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REPORT
TO
IES UTILITIES, INC.
CEDAR RAPIDS, IOWA

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM (REMP)
FOR THE
DUANE ARNOLD ENERGY CENTER
CEDAR RAPIDS, IOWA
DOCKET NO. 50-331

ANNUAL REPORT - PART I
SUMMARY AND INTERPRETATION
JANUARY - DECEMBER 1995

FOR SUBMITTAL TO
THE NUCLEAR REGULATORY COMMISSION

PREPARED AND SUBMITTED
BY
TELEDYNE ISOTOPES MIDWEST LABORATORY
PROJECT NO. 8001

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PREFACE

The staff members of the Teledyne Isotopes Midwest Laboratory were responsible fcr the acquisition of data presented in this report, with the exception of Appendices D and E, which were completed by DAEC personnel. All environmental samples, with the exception of aquatic, were collected by personnel of DAEC. Aquatic samples were collected by University of Iowa Hygenic Laboratory personnel.

The report was prepared by L. G. Huebner, Manager of the TIML, with the exception of Appendices D and E, which were prepared by DAEC personnel. He was assisted in the report preparation by other staff members of the laboratory.

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1.0 INTRODUCTION

This report summarizes and interprets results of the Radiological Environmental Monitoring Program conducted by Teledyne Isotopes Midwest Laboratory at the Duane Arnold Energy Center, Palo, Iowa, 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.

Tabulation of the individual analyses made during the year are included in Part II of this report.

Duane Arnold Energy Center (DAEC) is located in Linn County on the Cedar River, Iowa, and is operated by IES Utilities, Inc. The Duane Arnold Energy Center is a 565.7 MW(e) boiling water reactor. Initial criticality was attained on 23 March 1974. The reactor reached 100% power on 12 August 1974. Commercial operation began on 1 February 1975.

2.0 SUMMARY

The Radiological Environmental Monitoring Program required by the U.S. Nuclear Regulatory Commission (NRC) Technical Specifications for the Duane Arnold Energy Center 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 Duane Arnold Energy Center. No effect on the environment due to the operation of the Duane Arnold Energy Center is indicated.

3.0 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

3.1 Program Design and Data Interpretation

The purpose of the Radiological Environmental Monitoring Program at the Duane Arnold Energy Center (DAEC) 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; and

(4) Industrial and medical radioactive waste.

In interpreting the data, effects due to the DAEC operation 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 DAEC 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 station 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 DAEC site. The DAEC's monitoring program includes analyses for strontium-90 and iodine-131, which are fission products, and tritium, which is produced by cosmic rays, atmospheric nuclear detonations, and also by nuclear power plants. Most samples are also analyzed for gamma-emitting isotopes with results for the following groups quantified: zirconium-95, cesium-137, and cerium-144. These 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 ten (10) days after reactor shutdown. On the other hand, ten (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). 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 environment has been atmospheric nuclear testing. Nuclides of the next group, manganese-54, cobalt-58 and-60, and zinc-65, are activation products and arise from activation of corrosion products. They are typical components of nuclear power plant effluents, but are not produced in significant quantities by nuclear detonations.

3.1 Program Design and Data Interpretation (continued)

Nuclides of the final group, beryllium-7, which is of cosmogenic origin, and potassium-40, a naturally-occurring isotope, were chosen as calibration monitors and should not be considered radiological impact indicators.

Characteristic properties of isotopes quantified in gamma-spectroscopic analysis are presented in Table 5.1. Other means of distinguishing sources of environmental radiation can be employed in interpreting the data. Current radiation levels can be compared with previous levels, including those measured before the Plant became operational. Results of the DAEC'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 environmental radiological monitoring program at the DAEC is summarized in Table 5.2 and is briefly reviewed below. Table 5.3 defines the sampling location codes used in Table 5.2 and specifies for each location its type (indicator or control) and its distance, direction, and sector relative to the reactor site. The types of samples collected at each location and the frequency of collections are presented in Table 5.4 using codes defined in Table 5.5.

To monitor the air environment, airborne particulates are collected on membrane filters by continuous pumping at twelve (12) locations. Also, airborne iodine is collected by continuous pumping through charcoal filters at six (6) of these locations. Nine (9) of the twelve (12) locations are indicators and three (3) are controls (D-1, D-2, and D-13). Filters are changed and counted weekly. Particulate filters are analyzed for gross beta activity. If gross beta activity exceeds 10 times the yearly mean of the control samples gamma isotopic analysis is performed. Quarterly composites of airborne particulates from each location are gamma scanned on a germanium detector.

Charcoal filters are analyzed weekly for I-131 on all samples.

Ambient gamma radiation is monitored at twelve (12) air sampling locations. In addition, gamma radiation is monitored at thirty-two (32) special locations: seventeen (17) in a circle within 0.5 mi. radius of the DAEC stack; six (6) in 22.5° sectors within 1 mi. of the DAEC stack; and nine (9) in 22.5° sectors between 1 and 3 miles of the DAEC stack. Two TLDs are placed at each location and are exchanged and analyzed quarterly.

Precipitation samples are collected monthly from one location and analyzed for gamma-emitting isotopes. Quarterly composites are analyzed for tritium.

Milk samples are collected monthly from six (6) locations during the non-grazing season, October through April, and biweekly during the grazing season, May 1 through September 30. One location is a control (D-105) and the rest are indicators. All samples are analyzed for I-131 and gamma-emitting isotopes.

For additional monitoring of the terrestrial environment, grain, hay and broad leaf vegetation samples are collected annually, as available, from nine (9) locations: one control (D-105) and eight (8) indicators (D-57, D-58, D-63, D-72, D-93, D-94, D-106

Program Description (continued)

and D-16). Grain, hay and broad leaf (green leafy) vegetation samples are analyzed for gamma-emitting isotopes and at least one broad leaf vegetation is analyzed for iodine-131. If cattle are slaughtered for home use, a meat sample is collected annually, during or immediately following a grazing period from animals grazing on-site. The sample is analyzed for gamma-emitting isotopes. Also, potable ground water is collected quarterly from a treated municipal water system (D-53), the inlet to the municipal water treatment system (D-54) and four (4) additional ground water locations (D-55, D-57, D-58, and D-72). The samples are analyzed for gross beta and tritium. If gross beta activity exceeds 10 times the yearly mean of the control samples, gamma isotopic, strontium-89 and strontium-90 analyses are performed.

Soil samples are collected once per year at two indicator locations (D-15 and D-16). The samples are analyzed for strontium-90 and gamma-emitting isotopes.

Surface water is collected monthly from five (5) river, pond and sewage effluent locations, one (1) control (D-49) and four (4) indicator (D-50, D-51, D-99, and D-107). All monthly samples are analyzed for gamma-emitting isotopes. Tritium analyses are performed on quarterly composites from each location. In addition, all samples from Location D-107 (plant sewage discharge) are analyzed for K-40 by flame photometry.

The aquatic environment is also monitored by upstream and downstream (D-49 and D-61) semiannual collections of fish. River bottom sediment is also collected semiannually at the plant's intake and discharge (D-50 and D-51) and downstream of the sewage plant (D-107). The samples are analyzed for gamma-emitting isotopes.

3.3 Program Execution

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

(1) No air particulate/air iodine sample was available for the week ending July 20, 1995 from location D-2 due to failure of the air sampler pump.

(2) No air particulate sample was available for the week ending September 28, 1995 from location D-11. The sample was lost in the wind.

(3) TLDs were missing from location D-91 for the second quarter of 1995. The TLDs were lost in the field.

(4) No milk was available from location D-93 in January, 1995. The goat was dry.

(5) No milk was available from location D-101 from January through May, 1995 and the week of June 13, 1995. The goat was dry. No milk was collected from location D-101 the week of July 11, 1995. The sample was not available.

(6) No milk was collected from location D-105 for the week of July 11, 1995. The sample was not available.

3.4 Laboratory Procedures

All iodine-131 analyses in milk 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 high resolution germanium detectors. Levels of iodine-131 in vegetation were determined by gamma spectrometry. Levels of airborne iodine-131 in charcoal samples were measured by gamma spectrometry.

Tritium levels were determined by the liquid scintillation technique.

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

Details of TIML's QA program are presented elsewhere (Teledyne Isotopes Midwest Laboratory, 1992). The TIML QA Program includes participation in the Interlaboratory Comparison (Crosscheck) Program. Results obtained in the crosscheck program are presented in Appendix A.

3.5 Program Modifications

The milk animal sampling location (D-72) was dropped from the program in April, 1995.

4.0 RESULTS AND DISCUSSION

All of the scheduled collections and analyses were made on schedule except those listed in Table 5.6.

All results are summarized in Table 5.7 in a format recommended by the Nuclear Regulatory Commission in Regulatory Guide 4.8. For each type of analysis of each sample medium, this table lists the mean and range of all indicator and control locations. The locations with the highest mean and range are also shown.

The tabulated results of all measurements made in 1995 are not included in this section, although references to these results will be made in the discussion. The complete tabulation of the 1995 results is contained in Part II of the 1995 Annual Report on the Environmental Radiological Monitoring Program for the Duane Arnold Energy Center.

4.1 Atmospheric Nuclear Detonations and Nuclear Accidents

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

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

4.2 Program Findings

Results obtained show background levels of radioactivity in the environmental samples collected in 1995.

Airborne Particulates

The average annual gross beta concentration in airborne particulates was similar at indicator and control locations (0.025 and 0.024 pCi/m^3, respectively) and was similar to levels in 1984 (0.025 and 0.026 pCi/m^3, respectively), 1985 (0.024 pCi/m^3 at both locations), in 1986 (0.024 pCi/m^3, at both indicator and control locations), in 1987 (0.024 and 0.026 pCi/m^3, respectively), in 1988 (0.026 and 0.028 pCi/m^3, respectively), in 1989 (0.026 and 0.029 pCi/m^3, respectively), in 1990 (0.022 and 0.024 pCi/m^3, respectively), in 1991 (0.023 and 0.022 pCi/m^3, respectively), in 1992 (0.022 and 0.023 pCi/m^3, respectively), in 1993 (0.022 and 0.023 pCi/m^3, respectively) and in 1994 (0.023 and 0.024 pCi/m^3, respectively). The average of 0.024 pCi/m^3 for 1986 does not include the results from May 15 to June 12, 1986, which were influenced by the accident at Chernobyl.

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 did not occur from 1983 through 1995. In 1986, the spring peak could not be identified because it was overshadowed by the releases of radioactivity from Chernobyl. 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

Airborne Particulates (continued)

in all samples. All other gamma-emitting isotopes were below their respective LLD limits. No plant effect was indicated.

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.

Ambient Radiation (TLDs)

At twelve (12) air sampling locations, the TLD readings averaged 13.9 mR/quarter at both indicator and control locations. At locations within a 0.5 mile, 1.0 mile, and 3.0 mile radius of the stack, the measurements averaged 16.9 mR/quarter, 17.2 mR/quarter, and 15.0 mR/quarter, respectively. The average for all locations was 15.7 mR/quarter. This is slightly lower than the estimated average natural background radiation for Middle America, 19.5 mR/quarter, which is based on data on Pages 71 and 108 of the report, "Natural Background Radiation in the United States" (National Council on Radiation Protection and Measurements, 1975). The terrestrial absorbed dose (uncorrected for structural and body shielding) ranges from 8.8 to 18.8 mrad/quarter and averages 11.5 mrad/quarter for Middle America. Cosmic radiation and cosmogenic radionuclides contribute 8.0 mrad/quarter for a total average of 19.5 mrad/quarter. No plant effect was indicated.

Precipitation

In precipitation, the tritium concentration was below the LLD of 330 pCi/L in all samples. No gamma-emitting isotopes were detected. No plant effect was indicated.

Milk

Iodine-131 results were below the detection limit of 1.0 pCi/L in all samples.

No gamma-emitting isotopes, except naturally occurring potassium-40, were detected in any milk samples. This is consistent with the finding 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.

Ground Water

The annual mean for gross beta activity measured 3.1 pCi/L and was similar to the levels observed in 1980 through 1994. The location with the highest mean (7.4 pCi/L) was D-58, a farm 1.0 mile distant from the plant. Tritium was below the LLD of 330 pCi/L in all samples. No plant effect was indicated.

Vegetation

Iodine-131 results in broadleaf vegetation were below the LLD level of 0.023 pCi/g wet weight in all samples.

Except for potassium-40, which was observed in all vegetation samples (broadleaf, grain, and forage), all other gamma-emitting isotopes were below detection limits in all samples. No plant effect is indicated.

Soil

Strontium-90 was detected in both samples and averaged 0.044 pCi/g dry weight. Cesium-137 was detected in both samples at an average concentration of 0.21 pCi/g dry weight. Both strontium-90 and cesium-137 concentrations were similar to levels observed in 1987 (0.08 and 0.30 pCi/g dry weight, respectively), in 1988 (0.064 and 0.33 pCi/g dry weight, respectively), in 1989 (0.046 and 0.18 pCi/g dry weight, respectively), in 1990 (0.066 and 0.21 pCi/g dry weight, respectively), in 1991 (0.064 and 0.34 pCi/g dry weight, respectively), in 1992 (0.040 and 0.26 pCi/g dry weight, respectively), in 1993 (0.058 and 0.26 pCi/g dry weight, respectively) and in 1994 (0.040 and 0.27 pCi/g dry weight, respectively).

The only other gamma-emitting isotope detected was potassium-40 at an average concentration of 13.4 pCi/g dry weight. No plant effect on soil was indicated.

Surface Water

Tritium was below the LLD level of 330 pCi/L in all samples.

All gamma-emitting isotopes were below their respective LLDs.

K-40 was measured at one location, D-107 (sewage effluent). The concentration ranged from 13.0 to 29.4 pCi/L and averaged 19.6 pCi/L.

No plant effect on the radioactivity of surface water was indicated.

Fish

All gamma-emitting isotopes, except naturally-occurring potassium-40, in edible portions were below detection limits. The potassium-40 level was similar at both indicator and control locations (2.85 and 2.89 pCi/g wet weight, respectively). No plant effect on fish was indicated.

River Sediments

River sediments were collected in June and September, 1995, and analyzed for gamma-emitting isotopes. Cobalt-60 was detected in two samples from location D-107 (sewage effluent) at an average concentration of 0.10 pCi/g dry weight. Cesium-137 was detected at one indicator location at a concentration of 0.054 pCi/g dry weight. Potassium-40 ranged from 7.93 to 11.29 pCi/g dry weight and averaged 9.01 pCi/g dry weight.

All other gamma-emitting isotopes were below detection limits.

5.0 TABLES AND FIGURES

Table 5.1 Characteristic properties of isotopes quantified in gamma-spectroscopic analyses.

Designation	Comment	Isotope	Half-life[a]
I. Naturally Occurring			
A. Cosmogenic	Produced by interaction of cosmic rays with atmosphere	Be-7	53.2 d
B. Terrestrial	Primordial	K-40	1.26×10^9 y
II. Fission Products[b]	Nuclear detonations constitute the major environmental source		
A. Short-lived		I-131	8.04 d
		Ba-140	12.8 d
B. Other than Short-lived		Nb-95	35.15 d
		Zr-95	65 d
		Ru-103	39.35 d
		Ru-106	368.2 d
		Cs-134	2.061 y
		Cs-137	30.174 y
		Ce-141	32.5 d
		Ce-144	284.31 d
III. Activation Products	Typically found in nuclear power plant effluents	Mn-54	312.5 d
		Fe-59	45.0 d
		Co-58	70.78 d
		Co-60	5.26 y
		Zn-65	245 d

[a] Half-lives are taken from Appendix E of Environmental Quarterly, 1 January 1978, EML-334 (U. S. Department of Energy, 1978).

[b] Includes fission-product daughters.

Table 5.2 Sample collection and analysis program, 1995.

Expocure Pathway and/or Sample Type	Sampling Location: Sample Point	Sampling Location: Description	Sampling and Collection Frequency	Type and Frequency of Analysis
Airborne Particulates	1 2 3 5 6 7 8 10 11 13 15 16	Cedar Rapids (C) Marion (C) Hiawatha Palo Center Point Shellsburg Urbana Atkins Toddsville Alburnett (C) On-site North On-site South	Continuous operation of sampler with sample collection at least once per week or as required by dust loading	Analyze for gross beta activity more than 24 hours after filter change. Perform gamma isotopic analysis on each sample having gross beta activity greater than ten times the yearly mean of the control samples. Composite weekly samples to form a quarterly composite (by location). Analyze quarterly composite for gamma isotopic.
Airborne Iodine	2 5 7 8 11 15	Marion (C) Palo Shellsburg Urbana Toddville On-site North	Continuous operation of sampler with sample collection at least once per week.	Analyze each cartridge for iodine-131.
Ambient Radiation	1-3 5-8 10, 11 13,15 16 18-23, 28-32, 33-41 43-48 82-86, 91	Air Particulate Locations Within 0.5 mile of Stack Within 3.0 miles of Stack Within 1.0 mile of Stack	Two dosimeters continuously at each location. Both dosimeters are changed at least quarterly.	Read gamma radiation dose quarterly .
Surface Water	49 50 51 99 107	Lewis Access (C) Plant Intake (C) Plant Discharge Pleasant Creek Plant Sewage Dischange	Once per month.	Gamma isotopic analyses of each sample (by location). Composite monthly samples to form quarterly composite (by location). Analyze quarterly composite for tritium.

(C) denotes control location. All other locations are indicators.

Table 5.2 Sample collection and analysis program, 1995 (continued).

Exposure Pathway and/or Sample Type	Sampling Location: Sample Point	Sampling Location: Description	Sampling and Collection Frequency	Type and Frequency of Analysis
Ground Water (potable)	53 54 55 57, 58 72	Treated Municipal Water Inlet to Municipal Water Treatment System On-site well Wells off-site and within 4 km of DAEC	Grab sample at least once per quarter	Gross beta and tritium activity analysis on quarterly sample. If gross beta is greater than ten times the yearly mean of control samples, perform gamma isotopic and Sr-89 and Sr-90 analyses.
River Sediment	50 51 107	Plant Intake (C) Plant Discharge Sewage Effluent Canal	At least once every six months.	Gamma isotopic analysis of each sample.
Vegetation	16, 57, 58, 63, 72, 93, 94,106, 105 (C)	Farms that raise food crops	Annually at harvest time. One sample of each: grain, green leafy, and forage. At least one sample should be broadleaf vegetation.	Gamma isotopic analysis of edible portions. I-131 analysis on broadleaf vegetation.
Fish	49 61	Cedar River upstream of DAEC not influenced by effluent (C) Downstream of DAEC in influence of effluent	One sample per 6 months (once during January through July and once during August through December).	Gamma isotopic analysis on edible portions.
Milk[b]	105 63, 72, 93, 96 101	Control Farm near Amana, Iowa Dairy Farms within 10 miles of Site	At least once per two weeks during the grazing season. At least once per month during the non-grazing season.	<u>During the grazing season</u>: Gamma isotopic and iodine-131 analyses of each sample. <u>During the non-grazing season</u>: Gamma isotopic and iodine-131 analyses of each sample.

(C) denotes control location. All other locations are indicators.

Table 5.2 Sample collection and analysis program, 1995 (continued).

Exposure Pathway and/or Sample Type	Sampling Location: Sample Point	Sampling Location: Description	Sampling and Collection Frequency	Type and Frequency of Analysis
Precipitation		On-site	Monthly	Gamma isotopic on all samples. Tritium on quarterly composites.
Meat[c]		On-site	Annually	Gamma Isotopic
Soil	15, 16	On-site	Annually	Gamma Isotopic and Sr-90.

[a] Gamma isotopic analysis and analysis for gamma-emitting nuclides refer to high resolution gamma ray spectrum analysis. Any radionuclide detected at a concentration greater than the lower limit of detection (LLD) should be reported quantitatively; conversely, any radionuclide concentration less than the LLD should not be reported.

[b] The grazing season is considered to be May 1 through September 30.

[c] Meat was not collected in 1995; no animals slaughtered for home use.

Table 5.3 Sampling locations, Duane Arnold Energy Center.

Code	Type	Sampling Location		
		Sampling Point	Location Description	Distance and Direction from Site Stack
D-1	C	1	Cedar Rapids	11 mi @ 135°SE
D-2	C	2	Marion	11 mi @ 125°ESE
D-3		3	Hiawatha	7 mi @ 130°SE
D-5		5	Palo	3 mi @ 200°SSW
D-6		6	Center Point	7 mi @ 0°N
D-7		7	Shellsburg	6 mi @ 255°W
D-8		8	Urbana	10 mi @ 345°NW
D-10		10	Atkins	9 mi @ 210°SSW
D-11		11	Toddville	4 mi @ 90°E
D-13	C	13	Alburnett	9 mi @ 70°ENE
D-15		15	On-site, Northwest	0.5 mi @ 305°NW
D-16		16	On-site, South	0.5 mi @ 190°SSE
D-18		18		0.5 mi NNE
D-19		19		0.5 mi NE
D-20		20		0.5 mi ENE
D-21		21		0.5 mi ENE
D-22		22		0.5 mi E
D-23		23		0.5 mi ESE
D-28		28		0.5 mi WSW
D-29		29		0.5 mi W
D-30		30		0.5 mi WNW
D-31		31		0.5 mi NW
D-32		32		0.5 mi NNW
D-33		33		3.0 mi N
D-34		34		3.0 mi NNE
D-35		35		3.0 mi NE
D-36		36		3.0 mi ENE
D-37		37		3.0 mi E
D-38		38		3.0 mi ESE
D-39		39		3.0 mi SE
D-40		40		3.0 mi SSE
D-41		41		3.0 mi S
D-43		43		1.0 mi SSW
D-44		44		1.0 mi WSW
D-45		45		1.0 mi W
D-46		46		1.0 mi WNW
D-47		47		1.0 mi WNW
D-48		48		1.0 mi NW
D-49	C	49	Lewis Access, upstream of DAEC	4.0 mi NNW
D-50	C	50	Plant Intake	
D-51		51	Plant Discharge	
D-53		53	Treated Municipal Water	
D-54		54	Inlet to Municipal Water Treatment System	
D-55		55	On-site Well	

Table 5.3 Sampling locations, Duane Arnold Energy Center (continued).

Code	Type	Sampling Location: Sampling Point	Location Description	Distance and Direction from Site Stack
D-57		57	Farm (Off-site Well)	1.0 mi WSW
D-58		58	Farm (Off-site Well)	0.5 mi WSW-SW
D-61		61	0.5 mi downstream of plant discharge	
D-63		63	Farm	1.5 mi WNW
D-72		72	Farm	2.0 mi SSW
D-82		82		0.5 mi SE
D-83		83		0.5 mi SSE
D-84		84		0.5 mi S
D-85		85		0.5 mi SSW
D-86		86		0.5 mi SW
D-91		91		0.5 mi N
D-93		93	Farm	2.8 mi NNE
D-94		94	Farm	2.7 mi N
D-96		96	Farm	8.0 mi SSW
D-99		99	Pleasant Creek Lake	2.5 mi WNW
D-101		101	Farm	4.0 mi E
D-105	C	105	Farm	21.3 mi SSW
D-106		106	Farm	4.5 mi SE
D-107		107	Sewage Effluent Canal	On-site

"C" denotes control location. All other locations are indicators.

Table 5.4 Type and Frequency of collection.

Location	Location Type	Weekly	Monthly	Quarterly	Semiannually	Annually
D-1	C	AP		TLD		
D-2	C	AP, AI		TLD		
D-3		AP		TLD		
D-5		AP, AI		TLD		
D-6		AP		TLD		
D-7		AP, AI		TLD		
D-8		AP, AI		TLD		
D-10		AP		TLD		
D-11		AP, AI		TLD		
D-13	C	AP		TLD		
D-15		AP, AI		TLD		SO
D-16		AP		TLD		SO, [illegible]
D-18 through D-23				TLD		
D-28 through D-41				TLD		
D-43 through D-48				TLD		
D-49	C		SW		F	
D-50	C		SW		RS	
D-51			SW		RS	
D-53			WW			
D-54			WW			
D-55			WW			
D-57			WW			G
D-58			WW			G
D-61					F	
D-63			M			G
D-72			WW,M			G
D-82 through D-86				TLD		
D-91				TLD		
D-93			M			G
D-94			M			G
D-96			M			
D-99			SW			
D-101			M			
D-105	C		M			G
D-106			M			G
D-107			SW		RS	
On-site			P			ME

"C" denotes control location. All other locations are indicators.

Table 5.5. Sample codes used in 5.4.

Code	Description
AP	Airborne Particulates
AI	Airborne Iodine
TLD	Thermoluminescent Dosimeter
P	Precipitation
M	Milk
WW	Well Water
G	Vegetation
ME	Meat
SO	Soil
SW	Surface Water
F	Fish
RS	River Sediment

Table 5.6. Missed collections and analyses, Duane Arnold Energy Center, 1995.

Sample	Analysis	Location	Collection Date or Period	Comments
Milk	I-131, Gamma	D-93	01-04-95	Goat was dry.
Milk	I-131, Gamma	D-101	01-04-95	Goat was dry.
Milk	I-131, Gamma	D-101	02-07-95	Goat was dry.
Milk	I-131, Gamma	D-101	03-07-95	Goat was dry.
Milk	I-131, Gamma	D-101	04-04-95	Goat was dry.
Milk	I-131, Gamma	D-101	05-02-95	Goat was dry.
Milk	I-131, Gamma	D-101	05-16-95	Goat was dry.
Milk	I-131, Gamma	D-101	05-31-95	Goat was dry.
Milk	I-131, Gamma	D-101	06-13-95	Goat was dry.
TLD	Ambient Gamma	D-91	2nd Qtr., 1995	TLD lost in the field.
Milk	I-131, Gamma	D-101	07-11-95	Sample not available.
Milk	I-131, Gamma	D-105	07-11-95	Sample not available.
AP/AI	Gross Beta, I-131	D-2	07-20-95	Sampler pump failure.
AP	Gross Beta	D-11	09-28-95	Air filter lost in the wind.

Table 5.7 Radiological Environmental Program Summary.

Name of Facility	Duane Arnold Energy Center	Docket No.	50-331
Location of Facility	Linn, Iowa (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 Annual Mean		Control Locations Mean (F)[c] Range	Number Non-Routine Results[e]
					Location[d]	Mean (F)[c] Range[c]		
Airborne particulates (pCi/m^3)	GB	622	0.004	0.025 (467/467) (0.008-0.053)	D-5,6,10 All locations had identical means	0.026 (156/156) (0.011-0.053)	0.024 (155/155) (0.010-0.051)	0
	GS	48						
	Be-7		0.012	0.092 (36/36) (0.051-0.133)	D-6, Center Point, 7 mi. N	0.106 (4/4) (0.064-0.133)	0.093 (12/12) (0.059-0.120)	0
	Nb-95		0.0023	<LLD	-	-	<LLD	0
	Zr-95		0.0039	<LLD	-	-	<LLD	0
	Ru-103		0.0021	<LLD	-	-	<LLD	0
	Ru-106		0.012	<LLD	-	-	<LLD	0
	Cs-134		0.0018	<LLD	-	-	<LLD	0
	Cs-137		0.0020	<LLD	-	-	<LLD	0
	Ce-141		0.0046	<LLD	-	-	<LLD	0
	Ce-144		0.010	<LLD	-	-	<LLD	0
Airborne Iodine (pCi/m^3)	I-131	311	0.07	<LLD	-	-	<LLD	0
TLD, AP Locations (mR/quarter)	Gamma	48	1	13.9 (36/36) (7.8-18.7)	D-8, Urbana 10 mi. NW	17.9 (4/4) (16.8-18.7)	13.9 (12/12) (11.5-16.9)	0
TLD, within 0.5 mi of Stack (mR/quarter)	Gamma	67	1	16.9 (67/67) (12.5-21.3)	D-31, Onsite 0.5 mi. NW	19.8 (4/4) (19.0-21.3)	None	0
TLD, within 1.0 mi of Stack (mR/quarter)	Gamma	24	1	17.2 (24/24) (11.7-20.5)	D-44, 1.0 mi. WSW	19.0 (4/4) (17.1-20.5)	None	0
TLD, within 3.0 mi of Stack (mR/quarter)	Gamma	36	1	15.0 (36/36) (10.8-20.1)	D-37, 3.0 mi. E	17.4 (4/4) (15.8-20.1)	None	0
Precipitation[f] (pCi/L)	H-3	4	330	<LLD	-	-	None	0
	GS	12						
	Mn-54		7.9	<LLD	-	-	None	0
	Fe-59		26.9	<LLD	-	-	None	0
	Co-58		8.5	<LLD	-	-	None	0

Table 5.7 Radiological Environmental Program Summary.

Name of Facility: Duane Arnold Energy Center — Docket No.: 50-331

Location of Facility: Linn, Iowa (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 Annual Mean		Control Locations Mean (F)[c] Range	Number Non-Routine Results[e]
					Location[d]	Mean (F)[c] Range[c]		
Precipitation[f] (pCi/L) *(continued)*	Co-60		6.7	<LLD	-	-	None	0
	Zn-65		15.1	<LLD	-	-	None	0
	Nb-95		9.7	<LLD	-	-	None	0
	Zr-95		20.0	<LLD	-	-	None	0
	I-131		25.2	<LLD	-	-	None	0
	Cs-134		8.1	<LLD	-	-	None	0
	Cs-137		8.8	<LLD	-	-	None	0
	Ba-140		55.8	<LLD	-	-	None	0
	La-140		11.2	<LLD	-	-	None	0
Milk (pCi/L)	I-131	82	1.0	<LLD	-	-	<LLD	0
	GS	82						
	K-40		100	1490 (65/65) (1140-1930)	D-101, Farm 4.0 mi. E	1670 (9/9) (1350-1930)	1410 (17/17) (1270-1650)	0
	Cs-134		15	<LLD	-	-	<LLD	0
	Cs-137		18	<LLD	-	-	<LLD	0
	Ba-140		60	<LLD	-	-	<LLD	0
	La-140		15	<LLD	-	-	<LLD	0
Ground Water (pCi/L)	GB	24	0.8	3.1 (20/24) (0.9-9.6)	D-58, Farm 1.0 mi. WSW-SW	7.4 (4/4) (6.5-9.6)	None	0
	H-3	24	330	<LLD	-	-	None	0
Broadleaf Vegetation (pCi/g wet)	I-131	5	0.023	<LLD	-	-	<LLD	0
	GS	5						
	K-40		0.5	2.48 (4/4) (2.08-3.23)	D-105, Farm 21.3 mi. SSW	3.54 (1/1)	3.54 (1/1)	0
	Mn-54		0.015	<LLD	-	-	<LLD	0
	Co-58		0.029	<LLD	-	-	<LLD	0
	Co-60		0.013	<LLD	-	-	<LLD	0
	Nb-95		0.018	<LLD	-	-	<LLD	0
	Zr-95		0.026	<LLD	-	-	<LLD	0
	Ru-103		0.017	<LLD	-	-	<LLD	0

Table 5.7 Radiological Environmental Program Summary.

Name of Facility: Duane Arnold Energy Center   Docket No.: 50-331
Location of Facility: Linn, Iowa (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 Annual Mean Location[d]	Mean (F)[c] Range[c]	Control Locations Mean (F)[c] Range	Number Non-Routine Results[e]
Broadleaf Vegetation (pCi/g wet) *(continued)*	Ru-106	0.13	<LLD	-	-	<LLD	0
	Cs-134	0.016	<LLD	-	-	<LLD	0
	Cs-137	0.016	<LLD	-	-	<LLD	0
	Ce-141	0.031	<LLD	-	-	<LLD	0
	Ce-144	0.15	<LLD	-	-	<LLD	0
Vegetation (Grain) (pCi/g wet)	GS 9						
	K-40	0.5	4.08 (8/8) (2.27-11.42)	D-16, Onsite 0.5 mi. SSE	11.42 (1/1)	3.32 (1/1)	0
	Mn-54	0.018	<LLD	-	-	<LLD	0
	Co-58	0.015	<LLD	-	-	<LLD	0
	Co-60	0.022	<LLD	-	-	<LLD	0
	Nb-95	0.025	<LLD	-	-	<LLD	0
	Zr-95	0.035	<LLD	-	-	<LLD	0
	Ru-103	0.021	<LLD	-	-	<LLD	0
	Ru-106	0.13	<LLD	-	-	<LLD	0
	Cs-134	0.019	<LLD	-	-	<LLD	0
	Cs-137	0.024	<LLD	-	-	<LLD	0
	Ce-141	0.032	<LLD	-	-	<LLD	0
	Ce-144	0.12	<LLD	-	-	<LLD	0
Vegetation (Forage) (pCi/g wet)	GS 8						
	K-40	0.5	13.65 (7/7) (10.86-16.12)	D-106, Farm 4.5 mi. SE	16.12 (1/1)	15.13 (1/1)	0
	Mn-54	0.045	<LLD	-	-	<LLD	0
	Co-58	0.050	<LLD	-	-	<LLD	0
	Co-60	0.044	<LLD	-	-	<LLD	0
	Nb-95	0.035	<LLD	-	-	<LLD	0
	Zr-95	0.11	<LLD	-	-	<LLD	0
	Ru-103	0.045	<LLD	-	-	<LLD	0
	Ru-106	0.40	<LLD	-	-	<LLD	0
	Cs-134	0.035	<LLD	-	-	<LLD	0

Table 5.7 Radiological Environmental Program Summary.

Name of Facility: Duane Arnold Energy Center — Docket No. 50-331

Location of Facility: Linn, Iowa (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 Annual Mean		Control Locations Mean (F)[c] Range	Number Non-Routine Results[e]
					Location[d]	Mean (F)[c] Range[c]		
Vegetation - Forage (pCi/g wet) *(continued)*	Cs-137		0.056	<LLD	-	-	<LLD	0
	Ce-141		0.063	<LLD	-	-	<LLD	0
	Ce-144		0.24	<LLD	-	-	<LLD	0
Soil (pCi/g dry)	Sr-90	2	0.01	0.044 (2/2) (0.036-0.051)	D-15, Onsite 0.5 mi. NW	0.051 (1/1)	None	0
	GS	2						
	K-40		0.5	13.40 (2/2) (10.34-16.46)	D-15, Onsite 0.5 mi. NW	16.46 (1/1)	None	0
	Mn-54		0.037	<LLD	-	-	None	0
	Co-58		0.051	<LLD	-	-	None	0
	Co-60		0.036	<LLD	-	-	None	0
	Nb-95		0.050	<LLD	-	-	None	0
	Zr-95		0.078	<LLD	-	-	None	0
	Ru-103		0.042	<LLD	-	-	None	0
	Ru-106		0.27	<LLD	-	-	None	0
	Cs-134		0.070	<LLD	-	-	None	0
	Cs-137		0.060	0.21 (2/2) (0.20-0.22)	D-16, Onsite 0.5 mi. SSE	0.22 (1/1)	None	0
	Ce-141		0.079	<LLD	-	-	None	0
	Ce-144		0.28	<LLD	-	-	None	0
Surface Water (pCi/L)	H-3	20	330	<LLD	-	-	<LLD	0
	K-40	12	0.5	19.6 (12/12) (12.98-29.41)	D-107, Onsite Sewage Effluent	19.6 (12/12) (12.98-29.41)	None	0
	I-131	60	15	<LLD	-	-	<LLD	0
	GS	60						
	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

Table 5.7 Radiological Environmental Program Summary.

Name of Facility Duane Arnold Energy Center — Docket No. 50-331
Location of Facility Linn, Iowa (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 Annual Mean: Location[d]	Location with Highest Annual Mean: Mean (F)[c] Range[c]	Control Locations Mean (F)[c] Range	Number Non-Routine Results[e]
Surface Water (pCi/L) *(continued)*	Nb-95	15	<LLD	-	-	<LLD	0
	Zr-95	30	<LLD	-	-	<LLD	0
	Cs-134	15	<LLD	-	-	<LLD	0
	Cs-137	18	<LLD	-	-	<LLD	0
	Ba-140	60	<LLD	-	-	<LLD	0
	La-140	15	<LLD	-	-	<LLD	0
River Sediments (pCi/g dry)	GS 6						
	K-40	1.0	8.94 (4/4) (7.93-11.29)	D-51, Plant Discharge	9.92 (2/2) (8.56-11.29)	9.16 (2/2) (8.80-9.51)	0
	Mn-54	0.039	<LLD	-	-	<LLD	0
	Co-58	0.033	<LLD	-	-	<LLD	0
	Co-60	0.023	0.10 (2/4) (0.057-0.14)	D-107, Onsite Sewage Effluent	0.10 (2/2) (0.057-0.14)	<LLD	0
	Nb-95	0.11	<LLD	-	-	<LLD	0
	Zr-95	0.065	<LLD	-	-	<LLD	0
	Ru-103	0.063	<LLD	-	-	<LLD	0
	Ru-106	0.20	<LLD	-	-	<LLD	0
	Cs-134	0.038	<LLD	-	-	<LLD	0
	Cs-137	0.032	0.054 (1/4)	D-51, Plant Discharge	0.054 (1/2)	<LLD	0
	Ce-141	0.11	<LLD	-	-	<LLD	0
	Ce-144	0.19	<LLD	-	-	<LLD	0
Fish (Edible Portions) (pCi/g wet)	GS 8						
	K-40	0.5	2.85 (4/4) (2.64-3.08)	D-49, Lewis Access 4.0 mi. upstream of discharge	2.89 (4/4) (2.42-3.35)	2.89 (4/4) (2.42-3.35)	0
	Mn-54	0.021	<LLD	-	-	<LLD	0
	Co-58	0.022	<LLD	-	-	<LLD	0
	Co-60	0.024	<LLD	-	-	<LLD	0
	Fe-59	0.049	<LLD	-	-	<LLD	0
	Zn-65	0.036	<LLD	-	-	<LLD	0

Table 5.7 Radiological Environmental Program Summary.

Name of Facility Duane Arnold Energy Center   Docket No. 50-331
Location of Facility Linn, Iowa   Reporting Period January - December 1995
(County, State)

Sample Type (Units)	Type and Number of Analyses[a]	LLD[b]	Indicator Locations Mean (F)[c] Range[c]	Location with Highest Annual Mean		Control Locations Mean (F)[c] Range	Number Non-Routine Results[e]
				Location[d]	Mean (F)[c] Range[c]		
Fish (Edible Portions) (pCi/g wet) *(continued)*	Nb-95	0.024	<LLD	-	-	<LLD	0
	Zr-95	0.040	<LLD	-	-	<LLD	0
	Ru-103	0.021	<LLD	-	-	<LLD	0
	Ru-106	0.14	<LLD	-	-	<LLD	0
	Cs-134	0.023	<LLD	-	-	<LLD	0
	Cs-137	0.020	<LLD	-	-	<LLD	0
	Ce-141	0.058	<LLD	-	-	<LLD	0
	Ce-144	0.12	<LLD	-	-	<LLD	0

a GB = gross beta; GS = gamma scan.

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

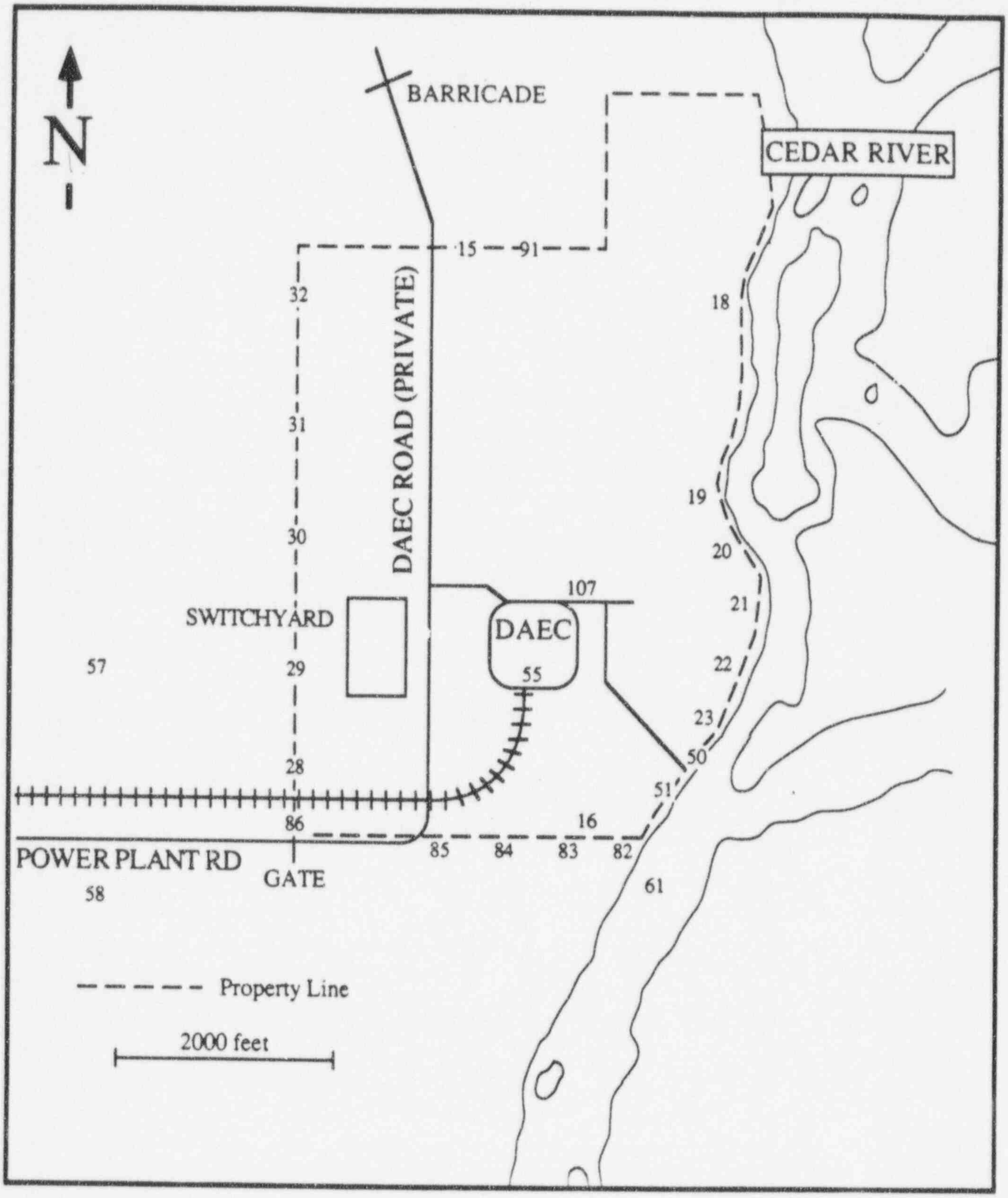
c Mean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parentheses (F).

d Locations are specified by: (1) Name and code (Table 5.3); and (2) distance, direction, and sector relative to reactor site.

e Non-routine results are those which exceed ten times the control station value for the location. If a control station value is not available, the result is considered non-routine if it exceeds ten times the preoperational value for the location.

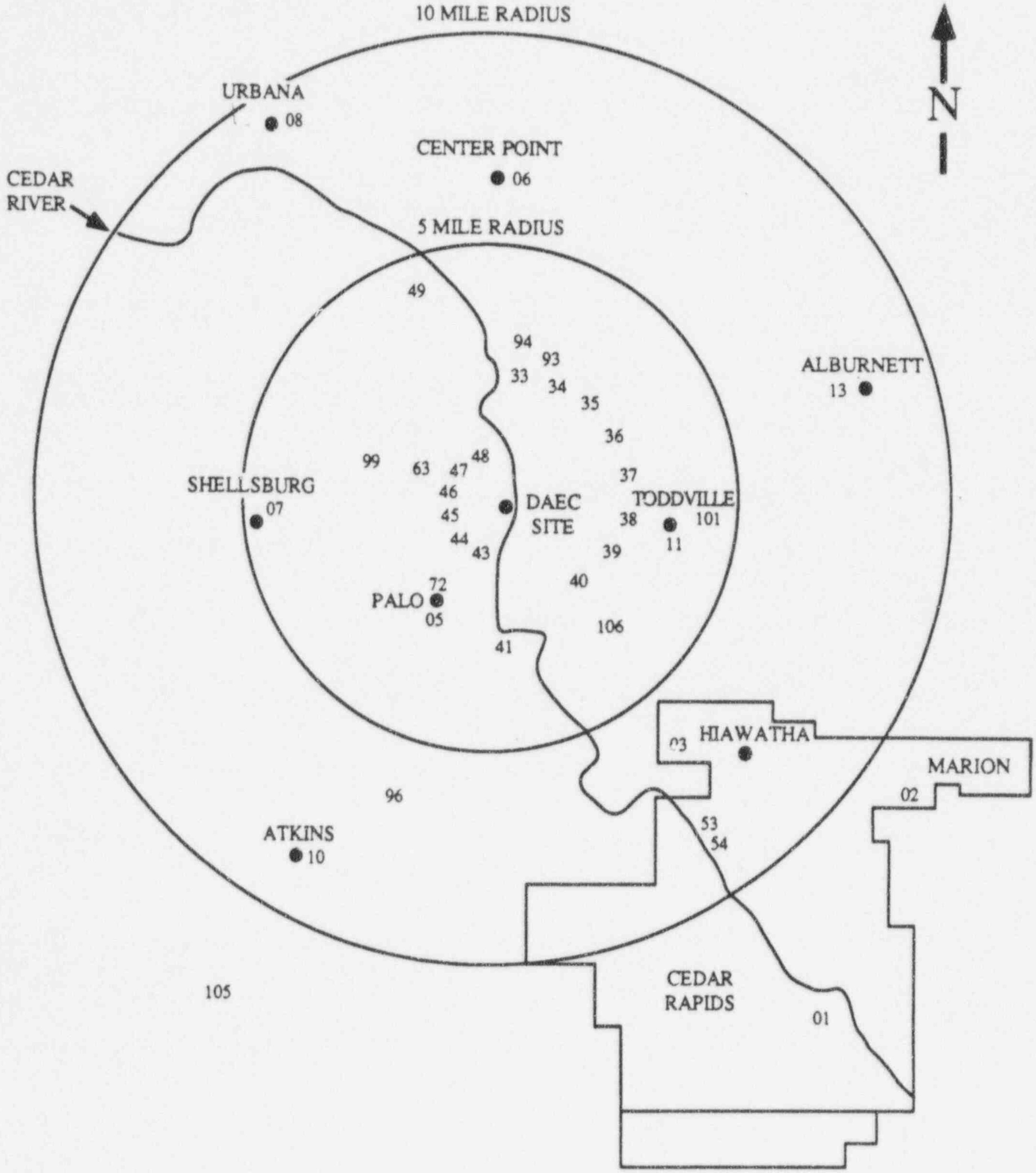
f Two precipitation results were eliminated from the calculation for gamma LLDs due to low sample volumes.

Figure 5.1 Radiological Environmental Monitoring Program Sampling Stations near the Duane Arnold Energy Center.



See Table 5.3 for sampling locations and Table 5.4 for Type and Frequency of collection.

Figure 5.2 Radiological Environmental Monitoring Program Sampling Stations Outside 0.5 Miles.



See Table 5.3 for sampling locations and Table 5.4 for Type and Frequency of collection.

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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 know 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	 Known Value ± 2 Sigma	 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	Known Value ± 2 Sigma	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.

<u>7th International Intercomparison</u>

115-7B	LiF-100 Chips	Jun, 1984	Field	71.5 ± 2.6	75.8 ± 6.0	75.1 ± 29.8
115-7B	LiF-100 Chips	Jun, 1984	Lab, Co-60	84.8 ± 6.4	79.9 ± 4.0	77.9 ± 27.6
115-7B	LiF-100 Chips	Jun, 1984	Lab, Cs-137	78.8 ± 1.6	75.0 ± 3.8	73.0 ± 22.2

Seventh International Intercomparison of Environmental Dosimeters conducted in the spring and summer of 1984 at Las Vegas, Nevada, and sponsored by the U.S. Department of Energy, The Nuclear Regulatory Commission, and the U.S. Environmental Protection Agency.

<u>7th International Intercomparison</u>

115-7C	$CaSO_4$: Dy Cards	Jun, 1984	Field	76.8 ± 2.7	75.8 ± 6.0	75.1 ± 29.8
115-7C	$CaSO_4$: Dy Cards	Jun, 1984	Lab, Co-60	82.5 ± 3.7	79.9 ± 4.0	77.9 ± 27.6
115-7C	$CaSO_4$: Dy Cards	Jun, 1984	Lab, Cs-137	79.0 ± 3.2	75.0 ± 3.8	73.0 ± 22.2

Seventh International Intercomparison of Environmental Dosimeters conducted in the spring and summer of 1984 at Las Vegas, Nevada, and sponsored by the U.S. Department of Energy, The Nuclear Regulatory Commission, and the U.S. Environmental Protection Agency.

<u>8th International Intercomparison</u>

115-8A	LiF-100 Chips	Jan, 1986	Field, Site 1	29.5 ± 1.4	29.7 ± 1.5	28.9 ± 12.4
115-8A	LiF-100 Chips	Jan, 1986	Field, Site 2	11.3 ± 0.8	10.4 ± 0.5	10.1 ± 9.1
115-8A	LiF-100 Chips	Jan, 1986	Lab, Cs-137	13.7 ± 0.9	17.2 ± 0.9	16.2 ± 6.8

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

<u>8th International Intercomparison</u>

115-8B	LiF-100 Chips	Jan, 1986	Field, Site 1	32.3 ± 1.2	29.7 ± 1.5	28.9 ± 12.4
115-8B	LiF-100 Chips	Jan, 1986	Field, Site 2	9.0 ± 1.0	10.4 ± 0.5	10.1 ± 9.0
115-8B	LiF-100 Chips	Jan, 1986	Lab, Cs-137	15.8 ± 0.9	17.2 ± 0.9	16.2 ± 6.8

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

<u>8th International Intercomparison</u>

115-8C	$CaSO_4$: Dy Cards	Jan, 1986	Field, Site 1	32.2 ± 0.7	29.7 ± 1.5	28.9 ± 12.4

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 Stat University and sponsored by the U.S. Department of Energy and the Idaho Stat 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).

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

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

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

Lab Code	TLD Type	Date	Measurement	mR 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	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	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)		Acceptance Criteria (4.66 Sigma)
				LLD	Activity[b]	
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.

			Concentration in pCi/L[a]		
Lab Codes[b]	Sample Date	Analysis	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.[illegible]155	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	First Result	Second Result	Averaged Result
			Concentration in pCi/L[a]		
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 ± [illegible]9969
MI-7260, 7261	Jul, 1995	Cs-137	1.6600 ± 2.5900	-1.4600 ± 3.3700	0.1000 ± [illegible]251
MI-7260, 7261	Jul, 1995	I-131	0.1745 ± 0.1944	0.1004 ± 0.1792	0.1374 ± [illegible]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-	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 ± 0.5920	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	5.0 pCi/liter 10% of known value
Potassium	>0.1 g/liter or kg	5% of known value
Gross alpha	≤20 pCi/liter >20 pCi/liter	5.0 pCi/liter 25% of known value
Gross beta	≤100 pCi/liter >100 pCi/liter	5.0 pCi/liter 5% of known value
Tritium	≤4,000 pCi/liter >4,000 pCi/liter	$1s = (pCi/liter) = 169.85 \times (known)^{0.0933}$ 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:

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

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

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

4.3 If all 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

Effluent Concentration Limits

for Radioactivity in Air and Water

Above Background in Unrestricted Areas

Table C-1. Effluent concentration limits for radioactivity in air and water above natural background in unrestricted areas[a].

Air		Water	
Iodine-131[b]	0.29 pCi/m^3	Strontium-89	8,000 pCi/L
		Strontium-90	500 pCi/L
		Cesium-137	1,000 pCi/L
		Barium-140	8,000 pCi/L
		Iodine-131	1000 pCi/L
		Potassium-40[c]	4,000 pCi/L
		Tritium	1×10^6 pCi/L

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

[b] From 10 CFR 20 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

SUMMARY OF THE LAND USE CENSUS

SUMMARY OF 1995 LAND USE CENSUS

The annual Land Use Census for DAEC was completed in September 1995. All milk animals and gardens greater than 500 square feet were identified within three miles for each of the 16 meteorological sectors. Within five miles, the nearest resident, milk animal and garden in each sector were identified. Additionally, the Cedar River was inspected for water use downstream of DAEC to Cedar Rapids.

There were no new uses of water.

A total of 24 new homes were built or under construction within 3 miles of DAEC since the last census. Most of the new homes were built in the sectors toward Cedar Rapids (SSE, SE and ESE) where increased building rates have been noted in previous land use census. Eight new homes were noted in the town of Palo (S and SSW).

Although the population continues to grow around the SE sector near 3 miles from DAEC, no new source pathway have been created.

Several adjustments will be made to the MIDAS dose projection model based on the results of this census. They will include removal of the milk animal location at 2 miles SSW and changes to the location of the nearest gardens for the NE, ENE, E, SE, S, SSW, SW and WNW Sectors.

The Radiological Environmental monitoring Program will be revised to include an additional TLD location in the SSE Sector where the greatest amount of population increase has been observed.

APPENDIX E

ANNUAL RADIATION DOSE ASSESSMENT

ANNUAL RADIATION DOSE ASSESSMENT

The annual offsite radiation dose to a member of the public was determined by assessment of environmental dosimeter results and by calculations based on monitored effluent releases.

SECTION A. DOSE CONTRIBUTION FROM DIRECT RADIATION

Direct radiation dose from the operation of DAEC was recorded by TLDs placed at locations in the surrounding environment as described in the Offsite Dose Assessment Manual (ODAM).

1. Pre-operational and 1995 TLD results were compared using a paired difference test. No difference in the TLD populations were observed for the 0.5 mile, 1 mile and 3 mile TLD populations using a confidence level of 99%.

2. As stated in Part 1, page 8 of this report, no plant effect was indicated by the TLDs when dose results were compared to the estimated average natural background for Middle America.

SECTION B. ESTIMATED OFFSITE DOSE FROM EFFLUENT RELEASES

The contribution of dose to a member of the public most likely to be exposed from effluent releases was calculated by the Meteorological Information and Dose Assessment Systems (MIDAS) computer program in accordance with the ODAM. The calculation methods follow those prescribed by Reg Guide 1.109. Because there were no nuclides detected in the environment at or beyond the site boundary that was due to the operation of DAEC, no comparison of calculated dose from stack releases and dose calculated from environmental contamination was performed.

Results of the MIDAS dose calculations are discussed below and shown in tabular form on Page E-4:

1. There were no releases of radioactive material to liquid effluents in 1995.

2. The dose to air from noble gases released was 2.15E-3 mrad from gamma radiation at the South site boundary and 2.65E-4 mrad from beta radiation at the South site boundary.

3. The total body dose equivalent to the maximally exposed individual from noble gases was 4.45E-4 mrem, at 805 meters West.

4. The skin dose equivalent to the maximally exposed individual from noble gases was 4.78E-4 mrem, at 805 meters West.

5. The maximally exposed organ due to iodines and particulates with half-lives greater than eight days was the skin of a child at 805 meters West, with an estimated dose equivalent of 1.28E-2 mrem.

CONCLUSION:

No measurable dose due to operation of DAEC was detected by environmental TLDs in 1995. The calculated doses are below the regulatory limits stated in Appendix I to 10 CFR 50 and in 40 CFR 190.

ESTIMATED MAXIMUM OFFSITE INDIVIDUAL DOSES FOR 1995

TYPE	AGE GROUP	DISTANCE (meters)	DIRECTION	DOSE OR DOSE EQUIVALENT	ANNUAL 10CFR50, APPENDIX I LIMIT
DIRECTION RADIATION (as measured by TLDs)				NONE	*
LIQUIDS RELEASES				NONE	3 MREM TOTAL BODY 10 MREM ANY ORGAN
NOBLE GAS					
GAMMA AIR DOSE		455	S	2.15E-3 MRAD	10 MRAD
BETA AIR DOSE		2416	S	2.65E-4 MRAD	20 MRAD
TOTAL BODY	ALL	805	W	4.45E-4 MREM	*
SKIN	ALL	805	W	4.78E-4 MREM	*
PARTICULATES & IODINES					
ORGAN DOSE	CHILD-SKIN	805	W	1.28E-2 MREM	15 MREM

* NO APPENDIX I LIMIT BUT IS USED TO DETERMINE COMPLIANCE WITH 40 CFR 190 LIMITS OF 25 MREM TOTAL BODY AND 75 MREM THYROID.

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REPORT
TO
IES UTILITIES, INC.
CEDAR RAPIDS, IOWA

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM (REMP)
FOR THE
DUANE ARNOLD ENERGY CENTER
CEDAR RAPIDS, IOWA
Docket No. 50-331

ANNUAL REPORT - PART II
DATA TABULATIONS AND ANALYSES
JANUARY - DECEMBER 1995

PREPARED AND SUBMITTED
BY
TELEDYNE ISOTOPES MIDWEST LABORATORY
PROJECT NO. 8001

Approved by: L. G. Huebner
L. G. Huebner
Manager

06 March 1996

TABLE OF CONTENTS

LIST OF TABLES

LIST OF TABLES (continued)

1.0 INTRODUCTION

The following constitutes a supplement to the Annual Report for the Radiological Environmental Monitoring Program conducted at the Duane Arnold Energy Center, Palo, Iowa in 1995. Results of completed analyses are presented in the attached tables.

For information regarding sampling locations, type and frequency of collection, and sample codes, please see Tables 5.3 - 5.5 and Figures 5.1 and 5.2 of Part I.

2.0 LISTING OF MISSED SAMPLES

Sample	Location	Collection Date or Period	Comments
Milk	D-93	01-04-95	Sample not available.
Milk	D-101	01-04-95	Sample not available.
Milk	D-101	02-07-95	Sample not available.
Milk	D-101	03-07-95	Sample not available.
Milk	D-101	04-04-95	Sample not available.
Milk	D-101	05-02-95	Sample not available.
Milk	D-101	05-16-95	Sample not available.
Milk	D-101	05-31-95	Sample not available.
Milk	D-101	06-13-95	Sample not available.
TLD	D-91	2nd Qtr., 1995	TLD lost in the field.
Milk	D-101	07-11-95	Sample not available.
Milk	D-105	07-11-95	Sample not available.
AP/AI	D-2	07-20-95	Sampler pump failure.
AP	D-11	09-28-95	Air filter lost in the wind.

3.0 DATA TABLES

DUANE ARNOLD

Table 1. Airborne particulates and charcoal canisters.
Analyses: Gross beta
Location: D-1 (Cedar Rapids)
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010			0.010
01-05-95	287	0.024 ± 0.003	07-06-95	285	0.016 ± 0.003
01-12-95	283	0.034 ± 0.004	07-13-95	281	0.022 ± 0.003
01-19-95	289	0.026 ± 0.003	07-20-95	289	0.026 ± 0.003
01-25-95	242 [a]	0.026 ± 0.003	07-27-95	284	0.022 ± 0.003
02-02-95	327 [b]	0.042 ± 0.004	08-03-95	286	0.020 ± 0.003
02-09-95	285	0.027 ± 0.003	08-10-95	285	0.021 ± 0.003
02-16-95	287	0.015 ± 0.003	08-17-95	288	0.024 ± 0.003
02-23-95	285	0.033 ± 0.003	08-24-95	286	0.023 ± 0.003
03-02-95	286	0.021 ± 0.003	08-31-95	283	0.044 ± 0.004
03-09-95	286	0.028 ± 0.003	09-07-95	287	0.031 ± 0.004
03-16-95	281	0.031 ± 0.003	09-14-95	284	0.028 ± 0.003
03-23-95	289	0.021 ± 0.003	09-20-95	245 [a]	0.020 ± 0.003
03-30-95	284	0.015 ± 0.003	09-28-95	329 [b]	0.029 ± 0.003
1st Qtr. mean±s.d.		0.026 ± 0.007	3rd Qtr. mean±s.d.		0.025 ± 0.007
04-06-95	284	0.020 ± 0.003	10-05-95	283	0.036 ± 0.004
04-13-95	285	0.017 ± 0.003	10-12-95	285	0.022 ± 0.003
04-20-95	284	0.013 ± 0.003	10-19-95	287	0.019 ± 0.003
04-27-95	286	0.011 ± 0.003	10-26-95	283	0.017 ± 0.003
05-04-95	285	0.017 ± 0.003	11-02-95	290	0.016 ± 0.003
05-11-95	284	0.016 ± 0.003	11-09-95	283	0.024 ± 0.003
05-17-95	246 [a]	0.015 ± 0.003	11-16-95	286	0.029 ± 0.003
05-25-95	326 [b]	0.014 ± 0.002	11-22-95	245 [a]	0.029 ± 0.004
06-01-95	285	0.014 ± 0.003	11-30-95	327 [b]	0.034 ± 0.003
06-08-95	287	0.016 ± 0.003	12-07-95	285	0.031 ± 0.003
06-15-95	284	0.016 ± 0.003	12-14-95	287	0.029 ± 0.003
06-22-95	286	0.032 ± 0.003	12-21-95	286	0.043 ± 0.004
06-29-95	286	0.023 ± 0.003	12-29-95	321	0.023 ± 0.003
2nd Qtr. mean±s.d.		0.017 ± 0.005	4th Qtr. mean±s.d.		0.027 ± 0.008

Cumulative Average:	0.024
Previous Annual Average:	0.024

[a] Six day collection.
[b] Eight day collection.

DUANE ARNOLD

Table 2. Airborne particulates and charcoal canisters.
Analyses: Gross beta and iodine-131
Location: D-2 (Marion)
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010			0.010
01-05-95	288	0.023 ± 0.003	07-06-95	285	0.015 ± 0.003
01-12-95	283	0.032 ± 0.003	07-13-95	279	0.023 ± 0.003
01-19-95	289	0.024 ± 0.003	07-20-95	ND[d]	-
01-25-95	242[b]	0.020 ± 0.003	07-27-95	242	0.022 ± 0.004
02-02-95	327[c]	0.045 ± 0.004	08-03-95	283	0.023 ± 0.003
02-09-95	285	0.030 ± 0.003	08-10-95	285	0.019 ± 0.003
02-16-95	284	0.030 ± 0.003	08-17-95	289	0.022 ± 0.003
02-23-95	286	0.039 ± 0.004	08-24-95	284	0.026 ± 0.003
03-02-95	287	0.018 ± 0.003	08-31-95	285	0.041 ± 0.004
03-09-95	283	0.028 ± 0.003	09-07-95	286	0.032 ± 0.004
03-16-95	285	0.030 ± 0.003	09-14-95	285	0.029 ± 0.003
03-23-95	290	0.014 ± 0.003	09-20-95	244[b]	0.021 ± 0.003
03-30-95	284	0.013 ± 0.003	09-28-95	327[c]	0.027 ± 0.003
1st Qtr. mean±s.d.		0.027 ± 0.009	3rd Qtr. mean±s.d.		0.025 ± 0.006
04-06-95	283	0.023 ± 0.003	10-05-95	284	0.033 ± 0.003
04-13-95	286	0.017 ± 0.003	10-12-95	285	0.026 ± 0.003
04-20-95	284	0.010 ± 0.003	10-19-95	287	0.025 ± 0.003
04-27-95	287	0.011 ± 0.003	10-26-95	283	0.016 ± 0.003
05-04-95	285	0.013 ± 0.002	11-02-95	291	0.017 ± 0.003
05-11-95	284	0.012 ± 0.003	11-09-95	285	0.029 ± 0.003
05-17-95	246[b]	0.017 ± 0.003	11-16-95	285	0.031 ± 0.004
05-25-95	326[c]	0.014 ± 0.002	11-22-95	245[b]	0.033 ± 0.004
06-01-95	285	0.013 ± 0.003	11-30-95	327[c]	0.034 ± 0.003
06-08-95	287	0.016 ± 0.003	12-07-95	285	0.031 ± 0.004
06-15-95	284	0.016 ± 0.003	12-14-95	287	0.020 ± 0.003
06-22-95	286	0.028 ± 0.003	12-21-95	286	0.046 ± 0.004
06-29-95	286	0.021 ± 0.003	12-29-95	321	0.021 ± 0.003
2nd Qtr. mean±s.d.		0.016 ± 0.005	4th Qtr. mean±s.d.		0.028 ± 0.008

Cumulative Average: 0.024
Previous Annual Average: 0.024

[a] Iodine-131 concentrations are <0.07 pCi/m^3 unless otherwise noted.
[b] Six day collection.
[c] Eight day collection.
[d] ND = No data; sample not available due to pump failure.

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Table 3. Airborne particulates and charcoal canisters.
Analyses: Gross beta
Location: D-3 (Hiawatha)
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010			0.010
01-05-95	286	0.023 ± 0.003	07-06-95	285	0.015 ± 0.003
01-12-95	284	0.034 ± 0.004	07-13-95	282	0.026 ± 0.003
01-19-95	287	0.024 ± 0.003	07-20-95	288	0.027 ± 0.003
01-25-95	244 [a]	0.025 ± 0.003	07-27-95	284	0.022 ± 0.003
02-02-95	326 [b]	0.045 ± 0.004	08-03-95	286	0.022 ± 0.003
02-09-95	286	0.032 ± 0.003	08-10-95	285	0.020 ± 0.003
02-16-95	285	0.030 ± 0.003	08-17-95	288	0.022 ± 0.003
02-23-95	284	0.042 ± 0.004	08-24-95	284	0.025 ± 0.003
03-02-95	287	0.020 ± 0.003	08-31-95	286	0.043 ± 0.004
03-09-95	285	0.026 ± 0.003	09-07-95	285	0.031 ± 0.004
03-16-95	285	0.028 ± 0.003	09-14-95	285	0.029 ± 0.003
03-23-95	288	0.015 ± 0.003	09-20-95	245 [a]	0.022 ± 0.003
03-30-95	285	0.012 ± 0.003	09-28-95	327 [b]	0.029 ± 0.003
1st Qtr. mean±s.d.		0.027 ± 0.009	3rd Qtr. mean±s.d.		0.026 ± 0.007
04-06-95	284	0.020 ± 0.003	10-05-95	284	0.039 ± 0.004
04-13-95	286	0.019 ± 0.003	10-12-95	285	0.023 ± 0.003
04-20-95	284	0.014 ± 0.003	10-19-95	287	0.024 ± 0.003
04-27-95	286	0.010 ± 0.003	10-26-95	284	0.020 ± 0.003
05-04-95	286	0.014 ± 0.003	11-02-95	290	0.016 ± 0.003
05-11-95	284	0.010 ± 0.003	11-09-95	284	0.030 ± 0.003
05-17-95	246 [a]	0.017 ± 0.003	11-16-95	285	0.027 ± 0.003
05-25-95	326 [b]	0.015 ± 0.002	11-22-95	245 [a]	0.035 ± 0.004
06-01-95	284	0.014 ± 0.003	11-30-95	326 [b]	0.035 ± 0.003
06-08-95	288	0.018 ± 0.003	12-07-95	285	0.029 ± 0.003
06-15-95	284	0.014 ± 0.003	12-14-95	286	0.025 ± 0.003
06-22-95	287	0.032 ± 0.003	12-21-95	286	0.051 ± 0.004
06-29-95	286	0.025 ± 0.003	12-29-95	322	0.022 ± 0.003
2nd Qtr. mean±s.d.		0.017 ± 0.006	4th Qtr. mean±s.d.		0.029 ± 0.009

Cumulative Average: 0.025
Previous Annual Average: 0.024

[a] Six day collection.
[b] Eight day collection.

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Table 4. Airborne particulates and charcoal canisters.
Analyses: Gross beta and iodine-131
Location: D-5 (Palo)
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010
01-05-95	285	0.025 ± 0.003
01-12-95	284	0.035 ± 0.004
01-19-95	288	0.028 ± 0.003
01-25-95	243 [b]	0.027 ± 0.004
02-02-95	327 [c]	0.047 ± 0.004
02-09-95	285	0.030 ± 0.003
02-16-95	286	0.027 ± 0.003
02-23-95	285	0.042 ± 0.004
03-02-95	285	0.022 ± 0.003
03-09-95	285	0.025 ± 0.003
03-16-95	285	0.029 ± 0.003
03-23-95	286	0.016 ± 0.003
03-30-95	286	0.015 ± 0.003
1st Qtr. mean±s.d.		0.028 ± 0.009
04-06-95	283	0.020 ± 0.003
04-13-95	286	0.016 ± 0.003
04-20-95	285	0.013 ± 0.003
04-27-95	285	0.011 ± 0.003
05-04-95	286	0.015 ± 0.003
05-11-95	285	0.015 ± 0.003
05-17-95	246 [b]	0.017 ± 0.003
05-25-95	325 [c]	0.013 ± 0.002
06-01-95	285	0.015 ± 0.003
06-08-95	287	0.018 ± 0.003
06-15-95	284	0.013 ± 0.003
06-22-95	286	0.032 ± 0.003
06-29-95	286	0.024 ± 0.003
2nd Qtr. mean±s.d.		0.017 ± 0.005
Required LLD		0.010
07-06-95	285	0.017 ± 0.003
07-13-95	283	0.027 ± 0.003
07-20-95	287	0.031 ± 0.003
07-27-95	283	0.024 ± 0.003
08-03-95	287	0.023 ± 0.003
08-10-95	285	0.018 ± 0.003
08-17-95	284	0.022 ± 0.003
08-24-95	289	0.027 ± 0.003
08-31-95	285	0.046 ± 0.004
09-07-95	287	0.032 ± 0.004
09-14-95	284	0.029 ± 0.003
09-20-95	246 [b]	0.022 ± 0.003
09-28-95	325 [c]	0.027 ± 0.003
3rd Qtr. mean±s.d.		0.027 ± 0.007
10-05-95	286	0.035 ± 0.003
10-12-95	285	0.024 ± 0.003
10-19-95	285	0.024 ± 0.003
10-26-95	286	0.021 ± 0.003
11-02-95	288	0.015 ± 0.003
11-09-95	285	0.031 ± 0.003
11-16-95	287	0.032 ± 0.004
11-22-95	244 [b]	0.032 ± 0.004
11-30-95	326 [c]	0.042 ± 0.004
12-07-95	286	0.032 ± 0.004
12-14-95	286	0.030 ± 0.003
12-21-95	286	0.049 ± 0.004
12-29-95	326	0.023 ± 0.003
4th Qtr. mean±s.d.		0.030 ± 0.009

Cumulative Average: 0.025
Previous Annual Average: 0.025

[a] Iodine-131 concentrations are <0.07 pCi/m^3 unless otherwise noted.
[b] Six day collection.
[c] Eight day collection.

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Table 5. Airborne particulates and charcoal canisters.
Analyses: Gross beta
Location: D-6 (Center Point)
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010			0.010
01-05-95	285	0.024 ± 0.003	07-06-95	285	0.018 ± 0.003
01-12-95	285	0.034 ± 0.004	07-13-95	283	0.027 ± 0.003
01-19-95	288	0.030 ± 0.003	07-20-95	287	0.029 ± 0.003
01-25-95	243 [a]	0.025 ± 0.003	07-27-95	283	0.022 ± 0.003
02-02-95	327 [b]	0.050 ± 0.004	08-03-95	287	0.020 ± 0.003
02-09-95	285	0.033 ± 0.004	08-10-95	285	0.020 ± 0.003
02-16-95	286	0.030 ± 0.003	08-17-95	283	0.024 ± 0.003
02-23-95	285	0.047 ± 0.004	08-24-95	289	0.023 ± 0.003
03-02-95	285	0.021 ± 0.003	08-31-95	285	0.048 ± 0.004
03-09-95	286	0.031 ± 0.003	09-07-95	288	0.036 ± 0.004
03-16-95	284	0.030 ± 0.003	09-14-95	283	0.031 ± 0.003
03-23-95	286	0.016 ± 0.003	09-20-95	245 [a]	0.021 ± 0.003
03-30-95	287	0.014 ± 0.003	09-28-95	326 [b]	0.030 ± 0.003
1st Qtr. mean±s.d.		0.030 ± 0.010	3rd Qtr. mean±s.d.		0.027 ± 0.008
04-06-95	283	0.022 ± 0.003	10-05-95	286	0.034 ± 0.003
04-13-95	286	0.017 ± 0.003	10-12-95	285	0.023 ± 0.003
04-20-95	285	0.015 ± 0.003	10-19-95	285	0.021 ± 0.003
04-27-95	285	0.012 ± 0.003	10-26-95	285	0.019 ± 0.003
05-04-95	286	0.015 ± 0.003	11-02-95	288	0.018 ± 0.003
05-11-95	283	0.017 ± 0.003	11-09-95	287	0.028 ± 0.003
05-17-95	246 [a]	0.017 ± 0.003	11-16-95	284	0.029 ± 0.003
05-25-95	325 [b]	0.015 ± 0.002	11-22-95	245 [a]	0.036 ± 0.004
06-01-95	285	0.015 ± 0.003	11-30-95	326 [b]	0.036 ± 0.003
06-08-95	287	0.018 ± 0.003	12-07-95	286	0.030 ± 0.003
06-15-95	284	0.018 ± 0.003	12-14-95	286	0.028 ± 0.003
06-22-95	286	0.035 ± 0.004	12-21-95	285	0.051 ± 0.004
06-29-95	286	0.024 ± 0.003	12-29-95	326	0.021 ± 0.003
2nd Qtr. mean±s.d.		0.018 ± 0.006	4th Qtr. mean±s.d.		0.029 ± 0.009

Cumulative Average:	0.026
Previous Annual Average:	0.025

[a] Six day collection.
[b] Eight day collection.

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Table 6. Airborne particulates and charcoal canisters.
Analyses: Gross beta and iodine-131
Location: D-7 (Shellsburg)
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010			0.010
01-05-95	285	0.024 ± 0.003	07-06-95	285	0.017 ± 0.003
01-12-95	284	0.034 ± 0.004	07-13-95	283	0.027 ± 0.003
01-19-95	288	0.026 ± 0.003	07-20-95	287	0.030 ± 0.003
01-25-95	243 [b]	0.023 ± 0.003	07-27-95	283	0.025 ± 0.003
02-02-95	327 [c]	0.045 ± 0.004	08-03-95	287	0.022 ± 0.003
02-09-95	285	0.028 ± 0.003	08-10-95	285	0.020 ± 0.003
02-16-95	286	0.030 ± 0.003	08-17-95	284	0.025 ± 0.003
02-23-95	285	0.039 ± 0.004	08-24-95	289	0.027 ± 0.003
03-02-95	285	0.022 ± 0.003	08-31-95	285	0.045 ± 0.004
03-09-95	285	0.026 ± 0.003	09-07-95	288	0.036 ± 0.004
03-16-95	285	0.025 ± 0.003	09-14-95	284	0.029 ± 0.003
03-23-95	286	0.016 ± 0.003	09-20-95	245 [b]	0.019 ± 0.003
03-30-95	286	0.015 ± 0.003	09-28-95	325 [c]	0.029 ± 0.003
1st Qtr. mean±s.d.		0.027 ± 0.008	3rd Qtr. mean±s.d.		0.027 ± 0.007
04-06-95	283	0.021 ± 0.003	10-05-95	286	0.028 ± 0.003
04-13-95	286	0.020 ± 0.003	10-12-95	286	0.008 ± 0.002
04-20-95	285	0.012 ± 0.003	10-19-95	285	0.016 ± 0.003
04-27-95	285	0.009 ± 0.003	10-26-95	285	0.012 ± 0.002
05-04-95	286	0.015 ± 0.003	11-02-95	288	0.015 ± 0.003
05-11-95	284	0.017 ± 0.003	11-09-95	285	0.021 ± 0.003
05-17-95	247 [b]	0.016 ± 0.003	11-16-95	286	0.027 ± 0.003
05-25-95	325 [c]	0.015 ± 0.002	11-22-95	245 [b]	0.025 ± 0.004
06-01-95	285	0.015 ± 0.003	11-30-95	326 [c]	0.041 ± 0.004
06-08-95	287	0.017 ± 0.003	12-07-95	286	0.036 ± 0.004
06-15-95	284	0.015 ± 0.003	12-14-95	285	0.031 ± 0.003
06-22-95	286	0.030 ± 0.003	12-21-95	286	0.051 ± 0.004
06-29-95	286	0.024 ± 0.003	12-29-95	326	0.025 ± 0.003
2nd Qtr. mean±s.d.		0.017 ± 0.005	4th Qtr. mean±s.d.		0.026 ± 0.012

Cumulative Average:	0.024
Previous Annual Average:	0.023

[a] Iodine-131 concentrations are <0.07 pCi/m^3 unless otherwise noted.
[b] Six day collection.
[c] Eight day collection.

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Table 7. Airborne particulates and charcoal canisters.
Analyses: Gross beta and iodine-131
Location: D-8 (Urbana)
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010			0.010
01-05-95	285	0.023 ± 0.003	07-06-95	285	0.016 ± 0.003
01-12-95	285	0.030 ± 0.003	07-13-95	283	0.028 ± 0.003
01-19-95	288	0.025 ± 0.003	07-20-95	287	0.028 ± 0.003
01-25-95	243 [b]	0.025 ± 0.003	07-27-95	283	0.022 ± 0.003
02-02-95	326 [c]	0.043 ± 0.004	08-03-95	287	0.023 ± 0.003
02-09-95	285	0.029 ± 0.003	08-10-95	285	0.020 ± 0.003
02-16-95	286	0.025 ± 0.003	08-17-95	284	0.022 ± 0.003
02-23-95	285	0.037 ± 0.003	08-24-95	289	0.027 ± 0.003
03-02-95	285	0.018 ± 0.003	08-31-95	285	0.046 ± 0.004
03-09-95	285	0.027 ± 0.003	09-07-95	288	0.032 ± 0.004
03-16-95	284	0.032 ± 0.003	09-14-95	283	0.027 ± 0.003
03-23-95	286	0.014 ± 0.003	09-20-95	246 [a]	0.021 ± 0.003
03-30-95	286	0.013 ± 0.003	09-28-95	325 [c]	0.031 ± 0.003
1st Qtr. mean±s.d.		0.026 ± 0.008	3rd Qtr. mean±s.d.		0.026 ± 0.007
04-06-95	283	0.022 ± 0.003	10-05-95	286	0.034 ± 0.003
04-13-95	286	0.018 ± 0.003	10-12-95	285	0.022 ± 0.003
04-20-95	285	0.013 ± 0.003	10-19-95	285	0.024 ± 0.003
04-27-95	285	0.012 ± 0.003	10-26-95	285	0.020 ± 0.003
05-04-95	286	0.015 ± 0.003	11-02-95	288	0.018 ± 0.003
05-11-95	284	0.016 ± 0.003	11-09-95	286	0.034 ± 0.003
05-17-95	246 [b]	0.014 ± 0.003	11-16-95	285	0.031 ± 0.004
05-25-95	325 [c]	0.015 ± 0.002	11-22-95	243 [b]	0.034 ± 0.004
06-01-95	285	0.015 ± 0.003	11-30-95	326 [c]	0.036 ± 0.003
06-08-95	287	0.020 ± 0.003	12-07-95	286	0.035 ± 0.004
06-15-95	284	0.015 ± 0.003	12-14-95	241 [d]	0.018 ± 0.003
06-22-95	286	0.031 ± 0.003	12-21-95	246	0.041 ± 0.004
06-29-95	286	0.023 ± 0.003	12-29-95	325	0.021 ± 0.003
2nd Qtr. mean±s.d.		0.018 ± 0.005	4th Qtr. mean±s.d.		0.028 ± 0.008

Cumulative Average: 0.025
Previous Annual Average: 0.024

[a] Iodine-131 concentrations are <0.07 pCi/m^3 unless otherwise noted.
[b] Six day collection.
[c] Eight day collection.
[d] Low volume due to sample pump malfunction.

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Table 8. Airborne particulates and charcoal canisters.
Analyses: Gross beta
Location: D-10 (Atkins)
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010
01-05-95	286	0.025 ± 0.003
01-12-95	285	0.036 ± 0.004
01-19-95	287	0.026 ± 0.003
01-25-95	243 [a]	0.023 ± 0.003
02-02-95	326 [b]	0.047 ± 0.004
02-09-95	286	0.029 ± 0.003
02-16-95	284	0.032 ± 0.003
02-23-95	285	0.039 ± 0.004
03-02-95	286	0.022 ± 0.003
03-09-95	287	0.028 ± 0.003
03-16-95	281	0.031 ± 0.003
03-23-95	289	0.017 ± 0.003
03-30-95	284	0.014 ± 0.003
1st Qtr. mean±s.d.		0.028 ± 0.009
04-06-95	284	0.021 ± 0.003
04-13-95	285	0.018 ± 0.003
04-20-95	285	0.014 ± 0.003
04-27-95	283	0.012 ± 0.003
05-04-95	285	0.016 ± 0.003
05-11-95	286	0.016 ± 0.003
05-17-95	246 [a]	0.018 ± 0.003
05-25-95	326 [b]	0.014 ± 0.002
06-01-95	286	0.015 ± 0.003
06-08-95	286	0.017 ± 0.003
06-15-95	284	0.016 ± 0.003
06-22-95	286	0.035 ± 0.004
06-29-95	287	0.024 ± 0.003
2nd Qtr. mean±s.d.		0.018 ± 0.006

Date Collected	Volume (m^3)	Gross Beta
		0.010
07-06-95	283	0.015 ± 0.003
07-13-95	281	0.026 ± 0.003
07-20-95	288	0.026 ± 0.003
07-27-95	284	0.021 ± 0.003
08-03-95	287	0.023 ± 0.003
08-10-95	285	0.018 ± 0.003
08-17-95	287	0.024 ± 0.003
08-24-95	286	0.027 ± 0.003
08-31-95	283	0.044 ± 0.004
09-07-95	288	0.027 ± 0.003
09-14-95	284	0.029 ± 0.003
09-20-95	246 [a]	0.021 ± 0.003
09-28-95	326 [b]	0.031 ± 0.003
3rd Qtr. mean±s.d.		0.026 ± 0.007
10-05-95	284	0.035 ± 0.003
10-12-95	284	0.025 ± 0.003
10-19-95	287	0.023 ± 0.003
10-26-95	283	0.020 ± 0.003
11-02-95	290	0.014 ± 0.003
11-09-95	277	0.028 ± 0.003
11-16-95	292	0.035 ± 0.004
11-22-95	245 [a]	0.034 ± 0.004
11-30-95	328 [b]	0.038 ± 0.003
12-07-95	284	0.031 ± 0.003
12-14-95	287	0.035 ± 0.004
12-21-95	286	0.053 ± 0.004
12-29-95	322	0.023 ± 0.003
4th Qtr. mean±s.d.		0.030 ± 0.009

Cumulative Average: 0.026
Previous Annual Average: 0.024

[a] Six day collection.
[b] Eight day collection.

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Table 9. Airborne particulates and charcoal canisters.
Analyses: Gross beta and iodine-131
Location: D-11 (Toddville)
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010			0.010
01-05-95	285	0.025 ± 0.003	07-06-95	283	0.015 ± 0.003
01-12-95	284 [b]	0.037 ± 0.004	07-13-95	284	0.027 ± 0.003
01-19-95	270	0.029 ± 0.003	07-20-95	288	0.025 ± 0.003
01-25-95	242 [b]	0.024 ± 0.003	07-27-95	284	0.018 ± 0.003
02-02-95	327 [c]	0.045 ± 0.004	08-03-95	286	0.023 ± 0.003
02-09-95	285	0.029 ± 0.003	08-10-95	285	0.019 ± 0.003
02-16-95	286	0.027 ± 0.003	08-17-95	288	0.019 ± 0.003
02-23-95	258	0.042 ± 0.004	08-24-95	284	0.025 ± 0.003
03-02-95	280	0.023 ± 0.003	08-31-95	284	0.042 ± 0.004
03-09-95	285	0.025 ± 0.003	09-07-95	287	0.030 ± 0.003
03-16-95	308	0.027 ± 0.003	09-14-95	284	0.031 ± 0.003
03-23-95	288	0.016 ± 0.003	09-20-95	246 [b]	0.020 ± 0.003
03-30-95	285	0.014 ± 0.003	09-28-95	NS [dc]	-
1st Qtr. mean±s.d.		0.028 ± 0.009	3rd Qtr. mean±s.d.		0.025 ± 0.007
04-06-95	284	0.019 ± 0.003	10-05-95	285	0.036 ± 0.004
04-13-95	285	0.017 ± 0.003	10-12-95	285	0.023 ± 0.003
04-20-95	286	0.014 ± 0.003	10-19-95	286	0.027 ± 0.003
04-27-95	286	0.011 ± 0.003	10-26-95	285	0.020 ± 0.003
05-04-95	285	0.015 ± 0.003	11-02-95	288	0.020 ± 0.003
05-11-95	285	0.014 ± 0.003	11-09-95	286	0.030 ± 0.003
05-17-95	246 [b]	0.018 ± 0.003	11-16-95	285	0.028 ± 0.003
05-25-95	326 [c]	0.015 ± 0.002	11-22-95	244 [b]	0.038 ± 0.004
06-01-95	284	0.010 ± 0.003	11-30-95	326 [c]	0.040 ± 0.004
06-08-95	288	0.016 ± 0.003	12-07-95	286	0.032 ± 0.004
06-15-95	284	0.014 ± 0.003	12-14-95	285	0.036 ± 0.004
06-22-95	287	0.031 ± 0.003	12-21-95	288	0.053 ± 0.004
06-29-95	285	0.023 ± 0.003	12-29-95	323	0.023 ± 0.003
2nd Qtr. mean±s.d.		0.017 ± 0.005	4th Qtr. mean±s.d.		0.031 ± 0.009

Cumulative Average: 0.025
Previous Annual Average: 0.024

[a] Iodine-131 concentrations are <0.07 pCi/m^3 unless otherwise noted.
[b] Six day collection.
[c] Eight day collection.
[d] ND = No data; filter paper lost due to wind.

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Table 10. Airborne particulates and charcoal canisters.
Analyses: Gross beta
Location: D-13 (Alburnett)
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010			0.010
01-05-95	285	0.022 ± 0.003	07-06-95	285	0.015 ± 0.003
01-12-95	284	0.032 ± 0.003	07-13-95	283	0.025 ± 0.003
01-19-95	288	0.026 ± 0.003	07-20-95	287	0.029 ± 0.003
01-25-95	242 [a]	0.022 ± 0.003	07-27-95	284	0.022 ± 0.003
02-02-95	327 [b]	0.041 ± 0.004	08-03-95	287	0.020 ± 0.003
02-09-95	285	0.029 ± 0.003	08-10-95	285	0.019 ± 0.003
02-16-95	286	0.030 ± 0.003	08-17-95	289	0.023 ± 0.003
02-23-95	285	0.037 ± 0.003	08-24-95	283	0.025 ± 0.003
03-02-95	287	0.019 ± 0.003	08-31-95	285	0.043 ± 0.004
03-09-95	286	0.025 ± 0.003	09-07-95	288	0.032 ± 0.004
03-16-95	284	0.029 ± 0.003	09-14-95	283	0.027 ± 0.003
03-23-95	287	0.013 ± 0.003	09-20-95	245 [a]	0.018 ± 0.003
03-30-95	286	0.013 ± 0.003	09-28-95	326 [b]	0.027 ± 0.003
	1st Qtr. mean±s.d.	0.026 ± 0.008		3rd Qtr. mean±s.d.	0.025 ± 0.007
04-06-95	283	0.020 ± 0.003	10-05-95	285	0.033 ± 0.003
04-13-95	286	0.016 ± 0.003	10-12-95	286	0.021 ± 0.003
04-20-95	285	0.015 ± 0.003	10-19-95	285	0.023 ± 0.003
04-27-95	285	0.011 ± 0.003	10-26-95	285	0.020 ± 0.003
05-04-95	286	0.016 ± 0.003	11-02-95	288	0.017 ± 0.003
05-11-95	275	0.016 ± 0.003	11-09-95	287	0.029 ± 0.003
05-17-95	242 [a]	0.016 ± 0.003	11-16-95	284	0.032 ± 0.004
05-25-95	325 [b]	0.013 ± 0.002	11-22-95	245 [a]	0.033 ± 0.004
06-01-95	285	0.014 ± 0.003	11-30-95	326 [b]	0.032 ± 0.003
06-08-95	287	0.016 ± 0.003	12-07-95	286	0.033 ± 0.004
06-15-95	284	0.013 ± 0.003	12-14-95	285	0.029 ± 0.003
06-22-95	286	0.031 ± 0.003	12-21-95	286	0.051 ± 0.004
06-29-95	286	0.023 ± 0.003	12-29-95	326	0.020 ± 0.003
	2nd Qtr. mean±s.d.	0.017 ± 0.005		4th Qtr. mean±s.d.	0.029 ± 0.009

Cumulative Average: 0.024
Previous Annual Average: 0.024

[a] Six day collection.
[b] Eight day collection.

DUANE ARNOLD

Table 11. Airborne particulates and charcoal canisters.
Analyses: Gross beta and iodine-131
Location: D-15 (On-site, north)
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010			0.010
01-05-95	285	0.020 ± 0.003	07-06-95	284	0.012 ± 0.003
01-12-95	284	0.030 ± 0.003	07-13-95	284	0.019 ± 0.003
01-19-95	288	0.020 ± 0.003	07-20-95	287	0.022 ± 0.003
01-25-95	243 [b]	0.020 ± 0.003	07-27-95	283	0.016 ± 0.003
02-02-95	327 [c]	0.045 ± 0.004	08-03-95	287	0.017 ± 0.003
02-09-95	285	0.026 ± 0.003	08-10-95	285	0.014 ± 0.003
02-16-95	285	0.027 ± 0.003	08-17-95	284	0.018 ± 0.003
02-23-95	286	0.031 ± 0.003	08-24-95	288	0.020 ± 0.003
03-02-95	285	0.018 ± 0.003	08-31-95	285	0.036 ± 0.004
03-09-95	277	0.021 ± 0.003	09-07-95	283	0.026 ± 0.003
03-16-95	285	0.025 ± 0.003	09-14-95	288	0.026 ± 0.003
03-23-95	286	0.016 ± 0.003	09-20-95	245 [b]	0.018 ± 0.003
03-30-95	286	0.014 ± 0.003	09-28-95	325 [c]	0.020 ± 0.003
1st Qtr. mean±s.d.		0.024 ± 0.008	3rd Qtr. mean±s.d.		0.020 ± 0.006
04-06-95	283	0.024 ± 0.003	10-05-95	285	0.029 ± 0.003
04-13-95	286	0.019 ± 0.003	10-12-95	286	0.019 ± 0.003
04-20-95	286	0.015 ± 0.003	10-19-95	285	0.022 ± 0.003
04-27-95	287	0.010 ± 0.003	10-26-95	286	0.018 ± 0.003
05-04-95	285	0.015 ± 0.003	11-02-95	287	0.016 ± 0.003
05-11-95	284	0.015 ± 0.003	11-09-95	285	0.028 ± 0.003
05-17-95	246 [b]	0.015 ± 0.003	11-16-95	286	0.025 ± 0.003
05-25-95	325 [c]	0.014 ± 0.002	11-22-95	245 [b]	0.028 ± 0.004
06-01-95	285	0.012 ± 0.003	11-30-95	326 [c]	0.029 ± 0.003
06-08-95	287	0.016 ± 0.003	12-07-95	286	0.026 ± 0.003
06-15-95	284	0.013 ± 0.003	12-14-95	285	0.028 ± 0.003
06-22-95	286	0.027 ± 0.003	12-21-95	286	0.048 ± 0.004
06-29-95	286	0.016 ± 0.003	12-29-95	326	0.019 ± 0.003
2nd Qtr. mean±s.d.		0.016 ± 0.004	4th Qtr. mean±s.d.		0.026 ± 0.008

Cumulative Average: 0.022
Previous Annual Average: 0.021

[a] Iodine-131 concentrations are <0.07 pCi/m^3 unless otherwise noted.
[b] Six day collection.
[c] Eight day collection.

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Table 12. Airborne particulates and charcoal canisters.
Analyses: Gross beta
Location: D-16 (on-site, south)
Units: pCi/m^3
Collection: Continuous, weekly exchange.

Date Collected	Volume (m^3)	Gross Beta	Date Collected	Volume (m^3)	Gross Beta
Required LLD		0.010			0.010
01-05-95	285	0.026 ± 0.003	07-06-95	284	0.013 ± 0.003
01-12-95	284	0.032 ± 0.003	07-13-95	284	0.022 ± 0.003
01-19-95	287	0.025 ± 0.003	07-20-95	287	0.026 ± 0.003
01-25-95	243 [a]	0.024 ± 0.003	07-27-95	283	0.017 ± 0.003
02-02-95	327 [b]	0.044 ± 0.004	08-03-95	287	0.018 ± 0.003
02-09-95	285	0.027 ± 0.003	08-10-95	285	0.018 ± 0.003
02-16-95	285	0.028 ± 0.003	08-17-95	284	0.020 ± 0.003
02-23-95	286	0.037 ± 0.003	08-24-95	288	0.021 ± 0.003
03-02-95	285	0.019 ± 0.003	08-31-95	285	0.035 ± 0.004
03-09-95	284	0.023 ± 0.003	09-07-95	283	0.024 ± 0.003
03-16-95	285	0.028 ± 0.003	09-14-95	288	0.023 ± 0.003
03-23-95	284	0.018 ± 0.003	09-20-95	245 [a]	0.018 ± 0.003
03-30-95	286	0.014 ± 0.003	09-28-95	325 [b]	0.025 ± 0.003
1st Qtr. mean±s.d.		0.027 ± 0.008	3rd Qtr. mean±s.d.		0.022 ± 0.005
04-06-95	283	0.025 ± 0.003	10-05-95	285	0.033 ± 0.003
04-13-95	283	0.018 ± 0.003	10-12-95	286	0.020 ± 0.003
04-20-95	286	0.015 ± 0.003	10-19-95	285	0.024 ± 0.003
04-27-95	286	0.015 ± 0.003	10-26-95	285	0.018 ± 0.003
05-04-95	286	0.017 ± 0.003	11-02-95	288	0.018 ± 0.003
05-11-95	284	0.014 ± 0.003	11-09-95	285	0.029 ± 0.003
05-17-95	246 [a]	0.021 ± 0.003	11-16-95	287	0.029 ± 0.003
05-25-95	325 [b]	0.016 ± 0.002	11-22-95	244 [a]	0.038 ± 0.004
06-01-95	285	0.016 ± 0.003	11-30-95	321 [b]	0.034 ± 0.003
06-08-95	287	0.019 ± 0.003	12-07-95	286	0.028 ± 0.003
06-15-95	284	0.019 ± 0.003	12-14-95	285	0.031 ± 0.003
06-22-95	286	0.026 ± 0.003	12-21-95	286	0.050 ± 0.004
06-29-95	286	0.018 ± 0.003	12-29-95	326	0.023 ± 0.003
2nd Qtr. mean±s.d.		0.018 ± 0.004	4th Qtr. mean±s.d.		0.029 ± 0.009

Cumulative Average: 0.024
Previous Annual Average: 0.021

[a] Six day collection.
[b] Eight day collection.

DUANE ARNOLD

Table 13. Airborne particulate samples, quarterly composites of weekly samples, analysis for gamma-emitting isotopes, 1995.

	Sample Description and Concentration (pCi/m^3)			
	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
	Location D-1			
Lab Code	DAP-2483	DAP-7707	DAP-11107	DAP-13078
Volume	3711	3711	3713	3748
Be-7	0.089 ± 0.016	0.120 ± 0.015	0.098 ± 0.020	0.071 ± 0.014
Nb-95	< 0.0004	< 0.0004	< 0.0009	< 0.0018
Zr-95	< 0.0006	< 0.0008	< 0.0008	< 0.0010
Ru-103	< 0.0007	< 0.0009	< 0.0008	< 0.0011
Ru-106	< 0.0037	< 0.0028	< 0.0028	< 0.0058
Cs-134	< 0.0005	< 0.0004	< 0.0004	< 0.0009
Cs-137	< 0.0004	< 0.0005	< 0.0005	< 0.0011
Ce-141	< 0.0017	< 0.0012	< 0.0020	< 0.0013
Ce-144	< 0.0034	< 0.0027	< 0.0037	< 0.0050
	Location D-2			
Lab Code	DAP-2484	DAP-7708	DAP-11108	DAP-13079
Volume	3713	3710	3376	3750
Be-7	0.101 ± 0.018	0.102 ± 0.027	0.113 ± 0.022	0.065 ± 0.017
Nb-95	< 0.0009	< 0.0008	< 0.0007	< 0.0018
Zr-95	< 0.0007	< 0.0019	< 0.0011	< 0.0016
Ru-103	< 0.0004	< 0.0009	< 0.0008	< 0.0010
Ru-106	< 0.0024	< 0.0072	< 0.0054	< 0.0124
Cs-134	< 0.0008	< 0.0009	< 0.0005	< 0.0014
Cs-137	< 0.0006	< 0.0012	< 0.0007	< 0.0004
Ce-141	< 0.0011	< 0.0021	< 0.0018	< 0.0020
Ce-144	< 0.0063	< 0.010	< 0.0051	< 0.0061

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Table 13. Airborne particulate samples, quarterly composites of weekly samples, analysis for gamma-emitting isotopes, 1995 (continued).

	Sample Description and Concentration (pCi/m^3)			
	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
	Location D-3			
Lab Code	DAP-2485	DAP-7709	DAP-11109	DAP-13080
Volume	3712	3711	3711	3750
Be-7	0.080 ± 0.016	0.122 ± 0.017	0.111 ± 0.021	0.062 ± 0.012
Nb-95	< 0.0006	< 0.0011	< 0.0013	< 0.0010
Zr-95	< 0.0006	< 0.0015	< 0.0012	< 0.0008
Ru-103	< 0.0004	< 0.0007	< 0.0008	< 0.0006
Ru-106	< 0.0054	< 0.0055	< 0.0066	< 0.0058
Cs-134	< 0.0005	< 0.0003	< 0.0006	< 0.0004
Cs-137	< 0.0007	< 0.0007	< 0.0005	< 0.0003
Ce-141	< 0.0016	< 0.0013	< 0.0024	< 0.0011
Ce-144	< 0.0050	< 0.0027	< 0.0041	< 0.0021
	Location D-5			
Lab Code	DAP-2486	DAP-7710	DAP-11110	DAP-13081
Volume	3710	3710	3709	3754
Be-7	0.085 ± 0.015	0.109 ± 0.021	0.100 ± 0.020	0.057 ± 0.011
Nb-95	< 0.0006	< 0.0008	< 0.0006	< 0.0008
Zr-95	< 0.0015	< 0.0027	< 0.0012	< 0.0007
Ru-103	< 0.0006	< 0.0016	< 0.0005	< 0.0012
Ru-106	< 0.0058	< 0.0087	< 0.0030	< 0.0059
Cs-134	< 0.0007	< 0.0012	< 0.0007	< 0.0006
Cs-137	< 0.0006	< 0.0012	< 0.0007	< 0.0009
Ce-141	< 0.0021	< 0.0026	< 0.0039	< 0.0013
Ce-144	< 0.0058	< 0.0066	< 0.0054	< 0.0029

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Table 13. Airborne particulate samples, quarterly composites of weekly samples, analysis for gamma-emitting isotopes, 1995 (continued).

	Sample Description and Concentration (pCi/m^3)			
	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
	Location D-6			
Lab Code	DAP-2487	DAP-7711	DAP-11111	DAP-13082
Volume	3712	3708	3709	3754
Be-7	0.099 ± 0.017	0.126 ± 0.016	0.133 ± 0.021	0.064 ± 0.011
Nb-95	< 0.0014	< 0.0013	< 0.0023	< 0.0008
Zr-95	< 0.0009	< 0.0020	< 0.0009	< 0.0018
Ru-103	< 0.0009	< 0.0007	< 0.0011	< 0.0006
Ru-106	< 0.0024	< 0.0084	< 0.0049	< 0.0048
Cs-134	< 0.0003	< 0.0011	< 0.0004	< 0.0007
Cs-137	< 0.0004	< 0.0008	< 0.0003	< 0.0005
Ce-141	< 0.0018	< 0.0024	< 0.0018	< 0.0011
Ce-144	< 0.0031	< 0.0031	< 0.0070	< 0.0037
	Location D-7			
Lab Code	DAP-2488	DAP-7712	DAP-11112	DAP-13083
Volume	3709	3710	3709	3754
Be-7	0.089 ± 0.016	0.114 ± 0.019	0.114 ± 0.022	0.062 ± 0.013
Nb-95	< 0.0008	< 0.0007	< 0.0007	< 0.0016
Zr-95	< 0.0006	< 0.0025	< 0.0012	< 0.0023
Ru-103	< 0.0010	< 0.0007	< 0.0006	< 0.0006
Ru-106	< 0.0024	< 0.0022	< 0.0028	< 0.0057
Cs-134	< 0.0006	< 0.0007	< 0.0004	< 0.0012
Cs-137	< 0.0007	< 0.0005	< 0.0005	< 0.0006
Ce-141	< 0.0019	< 0.0007	< 0.0010	< 0.0016
Ce-144	< 0.0061	< 0.0020	< 0.0050	< 0.0041

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Table 13. Airborne particulate samples, quarterly composites of weekly samples, analysis for gamma-emitting isotopes, 1995 (continued).

	Sample Description and Concentration (pCi/m^3)			
	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
	Location D-8			
Lab Code	DAP-2489	DAP-7713	DAP-11113	DAP-13084
Volume	3709	3710	3709	3668
Be-7	0.090 ± 0.016	0.109 ± 0.020	0.103 ± 0.022	0.053 ± 0.021
Nb-95	< 0.0007	< 0.0016	< 0.0011	< 0.0016
Zr-95	< 0.0007	< 0.0026	< 0.0010	< 0.0023
Ru-103	< 0.0007	< 0.0008	< 0.0016	< 0.0014
Ru-106	< 0.0069	< 0.0084	< 0.0082	< 0.0083
Cs-134	< 0.0003	< 0.0006	< 0.0007	< 0.0006
Cs-137	< 0.000[illegible]	< 0.0012	< 0.0004	< 0.0007
Ce-141	< 0.0008	< 0.0021	< 0.0015	< 0.0016
Ce-144	< 0.0066	< 0.0044	< 0.0018	< 0.0052
	Location D-10			
Lab Code	DAP-2490	DAP-7714	DAP-11114	DAP-13085
Volume	3709	3711	3708	3750
Be-7	0.094 ± 0.016	0.116 ± 0.015	0.113 ± 0.030	0.069 ± 0.011
Nb-95	< 0.0006	< 0.0006	< 0.0022	< 0.0007
Zr-95	< 0.0006	< 0.0013	< 0.0027	< 0.0018
Ru-103	< 0.0005	< 0.0011	< 0.0013	< 0.0007
Ru-106	< 0.0028	< 0.0063	< 0.0044	< 0.0041
Cs-134	< 0.0009	< 0.0006	< 0.0006	< 0.0005
Cs-137	< 0.0005	< 0.0006	< 0.0020	< 0.0006
Ce-141	< 0.0018	< 0.0009	< 0.0046	< 0.0005
Ce-144	< 0.0060	< 0.0036	< 0.0070	< 0.0021

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Table 13. Airborne particulate samples, quarterly composites of weekly samples, analysis for gamma-emitting isotopes, 1995 (continued).

	Sample Description and Concentration (pCi/m^3)			
	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
	Location D-11			
Lab Code	DAP-2491	DAP-7715	DAP-11115	DAP-13086
Volume	3711	3711	3383	3752
Be-7	0.088 ± 0.016	0.112 ± 0.012	0.102 ± 0.020	0.076 ± 0.019
Nb-95	< 0.0004	< 0.0009	< 0.0010	< 0.0019
Zr-95	< 0.0006	< 0.0013	< 0.0039	< 0.0038
Ru-103	< 0.0006	< 0.0008	< 0.0007	< 0.0008
Ru-106	< 0.0058	< 0.0027	< 0.0065	< 0.0058
Cs-134	< 0.0008	< 0.0005	< 0.0005	< 0.0015
Cs-137	< 0.0004	< 0.0006	< 0.0006	< 0.0012
Ce-141	< 0.0014	< 0.0011	< 0.0015	< 0.0025
Ce-144	< 0.0058	< 0.0033	< 0.0027	< 0.0068
	Location D-13			
Lab Code	DAP-2492	DAP-7716	DAP-11116	DAP-13087
Volume	3712	3696	3710	3754
Be-7	0.091 ± 0.019	0.112 ± 0.016	0.090 ± 0.026	0.059 ± 0.011
Nb-95	< 0.0005	< 0.0011	< 0.0018	< 0.0006
Zr-95	< 0.0010	< 0.0012	< 0.0032	< 0.0015
Ru-103	< 0.0006	< 0.0010	< 0.0019	< 0.0009
Ru-106	< 0.0059	< 0.0100	< 0.0120	< 0.0059
Cs-134	< 0.0005	< 0.0008	< 0.0018	< 0.0005
Cs-137	< 0.0008	< 0.0007	< 0.0011	< 0.0005
Ce-141	< 0.0010	< 0.0018	< 0.0023	< 0.0009
Ce-144	< 0.0046	< 0.0042	< 0.0071	< 0.0012

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Table 13. Airborne particulate samples, quarterly composites of weekly samples, analysis for gamma-emitting isotopes, 1995 (continued).

	Sample Description and Concentration (pCi/m^3)			
	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
	Location D-15			
Lab Code	DAP-2493	DAP-7717	DAP-11117	DAP-13088
Volume	3702	3711	3709	3754
Be-7	0.082 ± 0.016	0.112 ± 0.018	0.083 ± 0.018	0.051 ± 0.013
Nb-95	< 0.0006	< 0.0009	< 0.0016	< 0.0010
Zr-95	< 0.0006	< 0.0017	< 0.0027	< 0.0013
Ru-103	< 0.0005	< 0.0007	< 0.0007	< 0.0013
Ru-106	< 0.0055	< 0.0037	< 0.0076	< 0.0095
Cs-134	< 0.0007	< 0.0008	< 0.0007	< 0.0006
Cs-137	< 0.0004	< 0.0004	< 0.0006	< 0.0011
Ce-141	< 0.0013	< 0.0018	< 0.0014	< 0.0011
Ce-144	< 0.0034	< 0.0030	< 0.0019	< 0.0047
	Location D-16			
Lab Code	DAP-2494	DAP-7718	DAP-11118	DAP-13089
Volume	3706	3708	3709	3749
Be-7	0.085 ± 0.015	0.119 ± 0.014	0.090 ± 0.031	0.054 ± 0.010
Nb-95	< 0.0005	< 0.0006	< 0.0023	< 0.0008
Zr-95	< 0.0016	< 0.0011	< 0.0025	< 0.0009
Ru-103	< 0.0008	< 0.0009	< 0.0021	< 0.0007
Ru-106	< 0.0065	< 0.0050	< 0.0076	< 0.0043
Cs-134	< 0.0004	< 0.0008	< 0.0006	< 0.0004
Cs-137	< 0.0003	< 0.0003	< 0.0011	< 0.0006
Ce-141	< 0.0015	< 0.0005	< 0.0025	< 0.0008
Ce-144	< 0.0035	< 0.0023	< 0.0055	< 0.0018

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Table 14. Ambient gamma radiation (TLD), quarterly exposure, 1995.

Location	mR/91 days			
	1st. Qtr.	2nd. Qtr.	3rd. Qtr.	4th. Qtr.
Air Particulate Locations				
D-1	14.5 ± 0.3	12.2 ± 0.2	11.5 ± 0.2	12.3 ± 0.3
D-2	14.2 ± 0.2	13.2 ± 0.2	12.3 ± 0.2	14.4 ± 0.2
D-3	15.0 ± 0.2	13.2 ± 0.2	11.9 ± 0.2	13.6 ± 0.2
D-5	15.0 ± 0.2	14.5 ± 0.2	12.9 ± 0.2	14.5 ± 0.2
D-6	13.6 ± 0.2	12.7 ± 0.2	11.8 ± 0.2	12.2 ± 0.2
D-7	14.6 ± 0.2	14.6 ± 0.2	11.9 ± 0.2	14.5 ± 0.3
D-8	18.7 ± 0.3	17.5 ± 0.2	16.8 ± 0.2	18.7 ± 0.3
D-10	15.1 ± 0.2	14.5 ± 0.3	11.4 ± 0.3	14.4 ± 0.2
D-11	11.8 ± 0.3	9.8 ± 0.2	9.4 ± 0.2	7.8 ± 0.2
D-13	15.2 ± 0.2	16.9 ± 0.2	14.0 ± 0.3	16.3 ± 0.2
D-15	15.5 ± 0.2	14.4 ± 0.3	14.1 ± 0.4	14.1 ± 0.2
D-16	15.9 ± 0.2	14.9 ± 0.2	15.4 ± 0.2	15.0 ± 0.2
Mean ± s.d.	14.9 ± 1.6	14.0 ± 2.1	12.8 ± 2.0	14.0 ± 2.6
Within 0.5 Miles of Stack				
D-18	16.8 ± 0.2	16.7 ± 0.2	16.4 ± 0.2	18.1 ± 0.2
D-19	15.2 ± 0.3	15.9 ± 0.2	14.1 ± 0.3	17.6 ± 0.2
D-20	17.8 ± 0.2	18.4 ± 0.2	18.0 ± 0.2	20.9 ± 0.2
D-21	16.8 ± 0.4	17.2 ± 0.2	17.6 ± 0.4	19.0 ± 0.2
D-22	15.4 ± 0.3	15.3 ± 0.2	15.2 ± 0.2	15.8 ± 0.2
D-23	13.5 ± 0.2	12.9 ± 0.2	13.2 ± 0.2	13.5 ± 0.2
D-28	18.8 ± 0.3	17.9 ± 0.2	17.2 ± 0.2	17.7 ± 0.2
D-29	20.0 ± 0.3	18.4 ± 0.2	19.3 ± 0.2	18.7 ± 0.2
D-30	18.3 ± 0.2	18.7 ± 0.2	17.7 ± 0.2	18.3 ± 0.2
D-31	21.3 ± 0.4	19.9 ± 0.3	19.1 ± 0.2	19.0 ± 0.2
D-32	20.6 ± 0.3	18.4 ± 0.2	19.5 ± 0.3	18.5 ± 0.3
D-82	14.7 ± 0.2	13.6 ± 0.3	14.3 ± 0.2	13.5 ± 0.2
D-83	15.9 ± 0.3	15.7 ± 0.2	15.3 ± 0.2	15.7 ± 0.3
D-84	16.4 ± 0.2	16.0 ± 0.3	16.3 ± 0.3	16.2 ± 0.2
D-85	15.9 ± 0.3	15.6 ± 0.2	16.1 ± 0.2	16.0 ± 0.2
D-86	19.0 ± 0.3	17.8 ± 0.3	17.3 ± 0.3	17.7 ± 0.2
D-91	14.2 ± 0.2	ND[a]	12.5 ± 0.2	16.4 ± 0.2
Mean ± s.d.	17.1 ± 2.3	16.8 ± 1.9	16.4 ± 2.1	17.2 ± 2.0

[a] ND = No data; TLD lost in the field.

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Table 14. Ambient gamma radiation (TLD), quarterly exposure, 1995 (continued).

Location	mR/91 days			
	1st. Qtr.	2nd. Qtr.	3rd. Qtr.	4th. Qtr.
Within 1.0 Miles of Stack				
D-43	14.4 ± 0.3	15.9 ± 0.3	14.7 ± 0.2	16.4 ± 0.2
D-44	18.6 ± 0.3	19.9 ± 0.3	17.1 ± 0.3	20.5 ± 0.3
D-45	14.3 ± 0.3	14.4 ± 0.3	13.4 ± 0.2	11.7 ± 0.2
D-46	18.9 ± 0.3	19.1 ± 0.3	17.8 ± 0.4	19.2 ± 0.2
D-47	18.1 ± 0.3	15.6 ± 0.3	16.8 ± 0.3	18.3 ± 0.4
D-48	18.6 ± 0.2	20.2 ± 0.2	19.1 ± 0.2	18.7 ± 0.3
Mean ± s.d.	17.2 ± 2.2	17.5 ± 2.5	16.5 ± 2.1	17.5 ± 3.1
Within 3.0 Miles of Stack				
D-33	12.2 ± 0.3	13.2 ± 0.2	10.8 ± 0.2	12.1 ± 0.2
D-34	13.8 ± 0.2	13.1 ± 0.2	13.1 ± 0.3	12.7 ± 0.2
D-35	14.7 ± 0.2	14.1 ± 0.2	13.4 ± 0.3	13.7 ± 0.3
D-36	16.7 ± 0.3	14.6 ± 0.2	15.4 ± 0.2	14.2 ± 0.2
D-37	20.1 ± 0.3	15.9 ± 0.2	18.0 ± 0.2	15.8 ± 0.2
D-38	16.5 ± 0.2	15.3 ± 0.2	16.1 ± 0.2	13.9 ± 0.3
D-39	16.9 ± 0.2	17.1 ± 0.2	15.4 ± 0.2	16.6 ± 0.2
D-40	15.9 ± 0.4	15.2 ± 0.3	15.2 ± 0.2	14.3 ± 0.2
D-41	15.6 ± 0.3	15.8 ± 0.2	14.2 ± 0.2	16.8 ± 0.3
Mean ± s.d.	15.8 ± 2.2	14.9 ± 1.3	14.6 ± 2.1	14.5 ± 1.6

Table 15. Milk samples, analyses for iodine-131 and gamma-emitting isotopes.
Collection: Monthly during non-grazing season (October 1 through April 30); biweekly during grazing season (May 1 through September 30).

Date Collected	Lab Code	Concentration (pCi/L)					
		I-131	K-40	Cs-134	Cs-137	Ba-140	La-140
Indicator			Location D-63				
01-04-95	DMI - 0070	< 1.0	1140 ± 140	< 15	< 18	< 60	< 15
02-07-95	- 0854	< 1.0	1260 ± 110	< 15	< 18	< 60	< 15
03-07-95	- 1687	< 1.0	1400 ± 140	< 15	< 18	< 60	< 15
04-04-95	- 2368	< 1.0	1330 ± 110	< 15	< 18	< 60	< 15
05-02-95	- 3598, 9	< 1.0	1320 ± 90	< 15	< 18	< 60	< 15
05-16-95	- 4694	< 1.0	1260 ± 140	< 15	< 18	< 60	< 15
05-31-95	- 5509	< 1.0	1430 ± 110	< 15	< 18	< 60	< 15
06-13-95	- 6574	< 1.0	1520 ± 120	< 15	< 18	< 60	< 15
06-27-95	- 7032, 3	< 1.0	1550 ± 100	< 15	< 18	< 60	< 15
07-11-95	- 7577	< 1.0	1450 ± 130	< 15	< 18	< 60	< 15
07-24-95	- 8061	< 1.0	1460 ± 100	< 15	< 18	< 60	< 15
08-08-95	- 8588	< 1.0	1420 ± 120	< 15	< 18	< 60	< 15
08-22-95	- 9029	< 1.0	1560 ± 120	< 15	< 18	< 60	< 15
09-06-95	- 9460	< 1.0	1450 ± 160	< 15	< 18	< 60	< 15
09-19-95	- 9749	< 1.0	1480 ± 180	< 15	< 18	< 60	< 15
10-17-95	- 11018	< 1.0	1380 ± 120	< 15	< 18	< 60	< 15
11-07-95	- 11611, 2	< 1.0	1330 ± 100	< 15	< 18	< 60	< 15
12-05-95	- 12309	< 1.0	1280 ± 150	< 15	< 18	< 60	< 15
			Location D-72				
01-04-95	DMI - 0187, 8	< 1.0	1500 ± 110	< 15	< 18	< 60	< 15
02-07-95	- 0884	< 1.0	1520 ± 180	< 15	< 18	< 60	< 15
03-07-95	- 1688	< 1.0	1260 ± 100	< 15	< 18	< 60	< 15
04-04-95	NS[a]	-	-	-	-	-	-

[a] NS = No sample; Dairy out of business, dropped from program.

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Table 15. Milk samples, analyses for iodine-131 and gamma-emitting isotopes (continued).

Date Collected	Lab Code	Concentration (pCi/L)					
		I-131	K-40	Cs-134	Cs-137	Ba-140	La-140
Indicator			Location D-93				
01-04-95	NS[a]	-	-	-	-	-	-
02-07-95	DMI - 0856	< 1.0	1550 ± 160	< 15	< 18	< 60	< 15
03-07-95	- 1689	< 1.0	1720 ± 200	< 15	< 18	< 60	< 15
04-04-95	- 2369	< 1.0	1460 ± 160	< 15	< 18	< 60	< 15
05-02-95	- 3600	< 1.0	1600 ± 160	< 15	< 18	< 60	< 15
05-16-95	- 4695, 6	< 1.0	1570 ± 60	< 15	< 18	< 60	< 15
05-31-95	- 5510	< 1.0	1460 ± 150	< 15	< 18	< 60	< 15
06-13-95	- 6575	< 1.0	1660 ± 170	< 15	< 18	< 60	< 15
06-27-95	- 7034	< 1.0	1500 ± 160	< 15	< 18	< 60	< 15
07-11-95	- 7578	< 1.0	1570 ± 140	< 15	< 18	< 60	< 15
07-24-95	- 8062	< 1.0	1650 ± 70	< 15	< 18	< 60	< 15
08-08-95	- 8589	< 1.0	1720 ± 140	< 15	< 18	< 60	< 15
08-22-95	- 9030	< 1.0	1640 ± 160	< 15	< 18	< 60	< 15
09-06-95	- 9461	< 1.0	1670 ± 170	< 15	< 18	< 60	< 15
09-19-95	- 9750	< 1.0	1660 ± 160	< 15	< 18	< 60	< 15
10-17-95	- 11019	< 1.0	1800 ± 170	< 15	< 18	< 60	< 15
11-07-95	- 116132	< 1.0	1440 ± 160	< 15	< 18	< 60	< 15
12-05-95	- 12310	< 1.0	1370 ± 120	< 15	< 18	< 60	< 15
			Location D-96				
01-04-95	DMI - 0072	< 1.0	1430 ± 180	< 15	< 18	< 60	< 15
02-07-95	- 0857	< 1.0	1350 ± 140	< 15	< 18	< 60	< 15
03-07-95	- 1690	< 1.0	1510 ± 110	< 15	< 18	< 60	< 15
04-04-95	- 2370	< 1.0	1210 ± 140	< 15	< 18	< 60	< 15
05-02-95	- 3601	< 1.0	1340 ± 160	< 15	< 18	< 60	< 15
05-16-95	- 4697	< 1.0	1430 ± 150	< 15	< 18	< 60	< 15
05-31-95	- 5511	< 1.0	1470 ± 140	< 15	< 18	< 60	< 15
06-13-95	- 6576	< 1.0	1380 ± 170	< 15	< 18	< 60	< 15
06-27-95	- 7035	< 1.0	1300 ± 160	< 15	< 18	< 60	< 15
07-11-95	- 7579	< 1.0	1470 ± 160	< 15	< 18	< 60	< 15
07-24-95	- 8063	< 1.0	1400 ± 90	< 15	< 18	< 60	< 15
08-08-95	- 8590	< 1.0	1450 ± 170	< 15	< 18	< 60	< 15
08-22-95	- 9031	< 1.0	1580 ± 160	< 15	< 18	< 60	< 15
09-06-95	- 9462	< 1.0	1480 ± 180	< 15	< 18	< 60	< 15
09-19-95	- 9751	< 1.0	1400 ± 120	< 15	< 18	< 60	< 15
10-17-95	- 11020	< 1.0	1360 ± 170	< 15	< 18	< 60	< 15
11-07-95	- 11614	< 1.0	1590 ± 170	< 15	< 18	< 60	< 15
12-05-95	- 12311	< 1.0	1660 ± 200	< 15	< 18	< 60	< 15

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

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Table 15. Milk samples, analyses for iodine-131 and gamma-emitting isotopes (continued).

Date Collected	Lab Code	Concentration (pCi/L)					
		I-131	K-40	Cs-134	Cs-137	Ba-140	La-140
Indicator			Location D-101				
01-04-95	NS[a]	-	-	-	-	-	-
02-07-95	NS	-	-	-	-	-	-
03-07-95	NS	-	-	-	-	-	-
04-04-95	NS	-	-	-	-	-	-
05-02-95	NS	-	-	-	-	-	-
05-16-95	NS	-	-	-	-	-	-
05-31-95	NS	-	-	-	-	-	-
06-13-95	NS	-	-	-	-	-	-
06-27-95	DMI - 7036	< 1.0	1560 ± 110	< 15	< 18	< 60	< 15
07-11-95	NS[a]	-	-	-	-	-	-
07-24-95	DMI - 8064	< 1.0	1350 ± 80	< 15	< 18	< 60	< 15
08-08-95	- 8591	< 1.0	1930 ± 210	< 15	< 18	< 60	< 15
08-22-95	- 9032	< 1.0	1630 ± 170	< 15	< 18	< 60	< 15
09-06-95	- 9463, 4	< 1.0	1780 ± 110	< 15	< 18	< 60	< 15
09-19-95	- 9752	< 1.0	1740 ± 170	< 15	< 18	< 60	< 15
10-17-95	- 11021	< 1.0	1860 ± 160	< 15	< 18	< 60	< 15
11-07-95	11615	< 1.0	1700 ± 180	< 15	< 18	< 60	< 15
12-05-95	12312	< 1.0	1500 ± 160	< 15	< 18	< 60	< 15
Control			Location D-105				
01-04-95	DMI - 0073	< 1.0	1330 ± 160	< 15	< 18	< 60	< 15
02-07-95	- 0858	< 1.0	1310 ± 170	< 15	< 18	< 60	< 15
03-07-95	- 1691	< 1.0	1380 ± 160	< 15	< 18	< 60	< 15
04-04-95	- 2371	< 1.0	1410 ± 150	< 15	< 18	< 60	< 15
05-02-95	- 3602	< 1.0	1390 ± 190	< 15	< 18	< 60	< 15
05-16-95	- 4698	< 1.0	1520 ± 150	< 15	< 18	< 60	< 15
05-31-95	- 5512	< 1.0	1370 ± 110	< 15	< 18	< 60	< 15
06-13-95	- 6577	< 1.0	1510 ± 180	< 15	< 18	< 60	< 15
06-27-95	- 7037	< 1.0	1410 ± 50	< 15	< 18	< 60	< 15
07-11-95	NS[a]	-	-	-	-	-	-
07-24-95	DMI - 8065	< 1.0	1320 ± 90	< 15	< 18	< 60	< 15
08-08-95	- 8592	< 1.0	1270 ± 160	< 15	< 18	< 60	< 15
08-22-95	- 9033	< 1.0	1650 ± 160	< 15	< 18	< 60	< 15
09-06-95	- 9465	< 1.0	1480 ± 160	< 15	< 18	< 60	< 15
09-19-95	- 9753	< 1.0	1380 ± 140	< 15	< 18	< 60	< 15
10-17-95	- 11022	< 1.0	1390 ± 150	< 15	< 18	< 60	< 15
11-07-95	- 11616	< 1.0	1370 ± 150	< 15	< 18	< 60	< 15
12-05-95	- 12313	< 1.0	1460 ± 180	< 15	< 18	< 60	< 15

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

Table 16. Ground water samples, analysis for gross beta and tritium.
Collection: Quarterly, 1995.

		Concentration (pCi/L)	
Location and Collection	Lab Code	Gross Beta	H-3
D-53			
Treated Municipal Water			
1st. Quarter	DWW - 2212	2.1 ± 0.5	< 330
2nd. Quarter	- 7044	2.9 ± 0.5	< 330
3rd. Quarter	- 10205	2.4 ± 0.5	< 330
4th. Quarter	- 12722	2.7 ± 0.5	< 330
Annual Mean ± s.d.		2.5 ± 0.3	< 330
D-54			
Inlet to Municipal Water Treatment			
1st. Quarter	DWW - 2213	3.0 ± 0.6	< 330
2nd. Quarter	- 7045	3.4 ± 0.6	< 330
3rd. Quarter	- 10206	2.7 ± 0.5	< 330
4th. Quarter	- 12723	3.0 ± 0.4	< 330
Annual Mean ± s.d.		3.0 ± 0.2	< 330
D-55			
On-site Well			
1st. Quarter	DWW - 2214	1.6 ± 0.5	< 330
2nd. Quarter	- 7046	0.7 ± 0.5	< 330
3rd. Quarter	- 10207	<0.8	< 330
4th. Quarter	- 12724	<0.8	< 330
Annual Mean ± s.d.		1.2 ± 0.5	< 330
D-57			
Bull Farm			
1st. Quarter	DWW - 2215	1.3 ± 0.5	< 330
2nd. Quarter	- 7047	1.3 ± 0.5	< 330
3rd. Quarter	- 10208	1.4 ± 0.5	< 330
4th. Quarter	- 12725	1.4 ± 0.5	< 330
Annual Mean ± s.d.		1.4 ± 0.0	< 330

Table 16. Ground water samples, analysis for gross beta and tritium.
Collection: Quarterly, 1995.

Location and Collection	Lab Code	Concentration (pCi/L) Gross Beta	H-3
D-58			
Franz Farm			
1st. Quarter	DWW - 2216	6.9 ± 0.7	< 330
2nd. Quarter	- 7048	6.5 ± 0.7	< 330
3rd. Quarter	- 10209	6.6 ± 0.7	< 330
4th. Quarter	- 12726	9.6 ± 0.7	< 330
Annual Mean ± s.d.		7.4 ± 1.3	< 330
D-72			
Van Note Farm			
1st. Quarter	DWW - 2217	1.0 ± 0.5	< 330
2nd. Quarter	- 7049	0.8 ± 0.5	< 330
3rd. Quarter	- 10210	0.9 ± 0.5	< 330
4th. Quarter	- 12727	2.0 ± 0.4	< 330
Annual Mean ± s.d.		1.2 ± 0.5	< 330

Table 17. Vegetation samples (broadleaf), analyses for iodine-131 and gamma-emitting isotopes.
Collection: Annually

Sample Description and Concentration (pCi/g wet)

	Indicator			
Location	D-57	D-93	D-94	D-106
Date Collected	07-11-95	07-11-95	07-11-95	07-11-95
Type	Cabbage	Lettuce	Cabbage	Lettuce
Lab Code	DVE-07581	DVE-7582	DVE-7583	DVE-7585
I-131	< 0.014	< 0.007	< 0.012	< 0.023
K-40	2.08±0.23	3.23±0.26	2.44±0.21	2.17±0.31
Mn-54	< 0.009	< 0.008	< 0.007	< 0.006
Co-58	< 0.010	< 0.007	< 0.003	< 0.007
Co-60	< 0.008	< 0.010	< 0.009	< 0.013
Nb-95	< 0.009	< 0.004	< 0.006	< 0.018
Zr-95	< 0.011	< 0.010	< 0.005	< 0.026
Ru-103	< 0.009	< 0.011	< 0.004	< 0.017
Ru-106	< 0.095	< 0.081	< 0.048	< 0.081
Cs-134	< 0.005	< 0.009	< 0.006	< 0.016
Cs-137	< 0.008	< 0.010	< 0.008	< 0.016
Ce-141	< 0.024	< 0.015	< 0.011	< 0.031
Ce-144	< 0.074	< 0.072	< 0.053	< 0.12

	Control
Location	D-105
Date Collected	07-11-95
Type	Lettuce
Lab Code	DVE-7584
I-131	< 0.022
K-40	3.54±0.45
Mn-54	< 0.015
Co-58	< 0.029
Co-60	< 0.012
Nb-95	< 0.017
Zr-95	< 0.011
Ru-103	< 0.017
Ru-106	< 0.13
Cs-134	< 0.010
Cs-137	< 0.014
Ce-141	< 0.021
Ce-144	< 0.15

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Table 17. Vegetation samples, analyses for iodine-131 and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/g wet)

	Indicator					
Location	D-16	D-57	D-58	D-63	D-72	D-93
Date Collected	09-27-95	10-03-95	10-03-95	10-03-95	10-03-95	10-03-95
Type	Soybeans	Corn	Corn	Corn	Corn	Corn
Lab Code	DVE-10366	DVE-10367	DVE-10368	DVE-11023	DVE-10369	DVE-11024
I-131	< 0.023	< 0.029	< 0.020	< 0.017	< 0.023	< 0.053
K-40	11.42±0.62	2.65±0.35	2.27±0.33	2.77±0.28	2.73±0.28	3.16±0.27
Mn-54	< 0.017	< 0.016	< 0.010	< 0.007	< 0.006	< 0.005
Co-58	< 0.014	< 0.013	< 0.006	< 0.003	< 0.009	< 0.005
Co-60	< 0.019	< 0.014	< 0.016	< 0.004	< 0.011	< 0.011
Nb-95	< 0.010	< 0.014	< 0.013	< 0.016	< 0.020	< 0.008
Zr-95	< 0.021	< 0.015	< 0.025	< 0.032	< 0.015	< 0.017
Ru-103	< 0.014	< 0.009	< 0.013	< 0.011	< 0.007	< 0.012
Ru-106	< 0.11	< 0.060	< 0.064	< 0.10	< 0.11	< 0.074
Cs-134	< 0.019	< 0.014	< 0.007	< 0.005	< 0.010	< 0.007
Cs-137	< 0.024	< 0.012	< 0.008	< 0.004	< 0.005	0.021±0.012
Ce-141	< 0.030	< 0.032	< 0.017	< 0.020	< 0.011	< 0.016
Ce-144	< 0.064	< 0.11	< 0.085	< 0.081	< 0.072	< 0.073

	Indicator		Control
Location	D-94	D-106	D-105
Date Collected	10-03-95	10-03-95	10-03-95
Type	Corn	Corn	Corn
Lab Code	DVE-11025	DVE-10372	DVE-10370, 1
I-131	< 0.009	< 0.024	< 0.018
K-40	3.65±0.38	3.96±0.37	3.32±0.33
Mn-54	< 0.018	< 0.008	< 0.011
Co-58	< 0.015	< 0.009	< 0.015
Co-60	< 0.022	< 0.007	< 0.009
Nb-95	< 0.025	< 0.015	< 0.009
Zr-95	< 0.033	< 0.035	< 0.028
Ru-103	< 0.021	< 0.011	< 0.011
Ru-106	< 0.13	< 0.077	< 0.084
Cs-134	< 0.011	< 0.008	< 0.016
Cs-137	< 0.022	< 0.012	< 0.020
Ce-141	< 0.020	< 0.022	< 0.026
Ce-144	< 0.12	< 0.069	< 0.053

Table 18. Vegetation samples (hay and grain), analyses for gamma-emitting isotopes.
Collection: Annually

Sample Description and Concentration (pCi/g wet)

	Indicator				
Location	D-16	D-57	D-63	D-72	D-93
Date Collected	07-11-95	08-31-95	08-22-95	08-31-95	08-31-95
Type	Grass	Hay	Hay	Hay	Hay
Lab Code	DVE-7580	DVE-9319	DVE-9320	DVE-9321	DVE-9322
K-40	11.91±0.89	10.86±0.26	13.92±0.59	15.79±0.69	15.20±0.66
Mn-54	< 0.016	<0.045	<0.019	<0.018	<0.020
Co-58	<0.029	<0.050	<0.024	<0.026	<0.015
Co-60	<0.037	<0.044	<0.023	<0.040	<0.017
Nb-95	<0.025	<0.035	<0.027	<0.029	<0.028
Zr-95	<0.075	<0.11	<0.047	<0.041	<0.053
Ru-103	<0.030	<0.045	<0.024	<0.024	<0.028
Ru-106	<0.32	<0.40	<0.11	<0.23	<0.24
Cs-134	<0.028	<0.024	<0.026	<0.028	<0.026
Cs-137	<0.032	<0.056	<0.024	<0.031	<0.021
Ce-141	<0.036	<0.063	<0.019	<0.036	<0.025
Ce-144	<0.16	<0.32	<0.11	<0.13	<0.099

	Indicator		Control
Location	D-94	D-106	D-105
Date Collected	08-31-95	08-31-95	08-31-95
Type	Hay	Hay	Hay
Lab Code	DVE-9323	DVE-9325	DVE-9324
K-40	11.76±0.74	16.12±0.68	15.13±0.50
Mn-54	<0.027	<0.028	<0.016
Co-58	<0.014	<0.025	<0.021
Co-60	<0.036	<0.038	<0.026
Nb-95	<0.023	<0.021	<0.025
Zr-95	<0.041	<0.062	<0.037
Ru-103	<0.022	<0.016	<0.016
Ru-106	<0.13	<0.22	<0.18
Cs-134	<0.035	<0.031	<0.020
Cs-137	<0.034	<0.029	<0.018
Ce-141	<0.036	<0.048	<0.027
Ce-144	<0.15	<0.24	<0.054

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Table 19. Surface water samples, analysis for iodine-131 and gamma-emitting isotopes.
Collection: Monthly

Sample Description and Concentration (pCi/L)

Indicator

D-50 - Plant Intake

Date Collected	01-25-95	02-22-95	03-29-95	04-26-95	05-24-95	06-21-95
Lab Code	DSW-0819	DSW-1416	DSW-2208	DSW-3604	DSW-5390	DSW-7039
I-131	< 15	< 15	< 15	< 15	< 15	< 15
Mn-54	< 15	< 15	< 15	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30	< 30	< 30	< 30
Co-58	< 15	< 15	< 15	< 15	< 15	< 15
Co-60	< 15	< 15	< 15	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30	< 30	< 30	< 30
Nb-95	< 15	< 15	< 15	< 15	< 15	< 30
Zr-95	< 30	< 30	< 30	< 30	< 30	< 30
Cs-134	< 15	< 15	< 15	< 15	< 15	< 15
Cs-137	< 18	< 18	< 18	< 18	< 18	< 18
Ba-140	< 60	< 60	< 60	< 60	< 60	< 60
La-140	< 15	< 15	< 15	< 15	< 15	< 15

Date Collected	07-26-95	08-30-95	09-27-95	10-25-95	11-29-95	12-20-95
Lab Code	DSW-8296	DSW-9458	DSW-10200	DSW-11318	DSW-12198	DSW-12717
I-131	< 15	< 15	< 15	< 15	< 15	< 15
Mn-54	< 15	< 15	< 15	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30	< 30	< 30	< 30
Co-58	< 15	< 15	< 15	< 15	< 15	< 15
Co-60	< 15	< 15	< 15	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30	< 30	< 30	< 30
Nb-95	< 15	< 15	< 15	< 15	< 15	< 15
Zr-95	< 30	< 30	< 30	< 30	< 30	< 30
Cs-134	< 15	< 15	< 15	< 15	< 15	< 15
Cs-137	< 18	< 18	< 18	< 18	< 18	< 18
Ba-140	< 60	< 60	< 60	< 60	< 60	< 60
La-140	< 15	< 15	< 15	< 15	< 15	< 15

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Table 19. Surface water samples, analysis for iodine-131 and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/L)

Indicator	D-51 - Plant Discharge					
Date Collected	01-25-95	02-22-95	03-29-95	04-26-95	05-24-95	06-21-95
Lab Code	DSW-0820	DSW-1417	DSW-2209	DSW-3605	DSW-5391	DSW-7040
I-131	< 15	< 15	< 15	< 15	< 15	< 15
Mn-54	< 15	< 15	< 15	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30	< 30	< 30	< 30
Co-58	< 15	< 15	< 15	< 15	< 15	< 15
Co-60	< 15	< 15	< 15	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30	< 30	< 30	< 30
Nb-95	< 15	< 15	< 15	< 15	< 15	< 15
Zr-95	< 30	< 30	< 30	< 30	< 30	< 30
Cs-134	< 15	< 15	< 15	< 15	< 15	< 15
Cs-137	< 18	< 18	< 18	< 18	< 18	< 18
Ba-140	< 60	< 60	< 60	< 60	< 60	< 60
La-140	< 15	< 15	< 15	< 15	< 15	< 15
Date Collected	07-26-95	08-30-95	09-27-95	10-25-95	11-29-95	12-20-95
Lab Code	DSW-8297	DSW-9459	DSW-10201	DSW-11319	DSW-12199	DSW-12718
I-131	< 15	< 15	< 15	< 15	< 15	< 15
Mn-54	< 15	< 15	< 15	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30	< 30	< 30	< 30
Co-58	< 15	< 15	< 15	< 15	< 15	< 15
Co-60	< 15	< 15	< 15	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30	< 30	< 30	< 30
Nb-95	< 15	< 15	< 15	< 15	< 15	< 15
Zr-95	< 30	< 30	< 30	< 30	< 30	< 30
Cs-134	< 15	< 15	< 15	< 15	< 15	< 15
Cs-137	< 18	< 18	< 18	< 18	< 18	< 18
Ba-140	< 60	< 60	< 60	< 60	< 60	< 60
La-140	< 15	< 15	< 15	< 15	< 15	< 15

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Table 19. Surface water samples, analysis for iodine-131 and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/L)

Indicator	D-99 - Pleasant Creek					
Date Collected	02-02-95	02-24-95	03-29-95	04-28-95	05-26-95	06-26-95
Lab Code	DSW-0821	DSW-1418	DSW-2210	DSW-3606	DSW-5392	DSW-7041
I-131	< 15	< 15	< 15	< 15	< 15	< 15
Mn-54	< 15	< 15	< 15	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30	< 30	< 30	< 30
Co-58	< 15	< 15	< 15	< 15	< 15	< 15
Co-60	< 15	< 15	< 15	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30	< 30	< 30	< 30
Nb-95	< 15	< 15	< 15	< 15	< 15	< 15
Zr-95	< 30	< 30	< 30	< 30	< 30	< 30
Cs-134	< 15	< 15	< 15	< 15	< 15	< 15
Cs-137	< 18	< 18	< 18	< 18	< 18	< 18
Ba-140	< 60	< 60	< 60	< 60	< 60	< 60
La-140	< 15	< 15	< 15	< 15	< 15	< 15
Date Collected	07-25-95	08-31-95	09-26-95	10-23-95	11-29-95	12-18-95
Lab Code	DSW-8067	DSW-9368	DSW-10202	DSW-11320	DSW-12200	DSW-12719
I-131	< 15	< 15	< 15	< 15	< 15	< 15
Mn-54	< 15	< 15	< 15	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30	< 30	< 30	< 30
Co-58	< 15	< 15	< 15	< 15	< 15	< 15
Co-60	< 15	< 15	< 15	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30	< 30	< 30	< 30
Nb-95	< 15	< 15	< 15	< 15	< 15	< 15
Zr-95	< 30	< 30	< 30	< 30	< 30	< 30
Cs-134	< 15	< 15	< 15	< 15	< 15	< 15
Cs-137	< 18	< 18	< 18	< 18	< 18	< 18
Ba-140	< 60	< 60	< 60	< 60	< 60	< 60
La-140	< 15	< 15	< 15	< 15	< 15	< 15

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Table 19. Surface water samples, analysis for iodine-131 and gamma-emitting isotopes (continued).

Sample Description and Concentration (pCi/L)

Indicator	D-49 - Lewis Access					
Date Collected	02-02-95	02-24-95	03-29-95	04-28-95	05-26-95	06-26-95
Lab Code	DSW-0817, 8	DSW-1415	DSW-2207	DSW-3603	DSW-5389	DSW-7038
I-131	< 15	< 15	< 15	< 15	< 15	< 15
Mn-54	< 15	< 15	< 15	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30	< 30	< 30	< 30
Co-58	< 15	< 15	< 15	< 15	< 15	< 15
Co-60	< 15	< 15	< 15	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30	< 30	< 30	< 30
Nb-95	< 15	< 15	< 15	< 15	< 15	< 15
Zr-95	< 30	< 30	< 30	< 30	< 30	< 30
Cs-134	< 15	< 15	< 15	< 15	< 15	< 15
Cs-137	< 18	< 18	< 18	< 18	< 18	< 18
Ba-140	< 60	< 60	< 60	< 60	< 60	< 60
La-140	< 15	< 15	< 15	< 15	< 15	< 15
Date Collected	07-25-95	08-31-95	09-26-95	10-213	11-29-95	12-18-95
Lab Code	DSW-8066	DSW-9367	DSW-10199	DSW-11317	DSW-12197	DSW-12716
I-131	< 15	< 15	< 15	< 15	< 15	< 15
Mn-54	< 15	< 15	< 15	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30	< 30	< 30	< 30
Co-58	< 15	< 15	< 15	< 15	< 15	< 15
Co-60	< 15	< 15	< 15	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30	< 30	< 30	< 30
Nb-95	< 15	< 15	< 15	< 15	< 15	< 15
Zr-95	< 30	< 30	< 30	< 30	< 30	< 30
Cs-134	< 15	< 15	< 15	< 15	< 15	< 15
Cs-137	< 18	< 18	< 18	< 18	< 18	< 18
Ba-140	< 60	< 60	< 60	< 60	< 60	< 60
La-140	< 15	< 15	< 15	< 15	< 15	< 15

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Table 20. Surface water samples, analysis for potassium-40, iodine-131 and gamma-emitting isotopes.
Collection: Monthly

Sample Description and Concentration (pCi/L)

Indicator

D-107 - Plant Sewage Discharge

Date Collected	02-02-95	02-24-95	03-29-95	04-28-95	05-26-95	06-26-95
Lab Code	DSW-0822	DSW-1419	DSW-2211	DSW-3607	DSW-5393	DSW-7042
K-40	29.41	25.92	25.09	18.17	22.31	15.97
I-131	< 15	< 15	< 15	< 15	< 15	< 15
Mn-54	< 15	< 15	< 15	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30	< 30	< 30	< 30
Co-58	< 15	< 15	< 15	< 15	< 15	< 15
Co-60	< 15	< 15	< 15	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30	< 30	< 30	< 30
Nb-95	< 15	< 15	< 15	< 15	< 15	< 15
Zr-95	< 30	< 30	< 30	< 30	< 30	< 30
Cs-134	< 15	< 15	< 15	< 15	< 15	< 15
Cs-137	< 18	< 18	< 18	< 18	< 18	< 18
Ba-140	< 60	< 60	< 60	< 60	< 60	< 60
La-140	< 15	< 15	< 15	< 15	< 15	< 15

Date Collected	07-25-95	08-31-95	09-26-95	10-23-95	11-29-95	12-18-95
Lab Code	DSW-8068	DSW-9369	DSW-10203	DSW-11321	DSW-12201	DSW-12720
K-40	13.84	12.98	16.44	16.44	19.90	19.03
I-131	< 15	< 15	< 15	< 15	< 15	< 15
Mn-54	< 15	< 15	< 15	< 15	< 15	< 15
Fe-59	< 30	< 30	< 30	< 30	< 30	< 30
Co-58	< 15	< 15	< 15	< 15	< 15	< 15
Co-60	< 15	< 15	< 15	< 15	< 15	< 15
Zn-65	< 30	< 30	< 30	< 30	< 30	< 30
Nb-95	< 15	< 15	< 15	< 15	< 15	< 15
Zr-95	< 30	< 30	< 30	< 30	< 30	< 30
Cs-134	< 15	< 15	< 15	< 15	< 15	< 15
Cs-137	< 18	< 18	< 18	< 18	< 18	< 18
Ba-140	< 60	< 60	< 60	< 60	< 60	< 60
La-140	< 15	< 15	< 15	< 15	< 15	< 15

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Table 21. Surface water samples, quarterly composites of monthly samples, analysis for tritium, 1995.

Location and Collection Period	Lab Code	Concentration (pCi/L)
		H-3
Indicator		
D-50		
1st. Quarter	DSW - 2233	< 330
2nd. Quarter	- 7051	< 330
3rd. Quarter	- 10212	< 330
4th. Quarter	- 12729	< 330
Annual Mean ± s.d.		< 330
D-51		
1st. Quarter	DSW - 2234	< 330
2nd. Quarter	- 7052	< 330
3rd. Quarter	- 10213	< 330
4th. Quarter	- 12730, 1	< 330
Annual Mean ± s.d.		< 300
D-99		
1st. Quarter	DSW - 2235	< 330
2nd. Quarter	- 7053, 4	< 330
3rd. Quarter	- 10214	< 330
4th. Quarter	- 12732	< 330
Annual Mean ± s.d.		< 330
D-107		
1st. Quarter	DSW - 2236	< 330
2nd. Quarter	- 7055	< 330
3rd. Quarter	- 10215	< 330
4th. Quarter	- 12733	< 330
Annual Mean ± s.d.		< 330
Control		
D-49		
1st. Quarter	DSW - 2232	< 330
2nd. Quarter	- 7050	< 330
3rd. Quarter	- 10211	< 330
4th. Quarter	- 12728	< 330
Annual Mean ± s.d.		< 330

Table 22. Fish samples, analysis of edible portion for gamma-emitting isotopes.
Collection: Semiannually

Sample Description and Concentration (pCi/g dry)

Indicator	Downstream D-61	
Date Collected	06-29-95	06-29-95
Type	Carp	Buffalo
Lab Code	DF-7289	DF-7290
K-40	2.82±0.44	3.08±0.40
Mn-54	< 0.015	< 0.009
Co-58	< 0.022	< 0.007
Co-60	< 0.010	< 0.017
Fe-59	< 0.049	< 0.042
Zn-65	< 0.028	< 0.028
Nb-95	< 0.017	< 0.024
Zr-95	< 0.026	< 0.036
Ru-103	< 0.013	< 0.021
Ru-106	< 0.082	< 0.064
Cs-134	< 0.014	< 0.007
Cs-137	< 0.019	< 0.015
Ce-141	< 0.058	< 0.028
Ce-144	< 0.089	< 0.083
Date Collected	09-29-95	09-29-95
Type	Carp	Carpsucker
Lab Code	DF-10316	DF-10318
K-40	2.64±0.34	2.85±0.49
Mn-54	< 0.013	< 0.021
Co-58	< 0.014	< 0.008
Co-60	< 0.019	< 0.017
Fe-59	< 0.029	< 0.042
Zn-65	< 0.033	< 0.022
Nb-95	< 0.011	< 0.017
Zr-95	< 0.035	< 0.040
Ru-103	< 0.010	< 0.018
Ru-106	< 0.12	< 0.14
Cs-134	< 0.016	< 0.023
Cs-137	< 0.015	< 0.020
Ce-141	< 0.019	< 0.025
Ce-144	< 0.090	< 0.10

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Table 22. Fish samples, analysis of edible portion for gamma-emitting isotopes.
Collection: Semiannually

Sample Description and Concentration (pCi/g wet)

Control	Upstream D-49	
Date Collected	06-29-95	06-29-95
Type	Carp	Redhorse
Lab Code	DF-7287	DF-7288
K-40	3.15±0.39	3.35±0.39
Mn-54	< 0.009	< 0.015
Co-58	< 0.011	< 0.017
Co-60	< 0.014	< 0.016
Fe-59	< 0.040	< 0.023
Zn-65	< 0.032	< 0.017
Nb-95	< 0.007	< 0.021
Zr-95	< 0.024	< 0.039
Ru-103	< 0.013	< 0.016
Ru-106	< 0.12	< 0.12
Cs-134	< 0.007	< 0.015
Cs-137	< 0.014	< 0.012
Ce-141	< 0.023	< 0.054
Ce-144	< 0.049	< 0.12
Date Collected	09-29-95	09-29-95
Type	Carp	Carpsucker
Lab Code	DF-10315	DF-10317
K-40	2.63±0.46	2.42±0.44
Mn-54	< 0.010	< 0.020
Co-58	< 0.014	< 0.010
Co-60	< 0.010	< 0.024
Fe-59	< 0.039	< 0.047
Zn-65	< 0.028	< 0.036
Nb-95	< 0.009	< 0.016
Zr-95	< 0.030	< 0.019
Ru-103	< 0.008	< 0.011
Ru-106	< 0.066	< 0.11
Cs-134	< 0.015	< 0.018
Cs-137	< 0.012	< 0.014
Ce-141	< 0.014	< 0.019
Ce-144	< 0.069	< 0.098

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Table 23. River sediment samples, analysis for gamma-emitting isotopes.
Collection: Semiannually

Sample Description and Concentration (pCi/g dry)

	Indicator			
Location	D-51	D-107	D-51	D-107
Date Collected	06-14-95	06-14-95	09-07-95	09-07-95
Lab Code	DBS-6433	DBS-6434	DBS-9710, 1	DBS-9712
K-40	11.29±0.62	7.93±0.65	8.56±0.25	7.97±0.39
Mn-54	< 0.021	< 0.039	< 0.009	< 0.012
Co-58	< 0.014	< 0.033	< 0.012	< 0.018
Co-60	< 0.023	0.140±0.023	< 0.009	0.057±0.014
Nb-95	< 0.038	< 0.11	< 0.013	< 0.009
Zr-95	< 0.050	< 0.065	< 0.009	< 0.018
Ru-103	< 0.031	< 0.063	< 0.013	< 0.015
Ru-106	< 0.14	< 0.18	< 0.041	< 0.057
Cs-134	< 0.025	< 0.038	< 0.018	< 0.030
Cs-137	0.054±0.021	< 0.032	< 0.010	0.026±0.012
Ce-141	< 0.10	< 0.11	< 0.025	< 0.038
Ce-144	< 0.19	< 0.11	< 0.071	< 0.069

	Control	
Location	D-50	D-50
Date Collected	06-14-95	09-07-95
Lab Code	DBS-6432	DBS-9709
K-40	8.80±0.61	9.51±0.46
Mn-54	< 0.020	< 0.013
Co-58	< 0.029	< 0.022
Co-60	< 0.022	< 0.013
Nb-95	< 0.033	< 0.015
Zr-95	< 0.028	< 0.011
Ru-103	< 0.038	< 0.015
Ru-106	< 0.20	< 0.071
Cs-134	< 0.022	< 0.029
Cs-137	< 0.020	< 0.016
Ce-141	< 0.079	< 0.042
Ce-144	< 0.17	< 0.11

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Table 24. Precipitation samples, analysis for gamma-emitting isotopes.
Collection: Monthly, 1995.

Sample Description and Concentration (pCi/L)

Collection Period	January	February	March	April	May	June
Lab Code	DP-0823	DP-1420[a]	DP-2218	DP-3608	DP-5394	DP-7043
Mn-54	< 7.0	< 19.2	< 3.4	< 2.0	< 6.1	< 1.8
Fe-59	< 11.4	< 18.1	< 6.3	< 4.0	< 14.7	< 5.3
Co-58	< 8.5	< 20.3	< 5.0	< 4.7	< 7.0	< 2.8
Co-60	< 6.6	< 24.7	< 3.2	< 3.8	< 3.3	< 2.5
Zn-65	< 14.5	< 68.3	< 7.4	< 6.0	< 11.2	< 3.1
Nb-95	< 8.1	< 11.5	< 3.5	< 3.5	< 6.2	< 3.4
Zr-95	< 11.1	< 36.0	< 6.1	< 4.9	< 15.1	< 4.2
I-131	< 6.5	< 31.4	< 9.0	< 2.7	< 7.5	< 8.3
Cs-134	< 6.7	< 21.5	< 2.1	< 2.3	< 6.7	< 3.3
Cs-137	< 6.4	< 22.7	< 5.7	< 3.1	< 5.6	< 2.8
Ba-140	< 29.3	< 61.7	< 19.2	< 10.4	< 30.1	< 20.3
La-140	< 4.1	< 19.4	< 3.1	< 2.2	< 6.7	< 5.7

Collection Period	July	August	September	October	November	December
Lab Code	DP-8298[a]	DP-9370	DP-10204	DP-11322	DP-12202	DP-112721
Mn-54	< 6.2	< 6.3	< 3.0	< 7.0	< 7.9	< 5.3
Fe-59	< 20.5	< 26.9	< 8.3	< 11.9	< 18.3	< 8.7
Co-58	< 8.6	< 7.1	< 2.4	< 6.1	< 4.1	< 3.1
Co-60	< 7.6	< 3.7	< 3.8	< 6.3	< 6.7	< 3.6
Zn-65	< 11.1	< 7.5	< 5.4	< 9.9	< 15.1	< 6.8
Nb-95	< 8.1	< 4.7	< 4.2	< 7.8	< 9.7	< 7.6
Zr-95	< 20.9	< 6.4	< 5.3	< 9.9	< 20.0	< 7.1
I-131	< 58.4[b]	< 4.0	< 8.6	< 25.2	< 16.7	< 10.1
Cs-134	< 8.4	< 3.4	< 4.6	< 7.6	< 8.1	< 2.2
Cs-137	< 8.9	< 5.0	< 3.8	< 6.4	< 8.8	< 4.1
Ba-140	< 75.1	< 36.3	< 24.1	< 47.8	< 55.8	< 20.6
La-140	< 13.7	< 4.5	< 6.0	< 8.5	< 11.2	< 3.0

[a] LLDs are high due to low volume.
[b] Corrected data.

Table 25. Precipitation samples, quarterly composites of monthly samples, analysis for tritium, 1995.

Location and Collection Period	Lab Code	H-3 Concentration (pCi/L)
1st Quarter	DP - 2237	< 169
2nd Quarter	- 7056	< 146
3rd Quarter	- 10216, 7	< 152
4th Quarter	- 12734	< 155

NOTE: Page 43 is intentionally left out. Refer to Part I, p. 14, footnote "c".

Table 27. Soil samples, analyses for strontium-90 and gamma-emitting isotopes.
Collection: Annually

Sample Description and Concentration (pCi/g dry)

Location	D-15	D-16
Date Collected	10-03-95	10-03-95
Lab Code	DSO-10364	DSO-10365
Sr-90	0.051±0.011	0.036±0.009
K-40	16.46±0.72	10.34±0.99
Mn-54	< 0.022	< 0.037
Co-58	< 0.035	< 0.051
Co-60	< 0.021	< 0.036
Nb-95	< 0.017	< 0.050
Zr-95	< 0.022	< 0.078
Ru-103	< 0.023	< 0.042
Ru-106	< 0.18	< 0.27
Cs-134	< 0.063	< 0.070
Cs-137	0.199±0.036	0.225±0.052
Ce-141	< 0.065	< 0.079
Ce-144	< 0.16	< 0.28