Calvert Cliffs Nuclear Power Plant

1650 Calvert Cliffs Parkway
Lusby, Maryland 20657

Constellation Energy
Nuclear Generation Group

May 13, 2008

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
Independent Spent Fuel Storage Installation; Docket No. 72-8
Annual Radiological Environmental Operating Report

REFERENCES: (a) Calvert Cliffs Nuclear Power Plant Technical Specification 5.6.2

(b) Calvert Cliffs Independent Spent Fuel Storage Installation Technical Specification 6.2

In accordance with References (a) and (b), Calvert Cliffs Nuclear Power Plant is submitting the Annual Radiological Environmental Operating Report, for the calendar year 2007.

Should you have questions regarding this matter, please contact Mr. Jay S. Gaines at (410) 495-5219 or Ms. Brenda Nuse at (410) 495-4913.

Very truly yours,

Jay S. Gaines
Director-Licensing

JSG/CAN/bjd

Attachment: As stated

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ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT FOR THE CALVERT CLIFFS NUCLEAR POWER PLANT UNITS 1 AND 2 AND THE INDEPENDENT SPENT FUEL STORAGE INSTALLATION

January 1 - December 31, 2007

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CONSTELLATION ENERGY

CONSTELLATION ENERGY NUCLEAR GENERATION
APRIL 2008

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I. SUMMARY

During this operating period for Calvert Cliffs Nuclear Power Plant (CCNPP) Units 1 and 2, a total of 3436 radiological analyses were performed and the analytical results reviewed. Most of these analyses were performed to satisfy the requirements of the Offsite Dose Calculation Manual (ODCM) (Ref. 6) and the Environmental and Independent Spent Fuel Storage Installation (ISFSI) Technical Specifications (Ref. 10). Some of these samples, although not required by either the ODCM or the Technical Specifications, were collected to maintain our commitments to the surrounding community and to maintain historical continuity of the CCNPP Radiological Environmental Monitoring Program (REMP) that started in 1970. The entire monitoring program in place around CCNPP is divided into three parts: the original REMP, the ISFSI monitoring program, and the Non-ODCM Radiological Environmental Monitoring. The following paragraphs describe each of these parts in more detail.

A total of 643 radiochemical analyses were performed on 575 environmental samples and 546 thermoluminescent dosimeters (TLDs) were analyzed for ambient radiation exposure rates as part of the original REMP. These analyses were performed to satisfy the requirements of the ODCM (Ref. 6) and the Environmental Technical Specifications (Ref. 5).

For the ISFSI monitoring program, 358 radiochemical analyses were performed on 298 environmental samples, 52 of which were in common with the original REMP. In addition, 480 TLDs, 24 in common with the original REMP, were analyzed for ambient radiation exposure rates. These analyses were performed to satisfy the requirements of the ODCM (Ref. 6) and the ISFSI Technical Specifications (Ref. 10).

In addition, 582 analyses were performed on 534 additional environmental samples, and 474 additional TLDs were analyzed for ambient radiation exposure rates. Also, six pressurized ion chambers continuously monitored the environs around the plant for ambient radiation levels resulting in 72 monthly measurements. As mentioned earlier, these additional analyses reflect a commitment to maintain historical continuity for samples and sampling pathways discontinued from the program when the Environmental Technical Specifications were changed in March 1985 and to satisfy monitoring commitments made to the surrounding community.

And lastly, 237 radiochemical analyses were performed on 193 quality assurance samples and 132 quality assurance TLDs were analyzed as part of an internal and external quality assurance program associated with Teledyne Brown Engineering. Laboratory intercomparison samples were obtained and analyzed from Environmental Resource Associates (ERA) and Analytics' Inc.

Samples collected from the aquatic environment included bay water, well water, fish, oysters, and shoreline sediment. Water samples were 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 CCNPP and the ISFSI. 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 gaseous radioiodine.

Samples from the terrestrial environment consisted of vegetation and soil samples collected and analyzed for gamma emitters. Vegetation samples for the original REMP were also analyzed for I-131.

Measurements of direct radiation, as required by the ODCM, were performed by analyzing TLDs from forty-two locations surrounding CCNPP and the ISFSI.

Natural radioactivity was detected in essentially all radiological analyses performed. Low levels of the man-made fission product Cs-137 were also observed in 24 of these analyses. All of these observations were attributed to fallout from past atmospheric weapons testing. Detailed discussions about the results of these analyses are contained in the body of this report.

To assess the plant's contribution to the radiation levels of the ambient 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 1.0×10^{-2} mrem via liquid and gaseous pathways, which is about 0.01% of the acceptable limit of 75 mrem/yr as specified in 40 CFR Part 190;

b. a maximum whole body dose of 2.44×10^{-3} mrem via liquid and gaseous pathways, which is less than 0.01% of the acceptable limit of 25 mrem/yr as specified in 40 CFR Part 190;

c. a maximum calculated dose to all other organs via liquid and gaseous pathways was equal to 4.68×10^{-3} mrem to the skin. This dose is less than 0.02% of the allowable limit of 25 mrem/yr as specified in 40 CFR Part 190.

Thus, it is concluded based upon the levels of radioactivity observed and the various dose calculations performed, that CCNPP Units 1 and 2 and the ISFSI did not cause any significant radiological impact on the surrounding environment

II. CALVERT CLIFFS NUCLEAR POWER PLANT RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

II.A. INTRODUCTION

Constellation Energy (CE), previously known as Baltimore Gas and Electric Company (BGE), has been conducting a REMP in the environs of the CCNPP 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. The location of the plant in relation to local metropolitan areas is shown on Figure A-1, page 28.

Results of the monitoring program for the pre-operational period have been reported in a series of documents (Ref. 1-4). The results from previous operational periods are contained in annual reports submitted to the NRC as required.

Results of the monitoring program for the current operational period are included in this report. The report presents the content of the REMP (Table 1), the sampling locations (Appendix A), the summary of the analytical results (Table 2), a compilation of the analytical data (Appendix B), the results of the Analytics 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 (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 to evaluate the environmental radiological impact of CCNPP Units 1 and 2.

II.B. PROGRAM

II.B.1. Objectives

The objectives of the REMP for the Calvert Cliffs Nuclear Power Plant are:

a. To verify that radioactivity and ambient radiation levels attributable to plant operation are within the limits specified in the ODCM (Ref. 6) and the Environmental Radiation Protection Standards as stated 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.

II.B.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 Constellation Energy according to CCNPP Procedures (Ref. 7, 12).

II.B.3. Data Interpretation

Many results in environmental monitoring occur at or below the minimum detectable activity (MDA). In this report, all results at or below the relevant MDA are reported as being "less than" the MDA value.

II.B.4. Program Exceptions

There were no program exceptions for this operating period.

II.C. RESULTS AND DISCUSSIONS

All the environmental samples collected during the year were analyzed using Constellation Energy laboratory procedures (Ref. 8). The analytical results for this reporting period are presented in Appendix B and are also summarized in Table 2. For 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).

II.C.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.

II.C.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, revealed no evidence of tritium in any of the samples taken from either site throughout the year.

Figure 1 compares tritium observed in the plant discharge and intake with annual effluent releases as reported in the Radioactive Effluent Release Report.

Monthly analyses of bay water samples from both locations for gamma emitters exhibited no detectable concentrations of any plant-related radionuclides.

II.C.1.b. Aquatic Organisms

Twelve samples of aquatic organisms were obtained from four locations during the year. Samples of fish, when in season, are normally collected from the Discharge Area (sample codes Ia1 and Ia2) and from the Patuxent River (sample codes Ia4 and Ia5). As shown in Table B-2, two species of fish were sampled at both the plant discharge and the control point in the Patuxent River. Oyster samples were obtained quarterly from Camp Conoy (sample code Ia3) and Kenwood Beach (Ia6).

Edible portion of the fish and oyster samples were analyzed for gamma emitters. Gamma spectrometric analyses of the fish exhibited naturally occurring K-40 in all four samples collected, while detectable concentrations of Cs-137 were observed in two of them: one from the Discharge area Ia1, collected on 8/22/2007 at a concentration of 7 ± 9 pCi/Kg and the other from the Patuxent River Ia5, collected on 9/9/2007 at a concentration of 20 ± 10 pCi/Kg. Although the presence of Cs-137 may be related to plant operations, it is most probably due to lingering fallout from past atmospheric nuclear weapons testing. Oyster samples exhibited naturally occurring K-40, but no detectable concentrations of any plant related radionuclides.

II.C.1.c. Shoreline Sediment

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

Gamma spectrometric analyses of these samples exhibited naturally occurring radionuclides, but no detectable concentration of any plant-related radionuclides.

FIGURE 1
Tritium in Chesapeake Bay Water

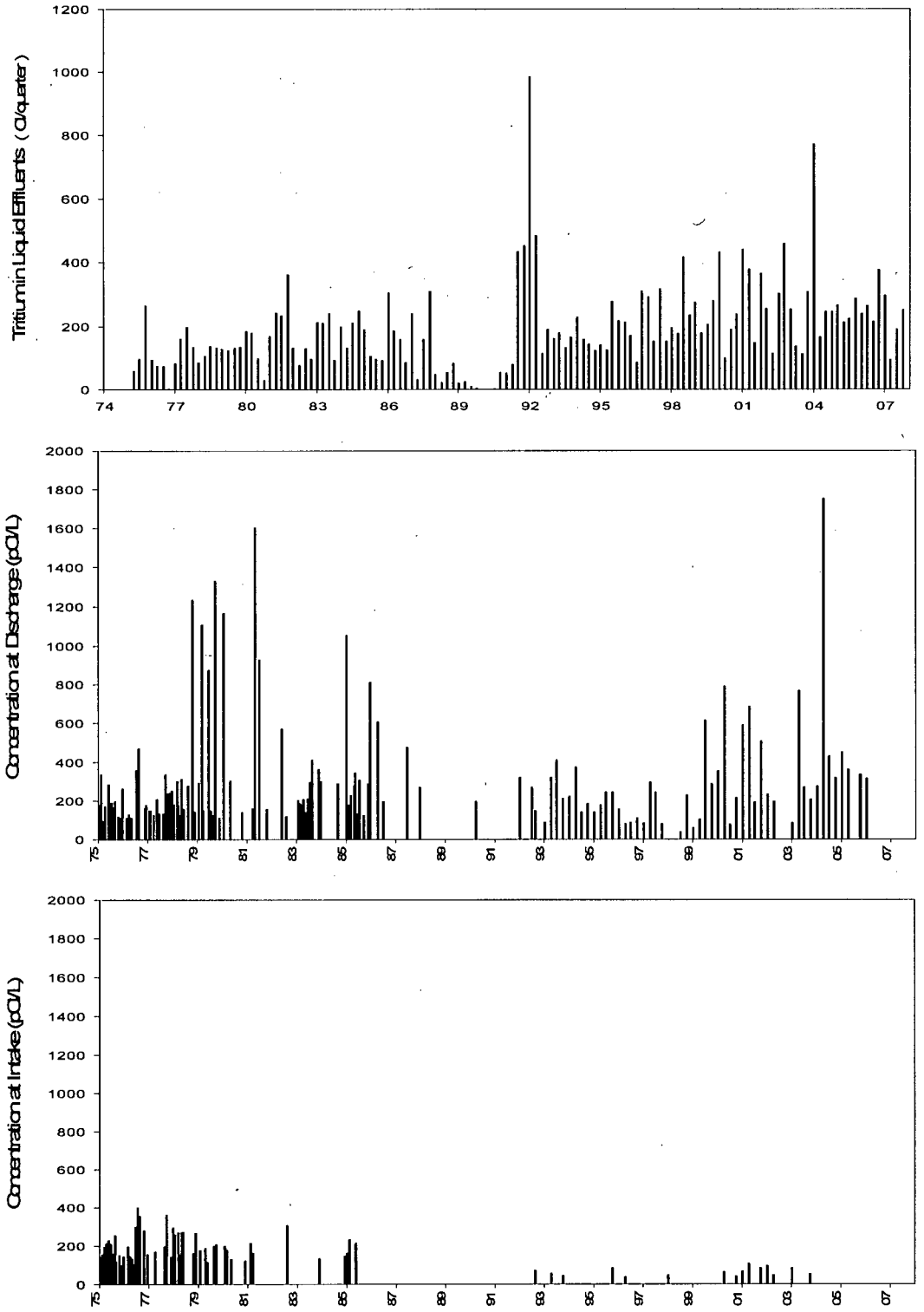
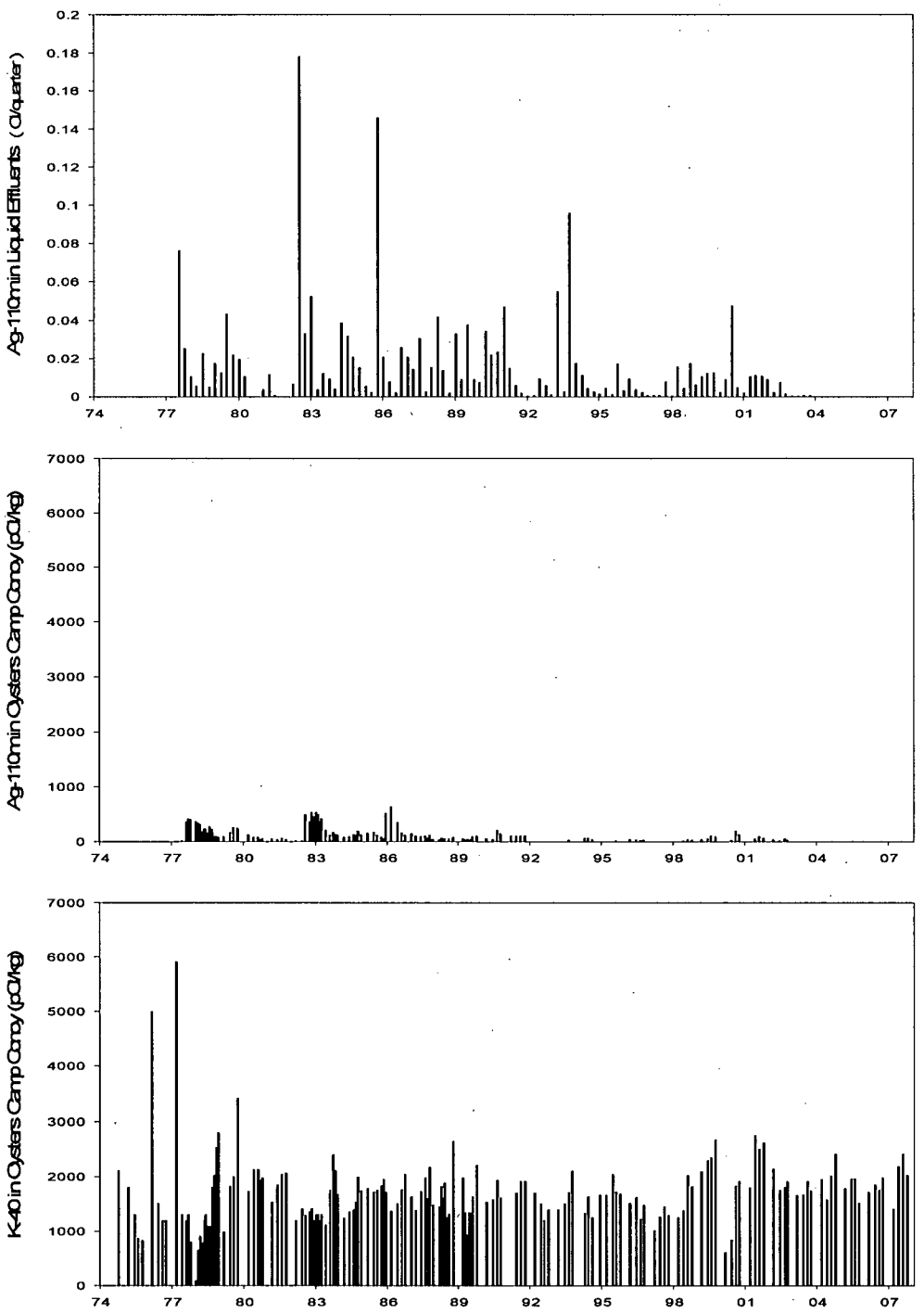


FIGURE 2
Silver-110m and Potassium-40 in Chesapeake Bay Oysters



II.C.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 five locations surrounding the plant. These locations are On Site before the Entrance to Camp Conoy (sample code A1), Camp Conoy Road at the Emergency Siren (sample code A2), Bay Breeze Road (sample code A3), Route 765 at Lusby (sample code A4), and at the Emergency Operations Facility (sample code A5).

II.C.2.a. Air Particulate Filters

Weekly composite air particulate filter samples were collected from the five locations during the year. These samples were analyzed for beta activity and gamma emitters.

Weekly analyses for beta activity on air particulate filters collected from all five locations showed values characteristic of background levels. The values ranged from 0.7×10^{-2} to 5.4×10^{-2} pCi/m^3 for the indicator locations and 0.8×10^{-2} to 4.9×10^{-2} pCi/m^3 at the control location. The location with the highest overall mean of 2.1×10^{-2} pCi/m^3 was A4, Route 765 at Lusby.

Gamma spectrometric analyses of monthly composited air particulate samples exhibited no detectable concentrations of any plant-related radionuclides in any of these samples. Naturally occurring radionuclides, such as Be-7, were detected in nearly all samples.

Figure 3 depicts the historical trends of beta activity.

II.C.2.b. Air Iodine

Weekly composited Silver Zeolite cartridges (for trapping radioiodine species) were collected from the five locations during the year. 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.

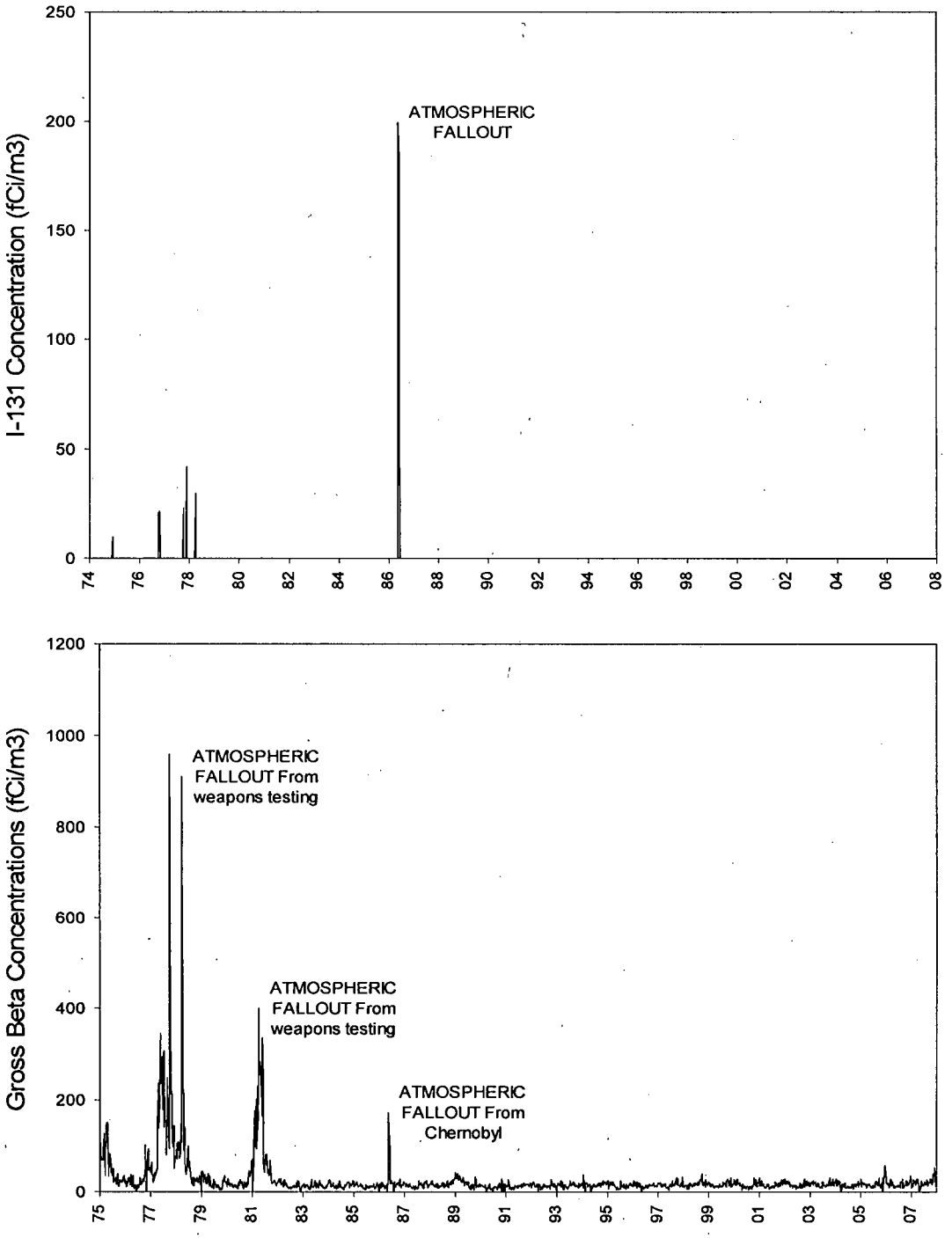
Figure 3 depicts the historical trends of radioiodine.

II.C.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.

FIGURE 3
Nuclear Fallout in the Calvert Cliffs Area

SURFACE AIR VAPORS, LUSBY, MD (A4)



II.C.3.a. Vegetation

Nine vegetation samples were collected from three locations during the year. These locations are Garden Plot off 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.

All samples showed detectable amounts of naturally occurring K-40 and Be-7. Detectable concentrations of Cs-137 were observed in two of the eighteen indicator samples: a squash sample at Bay Breeze Rd. Ib1, collected on 9/30/2007 at a concentration of 25 ± 20 pCi/Kg and a sample of tree leaves from Camp Conoy Entrance Ib5, collected on 9/30/2007 at a concentration of 112 ± 23 pCi/Kg. No other plant related radionuclides were found in any of these samples.

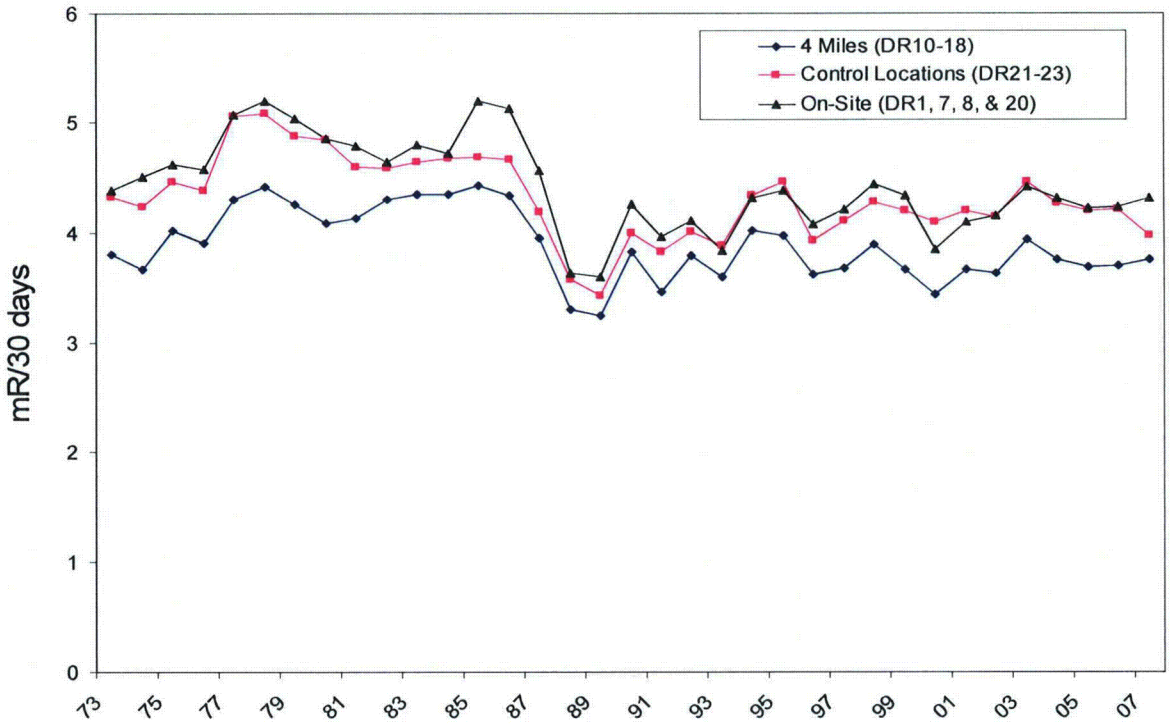
II.C.4. Direct Radiation

Direct radiation is measured by a network of TLDs in each overland sector surrounding the Plant both at the plant boundary and at 4 miles from the Plant.

TLDs were collected quarterly from twenty-three locations surrounding the plant. The twenty indicator locations are On Site Along the Cliffs (sample code DR1), Route 765 Auto Dump (sample code DR2), Giovanni's Tavern (sample code DR3), Route 765 across from White Sands (sample code DR4), John's Creek (sample code DR5), Lusby (sample code DR6), On Site before the Entrance to Camp Conoy (sample code DR7), On Site at 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), and On Site Near Shore (sample code DR20). The three control locations are the Emergency Operations Facility (sample code DR21), Solomons Island (sample code DR22), and Taylors Island, Carpenters Property (sample code DR23).

The mean 90 day ambient radiation measured at the indicator locations was 11.54 mR and ranged from 8.82 to 16.05 mR as reported in Table 2. The control locations showed a 90 day mean of 13.01 mR with ranges from 9.84 to 18.22 mR. The location with the highest overall mean of 15.80 was DR23, Taylors Island, which ranged from 14.07 to 18.22 mR. A comparison of the means and ranges of the current TLD data with those of both the historical data and the regional data shows no plant-related contribution to the measured direct radiation exposure. Figure 4 shows the historical comparison of the average monthly radiation levels per calendar year for TLDs on site, at four miles, and at the control locations.

FIGURE 4
Mean TLD Gamma Dose, Calvert Cliffs Nuclear Power Plant



II.D. CONCLUSION

No man-made fission by-products attributable to plant operations were observed in the environment surrounding the plant during the year.

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 are depicted in Figures 1 through 4. As can be seen from these figures, the plant made no adverse radiological contributions to the surrounding environment.

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 9.0×10^{-3} mrem to a child via the plume, ground, vegetable, meat, and inhalation pathways at 1.8 km SW of the containments at Calvert Cliffs. This is about 0.01% of the acceptable limit of 75 mrem/yr as specified in 40 CFR Part 190, "Environmental Radiation Protection Standards for Nuclear Power Operations."

A maximum whole body gamma dose of 1.3×10^{-3} mrem to a child at 2.1 km SE of the containments at Calvert Cliffs. This is less than 0.01% of the acceptable dose limit of 25 mrem/yr as specified in 40 CFR Part 190.

A maximum dose to any other organ, in this case the skin, of 4.6×10^{-3} mrem to an adult at 2.1 km SE of the containments at Calvert Cliffs. This is less than 0.02% of the acceptable dose limit of 25 mrem/yr as specified in 40 CFR Part 190.

Liquid Pathways

A maximum thyroid dose of 1.0×10^{-3} mrem to an adult for all liquid pathways, which is about 0.001% of the acceptable dose limit of 75 mrem/yr as specified in 40 CFR Part 190.

A maximum whole body dose of 1.1×10^{-3} mrem to an adult via all liquid pathways, which is less than 0.01% of the acceptable dose limit of 25 mrem/yr as stated in 40 CFR Part 190.

A maximum dose to any organ, in this case GI Tract, of 2.7×10^{-3} mR to an adult for all pathways, which is 0.01% of the acceptable dose limit of 25 mrem/yr specified in 40 CFR Part 190.

Gaseous and Liquid Pathways Combined

A maximum thyroid dose of 1.0×10^{-2} mrem via liquid and gaseous pathways, which is about 0.01% of the acceptable limit of 75 mrem/yr as specified in 40 CFR Part 190;

A maximum whole body dose of 2.44×10^{-3} mrem via liquid and gaseous pathways, which is less than 0.01% of the acceptable limit of 25 mrem/yr as specified in 40 CFR Part 190;

A maximum calculated dose to all other organs via liquid and gaseous pathways was equal to 4.68×10^{-3} mrem to the skin. This dose was less than 0.02% of the allowable limit of 25 mrem/yr as specified in 40 CFR Part 190.

In all cases, the calculated doses are a small fraction of the applicable limits specified in 40 CFR Part 190.

Therefore, it is concluded that the operation of Calvert Cliffs Units 1 & 2 produced radioactivity and ambient radiation levels significantly below the limits of the ODCM and 40 CFR Part 190, and there was no significant buildup of plant-related radionuclides in the environment due to the operation of the CCNPP.

FIGURE 5
Atmospheric Dispersion Around CCNPP Average Relative Air Concentrations

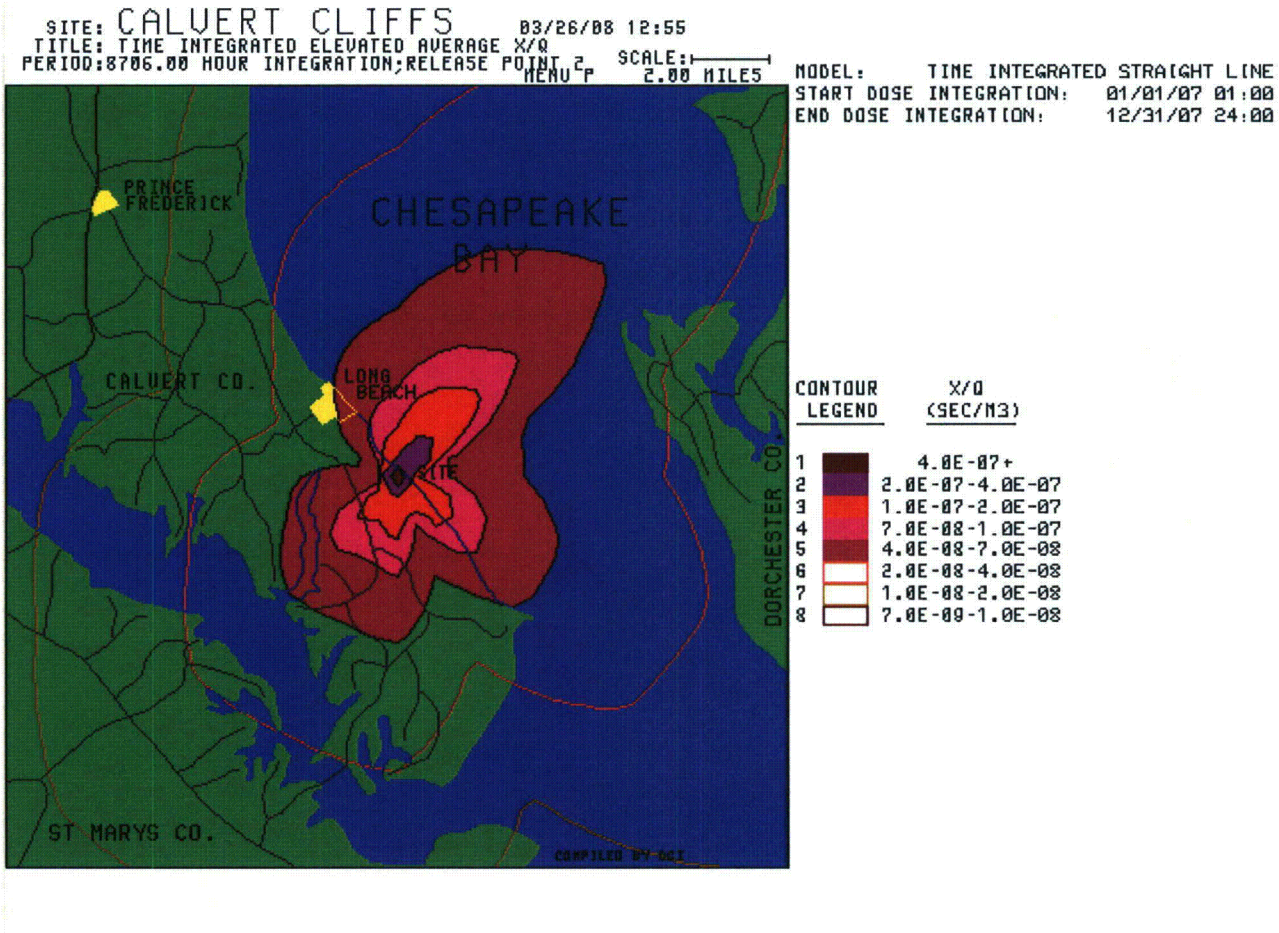


FIGURE 6
Atmospheric Dispersion Around CCNPP Average Relative Ground Deposition

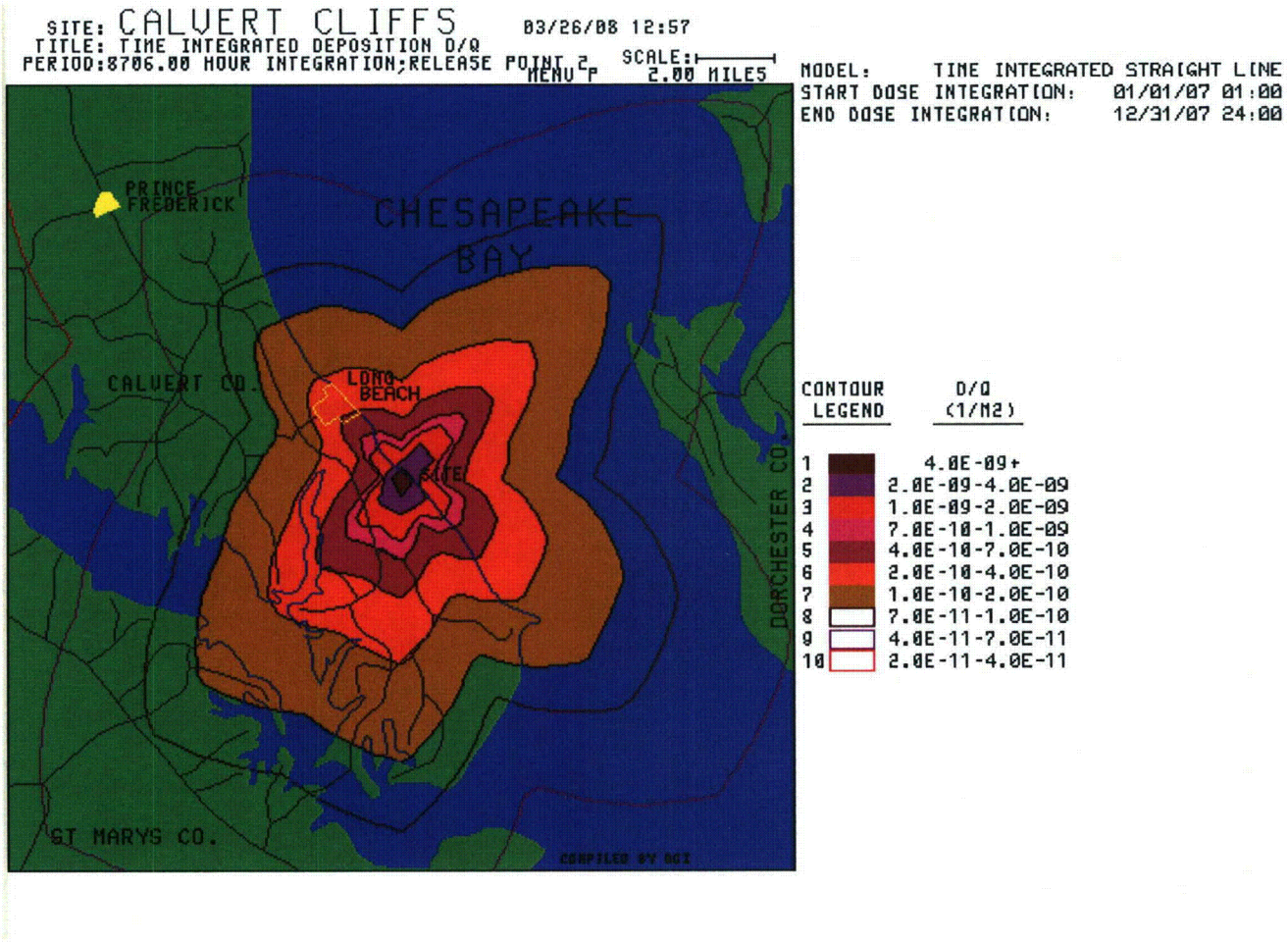


Table 1
Synopsis of 2007 Calvert Cliffs Nuclear Power Plant Radiological Environmental Monitoring Program

Sample Type	Sampling Frequency	Number of Locations	Number Collected	Analysis	Analysis Frequency[1]	Number Analyzed
Aquatic Environment						
Bay Water	MC	2	24	Gamma H-3	M QC	24 8
Fish [2]	A	4	4	Gamma	A	4
Oysters	Q	2	8	Gamma	Q	8
Shoreline Sediment	SA	1	2	Gamma	SA	2
Atmospheric Environment						
Air Iodine [3]	W	5	255	I-131	W	255
Air Particulates [4]	W	5	255	Gross Beta Gamma	W MC	255 60
Direct Radiation						
Ambient Radiation	Q	23	546	TLD	Q	546
Terrestrial Environment						
Vegetation [5]	M	3	27	Gamma	M	27

[1] W=weekly, M=monthly, Q=quarterly, SA=semiannual, A=annual, C=composite
[2] Once in Season, July through September
[3] The collection device contains Silver Zeolite
[4] Beta counting is performed after >72 hour decay, Gamma spectroscopy performed on monthly composites of weekly samples
[5] Monthly during growing season when available

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[1]	Location with Highest Annual Mean Name/Distance & Direction[2]	Highest Annual Mean (F) / Range[1]	Control Locations Mean (F)/Range[1]
Aquatic Environment						
Fish (pCi/kg wet)	Gamma (4) Cs-137	15	7 (1/2) --	Patuxent River Ia5	20 (1/1) --	20 (1/2) --
Atmospheric Environment						
Air Particulates (10^{-2} pCi/m^3)	Gross Beta (255)	0.5	1.9 (205/205) (0.7-5.4)	Route 765 at Lusby A4 2.9 km SSW	2.1 (50/52) (0.7-5.4)	2.0 (50/52) (0.8-4.91)
Direct Radiation						
Ambient Radiation (mR/90 days)	TLD (546)	--	11.54 (480/480) (8.82-16.05)	Taylors Island DR23 12.6 km ENE	15.80 (24/24) (14.07-18.22)	13.01 (66/72) (9.84-18.22)
Terrestrial Environment						
Vegetation (pCi/L)	Gamma (27) Cs-137	27	69 (2/18) (25-112)	Camp Conoy Entrance Ib5 0.7 km S	112 (1/3) --	-- --

[1] Mean and range based upon detectable measurements only. Fraction (F) of detectable measurements at specified locations is indicated in parentheses
[2] From the centerpoint between the two containment buildings.

III. INDEPENDENT SPENT FUEL STORAGE INSTALLATION RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

III.A. INTRODUCTION

In August 1990 BGE initiated a program of additional radiological environmental monitoring around the site for the Independent Spent Fuel Storage Installation (ISFSI). The first dry fuel storage canister was loaded into the ISFSI in November of 1993, with more canisters being loaded in subsequent years. During this operating period, four additional canisters of spent fuel were transferred to the ISFSI.

Results of the monitoring program for the ISFSI for the current period are included in this report.

This report presents the content of the ISFSI REMP (Table 3), the ISFSI sampling locations (Appendix A), the summary of the analytical results of the period (Table 4), and a compilation of the analytical data for the period (Appendix B). Interpretation of the data and conclusions are presented in the body of the report.

The ISFSI monitoring program is as described in this section of the report. Pressurized Ion Chambers (PICs), because they duplicate direct surveillance by TLDs and because they experience problems with reliability, were excluded from the Technical Specification portion of the ISFSI monitoring program. PIC results, however, are given in Table E-9 and will continue to be Non-ODCM surveillance to satisfy our commitment to the surrounding community.

The results were compared with that generated during the previous ISFSI pre-operational periods (Ref. 11) and the current and previous CCNPP REMP periods. These comparisons show little deviations from previous periods and are very close to the natural background levels for the region with the exception of TLDs around the north end of the ISFSI. More detailed discussions of these results are given in Section III. C.

III.B. PROGRAM

III.B.1. Objectives

The objectives of the radiological environmental monitoring program for the ISFSI are:

a. To satisfy the community concern regarding the impact of the ISFSI on the environment,

b. To verify that radioactivity and ambient radiation levels attributable to operation of the ISFSI are within the limits specified in the Environmental Radiation Protection Standards as stated in 40 CFR Part 190,

c. To detect any measurable buildup of long-lived radionuclides in the environment due to the ISFSI,

d. To monitor and evaluate ambient radiation levels around the ISFSI,

e. To determine whether any statistically significant increase occurs in the concentration of radionuclides near the ISFSI.

III.B.2. Sample Collection

The locations of the individual sampling sites are listed in Table A-2 and shown in Figures A-4 and A-5. All samples were collected by contractors to, or personnel of, Constellation Energy personnel according to Constellation Energy Laboratory Procedures (Ref. 7).

III.B.3. Data Interpretation

Many results in environmental monitoring occur at or below the minimum detectable activity (MDA). In this report, all results at or below the relevant MDA are reported as being "less than" the MDA value.

III.B.4. Program Exceptions

There were no program exceptions during this operating period.

III.C. RESULTS AND DISCUSSIONS

All the environmental samples collected were analyzed using Constellation Energy laboratory procedures (Ref. 8). The analytical results for this reporting period are presented in Appendix B and are also summarized for the period in Table 4. For discussion, the analytical results are divided into three categories. The categories are the Atmospheric Environment, the Terrestrial Environment, and Direct Radiation. These categories are further divided into subcategories according to sample type (e.g., Vegetation and Soil for Terrestrial Environment).

III.C.1. Atmospheric Environment

The atmospheric environment was monitored by analyzing air particulate filters. These samples were collected from five locations surrounding the ISFSI.

No source of airborne radioiodine exists for the ISFSI. Airborne radioiodine is, therefore, not considered in assessing the radiological impact of the ISFSI.

III.C.1.a. Air Particulate Filters

Weekly composite air particulate filter samples were collected from five locations during the period. These locations are On Site before the Entrance to Camp Conoy (sample code A1; in common with the CCNPP REMP), Meteorological Station (SFA1), CCNPP Visitor's Center (SFA2), NNW of the ISFSI (SFA3), and SSE of the ISFSI (SFA4). These samples were analyzed for beta radioactivity and gamma emitting radionuclides.

Weekly analyses for beta activity on air particulate filters collected from all five locations showed values characteristic of levels routinely observed in the REMP. These values ranged from 0.5×10^{-2} to 5.6×10^{-2} pCi/m^3 for the indicator locations and 0.8×10^{-2} to 4.4×10^{-2} Ci/m^3 for the control location. The location with the highest overall mean of 2.0×10^{-2} pCi/m^3 was Entrance to Camp Conoy A1, S of ISFSI.

Gamma spectrometric analyses of monthly composited air particulate samples exhibited no detectable concentrations of any plant-related radionuclides in any of these samples. Naturally occurring radionuclides, such as Be-7, were detected in nearly all samples.

III.C.2. Terrestrial Environment

The terrestrial environment was monitored by analyzing samples of vegetation and soil collected quarterly from the vicinity of the air sampling locations for the ISFSI.

III.C.2.a. Vegetation

Vegetation samples were collected quarterly from five locations during the year. These locations are: Meteorological Station (sample code SFb1), CCNPP Visitor's Center (sample code SFb2), NNW of the ISFSI (sample code SFb3), SSE of the ISFSI (sample code SFb4), and On Site before the Entrance to Camp Conoy (sample code SFb5). These samples were analyzed for gamma emitters.

Detectable concentrations of Cs-137 were observed in four of sixteen indicator locations ranging from 15 ± 12 to 43 ± 26 pCi/Kg. Although the presence of Cs-137 may be related to the operations of the plant, the most probable source is due to fallout from past weapons testing. Naturally occurring radionuclides such as K-40 were detected in all samples.

III.C.2.b. Soils

Soil samples were collected quarterly from five locations surrounding the ISFSI in the vicinity of the air samplers. These locations are: Meteorological Station (sample code SFS1), CCNPP Visitor's Center (sample code SFS2), NNW of the ISFSI (sample code SFS3), SSE of the ISFSI (sample code SFS4), and On Site before the Entrance to Camp Conoy (sample code SFS5).

Soil samples were analyzed for gamma emitting radionuclides. Cesium-137 was detected in twelve quarterly samples from both indicator and control locations. The Cs-137 concentrations ranged from 103 ± 39 to 743 ± 133 pCi/kg. While the presence of Cs-137 in these samples may be plant-related, this range is consistent with that found to be due to the residual fallout from past atmospheric nuclear weapons testing. In addition, the levels of the Cs-137 activity are comparable to those observed in previous annual reporting periods for the CCNPP REMP and in the earlier pre-operational data for the ISFSI. No other detectable concentrations of plant-related radionuclides were found in any of these samples. Naturally occurring radionuclides such as K-40 were also detected in all these samples.

III.C.3. Direct Radiation

Direct radiation is measured by a network of TLDs surrounding the ISFSI. These TLDs are collected quarterly from nineteen locations surrounding the ISFSI, plus one control TLD location at the Visitor's Center (sample code SFDR7). The locations include On Site before the Entrance to Camp Conoy (sample code DR7, common to both the CCNPP Program and the ISFSI Program) and the Meteorological Station (sample code DR30, previously a location maintained for historical continuity.) The other sampling locations are: SW of ISFSI, (sample code

SFDR1); NNW of ISFSI, (sample code SFDR2); North of ISFSI, (sample code SFDR3); NE of ISFSI, (sample code SFDR4); East of ISFSI, (sample code SFDR5); ESE of ISFSI, (sample code SFDR6); NNW of ISFSI, (sample code SFDR8); SSE of ISFSI, (sample code SFDR9); NW of ISFSI, (sample code SFDR10); WNW of ISFSI, (sample code SFDR11); WSW of ISFSI, (sample code SFDR12); South of ISFSI, (sample code SFDR13); SE of ISFSI, (sample code SFDR14); ENE of ISFSI, (sample code SFDR15); SSW of ISFSI, (sample code SFDR16); NNE of ISFSI, (sample code SFDR17) and West of ISFSI, (sample code SFDR18). Sampling locations are shown on Figures A-4 and A-5.

The mean 90 day ambient radiation measured at the ISFSI indicator locations was 26.06 mR and ranged from 9.61 to 45.97 mR as reported in Table 4. The control location showed a 90 day mean of 13.01 mR and ranged from 12.04 to 14.07 mR. The location with the highest overall mean of 42.14 mR with a range of 39.31 to 45.9 mR was SFDR18, West of ISFSI. These readings are consistent with those expected from the storage of spent fuel in the ISFSI. A comparison of the average monthly radiation levels per calendar year of the ISFSI TLD data from the indicator locations with the ISFSI control location at the Visitor's Center, SFDR7, can be seen in Figure 7.

III.D. CONCLUSION

Low levels of Cs-137 were observed in the environment surrounding the ISFSI during the period. The activities of this radionuclide are well below the federal limits established in 40 CFR Part 190, "Environmental Radiation Protection Standards for Nuclear Power Operations". The Cs-137 observations were attributed to fallout from past atmospheric weapons testing. No other plant-related radionuclide was observed in the environs of the ISFSI.

In general, the results in the following tables continue the historical trends previously observed at the official sites of the CCNPP REMP.

FIGURE 7
Mean TLD Gamma Dose, ISFSI

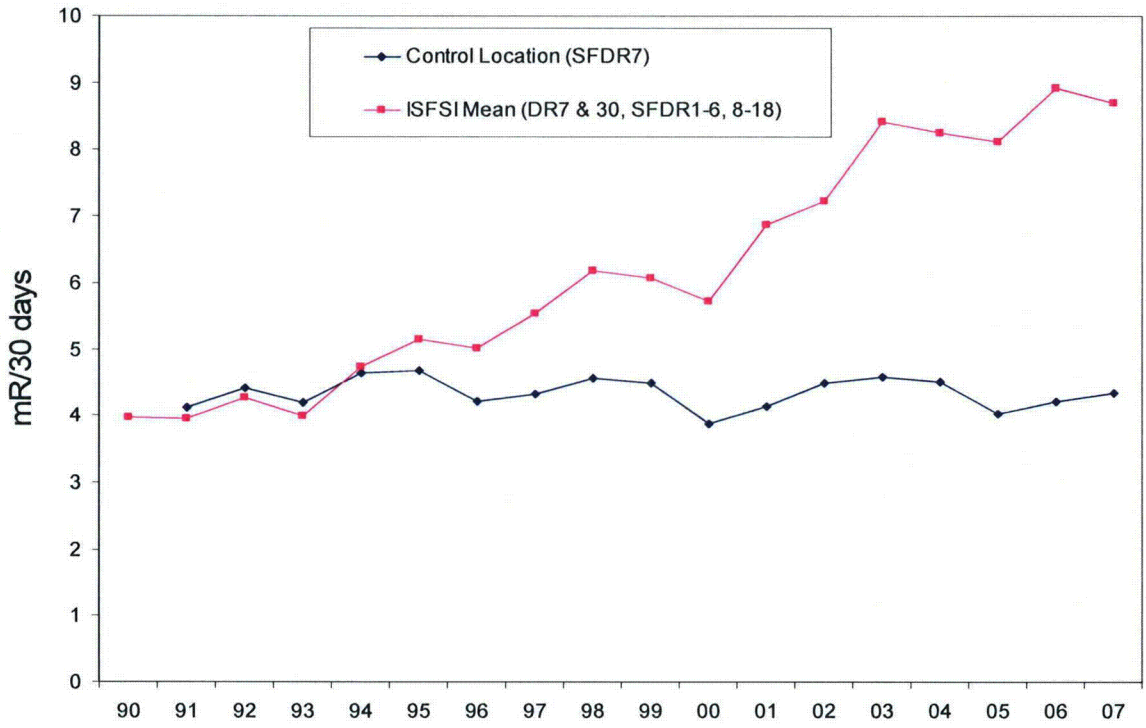


Table 3
Synopsis of 2007 Calvert Cliffs Nuclear Power Plant Independent Spent Fuel Storage Installation
Radiological Environmental Monitoring Program

Sample Type	Sampling Frequency	Number of Locations	Number Collected	Analysis	Analysis Frequency[1]	Number Analyzed
Atmospheric Environment						
Air Particulates[2]	W	5	258	Gross Beta Gamma	W MC	258 60
Direct Radiation						
Ambient Radiation	Q	20	480	TLD	Q	480
Terrestrial Environment						
Vegetation	Q	5	20	Gamma	Q	20
Soil	Q	5	20	Gamma	Q	20

[1] W=weekly, M=monthly, Q=quarterly, SA=semiannual, A=annual, C=composite
[2] Beta counting is performed after >72 hour decay, Gamma spectroscopy performed on monthly composites of weekly samples

Table 4
Annual Summary of Radioactivity in the Environs of the Calvert Cliffs Nuclear Power Plant
Independent Spent Fuel Storage Installation

Medium or Pathway Sampled (Unit of Measurement)	Type and Total Number of Analyses Performed	Lower Limit of Detection (LLD)	Indicator Locations Mean (F)/Range[1]	Location with Highest Annual Mean Name/Distance & Direction[2]	Highest Annual Mean (F) / Range[1]	Control Locations Mean (F)/Range[1]
Atmospheric Environment						
Air Particulates (10^{-2} pCi/m^3)	Gross Beta (258)	0.5	2.5 (206/206) (0.5-5.6)	Entrance to Camp Conoy A1 0.7 km S	2.0 (52/52) (0.7-3.7)	1.9 (52/52) (0.8-4.4)
Direct Radiation						
Ambient Radiation (mR/90 days)	TLD (480)	--	26.06 (456/456) (9.61-45.97)	West of ISFSI SFDR18 0.1 km W	42.14 (24/24) (39.31-45.97)	13.01 (24/24) (12.04-14.07)
Terrestrial Environment						
Vegetation (pCi/L)	Gamma (20) Cs-137	27	26 (4/16) (15-43)	On Site before Entrance to Camp Conoy SFb5 0.7 km ESE	29 (2/4) (15-43)	-- --
Soil (pCi/kg)	Gamma (20) Cs-137	17	523 (9/16) (165-743)	NNW of ISFSI SFS3 0.1 km NNW	607 (4/4) (502-727)	133 (3/4) (103-153)

[1] Mean and range based upon detectable measurements only. Fraction (F) of detectable measurements at specified locations is indicated in parentheses
[2] From the centerpoint of the ISFSI facility.

IV. REFERENCES

(1) Cohen, L. K., "Preoperational Environmental Radioactivity Monitoring Program at Calvert Cliffs Units 1 and 2", NUS No. 882 Semiannual Report January-June 1971, December 1971; NUS No. 1025 Annual Report 1971, March 1973.

(2) Cohen, L. K., "Preoperational Environmental Radioactivity Monitoring Program at Calvert Cliffs Units 1 and 2", NUS No. 1137 Annual Report 1972, December 1973.

(3) Cohen, L. K. and Malmberg, M.S., "Preoperational Environmental Radioactivity Monitoring Program at Calvert Cliffs Units 1 and 2", NUS No. 1188, Annual Report 1973, October 1974.

(4) Malmberg, M. S., "Preoperational Environmental Radioactivity Monitoring Program at Calvert Cliffs Units 1 and 2", NUS No. 1333, Data Summary Report, September 1970 to September 1974, July 1975.

(5) Calvert Cliffs Nuclear Power Plant, Units 1 and 2, License Nos. DPR-53 and DPR-69, Technical Specification 5.6.2; Annual Radiological Environmental Operating Report.

(6) Offsite Dose Calculation Manual for the Calvert Cliffs Nuclear Power Plant.

(7) CP-234, Specification and Surveillance for the Radiological Environmental Monitoring Program.

(8) Constellation Energy Laboratory Procedures Manual, General Services Department.

(9) Constellation Energy, "Land Use Survey Around Calvert Cliffs Nuclear Power Plant, August 2007."

(10) Calvert Cliffs Independent Spent Fuel Storage Installation Technical Specifications, Appendix A to Materials License SNM-2505.

(11) Baltimore Gas and Electric Company, Radiological Environmental Monitoring Program Pre-Operational Report for the Calvert Cliffs Independent Spent Fuel Storage Installation, August 1990 - November 1993, February 1994.

(12) CP-501, Liquid and Steam Sampling Techniques.

APPENDIX A
Sample Locations for the REMP and the ISFSI

Appendix A contains information concerning the environmental samples which were collected during this operating period.

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

Sample locations and specific information about individual locations for the ISFSI radiological environmental monitoring program are given in Table A-2. Figures A-4 and A-5 show the locations of the ISFSI 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[1] (KM)	Distance[1] (Miles)	Direction[1] (Sector)
A1	On Site before Entrance to Camp Conoy	0.7	0.4	S
A2	Camp Conoy at Emergency Siren	2.5	1.6	SSE
A3	Bay Breeze Road	2.6	1.6	SE
A4	Route 765 Lusby	2.9	1.8	SSW
A5	Emergency Operations Facility (EOF)	19.3	12.0	WNW
DR1	On Site along Cliffs	0.6	0.4	NW
DR2	Route 765, Auto Dump	2.7	1.7	WNW
DR3	Route 765, Giovanni's Tavern (Knotty Pine)	2.3	1.4	W
DR4	Route 765, across from White Sands Drive	2.0	1.2	WSW
DR5	Route 765, John's Creek	2.4	1.5	SW
DR6	Route 765 Lusby	2.9	1.8	SSW
DR7[2]	On Site before Entrance to Camp Conoy	0.7	0.4	S
DR8	Camp Conoy at Emergency Siren	2.5	1.6	SSE
DR9	Bay Breeze Road	2.6	1.6	SE
DR10	Calvert Beach Rd. and Decatur Street	6.4	4.0	NW
DR11	Dirt road off Mackall & Parran Roads	6.6	4.1	WNW
DR12	Mackall and Bowen Roads	6.7	4.2	W
DR13	Mackall Rd. near Wallville	6.1	3.8	WSW
DR14	Rodney Point	6.4	4.0	SW
DR15	Mill Bridge and Turner Roads	6.2	3.9	SSW
DR16	Across from Appeal School	6.5	4.0	S
DR17	Cove Point and Little Cove Point Roads	5.9	3.7	SSE
DR18	Cove Point	7.1	4.4	SE
DR19	Long Beach	4.4	2.7	NW
DR20	On Site near shore	0.4	0.2	NNW
DR21	Emergency Operations Facility (EOF)	19.3	12.0	WNW
DR22	Solomons Island	12.5	7.8	S
DR23	Taylors Island, Carpenter's Property	12.6	7.8	ENE
Ia1,2	Discharge Area	0.3	0.2	N
Ia3	Camp Conoy	0.9	0.6	E
Ia4,5	Patuxent River	N/A	N/A	N/A
Ia6	Kenwood Beach	10.7	6.6	NNW
Ia10	Hog Island	15.3	9.5	SSE
Ib1,2,3	Garden Off Bay Breeze Road	2.6	1.6	SSE
Ib4,5,6	On Site before Entrance to Camp Conoy	0.7	0.4	S
Ib7,8,9	Emergency Operations Facility (EOF)	19.3	12.0	WNW
Wa1	Intake Area	0.2	0.1	NNE
Wa2	Discharge Area	0.3	0.2	N
Wb1	Shoreline at Barge Rd.	0.6	0.4	ESE

[1] Distance and direction from the central point between the two containment buildings.
[2] Common to both the REMP and ISFSI monitoring program.

FIGURE A-1
Map of Southern Maryland and Chesapeake Bay Showing Location of Calvert Cliffs Nuclear Power Plant

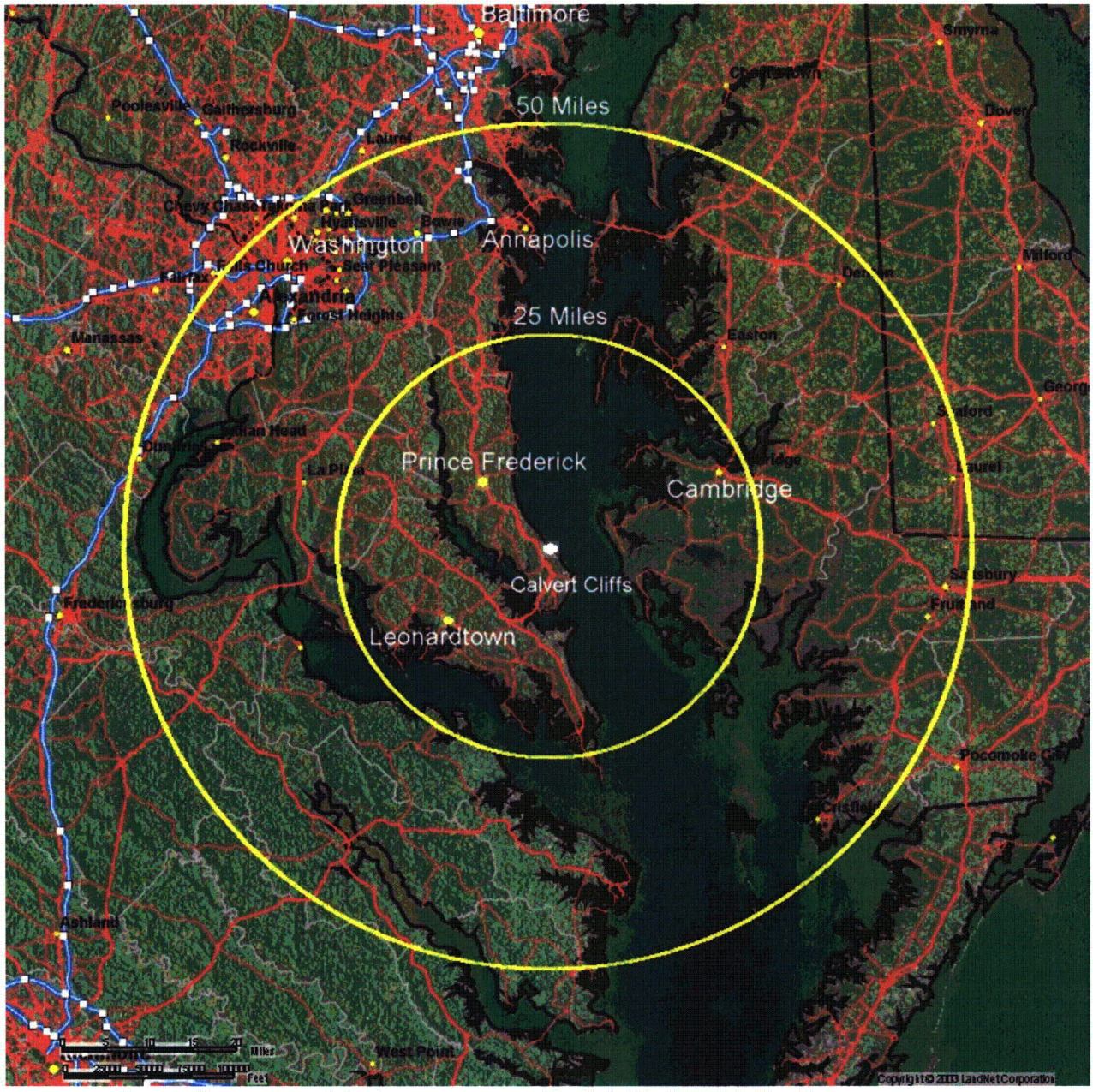


FIGURE A-2
Calvert Cliffs Nuclear Power Plant Sampling Locations
0-2 Miles

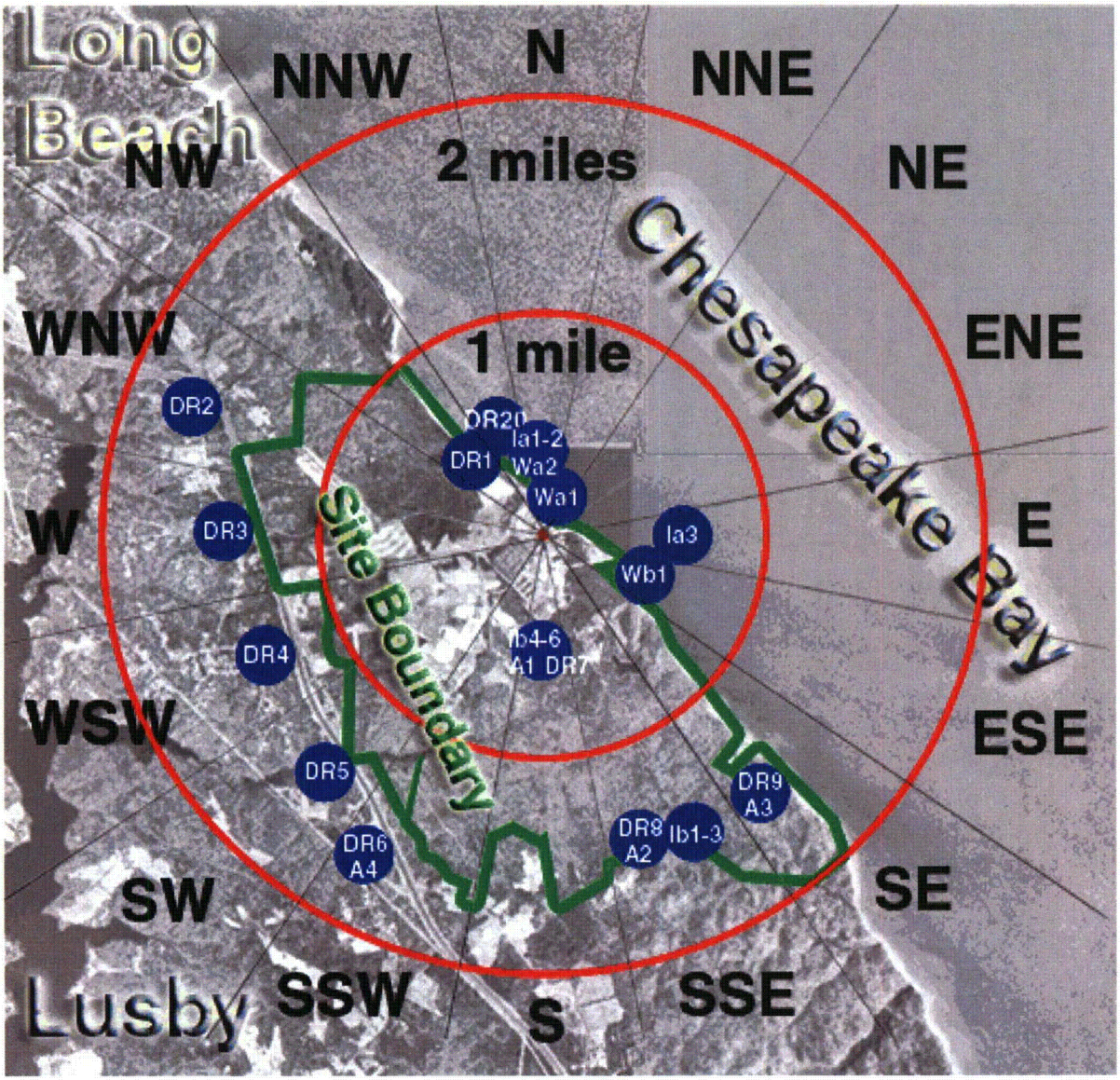


FIGURE A-3
Calvert Cliffs Nuclear Power Plant Sampling Locations
0-10 Miles

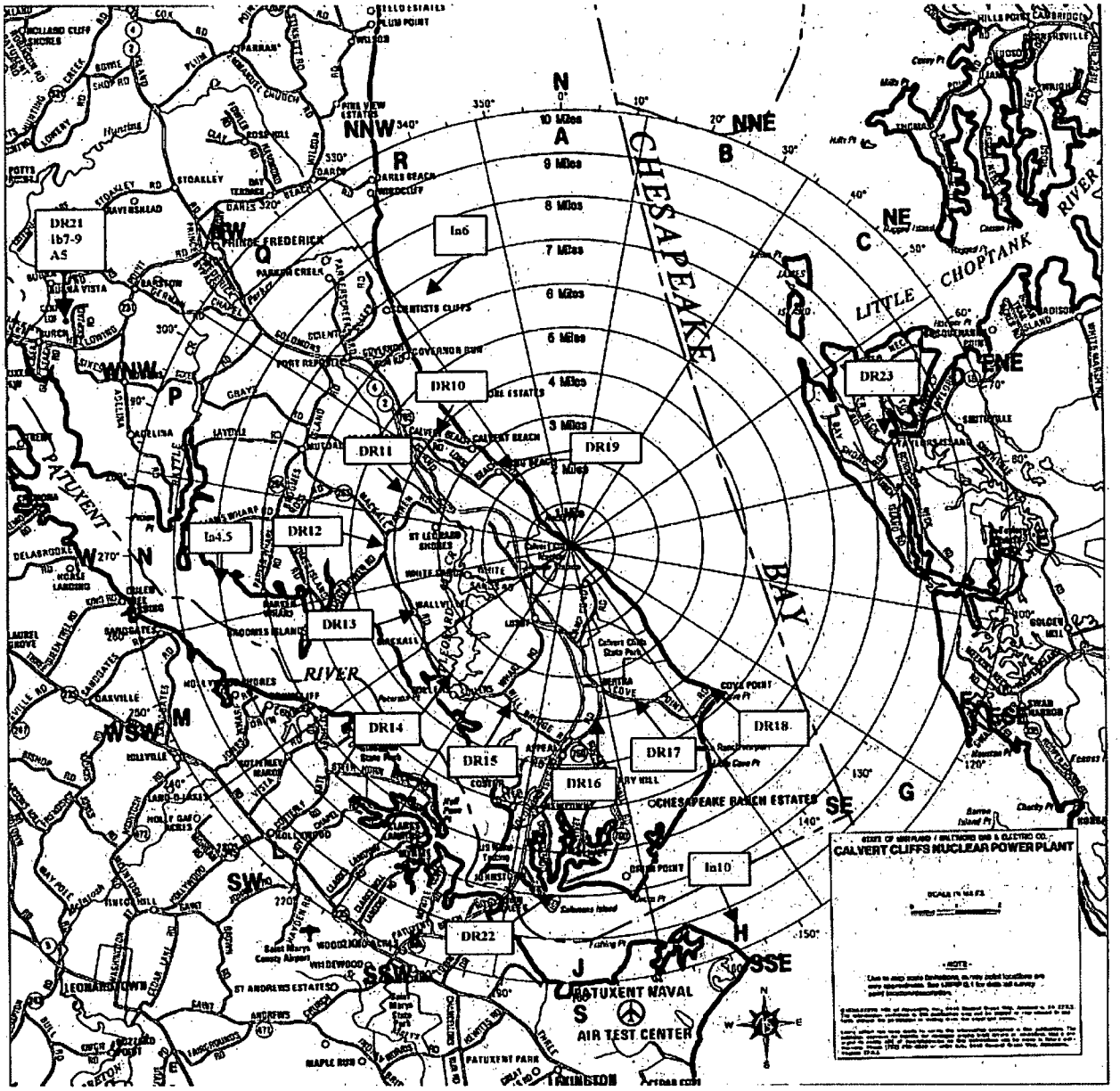


TABLE A-2
Locations of Environmental Sampling Stations for the Independent Spent Fuel Storage Installation at Calvert Cliffs

Station	Description	Distance[1] (KM)	Direction[1] (Sector)
Air Particulate			
A1[2]	On Site before Entrance to Camp Conoy	0.3	ESE
SFA1	Meteorological Station	0.3	NW
SFA2	CCNPP Visitor's Center	0.8	N
SFA3	NNW of ISFSI	0.1	NNW
SFA4	SSE of ISFSI	0.1	SSE
Direct Radiation			
SFDR1	SW of ISFSI	0.2	SW
SFDR2	NNW of ISFSI	0.2	NNW
SFDR3	North of ISFSI	0.1	N
SFDR4	NE of ISFSI	0.1	NE
SFDR5	East of ISFSI	0.1	E
SFDR6	ESE of ISFSI	0.1	ESE
SFDR7	CCNPP Visitor's Center	0.8	N
SFDR8	NNW of ISFSI	0.1	NNW
SFDR9	SSE of ISFSI	0.1	SSE
SFDR10	NW of ISFSI	0.1	NW
SFDR11	WNW of ISFSI	0.1	WNW
SFDR12	WSW of ISFSI	0.04	WSW
SFDR13	South of ISFSI	0.1	S
SFDR14	SE of ISFSI	0.1	SE
SFDR15	ENE of ISFSI	0.1	ENE
SFDR16	SSW of ISFSI	0.04	SSW
SFDR17	NNE of ISFSI	0.1	NNE
SFDR18	West of ISFSI	0.04	W
DR7[2]	On Site before Entrance to Camp Conoy	0.3	ESE
DR30	Meteorological Station	0.3	NW
Vegetation			
SFb1	Meteorological Station	0.3	NW
SFb2	CCNPP Visitor's Center	0.8	N
SFb3	NNW of ISFSI	0.1	NNW
SFb4	SSE of ISFSI	0.1	SSE
SFb5	On Site before Entrance to Camp Conoy	0.3	ESE
Soil			
SFS1	Meteorological Station	0.3	NW
SFS2	CCNPP Visitor's Center	0.8	N
SFS3	NNW of ISFSI	0.1	NNW
SFS4	SSE of ISFSI	0.1	SSE
SFS5	On Site before Entrance to Camp Conoy	0.3	ESE

[1] Distance and direction from the central point of the ISFSI.
[2] Common to both REMP and ISFSI monitoring program.

FIGURE A-4
Independent Spent Fuel Storage Installation Sampling Locations

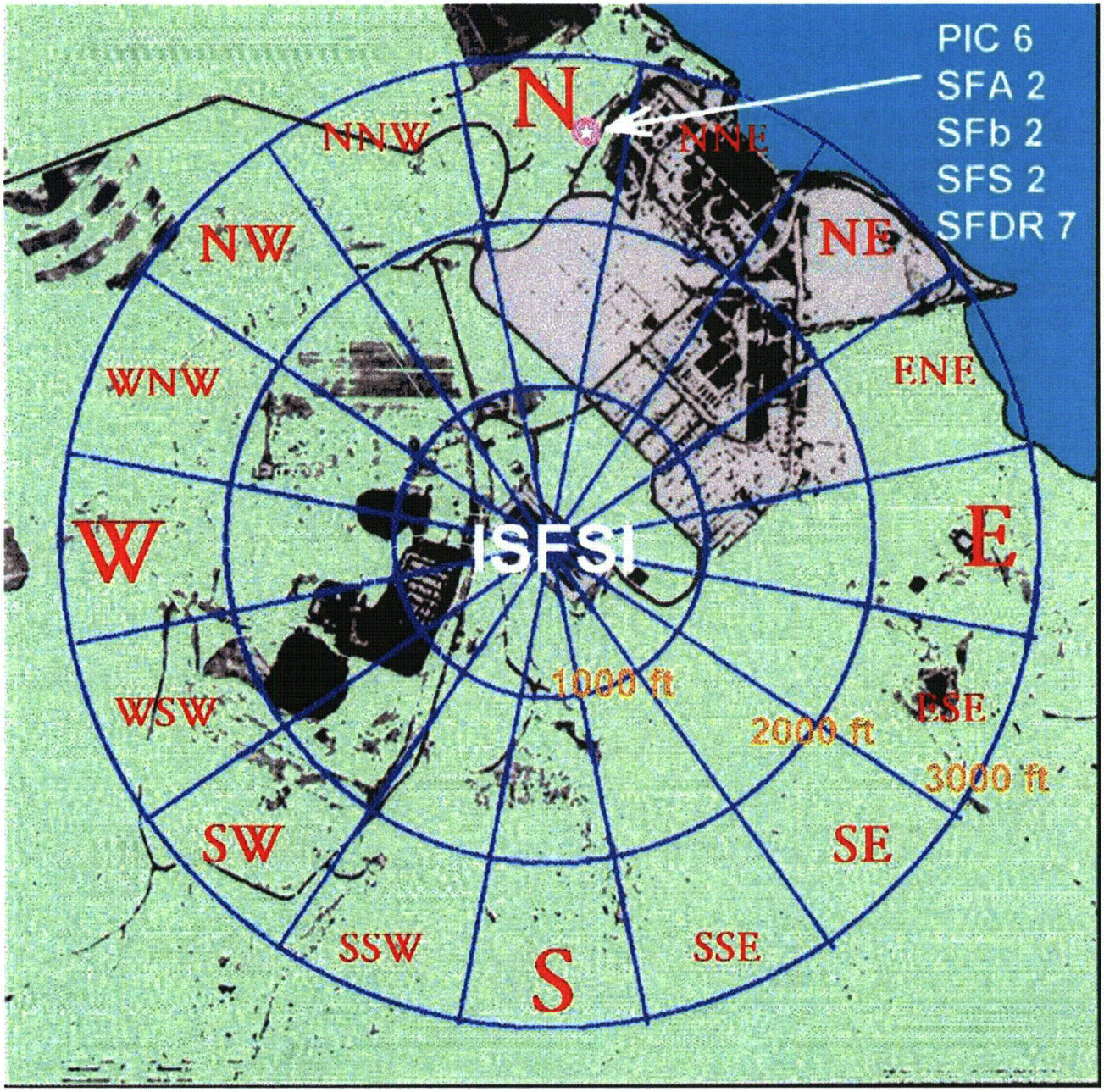
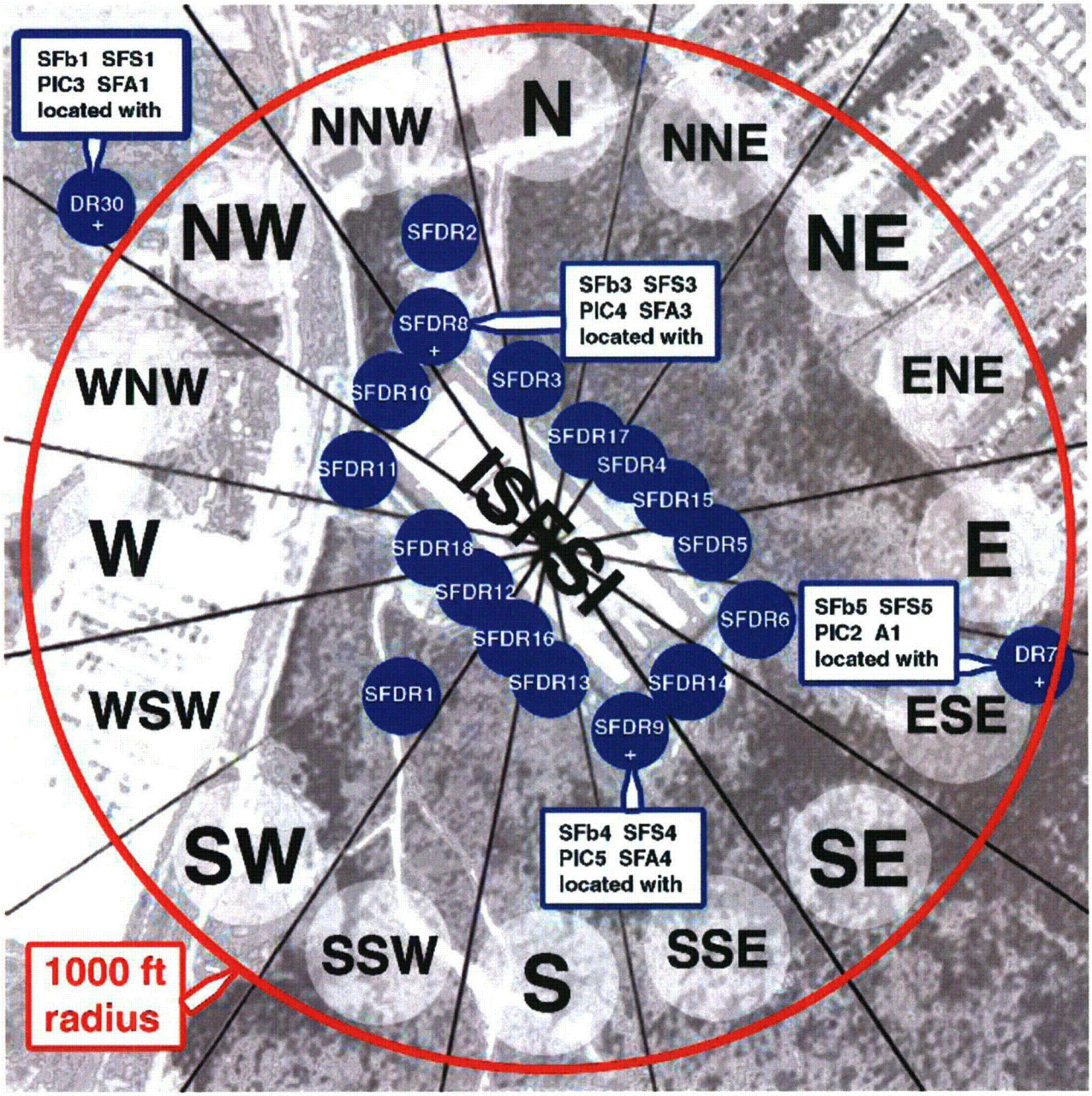


FIGURE A-5
Enlarged Map of the Independent Spent Fuel Storage Installation Sampling Locations



APPENDIX B
Analysis Results for the REMP and the ISFSI

Appendix B is a presentation of the analytical results for the CCNPP and the ISFSI radiological environmental monitoring programs.

Table B-1

Concentration of Tritium and Gamma Emitters in Bay Water
(Results in units of pCi/L ±2σ)

Sample Code	Sample Date	H-3[1]	Gamma Emitters
Wa1	1/31/2007		*
Intake Vicinity	2/28/2007		*
	3/29/2007	<335	*
	4/27/2007		*
	5/31/2007		*
	7/1/2007	<357	*
	7/31/2007		*
	8/31/2007		*
	9/28/2007	<357	*
	10/31/2007		*
	11/30/2007		*
	12/31/2007	<376	*
Wa2	1/31/2007		*
Discharge Vicinity	2/28/2007		*
	3/29/2007	<335	*
	4/27/2007		*
	5/31/2007		*
	7/1/2007	<357	*
	7/31/2007		*
	8/31/2007		*
	9/28/2007	<357	*
	10/31/2007		*
	11/30/2007		*
	12/31/2007	<494	*

[1] Quarterly composites of monthly samples
* All Non-Natural Gamma Emitters <MDA

Table B-2

Concentration of Gamma Emitters in the Flesh of Edible Fish
(Results in units of pCi/kg (wet) ±2σ)

SAMPLE CODE	Sample Date	Sample Type	Cs-137	Gamma Emitters
Ia1 Discharge Area	8/22/2007	Bluefish	7 ± 9	*
Ia2 Discharge Area	8/22/2007	Spot	[2]	*
Ia4[1] Patuxent River	9/7/2007	Bluefish	[2]	*
Ia5[1] Patuxent River	9/9/2007	Spot	20 ± 10	*

[1] Control Location
[2] This isotope < MDA
* All Non-Natural Gamma Emitters <MDA

Table B-3

Concentration of Gamma Emitters in Oyster Samples
(Results in units of pCi/kg (wet) ±2σ)

SAMPLE CODE	Sample Date	Gamma Emitters
Ia3	3/28/2007	*
Camp Conoy	6/27/2007	*
	8/22/2007	*
	10/31/2007	*
Ia6[1]	3/28/2007	*
Kenwood Beach	6/27/2007	*
	8/22/2007	*
	10/31/2007	*

[1] Control Location
* All Non-Natural Gamma Emitters <MDA

Table B-4

Concentration of Gamma Emitters in Shoreline Sediment
(Results in units of pCi/kg (dry) ±2σ)

SAMPLE CODE	Sample Date	Gamma Emitters
Wb1	5/31/2007	*
Shoreline at Barge Rd.	12/18/2007	*

* All Non-Natural Gamma Emitters <MDA

Table B-5

Concentration of Iodine-131 in Filtered Air
(Results in units of 10^{-3} pCi/m^3 ±2σ)

Start Date	Stop Date	A1 Entrance to Camp Conoy	A2 Camp Conoy Siren	A3 Bay Breeze Rd	A4 Route 765 at Lusby	A5[1] EOF
1/1/2007	1/8/2007	*	*	*	*	*
1/8/2007	1/15/2007	*	*	*	*	*
1/15/2007	1/22/2007	*	*	*	*	*
1/22/2007	1/29/2007	*	*	*	*	*
1/29/2007	2/5/2007	*	*	*	*	*
2/5/2007	2/12/2007	*	*	*	*	[2]
2/12/2007	2/19/2007	*	*	*	*	*
2/19/2007	2/26/2007	*	*	*	*	*
2/26/2007	3/5/2007	*	*	*	*	*
3/5/2007	3/12/2007	*	*	*	*	*
3/12/2007	3/19/2007	*	*	*	*	*
3/19/2007	3/26/2007	*	*	*	*	*
3/26/2007	4/2/2007	*	*	*	*	*
4/2/2007	4/9/2007	*	*	*	*	*
4/9/2007	4/16/2007	*	*	*	*	*
4/16/2007	4/23/2007	*	*	*	[2]	*
4/23/2007	4/30/2007	*	*	*	[2]	*
4/30/2007	5/7/2007	*	*	*	*	*
5/7/2007	5/14/2007	*	*	*	*	[2]
5/14/2007	5/21/2007	*	*	*	*	*
5/21/2007	5/28/2007	*	*	*	*	*
5/28/2007	6/4/2007	*	*	*	*	*
6/4/2007	6/11/2007	*	[2]	*	*	*
6/11/2007	6/18/2007	*	*	*	*	*
6/18/2007	6/25/2007	*	*	*	*	*
6/25/2007	7/2/2007	*	*	*	*	*

[1] Control Location
[2] Sampler Malfunction; Loss of Data
* All Non-Natural Gamma Emitters <MDA

Table B-5 Continued

Concentration of Iodine-131 in Filtered Air
(Results in units of 10^{-3} pCi/m^3 $\pm 2\sigma$)

Start Date	Stop Date	A1 Entrance to Camp Conoy	A2 Camp Conoy Siren	A3 Bay Breeze Rd	A4 Route 765 at Lusby	A5[1] EOF
7/2/2007	7/9/2007	*	*	*	*	*
7/9/2007	7/16/2007	*	*	*	*	*
7/16/2007	7/23/2007	*	*	*	*	*
7/23/2007	7/30/2007	*	*	*	*	*
7/30/2007	8/6/2007	*	*	*	*	*
8/6/2007	8/13/2007	*	*	*	*	*
8/13/2007	8/20/2007	*	*	*	*	*
8/20/2007	8/27/2007	*	*	*	*	*
8/27/2007	9/3/2007	*	*	*	*	*
9/3/2007	9/10/2007	*	*	*	*	*
9/10/2007	9/17/2007	*	*	*	*	*
9/17/2007	9/24/2007	*	*	*	*	*
9/24/2007	10/1/2007	*	*	*	*	*
10/1/2007	10/8/2007	*	*	*	*	*
10/8/2007	10/15/2007	*	*	*	*	*
10/15/2007	10/22/2007	*	*	*	*	*
10/22/2007	10/29/2007	*	*	*	*	*
10/29/2007	11/5/2007	*	*	*	*	*
11/5/2007	11/12/2007	*	*	*	*	*
11/12/2007	11/19/2007	*	*	*	*	*
11/19/2007	11/26/2007	*	*	*	*	*
11/26/2007	12/3/2007	*	*	*	*	*
12/3/2007	12/10/2007	*	*	*	*	*
12/10/2007	12/17/2007	*	*	*	*	*
12/17/2007	12/24/2007	*	*	*	*	*
12/24/2007	12/31/2007	*	*	*	*	*

[1] Control Location
* All Non-Natural Gamma Emitters <MDA

Table B-6

Concentration of Beta Emitters in Air Particulates
(Results in units of 10^{-2} pCi/m^3 ±2σ)

Start Date	Stop Date	A1 Entrance to Camp Conoy	A2 Camp Conoy Siren	A3 Bay Breeze Rd	A4 Route 765 at Lusby	A5[1] EOF
1/1/2007	1/8/2007	0.7 +/- 0.1	1.0 +/- 0.2	0.7 +/- 0.1	1.0 +/- 0.2	0.9 +/- 0.1
1/8/2007	1/15/2007	1.8 +/- 0.2	1.9 +/- 0.2	1.4 +/- 0.2	1.4 +/- 0.2	1.4 +/- 0.2
1/15/2007	1/22/2007	1.0 +/- 0.2	1.5 +/- 0.2	1.2 +/- 0.2	1.2 +/- 0.2	0.9 +/- 0.1
1/22/2007	1/29/2007	1.8 +/- 0.2	1.9 +/- 0.3	2.2 +/- 0.2	1.9 +/- 0.2	1.5 +/- 0.2
1/29/2007	2/5/2007	2.5 +/- 0.2	2.5 +/- 0.2	2.4 +/- 0.2	2.7 +/- 0.2	2.3 +/- 0.2
2/5/2007	2/12/2007	2.0 +/- 0.2	1.7 +/- 0.2	2.3 +/- 0.2	2.2 +/- 0.2	[2]
2/12/2007	2/19/2007	2.0 +/- 0.2	2.4 +/- 0.2	2.2 +/- 0.2	2.3 +/- 0.2	1.6 +/- 0.2
2/19/2007	2/26/2007	1.5 +/- 0.2	1.8 +/- 0.2	2.0 +/- 0.2	1.9 +/- 0.2	1.3 +/- 0.2
2/26/2007	3/5/2007	1.1 +/- 0.2	1.4 +/- 0.2	1.2 +/- 0.2	1.5 +/- 0.2	1.0 +/- 0.1
3/5/2007	3/12/2007	2.3 +/- 0.2	2.3 +/- 0.2	2.2 +/- 0.2	2.5 +/- 0.2	2.0 +/- 0.2
3/12/2007	3/19/2007	1.4 +/- 0.2	1.6 +/- 0.2	1.9 +/- 0.2	2.0 +/- 0.2	1.4 +/- 0.2
3/19/2007	3/26/2007	1.7 +/- 0.2	2.2 +/- 0.2	2.1 +/- 0.2	2.8 +/- 0.3	1.5 +/- 0.2
3/26/2007	4/2/2007	1.9 +/- 0.2	1.8 +/- 0.2	1.8 +/- 0.2	2.6 +/- 0.3	1.5 +/- 0.2
4/2/2007	4/9/2007	1.4 +/- 0.2	1.3 +/- 0.2	1.5 +/- 0.2	2.2 +/- 0.3	1.4 +/- 0.2
4/9/2007	4/16/2007	1.0 +/- 0.2	1.0 +/- 0.2	1.4 +/- 0.2	1.3 +/- 0.2	2.1 +/- 0.3
4/16/2007	4/23/2007	1.4 +/- 0.2	1.1 +/- 0.2	1.1 +/- 0.2	[2]	3.0 +/- 0.4
4/23/2007	4/30/2007	1.6 +/- 0.2	1.5 +/- 0.2	1.6 +/- 0.2	[2]	4.9 +/- 0.5
4/30/2007	5/7/2007	1.5 +/- 0.2	1.2 +/- 0.1	1.4 +/- 0.2	0.9 +/- 0.2	3.1 +/- 0.3
5/7/2007	5/14/2007	0.9 +/- 0.2	0.8 +/- 0.2	0.9 +/- 0.2	0.7 +/- 0.2	[2]
5/14/2007	5/21/2007	1.4 +/- 0.2	1.1 +/- 0.2	2.7 +/- 0.4	1.5 +/- 0.2	2.5 +/- 0.3
5/21/2007	5/28/2007	2.5 +/- 0.3	1.7 +/- 0.2	1.6 +/- 0.2	2.4 +/- 0.3	2.1 +/- 0.2
5/28/2007	6/4/2007	2.0 +/- 0.2	1.8 +/- 0.2	1.8 +/- 0.2	2.0 +/- 0.2	2.0 +/- 0.2
6/4/2007	6/11/2007	1.7 +/- 0.2	[2]	1.2 +/- 0.2	1.6 +/- 0.2	0.8 +/- 0.1
6/11/2007	6/18/2007	1.6 +/- 0.2	0.9 +/- 0.1	1.0 +/- 0.1	1.3 +/- 0.2	1.3 +/- 0.2
6/18/2007	6/25/2007	2.3 +/- 0.2	1.6 +/- 0.2	1.4 +/- 0.2	1.9 +/- 0.2	1.8 +/- 0.2
6/25/2007	7/2/2007	1.7 +/- 0.2	1.2 +/- 0.2	1.0 +/- 0.2	1.6 +/- 0.2	1.7 +/- 0.2

[1] Control Location
[2] Sampler Malfunction; Loss of Data

Table B-6 Continued

Concentration of Beta Emitters in Air Particulates
(Results in units of 10^{-2} pCi/m^3 ±2σ)

Start Date	Stop Date	A1 Entrance to Camp Conoy	A2 Camp Conoy Siren	A3 Bay Breeze Rd	A4 Route 765 at Lusby	A5[1] EOF
7/2/2007	7/9/2007	1.8 +/- 0.2	1.3 +/- 0.2	1.3 +/- 0.2	1.8 +/- 0.2	1.7 +/- 0.2
7/9/2007	7/16/2007	2.6 +/- 0.3	2.1 +/- 0.2	1.9 +/- 0.2	2.3 +/- 0.2	2.4 +/- 0.2
7/16/2007	7/23/2007	2.3 +/- 0.3	1.9 +/- 0.2	2.1 +/- 0.2	2.0 +/- 0.2	1.6 +/- 0.2
7/23/2007	7/30/2007	1.7 +/- 0.2	1.3 +/- 0.2	1.3 +/- 0.2	1.6 +/- 0.2	1.9 +/- 0.2
7/30/2007	8/6/2007	2.8 +/- 0.3	2.2 +/- 0.2	2.6 +/- 0.2	2.0 +/- 0.2	2.7 +/- 0.2
8/6/2007	8/13/2007	3.0 +/- 0.3	1.8 +/- 0.2	2.3 +/- 0.2	2.6 +/- 0.2	2.4 +/- 0.2
8/13/2007	8/20/2007	2.5 +/- 0.3	2.1 +/- 0.2	2.0 +/- 0.2	2.3 +/- 0.2	2.2 +/- 0.2
8/20/2007	8/27/2007	1.5 +/- 0.2	1.0 +/- 0.2	1.2 +/- 0.2	1.3 +/- 0.2	1.2 +/- 0.2
8/27/2007	9/3/2007	2.5 +/- 0.3	1.9 +/- 0.2	2.4 +/- 0.2	2.3 +/- 0.2	2.3 +/- 0.2
9/3/2007	9/10/2007	2.7 +/- 0.3	2.0 +/- 0.2	1.9 +/- 0.2	2.0 +/- 0.2	2.2 +/- 0.3
9/10/2007	9/17/2007	2.7 +/- 0.3	1.6 +/- 0.2	1.9 +/- 0.2	2.0 +/- 0.2	2.8 +/- 0.2
9/17/2007	9/24/2007	3.1 +/- 0.3	1.7 +/- 0.3	1.8 +/- 0.3	2.0 +/- 0.3	1.7 +/- 0.3
9/24/2007	10/1/2007	3.7 +/- 0.3	2.8 +/- 0.2	4.1 +/- 0.3	3.0 +/- 0.2	3.5 +/- 0.3
10/1/2007	10/8/2007	3.1 +/- 0.3	2.0 +/- 0.2	3.3 +/- 0.3	2.1 +/- 0.2	2.2 +/- 0.2
10/8/2007	10/15/2007	2.3 +/- 0.3	2.0 +/- 0.2	2.1 +/- 0.3	2.1 +/- 0.2	2.0 +/- 0.3
10/15/2007	10/22/2007	2.7 +/- 0.2	2.5 +/- 0.2	2.2 +/- 0.2	2.9 +/- 0.2	3.1 +/- 0.3
10/22/2007	10/29/2007	1.5 +/- 0.2	1.6 +/- 0.2	1.7 +/- 0.2	1.5 +/- 0.2	1.8 +/- 0.2
10/29/2007	11/5/2007	1.9 +/- 0.2	2.0 +/- 0.2	1.7 +/- 0.2	2.1 +/- 0.2	2.3 +/- 0.2
11/5/2007	11/12/2007	1.9 +/- 0.2	1.8 +/- 0.2	1.8 +/- 0.2	2.2 +/- 0.2	2.3 +/- 0.2
11/12/2007	11/19/2007	1.7 +/- 0.2	1.9 +/- 0.2	1.8 +/- 0.2	4.1 +/- 0.4	2.0 +/- 0.2
11/19/2007	11/26/2007	2.0 +/- 0.2	1.9 +/- 0.2	1.7 +/- 0.2	3.6 +/- 0.4	2.1 +/- 0.3
11/26/2007	12/3/2007	2.7 +/- 0.2	2.5 +/- 0.2	2.4 +/- 0.2	5.4 +/- 0.5	2.8 +/- 0.2
12/3/2007	12/10/2007	1.9 +/- 0.2	1.5 +/- 0.2	1.7 +/- 0.2	1.8 +/- 0.2	1.9 +/- 0.2
12/10/2007	12/17/2007	1.5 +/- 0.2	1.5 +/- 0.2	1.4 +/- 0.2	1.4 +/- 0.2	1.6 +/- 0.2
12/17/2007	12/24/2007	2.7 +/- 0.2	2.4 +/- 0.2	2.3 +/- 0.2	2.8 +/- 0.3	2.5 +/- 0.2
12/24/2007	12/31/2007	2.1 +/- 0.2	1.3 +/- 0.2	1.8 +/- 0.2	2.3 +/- 0.2	2.2 +/- 0.2

[1] Control Location
[2] Sampler Malfunction; Loss of Data

Table B-6 Continued

Concentration of Beta Emitters in Air Particulates
(Results in units of 10^{-2} pCi/m^3 ±2σ)

Start Date	Stop Date	SFA1 MET Station	SFA2[1] Visitors Center	SFA3 NNW of ISFSI	SFA4 SSE of ISFSI
1/1/2007	1/8/2007	0.8 +/- 0.1	1.0 +/- 0.1	1.1 +/- 0.1	1.0 +/- 0.2
1/8/2007	1/15/2007	1.9 +/- 0.2	1.4 +/- 0.2	1.6 +/- 0.2	1.9 +/- 0.2
1/15/2007	1/22/2007	1.0 +/- 0.2	0.9 +/- 0.2	0.8 +/- 0.1	1.2 +/- 0.2
1/22/2007	1/29/2007	2.0 +/- 0.2	1.9 +/- 0.2	1.9 +/- 0.2	2.1 +/- 0.2
1/29/2007	2/5/2007	2.6 +/- 0.2	2.6 +/- 0.2	2.4 +/- 0.2	2.7 +/- 0.2
2/5/2007	2/12/2007	2.1 +/- 0.2	2.0 +/- 0.2	2.0 +/- 0.2	2.3 +/- 0.2
2/12/2007	2/19/2007	2.2 +/- 0.2	2.0 +/- 0.2	1.7 +/- 0.2	2.2 +/- 0.2
2/19/2007	2/26/2007	1.5 +/- 0.2	1.7 +/- 0.2	1.5 +/- 0.2	1.7 +/- 0.2
2/26/2007	3/5/2007	1.1 +/- 0.1	1.0 +/- 0.1	1.1 +/- 0.1	1.5 +/- 0.2
3/5/2007	3/12/2007	3.5 +/- 0.3	2.1 +/- 0.2	1.9 +/- 0.2	2.8 +/- 0.3
3/12/2007	3/19/2007	2.0 +/- 0.2	1.7 +/- 0.2	1.5 +/- 0.2	[2]
3/19/2007	3/26/2007	1.7 +/- 0.2	1.8 +/- 0.2	[3]	1.9 +/- 0.2
3/26/2007	4/2/2007	1.8 +/- 0.2	1.5 +/- 0.2	1.2 +/- 0.2	1.5 +/- 0.2
4/2/2007	4/9/2007	1.6 +/- 0.2	1.3 +/- 0.2	1.4 +/- 0.2	1.3 +/- 0.2
4/9/2007	4/16/2007	0.8 +/- 0.2	0.8 +/- 0.2	0.8 +/- 0.1	1.2 +/- 0.2
4/16/2007	4/23/2007	1.0 +/- 0.2	0.8 +/- 0.2	0.9 +/- 0.1	1.2 +/- 0.2
4/23/2007	4/30/2007	1.2 +/- 0.2	1.2 +/- 0.2	1.2 +/- 0.2	1.3 +/- 0.2
4/30/2007	5/7/2007	1.3 +/- 0.2	1.2 +/- 0.1	1.0 +/- 0.1	1.1 +/- 0.1
5/7/2007	5/14/2007	0.7 +/- 0.2	4.4 +/- 0.3	0.5 +/- 0.2	0.8 +/- 0.2
5/14/2007	5/21/2007	1.2 +/- 0.2	1.1 +/- 0.2	1.2 +/- 0.1	1.2 +/- 0.1
5/21/2007	5/28/2007	2.0 +/- 0.2	2.0 +/- 0.2	1.8 +/- 0.2	2.1 +/- 0.2
5/28/2007	6/4/2007	1.7 +/- 0.2	1.8 +/- 0.2	1.7 +/- 0.2	1.9 +/- 0.2
6/4/2007	6/11/2007	1.3 +/- 0.2	1.5 +/- 0.2	1.4 +/- 0.2	1.3 +/- 0.2
6/11/2007	6/18/2007	1.2 +/- 0.2	1.1 +/- 0.2	0.9 +/- 0.1	1.0 +/- 0.2
6/18/2007	6/25/2007	1.6 +/- 0.2	1.7 +/- 0.2	1.5 +/- 0.2	1.6 +/- 0.2
6/25/2007	7/2/2007	1.3 +/- 0.2	1.2 +/- 0.2	1.9 +/- 0.2	1.5 +/- 0.2

[1] Control Location
[2] Sampler Malfunction; Loss of Data
[3] Operator Error; Loss of Data

Table B-6 Continued

Concentration of Beta Emitters in Air Particulates
(Results in units of 10^{-2} pCi/m^3 ±2σ)

Start Date	Stop Date	SFA1 MET Station	SFA2[1] Visitors Center	SFA3 NNW of ISFSI	SFA4 SSE of ISFSI
7/2/2007	7/9/2007	1.7 +/- 0.2	1.8 +/- 0.2	1.8 +/- 0.2	1.9 +/- 0.2
7/9/2007	7/16/2007	2.4 +/- 0.2	2.3 +/- 0.2	2.2 +/- 0.2	2.5 +/- 0.2
7/16/2007	7/23/2007	1.6 +/- 0.2	1.5 +/- 0.2	1.9 +/- 0.2	1.7 +/- 0.2
7/23/2007	7/30/2007	1.7 +/- 0.2	1.5 +/- 0.2	1.7 +/- 0.2	1.7 +/- 0.2
7/30/2007	8/6/2007	2.7 +/- 0.2	2.8 +/- 0.2	2.3 +/- 0.2	2.9 +/- 0.2
8/6/2007	8/13/2007	2.4 +/- 0.2	2.5 +/- 0.2	2.6 +/- 0.2	2.2 +/- 0.2
8/13/2007	8/20/2007	2.3 +/- 0.3	2.1 +/- 0.2	2.1 +/- 0.2	2.3 +/- 0.2
8/20/2007	8/27/2007	1.2 +/- 0.2	1.5 +/- 0.2	1.2 +/- 0.2	1.2 +/- 0.2
8/27/2007	9/3/2007	2.0 +/- 0.2	2.3 +/- 0.2	2.2 +/- 0.2	2.2 +/- 0.2
9/3/2007	9/10/2007	2.3 +/- 0.3	2.4 +/- 0.3	2.2 +/- 0.2	2.1 +/- 0.2
9/10/2007	9/17/2007	1.7 +/- 0.2	1.8 +/- 0.2	1.5 +/- 0.2	1.6 +/- 0.2
9/17/2007	9/24/2007	2.0 +/- 0.3	1.6 +/- 0.3	1.9 +/- 0.2	1.7 +/- 0.3
9/24/2007	10/1/2007	3.5 +/- 0.3	3.3 +/- 0.3	3.1 +/- 0.2	3.7 +/- 0.3
10/1/2007	10/8/2007	2.3 +/- 0.2	2.5 +/- 0.2	2.3 +/- 0.2	2.3 +/- 0.2
10/8/2007	10/15/2007	2.0 +/- 0.3	2.2 +/- 0.3	2.3 +/- 0.3	2.1 +/- 0.2
10/15/2007	10/22/2007	2.9 +/- 0.3	2.9 +/- 0.3	2.7 +/- 0.3	2.9 +/- 0.3
10/22/2007	10/29/2007	1.5 +/- 0.2	1.8 +/- 0.2	1.7 +/- 0.2	1.6 +/- 0.2
10/29/2007	11/5/2007	2.3 +/- 0.2	2.2 +/- 0.2	2.4 +/- 0.2	2.4 +/- 0.2
11/5/2007	11/12/2007	2.8 +/- 0.2	2.1 +/- 0.2	2.4 +/- 0.2	2.4 +/- 0.2
11/12/2007	11/19/2007	2.5 +/- 0.3	2.2 +/- 0.2	2.8 +/- 0.2	2.0 +/- 0.2
11/19/2007	11/26/2007	5.1 +/- 0.5	2.4 +/- 0.3	2.4 +/- 0.2	2.2 +/- 0.2
11/26/2007	12/3/2007	5.6 +/- 0.4	3.0 +/- 0.2	3.1 +/- 0.2	2.8 +/- 0.2
12/3/2007	12/10/2007	1.7 +/- 0.2	2.0 +/- 0.2	2.0 +/- 0.2	1.9 +/- 0.2
12/10/2007	12/17/2007	1.3 +/- 0.2	2.0 +/- 0.2	1.9 +/- 0.2	1.8 +/- 0.2
12/17/2007	12/24/2007	2.4 +/- 0.2	3.2 +/- 0.3	2.6 +/- 0.2	2.3 +/- 0.2
12/24/2007	12/31/2007	2.5 +/- 0.2	2.3 +/- 0.2	1.8 +/- 0.2	2.0 +/- 0.2

[1] Control Location

Table B-7

Concentration of Gamma Emitters in Air Particulates
(Results in units of 10^{-3} pCi/m^3 ±2σ)

Sample Date	A1 Entrance to Camp Conoy	A2 Camp Conoy Siren	A3 Bay Breeze Rd	A4 Route 765 at Lusby	A5[1] EOF
1/15/2007	*	*	*	*	*
2/15/2007	*	*	*	*	*
3/15/2007	*	*	*	*	*
4/15/2007	*	*	*	*	*
5/15/2007	*	*	*	*	*
7/15/2007	*	*	*	*	*
8/15/2007	*	*	*	*	*
9/15/2007	*	*	*	*	*
10/15/2007	*	*	*	*	*
11/15/2007	*	*	*	*	*
12/15/2007	*	*	*	*	*

[1] Control Location
* All Non-Natural Gamma Emitters <MDA

Sample Date	SFA1 MET Station	SFA2[1] Visitors Center	SFA3 NNW of ISFSI	SFA4 SSE of ISFSI
1/15/2007	*	*	*	*
2/15/2007	*	*	*	*
3/15/2007	*	*	*	*
4/15/2007	*	*	*	*
5/15/2007	*	*	*	*
7/15/2007	*	*	*	*
9/15/2007	*	*	*	*
10/15/2007	*	*	*	*
11/15/2007	*	*	*	*
12/15/2007	*	*	*	*

[1] Control Location
* All Non-Natural Gamma Emitters <MDA

Table B-8a

Concentration of Gamma Emitters in Vegetation Samples
(Results in units of pCi/kg (wet) ±2σ)

SAMPLE CODE	Sample Date	Sample Type	Cs-137	Gamma Emitters
Ib1	6/25/2007	Squash	[1]	*
Bay Breeze Rd	7/23/2007	Cabbage	[1]	*
	9/30/2007	Squash	25 ± 20	*
Ib2	6/28/2007	Cabbage	[1]	*
Bay Breeze Rd	7/23/2007	Collards	[1]	*
	9/30/2007	Tree Leaves	[1]	*
Ib3	6/28/2007	Brussels sprouts	[1]	*
Bay Breeze Rd	7/23/2007	Broccoli	[1]	*
	9/30/2007	Tree Leaves	[1]	*
Ib4	6/25/2007	Squash	[1]	*
Camp Conoy	7/23/2007	Cabbage	[1]	*
Entrance	9/30/2007	Cauliflower	[1]	*
Ib5	6/28/2007	Brussels sprouts	[1]	*
Camp Conoy	7/23/2007	Collards	[1]	*
Entrance	9/30/2007	Tree Leaves	112 ± 23	*
Ib6	6/28/2007	Collards	[1]	*
Camp Conoy	7/23/2007	Cauliflower	[1]	*
Entrance	9/30/2007	Collards	[1]	*
Ib7[2]	6/25/2007	Squash	[1]	*
EOF	7/23/2007	Cabbage	[1]	*
	9/30/2007	Cauliflower	[1]	*
Ib8[2]	6/28/2007	Tree Leaves	[1]	*
EOF	7/23/2007	Cauliflower	[1]	*
	9/30/2007	Cabbage	[1]	*
Ib9[2]	6/28/2007	Tree Leaves	[1]	*
EOF	7/23/2007	Broccoli	[1]	*
	9/30/2007	Collards	[1]	*

[1] This isotope <MDA
[2] Control Location
* All Non-Natural Gamma Emitters <MDA

Table B-8b

Concentration of Gamma Emitters in Vegetation from Locations around the ISFSI
(Results in units of pCi/kg (wet) ±2σ)

SAMPLE CODE	Sample Date	Cs-137	Gamma Emitters
SFb1	3/12/2007	[1]	*
MET Station	5/31/2007	[1]	*
	9/23/2007	19 ± 16	*
	12/18/2007	[1]	*
SFb2 [2]	3/12/2007	[1]	*
Visitor's Center	5/31/2007	[1]	*
	9/23/2007	[1]	*
	12/18/2007	[1]	*
SFb3	3/12/2007	[1]	*
NNW of ISFSI	5/31/2007	[1]	*
	9/23/2007	[1]	*
	12/18/2007	27 ± 24	*
SFb4	3/12/2007	[1]	*
SSE of ISFSI	5/31/2007	[1]	*
	9/23/2007	[1]	*
	12/18/2007	[1]	*
SFb5	3/12/2007	[1]	*
On Site before Entrance	5/31/2007	15 ± 12	*
to Camp Conoy	9/23/2007	43 ± 26	*
	12/18/2007	[1]	*

[1] This isotope <MDA
[2] Control Location
* All Non-Natural Gamma Emitters <MDA

Table B-9

Concentration of Gamma Emitters in Soil Samples from Locations around the ISFSI (Results in units of pCi/kg (dry) ±2σ)

SAMPLE CODE	Sample Date	Cs-137	Gamma Emitters
SFS1	3/12/2007	[1]	*
MET station	5/31/2007	[1]	*
	9/23/2007	[1]	*
	12/18/2007	[1]	*
SFS2 [2]	3/12/2007	153 ± 53	*
Visitors Center	5/31/2007	143 ± 42	*
	9/23/2007	[1]	*
	12/18/2007	103 ± 39	*
SFS3	3/12/2007	727 ± 97	*
NNW of ISFSI	5/31/2007	563 ± 103	*
	9/23/2007	637 ± 110	*
	12/18/2007	502 ± 91	*
SFS4	3/12/2007	[1]	*
SSE of ISFSI	5/31/2007	[1]	*
	9/23/2007	515 ± 89	*
	12/18/2007	[1]	*
SFS5	3/12/2007	743 ± 133	*
Entrance to Camp	5/31/2007	165 ± 50	*
Conoy	9/23/2007	413 ± 56	*
	12/18/2007	439 ± 71	*

[1] This isotope <MDA
[2] Control Location
* All Non-Natural Gamma Emitters <MDA

Table B-10
Typical MDA Ranges for Gamma Spectrometry

Selected Nuclides	Bay Water pCi/l	Fish pCi/kg	Shellfish pCi/kg	Shoreline pCi/kg	Vegetation pCi/kg	Soil pCi/kg	Particulates 10^{-3}pCi/m^3
Na-22	1.6 – 3.8	21 – 29	18 – 30	28 – 29	16 – 37	33 – 95	1.3 – 3.4
Cr-51	12 – 40	160 - 166	118 - 176	208 - 213	14 - 164	203 - 486	13 – 39
Mn-54	1.4 - 3.2	16 – 20	15 – 22	26 – 30	13 – 28	32 – 81	1.2 – 6.2
Co-58	1.5 - 4.0	20 – 23	16 - 26	28 – 32	13 – 26	28 – 79	1.4 – 3.4
Fe-59	3.5 – 11	53 – 74	36 – 65	60 – 77	28 – 69	65 - 174	3.7 – 8.2
Co-60	1.5 - 3.7	18 – 25	18 – 26	27 – 39	15 – 35	23 - 97	1.3 - 3.3
Zn-65	3.3 – 7.9	46 – 62	36 – 57	69 – 97	32 – 73	67 - 238	3.0 – 6.9
Nb-95	1.7 – 5.8	25 – 31	20 – 35	34 – 40	13 – 27	34 – 93	2.1 – 5.0
Zr-95	2.8 - 6.9	35 – 44	29 – 43	45 – 62	21 – 48	53 - 141	2.1 – 6.4
Ru-106	12 – 26	131-149	124 - 185	224 - 287	108 - 239	264 - 643	10 - 25
Ag-110m	1.2 – 2.9	15 – 18	15 – 18	21 – 31	11 – 25	29 – 88	0.1 - 2.6
Te-129m	18 – 60	247 - 280	192 - 284	321 - 367	135 - 281	346 - 855	19 – 55
I-131	2.4 - 49	99 - 121	30 – 89	50 – 52	11 – 37	32.7 – 179	[1]
Cs-134	1.2 - 2.6	14 – 17	13 – 19	24 – 34.5	11 – 24	27 – 94	1.0 – 2.4
Cs-137	1.2 – 3.0	15 - 18	15 – 34	25 – 30	1.5 – 26	27 - 72	1.0 – 2.8
Ba-140	7.3 – 66	174 - 208	75 - 184	138 - 150	41 - 109	112 - 430	12 – 84
La-140	3.2 – 29	-	49 – 74	75 – 75	17 – 51	60 – 138	8.7 – 19
Ce-144	7.1 – 12	45 – 49	42 – 49	101 - 111	49 – 86	110 - 245	2.8 – 8.2

[1] The MDA range for I-131 on a Silver Zeolite cartridge is typically 4.16×10^{-3} to 3.40×10^{-2}.

Table B-11
Typical LLDs 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	2.9	22	22	24	2.9	2.9	35	24	2.9
Cr-51	17	88	88	110	12	17	162	110	17
Mn-54	2.4	17	17	18	2.1	2.4	27	18	2.4
Co-58	2.4	16	16	17	2.0	2.4	25	17	2.4
Fe-59	5.2	37	37	38	4.6	5.2	60	38	5.2
Co-60	2.8	22	22	21	2.7	2.8	33	21	2.8
Zn-65	5.6	23	23	54	2.8	5.6	66	54	5.6
Nb-95	2.2	15	15	18	1.9	2.2	25	18	2.2
Zr-95	3.8	27	27	29	3.3	3.8	44	29	3.8
Ru-106	20	135	135	146	17	20	223	146	20
Ag-110m	2.1	14	14	16	1.8	2.1	25	16	2.1
Te-129m	26	149	149	180	20	26	265	180	26
I-131	2.0	11	11	14	1.5*	2.0	20	14	2.0
Cs-134	2.2	15	15	20	1.9	2.2	24	20	2.2
Cs-137	2.3	15	15	17	1.8	2.3	27	17	2.3
Ba-140	7.3	48	48	54	6.1	7.3	80	54	7.3
La-140	4.1	26	26	25	3.4	4.1	41	25	4.1
Ce-144	12	43	43	75	5.5	12	101	75	12

* The LLD for I-131 measured on a Silver Zeolite cartridge is 2.0 x10^{-3} pCi/m^3.

Table B-12

Direct Radiation
(Results in Units of mR/90 days ±2σ)

Site Code	Location	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
DR01	On Site, along Cliffs	12.28 +/- 1.05	14.23 +/- 4.18	12.60 +/- 0.96	14.28 +/- 1.12
DR02	Route 765, Auto Dump	10.48 +/- 0.37	10.40 +/- 0.80	10.15 +/- 0.92	11.29 +/- 0.97
DR03	Route 765, Giovanni's Tavern	10.69 +/- 0.66	10.12 +/- 1.05	10.02 +/- 1.24	11.61 +/- 1.29
DR04	Route 765, across from White Sands Drive.	12.12 +/- 0.77	11.72 +/- 0.94	12.11 +/- 1.18	13.53 +/- 0.37
DR05	Route 765, John's Creek	11.50 +/- 0.83	11.15 +/- 0.97	11.84 +/- 0.93	13.39 +/- 1.34
DR06	Route 765 at Lusby	10.14 +/- 0.51	9.57 +/- 0.58	9.29 +/- 0.65	11.02 +/- 1.06
DR07	Entrance to Camp Conoy	10.86 +/- 1.30	11.13 +/- 0.56	9.61 +/- 0.20	11.26 +/- 1.36
DR08	Camp Conoy Rd at Emergency Siren	14.31 +/- 2.24	14.01 +/- 1.23	14.48 +/- 0.79	16.05 +/- 1.67
DR09	Bay Breeze Rd	10.97 +/- 0.58	10.62 +/- 0.79	10.62 +/- 0.71	12.29 +/- 0.45
DR10	Calvert Beach Rd and Decatur Street	10.58 +/- 0.56	9.91 +/- 0.70	10.02 +/- 0.71	11.60 +/- 1.19
DR11	Dirt road off Mackall & Parren Rd	10.91 +/- 0.95	10.68 +/- 0.45	10.28 +/- 0.76	11.87 +/- 2.32
DR12	Mackall & Bowen Rds	10.37 +/- 1.14	10.49 +/- 0.91	9.76 +/- 0.74	11.79 +/- 1.00

Table B-12 - continued

Direct Radiation
(Results in Units of mR/90 days ±2σ)

Site Code	Location	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
DR13	Mackall Rd, near Wallville	11.27 +/- 1.08	11.46 +/- 0.25	11.06 +/- 1.38	12.99 +/- 0.36
DR14	Rodney Point	12.43 +/- 0.62	12.70 +/- 0.66	12.87 +/- 1.01	14.76 +/- 0.58
DR15	Mill Bridge & Turner Rds	10.99 +/- 0.88	11.37 +/- 1.34	11.34 +/- 0.67	13.41 +/- 0.35
DR16	Across from Appeal School	10.69 +/- 1.45	10.43 +/- 0.57	10.13 +/- 1.07	11.73 +/- 0.40
DR17	Cove Point & Little Cove Point Rds	12.19 +/- 0.94	12.16 +/- 1.07	11.81 +/- 0.86	13.79 +/- 1.15
DR18	Cove Point	9.38 +/- 0.64	9.33 +/- 0.83	8.82 +/- 0.58	10.66 +/- 0.54
DR19	Long Beach	9.95 +/- 0.45	10.63 +/- 0.50	10.59 +/- 0.65	12.36 +/- 1.29
DR20	On site, near shore	12.70 +/- 1.32	12.41 +/- 0.36	12.26 +/- 1.30	14.58 +/- 0.69
DR21[1]	EOF	11.37 +/- 0.78	11.74 +/- 1.21	11.29 +/- 0.40	13.52 +/- 0.67
DR22[1]	Solomons Island	10.49 +/- 0.28	9.84 +/- 1.52	[2]	11.71 +/- 0.88
DR23[1]	Taylors Island	14.07 +/- 0.86	14.79 +/- 1.63	16.10 +/- 1.81	18.22 +/- 0.33
DR30	MET Station	13.38 +/- 0.75	14.97 +/- 1.61	16.04 +/- 1.27	18.13 +/- 2.09
SFDR01	SW of ISFSI	16.21 +/- 1.84	16.47 +/- 1.20	16.33 +/- 1.45	19.34 +/- 1.77
SFDR02	NNW of ISFSI	20.08 +/- 2.53	19.94 +/- 2.04	20.26 +/- 2.07	22.42 +/- 2.03

[1] Control Location
[2] Missing Data

Table B-12 - continued

Direct Radiation
(Results in Units of mR/90 days ±2σ)

Site Code	Location	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
SFDR03	North of ISFSI	37.88 +/- 8.28	36.70 +/- 5.77	34.57 +/- 6.61	39.57 +/- 4.75
SFDR04	NE of ISFSI	31.78 +/- 6.26	30.81 +/- 2.74	29.93 +/- 4.04	31.74 +/- 2.06
SFDR05	East of ISFSI	18.88 +/- 3.04	18.04 +/- 2.43	19.41 +/- 2.09	19.09 +/- 2.05
SFDR06	ESE of ISFSI	17.38 +/- 1.19	15.55 +/- 0.46	15.66 +/- 1.01	17.43 +/- 1.81
SFDR07[1]	Visitor's Center	12.41 +/- 1.17	14.07 +/- 1.40	12.04 +/- 0.55	13.52 +/- 1.51
SFDR08	NNW of ISFSI	31.82 +/- 3.61	28.62 +/- 1.90	30.43 +/- 5.74	34.35 +/- 3.09
SFDR09	SSE of ISFSI	27.89 +/- 2.04	20.30 +/- 1.88	14.16 +/- 1.18	16.29 +/- 0.48
SFDR10	NW of ISFSI	45.34 +/- 10.77	33.54 +/- 5.13	36.90 +/- 9.02	37.17 +/- 1.40
SFDR11	WNW ISFSI	30.98 +/- 2.12	28.16 +/- 4.17	25.08 +/- 2.78	28.22 +/- 1.60
SFDR12	WSW of ISFSI	30.58 +/- 5.38	29.81 +/- 5.78	28.75 +/- 7.06	34.00 +/- 8.56
SFDR13	South of ISFSI	29.64 +/- 4.75	24.84 +/- 5.68	21.95 +/- 5.50	23.44 +/- 4.15
SFDR14	SE of ISFSI	31.62 +/- 3.34	21.47 +/- 2.53	15.26 +/- 2.37	17.90 +/- 3.71
SFDR15	ENE of ISFSI	22.22 +/- 1.26	20.42 +/- 3.30	20.60 +/- 3.21	20.18 +/- 3.71
SFDR16	SSW of ISFSI	32.24 +/- 2.94	31.35 +/- 6.50	32.22 +/- 5.72	32.20 +/- 4.11
SFDR17	NNE of ISFSI	37.44 +/- 5.85	36.39 +/- 3.48	35.48 +/- 4.01	42.20 +/- 3.44
SFDR18	West of ISFSI	39.31 +/- 7.86	42.22 +/- 9.55	41.05 +/- 7.48	45.97 +/- 4.45

[1] Control Location

APPENDIX C
Quality Assurance Program

Appendix C is a summary of Constellation Energy laboratory's quality assurance program. It consists of Table C-1 which is a compilation of the results of the Constellation Energy Laboratory's participation in an intercomparison program with Environmental Resource Associates (ERA) located in Arvada, Colorado and Analytics, Inc. located in Atlanta, Georgia. It also includes Table C-2 which is a compilation of the results of the Constellation Energy Laboratory's participation in a split sample program with Teledyne Brown Engineering located in Knoxville, Tennessee and Table C-3 which is a list of typical MDAs achieved by Teledyne Brown for Gamma Spectroscopy.

All the Constellation Energy Laboratory's results contained in Table C-1 generally agree with the intercomparison laboratory's results within the range of ±2 σ of each other. In addition, all the sets of intercomparison results in the table are in full agreement when they were further evaluated using the NRC Resolution Test Criteria[1]. The uncertainties for the Constellation Energy Laboratory's results and Analytics' results are ±2σ while the ERA laboratory's uncertainty is based on USEPA guidelines[2].

All the results contained in Table C-2 agree within the range of ±2 σ of each other with their respective Constellation Energy Laboratory original, replicate and/or Teledyne Brown Engineering's split laboratory samples, except for the comparisons of five samples involving Cs-137 results: an air filter composite sample from A3 collected 5/15/2007; a soil sample from SFA4 collected 5/31/2007; a shoreline sample from Wb1 collected 5/31/2007; a vegetation sample from Ib1 collected 7/23/2007; and a vegetation sample from SFb3 collected 12/18/2007. In all five cases low levels of Cs-137 were observed in only one of the results of the comparison set and not observed in the other two. These minor discrepancies, occurring very close to or below the analyses MDA's, are most probably due to counting statistical fluctuations and/or the non-homogeneous nature of the sample-splitting process. Other samples whose nature generally precludes sample splitting are marked "**" in the Split Analysis column.

[1] NRC Inspection Manual, Inspection Procedure 84750, March 15, 1994
[2] National Standards for Water Proficiency Testing Studies Criteria Document, December 1998

TABLE C-1

Results of Participation in Cross Check Programs

Sample Date	Sample Type and Units	Isotope Observed	Reported Laboratory's Results[1]	Cross Check Lab Results[1]
1/08/07	Water-pCi/L	Ba-133	90±10	91±15
		Co-60	104±9	101±9
		Cs-134	83±7	89±9
		Cs-137	233±15	231±20
		Zn-65	381±33	350±60
3/22/07	Milk-pCi/L	I-131	85±29	85±3
		Cs-134	99±13	112±4
		Cs-137	249±28	234±8
		Ce-141	309±28	297±10
		Cr-51	227±109	245±8
		Mn-54	197±27	182±6
		Co-58	106±22	100±3
		Fe-59	111±30	106±4
		Co-60	162±17	152±5
		Zn-65	1075±80	1000±33
3/22/07	Charcoal Cartridge-pCi	I-131	80±5	70±2
3/22/07	Water-pCi/L	Gross β	99±5	100±3
4/09/07	Water-pCi/L	I-131	19±7	19±5
6/14/07	Water-pCi	Gross β	147±2	148±5

[1] See discussion at the beginning of the Appendix

TABLE C-1 - Continued

Results of Participation in Cross Check Programs

Sample Date	Sample Type and Units	Isotope Observed	Reported Laboratory's Results[1]	Cross Check Lab Results[1]
6/14/07	Water-pCi/L	Cs-134	172±7	194±6
		Cs-137	138±11	135±5
		Ce-141	145±36	160±5
		Co-58	171±15	159±5
		Fe-59	145±26	134±4
		Cr-51	489±191	411±14
		Co-60	202±8	191±6
		Mn-54	144±10	133±4
		Zn-65	283±23	268±9
6/14/07	Filter-pCi/filter	Ce-141	121±24	114±4
		Cr-51	286±130	293±10
		Cs-134	118±6	138±5
		Cs-137	100±8	97±3
		Mn-54	108±9	95±3
		Fe-59	103±29	95±3
		Zn-65	230±22	191±6
		Co-60	143±8	136±5
		Co-58	122±14	113±4
7/06/07	Water-pCi/L	Ba-133	19±7	19±9
		Cs-134	67±6	69±9
		Cs-137	64±9	61±9
		Zn-65	113±15	55±9
		Co-60	34±5	34±8
7/06/07	Water-pCi/L	Gross β	7.6±0.4	11.5±9.0
9/13/07	Filter-pCi/filter	Gross β	82±2	87±1

[1] See discussion at the beginning of the Appendix

TABLE C-1 - Continued
Results of Participation in Cross Check Programs

Sample Date	Sample Type and Units	Isotope Observed	Reported Laboratory's Results[1]	Cross Check Lab Results[1]
9/18/07	Filter-pCi/filter	Am-241	31±22	21±8
		Cs-134	859±22	922±208
		Cs-137	916±23	831±269
		Co-60	562±14	505±126
		Zn-65	1554±51	1290±500
10/06/07	Water-pCi/L	I-131	29±2	29±5
12/06/07	Charcoal Cartridge-pCi	I-131	79±5	74±2
12/06/07	Milk-pCi/L	I-131	85±21	61±2
		Ce-141	157±16	141±5
		Cr-51	678±108	512±18
		Cs-134	124±11	137±5
		Cs-137	181±17	166±6
		Co-58	190±16	174±6
		Mn-54	208±16	190±6
		Fe-59	172±19	148±5
		Zn-65	264±30	234±8
		Co-60	224±13	211±8
12/06/07	Filter-pCi/filter	Ce-141	143±7	117±4
		Cr-51	535±60	425±14
		Cs-134	96±6	114±4
		Cs-137	148±10	138±5
		Co-58	152±12	144±5
		Mn-54	180±12	157±6
		Fe-59	148±14	123±4
		Zn-65	238±30	194±6
		Co-60	190±10	175±6
12/06/07	Water-pCi/L	Gross β	185±3	200±7

[1] See discussion at the beginning of the Appendix

TABLE C-2
Results of Quality Assurance Program

Sample Type And Location	Sample Date	Type of Analysis	Original Analysis	Replicate Analysis	Split Analysis
				10^{-2} pCi/m^3	
Air Iodine-A3	1/08/07	I-131	<MDA	<MDA	**
Air Iodine-A4	1/08/07	I-131	<MDA	<MDA	**
Air Filter -A1	1/08/07	Beta	0.7±0.1	0.8±0.1	**
Air Filter -A2	1/08/07	Beta	1.0±0.2	1.0±0.2	**
Air Filter -A3	1/08/07	Beta	0.7±0.1	0.7±0.1	**
Air Filter -A4	1/08/07	Beta	1.0±0.2	1.0±0.2	**
Air Filter -A5	1/08/07	Beta	0.9±0.1	0.9±0.1	**
Air Filter –SFA1	1/08/07	Beta	0.8±0.1	0.9±0.1	**
Air Filter –SFA2	1/08/07	Beta	1.0±0.1	0.9±0.1	**
Air Filter –SFA3	1/08/07	Beta	1.1±0.1	1.1±0.1	**
Air Filter –SFA4	1/08/07	Beta	1.0±0.2	0.9±0.1	**
				10^{-2} pCi/m^3	
Air Filter-A1	2/05/07	Beta	2.5±0.2	2.5±0.2	**
Air Filter-A2	2/05/07	Beta	2.5±0.2	2.4±0.2	**
Air Filter-A3	2/05/07	Beta	2.4±0.2	2.3±0.2	**
Air Filter-A4	2/05/07	Beta	2.7±0.3	2.9±0.2	**
Air Filter-A5	2/05/07	Beta	2.3±0.2	2.6±0.2	**
Air Filter-SFA1	2/05/07	Beta	2.6±0.2	2.7±0.2	**
Air Filter-SFA2	2/05/07	Beta	2.6±0.2	2.5±0.2	**
Air Filter-SFA3	2/05/07	Beta	2.4±0.2	2.6±0.2	**
Air Filter-SFA4	2/05/07	Beta	2.7±0.2	2.5±0.2	**
Air Iodine-A1	2/05/07	I-131	<MDA	<MDA	**
Air Iodine-A2	2/05/07	I-131	<MDA	<MDA	**
				pCi/L	
Bay Water-Wa2	2/28/07	Gamma	<MDA	<MDA	<MDA

** The nature of these samples precluded splitting them with an independent laboratory.

TABLE C-2 – Continued
Results of Quality Assurance Program

Sample Type And Location	Sample Date	Type of Analysis	Original Analysis	Replicate Analysis	Split Analysis
				10^{-2} pCi/m^3	
Air Filter-A1	3/05/07	Beta	1.1±0.2	1.2±0.2	**
Air Filter-A2	3/05/07	Beta	1.4±0.2	1.4±0.2	**
Air Filter-A3	3/05/07	Beta	1.2±0.2	1.1±0.2	**
Air Filter-A4	3/05/07	Beta	1.5±0.2	1.5±0.2	**
Air Filter-A5	3/05/07	Beta	1.0±0.1	1.0±0.1	**
Air Filter-SFA1	3/05/07	Beta	1.1±0.1	1.1±0.1	**
Air Filter-SFA2	3/05/07	Beta	1.0±0.1	1.2±0.2	**
Air Filter-SFA3	3/05/07	Beta	1.1±0.1	1.1±0.2	**
Air Filter-SFA4	3/05/07	Beta	1.5±0.2	1.4±0.2	**
Air Iodine-A3	3/05/07	I-131	<MDA	< MDA	**
Air Iodine-A4	3/05/07	I-131	< MDA	< MDA	**
				pCi/Kg	
Oysters-Ia3	3/28/07	Gamma	<MDA	<MDA	<MDA
				pCi/L	
Bay Water-Wa2	4/27/07	Cs-137	<MDA	<MDA	MDA
				10^{-2} pCi/m^3	
Air Filter-A1	4/09/07	Beta	1.2±0.2	1.3±0.2	**
Air Filter-A2	4/09/07	Beta	1.3±0.2	1.2±0.2	**
Air Filter-A3	4/09/07	Beta	1.5±0.2	1.6±0.2	**
Air Filter-A4	4/09/07	Beta	2.2±0.3	2.4±0.3	**
Air Filter-A5	4/09/07	Beta	1.4±0.2	1.2±0.2	**
Air Filter-SFA1	4/09/07	Beta	1.6±0.2	1.6±0.2	**
Air Filter-SFA2	4/09/07	Beta	1.3±0.2	1.5±0.2	**
Air Filter-SFA3	4/09/07	Beta	1.4±0.2	1.2±0.2	**
Air Filter-SFA4	4/09/07	Beta	1.3±0.2	1.4±0.2	**
				10^{-2} pCi/m^3	
Air Iodine-A1	4/09/07	I-131	<MDA	<MDA	**
Air Iodine-A2	4/09/07	I-131	<MDA	<MDA	**

** The nature of these samples precluded splitting them with an independent laboratory.

TABLE C-2 – Continued
Results of Quality Assurance Program

Sample Type And Location	Sample Date	Type of Analysis	Original Analysis	Replicate Analysis	Split Analysis
				10^{-2} pCi/m^3	
Air Filters-A1	5/15/07	Gamma	<MDA	<MDA	<MDA
Air Filters-A2	5/15/07	Gamma	<MDA	<MDA	<MDA
Air Filters-A3	5/15/07	Cs-137 [1]	<MDA	2±1	<MDA
Air Filters-A4	5/15/07	Gamma	<MDA	<MDA	<MDA
Air Filters-A5	5/15/07	Gamma	<MDA	<MDA	<MDA
Air Filters-SFA1	5/15/07	Gamma	<MDA	<MDA	<MDA
Air Filters-SFA2	5/15/07	Gamma	<MDA	<MDA	<MDA
Air Filters-SFA3	5/15/07	Gamma	<MDA	<MDA	<MDA
Air Filters-SFA4	5/15/07	Gamma	<MDA	<MDA	<MDA
				10^{-2} pCi/m^3	
Air Iodine-A3	5/07/07	I-131	<MDA	<MDA	**
Air Iodine-A4	5/07/07	I-131	<MDA	<MDA	**
Air Filter-A1	5/07/07	Beta	1.5±0.2	1.3±0.2	**
Air Filter-A2	5/07/07	Beta	1.2±0.1	1.1±0.1	**
Air Filter-A3	5/07/07	Beta	1.4±0.2	1.1±0.2	**
Air Filter-A4	5/07/07	Beta	0.9±0.2	1.0±0.2	**
Air Filter-A5	5/07/07	Beta	3.1±0.3	2.6±0.3	**
Air Filter-SFA1	5/07/07	Beta	1.3±0.2	1.0±0.1	**
Air Filter-SFA2	5/07/07	Beta	1.2±0.1	1.1±0.1	**
Air Filter-SFA3	5/07/07	Beta	1.0±0.1	1.0±0.1	**
Air Filter-SFA4	5/07/07	Beta	1.1±0.1	1.0±0.1	**
				pCi/Kg	
Soil-SFS3	5/31/07	Cs-137	563±103	672±101	708±99
Soil-SFS4	5/31/07	Cs-137 [1]	<MDA	<MDA	101±32
Vegetation-SFb3	5/31/07	Gamma	<MDA	<MDA	<MDA
Vegetation-SFb4	5/31/07	Gamma	<MDA	<MDA	<MDA

** The nature of these samples precluded splitting them with an independent laboratory.
[1] See discussion at the beginning of the Appendix.

TABLE C-2 – Continued
Results of Quality Assurance Program

Sample Type And Location	Sample Date	Type of Analysis	Original Analysis	Replicate Analysis	Split Analysis
				pCi/Kg	
Shoreline Wb1	5/31/07	Cs-137 [1]	<MDA	<MDA	336±344
				10^{-2} pCi/m^3	
Air Iodine-SFA2	6/04/07	I-131	<MDA	<MDA	**
Air Iodine-SFA3	6/04/07	I-131	<MDA	<MDA	**
				10^{-2} pCi/m^3	
Air Filter-A1	6/04/07	Beta	2.0±0.2	2.1±0.2	**
Air Filter-A2	6/04/07	Beta	1.8±0.2	1.7±0.2	**
Air Filter-A3	6/04/07	Beta	1.8±0.2	1.9±0.2	**
Air Filter-A4	6/04/07	Beta	2.0±0.2	2.2±0.2	**
Air Filter-A5	6/04/07	Beta	2.0±0.2	2.2±0.2	**
Air Filter-SFA1	6/04/07	Beta	1.7±0.2	1.7±0.2	**
Air Filter-SFA2	6/04/07	Beta	1.8±0.2	1.9±0.2	**
Air Filter-SFA3	6/04/07	Beta	1.7±0.2	2.0±0.2	**
Air Filter-SFA4	6/04/07	Beta	1.9±0.2	1.8±0.2	**
				mR/90 Days	
DR05	6/29/07	TLD	11.15±0.97	11.94±1.49	**
DR06	6/29/07	TLD	9.58±0.58	10.06±1.32	**
DR07	6/29/07	TLD	11.13±0.56	11.72±1.17	**
DR08	6/29/07	TLD	14.01±1.23	14.60±0.71	**
DR09	6/29/07	TLD	10.62±0.79	10.94±1.58	**
DR10	6/29/07	TLD	9.91±0.70	10.56±0.65	**
DR11	6/29/07	TLD	10.68±0.45	10.96±1.42	**
SFDR14	6/29/07	TLD	21.47±2.54	24.08±1.47	**
SFDR15	6/29/07	TLD	20.42±3.30	23.38±5.16	**
DR29	6/29/07	TLD	21.49±1.87	14.11±1.99	**
DR31	6/29/07	TLD	14.88±2.17	15.26±1.32	**

** The nature of these samples precluded splitting them with an independent laboratory.
[1] See discussion at the beginning of the Appendix.

TABLE C-2 - Continued
Results of Quality Assurance Program

Sample Type And Location	Sample Date	Type of Analysis	Original Analysis	Replicate Analysis	Split Analysis
				10^{-2} pCi/m^3	
Air Filter-A1	7/09/07	Beta	1.8±0.2	2.0±0.2	**
Air Filter-A2	7/09/07	Beta	1.3±0.2	1.2±0.2	**
Air Filter-A3	7/09/07	Beta	1.3±0.2	1.3±0.2	**
Air Filter-A4	7/09/07	Beta	1.8±0.2	2.0±0.2	**
Air Filter-A5	7/09/07	Beta	1.7±0.2	1.7±0.2	**
Air Filter-SFA1	7/09/07	Beta	1.7±0.2	1.6±0.2	**
Air Filter-SFA2	7/09/07	Beta	1.8±0.2	1.8±0.2	**
Air Filter-SFA3	7/09/07	Beta	1.8±0.2	1.8±0.2	**
Air Filter-SFA4	7/09/07	Beta	1.9±0.2	1.8±0.2	**
Air Iodine-A3	7/09/07	I-131	<MDA	<MDA	**
Air Iodine-A4	7/09/07	I-131	<MDA	<MDA	**
				pCi /kg	
Vegetation-Ib1	7/23/07	Cs-137 [1]	<MDA	18±11	<MDA
Vegetation-Ib3	7/23/07	Gamma	<MDA	<MDA	<MDA
Vegetation-Ib4	7/23/07	Gamma	<MDA	<MDA	<MDA
Vegetation-Ib5	7/23/07	Gamma	<MDA	<MDA	<MDA
Vegetation-Ib6	7/23/07	Gamma	<MDA	<MDA	<MDA
Vegetation-Ib7	7/23/07	Gamma	<MDA	<MDA	<MDA
Vegetation-Ib8	7/23/07	Gamma	<MDA	<MDA	<MDA
Vegetation-Ib9	7/23/07	Gamma	<MDA	<MDA	<MDA
				10^{-2} pCi/m^3	
Air Filter-A1	8/06/07	Beta	2.8±0.3	2.7±0.3	**
Air Filter-A2	8/06/07	Beta	2.2±0.2	2.3±0.2	**
Air Filter-A3	8/06/07	Beta	2.6±0.2	2.2±0.2	**
Air Filter-A4	8/06/07	Beta	2.0±0.2	2.1±0.2	**
Air Filter-A5	8/06/07	Beta	2.7±0.2	2.5±0.2	**
Air Filter-SFA1	8/06/07	Beta	2.7±0.2	2.4±0.2	**
Air Filter-SFA2	8/06/07	Beta	2.8±0.2	2.6±0.2	**
Air Filter-SFA3	8/06/07	Beta	2.3±0.2	2.1±0.2	**
Air Filter-SFA4	8/06/07	Beta	2.9±0.2	2.7±0.2	**

** The nature of these samples precluded splitting them with an independent laboratory.
[1] See discussion at the beginning of this Appendix.

TABLE C-2 - Continued
Results of Quality Assurance Program

Sample Type And Location	Sample Date	Type of Analysis	Original Analysis	Replicate Analysis	Split Analysis
				10^{-2} pCi/m^3	
Air Iodine-A1	8/06/07	I-131	<MDA	<MDA	**
Air Iodine-A2	8/06/07	I-131	<MDA	<MDA	**
				pCi/kg	
Fish-Ia1	8/22/07	Gamma	<MDA	<MDA	<MDA
Oysters-Ia3	8/22/07	Gamma	<MDA	<MDA	<MDA
				pCi/L	
Bay Water-Wa1	8/31/07	Gamma	<MDA	<MDA	<MDA
				pCi/kg	
Vegetation-Ib4	8/13/07	Gamma	<MDA	<MDA	<MDA
Vegetation-Ib6	8/13/07	Gamma	<MDA	<MDA	<MDA
				10^{-2} pCi/m^3	
Air Iodine-A3	9/10/07	I-131	<MDA	<MDA	**
Air Iodine-A4	9/10/07	I-131	<MDA	<MDA	**
Air Filter-A1	9/10/07	Beta	2.7±0.3	2.5±0.3	**
Air Filter-A2	9/10/07	Beta	2.0±0.2	2.0±0.2	**
Air Filter-A3	9/10/07	Beta	1.9±0.2	2.1±0.2	**
Air Filter-A4	9/10/07	Beta	2.0±0.2	2.2±0.2	**
Air Filter-A5	9/10/07	Beta	2.2±0.3	2.1±0.2	**
Air Filter-SFA1	9/10/07	Beta	2.3±0.3	2.2±0.3	**
Air Filter-SFA2	9/10/07	Beta	2.4±0.3	2.5±0.3	**
Air Filter-SFA3	9/10/07	Beta	2.2±0.2	2.2±0.2	**
Air Filter-SFA4	9/10/07	Beta	2.1±0.2	2.2±0.3	**
				10^{-3} pCi/m^3	
Air Filters-A1	10/15/07	Gamma	<MDA	<MDA	<MDA
Air Filters-A2	10/15/07	Gamma	<MDA	<MDA	<MDA
Air Filters-A3	10/15/07	Gamma	<MDA	<MDA	<MDA

** The nature of these samples precluded splitting them with an independent laboratory.

TABLEC-2 - Continued
Results of Quality Assurance Program

Sample Type And Location	Sample Date	Type of Analysis	Original Analysis	Replicate Analysis	Split Analysis
				10^{-3} pCi/m^3	
Air Filters-A4	10/15/07	Gamma	<MDA	<MDA	<MDA
Air Filters-A5	10/15/07	Gamma	<MDA	<MDA	<MDA
Air Filters-SFA1	10/15/07	Gamma	<MDA	<MDA	<MDA
Air Filters-SFA2	10/15/07	Gamma	<MDA	<MDA	<MDA
Air Filters-SFA3	10/15/07	Gamma	<MDA	<MDA	<MDA
Air Filters-SFA4	10/15/07	Gamma	<MDA	<MDA	<MDA
				10^{-2} pCi/m^3	
Air Iodine-A1	10/08/07	I-131	<MDA	<MDA	**
Air Iodine-A2	10/08/07	I-131	<MDA	<MDA	**
				10^{-2} pCi/m^3	
Air Filter-A1	10/08/07	Beta	3.1±0.3	3.3±0.3	**
Air Filter-A2	10/08/07	Beta	2.0±0.2	2.1±0.2	**
Air Filter-A3	10/08/07	Beta	3.3±0.3	3.4±0.3	**
Air Filter-A4	10/08/07	Beta	2.1±0.2	2.1±0.2	**
Air Filter-A5	10/08/07	Beta	2.2±0.2	2.4±0.2	**
Air Filter-SFA1	10/08/07	Beta	2.3±0.2	2.6±0.2	**
Air Filter-SFA2	10/08/07	Beta	2.5±0.2	2.3±0.2	**
Air Filter-SFA3	10/08/07	Beta	2.3±0.2	2.6±0.2	**
Air Filter-SFA4	10/08/07	Beta	2.3±0.2	2.5±0.2	**
				10^{-2} pCi/m^3	
Air Filter-A1	11/05/07	Beta	1.9±0.2	2.0±0.2	**
Air Filter-A2	11/05/07	Beta	2.0±0.2	2.0±0.2	**
Air Filter-A3	11/05/07	Beta	1.7±0.2	1.9±0.2	**
Air Filter-A4	11/05/07	Beta	2.1±0.2	2.2±0.2	**
Air Filter-A5	11/05/07	Beta	2.3±0.2	2.2±0.2	**
Air Filter-SFA1	11/05/07	Beta	2.3±0.2	2.4±0.2	**
Air Filter-SFA2	11/05/07	Beta	2.2±0.2	2.2±0.2	**
Air Filter-SFA3	11/05/07	Beta	2.4±0.2	2.4±0.2	**
Air Filter-SFA4	11/05/07	Beta	2.4±0.2	2.2±0.2	**

** The nature of these samples precluded splitting them with an independent laboratory.

TABLE C-2 - Continued
Results of Quality Assurance Program

Sample Type And Location	Sample Date	Type of Analysis	Original Analysis	Replicate Analysis	Split Analysis
				10^{-2} pCi/m^3	
Air Iodine-A3	11/05/07	I-131	<MDA	<MDA	**
Air Iodine-A5	11/05/07	I-131	<MDA	<MDA	**
				pCi/L	
Bay Water-Wa2	11/30/07	Gamma	<MDA	<MDA	<MDA
				10^{-2} pCi/m^3	
Air Filter-A1	12/10/07	Beta	1.9±0.2	1.7±0.2	**
Air Filter-A2	12/10/07	Beta	1.5±0.2	1.6±0.2	**
Air Filter-A3	12/10/07	Beta	1.7±0.2	1.6±0.2	**
Air Filter-A4	12/10/07	Beta	1.8±0.2	2.1±0.2	**
Air Filter-A5	12/10/07	Beta	1.9±0.2	1.8±0.2	**
Air Filter-SFA1	12/10/07	Beta	1.7±0.2	1.5±0.2	**
Air Filter-SFA2	12/10/07	Beta	2.0±0.2	2.1±0.2	**
Air Filter-SFA3	12/10/07	Beta	2.0±0.2	1.9±0.2	**
Air Filter-SFA4	12/10/07	Beta	1.9±0.2	1.8±0.2	**
Air Iodine-A1	12/10/07	I-131	<MDA	<MDA	**
Air Iodine-A2	12/10/07	I-131	<MDA	<MDA	**
				pCi/Kg	
Soil-SFS2	12/18/07	Cs-137	103±39	131±46	99±71
Soil-SFS3	12/18/07	Cs-137	502±91	565±91	565±91
				pCi/Kg	
Vegetation-SFb2	12/18/07	Gamma	<MDA	<MDA	<MDA
Vegetation-SFb3	12/18/07	Cs-137 [1]	27±24	<MDA	<MDA

** The nature of these samples precluded splitting them with an independent laboratory.
[1] See discussion at the beginning of the Appendix.

TABLE C-2 – Continued
Results of Quality Assurance Program

Sample Type And Location	Sample Date	Type of Analysis	Original Analysis	Replicate Analysis	Split Analysis
				mR/90 Days	
DR05	01/03/08	TLD	13.39±1.34	11.79±1.17	**
DR06	01/03/08	TLD	11.02±1.06	10.28±1.02	**
DR07	01/03/08	TLD	11.26±1.37	10.15±1.22	**
DR08	01/03/08	TLD	16.04±1.68	15.27±0.99	**
DR09	01/03/08	TLD	12.29±0.45	11.66±0.69	**
DR10	01/03/08	TLD	11.60±1.19	11.09±0.81	**
DR11	01/03/08	TLD	11.88±2.32	11.18±1.12	**
SFDR14	01/03/08	TLD	17.90±3.71	17.28±2.55	**
SFDR15	01/03/08	TLD	20.18±3.71	20.83±2.71	**
DR29	01/03/08	TLD	16.30±2.17	15.39±1.05	**
DR31	01/03/08	TLD	16.91±1.74	15.66±1.07	**

** The nature of these samples precluded splitting them with an independent laboratory.

TABLE C-3
Teledyne Brown Engineering's Typical MDAs 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
H-3	175	--	--	--	--	--
Na-22	1	8	3	12	6	5
Cr-51	12	105	4	104	50	63
Mn-54	1	9	3	12	5	4
Co-58	1	9	4	9	4	5
Fe-59	3	28	9	24	10	12
Co-60	1	9	4	12	5	6
Zn-65	2	20	8	25	10	9
Nb-95	1	12	7	14	6	9
Zr-95	2	18	8	20	9	9
Ru-106	9	75	30	90	41	40
Ag-110m	1	10	10	10	5	4
Te-129m	16	131	60	162	79	95
I-131	4	65	30	35	22	74
Cs-134	1	8	4	10	5	4
Cs-137	1	9	4	10	5	4
BaLa-140	3	32	15	25	14	36
Ce-144	7	40	16	54	26	18

APPENDIX D
Land Use Survey

Appendix D contains the results of a Land Use Survey conducted around Calvert Cliffs Nuclear Power Plant during this operating period. 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 to identify, within a distance of 5 miles, 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 (Ref. 9). The position of the nearest residence and garden in each sector out to 5 miles is given in the adjacent table. There are no animals producing milk for human consumption within the 5 mile radius. There were no new residences within the 5-mile radius.

Land Use Survey

	Distance From Plant (miles)	
Sector	Residence	Garden
SE	1.7	1.7
SSE	1.3	1.8
S	1.8	1.8
SSW	1.5	1.7
SW	1.1	1.1
WSW	1.2	1.4
W	1.3	1.5
WNW	2.5	2.5
NW	2.1	2.1

The closest residence is situated in the SW sector and the nearest garden, also situated in the SW 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 REMP have been placed in the sectors with the highest X/Q. One sampling garden is located in the S sector at a distance of 0.4 miles, and another is situated near the site boundary in the SSE sector at a distance of 1.6 miles from the plant. These two sampling sites are considered good indicator locations for radioactive depositions around the plant.

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

APPENDIX E
Additional Samples and Analysis Results

Appendix E is a presentation of the analytical results for additional samples collected in the environs of CCNPP. These extra samples are not required by the ODCM (Ref. 6). Table E-1 lists the locations of all the additional samples and the remaining tables in this appendix provide the results. Some of these samples 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. Additionally, they include the PICs added for the ISFSI.

Table E-11 shows the direct radiation readings from TLDs placed at the perimeter of the Resin Storage Area which is a temporary waste resin storage and cask transfer area located to the west of the ISFSI facility. The TLD values are somewhat higher than those in the REMP program due to their proximity to this source of the radiation. However, when the direct radiation readings for the Resin Storage Area are compared with those from the ISFSI and Site Boundary TLDs, it is apparent that temporary storage of spent resin and cask transfers are having no significant, measurable effect on the environs surrounding CCNPP.

TABLE E-1
Locations of Non-ODCM Environmental Sampling Stations
for Calvert Cliffs Nuclear Power Plant

Station	Description	Distance[1]		Direction[1]
		(KM)	(Miles)	(Sector)
A6	Long Beach	4.4	2.7	NW
A7	Taylors Island, Carpenter's Property	12.6	7.8	ENE
A8	Cambridge, U of MD Estuarine Center	32.0	19.9	NE
DR24	Route 4 and Parran Road	3.0	1.9	SW
DR25	Camp Conoy Guard House	1.0	0.6	S
DR26	Route 235 & Clarks Landing Rd.	20.5	12.7	SW
DR27	Route 231 & Route 4	23.0	14.3	NW
DR28	Taylors Island Emergency Siren #35	12.3	7.6	ENE
DR29	Taylors Island Emergency Siren #38	12.5	7.8	E
DR31	Cambridge, U of MD Estuarine Center	32.0	19.9	NE
DR32	Twining Property, Taylors Island	12.3	7.6	NE
DR33	P.A. Ransome Property, Taylors Island	14.8	9.2	ESE
DR34	Shoreline at Barge Road	0.2	0.1	NE
OSGDR1	North of Old Steam Generator Storage Facility	0.3	0.2	SW
OSGDR2	West of Old Steam Generator Storage Facility	0.3	0.2	SW
PIC1	Taylors Island, Carpenter's Property	12.6	7.8	ENE
PIC2	On Site before Entrance to Camp Conoy	0.7	0.4	S
PIC3	Meteorological Station	0.8	0.5	WSW
PIC4	NNW of ISFSI	0.6	0.4	SW
PIC5	SSE of ISFSI	0.6	0.4	SSW
PIC8	CCNPP Visitor's Center	0.3	0.2	NW
RPDR5	Resin Storage Area – North Fence Lower	0.7	0.4	SW
RPDR6	Resin Storage Area – North Fence Upper	0.7	0.4	SW
RPDR7	Resin Storage Area – West Fence Right	0.7	0.4	SW
RPDR8	Resin Storage Area – West Fence Left	0.7	0.4	SW
RPDR9	Resin Storage Area – South Fence Upper	0.7	0.4	SW
RPDR10	Resin Storage Area – South Fence Lower	0.7	0.4	SW
RPDR11	Resin Storage Area – East Fence Left	0.7	0.4	SW
RPDR12	Resin Storage Area – East Fence Right	0.7	0.4	SW
Wbs1	Intake Area	0.2	0.1	NE
Wbs2	Discharge Area	0.3	0.2	N
Wbs3	Long Beach	4.4	2.7	NW
Wbs4	Camp Conoy/Rocky Point	3.0	1.9	SE
Ww1	Taylors Island, Carpenter's Property	12.6	7.8	ENE

[1] Distance and direction from the central point between the two containment buildings.

Table E-2

Synopsis of 2007 Calvert Cliffs Nuclear Power Plant
Non-Tech Spec Radiological Environmental Monitoring Program

Sample Type	Sampling Frequency [1]	Number of Locations	Number Collected	Analysis	Analysis Frequency	Number Analyzed
Aquatic Environment						
Bottom Sediment	Q	2	4	Gamma	Q	4
Atmospheric Environment						
Air Iodine [2]	W	7	362	I-131	W	362
Air Particulates [3]	W	3	156	Gross Beta Gamma	W MC	156 36
Direct Radiation						
Pressurized Ion Chamber	M	6	72	Gamma	M	72
Ambient Radiation	Q	20	474	TLD	Q	474
Terrestrial Environment						
Ground water	M	1	12	H-3 Gamma	M M	12 12

[1] W=weekly, M=monthly, Q=quarterly, SA= Semiannual, A= annual, C=composite
[2] The collection device contains Silver Zeolite
[3] Beta counting is performed after >72 hour decay. Gamma spectroscopy performed on monthly composites of weekly samples

Table E-3

Annual Summary for Calvert Cliffs Nuclear Power Plant Units 1 & 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 [1]	Location with Highest Annual Mean Name/Distance & Direction [2]	Highest Annual Mean (F)/Range	Control Locations Mean (F)/Range
Aquatic Environment						
Bottom Sediment (pCi/kg)	Gamma (4) Cs-137	17	148 (2/2) (61-235)	Discharge Area Wbs2 0.3 km N	148 (2/2) (61-235)	110 (2/2) (90-131)
Atmospheric Environment						
Air Particulates (10^{-2} pCi/m^3)	Gross Beta (156)	0.5	1.8 (104/104) (0.7-3.2)	Cambridge CAM 32.0 km NE	1.9 (52/52) (0.9-3.2)	1.7 (52/52) (0.8-2.81)
Direct Radiation						
Ambient Radiation (mR/90 days)	TLD (474)	--	43.08 (474/474) (7.87-406.48)	South Fence Lower RPDR10 km	124.25 (24/24) (15.97-406.48)	-- --
Pressurized Ion Chamber (mR/30 days)	Ionization Chamber (72)	--	7.15 (60/60) (4.13-12.13)	NNW of ISFSI PIC4 0.6 km SW	11.64 (12/12) (11.20-12.13)	6.74 (12/12) (5.64-7.28)

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

[2] From the centerpoint between the two containment buildings.

Table E-4
Concentration of Gamma Emitters in Bottom Sediment
(Results in units of pCi/kg (dry) +/- 2σ)

SAMPLE CODE	Sample Date	Cs-137	Gamma Emitters
Wbs2	6/27/2007	235 ± 72	*
Discharge Area	10/31/2007	61 ± 62	*
Wbs4 [1]	6/27/2007	90 ± 55	*
Camp Conoy/ Rocky Point	10/31/2007	131 ± 55	*

[1]Control Location
*All Non-Natural Gamma Emitters <MDA

Table E-5
Concentration of Iodine-131 in Filtered Air
(Results in units of 10^{-3} pCi/m^3 +/- 2σ)

Start Date	Stop Date	A6 Long Beach	A7 Taylors Island	CAM Cambridge	SFA1 MET Station	SFA2[1] Visitors Center	SFA3 NNW of ISFSI	SFA4 SSE of ISFSI
1/1/2007	1/8/2007	*	*	*	*	*	*	*
1/8/2007	1/15/2007	*	*	*	*	*	*	*
1/15/2007	1/22/2007	*	*	*	*	*	*	*
1/22/2007	1/29/2007	*	*	*	*	*	*	*
1/29/2007	2/5/2007	*	*	*	*	*	*	*
2/5/2007	2/12/2007	*	*	*	*	*	*	*
2/12/2007	2/19/2007	*	*	*	*	*	*	*
2/19/2007	2/26/2007	*	*	*	*	*	*	*
2/26/2007	3/5/2007	*	*	*	*	*	*	*
3/5/2007	3/12/2007	*	*	*	*	*	*	*
3/12/2007	3/19/2007	*	*	*	*	*	*	2
3/19/2007	3/26/2007	*	*	*	*	*	3	*
3/26/2007	4/2/2007	*	*	*	*	*	*	*
4/2/2007	4/9/2007	*	*	*	*	*	*	*
4/9/2007	4/16/2007	*	*	*	*	*	*	*
4/16/2007	4/23/2007	*	*	*	*	*	*	*
4/23/2007	4/30/2007	*	*	*	*	*	*	*
4/30/2007	5/7/2007	*	*	*	*	*	*	*
5/7/2007	5/14/2007	*	*	*	*	*	*	*
5/14/2007	5/21/2007	*	*	*	*	*	*	*
5/21/2007	5/28/2007	*	*	*	*	*	*	*
5/28/2007	6/4/2007	*	*	*	*	*	*	*
6/4/2007	6/11/2007	*	*	*	*	*	*	*
6/11/2007	6/18/2007	*	*	*	*	*	*	*
6/18/2007	6/25/2007	*	*	*	*	*	*	*
6/25/2007	7/2/2007	*	*	*	*	*	*	*

[1] Control Location
[2] Loss of Data, Air Sampler Malfunction
[3] Loss of Data, Operator Error
* <MDA

Table E-5 Continued

Concentration of Iodine-131 in Filtered Air
(Results in units of 10^{-3} pCi/m^3 +/- 2σ)

Start Date	Stop Date	A6 Long Beach	A7 Taylors Island	CAM Cambridge	SFA1 MET Station	SFA2[1] Visitors Center	SFA3 NNW of ISFSI	SFA4 SSE of ISFSI
7/2/2007	7/9/2007	*	*	*	*	*	*	*
7/9/2007	7/16/2007	*	*	*	*	*	*	*
7/16/2007	7/23/2007	*	*	*	*	*	*	*
7/23/2007	7/30/2007	*	*	*	*	*	*	*
7/30/2007	8/6/2007	*	*	*	*	*	*	*
8/6/2007	8/13/2007	*	*	*	*	*	*	*
8/13/2007	8/20/2007	*	*	*	*	*	*	*
8/20/2007	8/27/2007	*	*	*	*	*	*	*
8/27/2007	9/3/2007	*	*	*	*	*	*	*
9/3/2007	9/10/2007	*	*	*	*	*	*	*
9/10/2007	9/17/2007	*	*	*	*	*	*	*
9/17/2007	9/24/2007	*	*	*	*	*	*	*
9/24/2007	10/1/2007	*	*	*	*	*	*	*
10/1/2007	10/8/2007	*	*	*	*	*	*	*
10/8/2007	10/15/2007	*	*	*	*	*	*	*
10/15/2007	10/22/2007	*	*	*	*	*	*	*
10/22/2007	10/29/2007	*	*	*	*	*	*	*
10/29/2007	11/5/2007	*	*	*	*	*	*	*
11/5/2007	11/12/2007	*	*	*	*	*	*	*
11/12/2007	11/19/2007	*	*	*	*	*	*	*
11/19/2007	11/26/2007	*	*	*	*	*	*	*
11/26/2007	12/3/2007	*	*	*	*	*	*	*
12/3/2007	12/10/2007	*	*	*	*	*	*	*
12/10/2007	12/17/2007	*	*	*	*	*	*	*
12/17/2007	12/24/2007	*	*	*	*	*	*	*
12/24/2007	12/31/2007	*	*	*	*	*	*	*

[1] Control Location
* <MDA

Table E-6
Concentration of Beta Emitters in Air Particulates
(Results in units of 10^{-2} pCi/m^3 +/- 2σ)

Start Date	Stop Date	A6 Long Beach	A7[1] Taylors Island	CAM Cambridge
1/1/2007	1/8/2007	1.4 +/- 0.2	1.2 +/- 0.2	0.9 +/- 0.2
1/8/2007	1/15/2007	1.7 +/- 0.2	1.7 +/- 0.2	1.9 +/- 0.2
1/15/2007	1/22/2007	1.3 +/- 0.2	1.1 +/- 0.1	1.2 +/- 0.2
1/22/2007	1/29/2007	2.2 +/- 0.2	2.1 +/- 0.2	2.2 +/- 0.2
1/29/2007	2/5/2007	3.0 +/- 0.3	2.8 +/- 0.2	2.8 +/- 0.2
2/5/2007	2/12/2007	2.3 +/- 0.2	1.9 +/- 0.2	2.0 +/- 0.2
2/12/2007	2/19/2007	2.3 +/- 0.2	2.2 +/- 0.2	2.6 +/- 0.2
2/19/2007	2/26/2007	1.9 +/- 0.2	1.1 +/- 0.2	1.3 +/- 0.2
2/26/2007	3/5/2007	1.4 +/- 0.2	1.5 +/- 0.2	1.6 +/- 0.2
3/5/2007	3/12/2007	2.6 +/- 0.3	2.1 +/- 0.2	2.4 +/- 0.2
3/12/2007	3/19/2007	1.9 +/- 0.2	2.0 +/- 0.2	1.8 +/- 0.2
3/19/2007	3/26/2007	1.9 +/- 0.2	1.6 +/- 0.2	2.0 +/- 0.2
3/26/2007	4/2/2007	1.6 +/- 0.2	1.7 +/- 0.2	2.0 +/- 0.2
4/2/2007	4/9/2007	1.6 +/- 0.2	1.5 +/- 0.2	2.0 +/- 0.2
4/9/2007	4/16/2007	1.2 +/- 0.2	1.0 +/- 0.2	1.2 +/- 0.2
4/16/2007	4/23/2007	1.0 +/- 0.2	1.1 +/- 0.2	1.2 +/- 0.2
4/23/2007	4/30/2007	1.2 +/- 0.2	2.0 +/- 0.2	2.1 +/- 0.2
4/30/2007	5/7/2007	1.1 +/- 0.1	1.1 +/- 0.1	1.4 +/- 0.2
5/7/2007	5/14/2007	0.7 +/- 0.2	0.8 +/- 0.2	1.0 +/- 0.2
5/14/2007	5/21/2007	1.1 +/- 0.1	1.1 +/- 0.1	1.5 +/- 0.2
5/21/2007	5/28/2007	1.6 +/- 0.2	2.2 +/- 0.2	2.8 +/- 0.3
5/28/2007	6/4/2007	1.4 +/- 0.2	1.0 +/- 0.2	1.3 +/- 0.2
6/4/2007	6/11/2007	1.4 +/- 0.2	1.4 +/- 0.2	1.3 +/- 0.2
6/11/2007	6/18/2007	1.0 +/- 0.1	1.2 +/- 0.2	1.5 +/- 0.2
6/18/2007	6/25/2007	1.7 +/- 0.2	1.7 +/- 0.2	2.1 +/- 0.2
6/25/2007	7/2/2007	1.2 +/- 0.2	1.3 +/- 0.2	1.7 +/- 0.2

[1] Control Location
* <MDA

Table E-6 Continued

Concentration of Beta Emitters in Air Particulates
(Results in units of 10^{-2} pCi/m^3 +/- 2σ)

Start Date	Stop Date	A6 Long Beach	A7[1] Taylors Island	CAM Cambridge
7/2/2007	7/9/2007	1.4 +/- 0.2	1.9 +/- 0.2	2.3 +/- 0.2
7/9/2007	7/16/2007	2.2 +/- 0.2	1.8 +/- 0.2	2.3 +/- 0.2
7/16/2007	7/23/2007	1.8 +/- 0.2	1.7 +/- 0.2	2.0 +/- 0.2
7/23/2007	7/30/2007	1.4 +/- 0.2	1.4 +/- 0.2	1.7 +/- 0.3
7/30/2007	8/6/2007	1.6 +/- 0.2	2.0 +/- 0.2	3.1 +/- 0.3
8/6/2007	8/13/2007	2.0 +/- 0.2	2.3 +/- 0.2	2.5 +/- 0.2
8/13/2007	8/20/2007	2.0 +/- 0.2	1.7 +/- 0.2	1.4 +/- 0.2
8/20/2007	8/27/2007	1.1 +/- 0.2	1.2 +/- 0.2	1.0 +/- 0.2
8/27/2007	9/3/2007	2.0 +/- 0.2	1.6 +/- 0.2	2.3 +/- 0.2
9/3/2007	9/10/2007	2.1 +/- 0.2	1.6 +/- 0.2	1.7 +/- 0.2
9/10/2007	9/17/2007	1.4 +/- 0.1	1.8 +/- 0.2	1.4 +/- 0.2
9/17/2007	9/24/2007	1.7 +/- 0.3	1.6 +/- 0.2	1.8 +/- 0.2
9/24/2007	10/1/2007	2.7 +/- 0.2	2.7 +/- 0.2	3.2 +/- 0.2
10/1/2007	10/8/2007	2.2 +/- 0.2	2.3 +/- 0.2	2.5 +/- 0.2
10/8/2007	10/15/2007	1.9 +/- 0.2	1.9 +/- 0.2	2.0 +/- 0.2
10/15/2007	10/22/2007	2.8 +/- 0.2	2.7 +/- 0.2	2.6 +/- 0.2
10/22/2007	10/29/2007	1.8 +/- 0.2	1.5 +/- 0.2	1.7 +/- 0.2
10/29/2007	11/5/2007	2.0 +/- 0.2	2.0 +/- 0.2	2.2 +/- 0.2
11/5/2007	11/12/2007	2.2 +/- 0.2	1.3 +/- 0.3	1.5 +/- 0.3
11/12/2007	11/19/2007	2.4 +/- 0.2	2.8 +/- 0.3	1.4 +/- 0.1
11/19/2007	11/26/2007	1.9 +/- 0.2	1.5 +/- 0.2	1.7 +/- 0.2
11/26/2007	12/3/2007	2.7 +/- 0.2	2.5 +/- 0.3	2.1 +/- 0.2
12/3/2007	12/10/2007	1.7 +/- 0.2	1.5 +/- 0.2	1.9 +/- 0.2
12/10/2007	12/17/2007	1.7 +/- 0.2	1.7 +/- 0.2	1.6 +/- 0.2
12/17/2007	12/24/2007	2.9 +/- 0.3	2.6 +/- 0.2	2.1 +/- 0.2
12/24/2007	12/31/2007	2.3 +/- 0.2	1.8 +/- 0.3	1.4 +/- 0.2

[1] Control Location
* <MDA

Table E-7
Concentration of Gamma Emitters in Air Particulates

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

Sample Date	A6 Long Beach	A7[1] Taylors Island	CAM Cambridge
1/15/2007	*	*	*
2/15/2007	*	*	*
3/15/2007	*	*	*
4/15/2007	*	*	*
5/15/2007	*	*	*
6/15/2007	*	*	*
7/15/2007	*	*	*
8/15/2007	*	*	*
9/15/2007	*	*	*
10/15/2007	*	*	*
11/15/2007	*	*	*
12/15/2007	*	*	*

[1] Control Location
*Non-Natural Gamma Emitters <MDA

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

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

Sample Date	H-3	Gamma Emitters
1/29/2007	<335	*
2/27/2007	<335	*
3/26/2007	<335	*
4/30/2007	<357	*
5/29/2007	<357	*
6/29/2007	<357	*
7/31/2007	<357	*
8/27/2007	<357	*
10/1/2007	<357	*
10/29/2007	<376	*
11/27/2007	<376	*
12/31/2007	<376	*

*Non-Natural Gamma Emitters <MDA

Table E-9
Direct Radiation as Measured in Pressurized Ion Chamber
(Results in units of mR/30 days +/- 10%)

Sample Code	Month		Month	
PIC1 [1]	JAN	5.64 +/- 0.56	FEB	5.66 +/- 0.57
Taylor's Island	MAR	5.93 +/- 0.59	APR	7.18 +/- 0.72
	MAY	7.25 +/- 0.72	JUN	6.92 +/- 0.69
	JUL	7.20 +/- 0.72	AUG	7.28 +/- 0.73
	SEP	7.17 +/- 0.72	OCT	7.10 +/- 0.71
	NOV	6.79 +/- 0.68	DEC	6.76 +/- 0.68
PIC2	JAN	4.31 +/- 0.43	FEB	4.36 +/- 0.44
Entrance to Camp	MAR	5.04 +/- 0.50	APR	4.67 +/- 0.47
Conoy	MAY	4.40 +/- 0.44	JUN	4.16 +/- 0.42
	JUL	4.20 +/- 0.42	AUG	4.22 +/- 0.42
	SEP	4.13 +/- 0.41	OCT	4.19 +/- 0.42
	NOV	4.21 +/- 0.42	DEC	4.20 +/- 0.42
PIC3	JAN	5.92 +/- 0.59	FEB	6.17 +/- 0.62
MET Station	MAR	6.09 +/- 0.61	APR	6.68 +/- 0.67
	MAY	6.71 +/- 0.67	JUN	7.02 +/- 0.70
	JUL	6.69 +/- 0.67	AUG	7.24 +/- 0.72
	SEP	6.75 +/- 0.68	OCT	6.68 +/- 0.67
	NOV	6.95 +/- 0.69	DEC	6.94 +/- 0.69
PIC4	JAN	11.65 +/- 1.16	FEB	11.74 +/- 1.17
NNW of ISFSI	MAR	11.88 +/- 1.19	APR	12.13 +/- 1.21
	MAY	11.66 +/- 1.17	JUN	11.87 +/- 1.19
	JUL	11.68 +/- 1.17	AUG	11.59 +/- 1.16
	SEP	11.48 +/- 1.15	OCT	11.46 +/- 1.15
	NOV	11.37 +/- 1.14	DEC	11.20 +/- 1.12
PIC5	JAN	10.81 +/- 1.08	FEB	10.81 +/- 1.08
SSE of ISFSI	MAR	10.67 +/- 1.07	APR	10.84 +/- 1.08
	MAY	7.00 +/- 0.70	JUN	6.65 +/- 0.66
	JUL	6.69 +/- 0.67	AUG	6.64 +/- 0.66
	SEP	6.52 +/- 0.65	OCT	6.59 +/- 0.66
	NOV	6.56 +/- 0.66	DEC	6.54 +/- 0.65
PIC8	JAN	5.00 +/- 0.50	FEB	5.14 +/- 0.51
Visitor's Center	MAR	5.20 +/- 0.52	APR	6.05 +/- 0.60
	MAY	5.52 +/- 0.55	JUN	4.86 +/- 0.49
	JUL	4.91 +/- 0.49	AUG	4.82 +/- 0.48
	SEP	4.81 +/- 0.48	OCT	4.85 +/- 0.48
	NOV	4.85 +/- 0.48	DEC	4.84 +/- 0.48

[1] Control location

Table E-10
Direct Radiation
(Results in units of mR/90 days +/- 2σ)

Site Code	Location	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
DR24	Rt. 4 and Parran Rd.	10.98 +/- 1.18	11.09 +/- 0.73	11.18 +/- 0.79	13.03 +/- 1.23
DR25	Camp Conoy Guard House	12.06 +/- 1.50	12.32 +/- 1.28	12.02 +/- 0.84	14.28 +/- 2.10
DR26	Rt. 235 and Clark's Landing Road	10.57 +/- 0.65	10.35 +/- 1.18	10.22 +/- 0.50	11.78 +/- 0.68
DR27	Rt. 231 and Rt. 4	10.66 +/- 0.66	10.13 +/- 0.68	10.41 +/- 1.44	12.20 +/- 0.74
DR28	Taylors Is. Siren #35	*	12.48 +/- 0.58	14.75 +/- 2.05	16.24 +/- 2.46
DR29	Taylors Is. Siren #38	14.38 +/- 1.92	12.49 +/- 1.87	14.14 +/- 1.45	16.30 +/- 2.17
DR31	Cambridge	13.17 +/- 1.48	14.88 +/- 2.17	15.57 +/- 1.08	16.91 +/- 1.74
DR32	Twining Property, Taylors Island	12.33 +/- 0.38	12.80 +/- 1.37	15.02 +/- 1.01	16.55 +/- 0.83
DR33	P. A. Ransome Property	28.64 +/- 2.70	14.17 +/- 2.11	15.33 +/- 1.13	17.83 +/- 1.70
DR34	Shoreline at Barge Rd.	9.57 +/- 0.71	9.16 +/- 0.80	8.87 +/- 0.71	10.18 +/- 0.65
OSG1	North of Old Steam Generator Storage Facility	18.65 +/- 1.17	18.64 +/- 2.40	19.87 +/- 1.80	21.56 +/- 0.93
OSG2	West of Old Steam Generator Storage Facility	16.57 +/- 1.53	18.26 +/- 3.18	16.70 +/- 2.23	20.26 +/- 2.04

*Lost TLD

Table E-11
Direct Radiation from Resin Storage Area
(Results in units of mR/90 days +/- 2σ)

Site Code	Location	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
RPDR05	North Fence Lower	57.91 +/- 4.19	196.41 +/- 22.99	44.99 +/- 3.54	43.78 +/- 3.85
RPDR06	North Fence Upper	50.20 +/- 7.06	138.67 +/- 2.96	59.31 +/- 9.13	8.79 +/- 0.49
RPDR07	West Fence Right	11.21 +/- 0.90	383.06 +/- 32.17	43.51 +/- 3.89	41.27 +/- 1.18
RPDR08	West Fence Left	14.32 +/- 0.65	363.55 +/- 50.59	7.87 +/- 0.25	9.88 +/- 0.94
RPDR09	South Fence Upper	15.41 +/- 1.14	215.35 +/- 4.74	13.84 +/- 0.92	13.31 +/- 1.31
RPDR10	South Fence Lower	32.09 +/- 3.04	406.48 +/- 36.49	42.46 +/- 2.92	15.97 +/- 2.12
RPDR11	East Fence Left	20.57 +/- 1.25	249.14 +/- 42.34	15.81 +/- 1.05	12.67 +/- 1.22
RPDR12	East Fence Right	20.04 +/- 1.99	122.12 +/- 14.15	8.13 +/- 0.73	59.39 +/- 6.67