ATTACHMENT (1)

ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT FOR THE

CALVERT CLIFFS NUCLEAR POWER PLANT

UNITS 1 AND 2

AND THE INDEPENDENT SPENT FUEL STORAGE INSTALLATION

Calvert Cliffs Nuclear Power Plant

May 13, 2022

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

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I. SUMMARY

During 2021, Calvert Cliffs Nuclear Power Plant (CCNPP) Units 1 and 2, a total of 2161 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), the Environmental Technical Specifications (Ref. 5) and the 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 953 radiochemical analyses were performed on 913 environmental samples; and 364 Optically Stimulated Luminescent Dosimeters (OSLDs) 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, 324 radiochemical analyses were performed on 304 environmental samples, 223 of which were in common with the original REMP. In addition, 320 OSLDs, 16 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).

Lastly, 283 radiochemical analyses were performed on 241 quality assurance samples and 160 quality assurance OSLDs were analyzed as part of an internal and external quality assurance program associated with Teledyne Brown Engineering. Laboratory inter-comparison samples obtained from Environmental Resource Associates (ERA) and Analytics' Inc. were also analyzed.

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

Monitoring the atmospheric environment involved sampling the air at various locations surrounding CCNPP and the ISFSI. Air particulates and gaseous iodine were collected on glass fiber filters and charcoal cartridges, respectively. The particulate filters were analyzed for beta activity and gamma emitting nuclides. The charcoal 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 OSLDs from forty-two locations surrounding CCNPP and the ISFSI.

Natural radioactivity was detected in essentially all 2161 radiological analyses performed. Low levels of man-made fission products were also observed in 9 of these analyses for the CCNPP REMP. Two of these observations were for low level Tritium and is attributed to normal plant operations. The other 7 observations were for Cs-137 and 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 by Murray and Trettel, Inc. using 2021 data from the plant's effluent releases, 2021 on-site meteorological data, and appropriate pathways. Details on these dose calculations and meteorological trends from 2021 are provided in the Annual Report on the Meteorological Monitoring Program at the Calvert Cliffs Nuclear Power Station 2021. The results of these dose calculations indicate:

a. a maximum thyroid dose of 1.53×10^{-3} mrem via liquid and gaseous pathways, which is about 0.00204% of the acceptable limit of 75 mrem/yr as specified in 40CFR190 "Environmental Radiation Protection Standards for Nuclear Power Operations" and 10CFR72.104, “Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste”;

b. a maximum whole-body dose of 1.75×10^{-3} mrem via liquid and gaseous pathways, which is about 0.007% of the acceptable limit of 25 mrem/yr as specified in both 40CFR190 and 10CFR72.104; and

c. a maximum calculated dose to all other organs via liquid and gaseous pathways was equal to 2.45×10^{-3} mrem. This dose is about 0.00980% of the allowable limit of 25 mrem/yr as specified in both 40CFR190 and 10CFR72.104.

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

The REMP has been conducted in the vicinity of 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.

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 Nuclear Regulatory Commission (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 Interlaboratory Comparison 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 40CFR190,

b. To detect any measurable buildup of long-lived radionuclides in the environment,

c. To monitor and evaluate ambient radiation levels, and

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 Exelon Generation according to Procedures (Ref. 7, 12 and 15).

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 which is the minimum detectable activity for each nuclide in that sample at the time of analysis.

II.B.4 Program Exceptions

GFCI trips on the air sampler resulted in lost samples at station A3 for air iodine and air particulate for the weeks ending March 8th and March 22nd 2021. These events were documented in the site's corrective action program in station Issue Reports 04407874 and 04411050 to document maintenance and trend future events should they occur.

A power failure occurred at the pole supplying power to the air sampler at station SFA4 for air iodine and air particulate for the week ending July 12th, 2021. This location is common to both the REMP and ISFSI programs. This event was documented in the site's corrective action program in station Issue Report 04434820 to document the event and trend future events should they occur.

There was one dosimetry program exception during this operating period.
DR22 in Quarter 4 dosimeters were lost. The dosimeters and their housing were completely missing in the field. New housing and dosimeters were deployed for the next quarter. These losses were captured in the Nuclear Corrective Action Program to document the events and trend future events should they occur.

Garden vegetation was unavailable from multiple locations through the months of June, July, and August due to high temperatures, lack of water and insect damage. Results are documented in Table B-8a. Alternative vegetation was collected from the vicinity of the sample locations where available as documented in station Issue Reports 04432295 and 04437716. Corrective actions have been implemented to improve garden conditions.

II.C. RESULTS AND DISCUSSIONS

All the environmental samples collected during the year were analyzed using Exelon Industrial Services laboratory procedures (Ref. 8), except Tritium which was analyzed by Teledyne Brown Engineering (Ref. 14) and Dosimetry analysis provided by Landauer using OSLDs (Ref. 17). 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 Aquatic Environment, Atmospheric Environment, Terrestrial Environment, and Direct Radiation. These categories are further divided into subcategories according to sample type (e.g. Bay Water and Aquatic Organisms for 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. The 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). Composite samples were obtained from 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 low level concentrations of Tritium in two samples at the Discharge Area (sample code WA2). Tritium was identified in the first quarterly sample collected from 12/31/2020 to 03/30/2021 at 346 +/- 133 pCi/L and the third quarterly sample collected from 06/29/2021 to 09/30/2021 at 345 +/- 126 pCi/L.

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).

Figure 2 compares K-40 and Ag-110m observed in oysters from Camp Conoy (IA3) with annual effluent releases of Ag-110m as reported in the Radioactive Effluent Release Report.

Edible portion of the fish and oyster samples were analyzed for gamma emitters.

Gamma spectrometric analyses of the fish exhibited naturally occurring K-40 but no detectable concentrations of any plant-related radionuclides. Oyster samples likewise exhibited naturally occurring K-40 but no detectable concentrations of any plant-related radionuclides.

II.C.1.c Shoreline Sediment

Semiannual shoreline sediment samples are taken from one location during the year. This location is Shoreline at Barge Road (sample code WB1). The semiannual shoreline sediment 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

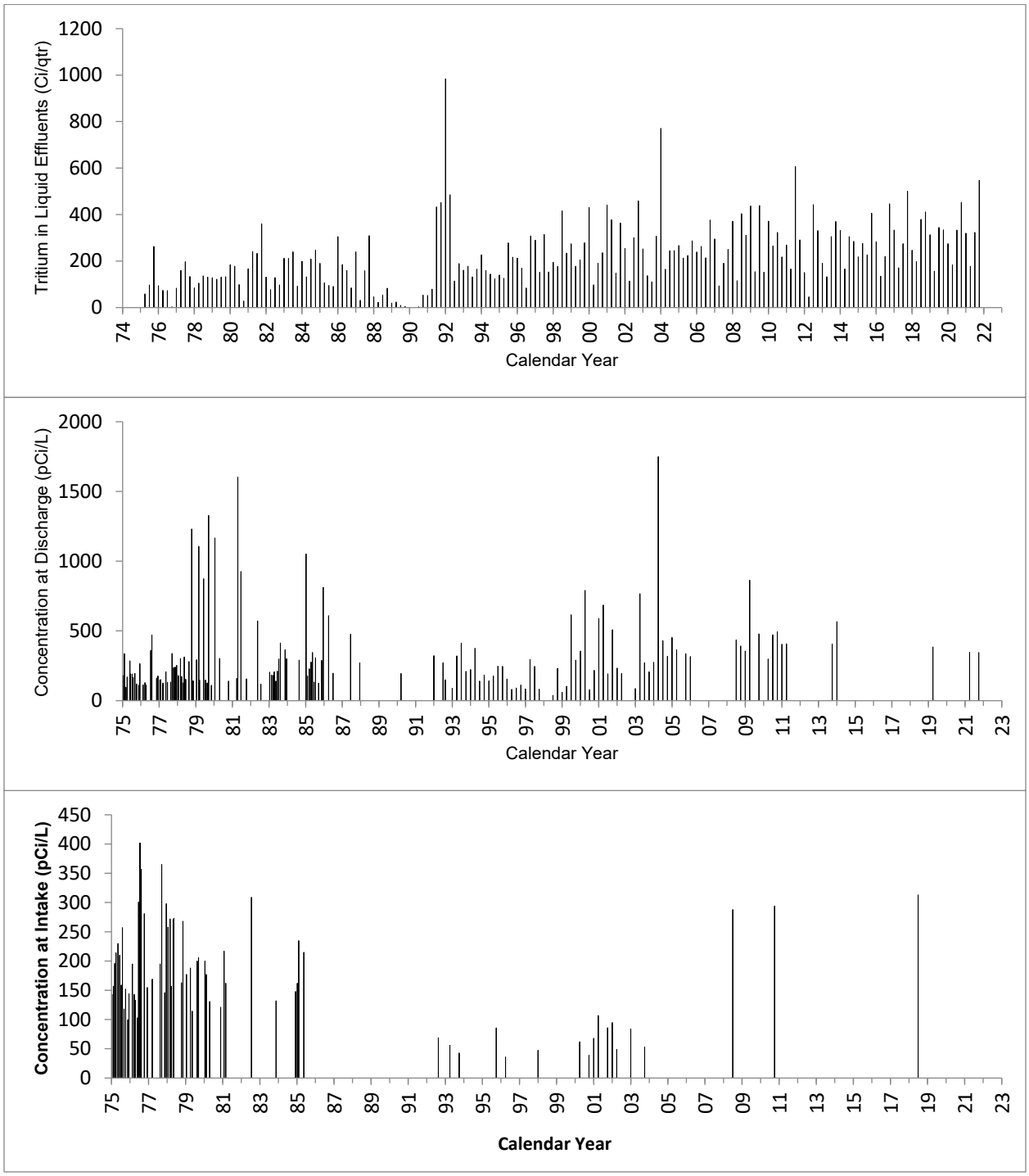
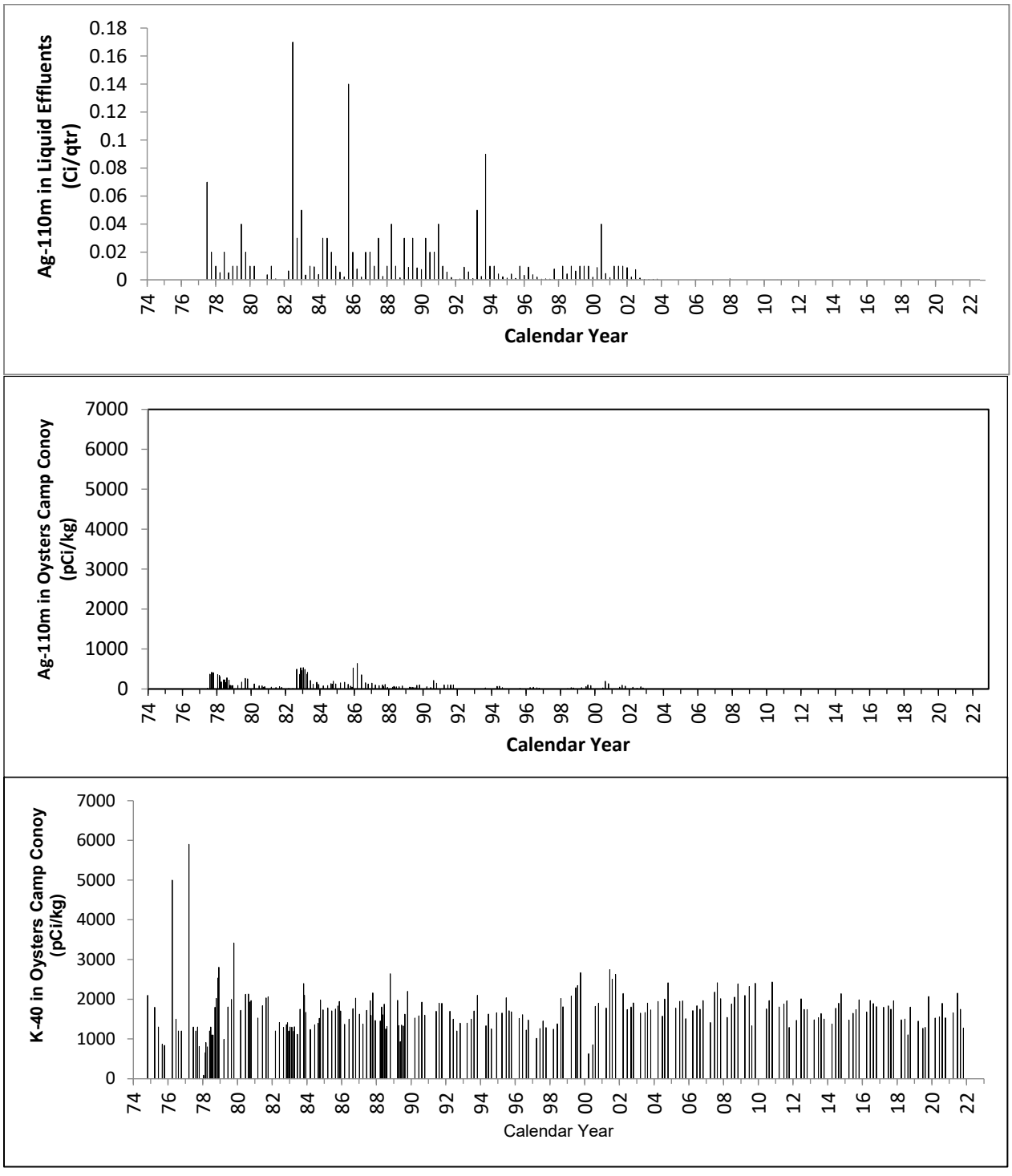


FIGURE 2
Silver-110m and Potassium-40 in Chesapeake Bay Oysters



II.C.2 Atmospheric Environment

The atmospheric environment was monitored by analyzing air particulate filters and charcoal cartridges (for trapping radioiodine species). Samples were collected from eight locations surrounding the plant. The locations are On Site Before 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), Meteorological Station (sample code SFA1), NNW of ISFSI (sample code SFA3), and SSE of ISFSI (sample code SFA4). Sample locations A1, SFA1, SFA3, and SFA4 are common to the REMP monitoring program and the ISFSI monitoring program.

II.C.2.a Air Particulate Filters

Weekly composite air particulate filter samples were collected from the eight locations, referenced, above 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 eight locations showed values characteristic of background levels. The values ranged from 0.9×10^{-2} to 4.1×10^{-2} pCi/m^3 for the indicator locations and 1.0×10^{-2} to 3.5×10^{-2} pCi/m^3 at the control location. The location with the highest overall mean of 2.2×10^{-2} pCi/m^3 was SFA3, NNW of the ISFSI.

Gamma spectrometric analyses of Quarterly composited air particulate weekly 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.

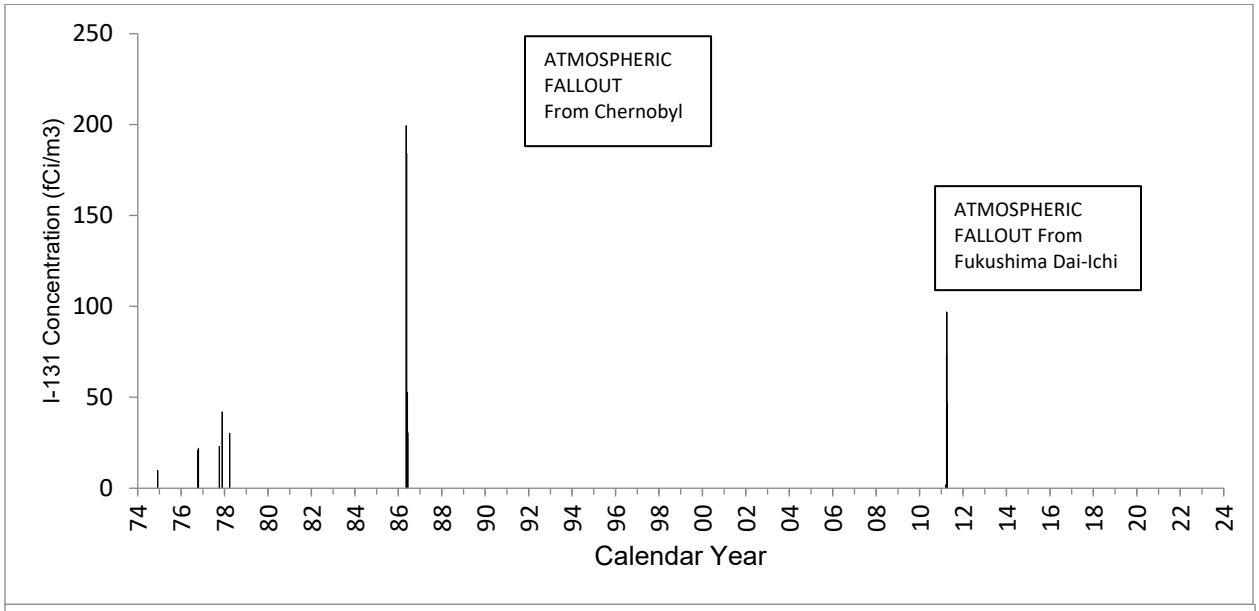
II.C.2.b Air Iodine

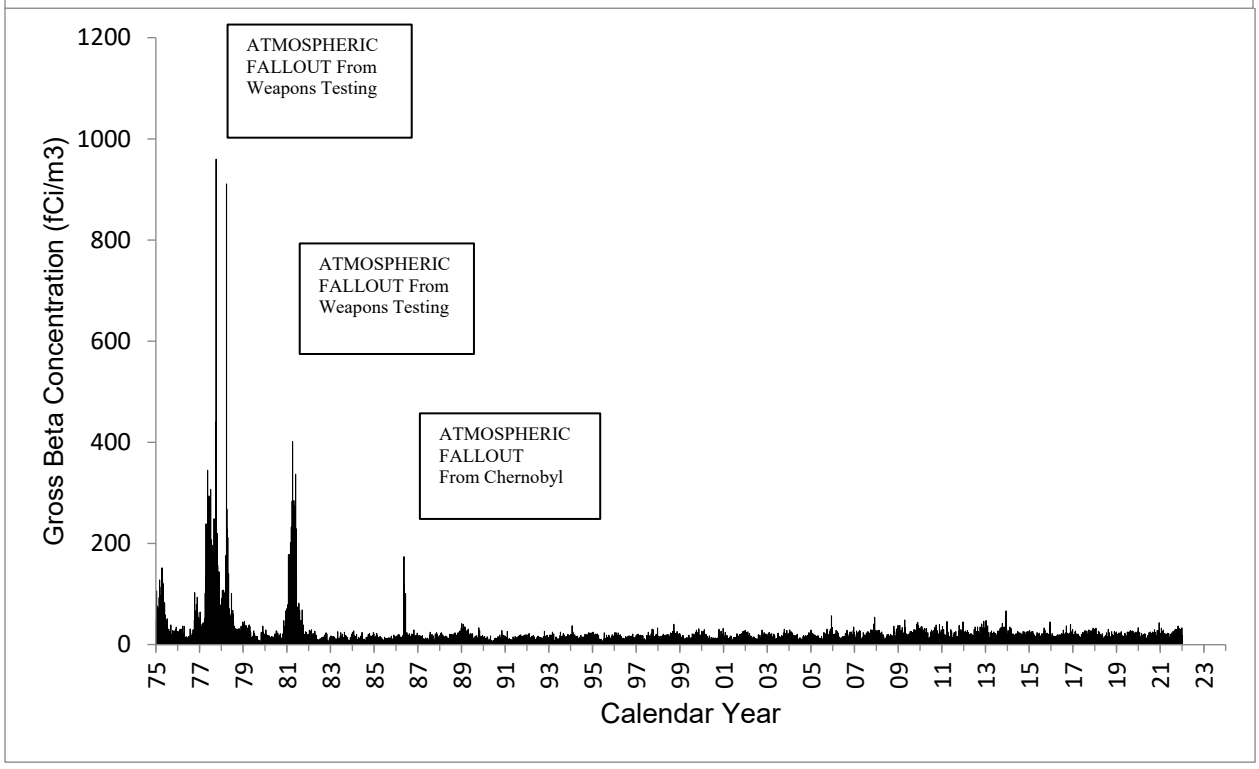
Weekly composited charcoal cartridges (for trapping radioiodine species) were collected from the eight locations, referenced above, during the year. These samples were analyzed for radioiodine species and exhibited no detectable concentrations of I-131 during the year.

Figure 3 depicts the historical trends of manmade radioiodine activity for location A4, Route 765 at Lusby including the impact I-131 due to significant events such as the fallout resulting from the accident event at Chernobyl in 1986 and the accident event at Fukushima Daiichi in 2011. These examples demonstrate the sensitivity of the CCNPP REMP. Since the REMP is able to detect fallout from nuclear accidents from across the world, it is clear that the REMP would be able to detect the environmental accumulation of radioactive material coming directly from CCNPP.

FIGURE 3
Nuclear Fallout in the Calvert Cliffs Area

SURFACE AIR VAPORS, LUSBY, MD (A4)





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.

II.C.3.a Vegetation

Vegetation samples were collected from three locations during the year. These locations are On Site Before Entrance to Camp Conoy (sample codes IB4, IB5, and IB6), the Emergency Operations Facility (sample codes IB7, IB8, and IB9), and the Garden Plot at Meteorological Station (sample codes IB10, IB11, and IB12). 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. No plant related radionuclides were found in any of these samples.

II.C.4 Direct Radiation

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

Environmental Dosimeters 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 Sand Dr (sample code DR4), Route 765 at 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), Calvert Beach Road & Decatur St (sample code DR10), Dirt Road off Mackall Rd & and Parran Rd (sample code DR11), Bowen Rd & Mackall Rd (sample code DR12), Mackall Rd near Wallville (sample code DR13), Rodney Point (sample code DR14), Mill Bridge Rd & Turner Rd (sample code DR15), Across from Appeal School (sample code DR16), Cove Point Rd & Little Cove Point Rd (sample code DR17), Cove Point (sample code DR18), Long Beach (sample code DR19), and Onsite 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, Anderson’s Property (sample code DR23).

In 2021 OSLDs were provided by and analyzed by Landauer, Inc. The 2021 mean 91-day ambient radiation measured at the indicator locations was 11.9 mrem and ranged from 8.9 to 16.8 mrem as reported in Table 2. The control locations showed a 91-day mean of 13.8 mrem with ranges from 10.3 to 19.1 mrem. The location with the highest overall mean of 17.0 was Taylors Island, Anderson’s Property (sample code DR23) which ranged from 13.9 to 19.1 mrem. Figure 4-a depicts the long-term trend of mean dosimeter exposure for the 4-mile, Control Location, and On-Site dosimeters. In June of 2018 the site adopted the requirements of the updated ANSI 13.34 standard which quantifies the dose due to the environment with enhanced accuracy and quality assurance by removing extraneous dose from the total measurement to give

a true facility related dose result. Dosimeters accumulate dose continuously and extraneous dose represents the dose accumulated before and after the time spent at the sample location so the true dose accumulated at that location can be accurately determined.

Figure 4-b depicts quarterly exposure at each Dosimeter location in 2021, with the locations ranked by increasing exposure. From these graphs, it can be seen that there is a slight bias towards higher exposure at the control locations outlined in bold. This is due to higher natural background radiation at DR23 (Taylor's Island, 7.8 miles from CCNPP). This slight bias is due to normal variations in background radiation levels and is consistent with pre-operational data.

Note that in figure 4-b, the ranking of DR22 is diminished because Q4 data was not available for that dosimetry location. This has been identified in the program exceptions section of this report.

For example, in figure 4a this trend can be observed in the first calendar year of the graph, 1973, which was a year prior to the first criticality of Unit 1 (October 7, 1974). Facility-related dose was not detected at any of the monitoring locations in 2021.

FIGURE 4a
Mean Dosimeter Gamma Dose, Calvert Cliffs Nuclear Power Plant

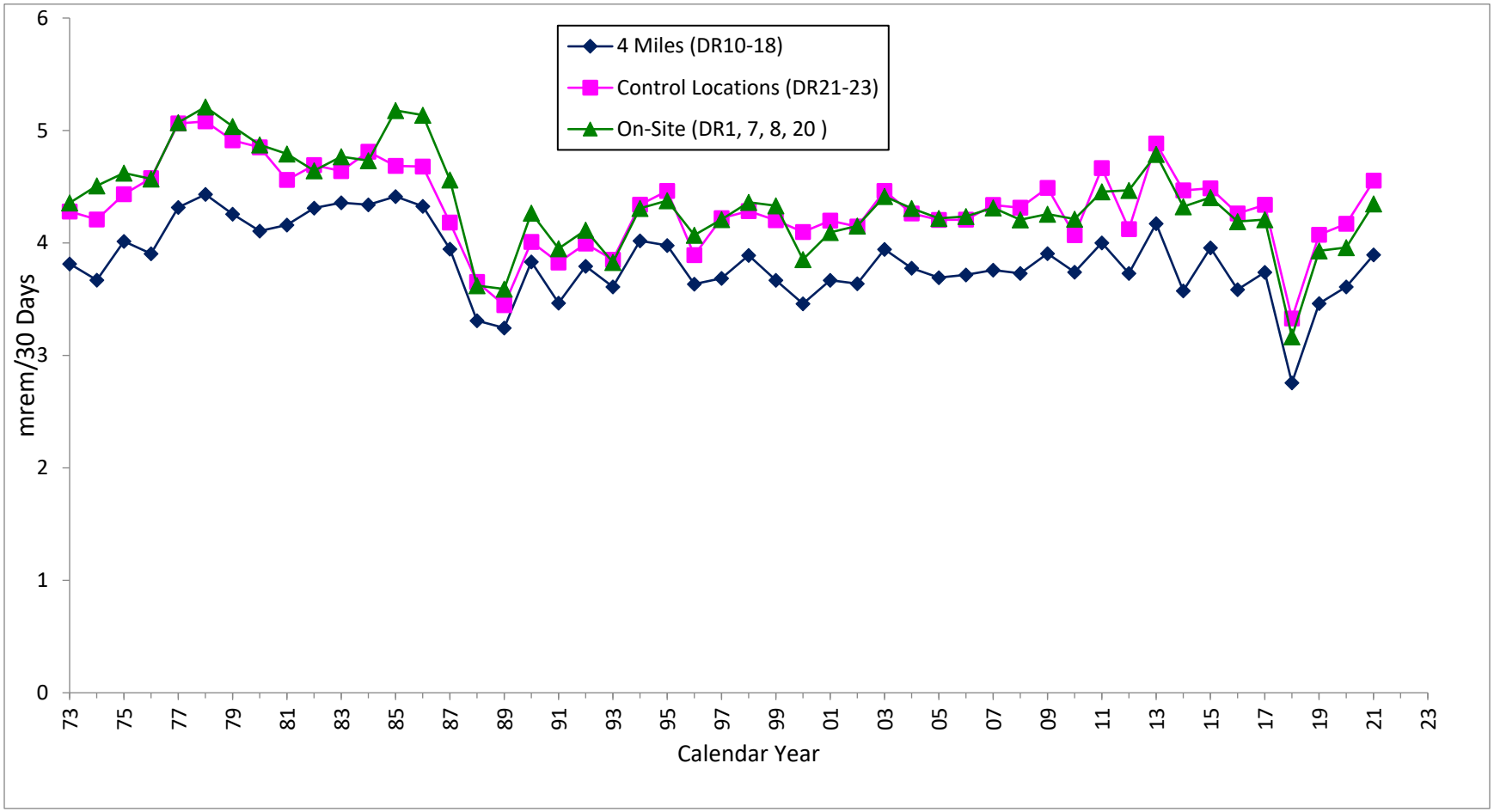
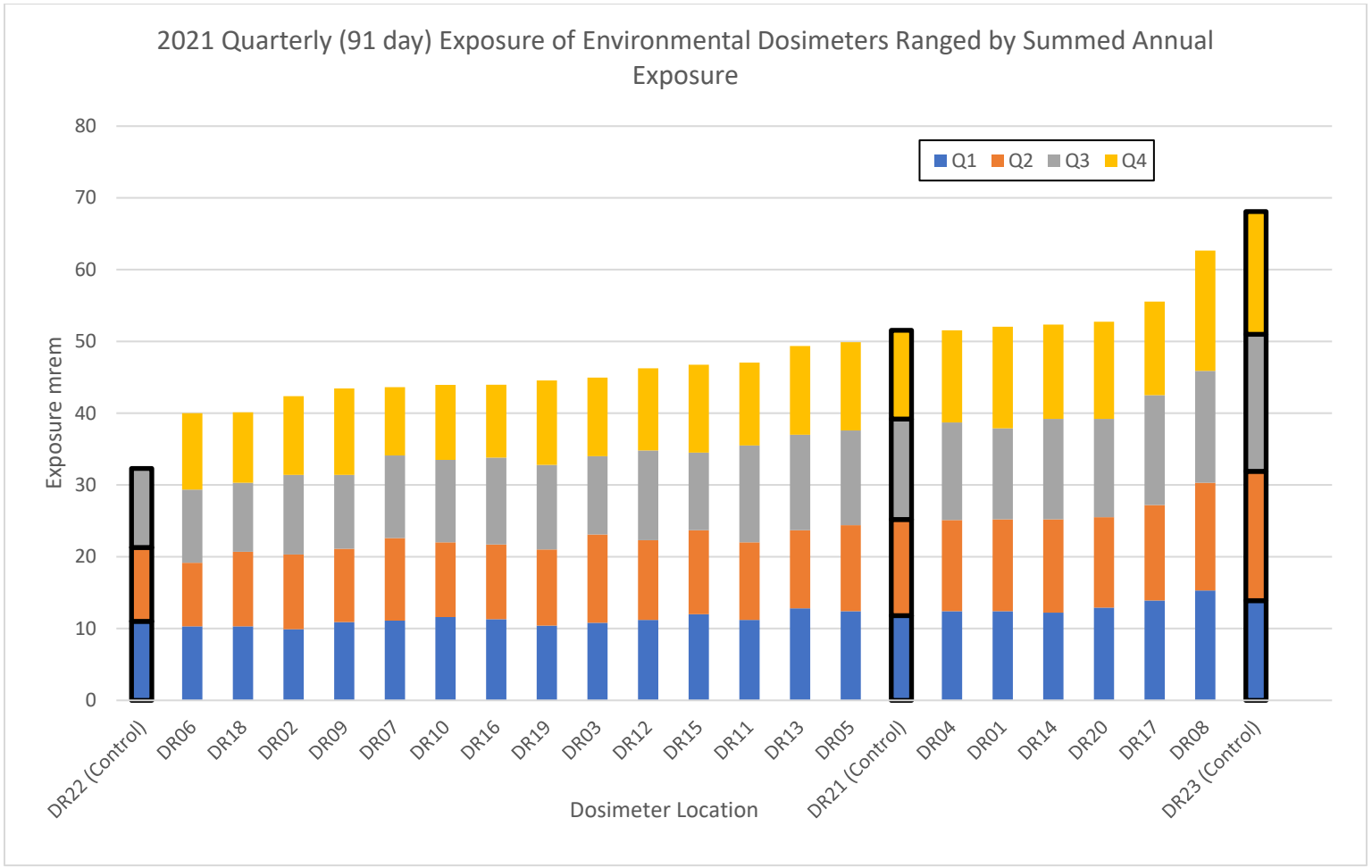


FIGURE 4b
2021 Quarterly Dosimeter Gamma Dose, per Location, Calvert Cliffs Nuclear Power Plant



II.D. CONCLUSION

No man-made fission or activation 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 OSLD 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 by Murray and Trettel, Inc. using the plant's 2020 effluent release data, on site meteorological data (see X/Q and D/Q values presented in Figures 5 and 6), and appropriate pathways. Details on these dose calculations and meteorological trends from 2020 are provided in the Annual Report on the Meteorological Monitoring Program at the Calvert Cliffs Nuclear Power Station 2020. The results of these dose calculations indicate:

Gaseous Pathways

A maximum thyroid dose of 4.04×10^{-5} mrem to a teen via the plume, ground, vegetable, and inhalation pathways at 1.1 miles SW of the containments at Calvert Cliffs.
This is about 0.0000539% of the acceptable limit of 75 mrem/yr as specified in 40CFR190 and 10CFR72.104.

A maximum whole-body gamma dose of 4.05×10^{-5} mrem to a teenager at 1.1 miles SW of the containments at Calvert Cliffs. This is about 0.000162% of the acceptable dose limit of 25 mrem/yr as specified in 40CFR190 and 10CFR72.104.

A maximum dose to any other organ, in this case the skin, of 4.10×10^{-5} mrem to a teenager at 1.1 miles SW of the containments at Calvert Cliffs. This is about 0.000164% of the acceptable dose limit of 25 mrem/yr as specified in 40CFR190 and 10CFR72.104.

Liquid Pathways

A maximum thyroid dose of 1.49×10^{-3} mrem to a teenager for all liquid pathways, which is about 0.00199% of the acceptable dose limit of 75 mrem/yr as specified in 40CFR190 and 10CFR72.104.

A maximum whole-body dose of 1.71×10^{-3} mrem to an teenager via all liquid pathways, which is about 0.00684 % of the acceptable dose limit of 25 mrem/yr as stated in 40CFR190 and 10CFR72.104.

A maximum dose to any other organ, in this case GI-Tract, of 2.41×10^{-3} mrem to a teenager for all pathways, which is 0.00964% of the acceptable dose limit of 25 mrem/yr specified in 40CFR190 and 10CFR72.104.

Gaseous and Liquid Pathways Combined

A maximum thyroid dose of 1.53 x 10^{-3} mrem via liquid and gaseous pathways, which is about 0.00204% of the acceptable limit of 75 mrem/yr as specified in 40CFR190 and 10CFR72.104.

A maximum whole-body dose of 1.75 x 10^{-3} mrem via liquid and gaseous pathways, which is about 0.00700% of the acceptable limit of 25 mrem/yr as specified in 40CFR190 and 10CFR72.104.

A maximum calculated dose to all other organs via liquid and gaseous pathways was equal to 2.45 x 10^{-3} mrem. This dose was about 0.00980% of the allowable limit of 25 mrem/yr as specified in 40CFR190 and 10CFR72.104.

In all cases, the calculated doses are a small fraction of the applicable limits specified in 40CFR190 and 10CFR72.104.

Therefore, it is concluded that the operation of Calvert Cliffs Units 1 and 2 produced radioactivity and ambient radiation levels significantly below the limits of the ODCM, 40CFR190, and 10CFR72.104. There was no significant buildup of plant-related radionuclides in the environment due to the operation of the CCNPP in 2021.

FIGURE 5

Atmospheric Dispersion Around CCNPP Average Relative Air Concentrations (X/Q)

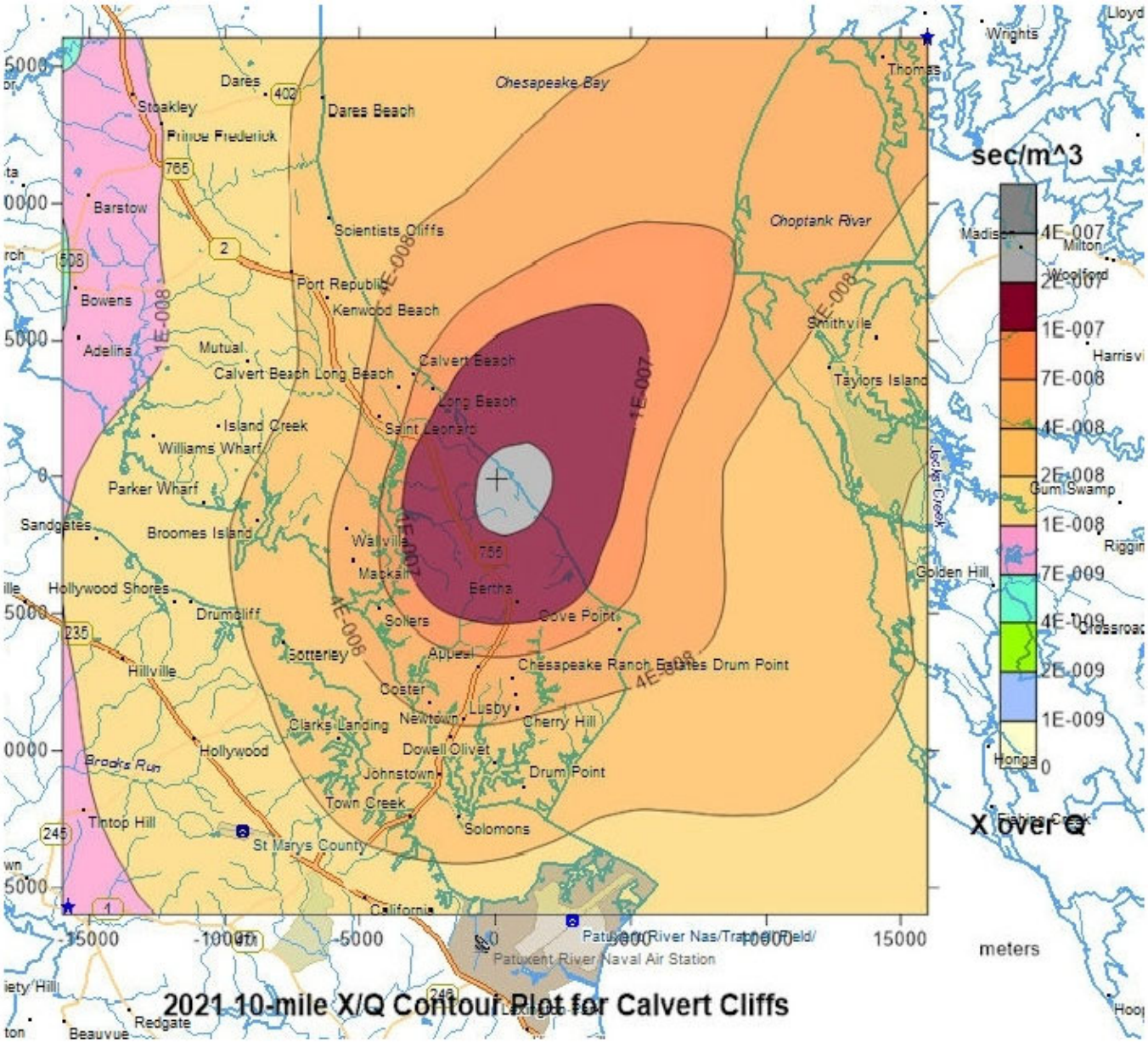


FIGURE 6

Atmospheric Dispersion Around CCNPP Average Relative Ground Deposition (D/Q)

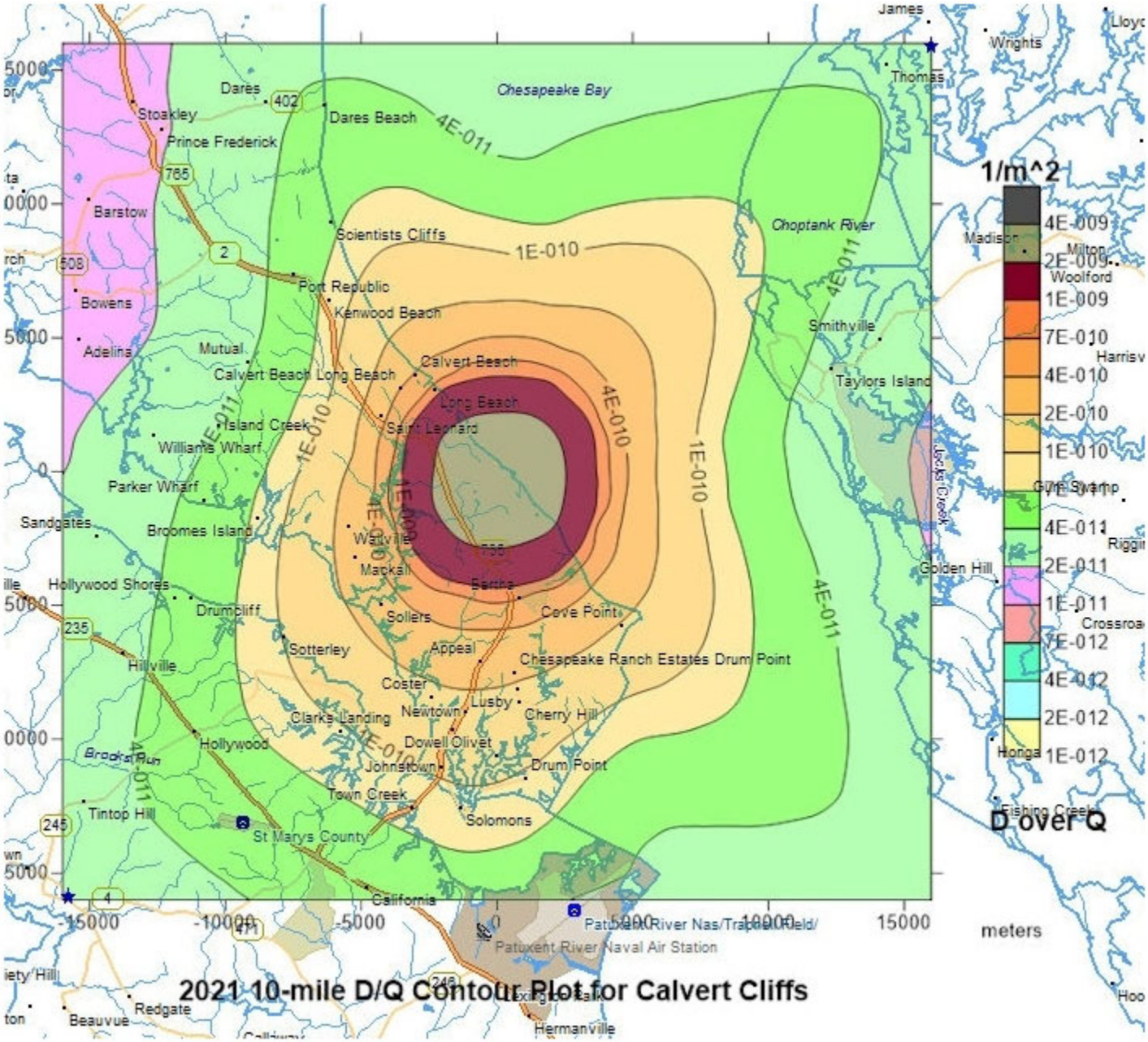


Table 1

Synopsis of 2021 Calvert Cliffs Nuclear Power Plant Radiological Environmental Monitoring Program

Sample Type	Sampling Frequency[1]	Number of Locations	Number Collected	Analysis	Analysis Frequency[1]	Number Analyzed
Aquatic Environment						
Bay Water	MC	2	24	Gamma	MC	24
				H-3	QC	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	8	421	I-131	W	421
Air Particulates[4]	W	8	421	Gross Beta	W	421
				Gamma	QC	32
Direct Radiation						
Ambient Radiation	Q	23	364	OSLD	Q	364
Terrestrial Environment						
Vegetation[5]	M	3	33	Gamma	M	33

[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 charcoal
[4] Beta counting is performed after >72-hour decay, Gamma spectroscopy performed on quarterly 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
Aquatic Environment						
Bay Water (pCi/L)	H-3 (8)	200	346 (2/4) (345-346)	Discharge Vicinity WA2 0.3 km N	346 (2/4) (345-346)	-- --
Atmospheric Environment						
Air Particulates (10^{-2} pCi/m^3)	Gross Beta (421)	0.5	2.1 (368/368) (0.9-4.1)	NNW of ISFSI SFA3 0.1 km NNW	2.2 (53/53) (1.1-3.8)	2.1 (53/53) (1.0-3.5)
Direct Radiation						
Ambient Radiation (mrem/91 days)	OSLD (364)	0.1	11.9 (320/320) (8.9-16.8)	Taylors Island DR23 12.4 km ENE	17.0 (18/18) (13.9-19.1)	13.8 (48/48) (10.3-19.1)

[1] Mean and range based upon detectable measurements only. Fraction (F) of detectable measurements at specified location is indicated in parentheses.
[2] Distance and direction from the central point 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. In 2021, the site transitioned to Holtec Hi-storm (Holtec International Storage Module) vertically ventilated storage overpack system for Independent Spent Fuel Storage installation. There were three such canisters of spent fuel 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.

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 results are discussed in more detail 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 40CFRPart190 and 10CFR72.104,

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, and

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, Exelon Industrial Services personnel according to Exelon Industrial Services 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 which is the minimum detectable activity for each nuclide in that sample at the time of analysis.

III.B.4 Program Exceptions

A power failure occurred at the pole supplying power to the air sampler at station SFA4 for air iodine and air particulate for the week ending July 12th, 2021. This location is common to both the REMP and ISFSI programs. This event was documented in the site's corrective action program in station Issue Report 04434820 to document the event and trend future events should they occur.

III.C. RESULTS AND DISCUSSIONS

All the environmental samples collected were analyzed using Exelon Industrial Services 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 Atmospheric Environment, 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), Meteorological Station (sample code SFA1), CCNPP Visitor's Center (sample code SFA2), NNW of the ISFSI (sample code SFA3), and SSE of the ISFSI (sample code SFA4). Sample

locations A1, SFA1, SFA3, and SFA4 are in common with CCNPP REMP Program. All 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 0.9 x 10^{-2} to 4.1 x 10^{-2} pCi/m^3 for the indicator locations and 1.1 x 10^{-2} to 3.4 x 10^{-2} pCi/m^3 for the control location. The location with the highest overall mean of 2.2 x 10^{-2} pCi/m^3 was SFA4, SSE of the ISFSI.

Gamma spectrometric analyses of quarterly 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).

No detectable concentrations of plant-related radionuclides were found in any of these samples. 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 six quarterly samples from indicator locations. The Cs-137 concentrations ranged from 54 ± 35 to 231 ± 74 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. The activities of this radionuclide are well below the federal limits established in 40CFR190 and 10CFR72.104. These 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 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 Environmental Dosimeters (OSLDs) surrounding the ISFSI. These dosimeters are collected quarterly from nineteen locations surrounding the ISFSI, plus one control 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); N 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); SW 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 2021 mean 91-day ambient radiation measured at the ISFSI indicator locations was 31.4 mrem and ranged from 9.5 to 74.2 mrem as reported in Table 4. The control location showed a 91-day mean of 14.4 mrem and ranged from 13.9 to 14.8 mrem. The location with the highest overall mean of 69.1 mrem with a range of 63.9 to 74.2 mrem was SFDR14, SE 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 dosimeter data from the indicator locations with the ISFSI control location at the Visitor's Center, SFDR7, can be seen in Figure 7.

Facility-related dose was detected NE of ISFSI (sample code SFDR4); East of ISFSI (sample code SFDR5);SSE of ISFSI (sample code SFDR9); South of ISFSI (sample code SFDR13); SE of ISFSI (sample code SFDR14); ENE of ISFSI (sample code SFDR15); SW of ISFSI (sample code SFDR16). This is expected as additional spent fuel casks are generally installed at the ISFSI each year. The ISFSI OSLDs are located directly around the perimeter of the ISFSI. Due to the proximity of these OSLDs to the spent fuel storage structures, they detect the small increase in radiation exposure each year. However, it is clear from Figure 4a that there is no observable direct radiation exposure of the public from the ISFSI, as the other REMP dosimeters (on-site, 4 miles, and beyond) show no observable increase in exposure when compared to control Dosimeters.

The 2021 mean 91-day Facility-related dose measured at the indicator locations was 22.8 mrem and ranged from 5.6 to 56.2 mrem. Facility-related dose was not detected at the control location. The location with the highest overall mean of 51.0 mrem was Southeast of ISFSI (sample code SFDR14 which ranged from 45.6 to 56.2 mrem. A summary of the 2021 results is shown in the table below.

2021 ISFSI Facility-related Dose Quarterly (91-Day) Summary		
	Mean Exposure (mrem)	**Range (mrem)**
Indicator Locations	22.8	5.6-56.2
Control Location	Not Detected	N/A
Highest Overall Location (SFDR14)	51.0	45.6-56.2

III.D. CONCLUSION

Low levels of Cs-137 were observed in the environment surrounding the ISFSI during the period. The Cs-137 observations were attributed to fallout from past atmospheric weapons testing. No plant-related radionuclides were 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 Dosimeter Gamma Dose, ISFSI

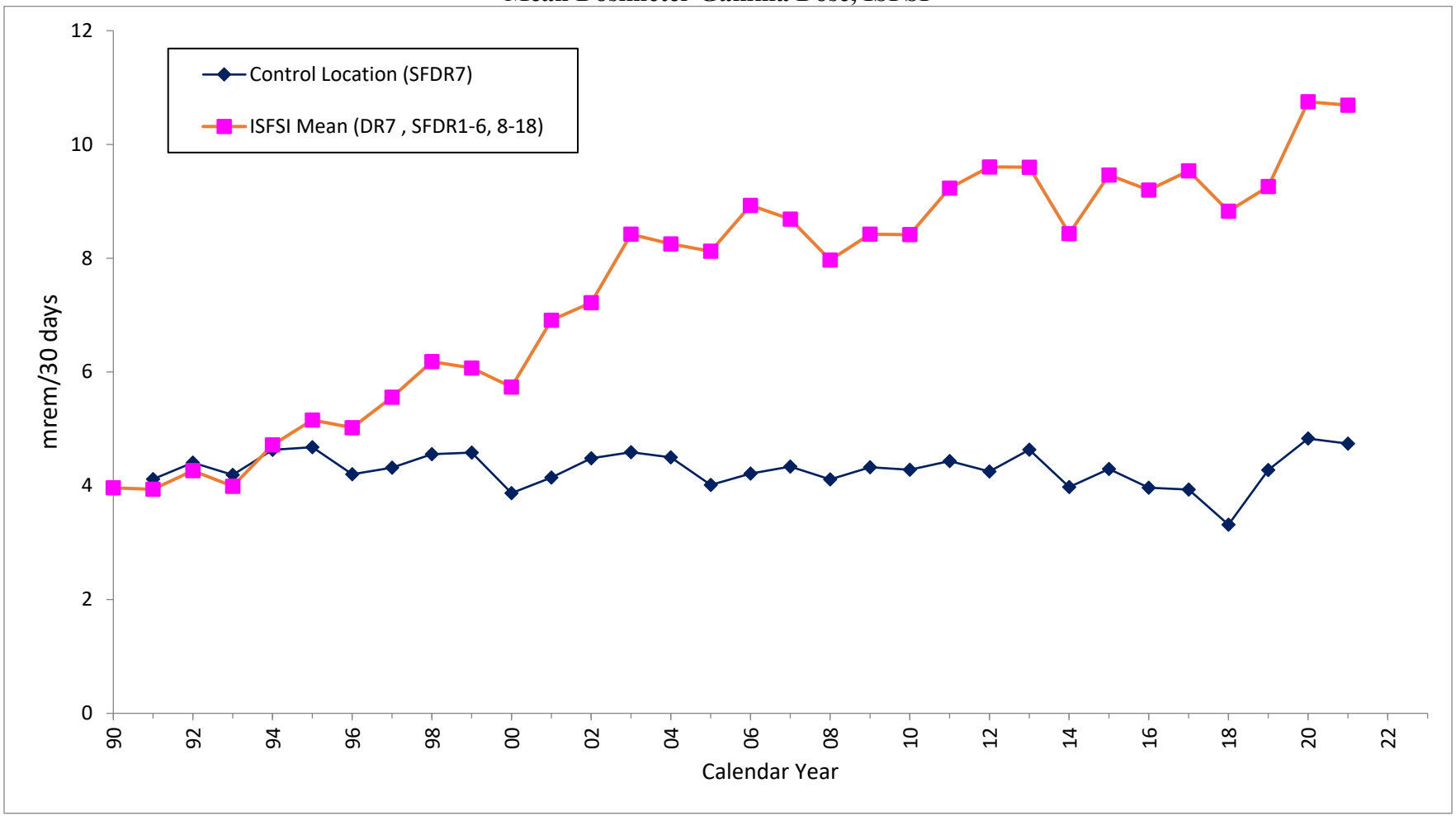


Table 3

Synopsis of 2021 Calvert Cliffs Nuclear Power Plant
Independent Spent Fuel Storage Installation
Radiological Environmental Monitoring Program

Sample Type	Sampling Frequency[1]	Number of Locations	Number Collected	Analysis	Analysis Frequency[1]	Number Analyzed
Atmospheric Environment						
Air Particulates[2]	W	5	264	Gross Beta	W	264
				Gamma	QC	20
Direct Radiation						
Ambient Radiation	Q	20	320	OSLD	Q	320
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
Atmospheric Environment						
Air Particulates (10^{-2} pCi/m^3)	Gross Beta (264)	0.5	2.2 (211/211) (0.9-4.1)	NNW of ISFSI SFA3 0.1 km NNW	2.2 (53/53) (1.1-3.8)	2.1 (53/53) (1.1-3.4)
Direct Radiation						
Ambient Radiation (mrem/91 days)	OSLDs (320)	0.1	31.4 (304/304) (9.5 - 74.2)	SE of ISFSI SFDR14 0.1 km SE	69.1 (16/16) (63.9 - 74.2)	14.4 (16/16) (13.9-14.8)
Terrestrial Environment						
Soil (pCi/kg)	Gamma (20) Cs-137	180	141 (6/16) (54-231)	NNW of ISFSI SFS3 0.1 km NNW	176 (4/4) (115-231)	-- --

[1] Mean and range based upon detectable measurements only. Fraction (F) of detectable measurements at specified location is indicated in parentheses.
[2] Distance and direction from the central point between the two containment buildings.

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) CY-CA-170-301 Current Revision, Offsite Dose Calculation Manual for the Calvert Cliffs Nuclear Power Plant.

(7) Exelon Industrial Services Sampling Procedures
a. CY-ES-214, Collection of RGPP Water Samples for Radiological Analysis
b. CY-ES-237, Air Iodine and Air Particulate Sample Collection for Radiological
c. CY-ES-239, EIS Collection Exchange of Field Dosimeters for Radiological Analysis
d. CY-ES-241, Vegetation Sample Collection for Radiological Analysis
e. CY-ES-242, Soil and Sediment Sample Collection for Radiological Analysis
f. CY-ES-247, Precipitation Sampling and Collection for Radiological Analysis

(8) Exelon Industrial Services Analytical Procedures
a. CY-ES-204, Sample Preparation for Gamma Analysis
b. CY-ES-205, Operation of HPGe Detectors with the Genie PC Counting System
c. CY-ES-206, Operation of the Tennelec S5E Proportional Counter
d. CY-ES-246, Sample Preparation for Gross Beta Analysis

(9) Land Use Census Around Calvert Cliffs Nuclear Power Plant, August 2021

(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) CY-AA-110-200, Current Revision, Sampling

(13) CY-AA-170-1000, Radiological Environmental Monitoring Program (REMP) and Meteorological Program Implementation.

(14) Teledyne Browne Engineering, (TBE) 2018 Analysis Procedures Current Revisions

a. TBE-2001 Alpha Isotopic and Pu-241
b. TBE-2006 Iron-55 Activity in Various Matrices
c. TBE-2007 Gamma Emitting Radioisotope Analysis
d. TBE-2008 Gross Alpha and/or Gross Beta Activity in Various Matrices
d. TBE-2011 Tritium Analysis in Drinking Water by Liquid Scintillation
e. TBE-2013 Radionickel Activity in Various Matrices
f. TBE-2019 Radiostrontium Analysis by Ion Exchange

(15) Normandeau Associates, Inc. (NAI) Sampling Procedures Current Revisions

a. Procedure No. ER20 Collection of Bottom Sediment for Radiological Analysis (Calvert Cliffs Nuclear Power Plant)

b. Procedure No. ER21 Collection of Fish Samples for Radiological Analysis (Calvert Cliffs Nuclear Power Plant)

c. Procedure No. ER22 Collection of Oyster Samples for Radiological Analysis (Calvert Cliffs Nuclear Power Plant

(16) EN-CA-408-4160 Current Revision, RGPP Reference Material for Calvert Cliffs

(17) Landauer Incorporated, Analysis procedure proprietary, Current Revision

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.

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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[2]	On Site Before Entrance to Camp Conoy	0.7	0.5	S
A2	Camp Conoy Rd, at emergency siren	2.5	1.5	SSE
A3	Bay Breeze Rd	2.6	1.6	SE
A4	Route 765, Lusby	2.9	1.8	SSW
A5	Emergency Operations Facility	19.3	12.1	WNW
DR01	On Site, along Cliffs	0.6	0.4	NW
DR02	Route 765, Auto Dump	2.7	1.7	WNW
DR03	Route 765, Giovanni's Tavern (Knotty Pine)	2.3	1.4	W
DR04	Route 765, across from Vera's Beach Club	2.0	1.2	WSW
DR05	Route 765, John's Creek	2.4	1.5	SW
DR06	Route 765, Lusby	2.9	1.8	SSW
DR07[2]	On Site Before Entrance to Camp Conoy	0.7	0.5	S
DR08	Camp Conoy Rd at Emergency Siren	2.5	1.5	SSE
DR09	Bay Breeze Rd	2.6	1.6	SE
DR10	Calvert Beach Rd and Decatur Street	6.4	4.0	NW
DR11	Dirt road off Mackall & Parren Rd	6.6	4.1	WNW
DR12	Mackall & Bowen Rds	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 & Turner Rds	6.2	3.9	SSW
DR16	Across from Appeal School	6.5	4.1	S
DR17	Cove Point & Little Cove Point Rds	5.9	3.7	SSE
DR18	Cove Point	7.1	4.5	SE
DR19	Long Beach	4.4	2.8	NW
DR20	On site, near shore	0.4	0.3	NNW
DR21	Emergency Operations Facility (EOF)	19.3	12.1	WNW
DR22	Solomons Island	12.5	7.8	S
DR23	Taylors Island, Anderson's Property	12.4	7.7	ENE
IA1	Discharge Area	0.3	0.2	N
IA2	Discharge Vicinity	0.3	0.2	N
IA3	Camp Conoy	0.9	0.6	E
IA4	Patuxent River	(Area not influenced		Patuxent
IA5	Patuxent river	by plant)		River
IA6	Kenwood Beach	10.7	6.7	NNW
IB10	Meteorological Station	0.7	0.4	SW
IB11	Meteorological Station	0.7	0.4	SW
IB12	Meteorological Station	0.7	0.4	SW
IB4	On site, before entrance to Camp Conoy	0.7	0.5	S
IB5	On site, before entrance to Camp Conoy	0.7	0.5	S
IB6	On site, before entrance to Camp Conoy	0.7	0.5	S
IB7	Emergency offsite facility	19.3	12.1	WNW
IB8	Emergency offsite facility	19.3	12.1	WNW
IB9	Emergency offsite facility	19.3	12.1	WNW
SFA1[2]	Meteorological Station	0.7	0.4	SW
SFA3[2]	NNW of ISFSI	0.6	0.4	SSW
SFA4[2]	SSE of ISFSI	0.8	0.5	SSW
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

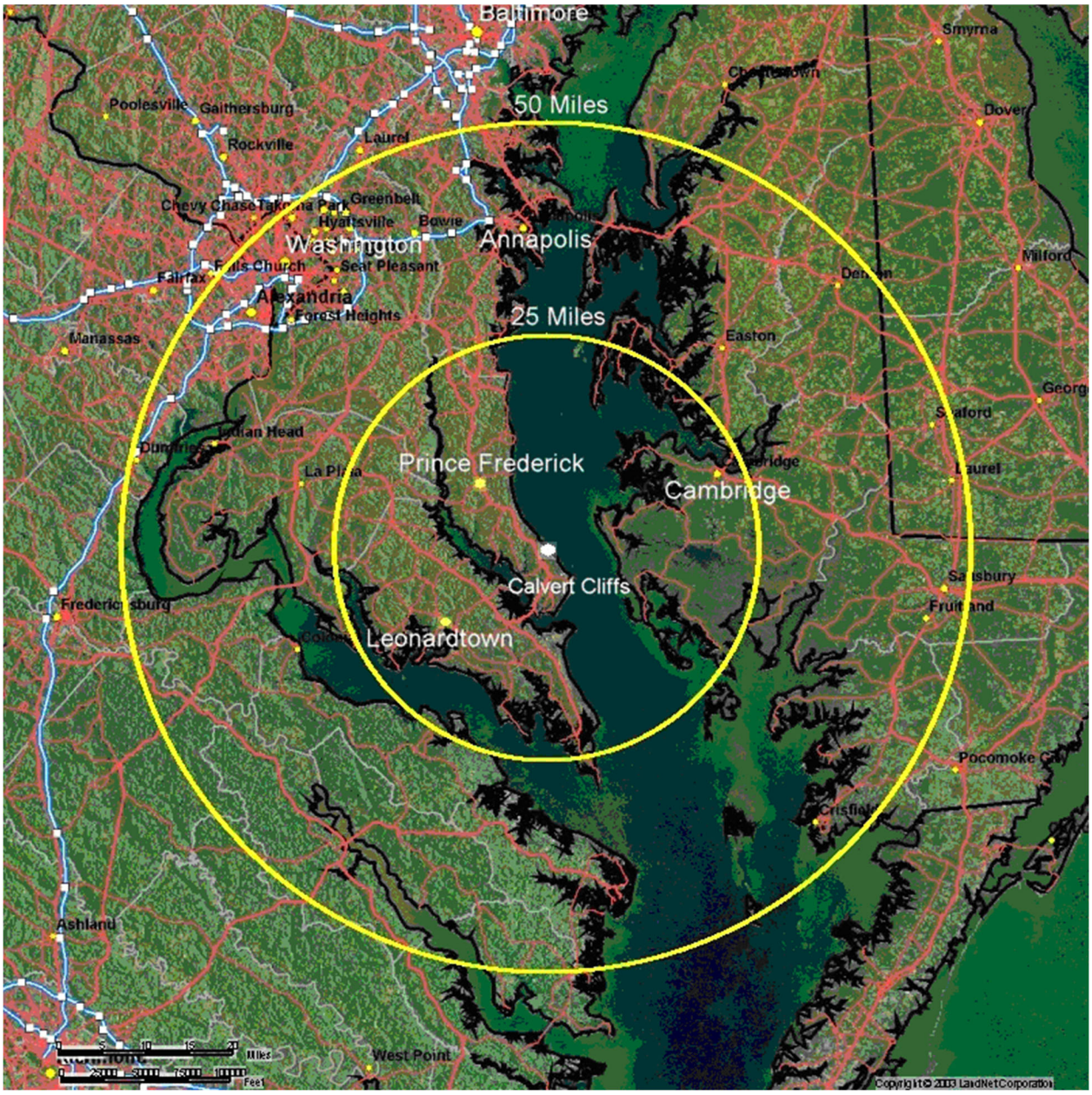


Figure A-2

Calvert Cliffs Nuclear Power Plant Sampling Locations
0-2 Miles

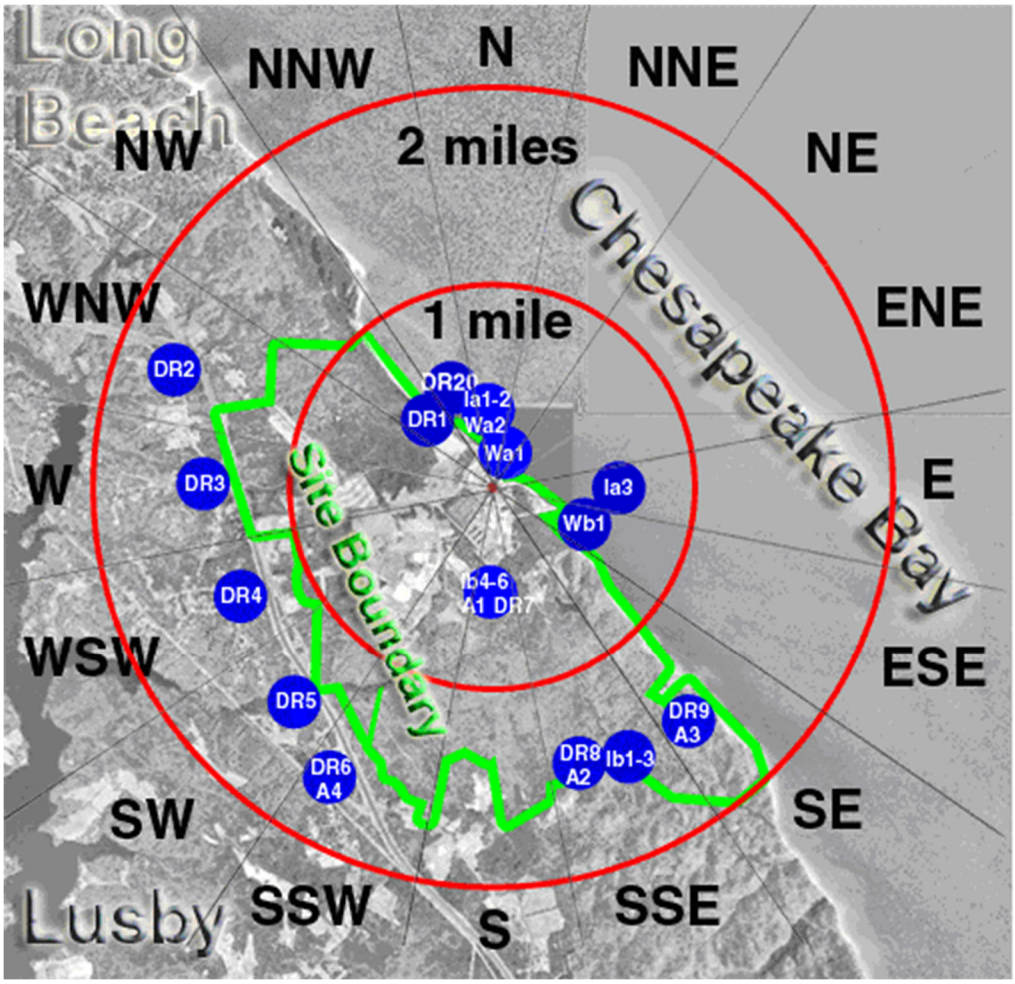


Figure A-3

Calvert Cliffs Nuclear Power Plant Sampling Locations
0-10 Miles

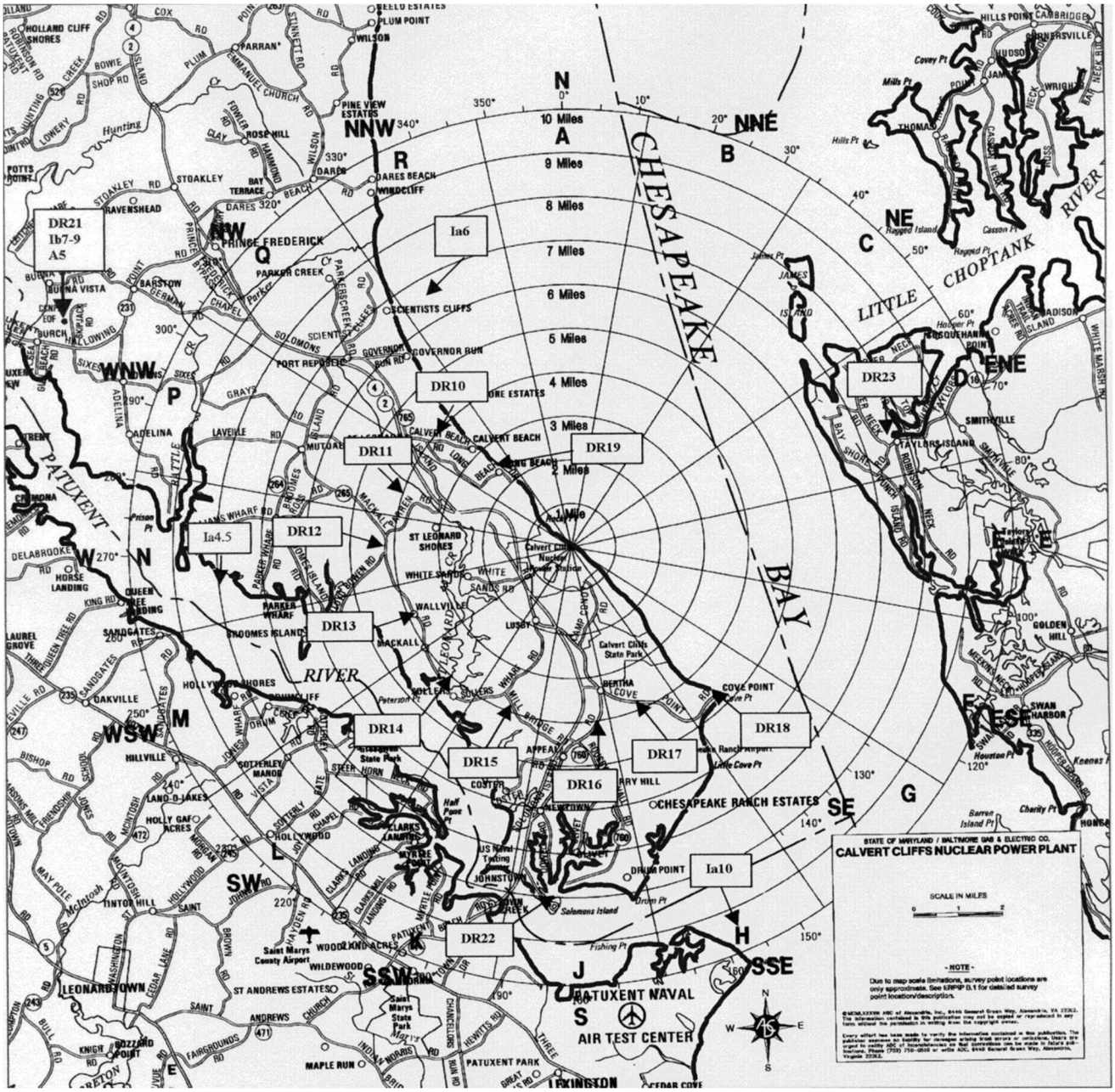


Table A-2

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[2]	Meteorological Station	0.3	NW
SFA2	CCNPP Visitor's Center	0.8	N
SFA3[2]	NNW of ISFSI	0.1	NNW
SFA4[2]	SSE of ISFSI	0.1	SSE
Direct Radiation			
DR07[2]	On Site Before Entrance to Camp Conoy	0.3	ESE
DR30	Meteorological Station	0.3	NW
SFDR01	SW of ISFSI	0.2	SW
SFDR02	N of ISFSI	0.2	N
SFDR03	North of ISFSI	0.1	N
SFDR04	NE of ISFSI	<0.1	NE
SFDR05	East of ISFSI	<0.1	E
SFDR06	ESE of ISFSI	0.1	ESE
SFDR07	CCNPP Visitor's Center	0.8	N
SFDR08	NNW of ISFSI	0.1	NNW
SFDR09	SSE of ISFSI	0.1	SSE
SFDR10	NW of ISFSI	0.1	NW
SFDR11	WNW ISFSI	0.1	WNW
SFDR12	WSW of ISFSI	<0.1	WSW
SFDR13	South of ISFSI	<0.1	S
SFDR14	SE of ISFSI	0.1	SE
SFDR15	ENE of ISFSI	<0.1	ENE
SFDR16	SW of ISFSI	<0.1	SW
SFDR17	NNE of ISFSI	0.1	NNE
SFDR18	West of ISFSI	0.04	W
Vegetation			
SFB1	ISFSI Vegetation Met Station	0.3	NW
SFB2	ISFSI Vegetation Visitors Center	0.8	N
SFB3	ISFSI Vegetation NNW of ISFSI	0.1	NNW
SFB4	ISFSI vegetation SSE of ISFSI	0.1	SSE
SFB5	On Site Before Entrance to Camp Conoy	0.3	ESE
Soil			
SFS1	ISFSI Soil Meteorological Station	0.3	NW
SFS2	ISFSI Soil CCNPP Visitors Center	0.8	N
SFS3	ISFSI Soil NNW of ISFSI	0.1	NNW
SFS4	ISFSI Soil SSE of ISFSI	0.1	SSE
SFS5	ISFSI Soil 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 the REMP and ISFSI monitoring program

Figure A-4

Independent Spent Fuel Storage Installation Sampling Locations

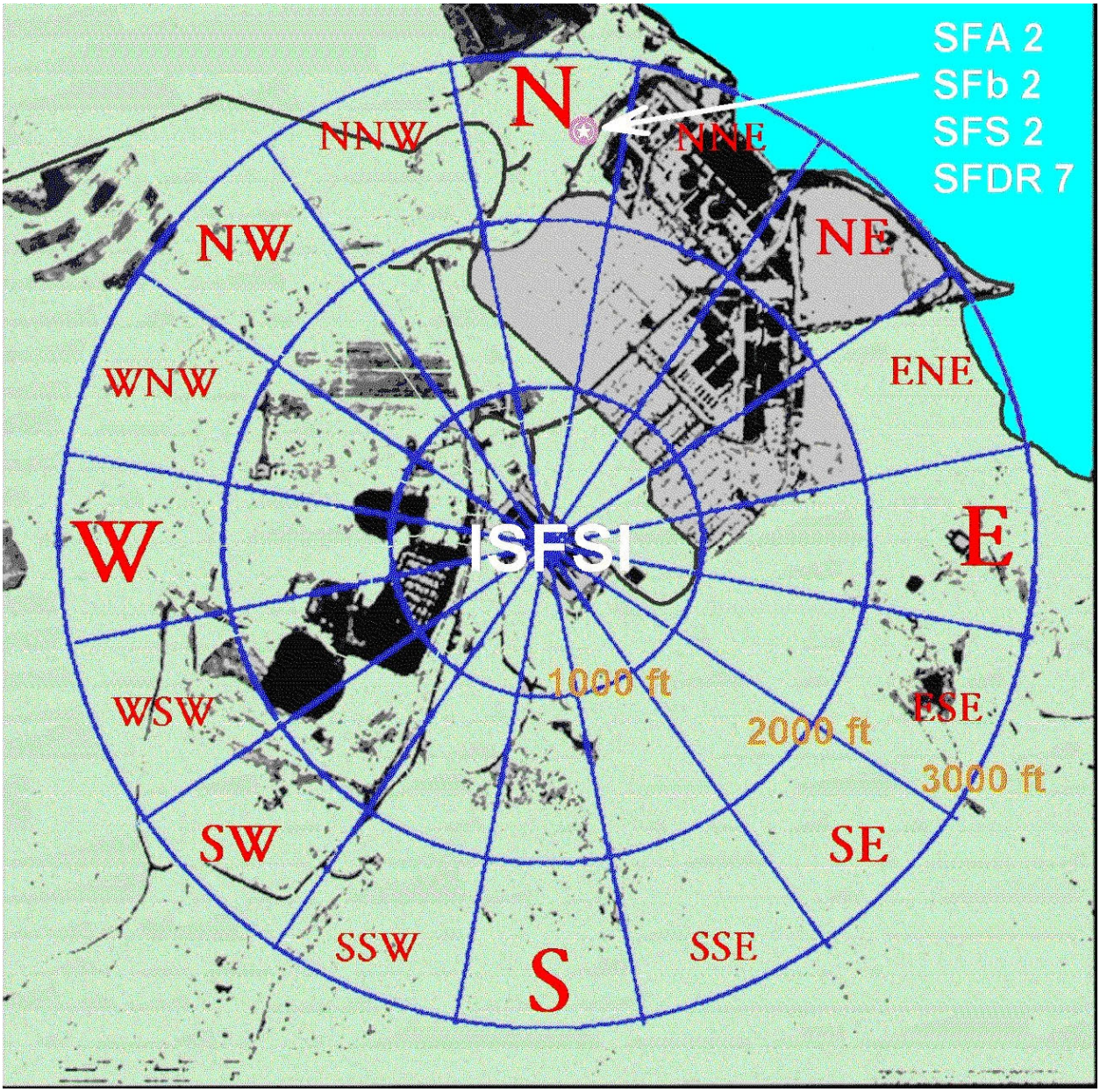
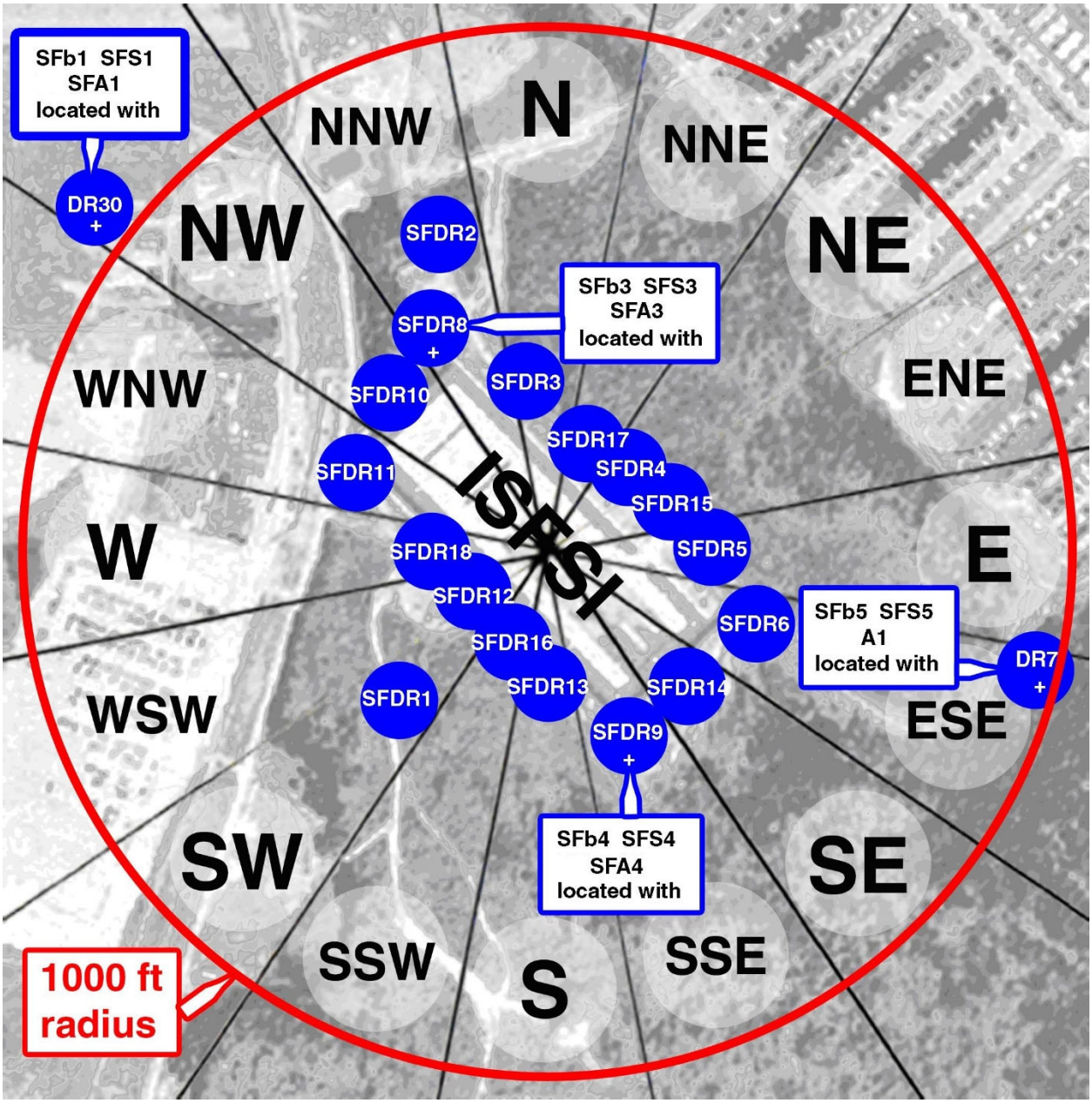


Figure A-5

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.

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Table B-1

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

Sample Code	Sample Date	Gamma Emitters	H-3[1]
WA1			
Intake Vicinity	1/29/2021	*	
	2/26/2021	*	
	3/30/2021	*	<190
	4/29/2021	*	
	6/1/2021	*	
	6/29/2021	*	<181
	7/30/2021	*	
	8/31/2021	*	
	9/30/2021	*	<179
	11/1/2021	*	
	12/2/2021	*	
	12/30/2021	*	<194
WA2			
Discharge Vicinity	1/29/2021	*	
	2/26/2021	*	
	3/30/2021	*	346+/-133
	4/29/2021	*	
	6/1/2021	*	
	6/29/2021	*	<184
	7/30/2021	*	
	8/31/2021	*	
	9/30/2021	*	345 +/- 126
	11/1/2021	*	
	12/2/2021	*	
	12/30/2021	*	<197

[1] Quarterly composite 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) ± 2 σ)

Sample Code	Sample Date	Sample Type	Gamma Emitters
IA1 Discharge Area	8/24/2021	Spanish Mackerel	*
IA2 Discharge Area	8/24/2021	Bluefish	*
IA4[1] Patuxent River	8/24/2021	Spanish Mackerel	*
IA5[1] Patuxent River	8/24/2021	Bluefish	*

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

Table B-3

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

Sample Code	Sample Date	Gamma Emitters
IA3		
Camp Conoy	3/24/2021	*
	6/23/2021	*
	8/24/2021	*
	10/26/2021	*
IA6[1]		
Kenwood Beach	3/24/2021	*
	6/23/2021	*
	8/24/2021	*
	10/26/2021	*

[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		
Shoreline at Barge Rd.	3/29/2021	*
	9/27/2021	*

* 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	SFA1[2] Met Sta	SFA3 NNW of ISFSI	SFA4 SSE of ISFSI
12/28/2020	1/5/2021	*	*	*	*	*	*	*	*
1/5/2021	1/11/2021	*	*	*	*	*	*	*	*
1/11/2021	1/19/2021	*	*	*	*	*	*	*	*
1/19/2021	1/25/2021	*	*	*	*	*	*	*	*
1/25/2021	2/3/2021	*	*	*	*	*	*	*	*
2/3/2021	2/8/2021	*	*	*	*	*	*	*	*
2/8/2021	2/15/2021	*	*	*	*	*	*	*	*
2/15/2021	2/22/2021	*	*	*	*	*	*	*	*
2/22/2021	3/1/2021	*	*	*	*	*	*	*	*
3/1/2021	3/8/2021	*	*	2	*	*	*	*	*
3/8/2021	3/15/2021	*	*	*	*	*	*	*	*
3/15/2021	3/22/2021	*	*	2	*	*	*	*	*
3/22/2021	3/29/2021	*	*	*	*	*	*	*	*
3/29/2021	4/5/2021	*	*	*	*	*	*	*	*
4/5/2021	4/12/2021	*	*	*	*	*	*	*	*
4/12/2021	4/19/2021	*	*	*	*	*	*	*	*
4/19/2021	4/26/2021	*	*	*	*	*	*	*	*
4/26/2021	5/3/2021	*	*	*	*	*	*	*	*
5/3/2021	5/10/2021	*	*	*	*	*	*	*	*
5/10/2021	5/17/2021	*	*	*	*	*	*	*	*
5/17/2021	5/24/2021	*	*	*	*	*	*	*	*
5/24/2021	6/1/2021	*	*	*	*	*	*	*	*
6/1/2021	6/9/2021	*	*	*	*	*	*	*	*
6/9/2021	6/14/2021	*	*	*	*	*	*	*	*
6/14/2021	6/21/2021	*	*	*	*	*	*	*	*
6/21/2021	6/28/2021	*	*	*	*	*	*	*	*
6/28/2021	7/6/2021	*	*	*	*	*	*	*	*
7/6/2021	7/12/2021	*	*	*	*	*	*	*	2
7/12/2021	7/19/2021	*	*	*	*	*	*	*	*
7/19/2021	7/26/2021	*	*	*	*	*	*	*	*
7/26/2021	8/2/2021	*	*	*	*	*	*	*	*
8/2/2021	8/9/2021	*	*	*	*	*	*	*	*
8/9/2021	8/16/2021	*	*	*	*	*	*	*	*
8/16/2021	8/23/2021	*	*	*	*	*	*	*	*
8/23/2021	8/30/2021	*	*	*	*	*	*	*	*
8/30/2021	9/7/2021	*	*	*	*	*	*	*	*
9/7/2021	9/14/2021	*	*	*	*	*	*	*	*
9/14/2021	9/20/2021	*	*	*	*	*	*	*	*
9/20/2021	9/27/2021	*	*	*	*	*	*	*	*

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	SFA1[2] Met Sta	SFA3 NNW of ISFSI	SFA4 SSE of ISFSI
9/27/2021	10/4/2021	*	*	*	*	*	*	*	*
10/4/2021	10/11/2021	*	*	*	*	*	*	*	*
10/11/2021	10/18/2021	*	*	*	*	*	*	*	*
10/18/2021	10/25/2021	*	*	*	*	*	*	*	*
10/25/2021	11/1/2021	*	*	*	*	*	*	*	*
11/1/2021	11/8/2021	*	*	*	*	*	*	*	*
11/8/2021	11/16/2021		*	*	*	*			
11/8/2021	11/17/2021	*					*	*	*
11/16/2021	11/22/2021		*	*	*	*			
11/17/2021	11/22/2021	*					*	*	*
11/22/2021	11/29/2021	*	*	*	*	*	*	*	*
11/29/2021	12/6/2021	*	*	*	*	*	*	*	*
12/6/2021	12/13/2021	*	*	*	*	*	*	*	*
12/13/2021	12/20/2021	*	*	*	*	*	*	*	*
12/20/2021	12/28/2021	*	*	*	*	*	*	*	*
12/28/2021	1/4/2022	*	*	*	*	*	*	*	*

[1] Control Location REMP Technical Specifications
[2] Lost Sample, power lost at the site
* 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
12/28/2020	1/5/2021	2.0 +/- 0.1	2.0 +/- 0.1	1.9 +/- 0.1	2.0 +/- 0.1	2.0 +/- 0.1
1/5/2021	1/11/2021	2.1 +/- 0.2	1.9 +/- 0.1	2.0 +/- 0.1	2.3 +/- 0.2	2.1 +/- 0.1
1/11/2021	1/19/2021	3.1 +/- 0.1	3.0 +/- 0.1	2.8 +/- 0.1	3.3 +/- 0.2	3.0 +/- 0.1
1/19/2021	1/25/2021	1.8 +/- 0.1	1.7 +/- 0.1	1.7 +/- 0.1	1.9 +/- 0.1	1.6 +/- 0.1
1/25/2021	2/3/2021	1.1 +/- 0.1	1.2 +/- 0.1	1.2 +/- 0.1	1.2 +/- 0.1	1.2 +/- 0.1
2/3/2021	2/8/2021	2.3 +/- 0.2	2.0 +/- 0.2	1.9 +/- 0.2	2.2 +/- 0.2	2.0 +/- 0.2
2/8/2021	2/15/2021	2.5 +/- 0.1	2.6 +/- 0.2	2.3 +/- 0.1	2.7 +/- 0.1	2.5 +/- 0.1
2/15/2021	2/22/2021	2.8 +/- 0.2	2.7 +/- 0.2	2.9 +/- 0.2	2.9 +/- 0.2	2.9 +/- 0.2
2/22/2021	3/1/2021	1.6 +/- 0.1	1.5 +/- 0.1	1.5 +/- 0.1	1.6 +/- 0.1	1.5 +/- 0.1
3/1/2021	3/8/2021	2.4 +/- 0.1	2.1 +/- 0.1	[2]	2.0 +/- 0.1	2.0 +/- 0.1
3/8/2021	3/15/2021	2.9 +/- 0.2	2.4 +/- 0.1	2.2 +/- 0.1	2.2 +/- 0.1	2.4 +/- 0.1
3/15/2021	3/22/2021	2.3 +/- 0.1	2.0 +/- 0.1	[2]	1.9 +/- 0.1	2.1 +/- 0.1
3/22/2021	3/29/2021	1.4 +/- 0.1	1.4 +/- 0.1	1.3 +/- 0.1	1.2 +/- 0.1	1.2 +/- 0.1
3/29/2021	4/5/2021	2.4 +/- 0.1	2.2 +/- 0.1	2.0 +/- 0.2	2.1 +/- 0.1	2.1 +/- 0.1
4/5/2021	4/12/2021	1.9 +/- 0.1	1.7 +/- 0.1	1.7 +/- 0.1	1.7 +/- 0.1	1.7 +/- 0.1
4/12/2021	4/19/2021	1.1 +/- 0.1	1.1 +/- 0.1	1.1 +/- 0.1	1.0 +/- 0.1	1.0 +/- 0.1
4/19/2021	4/26/2021	2.2 +/- 0.1	2.4 +/- 0.1	2.4 +/- 0.1	2.1 +/- 0.1	2.3 +/- 0.1
4/26/2021	5/3/2021	2.5 +/- 0.1	2.6 +/- 0.1	2.5 +/- 0.1	2.3 +/- 0.1	2.3 +/- 0.1
5/3/2021	5/10/2021	1.1 +/- 0.1	1.4 +/- 0.1	1.3 +/- 0.1	1.1 +/- 0.1	1.1 +/- 0.1
5/10/2021	5/17/2021	1.7 +/- 0.1	1.7 +/- 0.1	1.6 +/- 0.1	1.5 +/- 0.1	1.6 +/- 0.1
5/17/2021	5/24/2021	2.2 +/- 0.1	2.5 +/- 0.1	2.2 +/- 0.1	2.2 +/- 0.1	2.1 +/- 0.1
5/24/2021	6/1/2021	1.5 +/- 0.1	1.5 +/- 0.1	1.3 +/- 0.1	1.4 +/- 0.1	1.5 +/- 0.1
6/1/2021	6/9/2021	1.6 +/- 0.1	1.6 +/- 0.1	1.4 +/- 0.1	1.5 +/- 0.1	1.6 +/- 0.1
6/9/2021	6/14/2021	1.3 +/- 0.1	1.0 +/- 0.1	1.2 +/- 0.1	1.2 +/- 0.1	1.2 +/- 0.1
6/14/2021	6/21/2021	2.1 +/- 0.1	1.9 +/- 0.1	2.0 +/- 0.1	2.1 +/- 0.1	2.1 +/- 0.1
6/21/2021	6/28/2021	1.3 +/- 0.1	1.1 +/- 0.1	1.2 +/- 0.1	1.2 +/- 0.1	1.2 +/- 0.1
6/28/2021	7/6/2021	1.2 +/- 0.1	1.2 +/- 0.1	1.2 +/- 0.1	1.3 +/- 0.1	1.3 +/- 0.1
7/6/2021	7/12/2021	3.9 +/- 0.2	3.9 +/- 0.2	3.4 +/- 0.2	2.3 +/- 0.2	2.1 +/- 0.1
7/12/2021	7/19/2021	2.1 +/- 0.1	2.0 +/- 0.1	2.0 +/- 0.1	1.9 +/- 0.1	2.0 +/- 0.1
7/19/2021	7/26/2021	2.2 +/- 0.1	2.1 +/- 0.1	2.3 +/- 0.1	2.0 +/- 0.1	2.2 +/- 0.1
7/26/2021	8/2/2021	2.9 +/- 0.2	2.8 +/- 0.2	2.7 +/- 0.2	2.6 +/- 0.2	2.6 +/- 0.1
8/2/2021	8/9/2021	2.0 +/- 0.1	1.7 +/- 0.1	1.8 +/- 0.1	1.8 +/- 0.1	1.9 +/- 0.1
8/9/2021	8/16/2021	2.2 +/- 0.1	2.1 +/- 0.1	2.2 +/- 0.1	2.3 +/- 0.1	2.2 +/- 0.1
8/16/2021	8/23/2021	1.4 +/- 0.1	1.3 +/- 0.1	1.4 +/- 0.1	1.3 +/- 0.1	1.4 +/- 0.1
8/23/2021	8/30/2021	2.8 +/- 0.2	3.0 +/- 0.2	3.0 +/- 0.2	2.9 +/- 0.2	3.1 +/- 0.2
8/30/2021	9/7/2021	2.1 +/- 0.1	2.2 +/- 0.1	2.0 +/- 0.1	2.1 +/- 0.1	2.4 +/- 0.1
9/7/2021	9/14/2021	3.3 +/- 0.2	3.2 +/- 0.2	3.3 +/- 0.2	3.0 +/- 0.2	2.9 +/- 0.2

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
9/14/2021	9/20/2021	2.7 +/- 0.2	2.5 +/- 0.2	2.8 +/- 0.2	2.4 +/- 0.2	2.2 +/- 0.1
9/20/2021	9/27/2021	1.7 +/- 0.1	1.9 +/- 0.1	1.8 +/- 0.1	1.8 +/- 0.1	1.7 +/- 0.1
9/27/2021	10/4/2021	3.0 +/- 0.2	3.0 +/- 0.2	3.1 +/- 0.2	3.0 +/- 0.2	3.5 +/- 0.2
10/4/2021	10/11/2021	1.7 +/- 0.1	2.6 +/- 0.1	1.9 +/- 0.1	1.8 +/- 0.1	1.9 +/- 0.1
10/11/2021	10/18/2021	2.2 +/- 0.1	2.4 +/- 0.1	2.3 +/- 0.1	2.1 +/- 0.1	1.9 +/- 0.1
10/18/2021	10/25/2021	3.5 +/- 0.2	3.2 +/- 0.2	3.4 +/- 0.2	3.7 +/- 0.2	3.1 +/- 0.2
10/25/2021	11/1/2021	1.2 +/- 0.1	1.2 +/- 0.1	1.3 +/- 0.1	1.3 +/- 0.1	1.3 +/- 0.1
11/1/2021	11/8/2021	1.7 +/- 0.1	1.7 +/- 0.1	1.9 +/- 0.1	1.8 +/- 0.1	1.9 +/- 0.1
11/8/2021	11/16/2021		2.7 +/- 0.1	2.5 +/- 0.1	3.2 +/- 0.2	2.9 +/- 0.2
11/8/2021	11/17/2021	2.8 +/- 0.1				
11/16/2021	11/22/2021		1.9 +/- 0.1	1.9 +/- 0.1	2.0 +/- 0.2	2.3 +/- 0.2
11/17/2021	11/22/2021	2.0 +/- 0.2				
11/22/2021	11/29/2021	2.1 +/- 0.1	1.9 +/- 0.1	2.1 +/- 0.1	2.1 +/- 0.1	2.2 +/- 0.2
11/29/2021	12/6/2021	2.8 +/- 0.2	2.6 +/- 0.2	2.6 +/- 0.2	3.0 +/- 0.2	3.0 +/- 0.2
12/6/2021	12/13/2021	2.6 +/- 0.1	2.2 +/- 0.1	2.7 +/- 0.2	2.4 +/- 0.1	3.0 +/- 0.2
12/13/2021	12/20/2021	2.2 +/- 0.1	1.9 +/- 0.1	2.2 +/- 0.1	2.1 +/- 0.1	2.3 +/- 0.2
12/20/2021	12/28/2021	3.5 +/- 0.2	3.1 +/- 0.2	3.7 +/- 0.2	3.3 +/- 0.2	3.3 +/- 0.2
12/28/2021	1/4/2022	1.9 +/- 0.1	1.6 +/- 0.1	1.8 +/- 0.1	1.8 +/- 0.1	2.0 +/- 0.1

[1] Control Location
[2] Lost Sample, power lost at the site

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
12/28/2020	1/5/2021	1.9 +/- 0.1	2.0 +/- 0.1	1.9 +/- 0.1	2.2 +/- 0.1
1/5/2021	1/11/2021	1.8 +/- 0.1	2.2 +/- 0.2	2.0 +/- 0.1	2.1 +/- 0.2
1/11/2021	1/19/2021	2.7 +/- 0.1	3.3 +/- 0.2	3.1 +/- 0.1	3.5 +/- 0.2
1/19/2021	1/25/2021	1.5 +/- 0.1	1.7 +/- 0.1	1.7 +/- 0.1	1.7 +/- 0.1
1/25/2021	2/3/2021	0.9 +/- 0.1	1.2 +/- 0.1	1.1 +/- 0.1	1.2 +/- 0.1
2/3/2021	2/8/2021	1.9 +/- 0.2	2.1 +/- 0.2	2.1 +/- 0.2	2.3 +/- 0.2
2/8/2021	2/15/2021	2.2 +/- 0.1	2.8 +/- 0.2	2.4 +/- 0.1	2.8 +/- 0.2
2/15/2021	2/22/2021	2.6 +/- 0.1	3.0 +/- 0.2	2.7 +/- 0.2	2.9 +/- 0.2
2/22/2021	3/1/2021	1.4 +/- 0.1	1.8 +/- 0.1	1.6 +/- 0.1	1.5 +/- 0.1
3/1/2021	3/8/2021	2.1 +/- 0.1	2.6 +/- 0.2	2.4 +/- 0.1	2.3 +/- 0.1
3/8/2021	3/15/2021	2.3 +/- 0.1	2.9 +/- 0.2	2.8 +/- 0.2	2.8 +/- 0.2
3/15/2021	3/22/2021	1.9 +/- 0.1	2.3 +/- 0.1	2.2 +/- 0.1	2.2 +/- 0.1
3/22/2021	3/29/2021	1.2 +/- 0.1	1.5 +/- 0.1	1.5 +/- 0.1	1.3 +/- 0.1
3/29/2021	4/5/2021	2.2 +/- 0.1	2.6 +/- 0.1	2.5 +/- 0.1	2.4 +/- 0.1
4/5/2021	4/12/2021	1.4 +/- 0.1	2.0 +/- 0.1	1.9 +/- 0.1	1.9 +/- 0.1
4/12/2021	4/19/2021	0.9 +/- 0.1	1.2 +/- 0.1	1.2 +/- 0.1	1.1 +/- 0.1
4/19/2021	4/26/2021	2.0 +/- 0.1	2.5 +/- 0.1	2.4 +/- 0.1	2.2 +/- 0.1
4/26/2021	5/3/2021	2.1 +/- 0.1	2.7 +/- 0.2	2.7 +/- 0.1	2.6 +/- 0.1
5/3/2021	5/10/2021	1.0 +/- 0.1	1.4 +/- 0.1	1.2 +/- 0.1	1.2 +/- 0.1
5/10/2021	5/17/2021	1.5 +/- 0.1	1.8 +/- 0.1	1.8 +/- 0.1	1.5 +/- 0.1
5/17/2021	5/24/2021	1.9 +/- 0.1	2.4 +/- 0.1	2.5 +/- 0.1	2.2 +/- 0.1
5/24/2021	6/1/2021	1.3 +/- 0.1	1.2 +/- 0.1	1.5 +/- 0.1	1.4 +/- 0.1
6/1/2021	6/9/2021	1.5 +/- 0.1	1.4 +/- 0.1	1.6 +/- 0.1	1.6 +/- 0.1
6/9/2021	6/14/2021	1.1 +/- 0.1	1.1 +/- 0.1	1.4 +/- 0.1	1.3 +/- 0.1
6/14/2021	6/21/2021	1.8 +/- 0.1	2.0 +/- 0.1	2.3 +/- 0.1	2.1 +/- 0.1
6/21/2021	6/28/2021	1.1 +/- 0.1	1.1 +/- 0.1	1.3 +/- 0.1	1.3 +/- 0.1
6/28/2021	7/6/2021	1.2 +/- 0.1	1.2 +/- 0.1	1.4 +/- 0.1	1.3 +/- 0.1
7/6/2021	7/12/2021	2.1 +/- 0.1	1.9 +/- 0.1	2.4 +/- 0.2	[2]
7/12/2021	7/19/2021	1.8 +/- 0.1	1.8 +/- 0.1	2.2 +/- 0.1	2.3 +/- 0.2
7/19/2021	7/26/2021	2.3 +/- 0.2	2.1 +/- 0.1	2.5 +/- 0.1	2.2 +/- 0.1
7/26/2021	8/2/2021	2.8 +/- 0.2	2.4 +/- 0.1	2.9 +/- 0.2	2.5 +/- 0.1
8/2/2021	8/9/2021	2.0 +/- 0.1	1.7 +/- 0.1	2.0 +/- 0.1	1.9 +/- 0.1
8/9/2021	8/16/2021	2.5 +/- 0.1	2.1 +/- 0.1	2.5 +/- 0.1	2.2 +/- 0.1
8/16/2021	8/23/2021	1.6 +/- 0.1	1.3 +/- 0.1	1.4 +/- 0.1	1.4 +/- 0.1
8/23/2021	8/30/2021	3.4 +/- 0.2	2.7 +/- 0.2	3.2 +/- 0.2	3.7 +/- 0.2
8/30/2021	9/7/2021	2.0 +/- 0.1	2.0 +/- 0.2	2.1 +/- 0.1	2.2 +/- 0.1
9/7/2021	9/14/2021	3.2 +/- 0.2	3.1 +/- 0.2	3.5 +/- 0.2	3.2 +/- 0.2
9/14/2021	9/20/2021	2.6 +/- 0.2	2.4 +/- 0.2	2.8 +/- 0.2	2.6 +/- 0.2
9/20/2021	9/27/2021	2.0 +/- 0.1	1.6 +/- 0.1	2.0 +/- 0.1	1.8 +/- 0.1

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
9/27/2021	10/4/2021	3.5 +/- 0.2	2.7 +/- 0.2	3.5 +/- 0.2	3.0 +/- 0.2
10/4/2021	10/11/2021	2.0 +/- 0.1	1.7 +/- 0.1	1.9 +/- 0.1	1.9 +/- 0.1
10/11/2021	10/18/2021	1.9 +/- 0.1	2.7 +/- 0.1	2.6 +/- 0.1	2.4 +/- 0.1
10/18/2021	10/25/2021	4.1 +/- 0.2	3.4 +/- 0.2	3.8 +/- 0.2	3.7 +/- 0.2
10/25/2021	11/1/2021	1.3 +/- 0.1	1.2 +/- 0.1	1.3 +/- 0.1	1.3 +/- 0.1
11/1/2021	11/8/2021	1.8 +/- 0.1	1.7 +/- 0.1	1.9 +/- 0.1	1.9 +/- 0.1
11/8/2021	11/17/2021	3.2 +/- 0.1	2.8 +/- 0.1	3.2 +/- 0.1	2.6 +/- 0.1
11/17/2021	11/22/2021	2.1 +/- 0.2	2.0 +/- 0.2	2.1 +/- 0.2	2.0 +/- 0.2
11/22/2021	11/29/2021	2.3 +/- 0.1	2.0 +/- 0.1	2.4 +/- 0.1	2.1 +/- 0.1
11/29/2021	12/6/2021	3.0 +/- 0.2	2.6 +/- 0.1	3.0 +/- 0.2	2.8 +/- 0.2
12/6/2021	12/13/2021	2.4 +/- 0.1	2.2 +/- 0.1	2.7 +/- 0.1	2.5 +/- 0.1
12/13/2021	12/20/2021	2.2 +/- 0.1	2.0 +/- 0.1	2.3 +/- 0.1	2.2 +/- 0.1
12/20/2021	12/28/2021	3.5 +/- 0.2	3.2 +/- 0.1	3.7 +/- 0.2	3.4 +/- 0.2
12/28/2021	1/4/2022	1.9 +/- 0.1	1.8 +/- 0.1	1.8 +/- 0.1	2.0 +/- 0.1

[1] Control Location
2 Lost Sample, power lost at the site

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
3/29/2021	*	*	*	*	*
6/28/2021	*	*	*	*	*
9/27/2021	*	*	*	*	*
1/4/2022	*	*	*	*	*

Sample Date	SFA1 MET Station	SFA2[1] Visitors Center	SFA3 NNW of ISFSI	SFA4 SSE of ISFSI
3/29/2021	*	*	*	*
6/28/2021	*	*	*	*
9/27/2021	*	*	*	*
1/4/2022	*	*	*	*

[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) +/- 2□)

Sample Code	Sample Date	Sample Type	Gamma Emitters
IB4			
Camp Conoy			
Entrance	6/28/2021	Chard	*
	7/26/2021	Chard	*
	8/30/2021	Chard	*
	9/20/2021	Chard	*
IB5			
Camp Conoy			
Entrance	6/28/2021	Tree Leaves	*
	7/26/2021	Tree Leaves	*
	8/30/2021	Cabbage	*
	9/20/2021	Kale	*
IB6			
Camp Conoy			
Entrance	6/28/2021	Tree Leaves	*
	7/26/2021	Tree Leaves	*
	8/30/2021	Kale	*
	9/20/2021	Kale	*
IB7[1]			
EOF	6/28/2021	Broccoli	*
	7/26/2021	Chard	*
	8/30/2021	Chard	*
	9/20/2021	Chard	*
IB8[1]			
EOF	6/28/2021	Tree Leaves	*
	7/26/2021	Cabbage	*
	8/30/2021	Tree Leaves	*
	9/20/2021	Cabbage	*
IB9[1]			
EOF	6/28/2021	Tree Leaves	*
	7/26/2021	Tree Leaves	*
	8/30/2021	Tree Leaves	*
	9/20/2021	Collards	*

Table B-8a

Concentration of Gamma Emitters in Vegetation Samples
(Results in units of pCi/kg (wet) +/- 2□)

Sample Code	Sample Date	Sample Type	Gamma Emitters
IB10			
Met Station	6/28/2021	Grass	*
	7/26/2021	Chard	*
	8/30/2021	Chard	*
	9/20/2021	Chard	*
IB11			[2]
Met Station	6/28/2021	[2]	
	7/26/2021	Greens	*
	8/30/2021	Collards	*
	9/20/2021	Cabbage	*
IB12			
Met Station	6/28/2021	[2]	[2]
	7/26/2021	[2]	[2]
	8/30/2021	Cabbage	*
	9/20/2021	Collards	*

[1] Control Garden
[2] No sample available to collect and analyze
* 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	Gamma Emitters
SFB1		
MET Station	3/15/2021	*
	6/1/2021	*
	8/23/2021	*
	11/17/2021	*
SFB2[1]		
Visitor's Center	3/15/2021	*
	6/1/2021	*
	8/23/2021	*
	11/17/2021	*
SFB3		
NNW of ISFSI	3/15/2021	*
	6/1/2021	*
	8/23/2021	*
	11/17/2021	*
SFB4		
SSE of ISFSI	3/15/2021	*
	6/1/2021	*
	8/23/2021	*
	11/17/2021	*
SFB5		
On Site Before Entrance		
to Camp Conoy	3/15/2021	*
	6/1/2021	*
	8/23/2021	*
	11/17/2021	*

[1] 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			
MET station	3/15/2021	[1]	*
	6/1/2021	[1]	*
	8/23/2021	[1]	*
	11/17/2021	[1]	*
SFS2[2]		[1]	
Visitors Center	3/15/2021		*
	6/1/2021	[1]	*
	8/23/2021	[1]	*
	11/17/2021	[1]	*
SFS3			
NNW of ISFSI	3/15/2021	231 +/- 74	*
	6/1/2021	137 +/- 64	*
	8/23/2021	222 +/- 74	*
	11/17/2021	115 +/- 51	*
SFS4		[1]	
SSE of ISFSI	3/15/2021		*
	6/1/2021	[1]	*
	8/23/2021	[1]	*
	11/17/2021	[1]	*
SFS5			
Entrance to Camp Conoy	3/15/2021	87 +/- 38	*
	6/1/2021	[1]	*
	8/23/2021	54 +/- 35	*
	11/17/2021	[1]	*

[1] This isotope <MDA
[2] Control Location
* All Non-Natural Gamma Emitters <MDA except where Cs-137 is observed and reported

Table B-10

Typical MDA Ranges for Gamma Spectrometry

Selected Nuclides	Air Particulates (10^{-3} pCi/m^3)	Bay Water, Surface Water, Drinking Water (pCi/L)	Fish (pCi/kg) Wet	Ground water (pCi/L)	Milk (pCi/L)	Oysters (pCi/kg)	Shoreline Sediment (pCi/kg)Dry	Soil (pCi/kg) Dry	Vegetation (pCi/kg) Wet
K-40	5.65 - 24.6	16 - 182	2,747 - 4,505	21.5 -66.4	1,286 - 1,529	1,269 - 2,069	781 - 13,761	789 - 10,713	671 - 11,829
Mn-54	0.32 - 1.16	2.7 - 5.6	9.8 - 19.6	2.86 - 5.14	3.6 - 6.6	10.8 - 16.4	41.4 - 67.1	37.4 - 91.9	10.3 - 53.0
Fe-59	1.01 - 8.52	5.6 - 13.2	31.6 - 93.2	6.04 - 11.7	9.2 - 15.9	29.3 - 56.7	142 - 251	96.4 – 389	22.0 - 151
Co-58	0.38 - 2.07	2.7 - 5.6	10.9 - 28.3	2.86 - 5.27	3.7 - 6.3	10.5 - 19.3	53.7 - 82.9	44.6 – 133	10.9 - 59.8
Co-60	0.28 - 1.09	2.8 - 5.5	10.9 - 24.3	3.01 - 5.38	4.1 - 7.2	11.7 - 17.0	38.6 - 57.9	32.8 - 85.8	12.9 - 55.0
Zn-65	0.81 - 3.10	5.5 - 11.4	23.3 - 57.2	6.41 - 14.4	9.4 - 16.1	22.0 - 43.3	112 - 198	96.4 – 275	24.7 - 116
Ag-110m	0.33 – 1.06	2.42 - 4.96	8.2 – 18.1	2.79 - 5.06	3.26- 5.64	8.7 - 16.0	36.6 - 175	40.7 – 99.4	10.1 - 61.4
Zr-95	0.72 - 3.88	4.7 - 10.2	20.0 - 47.1	5.62 - 8.75	5.8 - 11.5	19.0 - 34.0	93.5 - 151	84.6 – 261	19.3 - 116
Nb-95	0.56 - 4.91	2.9 - 6.0	13.7 - 42.7	3.3 - 5.88	3.9 - 6.5	13.9 - 24.3	82.1 - 157	61.5 – 227	10.9 - 90.5
Ru-106	3.00 - 12.1	23.8 - 48.1	77.1 - 197	25.6 - 45.3	29.3 - 51.8	88.0 - 141	327.0 – 570	314.0 – 840	92.9 - 541
I-131[1]	2.73 - 914	0.52 - 11.7	21.4 - 2,340	4.87 - 9.04	0.5 - 7.03	22.4 - 107	470 - 2,040	139 - 8,060	13.4 - 854
Cs-134	0.47 - 0.88	3.2 - 5.7	7.8 - 16.0	2.92 - 5.48	4.09 - 4.82	9.7 - 16.5	43.3 - 82.4	33.4 - 109	11.1 - 58.1
Cs-137	0.46 - 0.88	3.7 - 5.9	3.8 - 17.5	2.97 - 5.43	4.08 - 5.29	10.0 - 16.7	38.4 - 65.4	39.1 - 135	11.1 - 62.3
La-140	2.01 – 116	5.05 - 11.5	15.9 - 444	4.87 - 10.3	4.89 - 6.28	24.1 - 80.4	368 - 773	136 - 1,820	9.1 - 388
Ba-140	2.01 - 116	5.05 - 11.5	15.9 - 444	5.86 - 26.0	4.89 - 6.28	24.1 - 80.4	368 – 773	136 - 1,820	9.1 - 388
Ce-144	1.12 - 3.27	16.8 - 36.7	38.1 - 70.9	17.8 - 32.0	20.5 - 31.0	42.6 - 72.6	208 - 279	191 - 414	46.6 - 289
Cr-51	4.90 - 45.0	23.2 - 50.6	93.0 - 395	26.7 - 42.1	30.4 - 46.8	97.0 - 199	711 - 1,110	489 - 1,810	93.9 - 850
Na-22	0.34 - 1.33	2.7 - 6.0	12.1 - 28.0	2.78 - 5.94	4.9 - 8.5	13.4 - 19.5	46.4 - 77.4	36.4 - 92.4	8.9 - 54.1

[1] This MDA range for I-131 on a charcoal cartridge is typically 5.22 x 10^{-3} to 1.37 x 10^{-2} pCi/m^3

Table B-11

Typical LLDs for Gamma Spectrometry

Selected Nuclides	Air Particulates 10-3 pCi/m3	Bay Water, Surface Water, Drinking Water pCi/L	Fish pCi/kg (wet)	Ground water pCi/L	Oysters pCi/kg (wet)	Milk pCi/L	Soil pCi/kg (dry)	Vegetation pCi/kg (wet)
Na-22	5	5.3	12	5.3	12	9.1	78	27
Cr-51	74	37	76	37	76	62	452	174
Mn-54	4.6	4.7	13	4.7	13	7.4	63	19
Co-58	6.7	4.3	12	4.3	12	8.2	78	23
Fe-59	20	11	27	11	27	18	123	57
Co-60	3.5	4.8	12	4.8	12	7.5	59	24
Zn-65	8.9	11	27	11	27	17	162	55
Nb-95	9.8	4.5	13	4.5	13	9.5	73	25
Zr-95	11	7.9	18	7.9	18	14	117	34
Ru-106	43	38	111	38	111	62	624	174
Ag-110m	4.2	4.3	11	4.3	11	6	65	20
Te-129m	101	56	118	56	118	90	833	263
I-131*	90	0.8	11	6.4	11	0.8	58	42
Cs-134	4.7	4.7	11	4.7	11	6.7	66	18
Cs-137	4.2	5.1	11	5.1	11	6.9	78	21
Ba-140	47	23	39	23	39	46	103	111
La-140	47	9.2	15	9.2	15	13	103	30
Ce-144	15	23	45	23	45	37	288	70

* The LLD for I-131 measured on a charcoal cartridge is 3.7 $x10^{-2}$ pCi/m^3

Table B-12
Direct Radiation
(Results in Units of mrem/91 days ± 2σ)

Site Code	Location	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Mean ± 2 σ
DR01	On Site, along Cliffs	12.4	12.8	12.7	14.2	13.0 ± 1.6
DR02	Route 765, Auto Dump	9.9	10.4	11.1	11.0	10.6 ± 1.1
DR03	Route 765, Giovanni's Tavern	10.8	12.3	10.9	11.0	11.2 ± 1.4
DR04	Route 765, across from Vera's Beach Club	12.4	12.7	13.6	12.9	12.9 ± 1.0
DR05	Route 765, John's Creek	12.4	12.0	13.2	12.3	12.5 ±1.0
DR06	Route 765 at Lusby	10.3	8.9	10.2	10.7	10.0 ± 1.6
DR07	Entrance to Camp Conoy	11.1	11.5	11.5	9.5	10.9 ± 1.9
DR08	Camp Conoy Rd at Emergency Siren	15.3	15.0	15.6	16.8	15.7 ± 1.5
DR09	Bay Breeze Rd	10.9	10.2	10.3	12.1	10.9 ± 1.7
DR10	Calvert Beach Rd and Decatur Street	11.6	10.4	11.5	10.5	11.0 ± 1.3
DR11	Dirt road off Mackall & Parren Rd	11.2	10.8	13.5	11.6	11.8 ± 2.4
DR12	Mackall & Bowen Rds	11.2	11.1	12.5	11.5	11.6 ± 1.3
DR13	Mackall Rd, near Wallville	12.8	10.9	13.3	12.4	12.3 ± 2.1
DR14	Rodney Point	12.2	13.0	14.0	13.2	13.1 ± 1.5

Table B-12
Direct Radiation
(Results in Units of mrem/91 days ± 2σ)

Site Code	Location	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Mean ± 2 σ
DR15	Mill Bridge & Turner Rds	12.0	11.7	10.8	12.3	11.7 ± 1.3
DR16	Across from Appeal School	11.3	10.4	12.1	10.2	11.0 ± 1.8
DR17	Cove Point & Little Cove Point Rds	13.9	13.3	15.3	13.1	13.9 ± 2.0
DR18	Cove Point	10.3	10.4	9.6	9.8	10.0 ± 0.8
DR19	Long Beach	10.4	10.6	11.8	11.8	11.1 ± 1.5
DR20	On site, near shore	12.9	12.6	13.7	13.6	13.2 ± 1.0
DR21[1]	EOF	11.8	13.4	14.0	12.4	12.9 ± 2.0
DR22[1]	Solomons Island	11.0	10.3	11.0	*	10.7 ± 0.8
DR23[1]	Taylors Island	13.9	18.0	19.1	17.1	17.0 ± 4.5
DR30	MET Station	11.6	12.4	12.6	12.5	12.3 ± 0.9
SFDR01	SW of ISFSI	17.7	16.5	19.4	18.4	18.0 ± 2.4
SFDR02	NNW of ISFSI	18.8	18.0	18.8	18.8	18.6 ± 0.8
SFDR03	North of ISFSI	32.0	33.2	35.3	30.2	32.7 ± 4.3
SFDR04	NE of ISFSI	33.1	34.6	35.2	36.7	34.9 ± 2.9
SFDR05	East of ISFSI	23.5	24.1	24.1	33.2	26.2 ± 9.3
SFDR06	ESE of ISFSI	19.3	22.0	21.5	23.4	21.6 ± 3.4

Table B-12
Direct Radiation
(Results in Units of mrem/91 days ± 2σ)

Site Code	Location	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Mean ± 2 σ
SFDR07[1]	Visitor's Center	14.6	13.9	14.8	14.2	14.4 ± 0.8
SFDR08	NNW of ISFSI	26.9	25.8	26.5	26.6	26.4 ± 0.9
SFDR09	SSE of ISFSI	48.0	50.0	52.2	53.0	50.8 ± 4.5
SFDR10	NW of ISFSI	25.6	27.1	24.1	25.7	25.6 ± 2.5
SFDR11	WNW ISFSI	27.9	23.2	25.4	24.6	25.3 ± 4.0
SFDR12	WSW of ISFSI	42.1	38.8	36.8	44.0	40.4 ± 6.4
SFDR13	South of ISFSI	29.9	30.8	31.8	38.1	32.6 ± 7.4
SFDR14	SE of ISFSI	68.6	69.8	74.2	63.9	69.1 ± 8.5
SFDR15	ENE of ISFSI	26.6	25.6	29.0	32.5	28.4 ± 6.1
SFDR16	SSW of ISFSI	45.4	45.7	52.0	50.8	48.5 ± 6.8
SFDR17	NNE of ISFSI	29.0	37.4	36.3	34.9	34.4 ± 7.5
SFDR18	West of ISFSI	39.4	39.1	38.5	41.2	39.5 ± 2.3

1 Control Location
- Missing Dosimeters, No data

APPENDIX C

Quality Assurance Program

Appendix C is a summary of Exelon Industrial Services (EIS) laboratory's quality assurance program. It consists of Table C-1 which is a compilation of the results of the EIS laboratory's participation in an interlaboratory comparison program with Environmental Resource Associates (ERA) located in Arvada, Colorado and Eckert and Ziegler Analytics, Inc. (EZA) located in Atlanta, Georgia. It also includes Table C-2, which is a compilation of the results of the Exelon Industrial Services (EIS) Laboratory's participation in a split sample program with Teledyne Brown Engineering located in Knoxville, Tennessee and Landauer original and replicate dosimeter results evaluated in accordance with their quality assurance program. Table C-3, which is a list of the Site Specific LLDs required by the ODCM.

The EIS laboratory's results contained in Table C-1, intercomparison results, are in full agreement when they were evaluated using the NRC Resolution Test Criteria[1] except as noted in the Pass/Fail column and described below. The EIS Laboratory's results are provided with their analytical uncertainties of 2 sigma. When evaluating with the NRC Resolution Test a one sigma uncertainty is used to determine Pass or Fail and noted accordingly. There were no failures of crosscheck studies in 2021. All results reported passed their respective vendor acceptance ranges and NRC Resolution Test Criteria[1]

The vendor laboratory used by EIS for subcontracting and interlaboratory comparison samples, Teledyne Brown Engineering, also participates in the ERA and EZA interlaboratory comparison program. A presentation of their full data report is published Teledyne Browne Engineering Environmental Services, 4th Quarter 2021 Quality Assurance Report, January – December 2021. In summary TBE's reported results met vendor and laboratory acceptance ranges with the following exception discussed here:

> TBE results for Gross Beta in Drinking water submitted in October 2021 failed the upper acceptance limit specified by the vendor. The laboratory investigated and the study results were within the acceptable range specified in TBE's QA plan, 70-130% of True Value. A repeat study was analyzed in December 2021 and also failed the vendor's upper acceptance limit. In both cases TBE's published QA requirements of acceptable range being 70-130% of True value were met. The lab's performance is within the acceptable range specified in their QA plan. This same range is considered acceptable by Exelon Nuclear Quality Assurance Requirements as well. TBE states in their investigation that there was no impact to sample data and no further action is warranted.

The Inter and Intra laboratory results contained in Table C-2 are intercomparison results for routine samples analyzed for replicate and split analyses and evaluated for beta and non-natural gamma emitters. The EIS laboratory's results are provided with their analytical uncertainties of 2 sigma. When evaluating with the NRC Resolution Test Criteria[1] a one sigma uncertainty is used to

determine Pass or Fail and noted accordingly. In the event there are no non-natural isotopes detected, the samples are reported <MDA and designated as Pass.

All the results contained in Table C-2 agree with their respective EIS laboratory original, replicate and/or Teledyne Brown Engineering's split laboratory samples.

The original analysis of soil collected on March 15, 2021, at SFS5 indicated low level, Non Plant related Cs-137 just above the analyses Minimum Detectable Activity. The replicate and split samples did not indicate Cs-137 above the Minimum Detectable Activity, MDA, of the analysis. In this case the original, replicate and split results pass the NRC Resolution Test Criteria[1], as specified in the rule. When compared to the MDA of the replicate and split analysis, the positive result is less than five times the MDA value. The low-level Cs-137 observed in these soil analyses is consistent with weapons related fallout previously identified in the environs around Calvert Cliffs Nuclear Power Plant.

All air particulate samples contain Beta emitters and are reported with a 2sigma uncertainty. The original and replicate analyses are evaluated for agreement using the NRC Resolution Test Criteria[1]. These samples must be composited for further analysis and this precludes them from being split for analysis of beta emitters. Filters and other samples whose nature generally preclude sample splitting are marked "**" in the Split Analysis column.

[1] NRC Inspection Manual, Inspection Procedure 84750, March 15, 1994

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Table C-1
Results of Participation in Cross Check Programs

Sample Date	Study ID	Sample Type and Units	Isotope Observed	Reported Laboratory's Results			Cross Check Lab Results	Pass/Fail
3/11/2021	E13390	Milk Gamma pCi/L	I-131	105	±	18.0	86.9	Pass
			Cs-134	145	±	7.1	151	Pass
			Cs-137	116	±	10.3	110	Pass
			Ce-141	122	±	12.4	125	Pass
			Cr-51	257	±	83.6	242	Pass
			Mn-54	122	±	10.3	112	Pass
			Co-58	126	±	12.4	128	Pass
			Fe-59	116	±	14.6	109	Pass
			Co-60	155	±	9.5	154	Pass
			Zn-65	195	±	21.7	211	Pass
3/11/2021	E13390	Milk Gamma pCi/L	I-131	89	±	17.8	86.9	Pass
			Cs-134	134	±	7.9	151	Pass
			Cs-137	111	±	11.3	110	Pass
			Ce-141	127	±	15.2	125	Pass
			Cr-51	302	±	79.7	242	Pass
			Mn-54	118	±	10.7	112	Pass
			Co-58	118	±	11.1	128	Pass
			Fe-59	121	±	14.7	109	Pass
			Co-60	147	±	8.9	154	Pass
			Zn-65	190	±	22.2	211	Pass

Table C-1
Results of Participation in Cross Check Programs

Sample Date	Study ID	Sample Type and Units	Isotope Observed	Reported Laboratory's Results			Cross Check Lab Results	Pass/Fail
3/11/2021	E13391	Water Beta pCi/L	Cs-137	250	±	4.7	283	Pass
3/11/2021	E13392	Cartridge Gamma pCi	I-131	80	±	5.7	88.2	Pass
3/11/2021	E13392	Cartridge Gamma pCi	I-131	79	±	5.3	88.2	Pass
4/5/2021	RAD 125	Water Beta pCi/L	Cs-137	58	±	2.3	67.5	Pass
4/5/2021	RAD 125	Water Gamma pCi/L	Ba-133	86.1	±	4.0	90.5	Pass
			Cs-137	163	±	6.2	168	Pass
			Cs-134	69.0	±	2.4	70.5	Pass
			Zn-65	172	±	10.3	177	Pass
			Co-60	22.3	±	1.8	20.9	Pass
4/5/2021	RAD 125	Water Gamma pCi/L	I-131	29	±	3.6	26.7	Pass

Table C-1
Results of Participation in Cross Check Programs

Sample Date	Study ID	Sample Type and Units	Isotope Observed	Reported Laboratory's Results			Cross Check Lab Results	Pass/Fail
6/3/2021	E13395	Filter Gamma pCi	Cs-134	136	±	4.6	156	Pass
			Cs-137	138	±	7.0	138	Pass
			Ce-141	146	±	6.1	132	Pass
			Cr-51	416	±	36.0	390	Pass
			Mn-54	204	±	8.7	183	Pass
			Co-58	133	±	7.0	131	Pass
			Fe-59	161	±	10.0	134	Pass
			Co-60	171	±	6.2	158	Pass
			Zn-65	255	±	17.0	220	Pass
6/3/2021	E13395	Filter Gamma pCi	Cs-134	138	±	4.6	156	Pass
			Cs-137	142	±	7.2	138	Pass
			Ce-141	141	±	6.1	132	Pass
			Cr-51	426	±	39.4	390	Pass
			Mn-54	208	±	8.8	183	Pass
			Co-58	136	±	6.8	131	Pass
			Fe-59	163	±	9.2	134	Pass
			Co-60	164	±	6.1	158	Pass
			Zn-65	230	±	15.2	220	Pass

Table C-1
Results of Participation in Cross Check Programs

Sample Date	Study ID	Sample Type and Units	Isotope Observed	Reported Laboratory's Results			Cross Check Lab Results	Pass/Fail
6/3/2021	E13396	Filter Beta pCi	Cs-137	166	±	2.7	143	Pass
6/3/2021	E13396	Filter Beta pCi	Cs-137	163	±	2.7	143	Pass
6/3/2021	E13394	Water Gamma pCi	Ce-141	201	±	20.2	180	Pass
			Co-58	168	±	15.5	179	Pass
			Co-60	226	±	12.9	215	Pass
			Cr-51	521	±	98.0	533	Pass
			Cs-134	193	±	10.6	213	Pass
			Cs-137	187	±	16.6	188	Pass
			Fe-59	199	±	19.4	183	Pass
			I-131	91	±	17.2	92	Pass
			Mn-54	247	±	18.4	249	Pass
			Zn-65	275	±	30.9	300	Pass
6/3/2021	E13394	Water Gamma pCi	Ce-141	176	±	18.8	180	Pass
			Co-58	173	±	15.2	179	Pass
			Co-60	216	±	12.6	215	Pass
			Cr-51	514	±	80.6	533	Pass
			Cs-134	195	±	10.1	213	Pass
			Cs-137	193	±	15.9	188	Pass

Table C-1
Results of Participation in Cross Check Programs

Sample Date	Study ID	Sample Type and Units	Isotope Observed	Reported Laboratory's Results			Cross Check Lab Results	Pass/Fail
6/3/2021	E13394	Water Gamma pCi (Continued)	Fe-59	181	±	19.4	183	Pass
			I-131	94	±	22.1	92	Pass
			Mn-54	236	±	18.4	249	Pass
			Zn-65	298	±	33.6	300	Pass
6/3/2021	E13394	Water Gamma pCi	Ce-141	161	±	18.4	180	Pass
			Co-58	176	±	17.9	179	Pass
			Co-60	222	±	13.9	215	Pass
			Cr-51	506	±	95.7	533	Pass
			Cs-134	198	±	10.6	213	Pass
			Cs-137	193	±	16.6	188	Pass
			Fe-59	202	±	21.8	183	Pass
			I-131	103	±	20.2	92	Pass
			Mn-54	250	±	19.7	249	Pass
			Zn-65	304	±	35.8	300	Pass
6/3/2021	E13393	Water Beta pCi	Cs-137	225	±	4.5	250	Pass
9/9/2021	E13397	Filter Beta pCi	Cs-137	220	±	3.1	217	Pass
9/9/2021	E13397	Filter Beta pCi	Cs-137	211	±	3.0	217	Pass

Table C-1
Results of Participation in Cross Check Programs

Sample Date	Study ID	Sample Type and Units	Isotope Observed	Reported Laboratory's Results			Cross Check Lab Results	Pass/Fail
9/20/2021	MRAD035	Filter Gamma pCi	Cs-134	218	±	7.1	241	Pass
			Cs-137	210	±	10.4	187	Pass
			Co-60	356	±	11.4	310	Pass
			Zn-65	411	±	28.3	366	Pass
10/6/2021	RAD127	Water Gamma pCi	Ba-133	84	±	4.7	87.5	Pass
			Cs-134	67	±	3.1	70.1	Pass
			Cs-137	152	±	7.1	156	Pass
			Co-60	83	±	4.3	85.9	Pass
			Zn-65	142	±	11.2	145	Pass
			0	0	0	0.0	0	0
10/6/2021	RAD127	Water Gamma pCi	I-131	30	±	6.1	26.4	Pass
12/2/2021	E13398	Filter Gamma pCi	Ce-141	92	±	6.4	99.7	Pass
			Co-58	79	±	7.7	86.6	Pass
			Co-60	167	±	7.8	169	Pass
			Cr-51	190	±	40.4	222	Pass
			Cs-134	98	±	4.7	126	Pass
			Cs-137	79	±	6.2	88.7	Pass

Table C-1
Results of Participation in Cross Check Programs

Sample Date	Study ID	Sample Type and Units	Isotope Observed	Reported Laboratory's Results			Cross Check Lab Results	Pass/Fail
12/2/2021	E13398	Filter Gamma pCi (Continued)	Fe-59	85	±	10.6	85.3	Pass
			Mn-54	110	±	8.0	115	Pass
			Zn-65	180	±	17.9	195	Pass
12/2/2021	E13398	Filter Gamma pCi	Cs-134	95	±	4.1	126	Pass
			Cs-137	76	±	5.8	88.7	Pass
			Ce-141	95	±	6.3	99.7	Pass
			Cr-51	212	±	41.7	222	Pass
			Mn-54	110	±	7.3	115	Pass
			Co-58	80	±	6.7	86.6	Pass
			Fe-59	93	±	8.7	85.3	Pass
			Co-60	154	±	6.7	169	Pass
			Zn-65	182	±	15.9	195	Pass
12/2/2021	E13399	Water Beta pCi	Cs-137	287	±	5.0	281	Pass
12/2/2021	E13400	Cartridge Gamma pCi	I-131	92	±	13.2	94.3	Pass
12/2/2021	E13400	Cartridge Gamma pCi	I-131	89	±	5.9	94.3	Pass

Table C-1
Results of Participation in Cross Check Programs

Sample Date	Study ID	Sample Type and Units	Isotope Observed	Reported Laboratory's Results			Cross Check Lab Results	Pass/Fail
12/2/2021	E13400	Cartridge Gamma pCi	I-131	89	±	6.8	94.3	Pass
12/2/2021	E13401	Milk Gamma pCi	I-131	84	±	21.1	90.3	Pass
			Cs-134	160	±	8.1	166	Pass
			Cs-137	114	±	12.3	117	Pass
			Ce-141	131	±	16.0	132	Pass
			Cr-51	285	±	76.5	293	Pass
			Mn-54	156	±	13.7	152	Pass
			Co-58	104	±	14.1	114	Pass
			Fe-59	125	±	18.1	113	Pass
			Co-60	224	±	12.5	223	Pass
			Zn-65	253	±	28.0	257	Pass
12/2/2021	E13401	Milk Gamma pCi	I-131	95	±	16.6	90.3	Pass
			Cs-134	161	±	8.1	166	Pass
			Cs-137	116	±	12.2	117	Pass
			Ce-141	115	±	13.3	132	Pass
			Cr-51	265	±	77.6	293	Pass
			Mn-54	164	±	12.9	152	Pass
			Co-58	106	±	11.5	114	Pass

Table C-1
Results of Participation in Cross Check Programs

Sample Date	Study ID	Sample Type and Units	Isotope Observed	Reported Laboratory's Results			Cross Check Lab Results	Pass/Fail
12/2/2021	E13401	Milk Gamma pCi	Fe-59	119	±	14.9	113	Pass
		(Continued)	Co-60	232	±	11.2	223	Pass
			Zn-65	261	±	26.1	257	Pass
12/2/2021	E13401	Milk Gamma pCi	I-131	84	±	21.1	90.3	Pass
			Cs-134	160	±	8.1	166	Pass
			Cs-137	114	±	12.3	117	Pass
			Ce-141	131	±	16.0	132	Pass
			Cr-51	285	±	76.5	293	Pass
			Mn-54	156	±	13.7	152	Pass
			Co-58	104	±	14.1	114	Pass
			Fe-59	125	±	18.1	113	Pass
			Co-60	224	±	12.5	223	Pass
			Zn-65	261	±	26.1	257	Pass

[1] See discussion at the beginning of the Appendix describes Acceptance Criteria

Table C-2

Results of Quality Assurance Program

Type and cation	Sample Date	Type of Analysis	Result Units	Original Analysis	Replicate Analysis	Split Analysis	Pass/Fail (Replicate)	Pass/F (Split
r-16C2	02/03/21	Gross Beta	pCi/L	2.09 +/- 0.8	NA	<2.67	NA	PASS
r-16C2	02/03/21	Gamma	pCi/L	<MDA	NA	<MDA	NA	PASS
k-19B1	1/12/2021	Gamma	pCi/L	<MDA	NA	<MDA	NA	PASS
k-25C1	1/12/2021	Gamma	pCi/L	<MDA	NA	<MDA	NA	PASS
k-19B1	1/12/2021	I-131	pCi/L	<MDA	NA	<MDA	NA	PASS
k-25C1	1/12/2021	I-131	pCi/L	<MDA	NA	<MDA	NA	PASS
lter - A1	01/25/21	Gross Beta	10^{-2} pCi/m^3	1.8 +/- 0.1	1.7 +/- 0.1	**	PASS	NA
lter - A2	01/25/21	Gross Beta	10^{-2} pCi/m^3	1.7 +/- 0.1	1.7 +/- 0.1	**	PASS	NA
lter - A3	01/25/21	Gross Beta	10^{-2} pCi/m^3	1.7 +/- 0.1	1.6 +/- 0.1	**	PASS	NA
lter - A4	01/25/21	Gross Beta	10^{-2} pCi/m^3	1.9 +/- 0.1	1.8 +/- 0.1	**	PASS	NA
lter - A5	01/25/21	Gross Beta	10^{-2} pCi/m^3	1.6 +/- 0.1	1.6 +/- 0.1	**	PASS	NA
er - SFA1	01/25/21	Gross Beta	10^{-2} pCi/m^3	1.5 +/- 0.1	1.6 +/- 0.1	**	PASS	NA
er - SFA2	01/25/21	Gross Beta	10^{-2} pCi/m^3	1.7 +/- 0.1	1.8 +/- 0.1	**	PASS	NA
er - SFA3	01/25/21	Gross Beta	10^{-2} pCi/m^3	1.7 +/- 0.1	1.7 +/- 0.1	**	PASS	NA
er - SFA4	01/25/21	Gross Beta	10^{-2} pCi/m^3	1.7 +/- 0.1	1.8 +/- 0.1	**	PASS	NA
dine - A1	02/15/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A2	02/15/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A3	02/15/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A4	02/15/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A5	02/15/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA

ne - SFA1	02/15/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne – SFA2	02/15/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne – SFA3	02/15/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne – SFA4	02/15/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
r-16C2	03/02/21	Gross Beta	pCi/L	2.12 +/- 0.8	NA	4.21+/- 1.7	NA	PASS
r-16C2	03/02/21	Gamma	pCi/L	<MDA	NA	<MDA	NA	PASS
Filter – TION-02	03/29/21	Gross Beta	10^{-2} pCi/m^3	1.7 +/- 0.1	1.7 +/- 0.1	**	PASS	NA
Filter – TION-03	03/29/21	Gross Beta	10^{-2} pCi/m^3	1.8 +/- 0.1	1.7 +/- 0.1	**	PASS	NA
Filter – TION-04	03/29/21	Gross Beta	10^{-2} pCi/m^3	1.6 +/- 0.2	1.6 +/- 0.2	**	PASS	NA
Filter – TION-05	03/29/21	Gross Beta	10^{-2} pCi/m^3	1.6 +/- 0.1	1.7 +/- 0.1	**	PASS	NA
Filter – TION-06	03/29/21	Gross Beta	10^{-2} pCi/m^3	1.8 +/- 0.1	1.7 +/- 0.1	**	PASS	NA
Filter – TION-07	03/29/21	Gross Beta	10^{-2} pCi/m^3	1.8 +/- 0.1	1.8 +/- 0.1	**	PASS	NA
Filter – TION-08	03/29/21	Gross Beta	10^{-2} pCi/m^3	2.1 +/- 0.2	2.2 +/- 0.2	**	PASS	NA
Filter – TION-09	03/29/21	Gross Beta	10^{-2} pCi/m^3	1.9 +/- 0.1	1.7 +/- 0.2	**	PASS	NA
Filter – TION-10	03/29/21	Gross Beta	10^{-2} pCi/m^3	1.7 +/- 0.1	1.8 +/- 0.1	**	PASS	NA
Filter – TION-11	03/29/21	Gross Beta	10^{-2} pCi/m^3	1.6 +/- 0.1	1.6 +/- 0.1	**	PASS	NA
Filter – TION-12	03/29/21	Gross Beta	10^{-2} pCi/m^3	1.7 +/- 0.1	1.6 +/- 0.1	**	PASS	NA
Filter – TION-13	03/29/21	Gross Beta	10^{-2} pCi/m^3	1.7 +/- 0.1	1.7 +/- 0.1	**	PASS	NA

r-16C2	03/30/21	Gross Beta	pCi/L	2.23 +/- 0.8	NA	<3.74	NA	PASS
r-16C2	03/30/21	Gamma	pCi/L	<MDA	NA	<MDA	NA	PASS
– SFS1	03/15/21	Gamma	pCi/kg	<MDA	<MDA	<MDA	PASS	PASS
– SFS5[1]	03/15/21	Cs-137	pCi/kg	87.2 +/- 37.6	<MDA	<MDA	PASS	PASS
– WB1	03//2921	Gamma	pCi/kg	<MDA	<MDA	<MDA	PASS	PASS
k-19B1	4/06/2021	Gamma	pCi/L	<MDA	NA	<MDA	NA	PASS
k-25C1	4/06/2021	Gamma	pCi/L	<MDA	NA	<MDA	NA	PASS
k-19B1	4/06/2021	I-131	pCi/L	<MDA	NA	<MDA	NA	PASS
k-25C1	4/06/2021	I-131	pCi/L	<MDA	NA	<MDA	NA	PASS
r-16C2	04/26/21	Gross Beta	pCi/L	3.05 +/- 0.8	NA	<2.39	NA	PASS
r-16C2	04/26/21	Gamma	pCi/L	<MDA	NA	<MDA	NA	PASS
dine - A1	04/26/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A2	04/26/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A3	04/26/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A4	04/26/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A5	04/26/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA1	04/26/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA2	04/26/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA3	04/26/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA4	04/26/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A1	05/10/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A2	05/10/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA

dine - A3	05/10/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A4	05/10/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A5	05/10/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA1	05/10/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA2	05/10/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA3	05/10/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA4	05/10/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
or-16C5	5/14/21	Gamma	pCi/kg	<MDA	NA	<MDA	NA	PASS
n Feeder-6C5	5/14/21	Gamma	pCi/kg	<MDA	NA	<MDA	NA	PASS
or-29C1	5/11/21	Gamma	pCi/kg	<MDA	NA	<MDA	NA	PASS
n Feeder-9C1	5/11/21	Gamma	pCi/kg	<MDA	NA	<MDA	NA	PASS
Filter – TION-02	05/03/21	Gross Beta	10^{-2} pCi/m^3	2.6 +/- 0.1	2.5 +/- 0.1	**	PASS	NA
Filter – TION-03	05/03/21	Gross Beta	10^{-2} pCi/m^3	2.5 +/- 0.2	2.5 +/- 0.2	**	PASS	NA
Filter – TION-04	05/03/21	Gross Beta	10^{-2} pCi/m^3	2.6 +/- 0.3	2.7 +/- 0.3	**	PASS	NA
Filter – TION-05	05/03/21	Gross Beta	10^{-2} pCi/m^3	2.6 +/- 0.2	2.6 +/- 0.2	**	PASS	NA
Filter – TION-06	05/03/21	Gross Beta	10^{-2} pCi/m^3	2.5 +/- 0.1	2.5 +/- 0.1	**	PASS	NA
Filter – TION-07	05/03/21	Gross Beta	10^{-2} pCi/m^3	2.5 +/- 0.2	2.5 +/- 0.2	**	PASS	NA
Filter – TION-08	05/03/21	Gross Beta	10^{-2} pCi/m^3	3.4 +/- 0.2	3.3 +/- 0.2	**	PASS	NA
Filter – TION-09	05/03/21	Gross Beta	10^{-2} pCi/m^3	2.7 +/- 0.2	2.6 +/- 0.2	**	PASS	NA

Filter – TION-10	05/03/21	Gross Beta	10^{-2} pCi/m^3	2.6 +/- 0.1	2.4 +/- 0.1	**	PASS	NA
Filter – TION-11	05/03/21	Gross Beta	10^{-2} pCi/m^3	2.4 +/- 0.2	2.5 +/- 0.2	**	PASS	NA
Filter – TION-12	05/03/21	Gross Beta	10^{-2} pCi/m^3	2.6 +/- 0.2	2.5 +/- 0.2	**	PASS	NA
Filter – TION-13	05/03/21	Gross Beta	10^{-2} pCi/m^3	2.6 +/- 0.1	2.5 +/- 0.2	**	PASS	NA
– WA2	6/01/2021	Gamma	pCi/L	<MDA	<MDA	<MDA	PASS	PASS
– WA1	6/01/2021	Gamma	pCi/L	<MDA	<MDA	<MDA	PASS	PASS
r-16C2	06/01/21	Gross Beta	pCi/L	1.43 +/- 0.8	NA	<2.38	NA	PASS
r-16C2	06/01/21	Gamma	pCi/L	<MDA	NA	<MDA	NA	PASS
dine - A1	06/14/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A2	06/14/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A3	06/14/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A4	06/14/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A5	06/14/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA1	06/14/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA2	06/14/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA3	06/14/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA4	06/14/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
lter - A1	6/28/21	Gamma	pCi/m^3	<MDA	<MDA	<MDA	PASS	PASS
lter - A2	6/28/21	Gamma	pCi/m^3	<MDA	<MDA	<MDA	PASS	PASS
lter - A3	6/28/21	Gamma	pCi/m^3	<MDA	<MDA	<MDA	PASS	PASS
lter - A4	6/28/21	Gamma	pCi/m^3	<MDA	<MDA	<MDA	PASS	PASS
lter - A5	6/28/21	Gamma	pCi/m^3	<MDA	<MDA	<MDA	PASS	PASS

er - SFA1	6/28/21	Gamma	pCi/m^3	<MDA	<MDA	<MDA	PASS	PASS
er - SFA2	6/28/21	Gamma	pCi/m^3	<MDA	<MDA	<MDA	PASS	PASS
er - SFA3	6/28/21	Gamma	pCi/m^3	<MDA	<MDA	<MDA	PASS	PASS
er - SFA4	6/28/21	Gamma	pCi/m^3	<MDA	<MDA	<MDA	PASS	PASS
r-16C2	06/28/21	Gross Beta	pCi/L	2.74 +/- 0.8	NA	<2.64	NA	PASS
r-16C2	06/28/21	Gamma	pCi/L	<MDA	NA	<MDA	NA	PASS
lter - A1	07/19/21	Gross Beta	10^{-2} pCi/m^3	2.1 +/- 0.1	2.1 +/- 0.1	**	PASS	NA
lter - A2	07/19/21	Gross Beta	10^{-2} pCi/m^3	2.0 +/- 0.1	1.8 +/- 0.1	**	PASS	NA
lter - A3	07/19/21	Gross Beta	10^{-2} pCi/m^3	2.0 +/- 0.1	2.0 +/- 0.1	**	PASS	NA
lter - A4	07/19/21	Gross Beta	10^{-2} pCi/m^3	1.9 +/- 0.1	1.8 +/- 0.1	**	PASS	NA
lter - A5	07/19/21	Gross Beta	10^{-2} pCi/m^3	2.0 +/- 0.1	2.1 +/- 0.1	**	PASS	NA
er - SFA1	07/19/21	Gross Beta	10^{-2} pCi/m^3	1.8 +/- 0.1	1.8 +/- 0.1	**	PASS	NA
er - SFA2	07/19/21	Gross Beta	10^{-2} pCi/m^3	1.8 +/- 0.1	1.8 +/- 0.1	**	PASS	NA
er - SFA3	07/19/21	Gross Beta	10^{-2} pCi/m^3	2.2 +/- 0.1	2.1 +/- 0.1	**	PASS	NA
er - SFA4	07/19/21	Gross Beta	10^{-2} pCi/m^3	2.3 +/- 0.2	2.4 +/- 0.2	**	PASS	NA
dine - A1	07/06/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A2	07/06/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A3	07/06/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A4	07/06/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine – A5	07/06/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA1	07/06/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA2	07/06/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA3	07/06/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne – SFA4	07/06/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA

k-19B1	7/13/2021	Gamma	pCi/L	<MDA	NA	<MDA	NA	PASS
k-25C1	7/13/2021	Gamma	pCi/L	<MDA	NA	<MDA	NA	PASS
k-19B1	7/13/2021	I-131	pCi/L	<MDA	NA	<MDA	NA	PASS
k-25C1	7/13/2021	I-131	pCi/L	<MDA	NA	<MDA	NA	PASS
d - IB4	7/26/2021	Gamma	pCi/kg	<MDA	<MDA	NA	PASS	NA
d - IB7	7/26/2021	Gamma	pCi/kg	<MDA	<MDA	NA	PASS	NA
ttuce ckport	7/27/2021	Gamma	pCi/kg	<MDA	<MDA	NA	PASS	NA
r-16C2	08/02/21	Gross Beta	pCi/L	3.87 +/- 0.9	NA	<2.72	NA	PASS
r-16C2	08/02/21	Gamma	pCi/L	<MDA	NA	<MDA	NA	PASS
– IA1	08/24/21	Gamma	pCi/kg	<MDA	<MDA	<MDA	PASS	PASS
– IA5	08/24/21	Gamma	pCi/kg	<MDA	<MDA	<MDA	PASS	PASS
rs – IA3	08/24/21	Gamma	pCi/kg	<MDA	<MDA	<MDA	PASS	PASS
rs – IA6	08/24/21	Gamma	pCi/kg	<MDA	<MDA	<MDA	PASS	PASS
lter - A1	08/30/21	Gross Beta	10^{-2} pCi/m^3	2.9 +/- 0.2	3.0 +/- 0.2	**	PASS	NA
lter - A2	08/30/21	Gross Beta	10^{-2} pCi/m^3	2.8 +/- 0.2	3.2 +/- 0.2	**	PASS	NA
lter - A3	08/30/21	Gross Beta	10^{-2} pCi/m^3	2.7 +/- 0.2	2.9 +/- 0.2	**	PASS	NA
lter - A4	08/30/21	Gross Beta	10^{-2} pCi/m^3	2.6 +/- 0.2	3.1 +/- 0.2	**	PASS	NA
lter - A5	08/30/21	Gross Beta	10^{-2} pCi/m^3	2.6 +/- 0.1	3.0 +/- 0.2	**	PASS	NA
er - SFA1	08/30/21	Gross Beta	10^{-2} pCi/m^3	2.8 +/- 0.2	3.5 +/- 0.2	**	PASS	NA
er - SFA2	08/30/21	Gross Beta	10^{-2} pCi/m^3	2.4 +/- 0.1	2.8 +/- 0.2	**	PASS	NA
er - SFA3	08/30/21	Gross Beta	10^{-2} pCi/m^3	2.9 +/- 0.2	3.5 +/- 0.2	**	PASS	NA
er - SFA4	08/30/21	Gross Beta	10^{-2} pCi/m^3	2.5 +/- 0.1	2.4 +/- 0.1	**	PASS	NA

dine - A1	08/16/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A2	08/16/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A3	08/16/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A4	08/16/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A5	08/16/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA1	08/16/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA2	08/16/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA3	08/16/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
r-16C2	08/30/21	Gross Beta	pCi/L	4.29 +/- 0.9	NA	<2.71	NA	PASS
r-16C2	08/30/21	Gamma	pCi/L	<MDA	NA	<MDA	NA	PASS
- Albion	09/02/21	Gamma	pCi/kg	<MDA	<MDA	<MDA	PASS	NA
s - East	09/02/21	Gamma	pCi/kg	<MDA	<MDA	<MDA	PASS	NA
Chard-IB4	09/20/21	Gamma	pCi/kg	<MDA	<MDA	<MDA	PASS	NA
hard-IB10	09/20/21	Gamma	pCi/kg	<MDA	<MDA	<MDA	PASS	NA
dine - A1	09/14/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A2	09/14/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A3	09/14/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A4	09/14/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A5	09/14/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA1	09/14/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA2	09/14/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA3	09/14/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA4	09/14/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA

r-16C2	09/27/21	Gross Beta	pCi/L	1.87 +/- 0.8	NA	<2.38	NA	PASS
r-16C2	09/27/21	Gamma	pCi/L	<MDA	NA	<MDA	NA	PASS
lter - A1	10/04/21	Gross Beta	10^{-2} pCi/m^3	3.0 +/- 0.2	3.1 +/- 0.2	**	PASS	NA
lter - A2	10/04/21	Gross Beta	10^{-2} pCi/m^3	3.0 +/- 0.2	3.1 +/- 0.2	**	PASS	NA
lter - A3	10/04/21	Gross Beta	10^{-2} pCi/m^3	3.1 +/- 0.2	2.9 +/- 0.2	**	PASS	NA
lter - A4	10/04/21	Gross Beta	10^{-2} pCi/m^3	3.0 +/- 0.2	3.1 +/- 0.2	**	PASS	NA
lter - A5	10/04/21	Gross Beta	10^{-2} pCi/m^3	3.5 +/- 0.2	3.4 +/- 0.2	**	PASS	NA
er - SFA1	10/04/21	Gross Beta	10^{-2} pCi/m^3	3.5 +/- 0.2	3.5 +/- 0.2	**	PASS	NA
er - SFA2	10/04/21	Gross Beta	10^{-2} pCi/m^3	2.7 +/- 0.2	2.7 +/- 0.1	**	PASS	NA
er - SFA3	10/04/21	Gross Beta	10^{-2} pCi/m^3	3.5 +/- 0.2	3.4 +/- 0.2	**	PASS	NA
er - SFA4	10/04/21	Gross Beta	10^{-2} pCi/m^3	3.0 +/- 0.2	3.2 +/- 0.2	**	PASS	NA
dine - A1	10/04/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A2	10/04/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A3	10/04/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A4	10/04/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A5	10/04/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA1	10/04/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA3	10/04/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA4	10/04/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
k-19B1	10/05/21	Gamma	pCi/L	<MDA	NA	<MDA	NA	PASS
k-25C1	10/05/21	Gamma	pCi/L	<MDA	NA	<MDA	NA	PASS
k-19B1	10/05/21	I-131	pCi/L	<MDA	NA	<MDA	NA	PASS
k-25C1	10/05/21	I-131	pCi/L	<MDA	NA	<MDA	NA	PASS

Filter – TION-02	10/26/21	Gross Beta	10^{-2} pCi/m^3	2.9 +/- 0.2	2.8 +/- 0.2	**	PASS	NA
Filter – TION-03	10/26/21	Gross Beta	10^{-2} pCi/m^3	2.9 +/- 0.2	3.0 +/- 0.2	**	PASS	NA
Filter – TION-04	10/26/21	Gross Beta	10^{-2} pCi/m^3	2.8 +/- 0.2	2.8 +/- 0.2	**	PASS	NA
Filter – TION-05	10/26/21	Gross Beta	10^{-2} pCi/m^3	2.8 +/- 0.2	2.8 +/- 0.2	**	PASS	NA
Filter – TION-06	10/26/21	Gross Beta	10^{-2} pCi/m^3	2.9 +/- 0.2	2.8 +/- 0.2	**	PASS	NA
Filter – TION-07	10/26/21	Gross Beta	10^{-2} pCi/m^3	4.1 +/- 0.3	3.9 +/- 0.3	**	PASS	NA
Filter – TION-08	10/26/21	Gross Beta	10^{-2} pCi/m^3	2.8 +/- 0.3	2.7 +/- 0.3	**	PASS	NA
Filter – TION-09	10/26/21	Gross Beta	10^{-2} pCi/m^3	2.6 +/- 0.1	2.7 +/- 0.1	**	PASS	NA
Filter – TION-10	10/26/21	Gross Beta	10^{-2} pCi/m^3	2.9 +/- 0.2	2.9 +/- 0.2	**	PASS	NA
Filter – TION-11	10/26/21	Gross Beta	10^{-2} pCi/m^3	2.9 +/- 0.2	3.0 +/- 0.2	**	PASS	NA
Filter – TION-12	10/26/21	Gross Beta	10^{-2} pCi/m^3	3.0 +/- 0.2	3.0 +/- 0.2	**	PASS	NA
Filter – TION-13	10/26/21	Gross Beta	10^{-2} pCi/m^3	2.7 +/- 0.1	2.6 +/- 0.1	**	PASS	NA
r-16C2	11/01/21	Gross Beta	pCi/L	1.98 +/- 0.8	NA	3.39 +/- 1.6	NA	PASS
r-16C2	11/01/21	Gamma	pCi/L	<MDA	NA	<MDA	NA	PASS
r-16C2	11/29/21	Gross Beta	pCi/L	3.11 +/- 0.9	NA	2.5 +/- 1.3	NA	PASS
r-16C2	11/29/21	Gamma	pCi/L	<MDA	NA	<MDA	NA	PASS

dine - A1	12/28/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A2	12/28/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A3	12/28/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A4	12/28/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
dine - A5	12/28/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA1	12/28/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA2	12/28/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA3	12/28/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
ne - SFA4	12/28/21	I-131	pCi/m^3	<MDA	<MDA	**	PASS	NA
r-16C2	01/03/22	Gross Beta	pCi/L	2.02 +/- 0.8	NA	<2.48	NA	PASS
r-16C2	01/03/22	Gamma	pCi/L	<MDA	NA	<MDA	NA	PASS
05[1]	04/05/21	Ambient Radiation	mrem	12.4	11.6	**	PASS	**
06[1]	04/05/21	Ambient Radiation	mrem	10.3	10.2	**	PASS	**
07[1]	04/05/21	Ambient Radiation	mrem	11.1	10.8	**	PASS	**
08[1]	04/05/21	Ambient Radiation	mrem	15.3	14.9	**	PASS	**
09[1]	04/05/21	Ambient Radiation	mrem	10.9	11.2	**	PASS	**
10[1]	04/05/21	Ambient Radiation	mrem	11.6	10.5	**	PASS	**
11[1]	04/05/21	Ambient Radiation	mrem	11.2	11.5	**	PASS	**
R14[1]	04/05/21	Ambient Radiation	mrem	68.6	65.4	**	PASS	**
R15[1]	04/05/21	Ambient Radiation	mrem	26.6	25.5	**	PASS	**
23[1]	04/12/21	Ambient Radiation	mrem	13.9	15.3	**	PASS	**
05[1]	07/12/21	Ambient Radiation	mrem	12.0	12.3	**	PASS	**
06[1]	07/12/21	Ambient Radiation	mrem	8.9	10.5	**	PASS	**
07[1]	07/12/21	Ambient Radiation	mrem	11.5	10.5	**	PASS	**
08[1]	07/12/21	Ambient Radiation	mrem	15.0	14.5	**	PASS	**
09[1]	07/12/21	Ambient Radiation	mrem	10.2	10.3	**	PASS	**

10[1]	07/12/21	Ambient Radiation	mrem	10.4	11.4	**	PASS	**
11[1]	07/12/21	Ambient Radiation	mrem	10.8	11.1	**	PASS	**
R14[1]	07/12/21	Ambient Radiation	mrem	69.8	64.5	**	PASS	**
R15[1]	07/12/21	Ambient Radiation	mrem	25.6	26.8	**	PASS	**
23[1]	07/14/21	Ambient Radiation	mrem	18.0	15.8	**	PASS	**
05[1]	10/04/21	Ambient Radiation	mrem	13.2	12.4	**	PASS	**
06[1]	10/04/21	Ambient Radiation	mrem	10.2	11.3	**	PASS	**
07[1]	10/04/21	Ambient Radiation	mrem	11.5	11.5	**	PASS	**
08[1]	10/04/21	Ambient Radiation	mrem	15.6	15.9	**	PASS	**
09[1]	10/04/21	Ambient Radiation	mrem	10.3	11.7	**	PASS	**
10[1]	10/04/21	Ambient Radiation	mrem	11.5	12.2	**	PASS	**
11[1]	10/04/21	Ambient Radiation	mrem	13.5	11.2	**	PASS	**
R14[1]	10/04/21	Ambient Radiation	mrem	19.1	19.2	**	PASS	**
R15[1]	10/04/21	Ambient Radiation	mrem	74.2	70.0	**	PASS	**
23[1]	10/11/21	Ambient Radiation	mrem	19.1	19.2	**	PASS	**
05[1]	01/11/22	Ambient Radiation	mrem	12.6	11.8	**	PASS	**
06[1]	01/11/22	Ambient Radiation	mrem	10.9	10.6	**	PASS	**
07[1]	01/11/22	Ambient Radiation	mrem	9.8	11.4	**	PASS	**
08[1]	01/11/22	Ambient Radiation	mrem	17.0	14.9	**	PASS	**
09[1]	01/11/22	Ambient Radiation	mrem	12.3	10.6	**	PASS	**
10[1]	01/11/22	Ambient Radiation	mrem	11.8	11.5	**	PASS	**
11[1]	01/11/22	Ambient Radiation	mrem	11.8	11.5	**	PASS	**
R14[1]	01/11/22	Ambient Radiation	mrem	64.1	68.1	**	PASS	**
R15[1]	01/11/22	Ambient Radiation	mrem	32.7	34.7	**	PASS	**
23[1]	01/11/22	Ambient Radiation	mrem	17.4	16.6	**	PASS	**

e discussion at the beginning of the Appendix
he nature of these samples precluded splitting them with an independent laboratory.

TABLE C-3

Calvert Cliffs Nuclear Power Plant ODCM Required LLDs

Selected Nuclides	Water pCi/l	Fish/Shellfish pCi/kg	Milk pCi/L	Sediment pCi/kg	Vegetation pCi/kg	Particulates[1] pCi/m^3
H-3	2000	--	--	--	--	--
Mn-54	15	130	--	--	--	--
Co-58	15	130	--	--	--	--
Fe-59	30	260	--	--	--	--
Co-60	15	130	--	--	--	--
Zn-65	30	260	--	--	--	--
Zr-95/Nb-95	15	--	--	--	--	--
I-131	15[2]	--	1	--	60	0.07[3]
Cs-134	15	130	15	150	60	0.05
Cs-137	18	150	18	180	80	0.06
BaLa-140	15	--	15	--	--	--

[1]Gross Beta activity LLD = 0.01pCi/m^3
[2] In accordance with the ODCM no drinking water pathway exists so the Gamma Isotopic LLD is used.
[3] Air samples for I-131 are collected separately on a charcoal radioiodine cannister

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. An "*" denotes a change in this sector since the 2020 Land Use Census.

Table D-1
Land Use Survey

	Distance from Plant (miles)	
Sector	Residence	Garden
SE	1.5	4.5
SSE	1.6	2.0*
S	1.6	1.9
SSW	1.5	1.6*
SW	1.1	2.4
WSW	1.2	1.5
W	1.3	1.2*
WNW	2.7	2.0*
NW	2.0	2.1

The closest residence is situated in the SW sector and the nearest garden is in the West sector.

There are no animals producing milk for public consumption within the 5-mile radius. In the WNW Sector, goats were identified as being used for milk and cheese production for consumption by the owners and employees only. At this time there is no plan to sell these items to the public. The closest beef cattle for meat consumption are 1.6 miles in the South Sector.

Discussion with a local waterman indicate that oysters are still harvested in the vicinity of CCNPP.

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 groundwater samples discussed below. 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.

Table E-4 through E-5 contain analytical results for samples taken from aquatic and atmospheric radiological pathways surrounding the plant. Cs-137 was detected in one sample of bottom sediment near the Discharge area (sample code WBS2) at 129 +/- 44 pCi/kg. While the presence of Cs-137 in this sample may be plant-related, this range is consistent with that found to be due to the residual fallout from past atmospheric nuclear weapons testing. The activities of this radionuclide are well below the federal limits established in 40CFR190 and 10CFR72.104. In general, these results continue the historical trends previously observed in the official sites of the CCNPP REMP and in the earlier pre-operational data for the ISFSI.

The NEI Industry Groundwater Protection Initiative was established to determine the potential impact nuclear power plants may have on the surrounding environment due to unplanned releases of radioactive liquids. Under the Groundwater Protection Initiative, groundwater monitoring is accomplished through routine sampling of the water table around the plant (Ref. 16). Analysis is performed for gamma, tritium, alpha, beta, and various other radiological isotopes. Tables E-6 through E-12 contain the analytical results for samples taken from the various groundwater monitoring wells, subsurface drains, and rainwater.
In 2019 MH24 was renamed to MH66/SSD3.

Groundwater samples were collected from 16 of 17 on-site piezometer tubes and three subsurface manholes in 2021. These locations are listed in Table E-1 and on Figure E-1, Site Map Groundwater Monitoring Wells. Figure E-2, Site Map RW Locations, shows precipitation collection sites. A piezometer tube is a shallow monitoring well which allows access to groundwater at a depth of approximately 40 feet beneath the site. Of the piezometer tubes sampled, only #11 piezometer, MH28 and MH30 showed any results greater than MDAs. This activity was previously identified and evaluated in December of 2005. The activity consists of tritium originating from normal radiological waste discharges and was previously reported in the Annual Radioactive Release Reports. The tritium contamination is contained on site. No drinking water has been affected; the groundwater at this location does not impact any drinking water pathway.

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TABLE E-1

Locations of Non-Tech Spec and Radiological Groundwater Environmental Sampling Stations for Calvert Cliffs Nuclear Power Plant

Non-Tech Spec Station	Description	Distance[1]		Direction[1]
		(KM)	(Miles)	(Sector)
WBS2	Discharge Area	0.3	0.2	N
WBS4	Camp Conoy/Rocky Point	3.0	1.9	SE
SFA2	Visitors Center	0.8 [2]	0.5 [2]	N [2]

RGPP Station	Description
PZ11	45' - North side of Unit 1 near roll-up door
PZ12	NW corner of Unit 1
PZ13	Unit 1 RWT
PZ15	Unit 2 RWT
PZ18	45' - South side near stairwell to waterfront (idle)
PZ19	10' - Southside near traveling screen trough
PZ20	10' -Northside of MMD Shop
PZ21	10' - In grass West of STP
PZ22	10’ - In grass West of STP
PZ23	45’ – S of SSB doors
PZ24	45' - East of SSB near Unit 2 roll-up door
PZ25	45' - South side near stairwell to waterfront
PZ26	45' -SW of Spare Transformer
PZ27	45' -SW of Spare Transformer
PZ28	45’ – SW corner of NRC Bldg
PZ29	45' - East of Nitrogen Tank in road
PZ30	45' -NE Corner of Turbine Bldg
RW1	Met Tower
RW2	Lower Lay Down Area
RW3	Visitor’s Center Overlook
RW4	Waterfront
RW5	Open Grass Area outside NSF PA exit
RW6	U2 Turbine Building roll up door
RW7	Open area north of Outfall 004
RW8	Open area on north wing wall
MH28	12'- Unit1 next to Feed Water Heater
MH30	12'- Unit 2 next to elevator
MH66/SSD3	45'- East of SSB and South of Turbine Bldg (formerly named MH-24)
SW003	Waterfront south of Sewage Treatment Plant
SW004	Waterfront Barge Dock Rd

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

[2.] Distance and direction from the central point of the ISFSI

Table E-2

Synopsis of 2021 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[1]	Number Analyzed
Aquatic Environment						
Bottom Sediment	SA	2	4	Gamma	SA	4
Atmospheric Environment						
Air Iodine[2]	W	1	53	I-131	W	53

[1] W=weekly, M=monthly, Q=quarterly, SA=semiannual, A=annual, C=composite
[2] The collection device contains Charcoal

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[1]	Control Locations Mean (F)/Range
Aquatic Environment						
Bottom Sediment	Gamma (4)	58.1pCi/kg	129 (1/2)	Discharge Area	129 (1/2)	--
(pCi/kg)	Cs-137		--	WBS2 0.3 km N	--	--

[1] Mean and range based upon detectable measurements only. Fraction (F) of detectable measurements at specified location is indicated in parentheses.
[2] Distance and direction from the central point 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			
Discharge Area	6/23/2021	[2]	*
	10/26/2021	129 +/- 44	*
WBS4[1]			
Camp Conoy/ Rocky Point	6/23/2021	[2]	*
	10/26/2021	[2]	*

[1] Control Location
[2] This isotope <MDA
* 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	SFA2[1] Visitors Center
12/28/2020	1/5/2021	*
1/5/2021	1/11/2021	*
1/11/2021	1/19/2021	*
1/19/2021	1/25/2021	*
1/25/2021	2/3/2021	*
2/3/2021	2/8/2021	*
2/8/2021	2/15/2021	*
2/15/2021	2/22/2021	*
2/22/2021	3/1/2021	*
3/1/2021	3/8/2021	*
3/8/2021	3/15/2021	*
3/15/2021	3/22/2021	*
3/22/2021	3/29/2021	*
3/29/2021	4/5/2021	*
4/5/2021	4/12/2021	*
4/12/2021	4/19/2021	*
4/19/2021	4/26/2021	*
4/26/2021	5/3/2021	*
5/3/2021	5/10/2021	*
5/10/2021	5/17/2021	*
5/17/2021	5/24/2021	*
5/24/2021	6/1/2021	*
6/1/2021	6/9/2021	*
6/9/2021	6/14/2021	*
6/14/2021	6/21/2021	*
6/21/2021	6/28/2021	*
6/28/2021	7/6/2021	*
7/6/2021	7/12/2021	*
7/12/2021	7/19/2021	*
7/19/2021	7/26/2021	*
7/26/2021	8/2/2021	*
8/2/2021	8/9/2021	*
8/9/2021	8/16/2021	*
8/16/2021	8/23/2021	*
8/23/2021	8/30/2021	*
8/30/2021	9/7/2021	*
9/7/2021	9/14/2021	*
9/14/2021	9/20/2021	*
9/20/2021	9/27/2021	*

Table E-5

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

Start Date	Stop Date	SFA2[1] Visitors Center
9/27/2021	10/4/2021	*
10/4/2021	10/11/2021	*
10/11/2021	10/18/2021	*
10/18/2021	10/25/2021	*
10/25/2021	11/1/2021	*
11/1/2021	11/8/2021	*
11/8/2021	11/17/2021	*
11/17/2021	11/22/2021	*
11/22/2021	11/29/2021	*
11/29/2021	12/6/2021	*
12/6/2021	12/13/2021	*
12/13/2021	12/20/2021	*
12/20/2021	12/28/2021	*
12/28/2021	01/04/2022	*

[1] Control Location
* <MDA

Table E-6

Alpha Isotopic and Pu-241 in Groundwater
(Results in units of pCi/L ± 2σ)

Station	Sample Date	AM-241 (AS)	CM-242 (AS)	CM-243/244 (AS)	PU-238 (AS)
PZ11	4/30/2021	<.0570	<.0565	<0.113	<0.0932

Station	Sample Date	U-233/234 (AS)	U-235 (AS)	U-238 (AS)	PU-239/240 (AS)
PZ11	4/30/2021	<0.0571	<0.0379	<0.0307	<0.0659

Station	Sample Date	Fe-55	Ni-63
PZ11	4/30/2021	<55.6	<4.79
MH66/SSD3*	10/21/2021	<79.0	<4.99

*Renamed MH-24

Table E-7

Gross Alpha Activity in Groundwater
(Results in units of pCi/L ± 2σ)

Station	Sample Date	GR-A (DIS) (pCi/L)	GR-A (SUS) (pCi/L)
MH66/SSD3*	10/21/2021	<0.963	<0.508

*Renamed MH-24

Table E-8

Concentration of Radiostrontium in Groundwater
(Results in units of pCi/L ± 2σ)

Station	Sample Date	SR-89 (pCi/L)	SR-90 (pCi/L)
MH28	4/13/2021	<8.65	<0.810
MH30	4/13/2021	<6.42	<0.918
PZ11	4/30/2021	<8.46	<0.853
PZ12	4/30/2021	<3.92	<0.939
PZ13	4/30/2021	<4.54	<0.937
PZ15	4/30/2021	<6.15	<0.855
PZ24	4/30/2021	<4.81	<0.940
PZ25	4/30/2021	<4.65	<0.835
PZ29	4/30/2021	<3.79	<0.978
PZ30	4/30/2021	<5.29	<0.927
MH66/SSD3*	6/17/2021	<9.36	<0.849

*Renamed MH-24

Table E-9

Concentration of Tritium in Groundwater
(Results in units of pCi/L ± 2σ)
By Piezometer Tube Locations

SAMPLE DATE	11	12	13	15	19	20	21	22	23	24	25	26	27	28	29	30
2/16/2021	ND	ND	<172	<177	ND	ND	ND	ND	ND	<180	<180	ND	ND	ND	ND	ND
03/03/2021	635 ± 142	<174	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<180	<179
4/29/2021	ND	ND	ND	ND	<184	<182	<185	<180	ND	ND	ND	ND	ND	ND	ND	ND
4/30/2021	180 ± 116	<180	<179	<186	ND	ND	ND	ND	<183	<189	<182	<182	<183	<185	<193	<190
7/22/2021	290 ± 127	<191	<186	<182	ND	ND	ND	ND	ND	<186	<182	ND	ND	ND	<180	<180
10/27/2021	ND	<199	<178	<176	ND	ND	ND	ND	ND	<177	<180	ND	ND	ND	ND	ND
10/28/2021	511 ± 126	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<173	<177

ND No Data – Sample obtained as required

Table E-10

Concentration of Tritium in Surface Water, Precipitation, and Subsurface Drainage
(Results in units of pCi/L ± 2σ)

SAMPLE DATE	*MH-66 /SSD3	MH28	MH30	SW003	SW004	RW1	RW2	RW3	RW4	RW5	RW6	RW7	RW8
1/13/2021	ND	2030 ± 268	3410 ± 402	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1/13/2021 (Confirmation/ Repeat)	ND	ND	3830 ± 444 / 3570 ± 412	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
02/01/2021	<185	ND	ND	ND	ND	<188	<187	<185	<187	<187	<184	<187	<188
4/13/2021	ND	1450 ± 218	2680 ± 335	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
06/17/2021	<180	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
06/22/2021	ND	ND	ND	ND	ND	<185	<188	<186	<188	<187	<189	<189	<189
7/13/2021	ND	1880 ± 257	2080 ± 275	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
07/20/2021	<185	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10/12/2021	ND	4160 ± 475	1230 ± 187	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10/12/2021 (Confirmation/ Repeat)	ND	3340 ± 403 / 3350 ± 404	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10/21/2021	<187	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

* MH24 Renamed MH-66/SSD3

ND No Data – sample obtained as required

Table E-11

Gross Concentration of Gamma Emitters in Groundwater
(Results in units of pCi/L ± 2σ)

By Piezometer Tube Locations

SAMPLE DATE	11	12	13	15	19	20	21	22	23	24	25	26	27	28	29	30

The requirement to monitor for Gamma emitters has changed to once every 2 years. This requirement was fulfilled in 2020 and is not required in 2021

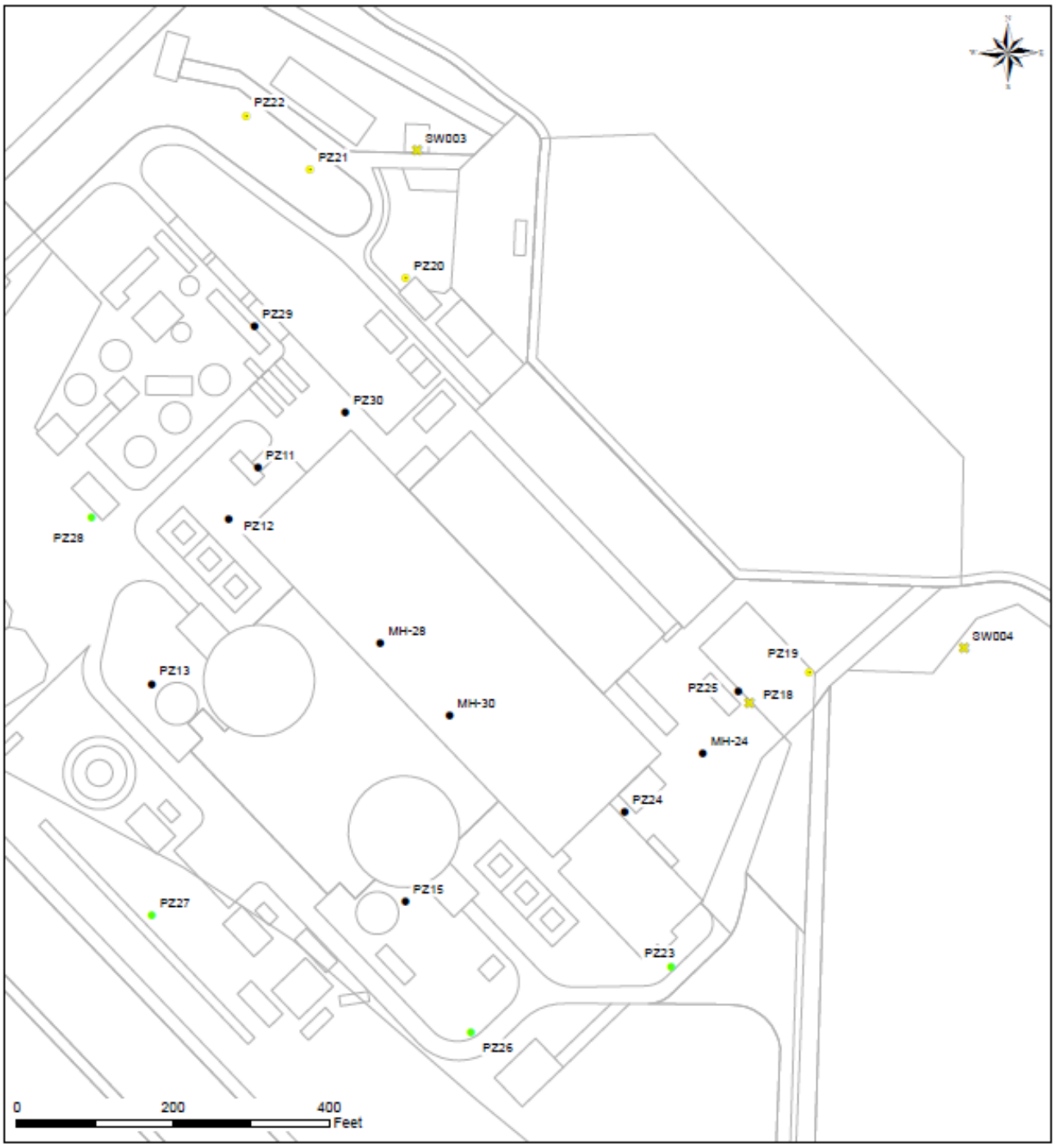
Table E-12

Gross Concentration of Gamma Emitters in Surface Water, Precipitation and MH (subsurface drains)
(Results in units of pCi/L ± 2σ)

SAMPLE DATE	*MH66/SSD3	MH28	MH30	SW003	SW004	RW1	RW2	RW3	RW4
10/21/2021	#	ND	ND	ND	ND	ND	ND	ND	ND

*MH24 Renamed as MH66/SSD3
All Non-Natural Gamma Emitters <MDA
ND No Data - Sample obtained as required.

Figure E-1
Site Map Groundwater Monitoring Wells



Explanation:
Modified RGPP Sample Locations

- Background
- Idle
- Perimeter
- Source

RGPP Sample Locations
Surface Water and Overburden
Exelon Corporation
Calvert Cliffs Generating Station

Figure E-2

Site Map Rainwater Locations