near expected natural background levels. Table 4.4 provides the complete data table of results for each quarter and sampling location.

The tritium level annual averages have shown a downward trend since the special sampling begun in 1989. Annual averages for the nearest resident south of the plant were: 1430 pCi/L in 1989, 1360 pCi/L in 1990, 960 pCi/L in 1991, 835 pCi/L in 1992, 516 pCi/L in 1993, 360 pCi/L in 1994 and 53 pCi/L in 1995.

The 1995 levels are within the range of expected background tritium levels in shallow ground water and surface water due to tritium concentrations measured in precipitation. Sampling points in North America have shown tritium concentrations in precipitation ranging from 5 pCi/L to 157 pCi/L (Environmental Isotope Data No. 10; World Survey of Isotope Concentration in Precipitation (1988-1991)).

The higher level results at Suter and Birch Lake in 1989 were possibly due to seepage from the PINGP discharge canal water into the ground water. This is thought to occur due to the elevation difference between the Vermillion River and the discharge canal. The Suter residence is located between the discharge canal and Birch Lake, which connects to the Vermillion River. The PINGP discharge canal piping was lengthened during 1991, so that liquid discharges from the plant are released near the end of the discharge canal, diffused and discharged to the Mississippi River. In 1992, the underground liquid discharge pipe from the plant to the discharge canal piping was replaced with a double walled leak detectable piping system. It is expected that these modifications will eliminate the suspected radioactive effluent flow into the local ground water. The 1995 trend supports this expectation.

Table D-4.1 Sample collection and analysis program for special well and seepage water samples, Prairie Island Nuclear Generating Plant, 1995.

Medium	No.	Location codes and type[a]	Collection type and frequency[b]	Analysis type[c]
Well water semi-annual	7	P-24d, P-25 (C), P-26, P-27, P-28, P-29, P-30	G/SA	H-3
Ground water	2	P-31, P-32	G/SA	H-3

[a] Location codes are defined in table D-4.2. Control Station are indicated by (C). All other stations are indicators.

[b] Collection type is codes as follows: C/ = continuous; G/ = grab. Collection frequency is coded as follows: W = weekly; M = monthly; Q = quarterly; SA = semi-annually; A = annually; X = no specified frequency or one time.

[c] Analysis type is coded as follows: GB = gross beta; GS = gamma spectroscopy; H-3 = tritium; I-131 = iodine 131.

Table D-4.2. Sampling locations for special well and seepage water samples, Prairie Island Nuclear Generating Plant, 1995.

Code type[a]	Collection site	Type of sample[b]	Distance and direction from site stack
P-24d	Suter residence, deep well	WW	0.6 mi. @ 158°/SSE
P-25 C	Rohl farm	WW	12.9 mi @ 352°/N
P-26	PITC	WW	0.4 mi. @ 258°/WSW
P-27	Nauer residence	WW	0.9 mi. @ 154°/SSE
P-28	Allyn (Perkins) residence	WW	1.0 mi. @ 152°/SSE
P-29	Childs residence	WW	1.2 mi. @ 149°/SSE
P-30	PINGP Environmental Laboratory	WW	0.2 mi. @ 32°/NNE
P-31	Birch Lake Seepage #1	GW	0.7 mi. @ 179°/S
P-32	Birch Lake Seepage #2	GW	0.8 mi. @ 169°/SSE

[a] "C" denotes control location. All other locations are indicators.

[b] Sample codes: WW = Well water; GW = Ground Water.

Table D-4.3 Radiation Environmental Monitoring Program Summary: Special well and seepage water samples.

Name of Facility Prairie Island Nuclear Power Station — Docket No. 50-282, 50-306
Location of Facility Goodhue, Minnesota (County, State) — Reporting Period January - December 1995

Sample Type (Units)	Type and Number of Analyses[a]	LLD[b]	Indicator Locations Mean (F)[c] Range[c]	Location with Highest Semi-Annual Mean Location[d]	Location with Highest Semi-Annual Mean Mean (F)[c] Range[c]	Control Locations Mean (F)[c] Range	Number Non-Routine Results[e]
Well Water (pCi/L)	H-3 12	6	50 (10/12) (15-97)	P-28, Allyn well, 1.0 mi. @ 152°/SSE	78 (2/2) (58-97)	20 (2/2) (17-23)	0
Ground Water (pCi/L)	H-3 4	6	93 (4/4) (69-110)	P-31, Birch Lake Seepage #1, 0.7 mi. @ 179°/S	100 (2/2) (89-110)	20 (2/2) (17-23)	0

a H-3 = tritium

b LLD = Nominal lower limit of detection based on 4.66 sigma error for background sample. Value shown is lowest for the period.

c Mean and range are based on detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parentheses (F).

d Locations are specified: (1) by name, and code (Table 2) and (2) by distance, direction and sector relative to reactor site.

e Non-routine results are those which exceed ten times the control station value.

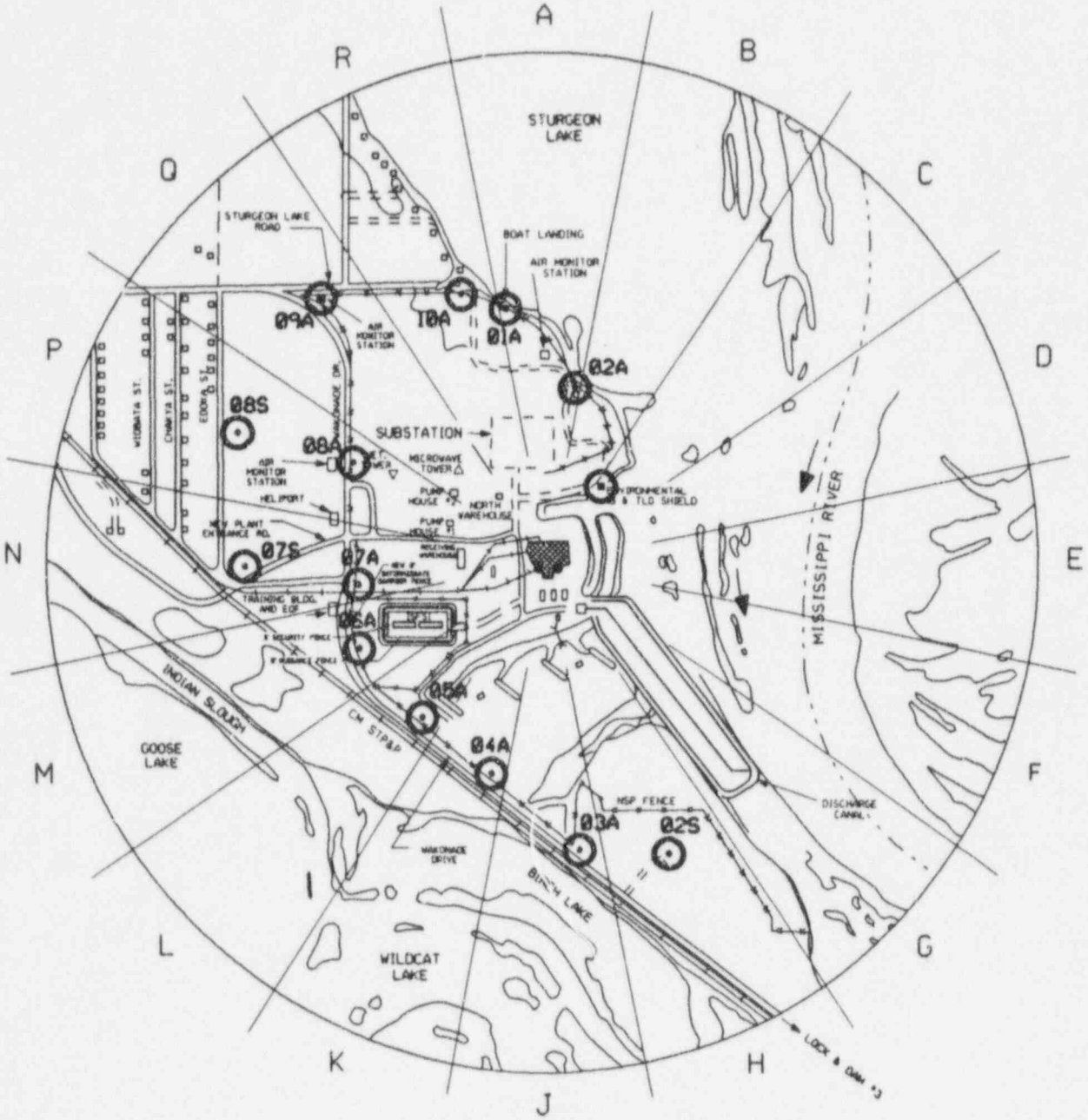
Table D-4.4 Radiological Environmental Monitoring Program , Complete Data Table, 1995.

SAMPLE DATES	APR. 1995	JUN. 1995	SEP. 1995	OCT. 1995
SAMPLE LOCATIONS	pCi/L	pCi/L	pCi/L	pCi/L
Suter residence	77	-	29	-
Rohl Farm (Control)	23	-	17	-
PITC	37	-	41	-
Nauer residence	27	-	15	-
Allyn (Perkin) residence	97	-	-	58
Child residence	75	-	-	46
Environmental Lab	<6	-	<6	-
Birch Lake Seepage #1	-	89	-	110
Birch Lake Seepage #2	-	105	-	69

APPENDIX E

Sampling Location Maps

TLD LOCATIONS
ONE MILE RADIUS



PLANT AREA ENLARGED PLAN [1.00 MILE RADIUS]

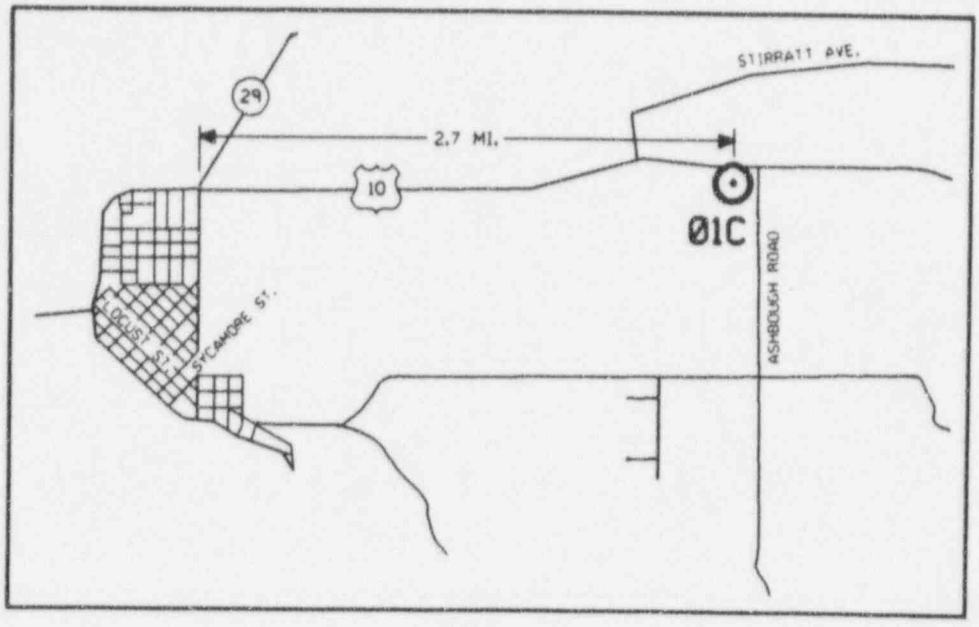
[NO SCALE]

MONITORING LEGEND:

⊙ N.S.P. TLD POINTS

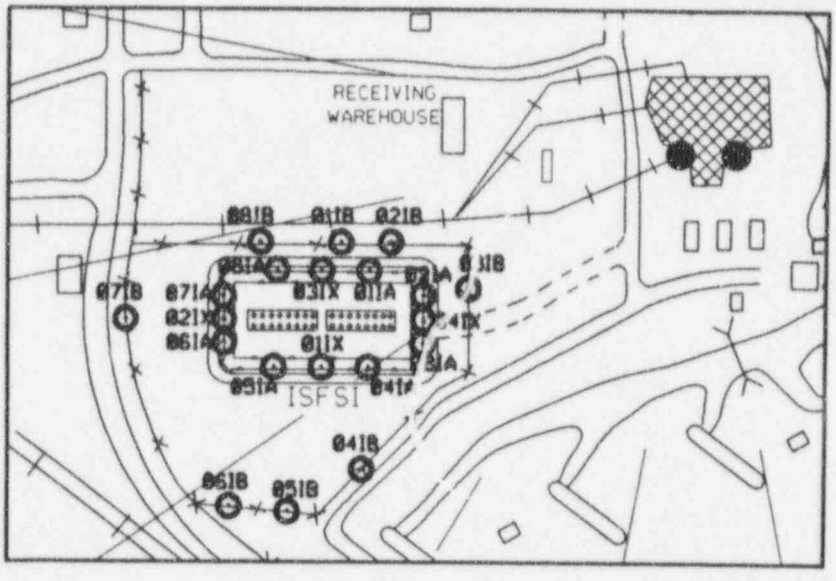
TLD01.DGN

TLD LOCATIONS



CONTROL POINTS

PRESCOTT, WISCONSIN



ISFSI AREA TLD LOCATIONS

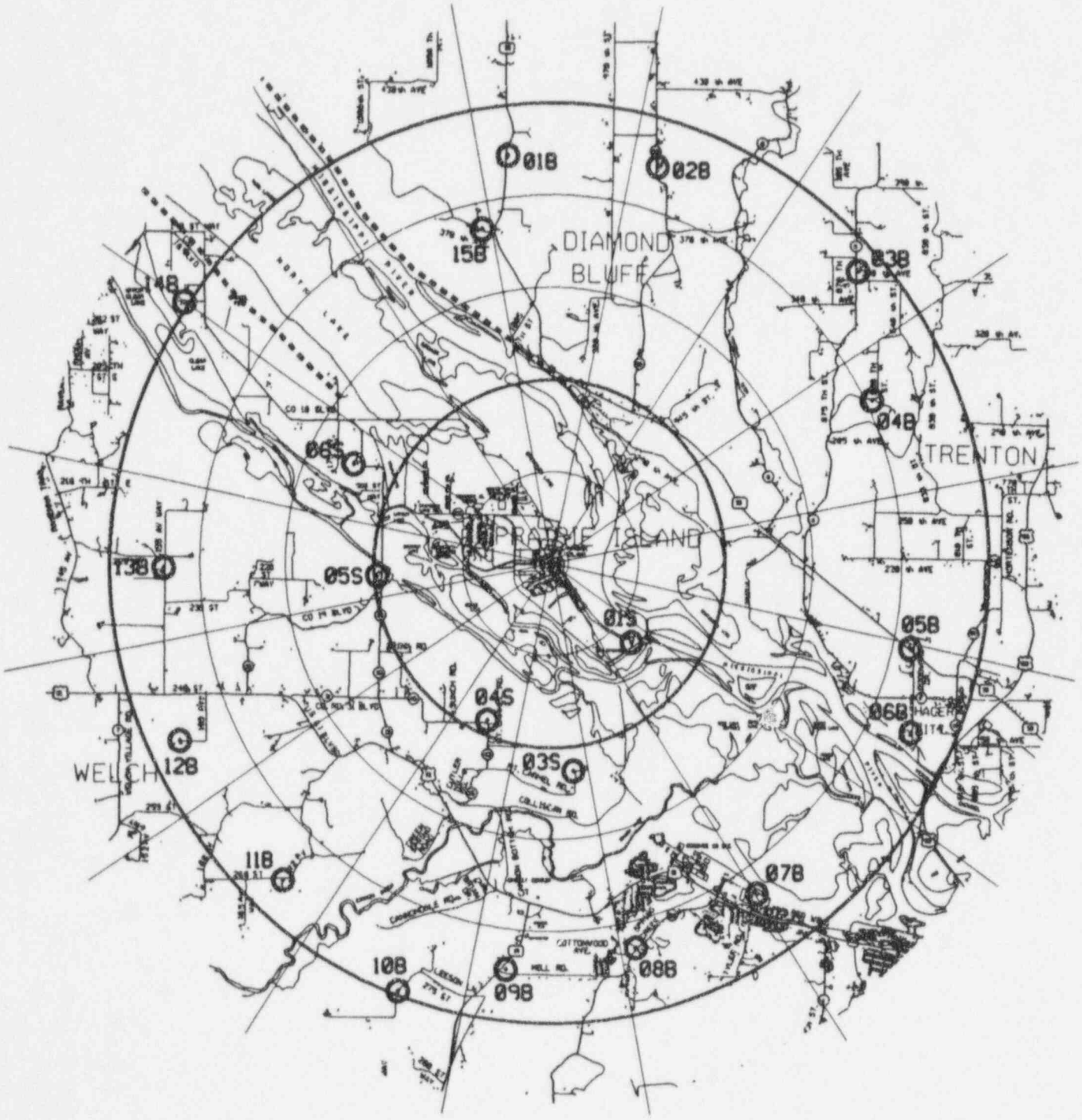
MONITORING LEGEND:

⊙ N.S.P. TLD POINTS

TLD02.DGN

TLD LOCATIONS

FIVE MILE RADIUS

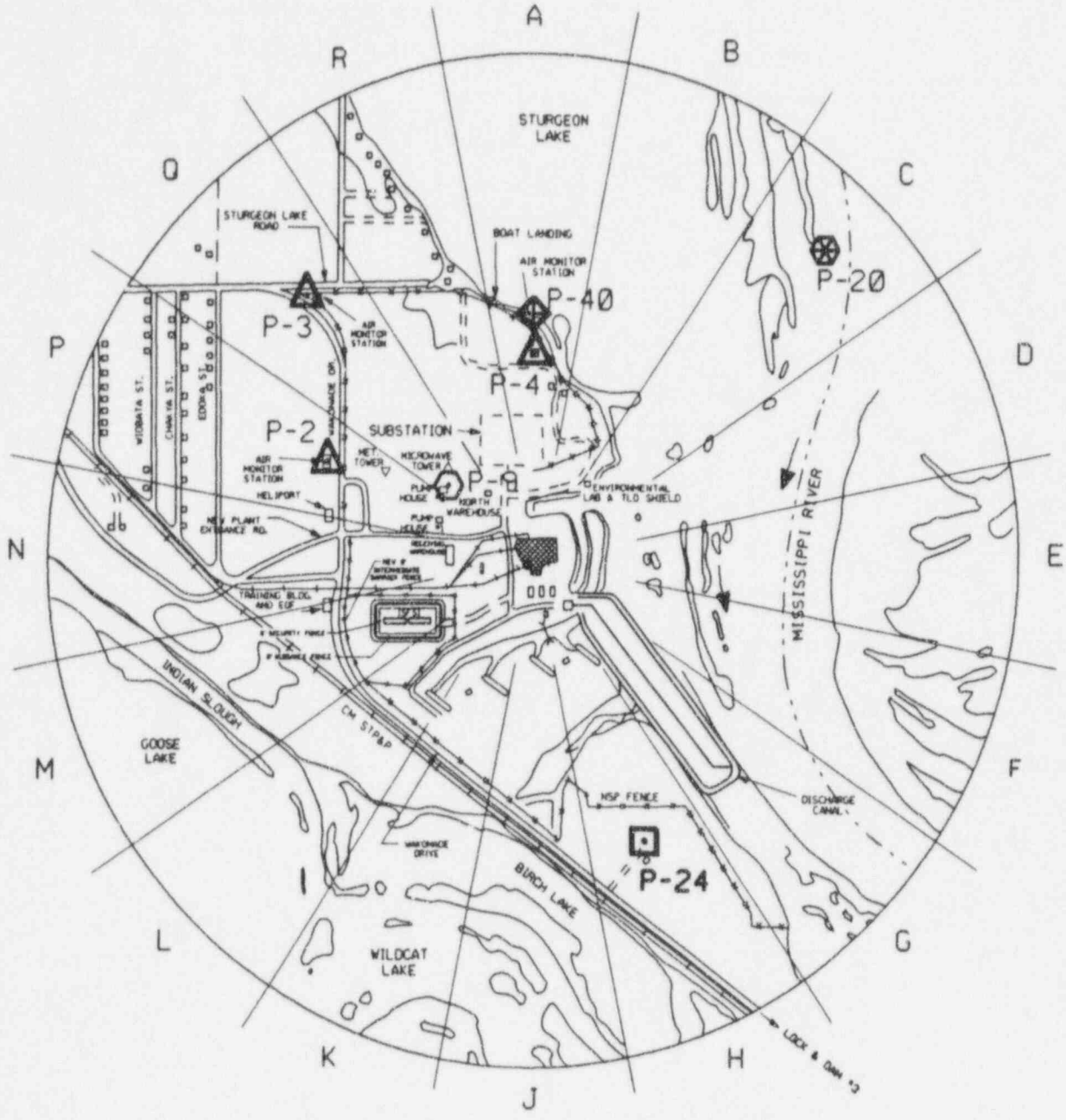


MONITORING LEGEND:

⊙ N.S.P. TLD POINTS

TLD03.DGN

ENVIRONMENTAL SAMPLING POINTS
ONE MILE RADIUS



PLANT AREA ENLARGED PLAN [1.00 MILE RADIUS]

[NO SCALE]

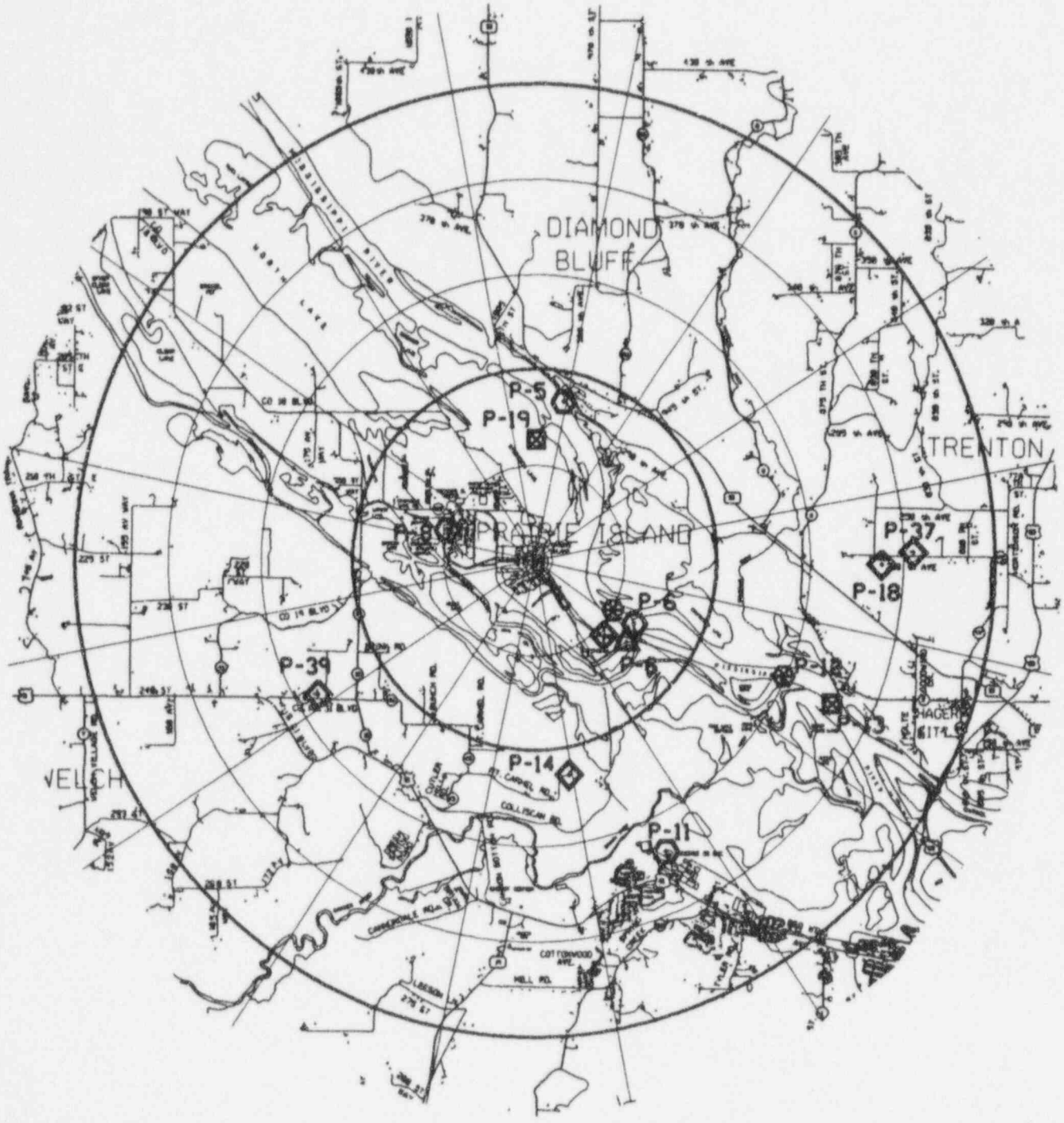
MONITORING LEGEND

- MILK SAMPLING POINT ID NUMBERS P-14, P-18, P-25, P-37, P-39
- AIR SAMPLING POINT ID NUMBERS P-1, P-2, P-3, P-4, P-6
- WATER SAMPLING POINT ID NUMBERS P-5, P-6, P-8, P-9, P-11, P-25
- VEGETATION / VEGETABLES ID NUMBERS P-24, P-38
- FISH SAMPLING POINT ID NUMBERS P-13, P-19
- INVERTEBRATES POINT ID NUMBERS P-6, P-40
- SEDIMENT SAMPLING POINT ID NUMBERS P-6, P-12, P-20

SAMP01.DGN

ENVIRONMENTAL SAMPLING POINTS

FIVE MILE RADIUS

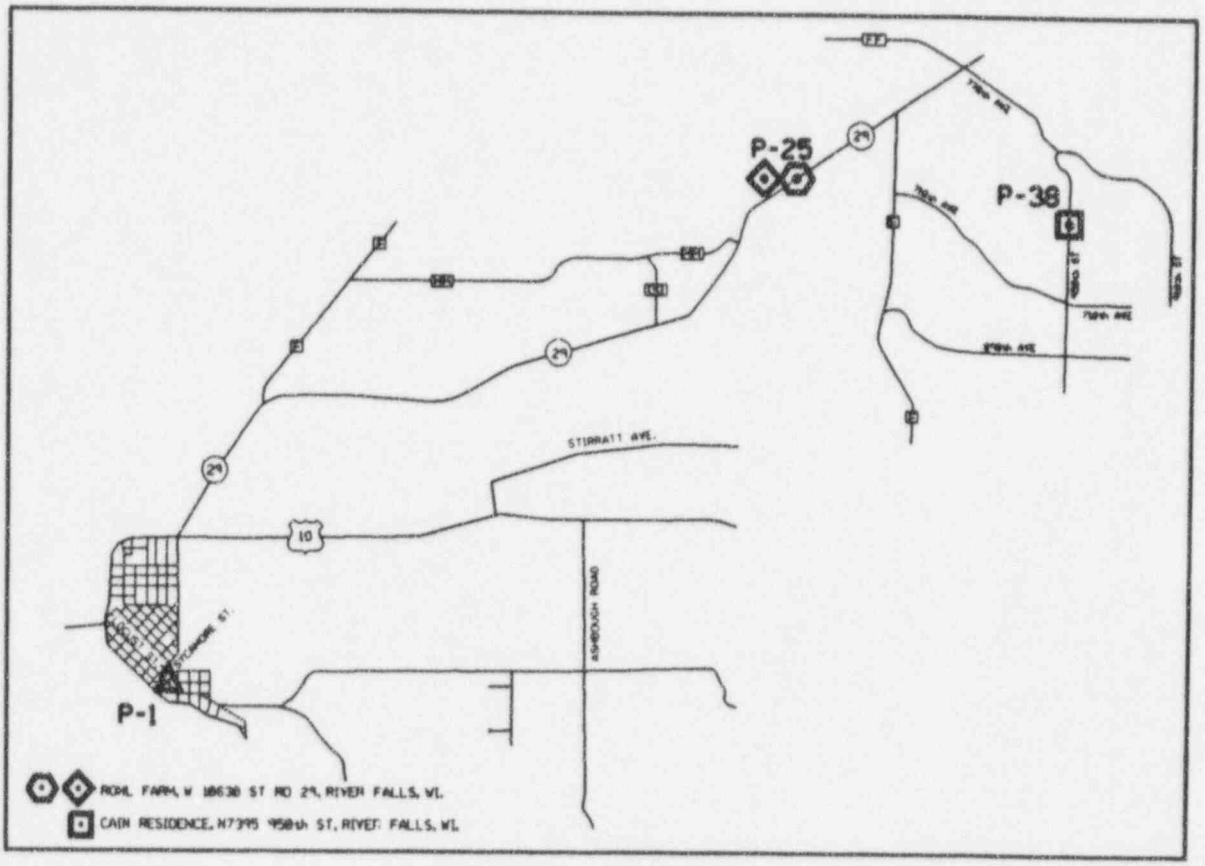


MONITORING LEGEND

- MILK SAMPLING POINT ID NUMBERS P-14, P-18, P-25, P-37, P-39
- AIR SAMPLING POINT ID NUMBERS P-1, P-2, P-3, P-4, P-6
- WATER SAMPLING POINT ID NUMBERS P-5, P-6, P-8, P-9, P-11, P-25
- VEGETATION / VEGETABLES ID NUMBERS P-24, P-38
- FISH SAMPLING POINT ID NUMBERS P-13, P-19
- INVERTEBRATES POINT ID NUMBERS P-6, P-48
- SEDIMENT SAMPLING POINT ID NUMBERS P-6, P-12, P-28

SAMP03.DGN

ENVIRONMENTAL SAMPLING POINTS



CONTROL POINTS
PRESCOTT, WISCONSIN

MONITORING LEGEND

- MILK SAMPLING POINT ID NUMBERS
  P-14, P-18, P-25, P-37, P-39
- AIR SAMPLING POINT ID NUMBERS
  P-1, P-2, P-3, P-4, P-6
- WATER SAMPLING POINT ID NUMBERS
  P-5, P-7, P-8, P-9, P-11, P-25
- VEGETATION / VEGETABLES ID NUMBERS
  P-24, P-38

SAMP02.DGN