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CORPORATE AFFAIRS

April 21, 1993

U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318
Radiological Environmental Monitoring Program Annual Report

REFERENCE: (a) Calvert Cliffs Nuclear Power Plant Technical Specification 6.9 1.7 and Section 3/4.12

Gentlemen:

In accordance with Reference (a), the Baltimore Gas and Electric Company is submitting the Annual Radiological Environmental Monitoring Report, dated March 1993.

Should you have any further questions regarding this matter, we will be pleased to discuss them with you.

Very truly yours,

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RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

ANNUAL REPORT

for the

CALVERT CLIFFS NUCLEAR POWER PLANT

UNITS 1 AND 2

January 1–December 31, 1992

Prepared by

BALTIMORE GAS & ELECTRIC COMPANY

March 1993

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM FOR THE CALVERT CLIFFS NUCLEAR POWER PLANT UNITS 1 AND 2 JANUARY 1 - DECEMBER 31, 1992

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BALTIMORE GAS AND ELECTRIC COMPANY

MARCH 1993

TABLE OF CONTENTS

LIST OF FIGURES....iii

LIST OF TABLES....v

A. SUMMARY....1

B. INTRODUCTION....2

C. PROGRAM....3
C.1 Objectives....3
C.2 Sample Collection....3
C.3 Data Interpretation....3
C.4 Program Exceptions....3

D. RESULTS AND DISCUSSIONS....3
D.1 Aquatic Environment....3
D.1.a Bay Water....4
D.1.b Aquatic Organisms....6
D.1.c Shoreline Sediment....6
D.2 Atmospheric Environment....6
D.2.a Air Particulate Filters....6
D.2.b Air Iodine....8
D.3 Terrestrial Environment....8
D.3.a Vegetation....8
D.4 Direct Radiation....8

E. CONCLUSION....12

F. REFERENCES....21

APPENDIX A....25

APPENDIX B....31

APPENDIX C....53

APPENDIX D....65

APPENDIX E....67

LIST OF FIGURES

Figure	Title	Page
1	Tritium in Chesapeake Bay Water	5
2	Silver-110m and Potassium-40 in Chesapeake Bay Oysters	7
3	Nuclear Fallout in the Calvert Cliffs Area	10
4	Mean TLD Gamma Dose	11
5	Atmospheric Dispersion Around CCNPP 1992 Average Relative Air Concentrations	15
6	Atmospheric Dispersion Around CCNPP 1992 Average Relative Ground Deposition	17
A-1	Map of Southern Maryland and Chesapeake Bay Showing Location of Calvert Cliffs Nuclear Power Plant	28
A-2	Calvert Cliffs Nuclear Power Plant Sampling Locations Scale 1" = 1.35 km	29
A-3	Calvert Cliffs Nuclear Power Plant Sampling Locations Scale 1" = 4.0 km	30
E-1	Map of Sampling Sites Around the Independent Spent Fuel Storage Installation	71
E-1a	Enlarged Map of Sampling Sites Around the Independent Spent Fuel Storage Installation	72

LIST OF TABLES

Table	Title	Page
1	Synopsis of the 1992 Calvert Cliffs Nuclear Power Plant Radiological Environmental Monitoring Program	19
2	Annual Summary of Radioactivity in the Environs of the Calvert Cliffs Nuclear Power Plant Units 1 and 2	20
A-1	Locations of Environmental Sampling Stations for the Calvert Cliffs Nuclear Power Plant	27
B-1	Concentrations of Tritium and Gamma Emitters in Bay Water	35
B-2	Concentrations of Gamma Emitters in the Flesh of Edible Fish	36
B-3	Concentrations of Gamma Emitters in Oyster Samples	37
B-4	Concentrations of Gamma Emitters in Shoreline Sediment	38
B-5	Concentrations of Iodine-131 in Filtered Air	39
B-6	Concentrations of Beta Emitters in Air Particulates	41
B-7	Concentrations of Gamma Emitters in Air Particulates	43
B-8	Concentration of Gamma Emitters in Vegetation	45
B-9	Typical MDL Ranges for Gamma Spectrometry	47
B-10	LLD's for Gamma Spectrometry	48
B-11	Direct Radiation	49
C-1	Results of EPA Cross Check Program for 1992	55
C-2	Results of Quality Assurance Program for 1992	57
C-3	Teledyne Isotopes' Typical MDL'S for Gamma Spectrometry	63
D-1	Land Use Survey	65
E-1	Locations of Non-Tech Spec Environmental Sampling Stations for Calvert Cliffs Nuclear Power Plant	73
E-2	Synopsis of the 1992 Calvert Cliffs Nuclear Power Plant Non-Tech Spec Radiological Environmental Monitoring Program	75
E-3	Annual Summary for Calvert Cliffs Nuclear Power Plant Non-Tech Spec Radiological Environmental Monitoring Program	76
E-4	Concentrations of Gamma Emitters in Bottom Sediment	78
E-5	Concentrations of I-131 in Filtered Air	79
E-6	Concentrations of Beta Emitters in Air Particulates	81
E-7	Concentrations of Gamma Emitters in Air Particulates	83
E-8	Concentrations of Tritium and Gamma Emitters in Taylors Island Well Water	86
E-9	Concentrations of Gamma Emitters in Forage Samples from Langley Farm	87
E-10	Concentrations of Gamma Emitters In Soil Samples from Locations Around the ISFSI	88
E-11	Concentrations of Gamma Emitters In Vegetation from Locations Around the ISFSI	89
E-12	Direct Radiation As Measured By Pressurized Ion Chamber	90
E-13	Direct Radiation	91

A. SUMMARY

During the 1992 operating period for Calvert Cliffs Nuclear Power Plant (CCNPP) Units 1 and 2, a total of 677 radiochemical analyses were performed on 609 environmental samples, and 1096 thermoluminescent dosimeters (TLD's) were analyzed for ambient radiation exposure rates. These analyses were performed to satisfy the requirements of the CCNPP Technical Specifications, Appendix A, Sections 3/4.12, B 3/4.12.

In addition, 255 analyses were performed on 151 quality assurance samples and 56 quality assurance TLD's were analyzed for ambient radiation exposure rates as part of the Environmental Protection Agency's Cross-Check Program and our internal Quality Assurance Program with Teledyne Isotopes Company.

And lastly, 781 analyses were performed on 694 extra environmental samples; 1019 extra TLD's were analyzed for ambient radiation exposure rates; and six pressurized ion chambers continuously monitored the environs around the plant for ambient radiation levels. The additional analyses reflect a commitment to maintain historical continuity for samples and sampling pathways discontinued when the Environmental Technical Specifications were changed in March, 1985. Additionally, the Radiological Environmental Monitoring Program was upgraded to include the Independent Spent Fuel Storage Installation (ISFSI).

The samples collected from the aquatic environment included bay water, fish, oysters, and shoreline sediment samples. Bay water was analyzed for tritium and gamma emitters. Fish, oysters, and shoreline sediments were analyzed for gamma emitting radionuclides.

Monitoring the atmospheric environment involved sampling the air at various locations surrounding the plant. Air particulates and gaseous iodine were collected on glass fiber filters and silver zeolite molecular sieve cartridges, respectively. The particulate filters were analyzed for beta activity and gamma emitting nuclides. The molecular sieve cartridges were analyzed for airborne I-131.

Samples from the terrestrial environment consisted of vegetation samples, which were collected and analyzed for gamma emitters and I-131.

Measurements of direct radiation were performed by analyzing TLD's from twenty-three locations surrounding the plant.

Low levels of various man-made fission and activation by-products were observed in the environment surrounding the plant during the year 1992. Some of these observations were attributed to fallout from past atmospheric weapons testing. The others cited were related to the operation of the plant (viz., Co-58 in monthly bay water samples, Ag-110m in oyster samples, and H-3 in quarterly composited bay water samples).

In order to assess the plant's contribution to the ambient radiation levels of the surrounding environment, dose calculations were performed using the plant's effluent release data, on-site meteorological data, and appropriate pathways. The results of these dose calculations indicate:

a. a maximum thyroid dose of 0.13 mrem via liquid and gaseous pathways, which is about 0.17% of the acceptable limit of 75 mrem/yr as specified in 40 CFR 190;

b. a maximum whole body dose of 0.11 mrem via liquid and gaseous pathways, which is about 0.5% of the acceptable limit of 25 mrem/yr as specified in 40 CFR 190;

c. a maximum calculated dose to all other organs via liquid and gaseous pathways was equal to 0.42 mrem to the GI-Tract. This dose was about 1.7% of the allowable limit of 25 mrem/yr as specified in 40 CFR 190.

Thus it is concluded, based upon the levels of radioactivity observed and the various dose calculations performed, that Calvert Cliffs Nuclear Power Plant Units 1 and 2 did not cause any significant impact on the surrounding environment during the year 1992.

B. INTRODUCTION

Baltimore Gas and Electric Company (BG&E) has been conducting a radiological environmental monitoring program in the environs of the Calvert Cliffs Nuclear Power Plant since the summer of 1970. The Calvert Cliffs site is an operating nuclear generating station consisting of two pressurized water reactors. Unit 1 achieved criticality on October 7, 1974 and commenced commercial operation in May 1975. Unit 2 achieved criticality on November 30, 1976 and went into commercial operation April 1, 1977.

Originally the radiological environmental monitoring program was conducted under separate Environmental Technical Specifications (29,30). On July 29, 1977 the monitoring program began operation under a combined set of Technical Specifications (31). The program has operated as such until March 1, 1985 when the Environmental Technical Specifications were revised to reflect a new generic format for radiological environmental monitoring adopted by the Nuclear Regulatory Commission (32). Changes in the program (sample locations, sample types, and/or sampling frequencies) have been implemented to conform to these revisions.

Results of the monitoring program for the preoperational and previous operational periods through December 31, 1990 have been reported in a series of documents (1-28).

Results of the monitoring program for the current operational period of January 1, 1992 through December 31, 1992 are included in this report. The report presents the content of the Radiological Environmental Monitoring Program (Table 1), the sampling locations (Appendix A), the summary of the analytical results of 1992 (Table 2), a compilation of the analytical data for 1992 (Appendix B), the results of the EPA Intercomparison Program and the Quality Assurance Program (Appendix C), the results of the Land Use Survey (Appendix D), and a compilation of the analytical data for extra samples collected in 1992 (Appendix E). Interpretation of the data and conclusions are presented in the body of the report.

The environmental surveillance data collected during this reporting period were compared with that generated in previous periods whenever possible in order to evaluate the environmental radiological impact of Calvert Cliffs Nuclear Power Plant Units 1 and 2 during the year 1992.

C. PROGRAM

C.1 Objectives

The objectives of the radiological environmental monitoring program are:

a. To verify that radioactivity and ambient radiation levels attributable to plant operation are within the limits specified in the Technical Specifications (32) and the Environmental Radiation Protection Standards as set forth in 40 CFR Part 190,
b. To detect any measurable buildup of long-lived radionuclides in the environment,
c. To monitor and evaluate ambient radiation levels,
d. To determine whether any statistically significant increase occurs in the concentration of radionuclides in important pathways.

C.2 Sample Collection

The locations of the individual sampling stations are listed in Table A-1 and shown in Figures A-2 and A-3. All samples were collected by contractors to, or personnel of, the Baltimore Gas and Electric Company according to BG&E Operating Procedures (33). Radiochemical analyses were performed by BG&E in accordance with established laboratory procedures (35).

C.3 Data Interpretation

In environmental monitoring data, many results occur at or below the minimum detectable level (MDL). In this report, all results at or below the relevant MDL are reported as being "less than" the MDL value.

C.4 Program Exceptions

There were no program exceptions during 1992.

D. RESULTS AND DISCUSSIONS

All the environmental samples collected during the year were analyzed using BG&E's laboratory procedures (35). The analytical results for this reporting period are presented in Appendix B and are also summarized on an annual basis in Table 2. For the purpose of discussion, the analytical results are divided into four categories. The categories are the Aquatic Environment, the Atmospheric Environment, the Terrestrial Environment, and Direct Radiation. These categories are further divided into subcategories according to sample type (e.g., Bay Water, Aquatic Organisms, etc. for the Aquatic Environment).

D.1 Aquatic Environment

The aquatic environment surrounding the plant was monitored by analyzing samples of bay water, aquatic organisms, and shoreline sediment. These

samples were obtained from various sampling locations on the Chesapeake Bay near the plant.

D.1.a Bay Water

Monthly bay water samples were taken from two locations during the year. These locations are the Intake Area (sample code Wa1) and the Discharge Area (sample code Wa2). The samples were obtained from a composite sampling system operating at each location for the entire sampling period. These samples were analyzed for tritium and gamma emitters.

The tritium analyses, performed on quarterly composites of the monthly bay water samples, showed the presence of tritium in both Intake (Wa1) and Discharge (Wa2) samples. The third quarter composite sample from (Wa1) exhibited a tritium concentration of 60±29 pCi/L while the second, third, and fourth quarter composite samples from Wa2 exhibited concentrations of tritium ranging from 88±33 to 272±147 pCi/L.

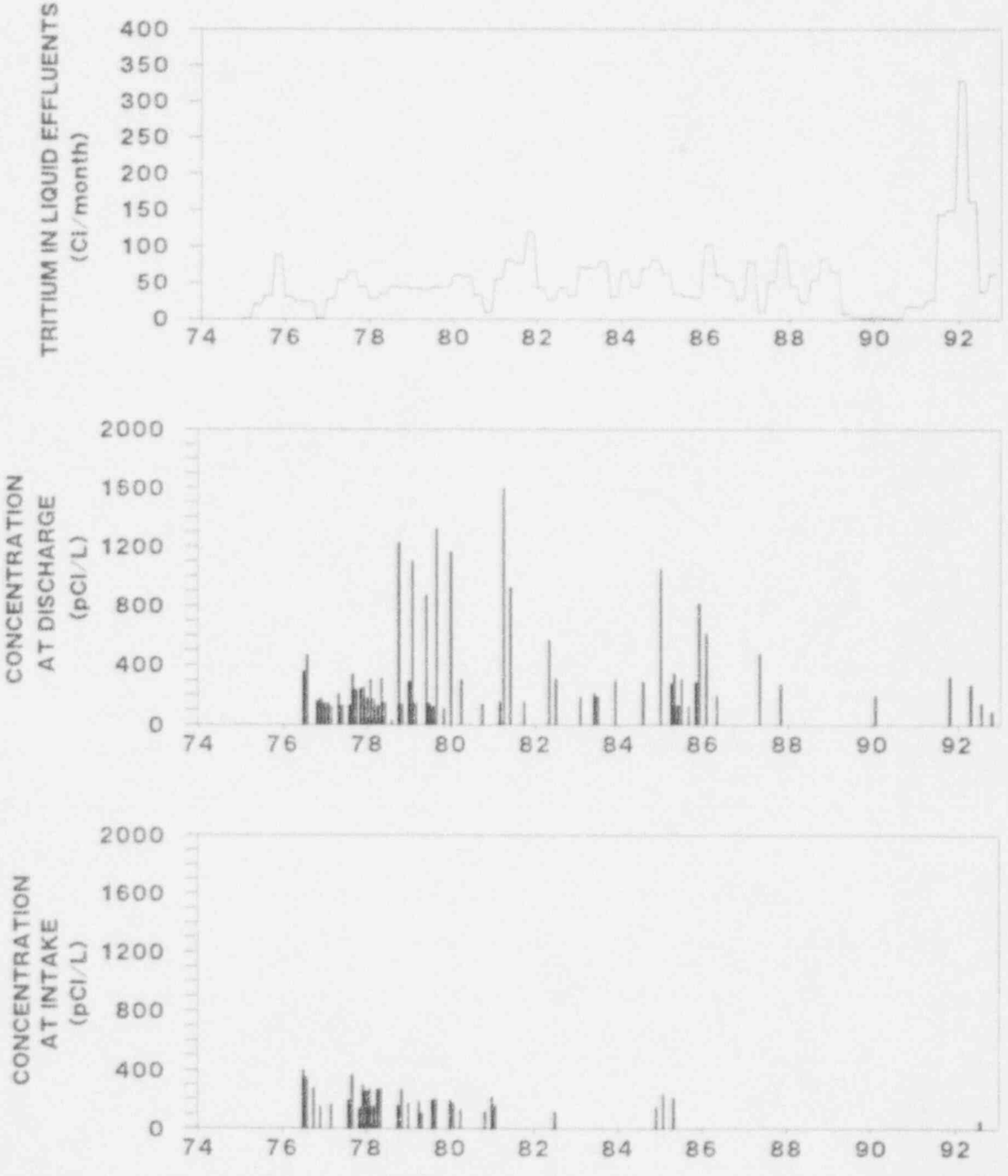
In considering this data, note that the laboratory's instrumentation used to identify tritium was upgraded after the second quarter composite samples were analyzed. This upgrade achieved lower detectable limits. Previously, as shown for the first and second quarter analyses, the Minimum Detectable Limit averaged 153 pCi/L. After the upgrade, the Minimum Detectable Limit is of the order of 35 pCi/L. Three of the four positive values for tritium mentioned above are less than the previous detectable limit, and are the direct result of enhanced detection capabilities. Regardless of this fact, the magnitude of these results is very low and is similar to the low values for tritium that have been observed sporadically in this sampling medium during the preoperational period and past operating periods (6,28).

Figure 1 compares tritium identified in the plant discharge and intake with the effluent releases in 1992 as reported in the Semi-Annual Radioactive Effluent Release Report required by Technical Specification 6.9.1.8. The reported effluent releases show significant increases in the second half of 1991 continuing throughout 1992. These increases were not observed in the environmental sampling program. The effluent data is being reviewed in detail for suspected data inaccuracies.

Monthly analyses of bay water samples from both locations for gamma emitters exhibited the presence of Co-58 at a concentration of 4.2±2.4 pCi/L in a single sample collected from the Discharge Area (Wa2). Cobalt is an activation product attributable to plant operations. Despite this, the magnitude of this result is very close to the range of Minimum Detectable Limits for this radionuclide in this sampling medium (viz., 2.2-2.8 pCi/L Table B-9). In addition, Co-58 has been observed at these low levels in past operating periods (7,28).

FIGURE 1

TRITIUM IN CHESAPEAKE BAY WATER



D.1.b Aquatic Organisms

Samples of aquatic organisms were obtained from four locations during the year. Samples of fish, when in season, were taken from the Intake-Discharge Area (samples codes Ia1 and Ia2), and from the Patuxent River (sample codes Ia4 and Ia5). Oyster samples were obtained quarterly from Camp Conoy (sample code Ia3) and Kenwood Beach (sample code Ia6). Edible portions of these samples were analyzed for gamma emitters.

Gamma spectrometric analyses of the fish from both locations exhibited the presence of Cs-137 at a concentration of 13±10 pCi/kg in a single fish sample collected in October from the Patuxent River (Ia5). Cesium-137 is a fission product that may be attributable to either plant operation or past atmospheric nuclear weapons testing. That it was seen in a sample from the control location suggests that the latter source (i.e., atmospheric testing) is most probable.

Quarterly analyses for gamma emitters in oysters, showed detectable concentrations of a plant-related radionuclide, Ag-110m, in samples obtained from Camp Conoy (Ia3). The observed concentrations ranged from 32±12 to 46±17 pCi/kg. The presence of this radionuclide has been observed in this sampling medium during previous operating periods (7-28). The magnitude of this range of values is much less than the ranges of values observed previously (7-28). An historical plot of the data from this location, Figure 2, demonstrates this clearly. In addition, the trending shows a maximum concentration for Ag-110 of 215±21 recorded in August, 1990, a steady decrease in concentration during the year 1991, and a leveling out of concentration during 1992. The observed decrease may be due simply to radiological decay of Ag-110. More than two half-lives have passed since the maximum concentration was observed, and approximately one-fourth of that maximum remains in this sampling medium.

D.1.c Shoreline Sediment

Semiannual shoreline sediment samples were taken from one location during the year. This location is the shoreline at Camp Conoy (sample code Wb1). The samples obtained from this location were analyzed for gamma emitters.

Gamma spectrometric analyses of these samples exhibited no detectable concentrations of any fission or activation products.

D.2 Atmospheric Environment

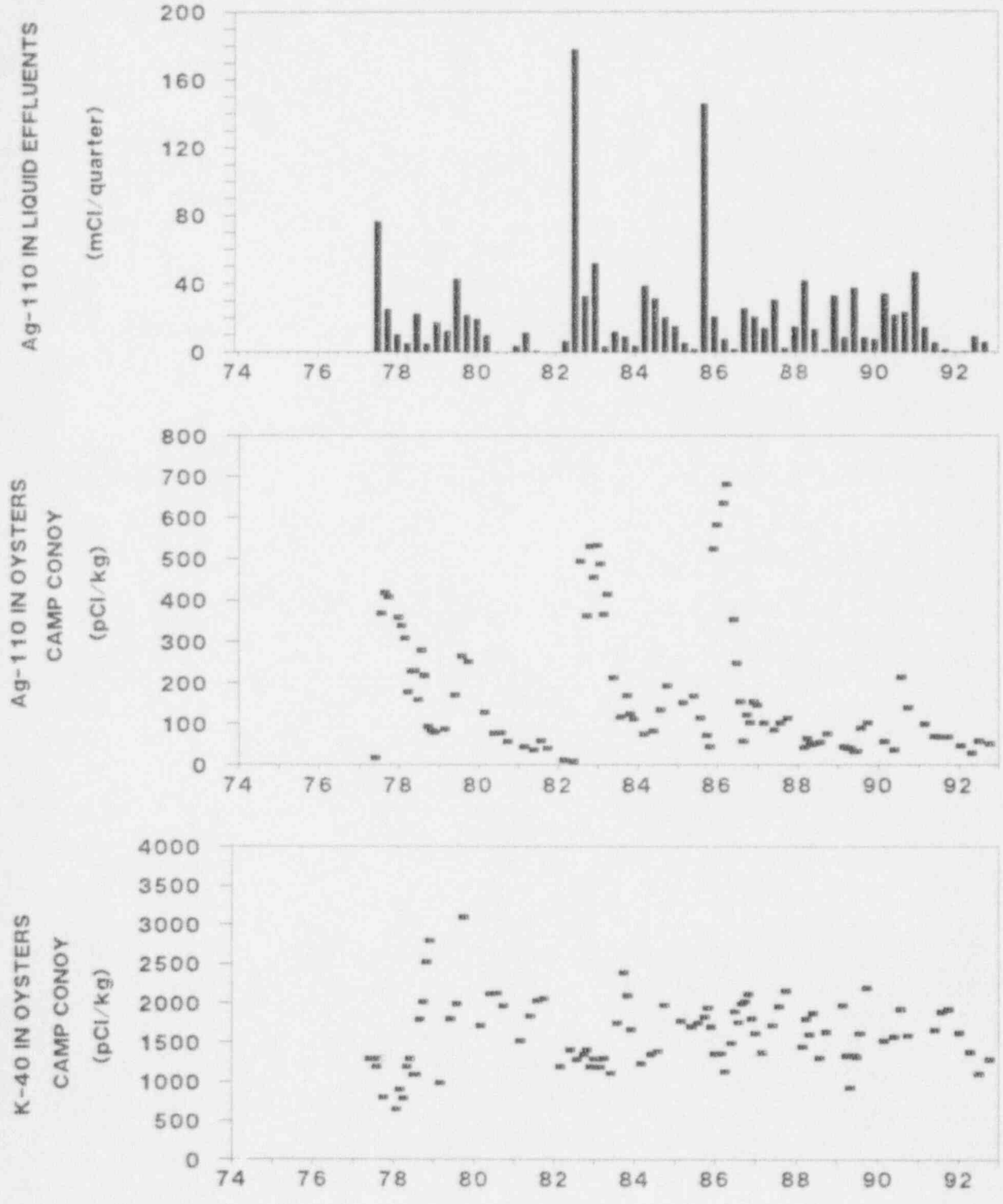
The atmospheric environment was monitored by analyzing air particulate filters and silver zeolite cartridges (for trapping radioiodine species). These samples were collected from various locations surrounding the plant.

D.2.a Air Particulate Filters

Weekly composite air particulate filter samples were collected from five locations during the year. These locations are On Site (sample code A1), Camp Conoy Road Near the Emergency Siren (sample code A2), Bay Breeze Road (sample code A3), Lusby (sample code A4), and at the Emergency Operations Facility (sample code A5). These samples were analyzed for beta activity and gamma emitters.

FIGURE 2

Ag-110 IN CHESAPEAKE OYSTERS



Weekly analyses for beta activity on air particulate filters collected from all five locations showed values characteristic of background levels (7-28).

Gamma spectrometric analyses of monthly composited air particulate samples exhibited no detectable concentrations of any fission or activation products in any of these samples.

D.2.b Air Iodine

Weekly composited silver zeolite cartridges (for trapping radioiodine species) were collected from five locations during the year. These locations are On Site (sample code A1), Camp Conoy Road Near the Emergency Siren (sample code A2), Bay Breeze Road (sample code A3), Lusby (sample code A4), and at the Emergency Operations Facility (sample code A5). These samples were analyzed for radioiodine species.

Weekly radioiodine analyses of silver zeolite cartridges collected from all five locations exhibited no detectable concentrations of I-131.

D.3 Terrestrial Environment

The terrestrial environment was monitored by analyzing samples of vegetation collected monthly, when available, from various sampling locations near the plant during the normal growing season.

D.3.a Vegetation

Vegetation samples were collected from three locations during the year. These locations are Bay Breeze Road (sample codes Ib1, Ib2, and Ib3), On Site Before the Entrance to Camp Conoy (sample codes Ib4, Ib5, and Ib6), and the Emergency Operations Facility (sample codes Ib7, Ib8, and Ib9). These samples were analyzed for gamma emitters, including analyses for I-131.

Gamma spectrometric analyses of these samples revealed the presence of Cs-137 in three vegetation samples collected from the Plant Gardens and in two samples from the EOF. The range of concentrations observed was 42±20 to 78±25 pCi/kg. The presence of this radionuclide in these samples may be plant related, but is more probably due to the residual fallout from past atmospheric nuclear weapons testing.

D.4 Direct Radiation

Thermoluminescent dosimeters were collected monthly from twenty-three locations surrounding the plant. The locations are On Site Along the Cliffs (sample code DR1), Route 765 Auto Dump (sample code DR2), Giovanni's Tavern (sample code DR3), White Sands (sample code DR4), John's Creek (sample code DR5), Lusby (sample code DR6), On Site (sample code DR7), On Site Near the Emergency Siren (sample code DR8), Bay Breeze Road (sample code DR9), Decatur and Calvert Beach Roads (sample code DR10), Dirt Road off Mackall and Parran Roads (sample code DR11), Mackall and Bowen Roads (sample code DR12), Wallville (sample code DR13), Rodney Point (sample code DR14), Mill Bridge and Turner Roads (sample code DR15), Appeal School (sample code DR16), Cove Point and Little Cove Point Roads (sample code DR17), Cove Point (sample code DR18), Long Beach(sample code DR19), On Site Near Shore (sample code DR20), Emergency

Operations Facility (sample code DR21), Solomons Island (sample code DR22), and Taylors Island (sample code DR23).

A comparison of the means and ranges of the current TLD data with those of both the historical data and the regional data (7,28) shows no plant-related contribution to the measured exposure rate for 1992.

FIGURE 3

NUCLEAR FALLOUT IN CALVERT CLIFFS AREA

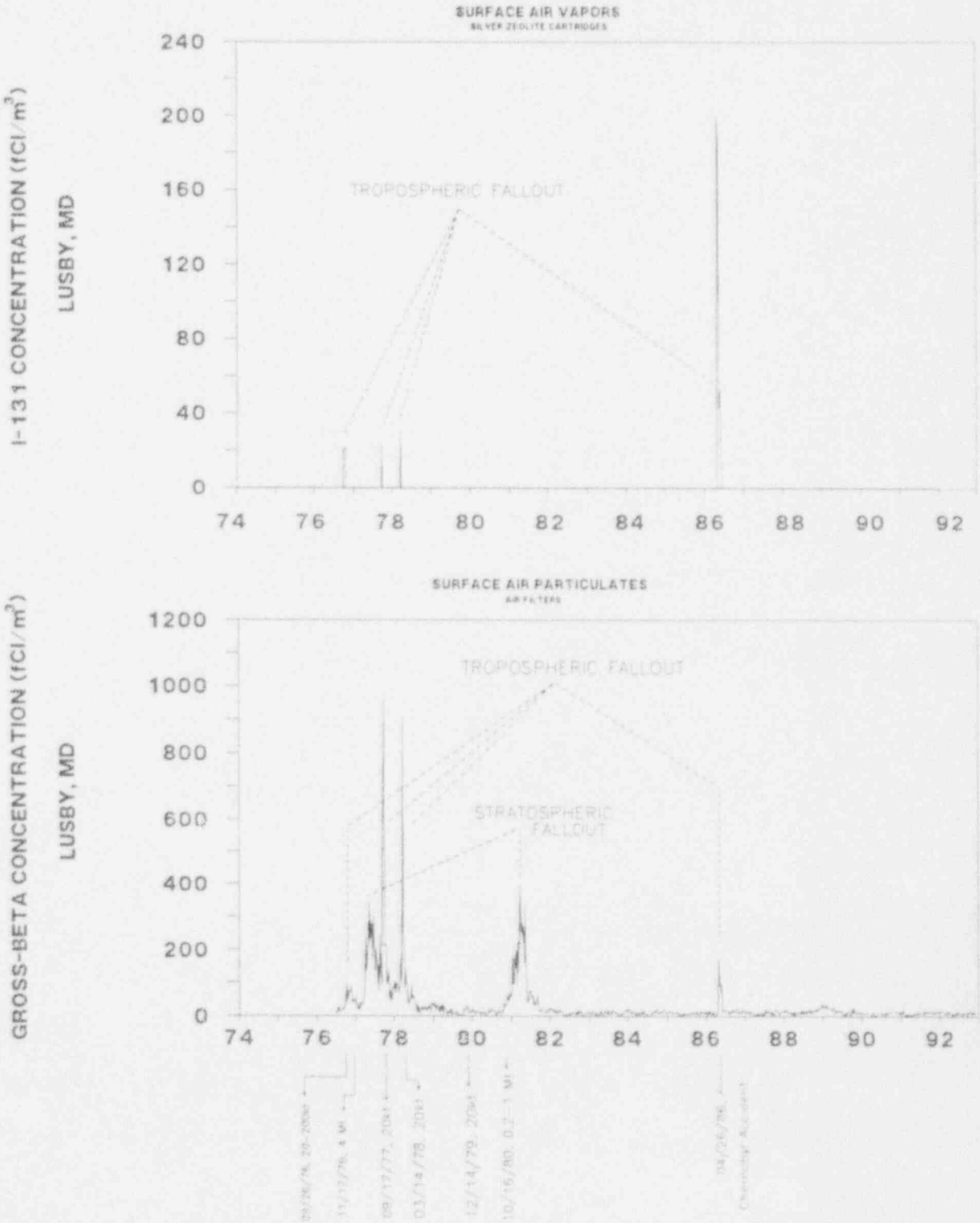
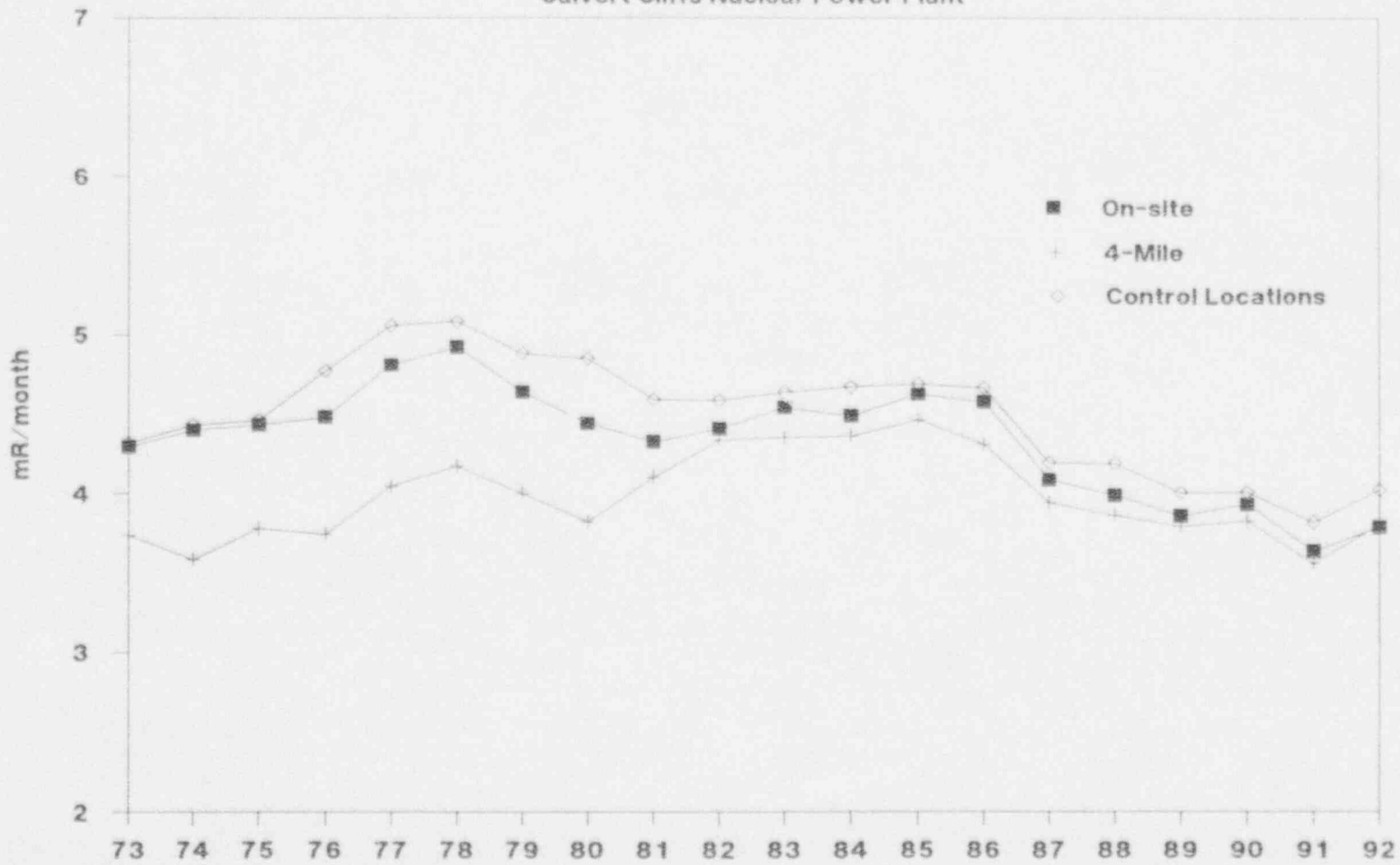


FIGURE 4

MEAN TLD GAMMA DOSE

Calvert Cliffs Nuclear Power Plant



E. CONCLUSION

Low levels of various man-made fission and activation by-products were observed in the environment surrounding the plant during the year 1992. Some of these observations were attributed to fallout from past atmospheric weapons testing. The others cited were related to the operation of the plant (viz., Co-58 in monthly bay water samples, Ag-110m in oyster samples, and tritium in quarterly composited bay water samples).

Historical trends for tritium in bay water, Ag-110m and K-40 in oyster samples, nuclear fallout in the Calvert Cliffs area, and TLD data from selected sites are depicted in Figures 1 through 4. As can be seen from these figures, the plant made only negligible radiological contributions to the surrounding environment during the year 1992.

In order to assess the plant's contribution to the ambient radiation levels of the surrounding environment, dose calculations were performed using the plant's effluent release data, on site meteorological data (see X/Q and D/Q values presented in Figures 5 and 6), and appropriate pathways. The results of these dose calculations indicate:

- Gaseous Pathways
  - A maximum thyroid dose of 4.89E-02 mrem to a child via the plume, ground, vegetable, meat, and inhalation pathways at 1.6 km NW of Calvert Cliffs. This is about 0.07% of the acceptable limit of 75 mrem/year as specified in 40 CFR 190, "Environmental Radiation Protection Standards for Nuclear Power Operations".
  - A maximum whole body gamma dose of 2.67E-02 mrem to a child at the site boundary, 1.6 km NW of Calvert Cliffs, which is about 0.11% of the acceptable dose limit of 25 mrem/year as specified in 40 CFR 190.
  - A maximum dose to any organ, in this case skin, of 7.80E-02 mrem at the site boundary, 1.6 km NW of Calvert Cliffs. This is about 0.31% of the acceptable dose limit of 25 mrem/year as specified in 40 CFR 190.
- Liquid Pathways
  - A maximum thyroid dose of 7.60E-02 mrem, which is about 0.10% of the acceptable dose limit of 75 mrem/year as specified in 40 CFR 190.
  - A maximum whole body dose of 8.73E-02 mrem via all liquid pathways, which is about 0.35% of the acceptable dose limit of 25 mrem/year as set forth in 40 CFR 190.
  - A maximum dose to any organ, in this case the GI-Tract, of 3.93E-01 mrem, which is 1.57% of the acceptable dose limit of 25 mrem/year as specified in 40 CFR 190.

- Gaseous and Liquid Pathways Combined

  - A maximum thyroid dose of 1.25E-01 mrem via liquid and gaseous pathways, which is about 0.17% of the acceptable limit of 75 mrem/year as specified in 40 CFR 190.

  - A maximum whole body dose of 1.14E-01 mrem via liquid and gaseous pathways which is about 0.5% of the acceptable limit of 25 mrem/year as specified in 40 CFR 190.

  - A maximum calculated dose to all other organs via liquid and gaseous pathways was equal to 4.20E-01 mrem to the GI-Tract. This dose is about 1.7% of the allowable limit of 25 mrem/year as specified in 40 CFR 190.

In all cases, the calculated doses are a small fraction of the applicable limits specified in 40 CFR 190. It is, therefore, concluded that the operation of Calvert Cliffs Units 1 and 2 met the criteria of 40 CFR 190 during 1992.

In addition it is also concluded, based upon the levels of radioactivity observed and the various dose calculations performed, that Calvert Cliffs Nuclear Power Plant Units 1 and 2 did not cause any significant impact on the environment during year 1992.

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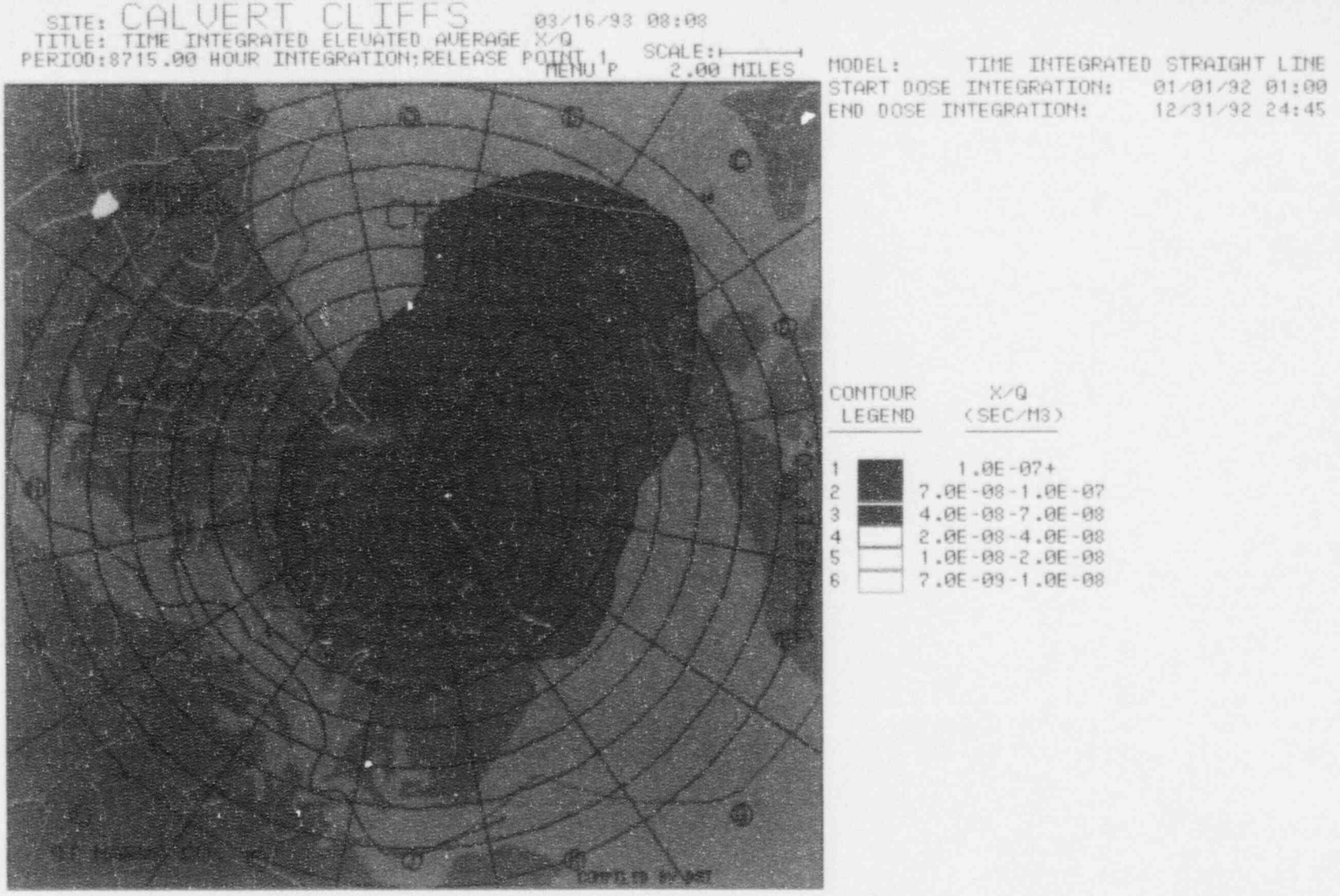

Figure 5
Atmospheric Dispersion Around CCNPP 1992 Average Relative Air Concentrations

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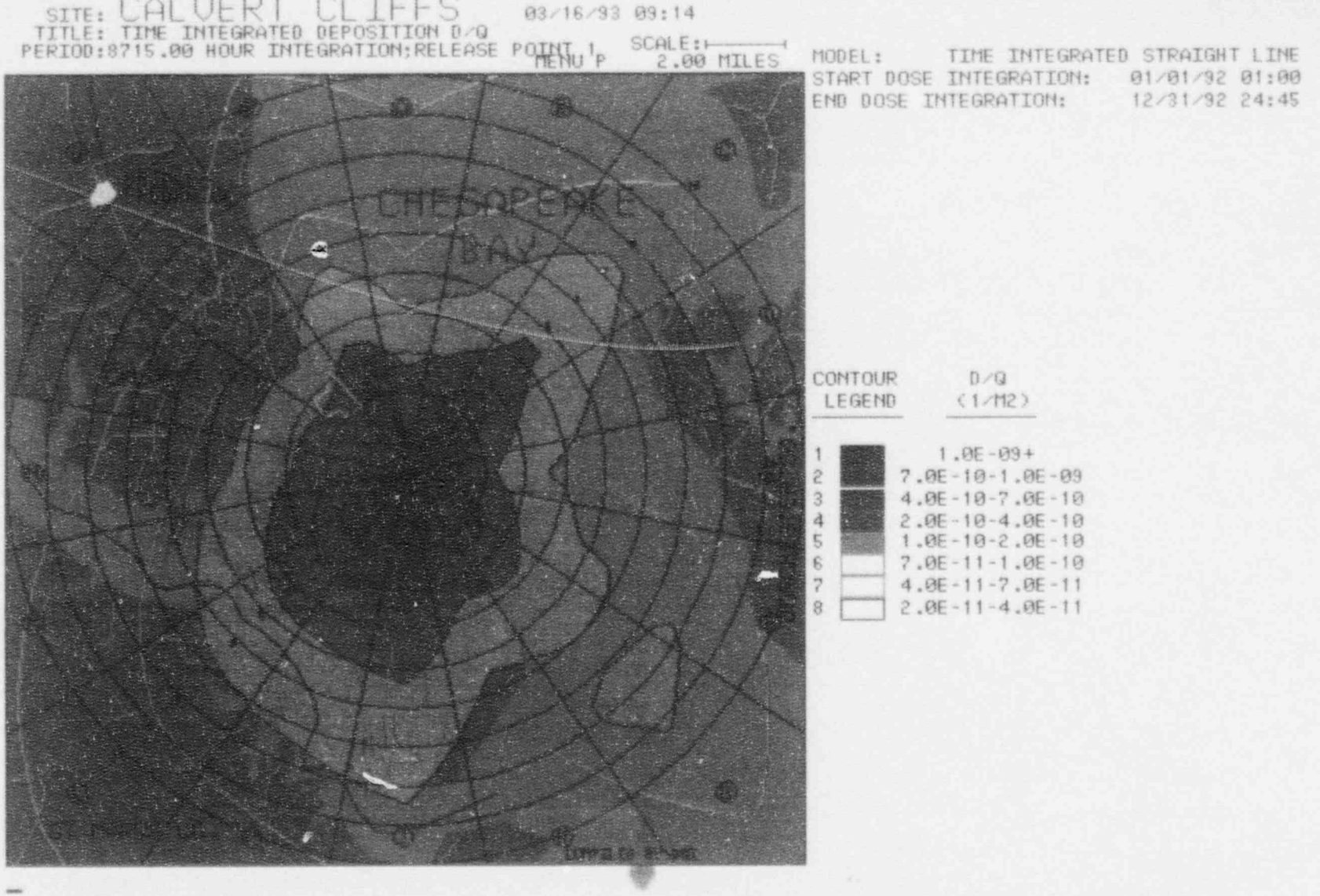

Figure 6
Atmospheric Dispersion Around CCNPP 1992 Average Relative Ground Deposition

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Table 1
Synopsis of the 1992 Calvert Cliffs Nuclear Power Plant Radiological Environmental Monitoring Program

SAMPLE TYPE	SAMPLING* FREQUENCY	NUMBER OF LOCATIONS	NUMBER COLLECTED	ANALYSIS	ANALYSIS* FREQUENCY	NUMBER ANALYZED
AQUATIC ENVIRONMENT						
Bay Water	MC	2	24	H-3	QC	8
				Gamma	M	24
Fish[1]	A	2	4	Gamma	A	4
Oysters	Q	2	8	Gamma	Q	8
Shoreline Sediment	SA	1	2	Gamma	SA	2
ATMOSPHERIC ENVIRONMENT						
Air Iodine[2]	W	5	259	I-131	W	259
Air Particulates[3]	W	5	259	Gross Beta	W	259
				Gamma	MC	60
TERRESTRIAL ENVIRONMENT						
Vegetation[4]	M	3	53	Gamma	M	53
DIRECT RADIATION						
Ambient Radiation	M	23	1096	TLD	M	1096

*W Weekly, M Monthly, Q Quarterly, SA Semiannual, A Annual, C Composite.

[1]Once in season July - September.

[2]The collection device contains silver zeolite.

[3]After a minimum decay of 72 hours, beta counting is performed. Gamma spectroscopy is performed on monthly composites of weekly samples.

[4]Monthly during growing season.

Table 2
Annual Summary of Radioactivity in the Environs of the Calvert Cliffs Nuclear Power Plant Units 1 and 2

Medium Or Pathway Sampled (Unit of Measurement)	Type And Total Number Of Analyses Performed	Lower Limit Of Detection (LLD)	Indicator Locations Mean (F)* Range	Location With Highest Annual Mean Name / Distance & Direction	Mean (F)* Range	Control Locations Mean (F)* Range
AQUATIC ENVIRONMENT						
Bay Water (pCi/L)	Gamma(24) Co-58	1.7	4.2(1/12) --	Discharge Wa2 0.3 km N	4.2(1/12) --	-- --
Bay Water** (pCi/L)	Tritium(8)	233 54	170(3/4) 88-272	Discharge Wa2 0.3 km N	170(3/4) 88-272	69(1/4) --
Fish (pCi/kg)	Gamma(4) Cs-137	9	12(1/4)	Patuxent River Ia5	12(1/4)	--
Oysters (pCi/kg)	Gamma(8) Ag-110m	10	42(4/4) (32-47)	C Conoy Ia3 0.9 km E	42(4/4) (32-47)	-- --
ATMOSPHERIC ENVIRONMENT						
Air Particulate (10^{-2} pCi/m^3)	Beta(259)	0.4	1.2(208/208) (0.1-2.7)	Lusby A4 2.9 km SSW	1.4(52/52) (0.5-2.6)	1.5(51/51) (0.5-2.6)
TERRESTRIAL ENVIRONMENT						
Vegetation (pCi/kg)	Gamma(53) Cs-137	24	67(3/34) (49-78)	Entr Camp Conoy Ib6 0.7 km S	77(2/6) (75-78)	44(2/19) (42-46)
DIRECT RADIATION						
Ambient Radiation (mR/30 day)	Exposure Rate (274)	--	3.80(238/238) (2.86-5.27)	Camp Conoy DR8 2.5 km SSE	4.48(12/12) (4.06-5.21)	4.02(36/36) (2.65-5.68)

*Mean and range based upon detectable measurements only. Fraction F of detectable measurements at specified location is indicated in parentheses.

**Two LLD's reported above are due to the upgrading of tritium instrumentation.

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APPENDIX A

Appendix A contains information concerning the environmental samples which were collected during the period January 1, 1992 to December 31, 1992.

Sample locations and specific information about individual locations are given in Table A-1. Figure A-1 shows the location of the Calvert Cliffs Nuclear Power Plant in relation to Southern Maryland and the Chesapeake Bay. Figures A-2 and A-3 show the locations of the sampling sites in relation to the plant site at different degrees of detail.

Table A-1
Locations of Environmental Sampling Stations
for the
Calvert Cliffs Nuclear Power Plant

Station	Description	Distance* (Kilometers)	Direction* (Sector)
A1	On site before entrance to Camp Conoy	0.7	S
A2	Camp Conoy Road near emergency siren	2.5	SSE
A3	Bay Breeze Road	2.6	SE
A4	Route 765 Lusby	2.9	SSW
A5	Emergency Operations Facility (EOF)	19.3	WNW
DR1	On site along cliffs	0.6	NW
DR2	Route 765 auto dump	2.7	WNW
DR3	Route 765 Giovanni's Tavern (Knotty Pine)	2.3	W
DR4	Route 765 across from White Sands sign	2.0	WSW
DR5	Route 765 John's Creek	2.4	SW
DR6	Route 765 Lusby	2.9	SSW
DR7	On site before entrance to Camp Canoy	0.7	S
DR8	Camp Conoy Road near emergency siren	2.5	SSE
DR9	Bay Breeze Road	2.6	SE
DR10	Calvert Beach Road and Decatur Street	6.4	NW
DR11	Dirt road off Mackall & Parran Roads	6.6	WNW
DR12	Mackall and Bowen Roads	6.7	W
DR13	Mackall Road near Wallville	6.1	WSW
DR14	Rodney Point	6.4	SW
DR15	Mill Bridge and Turner Roads	6.2	SSW
DR16	Across from Appeal School	6.5	S
DR17	Cove Point and Little Cove Point Roads	5.9	SSE
DR18	Cove Point	7.1	SE
DR19	Long Beach	4.4	NW
DR20	On site near shore	0.4	NNW
DR21	Emergency Operations Facility (EOF)	19.3	WNW
DR22	Solomons Island	12.5	S
DR23	Taylors Island	12.6	ENE
Ia1,2	Discharge Area	0.2	NNE
Ia3	Camp Conoy	0.9	E
Ia4,5	Patuxent	N/A	N/A
Ia6	Kenwood Beach	10.7	NNW
Ib1,2,3	Off Bay Breeze Road	2.6	SSE
Ib4,5,6	On site before entrance to Camp Conoy	0.7	S
Ib7,8,9	Emergency Operations Facility (EOF)	19.3	WNW
Wa1	Intake area	0.2	NNE
Wa2	Discharge Area	0.3	N
Wb1	Shoreline at Camp Conoy	0.6	ESE

*Distance and direction from the central point between the two containment buildings.

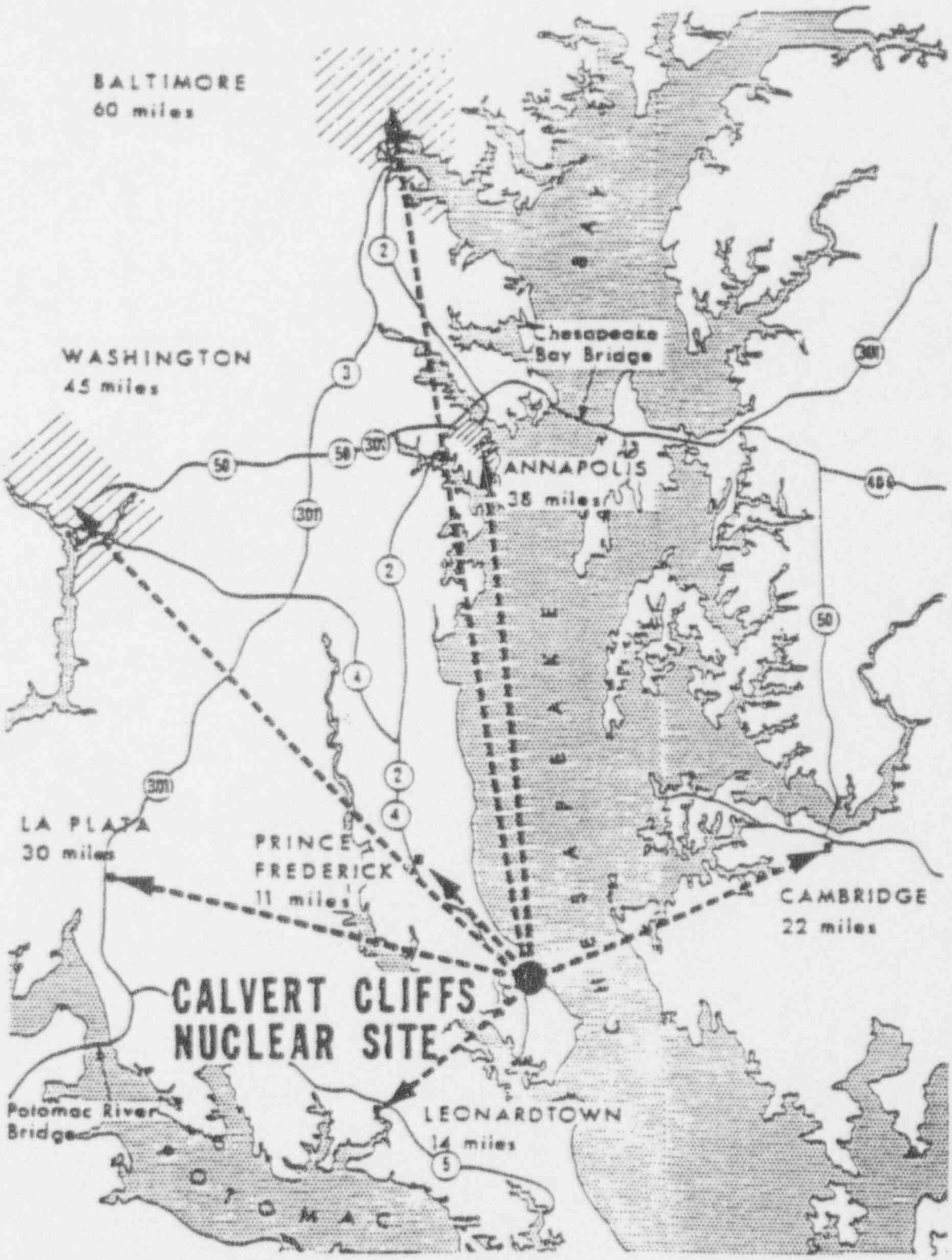


FIGURE A-1
MAP OF SOUTHERN MARYLAND AND CHESAPEAKE BAY SHOWING LOCATION
OF CALVERT CLIFFS NUCLEAR POWER PLANT

Figure A-2
Calvert Cliffs Nuclear Power Plant Sampling Locations Scale 1" = 1.35 km

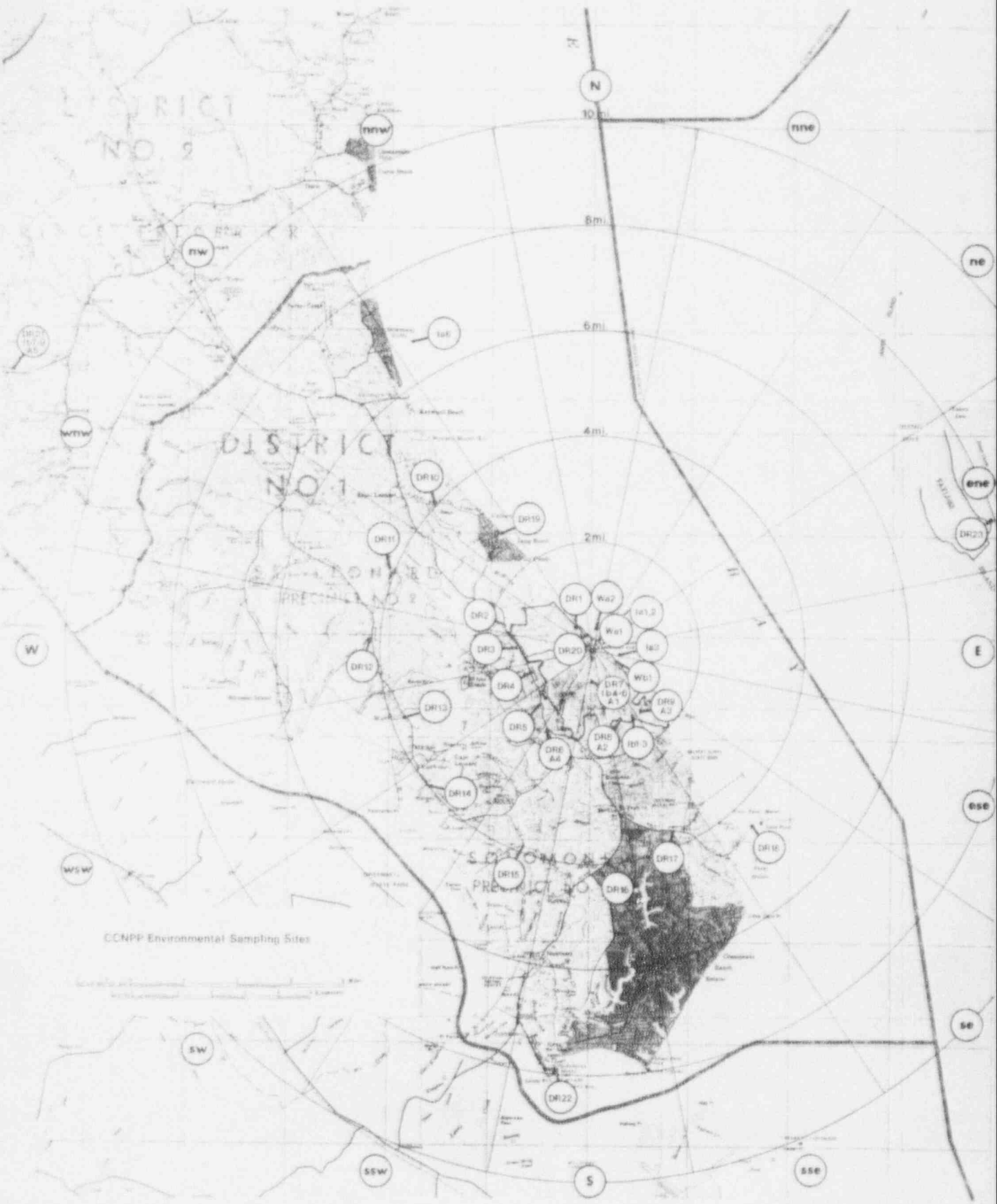


Figure A-3
Calvert Cliffs Nuclear Power Plant Sampling Locations Scale 1" = 4.0 km

APPENDIX B

Appendix B is a presentation of the analytical results of the 1992 Calvert Cliffs Nuclear Power Plant Environmental Monitoring Program.

TABLE OF CONTENTS - ANALYTICAL RESULTS

Table	Title	Page
B-1	Concentrations of Tritium and Gamma Emitters in Bay Water	35
B-2	Concentrations of Gamma Emitters in the Flesh of Edible Fish	36
B-3	Concentrations of Gamma Emitters in Oyster Samples	37
B-4	Concentrations of Gamma Emitters in Shoreline Sediment	38
B-5	Concentrations of Iodine-131 in Filtered Air	39
B-6	Concentrations of Beta Emitters in Air Particulates	41
B-7	Concentrations of Gamma Emitters in Air Particulates	43
B-8	Concentration of Gamma Emitters in Vegetation	45
B-9	Typical MDL Ranges for Gamma Spectrometry	47
B-10	LLD's for Gamma Spectrometry	48
B-11	Direct Radiation	49

Table B-1
Concentrations of Tritium and Gamma Emitters* in Bay Water

(Results in Units of pCi/L ±2σ)

Date	Sample Code	Tritium**	Co-58
01/15/92	Wa1 Intake		<MDL
	Wa2 Discharge		<MDL
02/15/92	Wa1	<153	<MDL
	Wa2	<152	<MDL
03/15/92	Wa1		<MDL
	Wa2		<MDL
04/15/92	Wa1		<MDL
	Wa2		<MDL
05/15/92	Wa1	<154	<MDL
	Wa2	272±147	<MDL
06/15/92	Wa1		<MDL
	Wa2		<MDL
07/15/92	Wa1		<MDL
	Wa2		4.2±2.4
08/15/92	Wa1	60±29	<MDL
	Wa2	150±30	<MDL
09/15/92	Wa1		<MDL
	Wa2		<MDL
10/15/92	Wa1		<MDL
	Wa2		<MDL
11/15/92	Wa1	<35	<MDL
	Wa2	88±33	<MDL
12/15/92	Wa1		<MDL
	Wa2		<MDL

*Naturally occurring K-40 was observed in all samples. All other gamma emitters not cited were <MDL; typical MDL's are given in Table B-9.

**Quarterly results.

Table B-2
Concentrations of Gamma Emitters in the Flesh of Edible Fish

(Results in Units of pCi/kg (Wet) ±2σ)

Sample Code		Sample Date	Gamma Type	Emitters Cs-137
Ia1	Discharge	08/27/92	Spot	*
Ia4	Patuxent River**	08/31/92	Spot	*
Ia2	Discharge	10/18/92	Bass	*
Ia5	Patuxent River**	10/19/92	Bass	13±10

* Naturally occurring K-40 was observed in all samples. All other gamma emitters not cited were <MDL; typical MDL's are given in Table B-9.

** Control location.

Table B-3
Concentrations of Gamma Emitters* in Oyster Samples

(Results in Units of pCi/kg (Wet) ±2σ)

Sample Code	Sample Date	Ag-110m
Ia3 Camp Conoy	03/26/92	42±11
	06/04/92	32±12
	08/21/92	47±17
	10/29/92	45±14
Ia6 Kenwood Beach**	03/26/92	<MDL
	06/04/92	<MDL
	08/21/92	<MDL
	10/27/92	<MDL

*Naturally occurring K-40 was observed in all samples. All other gamma emitters not cited were <MDL; typical MDL's are given in Table B-9.

**Control Location

Table B-4
Concentrations of Gamma Emitters in Shoreline Sediment

(Results in Units of 10^{-3} pCi/kg (Dry) ±2σ)

Sample Code	Sample Date	Gamma Emitters
Wb1 Shoreline at Camp Conoy	05/29/92	*
	10/02/92	*

*Naturally occurring K-40 and Ra-226 were observed in these samples. All other gamma emitters not cited were <MDL; typical MDL's are given in Table B-9.

Table B-5
Concentrations of Iodine-131 in Filtered Air

(Results in Units of 10^{-3} pCi/m^3 ±2σ)

Start Date	Stop Date	Entrance C. Conoy Site A1	Camp Conoy Rd Site A2	Bay Breeze Rd Site A3	Lusby Site A4	EOF[1] Site A5
DEC 30 91	JAN 6 92	<6.9	<6.3	<6.9	<5.2	<5.3
JAN 6 92	JAN 13 92	<6.5	<6.0	<5.8	<5.4	<6.7
JAN 13 92	JAN 20 92	<5.1	<6.2	<5.1	<5.6	<8.2[2]
JAN 20 92	JAN 27 92	<7.0	<5.2	<5.1	<5.8	<6.6
JAN 27 92	FEB 3 92	<5.4	<4.6	<5.0	<5.4	<5.2
FEB 3 92	FEB 10 92	<7.1	<7.2	<6.3	<5.1	<5.4
FEB 10 92	FEB 18 92	<5.1	<4.2	<4.9	<4.4	<5.0
FEB 18 92	FEB 24 92	<5.7	<8.2	<6.6	<6.6	<7.0
FEB 24 92	MAR 2 92	<5.4	<7.3	<5.2	<5.2	<5.0
MAR 2 92	MAR 9 92	<6.6	<5.3	<6.1	<5.0	<5.6
MAR 9 92	MAR 16 92	<5.8	<6.7	<6.5	<5.2	<5.7
MAR 16 92	MAR 23 92	<5.6	<6.3	<5.8	<5.8	<5.6
MAR 23 92	MAR 31 92	<5.3	<5.1	<5.4	<5.2	<5.2
MAR 31 92	APR 6 92	<6.7	<6.3	<6.1	<6.2	<9.7
APR 6 92	APR 13 92	<5.3	<8.8	<5.7	<5.6	<5.8
APR 13 92	APR 20 92	<6.0	<5.6	<8.2	<5.6	<6.5
APR 20 92	APR 27 92	<6.1	<6.3	<5.5	<5.9	<6.9
APR 27 92	MAY 4 92	<6.0	<6.0	<5.8	<5.7	<6.4
MAY 4 92	MAY 11 92	<6.6	<5.5	<5.7	<5.9	<6.5
MAY 11 92	MAY 18 92	<4.6	<5.6	<6.2	<5.7	<6.0
MAY 18 92	MAY 26 92	<5.2	<5.0	<4.8	<4.6	<4.8
MAY 26 92	JUN 1 92	<6.6	<6.0	<6.2	<6.0	<5.9
JUN 1 92	JUN 8 92	<5.1	<5.1	<5.6	<5.1	<4.8
JUN 8 92	JUN 15 92	<5.1	<6.2	<5.9	<5.0	<6.1
JUN 15 92	JUN 22 92	<4.4	<5.0	<5.1	<5.5	<6.0
JUN 22 92	JUN 29 92	<4.0	<5.3	<4.6	<5.1	<4.8

[1] Control Location

[2] Sampler Malfunction

Table B-5 -- Continued
Concentrations of Iodine-131 in Filtered Air

(Results in Units of 10^{-3} pCi/m^3 ±2σ)

Start Date	Stop Date	Entrance C. Conoy Site A1	Camp Conoy Rd Site A2	Bay Breeze Rd Site A3	Lusby Site A4	EOF[1] Site A5
JUN 29 92	JUL 6 92	<4.9	<4.5	<4.5	<4.7	<5.1
JUL 6 92	JUL 13 92	<3.5	<4.6	<4.0	<4.9	<4.9
JUL 13 92	JUL 20 92	<4.6	<4.7	<5.1	<4.8	<4.2
JUL 20 92	JUL 27 92	<4.6	<5.2	<4.0	<4.7	<4.1
JUL 27 92	AUG 3 92	<4.5	<5.4	<4.4	<4.5	<3.7
AUG 3 92	AUG 10 92	<3.9	<4.7	<3.8	<4.8	<5.1
AUG 10 92	AUG 17 92	<4.4	<4.6	<4.8	<4.3	<4.4
AUG 17 92	AUG 24 92	<3.9	<5.1	<5.1	<4.2	<6.0
AUG 24 92	AUG 31 92	<4.8	<5.0	<4.9	<4.9	<5.1
AUG 31 92	SEP 8 92	<3.5	<4.4	<4.2	<5.0	<4.7
SEP 8 92	SEP 14 92	<4.7	<6.2	<6.3	<5.1	<5.8
SEP 14 92	SEP 21 92	<4.9	<4.9	<5.0	<4.8	<5.1
SEP 21 92	SEP 28 92	<5.6	<6.2	<5.3	<4.5	<5.2
SEP 28 92	OCT 5 92	<3.8	<4.5	<5.5	<4.6	<4.9
OCT 5 92	OCT 12 92	<4.4	<4.5	<4.6	<4.7	<3.7
OCT 12 92	OCT 19 92	<4.0	<4.7	<4.3	<4.5	<4.5
OCT 19 92	OCT 26 92	<4.2	<5.0	<4.8	<4.1	<4.2
OCT 26 92	NOV 2 92	<3.9	<3.9	<4.3	<3.9	<3.9
NOV 2 92	NOV 9 92	<3.6	<4.2	<4.1	<4.2	<4.5
NOV 9 92	NOV 16 92	<4.1	<4.3	<4.3	<4.1	<3.2
NOV 16 92	NOV 23 92	<2.9	<3.0	<3.2	<2.8	<2.9
NOV 23 92	NOV 30 92	<3.3	<3.2	<3.2	<3.2	<2.9
NOV 30 92	DEC 7 92	<3.2	<3.0	<3.6	<3.2	<2.9
DEC 7 92	DEC 14 92	<2.7	<2.7	<3.3	<3.6	<3.4
DEC 14 92	DEC 21 92	<2.6	<3.1	<3.5	<3.2	<3.1
DEC 21 92	DEC 29 92	<2.7	<2.8	<2.5	<2.8	<3.0

[1] Control Location

Table B-6
Concentrations of Beta Emitters in Air Particulates

(Results in Units of 10^{-2} pCi/m^3 ±2σ)

Start Date	Stop Date	Entrance C. Conoy Site A1	Camp Conoy Rd Site A2	Bay Breeze Rd Site A3	Lusby Site A4	EOF[1] Site A5
DEC 30 91	JAN 6 92	1.2 ± 0.3	0.8 ± 0.3	0.6 ± 0.3	0.8 ± 0.2	1.0 ± 0.2
JAN 6 92	JAN 13 92	2.2 ± 0.3	1.7 ± 0.3	1.3 ± 0.3	1.9 ± 0.3	2.1 ± 0.3
JAN 13 92	JAN 20 92	1.7 ± 0.3	1.6 ± 0.3	1.3 ± 0.2	1.6 ± 0.3	[2]
JAN 20 92	JAN 27 92	2.4 ± 0.4	1.9 ± 0.3	1.6 ± 0.3	1.9 ± 0.3	2.0 ± 0.3
JAN 27 92	FEB 3 92	2.0 ± 0.3	2.1 ± 0.3	1.6 ± 0.3	2.2 ± 0.3	2.2 ± 0.3
FEB 3 92	FEB 10 92	1.5 ± 0.3	1.7 ± 0.3	1.3 ± 0.3	1.6 ± 0.3	1.4 ± 0.3
FEB 10 92	FEB 18 92	1.1 ± 0.2	1.0 ± 0.2	0.9 ± 0.2	1.4 ± 0.2	1.1 ± 0.2
FEB 18 92	FEB 24 92	1.3 ± 0.3	1.1 ± 0.3	1.1 ± 0.3	1.2 ± 0.3	1.4 ± 0.3
FEB 24 92	MAR 2 92	1.2 ± 0.3	1.5 ± 0.3	0.9 ± 0.2	1.3 ± 0.2	1.1 ± 0.2
MAR 2 92	MAR 9 92	1.2 ± 0.3	1.0 ± 0.2	0.8 ± 0.3	1.1 ± 0.2	0.9 ± 0.2
MAR 9 92	MAR 16 92	1.9 ± 0.3	2.0 ± 0.3	1.4 ± 0.3	1.7 ± 0.3	1.8 ± 0.3
MAR 16 92	MAR 23 92	1.5 ± 0.3	1.3 ± 0.3	1.1 ± 0.3	1.1 ± 0.3	1.1 ± 0.2
MAR 23 92	MAR 31 92	1.5 ± 0.2	1.4 ± 0.2	1.4 ± 0.2	1.6 ± 0.2	1.6 ± 0.2
MAR 31 92	APR 6 92	1.5 ± 0.3	1.2 ± 0.3	1.0 ± 0.3	1.4 ± 0.3	1.4 ± 0.4
APR 6 92	APR 13 92	1.8 ± 0.3	2.4 ± 0.4	1.6 ± 0.3	1.9 ± 0.3	2.0 ± 0.3
APR 13 92	APR 20 92	1.5 ± 0.3	1.4 ± 0.3	1.4 ± 0.3	1.5 ± 0.3	1.7 ± 0.3
APR 20 92	APR 27 92	1.0 ± 0.3	0.8 ± 0.3	0.8 ± 0.2	1.2 ± 0.3	0.8 ± 0.3
APR 27 92	MAY 4 92	1.3 ± 0.3	1.5 ± 0.3	1.3 ± 0.3	1.5 ± 0.3	1.6 ± 0.3
MAY 4 92	MAY 11 92	0.5 ± 0.3	0.5 ± 0.2	0.5 ± 0.2	0.4 ± 0.2	0.5 ± 0.3
MAY 11 92	MAY 18 92	0.8 ± 0.2	0.7 ± 0.2	0.8 ± 0.3	0.9 ± 0.3	1.2 ± 0.3
MAY 18 92	MAY 26 92	0.9 ± 0.2	0.8 ± 0.2	1.0 ± 0.2	1.0 ± 0.2	1.3 ± 0.2
MAY 26 92	JUN 1 92	1.0 ± 0.3	0.7 ± 0.2	0.8 ± 0.3	1.0 ± 0.3	0.8 ± 0.3
JUN 1 92	JUN 8 92	0.6 ± 0.2	0.6 ± 0.2	0.6 ± 0.2	0.7 ± 0.2	0.7 ± 0.2
JUN 8 92	JUN 15 92	1.3 ± 0.2	1.1 ± 0.3	1.0 ± 0.3	1.4 ± 0.2	1.5 ± 0.3
JUN 15 92	JUN 22 92	0.8 ± 0.2	0.7 ± 0.2	1.0 ± 0.2	1.1 ± 0.2	1.2 ± 0.3
JUN 22 92	JUN 29 92	1.5 ± 0.2	1.0 ± 0.2	0.9 ± 0.2	1.7 ± 0.3	1.6 ± 0.2

[1] Control Location

[2] Sampler Malfunction

Table B-6 Continued
Concentrations of Beta Emitters in Air Particulates

(Results in Units of 10^{-2} pCi/m^3 ±2σ)

Start Date	Stop Date	Entrance C. Conoy Site A1	Camp Conoy Rd Site A2	Bay Breeze Rd Site A3	Lusby Site A4	EOF[1] Site A5
JUN 29 92	JUL 6 92	1.1 ± 0.2	0.5 ± 0.2	0.7 ± 0.2	1.2 ± 0.2	1.7 ± 0.3
JUL 6 92	JUL 13 92	1.2 ± 0.2	0.6 ± 0.2	1.2 ± 0.2	1.6 ± 0.2	1.7 ± 0.3
JUL 13 92	JUL 20 92	1.1 ± 0.2	0.6 ± 0.2	1.0 ± 0.2	1.4 ± 0.2	1.4 ± 0.2
JUL 20 92	JUL 27 92	1.2 ± 0.2	0.5 ± 0.2	0.7 ± 0.2	1.2 ± 0.2	1.2 ± 0.2
JUL 27 92	AUG 3 92	2.0 ± 0.2	1.0 ± 0.2	1.0 ± 0.2	1.1 ± 0.2	1.2 ± 0.2
AUG 3 92	AUG 10 92	1.5 ± 0.2	1.1 ± 0.2	1.1 ± 0.2	1.4 ± 0.2	1.4 ± 0.2
AUG 10 92	AUG 17 92	1.1 ± 0.2	0.8 ± 0.2	0.9 ± 0.2	0.9 ± 0.2	1.1 ± 0.2
AUG 17 92	AUG 24 92	1.4 ± 0.2	1.2 ± 0.2	1.2 ± 0.2	1.4 ± 0.2	1.8 ± 0.3
AUG 24 92	AUG 31 92	1.5 ± 0.2	1.1 ± 0.2	1.4 ± 0.2	1.1 ± 0.2	1.3 ± 0.2
AUG 31 92	SEP 8 92	1.2 ± 0.2	0.8 ± 0.2	1.1 ± 0.2	1.3 ± 0.2	1.9 ± 0.3
SEP 8 92	SEP 14 92	1.2 ± 0.2	0.9 ± 0.3	0.9 ± 0.3	1.2 ± 0.2	1.2 ± 0.3
SEP 14 92	SEP 21 92	1.4 ± 0.2	1.0 ± 0.2	1.3 ± 0.2	1.3 ± 0.2	1.7 ± 0.3
SEP 21 92	SEP 28 92	1.0 ± 0.3	0.5 ± 0.3	0.6 ± 0.2	0.6 ± 0.2	0.7 ± 0.2
SEP 28 92	OCT 5 92	1.8 ± 0.2	1.3 ± 0.2	1.1 ± 0.3	1.6 ± 0.2	1.7 ± 0.3
OCT 5 92	OCT 12 92	1.4 ± 0.2	1.3 ± 0.2	1.2 ± 0.2	1.3 ± 0.2	1.3 ± 0.2
OCT 12 92	OCT 19 92	2.5 ± 0.2	2.4 ± 0.3	2.4 ± 0.3	2.7 ± 0.3	2.6 ± 0.3
OCT 19 92	OCT 26 92	1.3 ± 0.2	1.2 ± 0.2	1.6 ± 0.2	1.6 ± 0.2	1.8 ± 0.2
OCT 26 92	NOV 2 92	1.3 ± 0.2	1.1 ± 0.2	1.2 ± 0.2	1.6 ± 0.2	1.7 ± 0.2
NOV 2 92	NOV 9 92	1.1 ± 0.2	1.0 ± 0.2	0.9 ± 0.2	1.1 ± 0.2	1.2 ± 0.2
NOV 9 92	NOV 16 92	1.3 ± 0.2	1.4 ± 0.2	1.4 ± 0.2	1.7 ± 0.2	1.6 ± 0.2
NOV 16 92	NOV 23 92	1.5 ± 0.2	1.5 ± 0.2	1.3 ± 0.2	1.8 ± 0.2	1.7 ± 0.2
NOV 23 92	NOV 30 92	0.9 ± 0.2	0.9 ± 0.2	0.9 ± 0.2	1.0 ± 0.2	1.1 ± 0.2
NOV 30 92	DEC 7 92	1.6 ± 0.2	1.6 ± 0.2	1.5 ± 0.2	1.8 ± 0.2	2.0 ± 0.2
DEC 7 92	DEC 14 92	0.9 ± 0.2	0.7 ± 0.2	0.8 ± 0.2	1.1 ± 0.2	0.9 ± 0.2
DEC 14 92	DEC 21 92	1.2 ± 0.2	1.0 ± 0.2	0.9 ± 0.2	1.4 ± 0.2	1.4 ± 0.2
DEC 21 92	DEC 29 92	1.3 ± 0.2	1.4 ± 0.2	1.2 ± 0.2	1.4 ± 0.2	2.0 ± 0.2

[1] Control Location

Table B-7
Concentrations of Gamma Emitters in Air Particulates

(Results in Units of 10^{-3} pCi/m^3 ±2σ)

Sample Code	Sample Date	GAMMA EMITTERS
A1	1/92	*
Entrance Camp Conoy	2/92	*
	3/92	*
	4/92	*
	5/92	*
	6/92	*
	7/92	*
	8/92	*
	9/92	*
	10/92	*
	11/92	*
	12/92	*
A2	1/92	*
Camp Conoy Road	2/92	*
Near Emergency Siren	3/92	*
	4/92	*
	5/92	
	6/92	*
	7/92	*
	8/92	*
	9/92	*
	10/92	*
	11/92	*
	12/92	*
A3	1/92	*
Bay Breeze Road	2/92	*
	3/92	*
	4/92	*
	5/92	*
	6/92	*
	7/92	*
	8/92	*
	9/92	*
	10/92	*
	11/92	*
	12/92	*

*Naturally occurring Be-7 was observed in most samples. K-40 was observed in many. All other gamma emitters not cited were <MDL; typical MDL's are given in Table B-9.

TABLE B-7 -- Continued
Concentrations of Gamma Emitters In Air Particulates

(Results in Units of 10^{-3} pCi/m^3 ±2σ)

Sample Code	Sample Date	GAMMA EMITTERS
A4 Route 4 Lusby	1/92	*
	2/92	*
	3/92	*
	4/92	*
	5/92	*
	6/92	*
	7/92	*
	8/92	*
	9/92	*
	10/92	*
	11/92	*
	12/92	*
A5 EOF**	1/92	*
	2/92	*
	3/92	*
	4/92	*
	5/92	*
	6/92	*
	7/92	*
	8/92	*
	9/92	*
	10/92	*
	11/92	*
	12/92	*

*Naturally occurring Be-7 was observed in most samples. K-40 was observed in many. All other gamma emitters not cited were <MDL; typical MDL's are given in Table B-9.

**Control location.

Table B-8
Concentration of Gamma Emitters* in Vegetation

(Results in Units of pCi/kg (Wet) ±2σ)

Sample Code	Date	Sample Type	Cs-137
Ib1	05/29/92	Collards	< MDL
Bay Breeze Road	06/22/92	Collards	< MDL
	07/10/92	Collards	< MDL
	08/24/92	Collards	< MDL
	09/21/92	Collards	< MDL
	11/30/92	Collards	< MDL
Ib2	05/29/92	Cabbage	< MDL
Bay Breeze Road	06/22/92	Cauliflower	< MDL
	07/10/92	Cabbage	< MDL
	08/24/92	Cauliflower	< MDL
	09/21/92	Broccoli	< MDL
Ib3	05/29/92	Brussels Sprouts	< MDL
Bay Breeze Road	06/22/92	Broccoli	< MDL
	07/10/92	Brussels Sprouts	< MDL
	08/24/92	Cabbage	< MDL
	09/21/92	Brussels Sprouts	< MDL
Ib4	05/29/92	Collards	< MDL
Before Entrance	06/22/92	Collards	< MDL
to Camp Conoy	07/10/92	Collards	< MDL
	08/24/92	Collards	< MDL
	09/21/92	Collards	< MDL
	11/30/92	Collards	49±22
Ib5	05/29/92	Cabbage	< MDL
Before Entrance	06/22/92	Cauliflower	< MDL
to Camp Conoy	07/10/92	Cabbage	< MDL
	08/24/92	Cauliflower	< MDL
	09/21/92	Broccoli	< MDL
	11/30/92	Cabbage	< MDL
Ib6	05/29/92	Brussels Sprouts	< MDL
Before Entrance	06/22/92	Broccoli	< MDL
to Camp Conoy	07/10/92	Brussels Sprouts	< MDL
	08/24/92	Cabbage	< MDL
	09/21/92	Brussels Sprouts	78±25
	11/30/92	Brussels Sprouts	75±30

*Naturally occurring Be-7 and K-40 were observed in most samples. All other gamma emitters not cited were <MDL; typical MDL's are given in Table B-9.

TABLE B-8 -- Continued
Concentrations of Gamma Emitters* In Vegetation Samples

(Results in Units of pCi/kg (Wet) ±2σ)

Sample Code	Date	Sample Type	Cs-137
Ib7	05/29/92	Collards	< MDL
EOF**	06/22/92	Collards	< MDL
	07/10/92	Collards	< MDL
	08/24/92	Collards	< MDL
	09/21/92	Collards	< MDL
	11/30/92	Collards	< MDL
Ib8	05/29/92	Cabbage	< MDL
EOF**	06/22/92	Cauliflower	< MDL
	07/10/92	Cabbage	46±17
	08/24/92	Cauliflower	< MDL
	09/21/92	Broccoli	< MDL
	11/30/92	Cabbage	< MDL
Ib9	05/29/92	Brussels Sprouts	< MDL
EOF**	06/22/92	Broccoli	< MDL
	07/10/92	Brussels Sprouts	< MDL
	08/24/92	Cabbage	< MDL
	09/21/92	Brussels Sprouts	42±20
	11/30/92	Brussels Sprouts	< MDL

*Naturally occurring Be-7 and K-40 were observed in most samples. All other gamma emitters not cited were <MDL; typical MDL's are given in Table B-9.

**Control location.

Table B-9
Typical MDL Ranges for Gamma Spectrometry

Selected Nuclides	Bay Water pCi/l	Fish pCi/kg	Shellfish pCi/kg	Shoreline pCi/kg	Vegetation pCi/kg	Particulates 10^{-3}pCi/m^3
Na-22	2.0-2.7	16 - 19	13 - 15	22 - 37	23 - 41	1.4-3.0
Cr-51	19 - 26	109-123	79 -126	15 - 27	116-198	12 - 25
Mn-54	1.7-2.3	13 - 15	10 - 14	18 - 36	17 - 31	1.4-2.8
Co-58	2.2-2.8	13 - 16	11 - 20	20 - 31	16 - 30	1.5-3.1
Fe-59	4.1-7.1	33 - 50	31 - 40	39 - 73	40 - 75	3.3-7.5
Co-60	2.0-2.8	18 - 22	12 - 18	18 - 41	25 - 48	1.4-3.1
Zn-65	3.5-5.6	32 - 41	26 - 36	45 - 78	43 - 85	2.8-6.0
Nb-95	2.6-3.7	17 - 20	14 - 24	26 - 26	18 - 33	2.2-4.5
Zr-95	3.2-5.3	22 - 27	20 - 26	35 - 62	28 - 52	2.9-5.4
Ru-106	16 - 21	89 -114	80 -120	168-284	163-258	11 - 22
Ag-110m	1.7-2.2	10 - 12	10 - 19	17 - 32	17 - 31	1.2-2.2
Te-129m	28 - 38	158-189	158-203	227-414	203-312	19 - 39
I-131	8 - 17	38 - 82	30 - 75	43 - 51	17 - 38	*
Cs-134	1.9-2.7	13 - 17	12 - 15	20 - 45	21 - 34	1.3-2.8
Cs-137	1.7-2.2	12 - 14	9 - 15	19 - 38	19 - 38	1.0-2.3
Ba-140	16 - 27	86 -149	76 -135	111-152	61 -126	14 - 33
Ce-144	10 - 13	31 - 34	29 - 36	69 -165	79 -114	3.9-6.5

*The MDL range for I-131 measured on silver zeolite cartridge is 2.5×10^{-3} to 9.7×10^{-3} pCi/m^3.

Table B-10
LLD's for Gamma Spectrometry

Selected Nuclides	Bay Water pCi/l	Fish pCi/kg	Shellfish pCi/kg	Sediment pCi/kg	Particulate 10^{-3}pCi/m^3	Precipitation pCi/l	Vegetation pCi/kg	Soil pCi/kg	Well Water pCi/l
Na-22	1.74	14	14	51	2.0	1.7	27	51	1.7
Cr-51	13	55	55	294	10	13	124	294	13
Mn-54	1.9	12	12	40	2.0	1.9	19	40	1.9
Co-58	1.7	9	9	43	2.0	1.7	19	43	1.7
Fe-59	3.6	25	25	85	3.1	3.6	36	85	3.6
Co-60	1.9	15	15	46	2.2	1.9	29	46	1.9
Zn-65	3.9	24	24	99	4.8	3.9	48	99	3.9
Nb-95	1.7	9	9	48	1.5	1.7	22	48	1.7
Zr-95	3.3	18	18	82	2.7	3.3	29	82	3.3
Ru-106	16	81	81	381	13	16	181	381	16
Ag-110m	1.7	10	10	47	1.7	1.7	21	47	1.7
Te-129m	21	106	106	474	17	21	229	474	21
I-131	1.7	7	7	38	1.3*	1.7	16	38	1.7
Cs-134	2.5	12	12	49	2.1	2.5	19	49	2.5
Cs-137	2.0	9	9	53	1.8	2.0	24	53	2.0
Ba-140	7.5	31	31	133	4.6	7.5	63	133	7.5
La-140	4.0	12	12	53	2.8	4.0	26	53	4.0
Ce-144	11	27	27	189	5.1	11	83	189	11

*The LLD for I-131 measured on silver zeolite cartridge is 6.8×10^{-3} pCi/m^3 for NaI1 Detector and 4.9×10^{-3} pCi/m^3 for NaI2 Detector

Table B-11
Direct Radiation
(Results in Units of mR/30 days ±2σ)

DR1	Jan.	5.25±0.88	Jul.	3.85±0.51
On Site Along Cliffs	Feb.	4.88±0.32	Aug.	4.26±0.07
	Mar.	4.55±1.28	Sep.	4.24±1.25
	Apr.	4.73±0.26	Oct.	3.83±0.96
	May.	3.97±0.05	Nov.	4.16±0.15
	Jun.	4.38±0.21	Dec.	3.95±0.30
DR2	Jan.	**	Jul.	3.51±0.06
Route 765 Auto Dump	Feb.	**	Aug.	3.09±0.31
	Mar.	3.69±0.14	Sep.	3.17±0.77
	Apr.	3.82±1.10	Oct.	3.01±0.13
	May.	3.09±0.60	Nov.	3.35±0.32
	Jun.	3.33±0.53	Dec.	3.12±0.28
DR3	Jan.	4.00±0.39	Jul.	3.41±0.29
Route 765	Feb.	3.83±0.67	Aug.	3.42±0.29
Giovanni's Tavern	Mar.	3.94±0.62	Sep.	3.24±0.55
	Apr.	3.47±0.66	Oct.	3.21±0.44
	May.	3.23±0.23	Nov.	3.52±0.50
	Jun.	3.28±0.03	Dec.	3.17±0.13
DR4	Jan.	4.38±0.28	Jul.	3.80±0.04
Route 765 Across From	Feb.	4.66±0.68	Aug.	3.92±0.57
White Sands Sign	Mar.	4.06±0.20	Sep.	3.53±0.51
	Apr.	4.02±0.39	Oct.	4.07±1.26
	May.	3.56±0.52	Nov.	3.54±1.12
	Jun.	3.79±0.57	Dec.	3.50±0.63
DR5	Jan.	4.39±0.19	Jul.	3.75±0.06
Route 765	Feb.	4.23±1.28	Aug.	3.89±0.28
John's Creek	Mar.	4.32±0.21	Sep.	3.51±0.21
	Apr.	3.96±0.62	Oct.	3.93±1.39
	May.	3.33±0.41	Nov.	3.84±0.57
	Jun.	3.92±0.40	Dec.	3.59±1.01
DR6	Jan.	4.03±0.45	Jul.	3.38±0.30
Route 765 Lusby	Feb.	3.84±0.27	Aug.	3.43±0.03
	Mar.	3.63±0.49	Sep.	3.31±0.32
	Apr.	3.81±0.67	Oct.	3.79±1.49
	May.	2.86±0.30	Nov.	3.38±0.89
	Jun.	3.33±0.27	Dec.	3.20±0.49

**Missing TLD

TABLE B-11 -- Continued
Direct Radiation
(Results in Units of mR/30 days ±2σ)

DR7	Jan.	3.65±0.57	Jul.	3.12±0.40
Plant Site Garden	Feb.	3.56±0.21	Aug.	3.48±0.35
	Mar.	3.65±0.36	Sep.	3.22±0.44
	Apr.	3.77±0.10	Oct.	3.41±0.72
	May.	3.16±0.61	Nov.	3.59±0.30
	Jun.	3.61±0.70	Dec.	2.94±0.51
DR8	Jan.	4.64±0.91	Jul.	4.59±0.72
Camp Conoy Road	Feb.	5.21±0.73	Aug.	4.37±0.84
Near Emergency Siren	Mar.	4.74±0.15	Sep.	4.28±0.09
	Apr.	4.77±0.32	Oct.	4.20±0.33
	May.	4.06±0.18	Nov.	4.28±0.28
	Jun.	4.48±0.53	Dec.	4.14±0.44
DR9	Jan.	4.07±0.14	Jul.	3.63±0.76
Bay Breeze Road	Feb.	4.52±0.91	Aug.	3.57±0.91
	Mar.	3.83±0.41	Sep.	3.48±0.80
	Apr.	3.75±0.16	Oct.	4.13±0.76
	May.	3.35±0.41	Nov.	3.39±0.43
	Jun.	3.62±0.09	Dec.	3.13±0.78
DR10	Jan.	3.85±0.89	Jul.	3.80±0.49
Calvert Beach Road	Feb.	4.02±0.19	Aug.	3.44±0.50
and Decatur Street	Mar.	4.02±0.70	Sep.	3.29±0.57
	Apr.	3.70±0.47	Oct.	4.00±1.60
	May.	3.45±0.43	Nov.	3.12±0.64
	Jun.	3.51±0.30	Dec.	3.34±0.56
DR11	Jan.	4.42±0.68	Jul.	4.10±1.00
Dirt Road off Mackall	Feb.	4.27±0.63	Aug.	3.81±0.71
& Parran Roads	Mar.	3.98±0.42	Sep.	3.31±0.19
	Apr.	3.77±0.38	Oct.	5.27±4.42
	May.	3.56±0.49	Nov.	3.82±0.48
	Jun.	3.80±0.71	Dec.	3.41±0.51
DR12	Jan.	4.19±0.45	Jul.	3.58±0.79
Mackall & Bowen Roads	Feb.	4.06±0.23	Aug.	3.44±0.26
	Mar.	4.00±0.74	Sep.	3.42±0.29
	Apr.	3.55±0.35	Oct.	3.34±0.48
	May.	3.20±0.09	Nov.	3.31±0.19
	Jun.	3.67±0.36	Dec.	4.76±3.90

TABLE B-11 -- Continued
Direct Radiation
(Results in Units of mR/30 days ±2σ)

DR13	Jan.	4.21±0.83	Jul.	3.99±0.71
Mackall Road	Feb.	4.27±0.61	Aug.	3.80±0.70
Near Wallville	Mar.	4.12±0.67	Sep.	3.49±0.38
	Apr.	3.83±0.27	Oct.	3.42±0.09
	May.	3.47±0.24	Nov.	3.36±0.36
	Jun.	3.74±0.06	Dec.	3.52±0.22
DR14	Jan.	4.77±0.56	Jul.	4.19±1.27
Rodney Point	Feb.	4.82±0.40	Aug.	4.02±0.61
	Mar.	4.59±0.37	Sep.	3.70±0.39
	Apr.	4.29±0.28	Oct.	4.11±0.56
	May.	3.99±0.39	Nov.	3.70±0.17
	Jun.	4.18±0.16	Dec.	4.11±0.76
DR15	Jan.	4.41±0.19	Jul.	4.03±0.46
Mill Bridge &	Feb.	4.17±0.51	Aug.	4.02±0.11
Turner Roads	Mar.	4.37±0.94	Sep.	3.63±0.22
	Apr.	4.38±0.76	Oct.	3.51±0.39
	May.	3.46±0.15	Nov.	3.57±0.59
	Jun.	4.00±0.39	Dec.	3.70±0.24
DR16	Jan.	4.50±0.37	Jul.	3.79±0.22
Across From	Feb.	4.00±0.88	Aug.	3.65±0.65
Appeal School	Mar.	4.63±1.33	Sep.	3.50±0.37
	Apr.	3.84±0.52	Oct.	3.44±0.34
	May.	3.50±0.04	Nov.	3.37±0.26
	Jun.	3.90±0.07	Dec.	3.62±0.52
DR17	Jan.	4.44±0.12	Jul.	3.84±0.42
Cove Point &	Feb.	4.41±0.61	Aug.	4.02±0.61
Little Cove Point Roads	Mar.	4.23±0.17	Sep.	3.76±0.10
	Apr.	4.11±0.47	Oct.	4.07±1.84
	May.	3.50±0.24	Nov.	3.59±0.10
	Jun.	3.93±0.66	Dec.	3.74±0.09
DR18	Jan.	3.50±0.26	Jul.	3.12±0.12
Cove Point	Feb.	3.55±0.12	Aug.	3.52±0.41
	Mar.	3.35±0.23	Sep.	3.34±0.46
	Apr.	3.34±0.29	Oct.	3.09±0.07
	May.	3.05±0.09	Nov.	3.01±0.58
	Jun.	3.36±0.47	Dec.	3.12±0.04

TABLE B-11 -- Continued
Direct Radiation
(Results in Units of mR/30 days ±2σ)

DR19	Jan.	4.29±0.28	Jul.	3.55±0.69
Long Beach	Feb.	3.73±0.36	Aug.	3.97±0.23
	Mar.	3.85±0.16	Sep.	3.33±0.06
	Apr.	3.98±0.94	Oct.	3.25±0.52
	May.	3.30±0.23	Nov.	3.16±0.35
	Jun.	3.50±0.18	Dec.	3.19±1.23
DR20	Jan.	4.66±0.22	Jul.	4.24±0.03
On Site Near Shore	Feb.	4.83±0.58	Aug.	4.58±0.04
	Mar.	4.43±0.30	Sep.	4.07±0.09
	Apr.	4.35±0.21	Oct.	4.14±1.21
	May.	3.92±0.37	Nov.	3.63±0.74
	Jun.	4.71±0.95	Dec.	4.38±0.59
DR21	Jan.	4.32±0.35	Jul.	3.83±0.48
Emergency Operations	Feb.	4.36±0.24	Aug.	4.31±0.55
Facility (EOF*)	Mar.	4.13±0.08	Sep.	3.94±0.15
	Apr.	4.36±0.77	Oct.	3.79±0.36
	May.	3.65±0.20	Nov.	3.45±0.21
	Jun.	4.21±0.55	Dec.	3.91±1.25
DR22	Jan.	3.14±0.33	Jul.	3.00±0.44
Solomons Island*	Feb.	3.40±0.33	Aug.	3.03±0.34
	Mar.	3.12±0.38	Sep.	2.91±0.21
	Apr.	3.30±0.52	Oct.	2.77±0.32
	May.	2.83±0.10	Nov.	2.65±0.77
	Jun.	3.02±0.23	Dec.	2.80±0.48
DR23	Jan.	5.57±0.49	Jul.	5.01±0.38
Taylors Island*	Feb.	5.68±0.82	Aug.	5.03±0.24
	Mar.	5.40±0.75	Sep.	4.49±0.85
	Apr.	5.10±0.40	Oct.	5.31±1.36
	May.	4.76±0.31	Nov.	4.57±0.04
	Jun.	5.04±1.36	Dec.	4.64±0.10

*Considered control location

APPENDIX C

Appendix C contains Table C-1 which is a compilation of the results of BG&E laboratory's participation in the Environmental Protection Agency's Cross-Check Program during the period January 1, 1992 to December 31, 1992. It also contains Table C-2 and Table C-3 which together form a compilation of the results of BG&E laboratory's participation in a Quality Assurance program set up with Teledyne Isotopes Company during the same period. The Teledyne operating procedures are described in reference 34.

As can be readily seen in Tables C-1 and C-2 the laboratory's results agree quite well with both the EPA Cross-Check results and the Quality Assurance results from replicate and split-sample analyses. There are only three instances where the laboratory's results are different from Teledyne's (See Table C-2).

The first instance involved a bay water sample obtained from the Discharge Area (Wa2) in July 1992. The laboratory reported the presence of Co-58 in both its original analysis (4.2±2.4 pCi/L) and its replicate analysis (6.3±2.7), while Teledyne reported <MDL (3.0 pCi/L) for this radionuclide. Since the laboratory's results reported above are close to Teledyne's MDL value, it is probable that Teledyne did not observe Co-58 because of the statistical nature of this type of analysis.

The second instance involved two vegetation samples collected from locations Ib5 and Ib9 on August 24,1992. In both cases, Teledyne reported Cs-137 (10±5 pCi/kg and 10±4 pCi/kg respectively). The laboratory reported <MDL for Cs-137 in both samples. Since the laboratory's range of MDL's for Cs-137 in vegetation is 19-38 pCi/kg, and since both of Teledyne's positive results are below this range, it is again probable that this radionuclide was not observed.

The last instance involved a vegetation sample obtained from location Ib6 on November 30, 1992. In this case the presence of Cs-137 was observed in the laboratory's original analysis (75±30 Ci/kg) and Teledyne's split analysis (36±5 pCi/kg), while the laboratory reported < MDL for this radionuclide in its replicate analysis. The sample consisted of leaves and sprouts of the brussels sprout plant. Since the sprout portion of the sample is made up of tight balls of vegetative matter which may not be a good media for any radioactivity due to the process of deposition, it is possible that the three samples (original, replicate, and split) were not truly homogeneous in nature. This possibility could account for the observed discrepancy.

Table C-1
Results of EPA Cross Check Program for 1992

Sample Date	Sample Type and Units	Isotope Observed	Laboratory's Results	EPA's Results
02/07/92	Water-pCi/L	I-131	59±4	59±7
02/14/92	Water-pCi/L	Co-60	46±7	40±6
		Zn-65	162±17	148±17
		Ru-106	239±51	203±23
		Cs-134	38±6	31±6
		Cs-137	52±7	49±6
		Ba-133	83±8	76±9
02/21/92	Water-pCi/L	H-3	6892±689	7904±915
03/27/92	Filter-pCi/filter	Beta	45±5	41±6
		Cs-137	11±2	10±6
04/24/92	Milk-pCi/L	I-131	90±11	78±9
		Cs-137	42±10	39±6
04/14/92	Water-pCi/L	Co-60	62±8	56±6
		Cs-134	27±6	24±6
		Cs-137	24±5	22±6
06/05/92	Water-pCi/L	Co-60	25±5	20±6
		Zn-65	109±15	99±10
		Ru-106	150±43	141±16
		Ba-133	105±8	98±8
		Cs-134	18±5	15±6
		Cs-137	17±4	15±6
06/19/92	Water-pCi/L	H-3	2200±220	2125±402
08/07/92	Water-pCi/L	I-131	45±4	45±7
08/28/92	Filter-pCi/filter	Beta	79±8	69±12
		Cs-137	22±3	18±6
09/25/92	Milk-pCi/L	I-131	77±4	100±12
		Cs-137	17±7	15±6

Table C-1 -- Continued
Results of EPA Cross Check Program for 1992

Sample Date	Sample Type and Units	Isotope Observed	Laboratory's Results	EPA's Results
10/09/92	Water-pCi/L	CO-60	10±4	10±6
		Zn-65	156±16	148±17
		Ru-106	180±38	175±21
		Ba-133	72±7	74±8
		Cs-134	9±5	8±6
		Cs-137	9±4	8±6
10/20/92	Water-pCi/L	Co-60	15±5	15±6
		Cs-134	7±3	5±6
		Cs-137	10±3	8±6
10/23/92	Water-pCi/L	H-3	5902±590	5962±690

Table C-2
Results of Quality Assurance Program for 1992

Sample Type And Location	Sample Date	Type of Analysis	Original Analysis	Replicate Analysis	Split* Analysis
				10^{-2} pCi/m^3	
Air Filter-A1	01/27/92	Beta	2.4±0.4	2.4±0.4	**
Air Filter-A2	01/27/92	Beta	1.9±0.3	1.9±0.3	**
Air Filter-A3	01/27/92	Beta	1.6±0.3	1.9±0.3	**
Air Filter-A4	01/27/92	Beta	1.9±0.3	1.9±0.3	**
Air Filter-A5	01/27/92	Beta	2.0±0.3	2.5±0.3	
Air Iodine-A2	01/27/92	I-131	< 0.5	< 0.5	**
Air Iodine-A5	01/27/92	I-131	< 0.5	< 0.5	**
				pCi/L	
Bay Water-Wa1	01/15/92	Gamma	< MDL	< MDL	< MDL
Bay Water-Wa2	02/15/92	Tritium	< 152	< 154	< 200
				10^{-2} pCi/m^3	
Air Filter-A1	03/02/92	Beta	1.2±0.3	1.4±0.3	**
Air Filter-A2	03/02/92	Beta	1.5±0.3	1.6±0.3	**
Air Filter-A3	03/02/92	Beta	0.9±0.2	1.1±0.2	**
Air Filter-A4	03/02/92	Beta	1.3±0.3	1.3±0.3	**
Air Filter-A5	03/02/92	Beta	1.1±0.2	1.3±0.2	
Air Iodine-A2	03/02/92	I-131	< 0.7	< 0.7	**
Air Iodine-A3	03/02/92	I-131	< 0.5	< 0.5	**
Air Filter-A1	03/16/92	Beta	1.9±0.3	1.7±0.3	**
Air Filter-A2	03/16/92	Beta	2.0±0.3	1.7±0.3	**
Air Filter-A3	03/16/92	Beta	1.4±0.3	1.4±0.3	**
Air Filter-A4	03/16/92	Beta	1.7±0.3	1.7±0.3	**
Air Filter-A5	03/16/92	Beta	1.8±0.3	1.7±0.3	
Air Iodine-A1	03/16/92	I-131	< 0.6	< 0.6	**
Air Iodine-A4	03/16/92	I-131	< 0.5	< 0.5	**
				pCi/kg	
Oyster-Ia3	03/26/92	Ag-110	42±11	46±20	54±21

*Samples split with Teledyne Isotopes, Westwood, New Jersey. On the following table is a list of their typical MDL's.

**The nature of these samples precluded splitting them with Teledyne Isotopes.

Table C-2 -- Continued
Results of Quality Assurance Program for 1992

Sample Type And Location	Sample Date	Type of Analysis	Original Analysis	Replicate Analysis	Split* Analysis
				10^{-2} pCi/m^3	
Air Filter-A1	04/20/92	Beta	1.5±0.3	1.5±0.3	**
Air Filter-A2	04/20/92	Beta	1.4±0.3	1.4±0.3	**
Air Filter-A3	04/20/92	Beta	1.4±0.3	1.5±0.4	**
Air Filter-A4	04/20/92	Beta	1.5±0.3	1.4±0.3	**
Air Filter-A5	04/20/92	Beta	1.7±0.3	1.6±0.3	
Air Iodine-A3	04/20/92	I-131	< 0.8	< 0.8	**
Air Iodine-A5	04/20/92	I-131	< 0.6	< 0.6	**
				10^{-2} pCi/m^3	
Air Filter-A1	05/04/92	Beta	1.3±0.3	1.5±0.3	**
Air Filter-A2	05/04/92	Beta	1.5±0.3	1.6±0.3	**
Air Filter-A3	05/04/92	Beta	1.3±0.3	1.4±0.3	**
Air Filter-A4	05/04/92	Beta	1.5±0.3	1.6±0.3	**
Air Filter-A5	05/04/92	Beta	1.6±0.3	1.7±0.3	
Air Iodine-A1	05/04/92	I-131	< 0.6	< 0.6	**
Air Iodine-A2	05/04/92	I-131	< 0.6	< 0.6	**
				pCi/kg	
Shoreline-Wb1	05/29/92	Gamma	< MDL	< MDL	< MDL
				10^{-2} pCi/m^3	
Air Filter-A1	06/15/92	Beta	1.3±0.2	1.3±0.2	**
Air Filter-A2	06/15/92	Beta	1.1±0.3	1.0±0.3	**
Air Filter-A3	06/15/92	Beta	1.0±0.3	1.2±0.3	**
Air Filter-A4	06/15/92	Beta	1.4±0.2	1.4±0.2	**
Air Filter-A5	06/15/92	Beta	1.5±0.3	1.6±0.3	

*Samples split with Teledyne Isotopes, Westwood, New Jersey. On the following table is a list of their typical MDL's.

**The nature of these samples precluded splitting them with Teledyne Isotopes.

Table C-2 -- Continued
Results of Quality Assurance Program for 1992

Sample Type And Location	Sample Date	Type of Analysis	Original Analysis	Replicate Analysis	Split* Analysis
				10^{-2} pCi/m^3	
Air Iodine-A3	06/15/92	I-131	< 0.6	< 0.6	**
Air Iodine-A4	06/15/92	I-131	< 0.5	< 0.5	**
Air Filters-A1	06/15/92	Gamma	< MDL	< MDL	< MDL
Air Filters-A2	06/15/92	Gamma	< MDL	< MDL	< MDL
Air Filters-A3	06/15/92	Gamma	< MDL	< MDL	< MDL
Air Filters-A4	06/15/92	Gamma	< MDL	< MDL	< MDL
Air Filters-A5	06/15/92	Gamma	< MDL	< MDL	< MDL
				10^{-2} pCi/m^3	
Air Filter-A1	07/27/92	Beta	1.2±0.2	1.2±0.2	**
Air Filter-A2	07/27/92	Beta	0.5±0.2	0.5±0.2	**
Air Filter-A3	07/27/92	Beta	0.7±0.2	0.9±0.2	**
Air Filter-A4	07/27/92	Beta	1.2±0.2	1.1±0.2	**
Air Filter-A5	07/27/92	Beta	1.2±0.2	1.2±0.2	**
Air Iodine-A2	07/20/92	I-131	< 0.5	< 0.5	**
Air Iodine-A5	07/20/92	I-131	< 0.4	< 0.4	**
				pCi/L	
Bay Water-Wa2	07/15/92	Co-58	4.2±2.4	6.3±2.7	< MDL
				mR/30 Days	
DR1	07/31/92	TLD	3.9±0.5	4.3±0.8	**
DR2	07/31/92	TLD	3.5±0.1	3.3±0.5	**
DR3	07/31/92	TLD	3.4±0.3	3.7±0.4	**
DR4	07/31/92	TLD	3.8±0.4	3.9±0.3	**
DR5	07/31/92	TLD	3.8±0.1	3.7±0.8	**
DR6	07/31/92	TLD	3.4±0.3	3.4±0.5	**
DR7	07/31/92	TLD	3.1±0.4	3.2±0.3	**

*Samples split with Teledyne Isotopes, Westwood, New Jersey. On the following table is a list of their typical MDL's.

**The nature of these samples precluded splitting them with Teledyne Isotopes.

Table C-2 -- Continued
Results of Quality Assurance Program for 1992

Sample Type And Location	Sample Date	Type of Analysis	Original Analysis	Replicate Analysis	Split* Analysis
				10^{-2} pCi/m^3	
Air Filter-A1	08/17/92	Beta	1.1±0.2	1.1±0.2	**
Air Filter-A2	08/17/92	Beta	0.8±0.2	0.7±0.2	**
Air Filter-A3	08/17/92	Beta	0.9±0.2	0.9±0.2	**
Air Filter-A4	08/17/92	Beta	0.9±0.2	0.9±0.2	**
Air Filter-A5	08/17/92	Beta	1.1±0.2	1.2±0.2	
Air Iodine-A3	08/17/92	I-131	< 0.5	< 0.5	**
Air Iodine-A5	08/17/92	I-131	< 0.4	< 0.4	**
				pCi/L	
Bay Water-Wa2	08/15/92	Tritium	150±30	167±30	220±80
				pCi/kg	
Vegetation-Ib2	08/24/92	Gamma	< MDL	< MDL	< MDL
Vegetation-Ib3	08/24/92	Gamma	< MDL	< MDL	< MDL
Vegetation-Ib5	08/24/92	Cs-137	< MDL	< MDL	10±5
Vegetation-Ib6	08/24/92	Gamma	< MDL	< MDL	< MDL
Vegetation-Ib8	08/24/92	Gamma	< MDL	< MDL	< MDL
Vegetation-Ib9	08/24/92	Cs-137	< MDL	< MDL	10±4
				pCi/kg	
Oyster-Ia6	08/21/92	Gamma	< MDL	< MDL	< MDL
Spot - Ia2	08/27/92	Gamma	< MDL	< MDL	< MDL
				10^{-2} pCi/m^3	
Air Filter-A1	09/14/92	Beta	1.2±0.2	1.2±0.2	**
Air Filter-A2	09/14/92	Beta	0.9±0.3	0.9±0.3	**
Air Filter-A3	09/14/92	Beta	0.9±0.3	1.2±0.3	**
Air Filter-A4	09/14/92	Beta	1.2±0.2	1.2±0.2	**
Air Filter-A5	09/14/92	Beta	1.2±0.3	1.2±0.3	
Air Iodine-A1	09/14/92	I-131	< 0.5	< 0.5	**
Air Iodine-A5	09/14/92	I-131	< 0.6	< 0.6	**

*Samples split with Teledyne Isotopes, Westwood, New Jersey. On the following table is a list of their typical MDL's.

**The nature of these samples precluded splitting them with Teledyne Isotopes.

Table C-2 -- Continued
Results of Quality Assurance Program for 1992

Sample Type And Location	Sample Date	Type of Analysis	Original Analysis	Replicate Analysis	Split* Analysis
				10^{-2} pCi/m^3	
Air Filter-A1	10/12/92	Beta	1.4±0.2	1.3±0.2	**
Air Filter-A2	10/12/92	Beta	1.3±0.2	1.3±0.2	**
Air Filter-A3	10/12/92	Beta	1.2±0.2	1.1±0.2	**
Air Filter-A4	10/12/92	Beta	1.3±0.2	1.4±0.2	**
Air Filter-A5	10/12/92	Beta	1.3±0.2	1.2±0.2	
Air Iodine-A3	10/12/92	I-131	< 0.5	< 0.5	**
Air Iodine-A5	10/12/92	I-131	< 0.4	< 0.4	**
				pCi/L	
Bay Water-Wa2	10/15/92	Gamma	< MDL	< MDL	< MDL
				mR/30 Days	
DR8	10/31/92	TLD	4.2±0.3	4.3±0.6	**
DR9	10/31/92	TLD	4.1±0.8	3.6±0.3	**
DR10	10/31/92	TLD	4.0±1.6	3.5±0.5	**
DR11	10/31/92	TLD	5.3±4.4	3.6±0.6	**
DR12	10/31/92	TLD	3.3±0.5	3.6±0.6	**
DR13	10/31/92	TLD	3.4±0.1	4.5±2.6	**
DR14	10/31/92	TLD	4.1±0.6	3.9±0.4	
				10^{-2} pCi/m^3	
Air Filter-A1	11/23/92	Beta	1.5±0.2	1.4±0.2	**
Air Filter-A2	11/23/92	Beta	1.5±0.2	1.3±0.2	**
Air Filter-A3	11/23/92	Beta	1.3±0.2	1.4±0.2	**
Air Filter-A4	11/23/92	Beta	1.8±0.2	1.8±0.2	**
Air Filter-A5	11/23/92	Beta	1.7±0.2	1.8±0.2	
Air Iodine-A3	11/23/92	I-131	< 0.3	< 0.3	**
Air Iodine-A5	11/23/92	I-131	< 0.3	< 0.3	**
				10^{-2} pCi/m^3	
Air Filter-A1	11/15/92	Gamma	< MDL	< MDL	< MDL
Air Filter-A2	11/15/92	Gamma	< MDL	< MDL	< MDL
Air Filter-A3	11/15/92	Gamma	< MDL	< MDL	< MDL
Air Filter-A4	11/15/92	Gamma	< MDL	< MDL	< MDL
Air Filter-A5	11/15/92	Gamma	< MDL	< MDL	< MDL

*Samples split with Teledyne Isotopes, Westwood, New Jersey. On the following table is a list of their typical MDL's.

**The nature of these samples precluded splitting them with Teledyne Isotopes.

Table C-2 -- Continued
Results of Quality Assurance Program for 1992

Sample Type And Location	Sample Date	Type of Analysis	Original Analysis	Replicate Analysis	Split* Analysis
				pCi/L	
Bay Water-Wa1	11/15/92	Gamma	< MDL	< MDL	< MDL
				pCi/kg	
Vegetation-Ib1	11/30/92	Gamma	< MDL	< MDL	< MDL
Vegetation-Ib5	11/30/92	Gamma	< MDL	< MDL	< MDL
Vegetation-Ib6	11/30/92	Cs-137	75±30	< MDL	36±5
Vegetation-Ib7	11/30/92	Gamma	< MDL	< MDL	< MDL
				10^{-2} pCi/m^3	
Air Filter-A1	12/21/92	Beta	1.2±0.2	1.3±0.2	**
Air Filter-A2	12/21/92	Beta	1.0±0.2	1.0±0.2	**
Air Filter-A3	12/21/92	Beta	0.9±0.2	0.9±0.2	**
Air Filter-A4	12/21/92	Beta	1.4±0.2	1.4±0.2	**
Air Filter-A5	12/21/92	Beta	1.4±0.2	1.5±0.2	**
Air Iodine-A1	12/14/92	I-131	< 0.3	< 0.3	**
Air Iodine-A2	12/14/92	I-131	< 0.3	< 0.3	**

*Samples split with Teledyne Isotopes, Westwood, New Jersey. On the following table is a list of their typical MDL's.

**The nature of these samples precluded splitting them with Teledyne Isotopes.

Table C-3
Teledyne Isotopes' Typical MDL'S for Gamma Spectrometry

Selected Nuclides	Bay Water pCi/l	Fish pCi/kg	Shellfish pCi/kg	Sediment pCi/kg	Vegetation pCi/kg	Particulates 10^{-3} pCi/m^3
Be-7	30	200	300	200	80	--
K-40	90	--	--	--	--	40
Mn-54	2.0	20	30	20	6.0	2.0
Co-58	3.0	20	40	20	7.0	3.0
Fe-59	7.0	60	80	50	20	7.0
Co-60	3.0	20	30	20	6.0	2.0
Zn-65	5.0	40	70	40	10	6.0
Zr-95	3.0	20	40	30	7.0	3.0
Ru-103	4.0	40	50	30	9.0	4.0
Ru-106	20	200	300	200	50	20
I-131	30	--	--	--	--	40
Cs-134	3.0	20	500	20	7.0	3.0
Cs-137	3.0	20	30	20	6.0	3.0
Ba-140	10	200	200	70	30	20
Ce-141	9.0	70	60	40	10	6.0
Ce-144	20	100	200	100	40	100

APPENDIX D

Appendix D contains the results of a Land Use Survey conducted around Calvert Cliffs Nuclear Power Plant during the growing season of 1992. A table listing the raw data of this survey and a discussion of the results are included in this appendix.

Discussion

A Land Use Survey was conducted during the growing season of the year 1992 to identify, within a distance of 8 km, the location of the nearest milk animal, the nearest residence, and the nearest garden greater than 50 m^2 in each of the nine sectors over land. A detailed description of the Land Use Survey is given in a separate document (39). The position of the nearest residence and garden in each sector out to 8 km are given in the adjacent table. No dairy animal was within 8 km.

Table D-1
Land Use Survey

	Distance From Plant (km)	
Sector	Residence	Garden
SE	2.2	7.4
SSE	2.7	2.7
S	2.7	2.9
SSW	2.7	2.8
SW	2.1	2.0
WSW	1.9	1.9
W	2.2	3.2
WNW	2.5	2.7
NW	3.2	3.3

The closest residence and garden are situated in the WSW sector, which is one of the least prevalent wind directions. In the S, SSE, and SE sectors, there is the highest probability of wind blowing from the direction of the plant. The two gardens used for vegetable samples by the Radiological Environmental Program have been placed in the sectors with the highest X/Q. One sampling garden is located in the S sector at a distance of 0.7 km, and another is situated near the site boundary between the SSE and SE sectors at a distance of 2.6 km from the plant. These two sampling sites are considered good indicator locations for radioactive depositions around the plant.

The milk cow previously identified in the SSW sector 4.8 km from the release point was misidentified as a dairy cow.. A small herd of beef cattle are maintained at that location. The previously identified milk cow has been used only to suckle calves.

Because this determination was made late in the monitoring year, forage samples were still collected from that location and analyzed (see Table E-8 in Appendix E).

The dose assessment using 1992 meteorological data was performed, and no significant impact from the plant was found.

APPENDIX E

Appendix E is a presentation of the analytical results for additional samples collected in the environs of Calvert Cliffs Nuclear Power Plant during the year 1992. These extra samples are not required by the Environmental Technical Specifications (29-32). They were collected and analyzed to maintain the historical continuity for samples and sampling pathways discontinued when the Environmental Technical Specifications were changed in March, 1985. In addition, this extra sampling broadens the range of our current monitoring program to incorporate the Independent Spent Fuel Storage Installation (ISFSI).

With these reasons in mind the following samples were added to our monitoring program:

1. TLD's were placed at seven locations in various meteorological sectors immediately surrounding the ISFSI. The location designations along with their associated meteorological sectors are: SFDR10 North ISFSI, SFDR11 WNW ISFSI, SFDR12 West ISFSI, SFDR13 SSW ISFSI, SFDR14 SSE ISFSI, SFDR15 ENE ISFSI, SFDR16 WSW ISFSI. TLD locations SFDR10 through SFDR14 were established on September 30, 1992 and SFDR15 and SFDR16 on December 3,1992.

2. An Air sampler to collect air particulates and air iodines was setup South of the ISFSI on September 21, 1992. On the same date the pressurized ion chamber located at the Southwest corner of the ISFSI (PIC5) and the pair of TLD's collocated with it, designated as SFDR9, were moved closer to the ISFSI and were collocated with the newly installed air sampler.

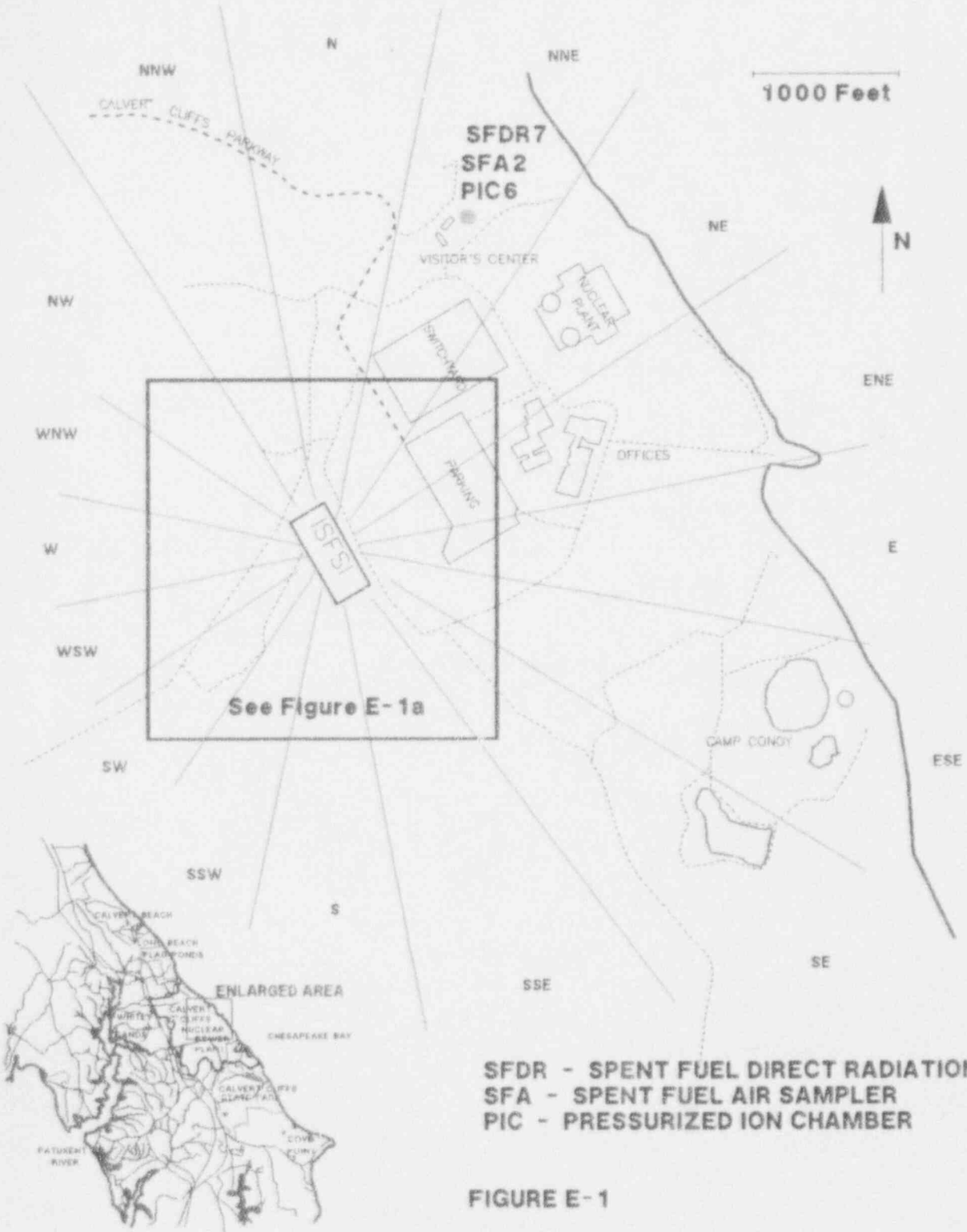
3. Soil and vegetation samples were taken quarterly from Tech Spec location A1 and ISFSI locations SFA1 through SFA4.

Figure 3-1 shows the location of the sampling sites around the ISFSI.

In general, the results in the following tables continue the historical trends previously observed. In those cases where new sampling sites were established, the levels observed are similar to those observed at the official sites of the Environmental Monitoring Program.

TABLE OF CONTENTS - ANALYTICAL RESULTS

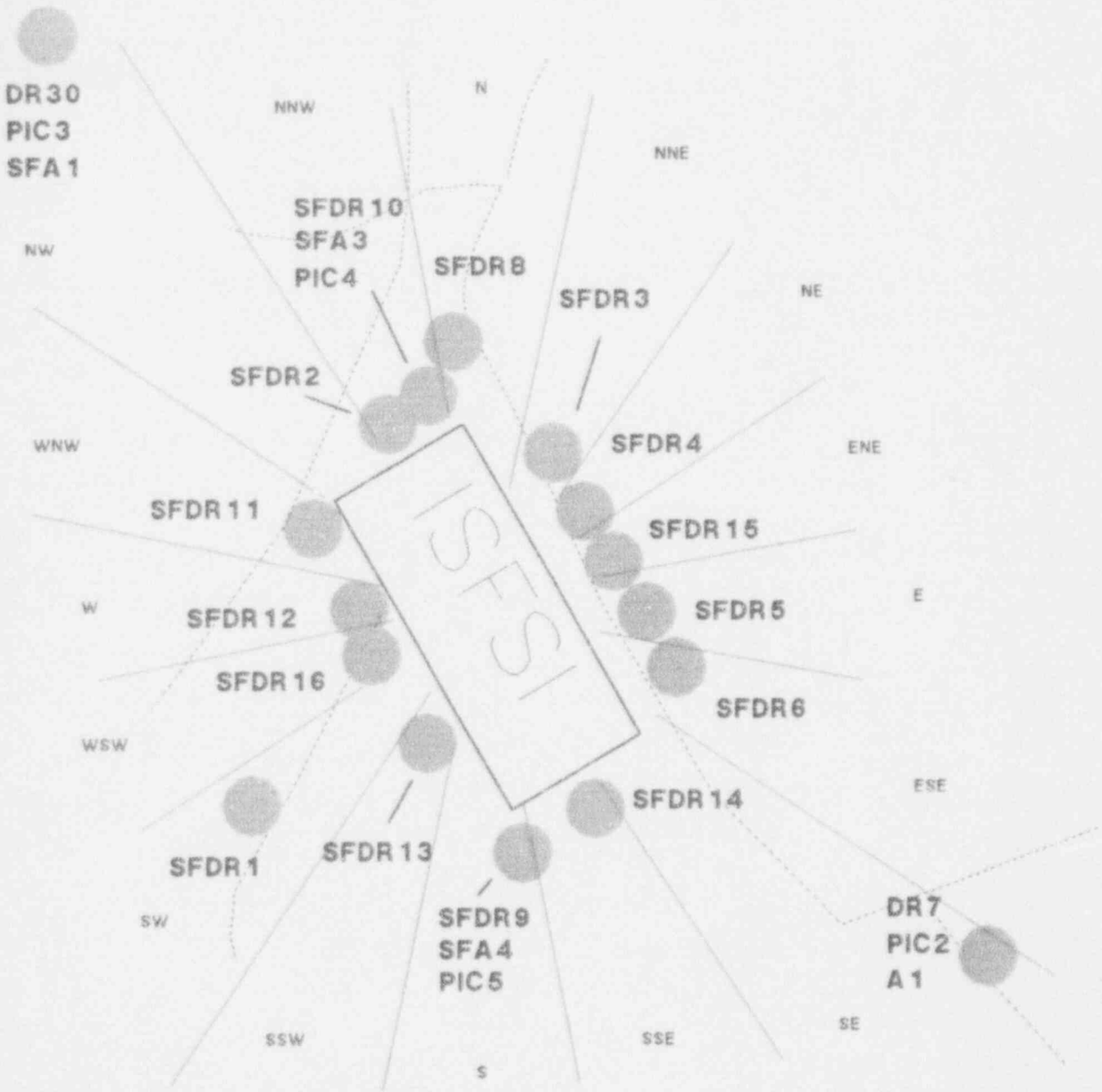
Table	Title	Page
E-1	Locations of Non-Tech Spec Environmental Sampling Stations for Calvert Cliffs Nuclear Power Plant	73
E-2	Synopsis of the 1992 Calvert Cliffs Nuclear Power Plant Non-Tech Spec Radiological Environmental Monitoring Program	75
E-3	Annual Summary for Calvert Cliffs Nuclear Power Plant Non-Tech Spec Radiological Environmental Monitoring Program	76
E-4	Concentrations of Gamma Emitters in Bottom Sediment	78
E-5	Concentrations of I-131 in Filtered Air	79
E-6	Concentrations of Beta Emitters in Air Particulates	81
E-7	Concentrations of Gamma Emitters in Air Particulates	83
E-8	Concentrations of Tritium and Gamma Emitters in Taylors Island Well Water	86
E-9	Concentrations of Gamma Emitters in Forage Samples from Langley Farm	87
E-10	Concentrations of Gamma Emitters In Soil Samples from Locations Around the ISFSI	88
E-11	Concentrations of Gamma Emitters In Vegetation from Locations Around the ISFSI	89
E-12	Direct Radiation As Measured By Pressurized Ion Chamber	90
E-13	Direct Radiation	91



SFDR - SPENT FUEL DIRECT RADIATION
SFA - SPENT FUEL AIR SAMPLER
PIC - PRESSURIZED ION CHAMBER

FIGURE E-1

Map of Sampling Sites
Independent Spent Fuel Storage Installation



SFDR - SPENT FUEL DIRECT RADIATION
SFA - SPENT FUEL AIR SAMPLER
PIC - PRESSURIZED ION CHAMBER

FIGURE E-1A

Enlarged Map of Sampling Sites
Independent Spent Fuel Storage Installation

Table E-1
Locations of Non-Tech Spec Environmental Sampling Stations for Calvert Cliffs Nuclear Power Plant

Station	Description	Distance* (Kilometers)	Direction* (Sector)
A6	Long Beach	4.4	NW
A7	Taylors Island, Carpenter's Property	12.6	ENE
A8	Cambridge, U of Md Estuarine Center	32.0	NE
SFA1	Meteorological Station	0.8	WSW
SFA2	CCNPP Visitor's Center	0.3	NW
SFA3	Northeast Corner of ISFSI	0.6	SW
SFA4	South of ISFSI	0.6	SW
DR24	Route 4 at St. Leonard	3.0	SW
DR25	CCNPP Guard House off Camp Conoy Rd.	1.0	S
DR26	Route 234 & Clarks Landing Rd.	20.5	SW
DR27	Route 231 & Route 4	23.0	NW
DR28	Taylors Island Emergency Siren #35	12.3	ENE
DR29	Taylors Island Emergency Siren #38	12.5	E
DR30	Meteorological Station	0.8	WSW
DR31	Cambridge, U of Md Estuarine Center	32.0	NE
DR32	Twining Property, Taylors Island	12.3	NE
DR33	P.A. Ransome Property, Taylors Island	14.8	ESE
DR34	Intake Trailer	0.2	NE
SFDR1	Collocated with Plant TLD #159	0.8	SW
SFDR2	Collocated with Plant TLD #160	0.7	SW
SFDR3	Collocated with Plant TLD #161	0.6	SW
SFDR4	Collocated with Plant TLD #162	0.6	SW
SFDR5	Collocated with Plant TLD #163	0.7	SW
SFDR6	Collocated with Plant TLD #164	0.7	SSW
SFDR7	CCNPP Visitor's Center	0.3	NW
SFDR8	Northeast Corner of ISFSI	0.6	SW
SFDR9	South of ISFSI	0.6	SW
SFDR10	North ISFSI	0.6	SW
SFDR11	WNW ISFSI	0.7	SW
SFDR12	West ISFSI	0.7	SW
SFDR13	SSW ISFSI	0.7	SW
SFDR14	SSE ISFSI	0.8	SSW
SFDR15	ENE ISFSI	0.6	SW
SFDR16	WSW ISFSI	0.7	SW

*Distance and direction from the central point between the two containment buildings.

Table E-1 -- Continued
Locations of Non-Tech Spec Environmental Sampling Stations for Calvert Cliffs Nuclear Power Plant

Station	Description	Distance* (Kilometers)	Direction* (Sector)
PIC1	Taylors Island, Carpenter's Property	12.6	ENE
PIC2	Plant Site Garden	0.7	SSW
PIC3	Meteorological Station	0.8	WSW
PIC4	Northeast Corner of ISFSI	0.6	SW
PIC5	South of ISFSI	0.6	SW
PIC8	Visitor's Center	0.3	NW
Wbs1	Plant Site Intake Area	0.2	NE
Wbs2	Plant Site Discharge Area	0.3	N
Wbs3	Long Beach	4.4	NW
Wbs4	Camp Conoy/Rocky Point	3.0	SE
Ww1	Taylors Island, Carpenter's Property	12.6	ENE
V1	Langley Farm, Sollers Wharf Road	4.7	SSW

*Distance and direction from the central point between the two containment buildings.

Table E-2
Synopsis of the 1992 Calvert Cliffs Nuclear Power Plant
Non-Tech Spec Radiological Environmental Monitoring Program

SAMPLE TYPE	SAMPLING* FREQUENCY	NUMBER OF LOCATIONS	NUMBER COLLECTED	ANALYSIS	ANALYSIS* FREQUENCY	NUMBER ANALYZED
AQUATIC ENVIRONMENT						
Bottom Sediment	Q	4	12	Gamma	Q	12
ATMOSPHERIC ENVIRONMENT						
Air Iodine[1]	W	7	318	I-131	W	318
Air Particulates[2]	W	7	318	Gross Beta	W	318
				Gamma	MC	69
TERRESTRIAL ENVIRONMENT						
Ground Water	M	1	12	Tritium	M	12
				Gamma	M	12
Vegetation[3]	M	1	10	Gamma	M	10
Vegetation (ISFSI)	Q	5	20	Gamma	Q	20
Soil	Q	5	20	Gamma	Q	20
DIRECT RADIATION						
Ambient Radiation	M	6	71	PIC	M	71
Ambient Radiation	M	27	1028	TLD	M	1028

*W Weekly, M Monthly, Q Quarterly, SA Semiannual, A Annual, C Composite.

[1]The collection device contains silver zeolite.

[2]After a minimum decay of 72 hours, beta counting is performed. Gamma spectroscopy is performed on monthly composites of weekly samples.

[3]Monthly during growing season.

Table E-3
Annual Summary for Calvert Cliffs Nuclear Power Plant Units 1 And 2
Non-Tech Spec Radiological Environmental Monitoring Program

Medium Or Pathway Sampled (Unit of Measurement)	Type And Total Number of Analyses Performed	Lower Limit of Detection (LLD)	Indicator Locations Mean (F)* Range	Location With Highest Annual Mean Name Distance & Direction	Mean (F)* Range	Control Locations Mean (F)* Range
AQUATIC ENVIRONMENT						
Bottom Sediment (pCi/kg)	Gamma(16)					
	Co-58	43	125(1/8)	Intake Wbs1 0.2 km NE	125(1/4)	--
	Co-60	46	119(1/8)	Intake Wbs1 0.2 km NE	119(1/4)	93(2/8)
			--		--	(89-96)
	Cs-137	53	234(8/8)	Intake Wbs1	244(4/4)	272(7/8)
			(150-359)	0.2 km NE	(150-359)	(<53-362)
ATMOSPHERIC ENVIRONMENT						
Air Particulate (10^{-2} pCi/m^3)	Beta(320)	0.4	1.3(320/320) (0.4-2.8)	Vis Center SFA2 0.3 km NW	1.4(52/52) (0.4-2.8)	1.5(51/51) (0.5-2.6)
TERRESTRIAL ENVIRONMENT						
Vegetation (pCi/kg)	Gamma(10)					
	Cs-137	24	55(1/10)	Langley VI 4.7 km SSW	55(1/10)	44(2/19)
			--		--	(42-46)
Vegetation (ISFSI) (pCi/kg)	Gamma(20)					
	Co-60	29	49(2/20)	Visit Center	59(1/4)	--
			39-59	0.3 km NW	--	--
	Cs-137	24	104(7/20)	Visit Center	140(3/4)	44(2/19)
			(<24-196)	0.3 km WSW	(<24-178)	(42-46)
Soil (pCi/kg)	Gamma(20)					
	Co-60	46	57(1/20)	Visit Center	57(1/4)	--
			--	0.3 km NW	--	--
	Cs-137	53	317(12/16)	Met Stat	746(1/4)	--
			(<53-746)	0.7 km WSW	--	--

*Mean and range based upon detectable measurements only. Fraction F of detectable measurements at specified location is indicated in parentheses.

Table E-3 -- Continued
Annual Summary for Calvert Cliffs Nuclear Power Plant Units 1 And 2
Non-Tech Spec Radiological Environmental Monitoring Program

Medium Or Pathway Sampled (Unit of Measurement)	Type And Total Number of Analyses Performed	Lower Limit of Detection (LLD)	Indicator Locations Mean (F)* Range	Location With Highest Annual Mean Name Distance & Direction	Mean (F)* Range	Control Locations Mean (F)* Range
DIRECT RADIATION						
Ambient Radiation (mR/30 day)	Exposure Rate (257)	--	4.25(257/257) (2.52-6.08)	Ransom DR33 14.8 km ESE	5.26(12/12) (4.70-6.08)	4.02(36/36) (2.65-5.68)
Pzd Ion Chamber (mR/30 day)	Exposure Rate (71)	--	4.69(60/60) (3.85-5.57)	Visitor's Center 0.3 km NW	5.26(12/12) (5.09-5.52)	5.72(12/12) (5.54-6.02)

*Mean and range based upon detectable measurements only. Fraction F of detectable measurements at specified location is indicated in parentheses.

Table E-4
Concentrations of Gamma Emitters* in Bottom Sediment
(Results in Units of pCi/kg (Dry) ±2σ)

Sample Site	Sample Date	Co-58	Co-60	Cs-137
Wbs1	03/26/92	< MDL	< MDL	359±95
Plant Site	06/04/92	< MDL	< MDL	270±68
Intake Area	08/18/92	< MDL	< MDL	159±41
	10/29/92	125±49	119±79	187±62
Wbs2	03/26/92	< MDL	< MDL	299±64
Plant Site	06/04/92	< MDL	< MDL	210±55
Discharge	08/18/92	< MDL	< MDL	241±42
Area	10/29/92	< MDL	< MDL	150±52
Wbs3	03/26/92	< MDL	89±75	362±62
Long Beach	06/04/92	< MDL	< MDL	341±77
	08/18/92	< MDL	< MDL	< MDL
	10/29/92	< MDL	< MDL	232±59
Wbs4	03/26/92	< MDL	< MDL	274±56
Camp Conoy/	06/04/92	< MDL	< MDL	312±69
Rocky Point	08/18/92	< MDL	96±40	119±42
	10/29/92	< MDL	< MDL	267±56

*Naturally occurring Be-7, K-40, Ra-226 and Th-232C were observed in some samples. All other gamma emitters not cited were <MDL; typical MDL's are given in Table B-9.

Table E-5
Concentrations of I-131 in Filtered Air
(Results in Units of 10^{-3} pCi/m^3 ±2σ)

Start Date	Stop Date	Long Beach A6	Taylors Island A7	Cambridge A8	Met Station SFA1	Visitors Center SFA2	NE ISFSI SFA3	SW ISFSI SFA4[1]
DEC 30 91	JAN 6 92	<7.3	<3.6	<3.6	<4.9	<3.9	<3.7	
JAN 6 92	JAN 13 92	<6.5	<3.2	<3.1	<4.4	<3.8	<3.6	
JAN 13 92	JAN 20 92	<5.4	<3.5	<3.2	<3.5	<3.5	<5.2	
JAN 20 92	JAN 27 92	<6.9	<4.0	<4.3	<4.0	<3.9	<3.4	
JAN 27 92	FEB 3 92	<4.8	<3.8	<4.3	<3.8	<3.6	<3.2	
FEB 3 92	FEB 10 92	<5.6	<4.1	<9.9[2]	<3.6	<3.7	<4.0	
FEB 10 92	FEB 18 92	<6.4[4]	<3.5	<3.3	<3.8	<3.4	<3.1	
FEB 18 92	FEB 24 92	<5.6	<3.8	<3.6	<4.3	<4.0	<4.8	
FEB 24 92	MAR 2 92	<5.8	<3.1	<5.3	<4.0	<3.6	<4.1	
MAR 2 92	MAR 9 92	<6.9	<4.1	<2.9	<3.8	<5.2	<4.8	
MAR 9 92	MAR 16 92	<4.8	<4.2	<4.0	<4.4	<3.8	<3.6	
MAR 16 92	MAR 23 92	<4.4	<3.6	<3.3	<4.2	<3.8	<3.8	
MAR 23 92	MAR 31 92	[3]	<3.3	<3.1	<3.4	<3.4	<3.1	
MAR 31 92	APR 6 92	<5.0[4]	<4.9	<4.7	<4.6	<4.6	<4.8	
APR 6 92	APR 13 92	<5.7	<3.9	<3.7	<3.7	<4.5	<3.1	
APR 13 92	APR 20 92	<4.1	<4.2	<4.1	<3.9	<3.6	<4.1	
APR 20 92	APR 27 92	<5.7	<4.4	<5.5	<4.0	<5.4	<4.4	
APR 27 92	MAY 4 92	<4.2	<4.8	<7.8	<4.1	<4.6	<5.5	
MAY 4 92	MAY 11 92	<6.5	<4.7	<5.3	<4.4	<4.0	<5.2	
MAY 11 92	MAY 18 92	<5.8	<4.0	<4.4	<3.7	<4.2	<4.8	
MAY 18 92	MAY 26 92	<4.5	<3.6	<3.3	<3.3	<3.0	<3.2	
MAY 26 92	JUN 1 92	<8.1	<4.9	<4.9	<4.7	<5.3	<4.7	
JUN 1 92	JUN 8 92	<5.8	<4.0	<3.6	<3.6	<3.8	<3.9	
JUN 8 92	JUN 15 92	<5.0	<4.3	<4.2	<4.3	<4.0	<3.7	
JUN 15 92	JUN 22 92	<5.4	<3.4	<3.7	<3.2	<3.8	<3.7	
JUN 22 92	JUN 29 92	<5.1	<2.8	<4.3	<3.2	<3.5	<3.7	

[1] Monitor installed in September 1992

[2] Low Flow/ Power Failure/ Sampler Malfunction

[3] No sample received

[4] Estimated flow

Table E-5 -- Continued
Concentrations of I-131 In Filtered Air
(Results in Units of 10^{-3} pCi/m^3 ±2σ)

Start Date	Stop Date	Long Beach A6	Taylors Island A7	Cambridge A8	Met Station SFA1	Visitors Center SFA2	NE ISFSI SFA3	SW ISFSI SFA4[1]
JUN 29 92	JUL 6 92	<5.3[4]	<3.1	<2.6	<3.2	<3.3	<3.5	
JUL 6 92	JUL 13 92	<4.9	<3.1	<3.5	<3.1	<3.6	<3.0	
JUL 13 92	JUL 20 92	<27.3[2]	<3.4	<3.2	<3.0	<2.7	<3.6	
JUL 20 92	JUL 27 92	<5.2	<3.0	<2.7	<3.0	<2.3	<3.3	
JUL 27 92	AUG 3 92	<8.5[2]	<2.9	<3.7	<3.4	<2.6	<3.4	
AUG 3 92	AUG 10 92	<5.5	<3.1	<3.1	<2.6	<2.7	<3.5	
AUG 10 92	AUG 17 92	<6.1	<3.8	<3.4	<2.9	<3.1	<3.5	
AUG 17 92	AUG 24 92	<5.0	<3.5	<3.3	<2.7	<3.0	<3.7	
AUG 24 92	AUG 31 92	<5.1	<3.1	<3.5	<3.4	<3.3	<3.4	
AUG 31 92	SEP 8 92	<5.3	<3.4	<2.9	<3.0	<3.1	<2.8	
SEP 8 92	SEP 14 92	<5.3	<3.0	<3.8	<3.6	<4.0	<4.5	
SEP 14 92	SEP 21 92	<4.3	<3.0	<4.9	<3.5	<3.9	<3.3	<3.2
SEP 21 92	SEP 28 92	<5.1	<3.2	<3.8	<3.3	<3.7	<3.5	<2.9
SEP 28 92	OCT 5 92	<5.2	<3.1	<5.0	<2.7	<3.0	<3.8	<4.0
OCT 5 92	OCT 12 92	<4.9	<3.6	<3.3	<3.9	<3.3	<3.7	<2.8
OCT 12 92	OCT 19 92	[3]	<3.1	<3.3	<3.3	<3.9	<3.0	<2.9
OCT 19 92	OCT 26 92	<6.0	<5.4	<4.2	<3.4	<3.4	<3.2	<2.9
OCT 26 92	NOV 2 92	<4.3	<3.1	<3.1	<3.1	<3.2	<2.8	<2.6
NOV 2 92	NOV 9 92	<4.6	<4.1	<2.8	<3.1	<3.3	<3.0	<2.9
NOV 9 92	NOV 16 92	<3.0	<2.9	<3.9	<2.6	<2.9	<2.8	<2.7
NOV 16 92	NOV 23 92	[3]	<4.4	<3.5	<4.6	<4.0	<3.7	<3.3
NOV 23 92	NOV 30 92	<3.7[4]	<2.8	<3.7	<3.8	<3.7	<4.0	<3.5
NOV 30 92	DEC 7 92	[3]	<4.3	<2.9	<4.6	<4.6	<4.6	<4.6
DEC 7 92	DEC 14 92	[3]	<4.8	<4.2	<3.8	<4.0	<4.0	<4.7
DEC 14 92	DEC 21 92	[3]	<6.2	<3.0	<4.3	<5.4	<4.4	<4.4
DEC 21 92	DEC 29 92	[3]	<3.6	<3.4	<3.8	<4.1	<3.5	<2.9

[1] Monitor installed in September 1992

[2] Low Flow/ Power Failure/ Sampler Malfunction

[3] No sample received

[4] Estimated flow

Table E-6
Concentrations of Beta Emitters in Air Particulates
(Results in Units of 10^{-2} pCi/m^3 ±2σ)

Start Date	Stop Date	Long Beach A6	Taylors Island A7	Cambridge A8	Met Station SFA1	Visitors Center SFA2	NE ISFSI SFA3	SW ISFSI SFA4[1]
DEC 30 91	JAN 6 92	0.7±0.3	1.2±0.3	0.8±0.3	1.0±0.3	0.8±0.3	1.1±0.3	
JAN 6 92	JAN 13 92	2.2±0.3	2.2±0.3	1.5±0.2	2.5±0.3	2.4±0.3	2.1±0.3	
JAN 13 92	JAN 20 92	1.8±0.3	1.6±0.3	1.4±0.3	1.8±0.3	1.9±0.3	1.6±0.3	
JAN 20 92	JAN 27 92	1.8±0.3	2.0±0.3	1.4±0.3	2.0±0.3	2.1±0.3	1.8±0.3	
JAN 27 92	FEB 3 92	2.4±0.4	1.9±0.3	1.3±0.3	2.3±0.3	2.4±0.3	2.1±0.3	
FEB 3 92	FEB 10 92	1.3±0.2	1.3±0.3	1.4±0.6[2]	1.6±0.3	1.7±0.3	1.5±0.3	
FEB 10 92	FEB 18 92	0.8±0.3[4]	1.0±0.2	1.1±0.2	1.1±0.3	0.9±0.2	0.9±0.2	
FEB 18 92	FEB 24 92	1.3±0.2	1.0±0.3	0.7±0.2	1.5±0.3	1.5±0.3	1.4±0.3	
FEB 24 92	MAR 2 92	1.3±0.3	1.0±0.2	1.1±0.4	1.2±0.3	1.4±0.3	1.3±0.3	
MAR 2 92	MAR 9 92	0.9±0.3	0.8±0.3	0.8±0.2	0.9±0.3	0.8±0.3	0.9±0.3	
MAR 9 92	MAR 16 92	2.0±0.3	1.9±0.3	1.4±0.3	2.1±0.3	2.0±0.3	1.6±0.3	
MAR 16 92	MAR 23 92	1.2±0.2	1.2±0.3	1.0±0.2	1.4±0.3	1.6±0.3	1.3±0.3	
MAR 23 92	MAR 30 92	0.0±0.0[3]	1.6±0.2	1.1±0.2	1.6±0.3	1.8±0.3	1.6±0.2	
MAR 31 92	APR 6 92	1.2±0.2[4]	1.3±0.3	0.9±0.3	1.5±0.3	1.5±0.3	1.4±0.3	
APR 6 92	APR 13 92	2.0±0.3	2.0±0.3	1.4±0.3	2.1±0.3	2.0±0.3	1.9±0.3	
APR 13 92	APR 20 92	1.2±0.3	1.6±0.3	1.2±0.3	1.6±0.3	1.5±0.3	1.5±0.3	
APR 20 92	APR 27 92	1.2±0.3	1.0±0.3	0.8±0.2	1.2±0.3	0.8±0.3	1.1±0.3	
APR 27 92	MAY 4 92	1.4±0.3	1.6±0.3	1.3±0.3	1.4±0.3	1.5±0.3	1.5±0.3	
MAY 4 92	MAY 11 92	0.8±0.3	0.6±0.3	0.4±0.2	0.6±0.2	0.4±0.2	0.5±0.3	
MAY 11 92	MAY 18 92	0.7±0.3	0.9±0.2	0.5±0.3	0.7±0.2	0.7±0.3	0.9±0.3	
MAY 18 92	MAY 26 92	0.5±0.2	1.2±0.2	0.8±0.2	1.2±0.2	0.9±0.2	1.0±0.2	
MAY 26 92	JUN 1 92	0.6±0.3	0.9±0.3	0.5±0.3	0.8±0.3	1.1±0.3	0.8±0.3	
JUN 1 92	JUN 8 92	0.6±0.2	0.8±0.2	0.6±0.2	0.9±0.2	0.9±0.2	0.8±0.2	
JUN 8 92	JUN 15 92	1.1±0.2	1.2±0.3	0.8±0.2	1.3±0.3	1.4±0.2	1.3±0.2	
JUN 15 92	JUN 22 92	0.9±0.2	1.0±0.2	0.8±0.2	1.0±0.2	1.2±0.2	1.1±0.2	
JUN 22 92	JUN 29 92	1.5±0.3	1.1±0.2	1.1±0.3	1.2±0.2	1.1±0.2	1.6±0.2	

[1] Monitor installed in September 1992

[2] Low Flow/ Power Failure/ Sampler Malfunction

[3] No Sample Received

[4] Estimated Flow

Table E-6 -- Continued
Concentrations of Beta Emitters in Air Particulates
(Results in Units of 10^{-2} pCi/m^3 ±2σ)

Start Date	Stop Date	Long Beach A6	Taylors Island A7	Cambridge A8	Met Station SFA1	Visitors Center SFA2	NE ISFSI SFA3	SW ISFSI SFA4[1]
JUN 29 92	JUL 6 92	0.8±0.2[4]	1.2±0.2	0.8±0.2	1.1±0.2	1.0±0.2	1.4±0.2	
JUL 6 92	JUL 13 92	1.3±0.2	1.1±0.2	0.9±0.2	1.6±0.2	1.7±0.3	1.6±0.2	
JUL 13 92	JUL 20 92	1.1±0.0[2]	1.0±0.2	0.9±0.2	1.3±0.2	1.3±0.2	1.4±0.2	
JUL 20 92	JUL 27 92	0.8±0.2	1.4±0.2	0.6±0.2	1.0±0.2	1.1±0.2	1.2±0.2	
JUL 27 92	AUG 3 92	1.2±0.4[2]	1.4±0.2	0.7±0.2	1.2±0.2	1.2±0.2	1.2±0.2	
AUG 3 92	AUG 10 92	1.6±0.3	1.3±0.2	0.9±0.2	1.3±0.2	1.4±0.2	1.3±0.2	
AUG 10 92	AUG 17 92	0.7±0.3	0.4±0.2	0.9±0.2	0.9±0.2	0.6±0.2	0.8±0.2	
AUG 17 92	AUG 24 92	1.6±0.3	1.5±0.2	1.2±0.2	1.6±0.2	1.7±0.2	1.5±0.3	
AUG 24 92	AUG 31 92	1.8±0.3	1.1±0.2	1.2±0.2	1.5±0.2	1.4±0.2	1.6±0.2	
AUG 31 92	SEP 8 92	1.1±0.3	1.4±0.2	1.0±0.2	1.0±0.2	1.2±0.2	1.4±0.2	
SEP 8 92	SEP 14 92	1.1±0.2	1.3±0.2	1.0±0.2	1.0±0.2	1.1±0.3	1.3±0.3	
SEP 14 92	SEP 21 92	1.2±0.2	1.4±0.2	1.3±0.2	1.5±0.2	1.6±0.3	1.6±0.2	1.3±0.2
SEP 21 92	SEP 28 92	0.5±0.2	0.5±0.2	0.5±0.2	0.6±0.2	0.6±0.2	0.4±0.2	0.5±0.2
SEP 28 92	OCT 5 92	1.5±0.2	1.4±0.2	1.3±0.2	1.5±0.2	1.1±0.2	1.7±0.3	1.3±0.3
OCT 5 92	OCT 12 92	1.1±0.2	1.0±0.2	1.4±0.2	1.3±0.2	1.1±0.2	1.4±0.2	1.1±0.2
OCT 12 92	OCT 19 92	0.0±0.0[3]	2.3±0.3	2.1±0.2	2.5±0.3	2.8±0.3	2.4±0.2	2.0±0.2
OCT 19 92	OCT 26 92	1.7±0.3	1.7±0.3	1.3±0.3	1.7±0.2	1.8±0.2	1.4±0.2	0.7±0.2
OCT 26 92	NOV 2 92	1.3±0.3	1.6±0.2	1.2±0.2	1.3±0.2	1.4±0.2	1.3±0.2	1.1±0.2
NOV 2 92	NOV 9 92	1.1±0.2	1.1±0.2	1.0±0.2	1.3±0.2	1.1±0.2	1.2±0.2	0.9±0.2
NOV 9 92	NOV 16 92	1.5±0.2	1.7±0.2	1.4±0.2	1.4±0.2	1.6±0.2	1.6±0.2	0.9±0.2
NOV 16 92	NOV 23 92	0.0±0.0[3]	1.8±0.2	1.5±0.2	1.7±0.2	1.9±0.2	1.8±0.2	1.3±0.2
NOV 23 92	NOV 30 92	2.3±0.3[4]	1.2±0.2	0.9±0.2	1.1±0.2	1.2±0.2	1.2±0.2	0.8±0.2
NOV 30 92	DEC 7 92	0.0±0.0[3]	1.9±0.2	1.6±0.2	2.0±0.2	2.0±0.3	2.0±0.2	1.0±0.2
DEC 7 92	DEC 14 92	0.0±0.0[3]	1.9±0.2	0.8±0.2	0.9±0.2	1.2±0.2	1.1±0.2	0.7±0.2
DEC 14 92	DEC 21 92	0.0±0.0[3]	1.5±0.3	1.0±0.2	1.3±0.2	1.3±0.3	1.4±0.2	1.3±0.2
DEC 21 92	DEC 29 93	0.0±0.0[3]	2.1±0.2	1.4±0.2	1.5±0.2	1.8±0.2	1.1±0.2	0.9±0.2

[1] Monitor installed in September 1992

[2] Low Flow/ Power Failure/ Sampler Malfunction

[3] No Sample Received

[4] Estimated Flow

Table E-7
Concentrations of Gamma Emitters in Air Particulates

(Results in Units of 10^{-3} pCi/m^3 ±2σ)

Sample Code	Sample Date	Gamma Emitters
A6 Long Beach	1/92	*
	2/92	*
	3/92	*
	4/92	*
	5/92	*
	6/92	*
	7/92	*
	8/92	*
	9/92	*
	10/92	*
	11/92	*
	12/92	*
A7 Taylors Island	1/92	*
	2/92	*
	3/92	*
	4/92	*
	5/92	*
	6/92	*
	7/92	*
	8/92	*
	9/92	*
	10/92	*
	11/92	*
	12/92	*
A8 Cambridge	1/92	*
	2/92	*
	3/92	*
	4/92	*
	5/92	*
	6/92	*
	7/92	*
	8/92	*
	9/92	*
	10/92	*
	11/92	*
	12/92	*

*Naturally occurring Be-7 and K-40 were observed in most samples. All other gamma emitters not cited were <MDL; typical MDL's are given in Table B-9.

Table E-7 -- Continued
Concentrations of Gamma Emitters In Air Particulates

(Results in Units of 10^{-3} pCi/m^3 $\pm 2\sigma$)

Sample Code	Sample Date	Gamma Emitters
SFA1 Met. Station	1/92	*
	2/92	*
	3/92	*
	4/92	*
	5/92	*
	6/92	*
	7/92	*
	8/92	*
	9/92	*
	10/92	*
	11/92	*
	12/92	*
SFA2 Visitors Center	1/92	*
	2/92	*
	3/92	*
	4/92	*
	5/92	*
	6/92	*
	7/92	*
	8/92	*
	9/92	*
	10/92	*
	11/92	*
	12/92	*

*Naturally occurring Be-7 and K-40 were observed in most samples. All other gamma emitters not cited were <MDL; typical MDL's are given in Table B-9.

Table E-7 -- Continued
Concentrations of Gamma Emitters In Air Particulates

(Results in Units of 10^{-3} pCi/m^3 ±2σ)

Sample Code	Sample Date	Gamma Emitters
SFA3 NE Corner ISFSI	1/92	*
	2/92	*
	3/92	*
	4/92	*
	5/92	*
	6/92	*
	7/92	*
	8/92	*
	9/92	*
	10/92	*
	11/92	*
	12/92	*
SFA4** SW Corner ISFSI	9/92	*
	10/92	*
	11/92	*
	12/92	*

*Naturally occurring Be-7 and K-40 were observed in most samples. All other gamma emitters not cited were <MDL; typical MDL's are given in Table B-9.

**SFA4 was added in September 1992

Table E-8
Concentrations of Tritium and Gamma Emitters* in Taylors Island Well Water

(Results in Units of pCi/L ±2σ)

Date	Tritium	Gamma Emitters
01/31/92	< 152	*
02/28/92	< 152	*
03/31/92	< 152	*
04/30/92	< 160	*
06/01/92	< 153	*
06/30/92	< 154	*
07/31/92	< 32	*
08/31/92	< 30	*
09/30/92	< 30	*
10/30/92	< 35	*
11/30/92	< 35	*
12/31/92	< 34	*

*Naturally occurring K-40 was observed in two samples. All other gamma emitters not cited were <MDL; typical MDL's are given in Table B-9

Table E-9
Concentrations of Gamma Emitters* in Forage Samples from Langley Farm

(Results in Units of pCi/kg ±2σ)

Sample Site	Sample Date	Cs-137
Langley Farm	01/20/92	55±19
	02/18/92	<MDL
	03/13/92	<MDL
	04/17/92	<MDL
	05/15/92	<MDL
	06/15/92	<MDL
	07/07/92	<MDL
	08/14/92	<MDL
	09/14/92	<MDL
	10/23/92	<MDL

*Naturally occurring K-40 and Be-7 were observed in most samples. All other gamma emitters not cited were <MDL; typical MDL's are given in Table B-9.

Table E-10
Concentrations of Gamma Emitters* In Soil Samples
From Locations Around the ISFSI

(Results in Units of pCi/kg (Dry) ±2σ)

Sample Location	Sample Date	Co-60	Cs-137
At A1	03/27/92	< MDL	276±79
At SFA1	03/27/92	< MDL	< MDL
At SFA2	03/27/92	57±28	342±57
At SFA3	03/27/92	< MDL	424±70
At SFA4	03/27/92	< MDL	154±41
At A1	06/19/92	< MDL	699±81
At SFA1	06/19/92	< MDL	746±86
At SFA2	06/19/92	< MDL	305±64
At SFA3	06/19/92	< MDL	281±80
At SFA4	06/19/92	< MDL	228±71
At A1	10/15/92	< MDL	365±41
At SFA1	10/15/92	< MDL	< MDL
At SFA2	10/15/92	< MDL	130±38
At SFA3	10/15/92	< MDL	150±29
At SFA4	10/15/92	< MDL	< MDL
At A1	12/03/92	< MDL	181±33
At SFA1	12/03/92	< MDL	< MDL
At SFA2	12/03/92	< MDL	150±31
At SFA3	12/03/92	< MDL	208±40
At SFA4	12/03/92	< MDL	94±28

*Naturally occurring Be-7 was observed infrequently; K-40 was observed always; Ra-226 and Th-232 were observed in half the samples. All other gamma emitters not cited were <MDL; typical MDL's are given in Table B-9.

Table E-11
Concentrations of Gamma Emitters* In Vegetation
From Locations Around the ISFSI

(Results in Units of pCi/kg ±2σ)

Sample Location	Sample Date	Co-60	Cs-137
At A1	03/27/92	< MDL	196±29
At SFA1	03/27/92	< MDL	< MDL
At SFA2	03/27/92	59±28	178±27
At SFA3	03/27/92	< MDL	24±24
At SFA4	03/27/92	< MDL	< MDL
At A1	06/19/92	< MDL	< MDL
At SFA1	06/19/92	< MDL	< MDL
At SFA2	06/19/92	< MDL	< MDL
At SFA3	06/19/92	< MDL	< MDL
At SFA4	06/19/92	< MDL	29±26
At A1	10/15/92	39±8	59±14
At SFA1	10/15/92	< MDL	< MDL
At SFA2	10/15/92	< MDL	80±25
At SFA3	10/15/92	< MDL	< MDL
At SFA4	10/15/92	< MDL	< MDL
At A1	12/03/92	< MDL	< MDL
At SFA1	12/03/92	< MDL	< MDL
At SFA2	12/03/92	< MDL	163±33
At SFA3	12/03/92	< MDL	< MDL
At SFA4	12/03/92	< MDL	< MDL

*Naturally occurring Be-7 was observed infrequently; K-40 was observed always; Ra-226 and Th-232 were observed in half the samples. All other gamma emitters not cited were <MDL; typical MDL's are given in Table B-9.

Table E-12
Direct Radiation As Measured By Pressurized Ion Chamber

(Results in Units of mR/30 days ±2σ)

PIC1	Jan.	5.83±0.58	Jul.	6.02±0.60
Taylors Island	Feb.	5.69±0.57	Aug.	*
	Mar.	5.54±0.55	Sep.	5.65±0.56
	Apr.	5.62±0.56	Oct.	5.80±0.58
	May.	5.72±0.57	Nov.	5.69±0.57
	Jun.	5.72±0.57	Dec.	5.62±0.56
PIC2	Jan.	3.99±0.40	Jul.	3.98±0.40
Plant Site Garden	Feb.	3.97±0.40	Aug.	3.90±0.39
	Mar.	3.96±0.40	Sep.	3.85±0.39
	Apr.	3.96±0.40	Oct.	4.04±0.40
	May	3.89±0.39	Nov.	4.18±0.42
	Jun	3.95±0.40	Dec.	4.04±0.40
PIC3	Jan.	3.90±0.39	Jul.	3.97±0.40
Met Station	Feb.	3.86±0.39	Aug.	3.90±0.39
	Mar.	4.07±0.41	Sep.	3.86±0.39
	Apr.	4.10±0.41	Oct.	4.48±0.45
	May	4.01±0.40	Nov.	5.23±0.52
	Jun	4.01±0.40	Dec.	5.27±0.53
PIC4	Jan.	5.02±0.50	Jul.	4.81±0.48
NE Corner ISFSI	Feb.	4.98±0.50	Aug.	4.71±0.47
	Mar.	4.94±0.49	Sep.	4.67±0.47
	Apr.	4.90±0.49	Oct.	4.85±0.49
	May	4.82±0.48	Nov.	5.01±0.50
	Jun	4.83±0.48	Dec.	5.11±0.51
PIC5	Jan.	5.57±0.56	Jul.	5.40±0.54
South of ISFSI	Feb.	5.53±0.55	Aug.	5.34±0.53
	Mar.	5.50±0.55	Sep.	5.00±0.50
	Apr.	5.48±0.55	Oct.	4.90±0.49
	May	5.38±0.54	Nov.	4.36±0.44
	Jun	5.40±0.54	Dec.	4.18±0.42
PIC6	Jan.	5.23±0.52	Jul.	5.33±0.53
Visitors Center	Feb.	5.14±0.51	Aug.	5.18±0.52
	Mar.	5.09±0.51	Sep.	5.11±0.51
	Apr.	5.23±0.52	Oct.	5.52±0.55
	May	5.18±0.52	Nov.	5.39±0.54
	Jun	5.24±0.52	Dec.	5.43±0.54

*Monitor malfunction

Table E-13
Direct Radiation

(Results in Units of mR/30 days ±2σ)

DR24	Jan.	4.23±0.52	Jul.	3.72±0.37
Route 4 at	Feb.	4.29±0.19	Aug.	4.00±0.78
St. Leonard	Mar.	4.03±0.43	Sep.	3.76±0.91
	Apr.	3.81±0.75	Oct.	3.70±0.16
	May	3.47±0.30	Nov.	3.46±0.30
	Jun.	4.28±0.90	Dec.	3.57±0.37
DR25	Jan.	4.59±0.55	Jul.	4.08±0.19
Onsite Guard	Feb.	4.57±0.43	Aug.	4.50±0.25
House off Camp	Mar.	4.37±0.27	Sep.	4.11±0.54
Conoy Rd	Apr.	4.42±0.44	Oct.	3.69±0.34
	May	3.82±0.17	Nov.	3.68±0.35
	Jun.	4.29±0.04	Dec.	4.00±0.60
DR26	Jan.	4.07±0.50	Jul.	3.37±0.27
Route 234 &	Feb.	3.84±0.30	Aug.	3.53±0.31
Clark's Landing	Mar.	3.51±0.16	Sep.	3.31±0.00
Road	Apr.	3.76±0.03	Oct.	3.26±0.44
	May	3.29±0.28	Nov.	3.19±0.34
	Jun.	4.14±0.57	Dec.	3.33±0.55
DR27	Jan.	3.83±0.18	Jul.	3.76±0.35
Route 231 &	Feb.	3.69±0.58	Aug.	3.67±0.35
Route 4	Mar.	3.70±0.44	Sep.	3.86±1.18
	Apr.	3.89±0.47	Oct.	3.54±0.22
	May	3.43±0.44	Nov.	3.22±0.21
	Jun.	4.09±0.26	Dec.	3.47±0.27
DR28	Jan.	4.93±0.17	Jul.	4.59±0.33
Taylors Island	Feb.	5.17±0.77	Aug.	4.79±0.68
Siren #35 Pine	Mar.	4.45±0.53	Sep.	4.34±0.10
Tap Road	Apr.	4.96±0.35	Oct.	4.93±0.48
	May	4.25±0.32	Nov.	4.62±0.86
	Jun.	5.06±0.91	Dec.	4.43±0.27
DR29	Jan.	5.15±0.35	Jul.	4.55±0.63
Taylors Island	Feb.	5.35±0.24	Aug	4.56±0.36
Siren #38 Punch	Mar.	4.78±0.37	Sep.	4.40±1.06
Island Road	Apr.	4.86±0.71	Oct.	4.21±0.24
	May	4.44±0.19	Nov.	4.31±0.16
	Jun.	4.68±0.70	Dec.	4.35±0.04
DR30	Jan.	3.72±0.22	Jul.	4.67±0.22
Meteorological	Feb.	4.07±0.68	Aug.	4.74±0.16
Station	Mar.	3.64±0.25	Sep.	5.41±2.98
	Apr.	4.00±0.25	Oct.	4.53±0.28
	May	4.42±0.73	Nov	4.49±0.30
	Jun.	5.11±0.46	Dec.	4.69±0.31

Table E-13 -- Continued
Direct Radiation

(Results in Units of mR/30 days ±2σ)

DR31	Jan.	5.18±0.10	Jul.	5.19±1.29
Cambridge	Feb.	5.28±0.36	Aug.	5.02±0.44
U of Maryland	Mar.	5.56±1.05	Sep.	4.29±0.22
	Apr.	5.26±0.29	Oct.	4.69±0.55
	May	4.67±0.19	Nov.	4.47±1.25
	Jun.	5.25±0.08	Dec.	4.55±0.59
DR32	Jan.	3.74±0.30	Jul.	3.18±0.19
Twining Property	Feb.	3.89±0.93	Aug.	3.49±0.40
Taylors Island	Mar.	3.72±0.13	Sep.	3.01±0.30
	Apr.	3.52±0.41	Oct.	3.02±0.12
	May	3.25±0.23	Nov.	3.13±0.15
	Jun.	3.54±0.41	Dec.	3.29±0.14
DR33	Jan.	6.08±0.88	Jul.	5.19±0.54
Ransome Property	Feb.	5.71±0.67	Aug.	5.56±0.52
Taylors Island	Mar.	5.50±1.34	Sep.	4.62±0.65
	Apr.	5.58±0.39	Oct.	4.70±0.21
	May	5.05±0.54	Nov.	4.81±1.32
	Jun.	5.36±0.27	Dec.	4.96±0.25
DR34	Jan.	3.21±0.39	Jul.	2.89±0.44
Railing, Intake	Feb.	2.99±0.09	Aug.	3.33±1.55
Water Trailer	Mar.	3.08±0.53	Sep.	2.52±0.00
	Apr.	2.92±0.12	Oct.	2.79±0.05
	May	2.56±0.03	Nov.	3.02±0.78
	Jun.	2.92±0.33	Dec.	2.83±0.09
SFDR1	Jan.	5.70±1.26	Jul.	4.47±0.36
Collocated Plant	Feb.	4.69±0.23	Aug.	4.39±0.32
TLD #159	Mar.	4.84±0.74	Sep.	3.83±0.35
	Apr.	4.47±0.15	Oct.	4.24±1.48
	May	4.34±0.72	Nov.	4.11±0.44
	Jun.	4.27±0.07	Dec.	3.98±0.46
SFDR2	Jan.	5.80±1.20	Jul.	4.65±0.40
Collocated Plant	Feb.	5.17±0.22	Aug.	4.79±0.22
TLD #160	Mar.	5.28±0.71	Sep.	4.47±0.97
	Apr.	5.09±0.09	Oct.	4.53±0.33
	May	4.79±0.54	Nov.	4.47±0.11
	Jun.	4.80±0.33	Dec.	4.57±0.48
SFDR3	Jan.	5.78±1.62	Jul.	4.60±0.95
Collocated Plant	Feb.	4.67±0.51	Aug.	4.35±0.17
TLD #161	Mar.	4.79±0.42	Sep.	3.94±0.14
	Apr.	4.58±0.32	Oct.	3.87±0.51
	May	4.40±0.50	Nov.	4.41±0.49
	Jun.	4.55±0.42	Dec.	4.23±0.19

Table E-13 -- Continued
Direct Radiation
(Results in Units of mR/30 days ±2σ)

SFDR4	Jan.	4.69±0.62	Jul.	4.36±1.00
Collocated Plant	Feb.	4.54±0.44	Aug.	4.27±0.43
TLD #162	Mar.	4.64±0.18	Sep.	3.84±0.23
	Apr.	4.31±0.46	Oct.	4.60±2.54
	May	4.32±0.17	Nov.	4.06±0.47
	Jun.	4.46±0.20	Dec.	4.22±0.51
SFDR5	Jan.	4.98±0.78	Jul.	3.80±1.14
Collocated Plant	Feb.	4.95±0.25	Aug.	4.11±0.75
TLD #163	Mar.	4.59±0.23	Sep.	3.42±0.26
	Apr.	4.40±0.36	Oct.	3.49±0.38
	May	4.07±0.08	Nov.	3.59±0.07
	Jun.	4.12±0.29	Dec.	3.60±0.03
SFDR6	Jan.	4.94±0.08	Jul.	4.48±0.74
Collocated Plant	Feb.	4.90±0.10	Aug.	4.32±0.54
TLD #164	Mar.	4.63±0.04	Sep.	3.96±0.50
	Apr.	4.54±0.43	Oct.	4.16±0.13
	May	4.38±0.42	Nov.	5.63±0.58
	Jun.	4.29±0.41	Dec.	4.06±0.30
SFDR7	Jan.	4.89±0.65	Jul.	4.89±0.59
Visitor's	Feb.	4.57±0.71	Aug.	4.76±0.65
Center	Mar.	4.42±0.35	Sep.	4.12±0.58
	Apr.	4.56±0.34	Oct.	3.90±0.35
	May	4.54±0.28	Nov.	3.96±0.37
	Jun.	4.30±0.06	Dec.	4.20±0.06
SFDR8	Jan.	4.83±0.11	Jul.	4.65±0.13
NE Corner	Feb.	4.99±0.12	Aug.	4.37±0.48
ISFSI	Mar.	4.53±0.04	Sep.	4.05±0.59
	Apr.	4.56±0.14	Oct.	4.09±0.45
	May	4.37±0.19	Nov.	3.88±0.03
	Jun.	4.62±0.54	Dec.	4.12±0.23
SFDR9	Jan.	5.04±0.48	Jul.	4.81±0.59
SW Corner	Feb.	5.23±0.37	Aug.	5.28±1.48
ISFSI	Mar.	4.96±0.39	Sep.	3.79±0.39
	Apr.	4.73±0.24	Oct.	3.54±0.40
	May	4.62±0.33	Nov.	3.49±0.08
	Jun.	4.71±0.02	Dec.	3.77±0.04
SFDR10*	Jan.	---	Jul.	---
North	Feb.	---	Aug.	---
ISFSI	Mar	---	Sep.	---
	Apr.	---	Oct.	3.59±0.54
	May	---	Nov.	3.39±0.07
	Jun.	---	Dec.	3.49±0.72

*TLD not in service until October 1992

Table E-13 -- Continued
Direct Radiation

(Results in Units of mR/30 days ±2σ)

SFDR11*	Jan.	---	Jul.	---
WNW	Feb.	---	Aug.	---
ISFSI	Mar.	---	Sep.	---
	Apr.	---	Oct.	4.01±1.88
	May	---	Nov.	3.61±0.47
	Jun.	---	Dec.	4.07±0.34
SFDR12*	Jan.	---	Jul.	---
West	Feb.	---	Aug.	---
ISFSI	Mar.	---	Sep.	---
	Apr.	---	Oct.	3.13±0.04
	May	---	Nov.	3.19±0.03
	Jun.	---	Dec.	4.22±2.29
SFDR13*	Jan.	---	Jul.	---
WSW	Feb.	---	Aug.	---
ISFSI	Mar.	---	Sep.	---
	Apr.	---	Oct.	3.64±0.36
	May	---	Nov.	3.35±0.32
	Jun.	---	Dec.	3.65±0.25
SFDR14*	Jan.	---	Jul.	---
South	Feb.	---	Aug.	---
ISFSI	Mar.	---	Sep.	---
	Apr.	---	Oct.	3.54±0.46
	May	---	Nov.	3.44±0.12
	Jun.	---	Dec.	3.68±0.47
SFDR15**	Jan.	---	Jul.	---
East	Feb.	---	Aug.	---
ISFSI	Mar.	---	Sep.	---
	Apr.	---	Oct.	---
	May	---	Nov.	---
	Jun.	---	Dec.	3.93±0.84
SFDR16**	Jan.	---	Jul.	---
ISFSI	Feb.	---	Aug.	---
	Mar.	---	Sep.	---
	Apr.	---	Oct.	---
	May	---	Nov.	---
	Jun.	---	Dec.	4.10±0.21

*TLD not in service until October 1992

**TLD not in service until December 1992