VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

April 28, 2021

United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Serial No. 21-149
S&L/JWD R0
Docket Nos. 50-280
50-281
72-2
72-55
License Nos. DPR-32
DPR-37
SNM-2501

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
INDEPENDENT SPENT FUEL STORAGE INSTALLATION
ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

Surry Units 1 and 2 Technical Specification 6.6.B.2 requires the submittal of an Annual Radiological Environmental Operating Report (AREOR) for Surry Power Station. Surry Independent Spent Fuel Storage Installation (ISFSI) Technical Specification Appendix C, Item 1.3.1 requires that the Surry ISFSI be included in the environmental monitoring for Surry Power Station. Accordingly, enclosed is the Surry Power Station AREOR for the period of January 1, 2020 through December 31, 2020, which includes environmental monitoring for the Surry ISFSI.

If you have any further questions, please contact William Terrry at 757-365-2010.

Sincerely,

Johnny Henderson
Director Safety & Licensing
Surry Power Station

Attachment

Commitments made in this letter: None

Serial No. 21-149
Docket Nos.: 50-280
50-281
72-2
72-55

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Serial No. 21-149
Docket Nos.: 50-280
50-281
72-2
72-55

ATTACHMENT 1

2020 Annual Radiological Environmental Operating Report

SURRY POWER STATION UNITS 1 AND 2
VIRGINIA ELECTRIC AND POWER COMPANY

Dominion Energy

Surry Power Station

Radiological Environmental Monitoring Program

January 1, 2020 to December 31, 2020

Annual Radiological Environmental Operating Report

Surry Power Station

January 1, 2020 to December 31, 2020

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Table of Contents

PREFACE 4
1. EXECUTIVE SUMMARY 5
2. PROGRAM DESCRIPTION 7
    2.1 Introduction 7
    2.2 Sampling and Analysis Program 8
3. ANALYTICAL RESULTS 20
    3.1 Summary of Results 20
    3.2 Analytical Results of 2020 REMP Samples 28
4. DISCUSSION OF RESULTS 49
    4.1 Gamma Exposure Rate 50
    4.2 Airborne Gross Beta 50
    4.3 Airborne Radioiodine 52
    4.4 Air Particulate Gamma 52
    4.5 Animal Milk 52
    4.6 Food Products 53
    4.7 Well Water 53
    4.8 River Water 53
    4.9 Silt 54
    4.10 Shoreline Sediment 56
    4.11 Fish 56
    4.12 Oysters 56
    4.13 Clams 56
    4.14 Crabs 56
5. PROGRAM EXCEPTIONS 57
6. CONCLUSIONS 58
REFERENCES 60
APPENDICES 62
  APPENDIX A: LAND USE CENSUS 63
  APPENDIX B: SUMMARY OF INTERLABORATORY COMPARISONS 65

PREFACE

This report is submitted as required by Technical Specification 6.6.B.2, Annual Radiological Environment Operating Report, for Surry, Units 1 and 2, Virginia Electric and Power Company Docket Nos. 50-280 and 50-281, and the Surry Independent Spent Fuel Storage Installation (ISFSI) Technical Specifications, Appendix C, Item 1.3.1.

1. EXECUTIVE SUMMARY

This document is a detailed report of the 2020 Surry Power Station Radiological Environmental Monitoring Program (REMP). Radioactivity levels from January 1 through December 31, 2020, in air, water, silt, shoreline sediment, milk, aquatic biota, food products and direct exposure pathways have been analyzed, evaluated, and summarized. The REMP is designed to confirm that radiological effluent releases are As Low As (is) Reasonably Achievable (ALARA), no undue environmental effects occur, and the health and safety of the public are protected. The program also detects any unexpected environmental processes that could allow radiation accumulations in the environment or food pathway chains.

Radiation and radioactivity in the environment are monitored within a 20-mile radius of the station. Surry Power Station personnel collect a variety of samples within this area. Several sampling locations for each medium are selected using available meteorological, land use, and water use data. Two types of samples are obtained. The first type, control samples, is collected from areas that are beyond the measurable influence of Surry Power Station or any other nuclear facility. These samples represent normal background radiation levels. Background radiation levels can be compared to the environment surrounding the station. Indicator samples are the second sample type obtained. These samples show how much radiation is contributed to the environment by the station. Indicator samples are taken from areas close to the station where any station contribution will be at the highest concentration.

Prior to station operation, samples were collected and analyzed to determine the amount of radioactivity present in the area. The resulting values are used as a "pre-operational baseline." Analysis results from the indicator samples are compared to control sample values and the pre-operational baseline to determine if changes in radioactivity levels are attributable to station operations, or natural variation, or other causes such as the Chernobyl and Fukushima Daiichi accidents that released radioactive material to the environment.

Teledyne Brown Engineering, Inc. (TBE) provides radioanalyses for this program and Mirion Technologies provides thermoluminescent dosimetry (TLD) services. Participation in an Interlaboratory Comparison Program provides an independent check of sample measurement precision and accuracy. Typically, radioactivity levels in the environment are so low that analysis values frequently fall below the minimum detection limits of state-of-the-art measurement methods. Because of this, the United States Nuclear Regulatory Commission (USNRC) requires that equipment used for radiological environmental monitoring must be able to detect specified minimum Lower Limits of Detection (LLDs). This ensures that analyses are as accurate as possible. The USNRC also mandates a reporting level for radionuclides. Licensed nuclear facilities must report the radionuclide activities in those environmental samples that are equal to or greater than the specified reporting level. Environmental radiation levels are sometimes referred to as a percent of the reporting level.

Analytical results are reported for all possible radiation exposure pathways to man. These pathways include airborne, aquatic, terrestrial and direct radiation exposure. The airborne exposure pathway includes radioactive airborne iodine and particulates. The 2020 airborne results were comparable to previous years. No station related radioactivity was detected and natural radioactivity levels remained at levels consistent with past years' results. Aquatic exposure pathway samples include well and river water, silt and shoreline sediments, crabs, fish, clams, and oysters. Naturally occurring radionuclides such as beryllium-7, potassium-40, radium-226, actinium-228, thorium-228, and thorium-232 were detected at average environmental levels. No man-made radionuclides were detected in well water. This trend is consistent throughout the operational environmental monitoring program. No man-made radionuclides were detected in river water. Silt samples indicated the presence of cesium-137 and naturally occurring radionuclides. Cesium-137 concentrations were present in indicator location samples at nominal background levels. No other man-made radionuclides were detected. These background levels are attributable to fallout from historic weapons testing and nuclear accidents such as Chernobyl. Naturally occurring beryllium-7, potassium-40, radium-226, actinium-228, thorium-228, and thorium-232 were detected at average environmental levels. Shoreline sediment, which may provide a direct exposure pathway, contained no station related radionuclides. Naturally occurring radionuclides potassium-40, radium-226, actinium-228, thorium-228, and thorium-232 were detected at average environmental levels. The terrestrial exposure pathway includes milk and food products. Iodine-131 was not detected in any 2020 milk samples and has not been detected in milk prior to or since the 1986 Chernobyl accident. Strontium-90 was detected in milk and this activity is attributable to past atmospheric nuclear weapons testing. No other man-made radionuclides were detected in milk samples. Consistent with historical data, naturally occurring potassium-40 was detected in milk. No man-made radionuclides were detected in food product samples. Naturally occurring potassium-40 was detected in food product samples. The direct exposure pathway measures environmental radiation dose using TLDs. TLD results have remained relatively constant over the years.

During 2020, as in previous years, the operation of Surry Power Station has created no adverse environmental effects or health hazards. The maximum total body dose calculated for a hypothetical individual at the station site boundary due to liquid and gaseous effluents released from the station during 2020 was 0.038 millirem. For reference, this dose may be compared to the 620 millirem average annual exposure to every person in the United States from natural and man-made sources. Natural sources in the environment provide approximately 50% of radiation exposure to man, while nuclear power contributes less than 0.1%. These results demonstrate compliance with federal and state regulations and demonstrate the adequacy of radioactive effluent controls at Surry Power Station.

2. PROGRAM DESCRIPTION

2.1 Introduction

This report documents the 2020 Surry Power Station operational Radiological Environmental Monitoring Program (REMP). Dominion Energy's Surry Power Station is located on the Gravel Neck peninsula adjacent to the James River, approximately 25 miles upstream of the Chesapeake Bay. The site consists of two units, each with a pressurized water reactor (PWR) nuclear steam supply system and turbine generator furnished by Westinghouse Electric Corporation. Each unit was designed with a nominal gross electrical output of 910 megawatts electric (MWe). Unit 1 achieved commercial operation on December 22, 1972, and Unit 2 on May 1, 1973.

The United States Nuclear Regulatory Commission regulations (10CFR50.34a) require that nuclear power plants be designed, constructed, and operated to keep levels of radioactive material in effluents to unrestricted areas As Low As (is) Reasonably Achievable. To ensure these criteria are met, the operating license for Surry Power Station includes Technical Specifications that address the release of radioactive effluents. In-plant monitoring is used to ensure that these release limits are not exceeded. As a precaution against unexpected or undefined environmental processes, which might allow undue accumulation of radioactivity in the environment, a program for monitoring the station environs is also included in Surry Power Station Technical Specifications.
Dominion personnel are responsible for collecting the various indicator and control environmental samples. Mirion Technologies is responsible for processing the TLDs. Teledyne Brown Engineering is responsible for sample analyses. The results of the analyses are used to determine if changes in radioactivity levels may be attributable to station operations. Measured values are compared with control values, which vary with time due to external events, such as cosmic ray bombardment, nuclear weapons test fallout and seasonal variations of naturally occurring radionuclides. Data collected prior to station operation is used to indicate the degree of natural variation to be expected. This pre-operational data is compared with data collected during the operational phase to assist in evaluating any radiological impact of station operation.

Occasionally, samples of environmental media may show the presence of man-made radionuclides. As a method of referencing the measured radionuclide concentrations in the sample media to a dose consequence to man, the data is compared to the reporting level concentrations listed in the USNRC Regulatory Guide 4.8, “Environmental Technical Specifications for Nuclear Power Plants”, (December, 1975) and VPAP-2103S, Offsite Dose Calculation Manual (Surry). These concentrations are based upon the annual dose commitment recommended by 10CFR50, Appendix I, to meet the criterion of "As Low As (is) Reasonably Achievable."

This report documents the results of the REMP for 2020 and satisfies the following objectives of the program:

- To provide measurements of radiation and of radioactive materials in those exposure pathways and for those radionuclides that lead to the highest potential radiation exposure of the maximum exposed member of the public resulting from station operations.

- To supplement the radiological effluent monitoring program by verifying that radioactive effluents are within allowable limits.

- To identify changes in radioactivity in the environment.

- To verify that station operations have no detrimental effect on the health and safety of the public.

2.2 Sampling and Analysis Program

Table 2-1 summarizes the 2020 sampling program for Surry Power Station. All samples listed in Table 2-1 are taken at indicator locations except those labeled "control location." Dominion Energy personnel collect all samples listed in Table 2-1.

Table 2-2 summarizes the analysis program conducted by Teledyne Brown Engineering and Mirion Technologies for Surry Power Station. All samples, except for TLDs, are shipped to Teledyne Brown Engineering, located in Knoxville, TN, for analysis. The TLDs are shipped to Mirion Technologies, located in Irvine, CA, for processing.

The Surry Radiological Monitoring Locations map (Figures 1 – 5) denote sample locations for Surry Power Station. The locations are color coded to designate sample types.

Table 2-1

SURRY - 2020

RADIOLOGICAL SAMPLING STATIONS

DISTANCE AND DIRECTION FROM UNIT NO. 1

Sample Media	Location	Station	Distance Miles	Direction	Degrees	Collection Frequency	Remarks
Environmental	Control	(00)	-	-	-	Quarterly	Onsite (Stored in a lead shield outside the protected area)
TLDs	West North West	(02)	0.2	WNW	293°	Quarterly	Site Boundary
	Surry Station Discharge	(03)	0.4	NW	321°	Quarterly	Site Boundary
	North North West	(04)	0.2	NNW	329°	Quarterly	Site Boundary
	North	(05)	0.3	N	4°	Quarterly	Site Boundary
	North North East	(06)	0.3	NNE	28°	Quarterly	Site Boundary
	North East	(07)	0.3	NE	44°	Quarterly	Site Boundary
	East North East	(08)	0.4	ENE	67°	Quarterly	Site Boundary
	East	(09)	0.3	E	89°	Quarterly	Site Boundary
	West	(10)	0.1	W	271°	Quarterly	Site Boundary
	West South West	(11)	0.4	WSW	252°	Quarterly	Site Boundary
	South West	(12)	0.3	SW	228°	Quarterly	Site Boundary
	South South West	(13)	0.3	SSW	201°	Quarterly	Site Boundary
	South	(14)	0.4	S	182°	Quarterly	Site Boundary
	South South East	(15)	0.6	SSE	157°	Quarterly	Site Boundary
	South East	(16)	0.9	SE	135°	Quarterly	Site Boundary
	Station Intake	(18)	1.6	ESE	115°	Quarterly	Site Boundary
	Hog Island Reserve	(19)	2.0	NNE	26°	Quarterly	Near Resident
	Bacon's Castle	(20)	4.5	SSW	202°	Quarterly	Apx. 5 miles
	Route 633	(21)	4.9	SW	227°	Quarterly	Apx. 5 miles
	Alliance	(22)	5.1	WSW	247°	Quarterly	Apx. 5 miles
	Surry	(23)	7.7	WSW	256°	Quarterly	Population Center
	Route 636 and 637	(24)	4.0	W	270°	Quarterly	Apx. 5 miles
	Scotland Wharf	(25)	5.0	WNW	284°	Quarterly	Apx. 5 miles
	Jamestown	(26)	6.3	NW	308°	Quarterly	Apx. 5 miles
	Colonial Parkway	(27)	3.8	NNW	333°	Quarterly	Apx. 5 miles
	Route 617 and 618	(28)	4.9	NNW	340°	Quarterly	Apx. 5 miles
	Kingsmill	(29)	4.6	N	2°	Quarterly	Apx. 5 miles
	Williamsburg	(30)	7.8	N	0°	Quarterly	Population Center
	Kingsmill North	(31)	5.5	NNE	12°	Quarterly	Apx. 5 miles
	Budweiser	(32)	5.8	NNE	27°	Quarterly	Population Center
	Water Plant	(33)	5.0	NE	46°	Quarterly	Apx. 5 miles

Table 2-1

SURRY - 2020
RADIOLOGICAL SAMPLING STATIONS
DISTANCE AND DIRECTION FROM UNIT NO. 1

Sample Media	Location	Station	Distance Miles	Direction	Degrees	Collection Frequency	Remarks
Environmental TLDs	BASF	(34)	5.1	ENE	70°	Quarterly	Apx. 5 miles
	Lee Hall	(35)	7.1	ENE	75°	Quarterly	Population Center
	Goose Island	(36)	5.1	E	90°	Quarterly	Apx. 5 miles
	Fort Eustis	(37)	4.9	ESE	104°	Quarterly	Apx. 5 miles
	Newport News	(38)	19.3	SE	130°	Quarterly	Population Center
	James River Bridge	(39)	17.1	SE	142°	Quarterly	Control Location
	Benn's Church	(40)	17.0	SSE	159°	Quarterly	Control Location
	Smithfield	(41)	13.4	SSE	167°	Quarterly	Control Location
	Rushmere	(42)	5.3	SSE	156°	Quarterly	Apx. 5 miles
	Route 628	(43)	5.1	S	177°	Quarterly	Apx. 5 miles
Air Charcoal and Particulate	Surry Station	(SS)	0.3	NNE	18°	Weekly	Site boundary location with highest D/Q
	Hog Island Reserve	(HIR)	2.0	NNE	26°	Weekly	
	Bacon's Castle	(BC)	4.5	SSW	202°	Weekly	
	Alliance	(ALL)	5.1	WSW	247°	Weekly	
	Colonial Parkway	(CP)	3.8	NNW	333°	Weekly	
	BASF	(BASF)	5.1	ENE	70°	Weekly	
	Fort Eustis	(FE)	4.9	ESE	104°	Weekly	
	Newport News	(NN)	19.3	SE	130°	Weekly	Control Location
River Water	Surry Station Discharge	(SD)	0.4	NW	323°	Monthly	
	Scotland Wharf	(SW)	4.9	WNW	284°	Monthly	Control Location
Well Water	Surry Station	(SS)	0.1	SW	227°	Quarterly	Onsite
	Hog Island Reserve	(HIR)	2.0	NNE	28°	Quarterly	
	Construction Site	(CS)	0.3	E	87°	Quarterly	
Shoreline Sediment	Hog Island Reserve	(HIR)	0.6	N	7°	Semi-Annually	
	Chickahominy River	(CHIC)	11.2	WNW	301°	Semi-Annually	Control Location
Silt	Chickahominy River	(CHIC)	11.2	WNW	300°	Semi-Annually	Control Location
	Surry Station Discharge	(SD)	0.5	NW	315°	Semi-Annually	
	Surry Station Intake	(SI)	1.8	ESE	112°	Semi-Annually	

Table 2-1

SURRY - 2020

RADIOLOGICAL SAMPLING STATIONS

DISTANCE AND DIRECTION FROM UNIT NO. 1

Sample Media	Location	Station	Distance Miles	Direction	Degrees	Collection Frequency	Remarks
Milk	Colonial Parkway	(CP)	3.7	NNW	336°	Monthly	
	Beachy Farm	(BF)	12.0	SW	220°	Monthly	Control Location
	Epps	(EPPS)	4.8	SSW	200°	Monthly	
Oysters	Point of Shoals	(POS)	6.4	SSE	157°	Semi-Annually	
	Mulberry Point	(MP)	4.9	ESE	124°	Semi-Annually	
	Swash Hole Island	(SHI)	6.8	SE	128°	Semi-Annually	
Clams	Chickahominy River	(CHIC)	11.2	WNW	300°	Semi-Annually	Control Location
	Surry Station Discharge	(SD)	1.3	NNW	341°	Semi-Annually	
	Jamestown Island	(JI)	3.9	NW	324°	Semi-Annually	
Fish	Surry Station Discharge	(SD)	1.3	NNW	341°	Semi-Annually	
Crabs	Surry Station Discharge	(SD)	1.3	NNW	341°	Annually	
Crops (Corn, Peanuts, Soybeans)	Brock's Farm	(BROCK)	3.8	S	183°	Annually	
	Slade's Farm	(SLADE)	3.2	S	179°	Annually	

Table 2-2

SURRY - 2020

SAMPLE ANALYSIS PROGRAM

SAMPLE MEDIA	FREQUENCY	ANALYSIS	LLD*	REPORT UNITS
Thermoluminescent Dosimetry (TLD)	Quarterly	Gamma Dose	6	mR/Std. Quarter
Air Iodine	Weekly	I-131	0.07	pCi/m^3
Air Particulate	Weekly	Gross Beta	0.01	pCi/m^3
	Quarterly (a)	Gamma Isotopic		pCi/m^3
		Cs-134	0.05	
		Cs-137	0.06	
River Water	Quarterly Composite of monthly sample	Tritium (H-3)	2000	pCi/L
	Monthly	I-131	10	pCi/L
		Gamma Isotopic		pCi/L
		Mn-54	15	
		Fe-59	30	
		Co-58	15	
		Co-60	15	
		Zn-65	30	
		Zr-95	30	
		Nb-95	15	
		Cs-134	15	
		Cs-137	18	
		Ba-140	60	
		La-140	15	
Well Water	Quarterly	Tritium (H-3)	2000	pCi/L
		I-131	1	
		Gamma Isotopic		pCi/L
		Mn-54	15	
		Fe-59	30	
		Co-58	15	
		Co-60	15	
		Zn-65	30	
		Zr-95	30	
		Nb-95	15	
		Cs-134	15	
		Cs-137	18	
		Ba-140	60	
		La-140	15	

Footnotes located at end of table.

Table 2-2

SURRY - 2020

SAMPLE ANALYSIS PROGRAM

SAMPLE MEDIA	FREQUENCY	ANALYSIS	LLD*	REPORT UNITS
Shoreline Sediment	Semi-Annually	Gamma Isotopic		pCi/kg - dry
		Cs-134	150	
		Cs-137	180	
Silt	Semi-Annually	Gamma Isotopic		pCi/kg - dry
		Cs-134	150	
		Cs-137	180	
Milk	Monthly	I-131	1	pCi/L
		Gamma Isotopic		pCi/L
		Cs-134	15	
		Cs-137	18	
		Ba-140	60	
		La-140	15	
	Quarterly Composite of CP monthly sample	Sr-89	NA	pCi/L
		Sr-90	NA	
Oysters	Semi-Annually	Gamma Isotopic		pCi/kg - wet
		Mn-54	130	
		Fe-59	260	
		Co-58	130	
		Co-60	130	
		Zn-65	260	
		Cs-134	130	
		Cs-137	150	
Clams	Semi-Annually	Gamma Isotopic		pCi/kg - wet
		Mn-54	130	
		Fe-59	260	
		Co-58	130	
		Co-60	130	
		Zn-65	260	
		Cs-134	130	
		Cs-137	150	
Crabs	Annually	Gamma Isotopic		pCi/kg - wet
		Mn-54	130	
		Fe-59	260	
		Co-58	130	
		Co-60	130	
		Zn-65	260	
		Cs-134	130	
		Cs-137	150	

Footnotes located at end of table.

Table 2-2

SURRY - 2020

SAMPLE ANALYSIS PROGRAM

SAMPLE MEDIA	FREQUENCY	ANALYSIS	LLD*	REPORT UNITS
Fish	Semi-Annually	Gamma Isotopic		pCi/kg - wet
		Mn-54	130	
		Fe-59	260	
		Co-58	130	
		Co-60	130	
		Zn-65	260	
		Cs-134	130	
		Cs-137	150	
Food Products	Annually	Gamma Isotopic		pCi/kg - wet
		I-131	60	
		Cs-134	60	
		Cs-137	80	

Note: This table is not a complete listing of nuclides that can be detected and reported. Other peaks that are measurable and identifiable, together with the above nuclides, are also identified and reported.

* LLD is the Lower Limit of Detection as defined and required in the USNRC Branch Technical Position on an Acceptable Radiological Environmental Monitoring Program, Revision 1, November 1979. LLDs indicate those concentrations to which environmental samples are required to be analyzed. Actual analysis of samples may be lower than these listed values.

(a) Quarterly composites of each location's weekly air particulate samples are analyzed for gamma emitters.

NA None assigned


N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
Legend
Air Sampling Stations
TLD Sampling
State Environmental Monitoring Sites
State TLD Sites
Exclusion Area Boundary
Figure 1 Surry Radiological Monitoring Locations
Graphics No. SV645F

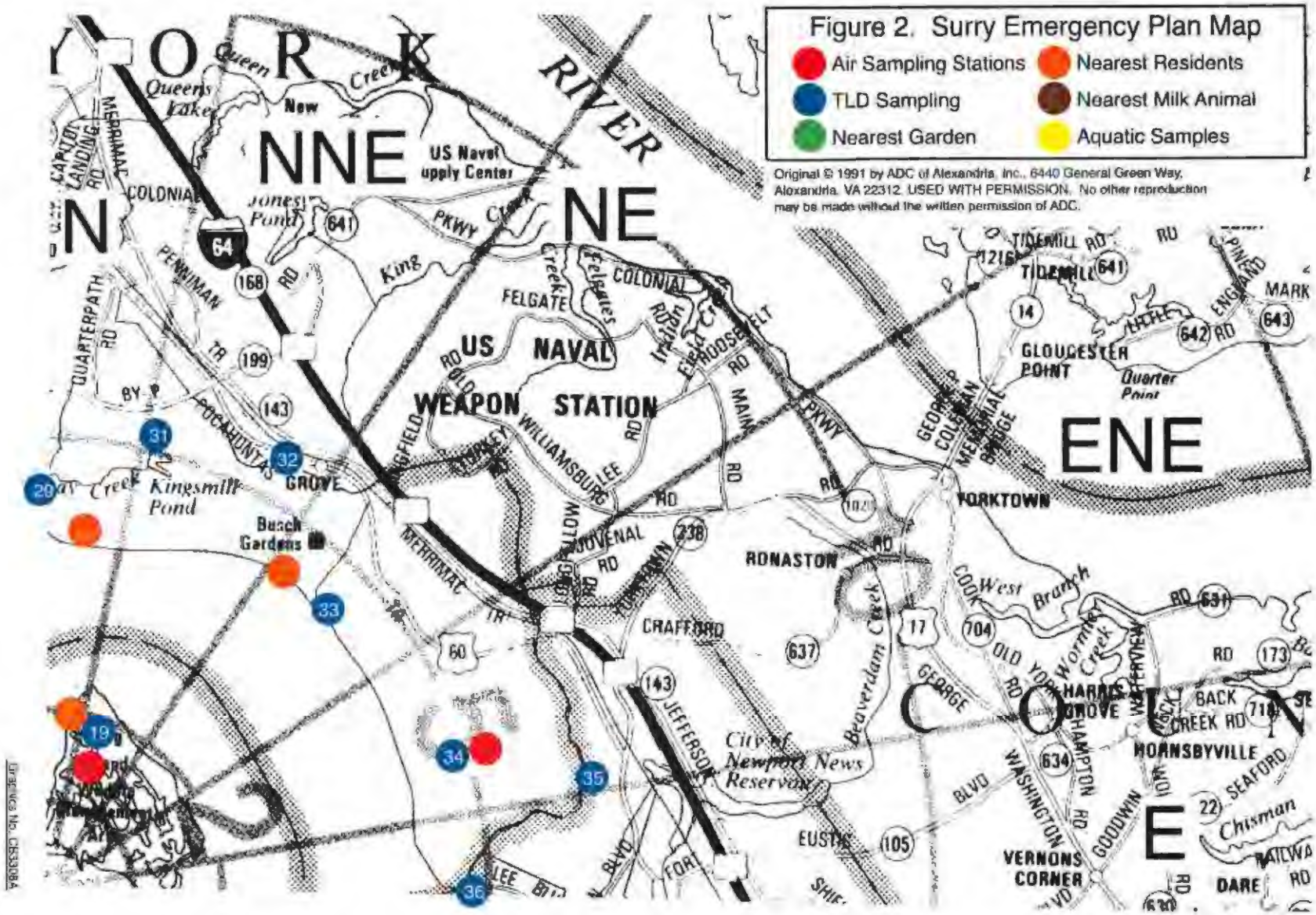
Figure 2. Surry Emergency Plan Map
Air Sampling Stations
Nearest Residents
TLD Sampling
Nearest Milk Animal
Nearest Garden
Aquatic Samples
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NNE
NE
ENE
E
RIVER
US Naval Supply Center
US NAVAL WEAPON STATION
Queens Lake
Jones Pond
Kingsmill Pond
Busch Gardens
GROVE
RONASTON
CRAFFORD
YORKTOWN
GLOUCESTER POINT
Quarter Point
HORNSBYVILLE
VERNONS CORNER
City of Newport News Reservoir
Beaverdam Creek
Wormley Creek
West Branch
Chisman
COLONIAL PKWY
JEFFERSON
WILLIAMSBURG
MERRIMAC TR
QUARTERPATH RD
PENNIMAN RD
MAIN RD
BACK CREEK RD
SEAFORD
DARE
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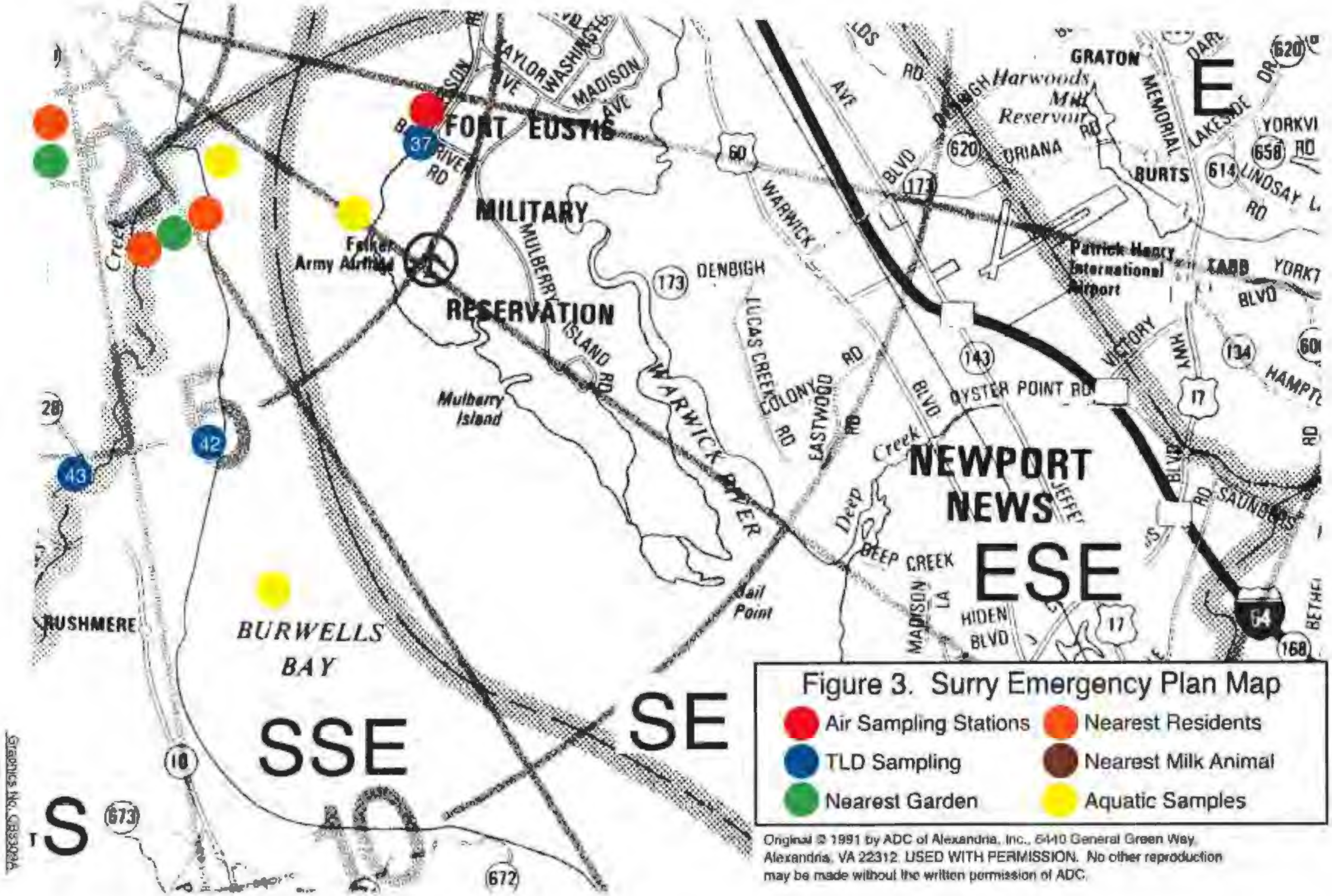
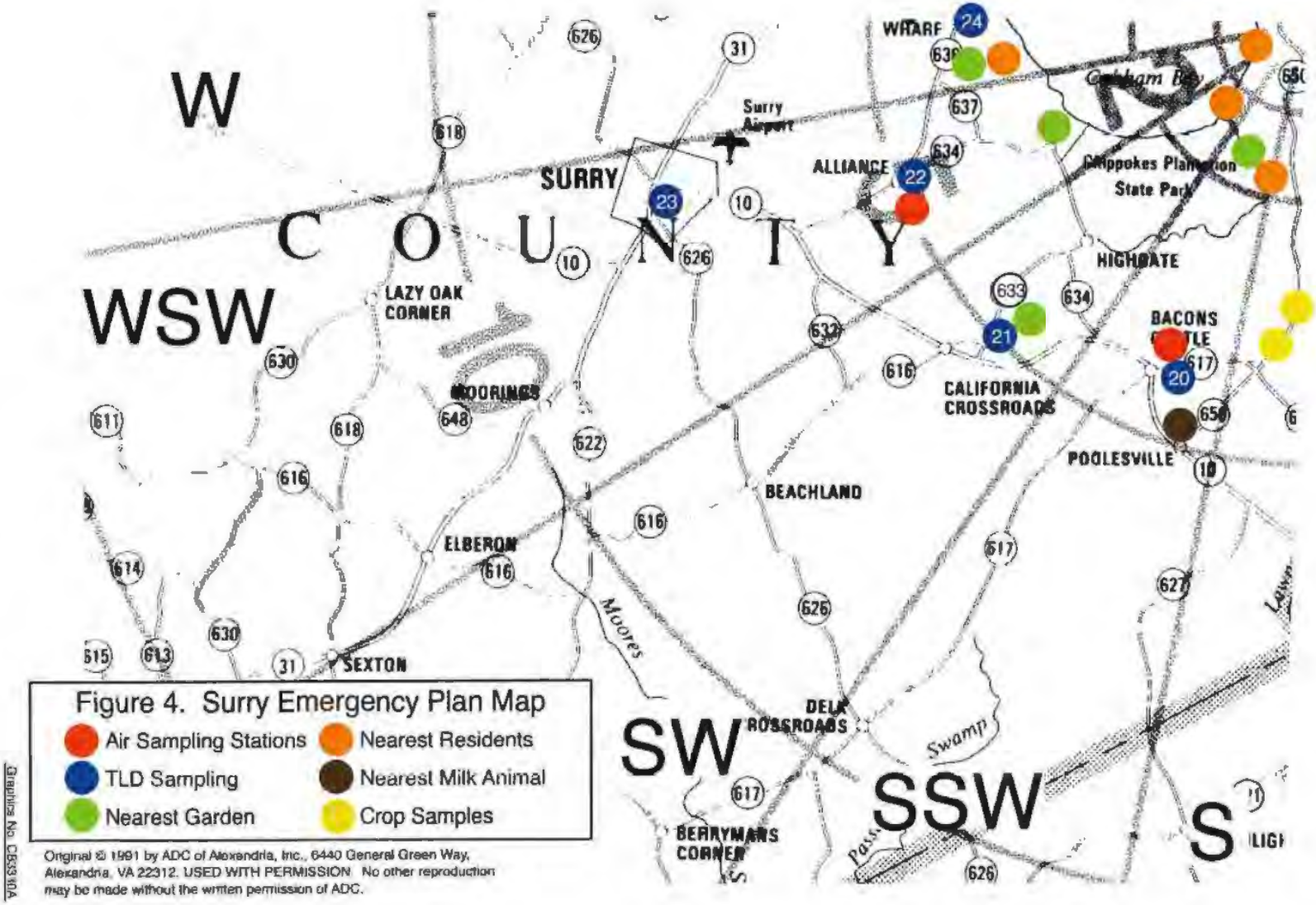


Figure 3. Surry Emergency Plan Map



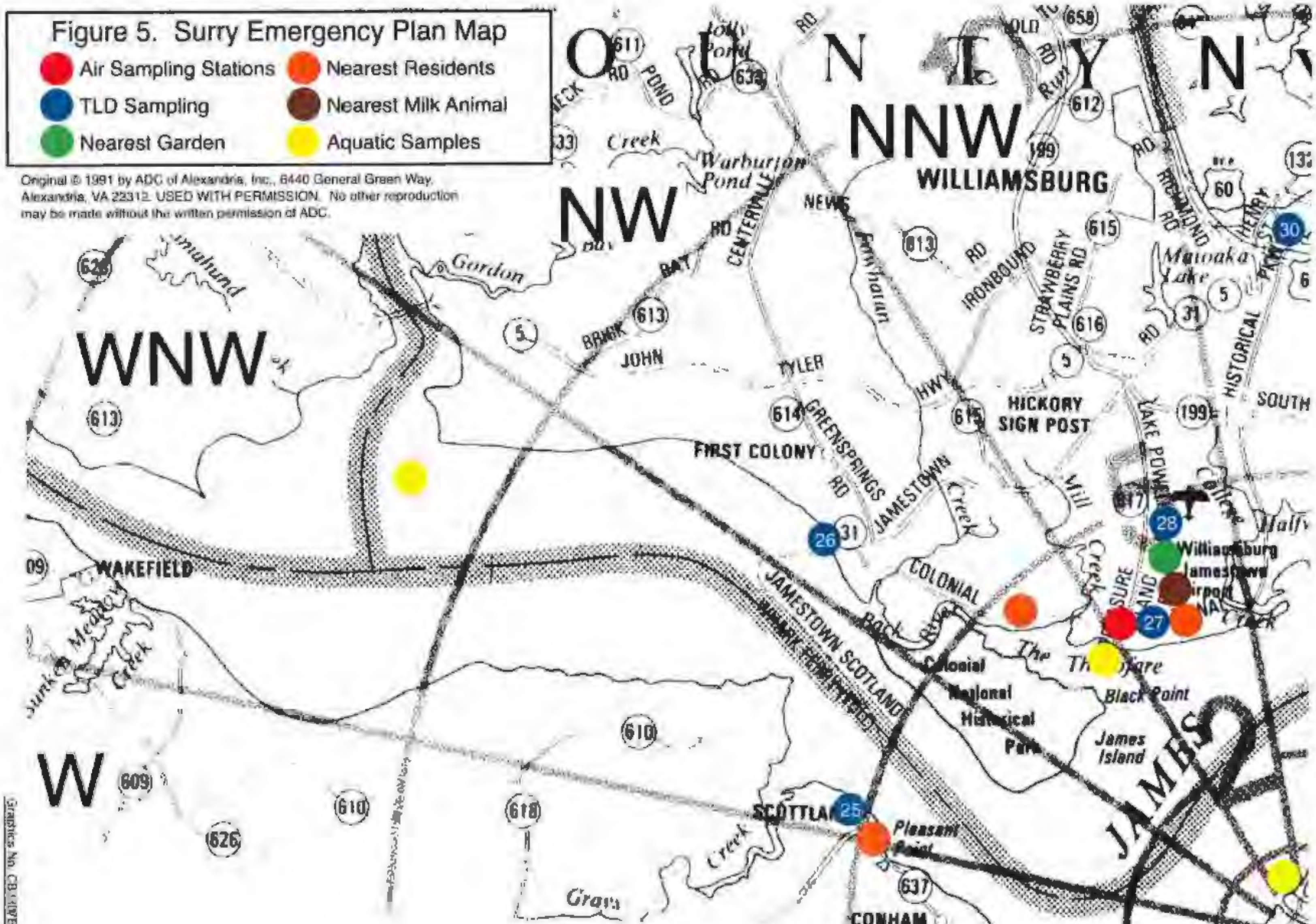


Figure 5. Surry Emergency Plan Map

3. ANALYTICAL RESULTS

3.1 Summary of Results

In accordance with the Surry Offsite Dose Calculation Manual (ODCM), a summary table of the analytical results has been prepared and is presented in Table 3-1. This data is presented in accordance with the format of the USNRC Branch Technical Position, "Acceptable Radiological Environmental Monitoring Program", Revision 1, November 1979. A more detailed analysis of the data is provided in Section 4.

TABLE 3-1: RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

Surry Power Station, Surry County, Virginia - 2020
Docket No. 50-280-281 Page 1 of 7

Medium or Pathway Sampled (Units)	Analysis Type	Analysis Total No.	LLD	Indicator Locations Mean Range	Location with Highest Mean Name	Location with Highest Mean Distance Direction	Location with Highest Mean Mean Range	Control Locations Mean Range	Non-Routine Reported Measurements
Direct Radiation *TLD (mR/ Std quarter)*	**Gamma**	164	2	**22.8 (152/152) (22.1 - 23.4)**	**STA-9**	**0.3 mi E**	**22.8 (4/4) (20.3 - 24.1)**	**21.7 (11/12) (20.3 - 24.1)**	0
Air Particulate *(1E-3 pCi/m3)*	**Gross Beta**	416	10	**12.1 (363/364) (4.84 - 23.9)**	**ALL**	**5.1 mi WSW**	**13.0 (52/52) (6.6 - 23.0)**	**12.6 (52/52) (5.0 - 22.1)**	0
	Gamma	32							
	Be-7	32		**122.2 (27/28) (90.7 - 144)**	**ALL**	**5.1 mi WSW**	**128.8 (4/4) (124 - 138)**	**128.8 (4/4) (114 - 140)**	0
	K-40	32		< LLD	N/A		< LLD	< LLD	0
	Cs-134	32	50	< LLD	N/A		< LLD	< LLD	0
	Cs-137	32	60	< LLD	N/A		< LLD	< LLD	0
Air Iodine *(1E-3 pCi/m3)*	**I-131**	416	70	< LLD	N/A		< LLD	< LLD	0
Milk *(pCi/Liter)*	**Strontium**	4							
	Sr-89	4		< LLD	N/A		< LLD	< LLD	0
	Sr-90	4		**1.68 (4/4) (1.33 - 2.47)**	**CP**	**3.7 mi NNW**	**1.68 (4/4) (1.33 - 2.47)**	< LLD	0
	Gamma	36							
	K-40	36		**1240 (24/24) (1000 - 1380)**	**EPPS**	**4.8 mi SSW**	**1262 (12/12) (1000 - 1380)**	**1119 (10/12) (929 - 1220)**	0
	Th-228	36		< LLD	N/A		< LLD	< LLD	0
	I-131	36	1	< LLD	N/A		< LLD	< LLD	0
	Cs-134	36	15	< LLD	N/A		< LLD	< LLD	0
	Cs-137	36	18	< LLD	N/A		< LLD	< LLD	0
	Ba-140	36	60	< LLD	N/A		< LLD	< LLD	0
	La-140	36	15	< LLD	N/A		< LLD	< LLD	0

TABLE 3-1: RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

Surry Power Station, Surry County, Virginia - 2020
Docket No. 50-280-281 Page 2 of 7

Medium or Pathway Sampled (Units)	Analysis Type	Analysis Total No.	LLD	Indicator Locations Mean Range	Location with Highest Mean Name	Location with Highest Mean Distance Direction	Location with Highest Mean Mean Range	Control Locations Mean Range	Non-Routine Reported Measurements
Food Products *(pCi/kg wet)*	**Gamma**	3							
	K-40	3		**7173 (3/3) (2580 - 13300)**	**Slade**	**3.2 mi S**	**13300 (1/1) (13300-13300)**	N/A	0
	Be-7	3		< LLD	N/A		< LLD	N/A	0
	Th-228	3		< LLD	N/A		< LLD	N/A	0
	I-131	3	60	< LLD	N/A		< LLD	N/A	0
	Cs-134	3	60	< LLD	N/A		< LLD	N/A	0
	Cs-137	3	80	< LLD	N/A		< LLD	N/A	0
Well Water *(pCi/Liter)*	**H-3**	12	2000	< LLD	N/A		< LLD	N/A	0
	Gamma	12							
	Mn-54	12	15	< LLD	N/A		< LLD	N/A	0
	Co-58	12	15	< LLD	N/A		< LLD	N/A	0
	Fe-59	12	30	< LLD	N/A		< LLD	N/A	0
	Co-60	12	15	< LLD	N/A		< LLD	N/A	0
	Zn-65	12	30	< LLD	N/A		< LLD	N/A	0

TABLE 3-1: RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

Surry Power Station, Surry County, Virginia - 2020
Docket No. 50-280-281 Page 3 of 7

Medium or Pathway Sampled (Units)	Analysis Type	Analysis Total No.	LLD	Indicator Locations Mean Range	Location with Highest Mean Name	Location with Highest Mean Distance Direction	Location with Highest Mean Mean Range	Control Locations Mean Range	Non-Routine Reported Measurements
Well Water *(pCi/Liter)*	Nb-95	12	15	< LLD	N/A		< LLD	N/A	0
	Zr-95	12	30	< LLD	N/A		< LLD	N/A	0
	I-131	12	1	< LLD	N/A		< LLD	N/A	0
	Cs-134	12	15	< LLD	N/A		< LLD	N/A	0
	Cs-137	12	18	< LLD	N/A		< LLD	N/A	0
	Ba-140	12	60	< LLD	N/A		< LLD	N/A	0
	La-140	12	15	< LLD	N/A		< LLD	N/A	0
River Water *(pCi/Liter)*	**H-3**	8	2000	< LLD	N/A		< LLD	< LLD	0
	Gamma	24							
	K-40	24		< LLD	N/A		< LLD	**61.9 (1/12) (61.9 - 61.9)**	0
	Ra-226	24		< LLD	N/A		< LLD	< LLD	0
	Th-228	24		< LLD	N/A		< LLD	< LLD	0
	Mn-54	24	15	< LLD	N/A		< LLD	< LLD	0
	Co-58	24	15	< LLD	N/A		< LLD	< LLD	0
	Fe-59	24	30	< LLD	N/A		< LLD	< LLD	0
	Co-60	24	15	< LLD	N/A		< LLD	< LLD	0
	Zn-65	24	30	< LLD	N/A		< LLD	< LLD	0

TABLE 3-1: RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

Surry Power Station, Surry County, Virginia - 2020
Docket No. 50-280-281 Page 4 of 7

Medium or Pathway Sampled (Units)	Analysis Type	Analysis Total No.	LLD	Indicator Locations Mean Range	Location with Highest Mean Name	Location with Highest Mean Distance Direction	Location with Highest Mean Mean Range	Control Locations Mean Range	Non-Routine Reported Measurements
River Water *(pCi/Liter)*	Nb-95	24	15	< LLD	N/A		< LLD	< LLD	0
	Zr-95	24	30	< LLD	N/A		< LLD	< LLD	0
	I-131	24	10	< LLD	N/A		< LLD	< LLD	0
	Cs-134	24	15	< LLD	N/A		< LLD	< LLD	0
	Cs-137	24	18	< LLD	N/A		< LLD	< LLD	0
	Ba-140	24	60	< LLD	N/A		< LLD	< LLD	0
	La-140	24	15	< LLD	N/A		< LLD	< LLD	0
Silt *(pCi/kg dry)*	**Gamma**	6							
	Be-7	6		**2620 (2/4) (2440 -2800)**	**SD**	**1.3 mi NNW**	**2800 (1/2) (2800 -2800)**	< LLD	0
	K-40	6		**14750 (4/4) (13900-16600)**	**SI**	**1.8 mi ESE**	**15300 (2/2) (14000-16600)**	**14450 (2/2) (14000-14900)**	0
	Cs-134	6	150	< LLD	N/A		< LLD	< LLD	0
	Cs-137	6	180	**163 (1/4) (163 - 163)**	**SD**	**1.3 mi NNW**	**163 (1/4) (163 - 163)**	< LLD	0
	Ra-226	6		**2480 (3/4) (2390 - 2590)**	**SI**	**1.8 mi ESE**	**2590 (1/2) (2590 - 2590)**	**2175 (2/2) (1610 - 2740)**	0
	Th-228	6		**921.3 (4/4) (819 - 1090)**	**SD**	**1.3 mi NNW**	**977.5 (2/2) (865 - 1090)**	**910.5 (2/2) (781 - 1040)**	0
	Th-232	6		**1036 (2/4) (822 - 1250)**	**SD**	**1.3 mi NNW**	**1250 (1/2) (1250 - 1250)**	**970 (1/2) (970 - 970)**	0
	Ac-228	6		**1120.7 (3/4) (922 - 1260)**	**SI**	**1.8 mi ESE**	**1220 (2/2) (1180 - 1260)**	**1071.5 (2/2) (973 - 1170)**	0

TABLE 3-1: RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

Surry Power Station, Surry County, Virginia - 2020
Docket No. 50-280-281 Page 5 of 7

Medium or Pathway Sampled (Units)	Analysis Type	Analysis Total No.	LLD	Indicator Locations Mean Range	Location with Highest Mean Name	Location with Highest Mean Distance Direction	Location with Highest Mean Mean Range	Control Locations Mean Range	Non-Routine Reported Measurements
Shoreline Sediment *(pCi/kg dry)*	K-40	4		**4605 (2/2) (4450 - 4760)**	**HIR**	**0.6 mi N**	**4605 (2/2) (4450 - 4760)**	**2115 (2/2) (1370 - 2860)**	0
	Cs-134	4	150	< LLD	N/A		< LLD	< LLD	0
	Cs-137	4	180	< LLD	N/A		< LLD	**18.5 (1/2) (18.5 - 18.5)**	0
	Ra-226	4		< LLD	N/A		< LLD	**1400 (1/2) (1400 - 1400)**	0
	Th-228	4		**188 (2/2) (136 - 240)**	**HIR**	**0.6 mi N**	**188 (2/2) (136 - 240)**	**244.5 (2/2) (141 - 348)**	0
	Th-232	4		**234 (1/2) (234 - 234)**	**HIR**	**0.6 mi N**	**234 (1/2) (234 - 234)**	**376 (1/2) (376 - 376)**	0
Fish *(pCi/kg wet)*	**Gamma**	4							
	K-40	4		**1700 (4/4) (1570 - 1800)**	**SD**	**1.3 mi NNW**	**1700 (4/4) (1570 - 1800)**	N/A	0
	Mn-54	4	130	< LLD	N/A		< LLD	N/A	0
	Co-58	4	130	< LLD	N/A		< LLD	N/A	0
	Fe-59	4	260	< LLD	N/A		< LLD	N/A	0
	Co-60	4	130	< LLD	N/A		< LLD	N/A	0
	Zn-65	4	260	< LLD	N/A		< LLD	N/A	0
	Cs-134	4	130	< LLD	N/A		< LLD	N/A	0
	Cs-137	4	150	< LLD	N/A		< LLD	N/A	0

TABLE 3-1: RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

Surry Power Station, Surry County, Virginia - 2020
Docket No. 50-280-281 Page 6 of 7

Medium or Pathway Sampled (Units)	Analysis Type	Analysis Total No.	LLD	Indicator Locations Mean Range	Location with Highest Mean Name	Location with Highest Mean Distance Direction	Location with Highest Mean Mean Range	Control Locations Mean Range	Non-Routine Reported Measurements
Oysters	**Gamma**	6							
	K-40	6		< LLD	N/A		< LLD	N/A	0
	Mn-54	6	130	< LLD	N/A		< LLD	N/A	0
	Fe-59	6	260	< LLD	N/A		< LLD	N/A	0
	Co-58	6	130	< LLD	N/A		< LLD	N/A	0
	Co-60	6	130	< LLD	N/A		< LLD	N/A	0
	Zn-65	6	260	< LLD	N/A		< LLD	N/A	0
	Cs-134	6	130	< LLD	N/A		< LLD	N/A	0
	Cs-137	6	150	< LLD	N/A		< LLD	N/A	0
Clams *(pCi/kg wet)*	**Gamma**	6							
	K-40	6		< LLD	N/A		< LLD	< LLD	0
	Mn-54	6	130	< LLD	N/A		< LLD	< LLD	0
	Co-58	6	130	< LLD	N/A		< LLD	< LLD	0
	Fe-59	6	260	< LLD	N/A		< LLD	< LLD	0
	Co-60	6	130	< LLD	N/A		< LLD	< LLD	0
	Zn-65	6	260	< LLD	N/A		< LLD	< LLD	0
	Cs-134	6	130	< LLD	N/A		< LLD	< LLD	0
	Cs-137	6	150	< LLD	N/A		< LLD	< LLD	0

TABLE 3-1: RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

Surry Power Station, Surry County, Virginia - 2020
Docket No. 50-280-281 Page 7 of 7

Medium or Pathway Sampled (Units)	Analysis Type	Analysis Total No.	LLD	Indicator Locations Mean Range	Location with Highest Mean Name	Location with Highest Mean Distance Direction	Location with Highest Mean Mean Range	Control Locations Mean Range	Non-Routine Reported Measurements
Crabs *(pCi/kg wet)*	**Gamma**	1							
	K-40	1		< LLD	N/A		< LLD	N/A	0
	Mn-54	1	130	< LLD	N/A		< LLD	N/A	0
	Co-58	1	130	< LLD	N/A		< LLD	N/A	0
	Fe-59	1	260	< LLD	N/A		< LLD	N/A	0
	Co-60	1	130	< LLD	N/A		< LLD	N/A	0
	Zn-65	1	260	< LLD	N/A		< LLD	N/A	0
	Cs-134	1	130	< LLD	N/A		< LLD	N/A	0
	Cs-137	1	150	< LLD	N/A		< LLD	N/A	0

3.2 Analytical Results of 2020 REMP Samples

Radiological analyses of environmental media characteristically approach and frequently fall below the detection limits of state-of-the-art measurement methods. The reported error is two times the standard deviation (2σ) of the net activity. Unless otherwise noted, the overall error (counting, sample size, chemistry, errors, etc.) is estimated to be 2 to 5 times that listed. Results are considered positive when the measured value exceeds 2σ uncertainty, unless otherwise noted. MDC is noted in the footnote in several tables. The term <MDC means the value is less than its Minimum Detectable Concentration and is therefore, not considered a positive value or result. Positive values or results are indicated by **bold** text.

Teledyne Brown Engineering analytical methods meet the Lower Limit of Detection (LLD) requirements given in Table 2 of the USNRC Branch Technical Position, "An Acceptable Radiological Environmental Monitoring Program", (November 1979, Revision 1) and the Surry ODCM.

Data are given according to sample type as indicated below.

1. Gamma Exposure Rate
2. Air Particulates, Weekly Gross Beta Radioactivity
3. Air Particulates, Weekly I-131
4. Air Particulates, Quarterly Gamma Spectroscopy
5. Animal Milk
6. Food Products
7. Well Water
8. River Water
9. Silt
10. Shoreline Sediment
11. Fish
12. Oysters
13. Clams
14. Crabs

TABLE 3-2: GAMMA EXPOSURE RATE

Surry Power Station, Surry County, Virginia – 2020

$MDD_Q = 3 \times \sigma_Q = 3 \times 1.0 = 5$ Note: IF $MDD_Q < 5$ mR, THEN MDD_Q rounded to 5 mR (ANSI N13.37)

$MDD_A = 3 \times \sigma_A = 3 \times 2.3 = 10$ Note: IF $MDD_A < 10$ mR, THEN MDD_A rounded to 10 mR (ANSI N13.37)

Monitoring Location	Quarterly Baseline, B_Q Baseline, (mrem)	Normalized Quarterly Monitoring Data, M_Q (mrem per standard quarter)				Quarterly Facility Dose, $F_Q = M_Q - B_Q$ (mrem)				Annual Baseline, B_A (mrem)	Annual Monitoring Data, M_A	Annual Facility Dose, $F_A = M_A - B_A$
		1	2	3	4	1	2	3	4		(mrem)	(mrem)
2	19.8	19.7	20.2	18.8	18.3	ND	ND	ND	ND	79.2	77.0	ND
3	19.2	18.4	19.6	19.1	17.5	ND	ND	ND	ND	76.9	74.6	ND
4	17.9	17.3	17.9	17.1	17.1	ND	ND	ND	ND	71.7	69.5	ND
5	19.0	18.4	18.4	18.4	18.1	ND	ND	ND	ND	76.0	73.3	ND
6	18.4	16.9	18.9	17.8	16.8	ND	ND	ND	ND	73.8	70.4	ND
7	18.7	16.9	18.9	17.1	15.8	ND	ND	ND	ND	74.6	68.7	ND
8	17.0	16.2	16.7	15.8	15.5	ND	ND	ND	ND	68.4	64.2	ND
9	23.2	22.1	23.3	23.4	22.2	ND	ND	ND	ND	92.8	91.0	ND
10	18.1	17.0	17.9	17.8	14.5	ND	ND	ND	ND	72.5	67.2	ND
11	16.1	16.6	16.2	15.7	15.9	ND	ND	ND	ND	64.2	64.4	ND
12	16.6	16.1	16.7	15.4	14.6	ND	ND	ND	ND	66.4	62.8	ND
13	18.6	18.0	19.6	18.0	16.9	ND	ND	ND	ND	74.5	72.5	ND
14	17.9	17.8	18.8	17.0	15.6	ND	ND	ND	ND	71.6	69.2	ND
15	18.5	18.4	19.0	17.4	16.9	ND	ND	ND	ND	74.1	71.7	ND
16	17.0	17.7	17.4	16.7	15.7	ND	ND	ND	ND	67.7	67.5	ND
18	14.5	15.3	15.6	14.5	13.3	ND	ND	ND	ND	58.0	58.7	ND
19	15.5	15.5	16.0	14.5	14.4	ND	ND	ND	ND	62.1	60.4	ND
20	14.3	12.9	15.0	13.4	12.9	ND	ND	ND	ND	57.4	54.2	ND
21	15.1	16.0	14.9	15.4	14.7	ND	ND	ND	ND	60.5	61.0	ND
22	13.2	13.7	13.2	12.7	12.0	ND	ND	ND	ND	52.7	51.7	ND
23	18.1	18.9	19.4	17.7	17.5	ND	ND	ND	ND	72.3	73.5	ND
24	14.8	14.7	14.6	14.1	14.0	ND	ND	ND	ND	59.2	57.4	ND
25	18.1	18.3	18.2	17.7	17.8	ND	ND	ND	ND	72.3	72.0	ND
26	15.7	15.5	15.4	15.1	14.2	ND	ND	ND	ND	62.9	60.2	ND
27	14.7	15.0	14.0	13.8	13.6	ND	ND	ND	ND	58.7	56.3	ND
28	14.2	14.6	13.6	13.5	12.8	ND	ND	ND	ND	56.8	54.4	ND
29	13.2	14.1	13.8	12.1	12.5	ND	ND	ND	ND	52.9	52.5	ND
30	14.4	14.4	14.6	13.8	13.3	ND	ND	ND	ND	57.7	56.1	ND
31	12.3	12.7	13.1	12.1	11.2	ND	ND	ND	ND	49.2	49.2	ND
32	15.2	15.1	14.6	13.5	13.6	ND	ND	ND	ND	60.7	56.7	ND
33	14.2	14.5	14.7	14.4	14.6	ND	ND	ND	ND	57.1	58.2	ND
34	16.0	15.9	16.9	15.8	15.1	ND	ND	ND	ND	64.1	63.7	ND
35	18.6	19.5	19.1	19.1	17.4	ND	ND	ND	ND	74.4	75.1	ND
36	18.6	21.3	20.1	18.4	17.5	ND	ND	ND	ND	74.4	77.4	ND
37	15.4	15.3	15.8	14.8	14.9	ND	ND	ND	ND	61.7	60.7	ND
38	20.9	18.7	17.7	18.1	17.2	ND	ND	ND	ND	83.6	71.6	ND
39	14.9	15.8	15.0	14.8	15.1	ND	ND	ND	ND	59.7	60.7	ND
40	16.2	15.7	16.9	15.8	14.9	ND	ND	ND	ND	64.7	63.4	ND
41	21.8	24.1	20.9	21.4	20.3	ND	ND	ND	ND	87.3	86.7	ND
42	16.4	16.0	16.9	16.4	15.3	ND	ND	ND	ND	65.5	64.6	ND
43	14.3	14.7	14.8	14.1	13.9	ND	ND	ND	ND	57.3	57.4	ND

[a] ND = Not detected, where $M_Q < (B_Q + MDD_Q)$

[b] ND = Not detected, where $M_A < (B_A + MDD_A)$

d = Damaged TLDs; m = Missing TLDs; v = Vendor reports TLD not received

N/A = Missing or Damaged TLD Reading Not Available for Calculation

Note: Table formatted in accordance with ANSI/HPS N13.37-2014, Environmental Dosimetry - Criteria for system Design and Implementation.

TABLE 3-3: GROSS BETA CONCENTRATION IN FILTERED AIR

Surry Power Station, Surry County, Virginia - 2020

1.0E-3 pCi/m3 ± 2 Sigma

COLLECTION DATE	SAMPLING LOCATIONS SS	HIR	BC	ALL	CP	BASF	FE	NN-C
January 07	**7.09** ± 2.20	**7.11** ± 2.15	**11.5** ± 2.44	**9.72** ± 2.34	**9.73** ± 2.31	**9.47** ± 2.25	**9.23** ± 2.26	**9.28** ± 2.27
January 14	**8.35** ± 2.77	**9.92** ± 2.77	**10.6** ± 2.85	**9.76** ± 2.82	**9.33** ± 2.81	**13.6** ± 2.98	**9.36** ± 2.76	**10.9** ± 2.86
January 21	**15.6** ± 2.97	**13.6** ± 2.79	**13.8** ± 2.84	**16.2** ± 2.96	**14.6** ± 2.86	**12.0** ± 2.68	**18.0** ± 3.00	**15.0** ± 2.89
January 28	**11.1** ± 2.71	**11.8** ± 2.69	**14.1** ± 2.88	**16.6** ± 3.05	**13.8** ± 2.85	**12.2** ± 2.73	**10.8** ± 2.66	**14.4** ± 2.89
February 04	**9.85** ± 2.54	**8.50** ± 2.39	**11.7** ± 2.63	**10.4** ± 2.57	**12.1** ± 2.62	**13.6** ± 2.69	**10.1** ± 2.49	**8.98** ± 2.42
February 10	**9.01** ± 2.73	**7.78** ± 2.58	**10.3** ± 2.83	**9.29** ± 2.81	**9.28** ± 2.79	**11.4** ± 2.88	**8.70** ± 2.74	**6.98** ± 2.62
February 18	**10.1** ± 2.33	**8.80** ± 2.20	**12.1** ± 2.39	**11.3** ± 2.36	**10.3** ± 2.27	**10.5** ± 2.25	**10.5** ± 2.27	**11.7** ± 2.34
February 25	**14.5** ± 2.98	**15.8** ± 2.98	**19.2** ± 3.20	**15.0** ± 3.01	**18.0** ± 3.13	**18.7** ± 3.12	**19.4** ± 3.20	**21.5** ± 3.32
March 03	**13.5** ± 2.81	**10.3** ± 2.55	**10.1** ± 2.53	**14.0** ± 2.84	**11.2** ± 2.62	**8.21** ± 2.67	**11.4** ± 2.62	**11.1** ± 2.62
March 10	**7.16** ± 2.39	**9.25** ± 2.46	**9.35** ± 2.50	**10.6** ± 2.63	**8.06** ± 2.42	**6.23** ± 2.29	**10.3** ± 2.55	**11.1** ± 2.6
March 17	**9.56** ± 2.66	**11.0** ± 2.68	**11.6** ± 2.76	**9.65** ± 2.68	**12.1** ± 2.76	**11.8** ± 2.72	**11.8** ± 2.75	**10.5** 3 2.69
March 24	**11.8** ± 2.68	**9.48** ± 2.46	**13.4** ± 2.74	**11.3** ± 2.65	**12.9** ± 2.72	**12.0** ± 2.62	**13.9** ± 2.76	**13.0** ± 2.73
March 31	**10.3** 2.68	**6.91** 2.35	**8.99** 2.57	**10.4** 2.70	**8.80** 2.55	**8.94** 2.50	**7.86** 2.48	**10.4** 2.64
April 07	**5.77** ± 2.41	**7.62** ± 2.56	**0.00** ± 0.00 B	**6.56** ± 2.49	**8.24** ± 2.55	**9.39** ± 2.57	**8.79** ± 2.59	**11.8** ± 2.77
April 14	**15.6** ± 2.90	**12.9** ± 2.74	**15.2** ± 2.91	**17.8** ± 3.10	**14.5** ± 2.87	**14.5** ± 2.83	**16.4** ± 2.98	**17.2** ± 3.02
April 21	**15.6** ± 3.12	**14.6** ± 3.04	**13.6** ± 2.80	**15.2** ± 2.93	**12.6** ± 2.75	**14.5** ± 2.78	**15.2** ± 2.86	**14.8** ± 2.82
April 28	**9.42** ± 2.32	**8.16** ± 2.22	**7.88** ± 2.48	**10.0** ± 2.65	**6.46** ± 2.38	**9.18** ± 2.51	**9.44** ± 2.57	**9.31** ± 2.56
May 05	**8.56** ± 2.68	**7.71** ± 2.59	**9.34** ± 2.66	**8.71** ± 2.64	**8.65** ± 2.60	**8.14** ± 2.51	**10.1** ± 2.66	**10.4** ± 2.71
May 12	**10.2** ± 2.59	**7.69** ± 2.40	**7.83** ± 2.45	**10.1** ± 2.61	**8.56** ± 2.50	**8.90** ± 2.47	**6.73** ± 2.37	**9.35** ± 2.55
May 19	**10.8** ± 2.59	**9.19** ± 2.46	**9.67** ± 2.52	**10.2** ± 2.59	**9.67** ± 2.52	**10.1** ± 2.49	**7.74** ± 2.39	**7.71** ± 2.40
May 26	**5.63** ± 2.30	**4.99** ± 2.22	**7.15** ± 2.39	**8.07** ± 2.48	**6.34** ± 2.35	**7.97** ± 2.40	**6.12** ± 2.31	**5.01** ± 2.26
June 02	**7.80** ± 2.37	**4.84** ± 2.13	**5.62** ± 2.19	**7.28** ± 2.33	**8.34** ± 2.35	**5.64** ± 2.12	**6.51** ± 2.21	**7.65** ± 2.31
June 09	**18.1** ± 2.94	**13.8** ± 2.67	**15.2** ± 2.86	**14.8** ± 2.87	**18.5** ± 3.03	**13.9** ± 2.74	**18.6** ± 3.00	**16.9** ± 2.94
June 16	**11.0** ± 2.68	**7.91** ± 2.44	**8.71** ± 2.48	**8.37** ± 2.49	**7.56** ± 2.39	**7.70** ± 2.36	**7.47** ± 2.38	**9.97** ± 2.55
June 23	**11.3** ± 2.59	**9.16** ± 2.41	**8.75** ± 2.43	**9.26** ± 2.52	**9.13** ± 2.45	**8.50** ± 2.36	**7.95** ± 2.37	**9.44** ± 2.47
June 30	**19.4** ± 3.24	**15.7** ± 2.98	**16.3** ± 3.07	**17.8** ± 3.20	**17.8** ± 3.15	**18.2** ± 3.11	**17.4** ± 3.13	**19.9** ± 3.26

B = Visual inspection indicated very little particulate material on filter; result not included.

TABLE 3-3: GROSS BETA CONCENTRATION IN FILTERED AIR

Surry Nuclear Power Station, Surry County, Virginia - 2020

1.0E-3 pCi/m3 ± 2 Sigma

COLLECTION DATE	SAMPLING LOCATIONS							
	SS	HIR	BC	ALL	CP	BASF	FE	NN
July 07	**14.3** ± 3.10	**12.6** ± 2.95	**14.1** ± 3.08	**14.1** ± 3.13	**13.7** ± 3.04	**12.7** ± 2.95	**14.8** ± 3.06	**15.7** ± 3.16
July 14	**14.4** ± 2.68	**11.7** ± 2.48	**10.8** ± 2.46	**12.0** ± 2.58	**14.2** ± 2.68	**12.1** ± 2.51	**13.0** ± 2.60	**12.7** ± 2.60
July 21	**20.4** ± 3.64	**17.0** ± 3.41	**17.2** ± 3.48	**15.5** ± 3.42	**21.6** ± 3.44	**18.7** ± 3.23	**20.7** ± 3.35	**22.1** ± 3.44
July 28	**16.5** ± 2.77	**17.0** ± 2.77	**19.9** ± 3.00	**18.8** ± 2.95	**13.6** ± 2.83	**16.3** ± 2.92	**16.0** ± 2.94	**13.3** ± 2.82
August 03	**8.84** ± 2.81	**9.25** ± 2.82	**11.1** ± 3.00	**12.7** ± 3.12	**11.2** ± 2.97	**10.3** ± 2.85	**10.1** ± 2.90	**9.65** ± 2.86
August 11	**9.50** ± 2.42	**10.2** ± 2.44	**13.3** ± 2.67	**13.8** ± 2.73	**11.9** ± 2.58	**10.4** ± 2.46	**13.0** ± 2.64	**11.7** ± 2.57
August 18	**7.30** ± 2.44	**10.2** ± 2.59	**12.6** ± 2.88	**10.6** ± 2.78	**13.3** ± 2.90	**11.2** ± 2.73	**9.06** ± 2.63	**12.2** ± 2.84
August 25	**15.5** ± 3.01	**15.0** ± 2.95	**17.1** ± 3.06	**18.9** ± 3.18	**16.9** ± 3.05	**15.7** ± 2.92	**17.4** ± 3.02	**17.5** ± 3.08
September 01	**17.6** ± 2.95	**13.5** ± 2.72	**19.1** ± 3.06	**17.4** ± 3.13	**20.0** ± 3.08	**17.3** ± 2.89	**14.0** ± 2.73	**18.7** ± 3.00
September 08	**15.5** ± 2.91	**14.8** ± 2.86	**19.5** ± 3.17	**18.7** ± 3.18	**17.6** ± 3.09	**16.4** ± 2.96	**19.5** ± 3.17	**17.7** ± 3.10
September 14	**7.04** ± 2.26	**6.43** ± 2.19	**8.24** ± 2.38	**7.82** ± 2.38	**7.87** ± 2.33	**7.15** ± 2.23	**7.18** ± 2.26	**6.03** ± 2.20
September 21	**9.16** ± 2.71	**10.4** ± 2.76	**10.2** ± 2.81	**11.6** ± 2.94	**12.9** ± 2.95	**8.79** ± 2.66	**11.5** ± 2.85	**9.48** ± 2.76
September 29	**19.3** ± 2.98	**14.2** ± 2.71	**23.9** ± 3.23	**23.0** ± 3.24	**21.6** ± 3.12	**19.3** ± 2.95	**17.9** ± 2.93	**19.4** ± 3.01
October 06	**9.71** ± 2.55	**7.85** ± 2.41	**11.6** ± 2.69	**12.9** ± 2.79	**10.3** ± 2.58	**12.3** ± 2.64	**11.3** ± 2.62	**11.9** ± 2.70
October 13	**12.5** ± 2.49	**13.2** ± 2.50	**14.5** ± 2.70	**17.7** ± 2.91	**17.9** ± 2.87	**15.4** ± 2.69	**14.9** ± 2.69	**17.0** ± 2.85
October 19	**6.72** ± 2.58	**6.30** ± 2.53	**8.40** ± 2.43	**8.00** ± 2.44	**7.20** ± 2.32	**5.81** ± 2.25	**5.50** ± 2.18	**9.92** ± 2.50
October 27	**5.93** ± 2.55	**5.62** ± 2.51	**9.83** ± 3.09	**9.10** ± 3.11	**7.53** ± 2.93	**7.68** ± 2.90	**7.16** ± 2.91	**7.74** ± 2.98
November 03	**8.03** ± 2.34	**10.9** ± 2.49	**10.2** ± 2.45	**9.33** ± 2.42	**8.35** ± 2.32	**9.75** ± 2.34	**8.64** ± 2.31	**9.86** ± 2.42
November 10	**12.7** ± 2.56	**13.1** ± 2.59	**15.8** ± 2.86	**15.9** ± 2.91	**15.5** ± 2.85	**17.5** ± 2.90	**17.5** ± 2.94	**13.0** ± 2.72
November 17	**11.0** ± 2.72	**11.2** ± 2.72	**16.7** ± 3.04	**16.3** ± 3.07	**15.1** ± 2.93	**13.9** ± 2.81	**13.7** ± 2.83	**14.7** ± 2.93
November 24	**12.0** ± 2.82	**11.7** ± 2.79	**14.9** ± 3.42	**14.6** ± 3.46	**13.0** ± 3.31	**12.6** ± 3.21	**14.1** ± 3.33	**9.09** ± 2.83
December 01	**15.0** ± 2.77	**12.1** ± 2.61	**15.0** ± 2.54	**17.4** ± 2.69	**16.5** ± 2.59	**15.7** ± 2.50	**15.9** ± 2.55	**15.0** ± 2.57
December 07	**7.11** ± 2.35	**5.54** ± 2.22	**9.55** ± 2.62	**10.2** ± 2.71	**9.93** ± 2.65	**7.94** ± 2.46	**7.73** ± 2.48	**8.92** ± 2.63
December 15	**14.3** ± 2.27	**12.8** ± 2.17	**17.0** ± 2.46	**17.7** ± 2.52	**15.2** ± 2.34	**15.6** ± 2.33	**18.5** ± 2.52	**18.5** ± 2.57
December 22	**12.3** ± 2.58	**10.7** ± 2.45	**14.2** ± 2.75	**16.0** ± 2.88	**14.6** ± 2.75	**11.0** ± 2.49	**14.9** ± 2.74	**14.3** ± 2.77
December 29	**11.1** ± 2.66	**9.48** ± 2.55	**13.7** ± 2.76	**15.2** ± 2.90	**13.0** ± 2.72	**11.0** ± 2.56	**14.3** ± 2.79	**13.0** ± 2.80

TABLE 3-4: IODINE-131 CONCENTRATION IN FILTERED AIR

Surry Power Station, Surry County, Virginia - 2020

1.0E-3 pCi/m3 ± 2 Sigma

COLLECTION DATE	SAMPLING LOCATIONS							
	SS	HIR	BC	ALL	CP	BASF	FE	NN-C
January 07	-15.9 ± 15.1	-15.4 ± 14.7	-15.4 ± 14.7	-15.5 ± 14.8	-1.33 ± 25.3	-1.29 ± 24.6	-1.31 ± 24.9	-1.31 ± 25.0
January 14	-5.57 ± 12.5	-5.37 ± 12.0	-5.46 ± 12.2	-5.48 ± 12.3	2.99 ± 13.8	2.91 ± 13.4	2.92 ± 13.4	2.93 ± 13.5
January 21	-1.48 ± 9.96	-1.43 ± 9.58	-1.46 ± 9.77	-1.45 ± 9.74	-3.27 ± 17.1	-3.20 ± 16.7	-3.20 ± 16.7	-3.25 ± 17.0
January 28	10.9 ± 21.0	10.6 ± 20.4	10.8 ± 20.8	11.0 ± 21.1	7.29 ± 14.0	7.17 ± 13.7	7.19 ± 13.8	7.25 ± 13.9
February 04	-3.66 ± 11.3	-3.52 ± 10.9	-3.60 ± 11.2	-3.63 ± 11.2	3.67 ± 11.6	3.62 ± 11.4	3.64 ± 11.5	3.62 ± 11.4
February 10	-10.0 ± 12.1	-9.67 ± 11.7	-10.2 ± 12.3	-10.4 ± 12.5	2.41 ± 13.3	2.36 ± 13.0	2.39 ± 13.2	2.37 ± 13.1
February 18	3.22 ± 13.3	3.12 ± 12.9	3.12 ± 12.9	3.17 ± 13.1	-0.26 ± 8.00	-0.25 ± 7.82	-0.25 ± 7.90	-0.25 ± 7.85
February 25	-2.00 ± 10.9	-1.93 ± 10.5	-1.97 ± 10.7	-2.00 ± 10.9	-0.53 ± 13.5	-0.22 ± 5.56	-0.53 ± 13.5	-0.53 ± 13.5
March 03	0.39 ± 10.4	0.38 ± 9.98	0.37 ± 9.91	0.39 ± 10.3	-0.26 ± 10.5	-0.29 ± 11.7	-0.26 ± 10.4	-0.26 ± 10.4
March 10	0.80 ± 11.0	0.77 ± 10.6	0.79 ± 10.7	0.81 ± 11.0	-0.68 ± 14.9	-0.67 ± 14.8	-0.67 ± 14.8	-0.67 ± 14.8
March 17	-6.48 ± 11.6	-6.28 ± 11.3	-6.41 ± 11.5	-6.53 ± 11.7	-2.07 ± 42.1	-2.04 ± 41.5	-2.07 ± 42.0	-2.08 ± 42.2
March 24	-2.81 ± 19.5	-2.69 ± 18.7	-2.75 ± 19.0	-2.80 ± 19.4	-2.77 ± 8.39	-2.26 ± 6.82	-2.74 ± 8.29	-2.77 ± 8.36
March 31	-9.91 15.7	-9.23 14.7	-9.73 15.5	-9.96 15.8	-7.76 9.79	-7.54 9.52	-7.71 9.73	-7.71 9.73
April 07	6.55 ± 10.5	6.58 ± 10.6	6.34 ± 10.2	6.61 ± 10.6	-4.87 ± 10.4	-4.73 ± 10.1	-4.86 ± 10.4	-4.85 ± 10.3
April 14	1.92 ± 8.06	1.91 ± 7.99	1.95 ± 8.16	1.99 ± 8.36	3.98 ± 27.8	3.88 ± 27.2	3.97 ± 27.8	3.97 ± 27.8
April 21	4.16 ± 9.93	4.09 ± 9.77	3.65 ± 8.70	3.71 ± 8.86	5.86 ± 10.8	5.65 ± 10.4	5.73 ± 10.5	5.69 ± 10.5
April 28	1.51 ± 16.1	1.49 ± 15.9	1.69 ± 18.1	1.72 ± 18.4	4.25 ± 16.7	4.16 ± 16.3	4.21 ± 16.5	4.22 ± 16.5
May 05	-5.06 ± 9.41	-4.99 ± 9.27	-4.96 ± 9.22	-4.99 ± 9.28	1.31 ± 16.3	1.27 ± 15.7	1.29 ± 15.9	1.31 ± 16.2
May 12	3.44 ± 12.0	3.37 ± 11.8	3.43 ± 12.0	3.46 ± 12.1	4.76 ± 15.8	4.64 ± 15.4	4.73 ± 15.7	4.73 ± 15.7
May 19	-17.1 ± 17.1	-16.8 ± 16.8	-17.0 ± 17.1	-17.3 ± 17.3	-3.99 ± 14.2	-3.86 ± 13.7	-3.95 ± 14.0	-3.96 ± 14.1
May 26	-6.67 ± 10.9	-6.55 ± 10.7	-6.63 ± 10.9	-6.75 ± 11.0	0.40 ± 8.16	0.39 ± 7.91	0.40 ± 8.05	0.23 ± 4.58
June 02	-3.69 ± 13.5	-3.62 ± 13.3	-3.61 ± 13.2	-3.66 ± 13.4	-5.62 ± 14.6	-5.47 ± 14.2	-5.56 ± 14.4	-5.60 ± 14.5
June 09	0.11 ± 12.2	0.11 ± 12.0	0.12 ± 12.8	0.12 ± 13.0	-6.22 ± 29.6	-6.08 ± 28.9	-6.10 ± 29.0	-6.17 ± 29.3
June 16	-10.6 ± 23.4	-10.3 ± 22.8	-10.4 ± 22.9	-10.5 ± 23.2	6.11 ± 12.8	3.37 ± 7.03	6.08 ± 12.7	6.10 ± 12.7
June 23	12.5 ± 20.3	12.2 ± 19.8	12.5 ± 20.3	12.9 ± 20.8	-4.62 ± 12.0	-4.50 ± 11.7	-4.61 ± 12.0	-4.60 ± 11.9
June 30	-4.84 ± 14.0	-4.71 ± 13.6	-4.82 ± 13.9	-4.92 ± 14.2	-0.88 ± 23.5	-0.86 ± 22.8	-0.88 ± 23.3	-0.88 ± 23.4

TABLE 3-4: IODINE-131 CONCENTRATION IN FILTERED AIR

Surry Power Station, Surry County, Virginia - 2020

1.0E-3 pCi/m3 ± 2 Sigma

COLLECTION DATE	SAMPLING LOCATIONS							
	SS	HIR	BC	ALL	CP	BASF	FE	NN-C
July 07	-13.2 ± 22.3	-12.9 ± 21.7	-13.1 ± 22.1	-13.4 ± 22.6	8.31 ± 14.4	8.17 ± 14.2	8.13 ± 14.1	8.32 ± 14.4
July 14	3.44 ± 15.3	3.37 ± 15.0	3.42 ± 15.3	3.50 ± 15.6	6.96 ± 16.0	6.78 ± 15.5	6.92 ± 15.9	6.97 ± 16.0
July 21	-7.51 ± 19.3	-7.35 ± 18.9	-7.52 ± 19.3	-7.61 ± 19.6	11.6 ± 16.7	11.3 ± 16.2	11.4 ± 16.3	11.4 ± 16.4
July 28	8.55 ± 10.9	8.43 ± 10.7	8.75 ± 11.1	8.77 ± 11.2	-6.08 ± 16.9	-2.49 ± 6.92	-6.03 ± 16.8	-6.09 ± 16.9
August 03	10.3 ± 12.8	10.2 ± 12.8	10.5 ± 13.1	10.6 ± 13.2	-4.20 ± 8.69	-4.08 ± 8.44	-4.17 ± 8.65	-4.13 ± 8.56
August 11	-0.29 ± 9.93	-0.29 ± 9.80	-0.30 ± 10.0	-0.30 ± 10.2	3.11 ± 11.2	3.06 ± 11.0	3.11 ± 11.2	3.09 ± 11.1
August 18	-3.76 ± 9.73	-3.70 ± 9.58	-4.03 ± 10.4	-4.07 ± 10.5	2.84 ± 13.4	2.31 ± 10.9	2.80 ± 13.2	2.82 ± 13.3
August 25	-8.04 ± 16.9	-7.92 ± 16.6	-8.01 ± 16.8	-8.08 ± 16.9	-7.54 ± 11.7	-3.73 ± 5.80	-7.32 ± 11.4	-7.49 ± 11.6
September 01	2.61 ± 14.5	2.60 ± 14.4	2.64 ± 14.7	2.84 ± 15.8	-7.99 ± 11.5	-7.73 ± 11.1	-7.84 ± 11.3	-7.85 ± 11.3
September 08	-8.58 ± 17.5	-8.55 ± 17.4	-8.75 ± 17.8	-8.93 ± 18.2	2.56 ± 20.3	2.48 ± 19.6	2.54 ± 20.1	2.55 ± 20.2
September 14	7.41 ± 12.8	7.33 ± 12.7	7.52 ± 13.0	7.62 ± 13.2	-3.78 ± 14.4	-3.68 ± 14.0	-3.74 ± 14.2	-3.78 ± 14.4
September 21	-8.51 ± 18.4	-8.43 ± 18.3	-8.66 ± 18.7	-8.84 ± 19.1	-1.85 ± 19.9	-1.80 ± 19.4	-1.83 ± 19.7	-1.85 ± 19.9
September 29	-2.97 ± 7.08	-2.94 ± 7.01	-3.02 ± 7.20	-3.08 ± 7.33	2.96 ± 5.83	2.88 ± 5.67	2.94 ± 5.79	2.95 ± 5.80
October 06	0.61 ± 19.1	0.60 ± 18.9	0.62 ± 19.4	0.63 ± 19.6	-4.24 ± 12.0	-4.11 ± 11.7	-4.18 ± 11.9	-2.05 ± 5.83
October 13	2.88 ± 14.3	2.83 ± 14.1	3.04 ± 15.2	3.09 ± 15.4	-5.01 ± 9.26	-4.87 ± 9.01	-4.96 ± 9.16	-5.04 ± 9.32
October 19	9.43 ± 19.2	9.34 ± 19.0	8.07 ± 16.4	8.20 ± 16.7	-2.04 ± 18.8	-2.06 ± 19.1	-2.00 ± 18.5	-2.03 ± 18.7
October 27	-4.01 ± 11.6	-3.32 ± 9.62	-4.39 ± 12.7	-4.49 ± 13.0	-7.84 ± 8.72	-7.69 ± 8.56	-7.81 ± 8.69	-7.89 ± 8.78
November 03	-1.09 ± 7.54	-1.08 ± 7.48	-1.07 ± 7.42	-0.50 ± 3.42	-1.06 ± 7.28	-0.65 ± 6.34	-0.66 ± 6.45	-0.68 ± 6.57
November 10	0.58 ± 6.77	0.58 ± 6.80	0.62 ± 7.28	0.64 ± 7.42	-4.53 ± 10.8	-4.39 ± 10.4	-4.48 ± 10.7	-3.78 ± 9.01
November 17	-1.70 ± 8.38	-1.69 ± 8.33	-1.71 ± 8.44	-1.74 ± 8.60	-19.8 ± 32.0	-19.3 ± 31.2	-19.6 ± 31.7	-19.9 ± 32.2
November 24	2.26 ± 13.1	2.24 ± 13.0	2.84 ± 16.5	2.90 ± 16.8	-11.9 ± 19.8	-11.5 ± 19.2	-11.7 ± 19.5	-11.8 ± 19.7
December 01	-25.2 ± 22.0	-25.1 ± 22.0	-23.1 ± 20.2	-23.4 ± 20.4	21.8 ± 39.3	21.2 ± 38.2	21.5 ± 38.8	22.4 ± 40.5
December 07	2.07 ± 9.22	2.05 ± 9.14	2.19 ± 9.78	2.24 ± 9.98	2.18 ± 9.73	12.7 ± 12.8	12.9 ± 13.0	13.3 ± 13.4
December 15	2.31 ± 5.84	2.30 ± 5.83	2.39 ± 6.05	2.44 ± 6.17	1.09 ± 6.54	1.06 ± 6.35	1.08 ± 6.45	1.12 ± 6.69
December 22	5.01 ± 18.0	4.93 ± 17.7	5.28 ± 18.9	5.34 ± 19.2	-11.1 ± 25.5	-10.8 ± 24.8	-10.9 ± 25.0	-11.2 ± 25.8
December 29	-6.53 ± 25.9	-6.46 ± 25.7	-6.42 ± 25.5	-6.58 ± 26.1	1.60 ± 10.3	1.56 ± 10.0	1.58 ± 10.2	1.64 ± 10.5

TABLE 3-5: GAMMA EMITTER CONCENTRATION IN FILTERED AIR

Surry Power Station, Surry County, Virginia - 2020

1.0E-3 pCi/m3 ± 2 Sigma

SAMPLING LOCATIONS	NUCLIDE	FIRST QUARTER	SECOND QUARTER	THIRD QUARTER	FOURTH QUARTER	AVERAGE ± 2 SIGMA
SS	Cs-134	-0.28 ± 0.82	-0.37 ± 0.94	0.06 ± 0.64	0.11 ± 0.80	
	Cs-137	0.32 ± 0.73	0.19 ± 0.74	0.31 ± 0.60	-0.06 ± 0.07	
	Be-7	**114** ± 22.9	**137** ± 26.1	**134** ± 19.9	**105** ± 20.0	123 ± 31.0
	K-40	14.9 ± 13.7 **A**				
HIR	Cs-134	-0.27 ± 0.91	0.36 ± 0.84	0.05 ± 0.78	-0.10 ± 0.92	
	Cs-137	0.52 ± 0.69	-0.03 ± 0.59	0.59 ± 0.56 A	0.40 ± 0.70	
	Be-7	**115** ± 22.0	**127** ± 21.8	**109** ± 21.1	**90.7** ± 20.5	110 ± 30.3
BC	Cs-134	-0.22 ± 0.66	-0.13 ± 1.06	0.02 ± 0.92	0.58 ± 0.66	
	Cs-137	0.39 ± 0.55	0.02 ± 0.76	0.44 ± 0.76	-0.32 ± 0.63	
	Be-7	**134** ± 22.5	**118** ± 30.1	**122** ± 25.6	**114** ± 21.6	122 ± 17.3
ALL	Cs-134	0.04 ± 0.66	-0.16 ± 0.54	-0.05 ± 0.79	-0.20 ± 0.70	
	Cs-137	-0.07 ± 0.58	0.53 ± 0.48 A	-0.33 ± 0.59	0.35 ± 0.58	
	Be-7	**138** ± 22.1	**126** ± 22.8	**127** ± 21.5	**124** ± 21.7	129 ± 12.6
CP	Cs-134	-0.52 ± 0.63	0.38 ± 0.70	-0.39 ± 0.86	-0.39 ± 0.92	
	Cs-137	-0.64 ± 0.69	-0.15 ± 0.46	0.12 ± 0.72	0.40 ± 0.67	
	Be-7	**144** ± 23.1	**119** ± 23.9	**117** ± 24.7	**125** ± 21.4	126 ± 24.6
BASF	Cs-134	-0.65 ± 0.68	-0.64 ± 0.96	-0.80 ± 0.80	-0.06 ± 1.04	
	Cs-137	0.22 ± 0.56	-0.05 ± 1.00	-0.55 ± 0.50	0.27 ± 0.94	
	Be-7	122 ± 20.3	126 ± 24.3	117 ± 19.4	107 ± 22.3	118 ± 16.4
FE	Cs-134	-0.01 ± 0.63	-0.66 ± 0.78	0.14 ± 0.89	-0.07 ± 0.63	
	Cs-137	-0.35 ± 0.57	0.05 ± 0.69	0.51 ± 0.76	0.07 ± 0.58	
	Be-7	**127** ± 19.5	**128** ± 26.4	**141** ± 23.0	**115** ± 18.9	128 ± 21.3
NN-C	Cs-134	-0.11 ± 0.68	0.46 ± 0.81	-0.08 ± 1.00	-0.43 ± 0.81	
	Cs-137	-0.04 ± 0.59	0.20 ± 0.54	-0.09 ± 0.96	-0.48 ± 0.61	
	Be-7	**139** ± 22.6	**122** ± 22.5	**140** ± 29.2	**114** ± 20.1	129 ± 25.7
	K-40	12.1 ± 10.5 **A**				

A: < MDC

TABLE 3-6: GAMMA EMITTER AND STRONTIUM CONCENTRATIONS IN MILK

Surry Power Station, Surry County, Virginia - 2020

pCi/Liter ± 2 Sigma

NUCLIDE	EPPS	COLONIAL PARKWAY	BEACHY FARM-C
JANUARY			
Cs-134	0.32 ± 4.02	-1.24 ± 6.45	
Cs-137	0.56 ± 3.95	-1.66 ± 5.60	
Ba-140	14.7 ± 14.7 **A**	-1.76 ± 17.3	**B**
La-140	-1.23 ± 3.87	-0.53 ± 7.10	
I-131	0.18 ± 0.40	0.56 ± 0.48 **A**	
K-40	**1,250** ± 137	**1,120** ± 178	
FEBRUARY			
Cs-134	-5.43 ± 6.34	-0.71 ± 5.11	
Cs-137	-4.31 ± 6.04	1.60 ± 6.01	
Ba-140	3.37 ± 20.1	-7.45 ± 16.1	**B**
La-140	-0.79 ± 6.82	2.20 ± 5.57	
I-131	-0.31 ± 0.39	-0.03 ± 0.53	
K-40	**1240** ± 198	**1110** ± 172	
MARCH			
Cs-134	2.34 ± 5.50	-4.79 ± 5.39	1.20 ± 4.29
Cs-137	-3.17 ± 5.15	-2.68 ± 4.90	-0.23 ± 4.03
Ba-140	-10.2 ± 15.5	-6.88 ± 17.3	-4.01 ± 13.7
La-140	-0.36 ± 6.75	0.56 ± 4.24	-2.68 ± 4.37
I-131	0.16 ± 0.46	-0.87 ± 5.56	-0.11 ± 0.42
K-40	**1,000** ± 202	**1300** ± 206	**929** ± 162
Sr-89		2.32 ± 2.11 **A**	
Sr-90		**2.47** ± 0.54	
APRIL			
Cs-134	0.51 ± 4.34	0.68 ± 5.08	-0.72 ± 5.69
Cs-137	-2.00 ± 4.42	-2.94 ± 4.27	-0.80 ± 5.93
Ba-140	-2.03 ± 15.1	-7.37 ± 15.8	-6.77 ± 19.9
La-140	-2.53 ± 4.05	1.60 ± 4.46	1.56 ± 4.90
I-131	-0.12 ± 0.31	-0.02 ± 0.38	-0.01 ± 0.26
K-40	**1360** ± 165	**1240** ± 168	**1220** ± 190

*Sr-89/90 analysis performed quarterly on location Colonial Parkway only.

A: <MDC

B: Milk sample unavailable due to seasonal unavalibility**.**

TABLE 3-6: GAMMA EMITTER AND STRONTIUM CONCENTRATIONS IN MILK

Surry Power Station, Surry County, Virginia - 2020

pCi/Liter ± 2 Sigma

NUCLIDE	EPPS	COLONIAL PARKWAY	BEACHY FARM-C
MAY			
Cs-134	4.39 ± 5.32	-3.81 ± 3.89	-2.45 ± 5.84
Cs-137	0.51 ± 4.61	-1.22 ± 4.00	-3.31 ± 5.11
Ba-140	1.06 ± 15.5	-1.17 ± 13.2	8.29 ± 20.6
La-140	-1.45 ± 5.89	-0.17 ± 4.24	0.67 ± 4.61
I-131	0.40 ± 0.47	0.00 ± 0.23	0.24 ± 0.42
K-40	**1260** ± 164	**1100** ± 135	**1040** ± 186
JUNE			
Cs-134	-2.04 ± 3.82	-0.42 ± 3.73	-0.69 ± 3.64
Cs-137	-0.44 ± 4.24	3.40 ± 3.73	0.93 ± 3.95
Ba-140	-1.20 ± 14.1	8.44 ± 13.0	-13.6 ± 14.1
La-140	0.09 ± 4.30	2.91 ± 3.95	-8.00 ± 5.76
I-131	-0.08 ± 0.35	0.34 ± 0.42	0.05 ± 0.32
K-40	**1370** ± 165	**1270** ± 132	**1180** ± 174
Sr-89		3.24 ± 2.66 **A**	
Sr-90		**1.33** ± 0.63	
JULY			
Cs-134	1.41 ± 4.62	0.37 ± 5.46	1.28 ± 4.87
Cs-137	1.50 ± 4.28	1.02 ± 5.26	-0.45 ± 6.08
Ba-140	18.3 ± 20.5	29.5 ± 22.1 **A**	-3.04 ± 21.5
La-140	-1.24 ± 6.61	1.30 ± 7.20	0.88 ± 7.16
I-131	-0.47 ± 0.50	0.03 ± 0.45	0.02 ± 0.42
K-40	**1180** ± 166	**1200** ± 186	**1190** ± 196
AUGUST			
Cs-134	-0.24 ± 4.97	-0.80 ± 5.41	-2.16 ± 5.01
Cs-137	-1.49 ± 5.38	0.53 ± 5.20	3.47 ± 4.96
Ba-140	6.82 ± 18.0	1.17 ± 17.3	5.29 ± 16.3
La-140	2.21 ± 4.87	0.94 ± 5.41	1.49 ± 4.40
I-131	0.20 ± 0.43	0.03 ± 0.39	0.09 ± 0.44
K-40	**1320** ± 178	**1260** ± 169	**1110** ± 162

*Sr-89/90 analysis performed quarterly on location Colonial Parkway only.

A: <MDC

TABLE 3-6: GAMMA EMITTER AND STRONTIUM CONCENTRATIONS IN MILK

Surry Power Station, Surry County, Virginia - 2020

pCi/Liter ± 2 Sigma

NUCLIDE	EPPS	COLONIAL PARKWAY	BEACHY FARM-C
SEPTEMBER			
Cs-134	-2.04 ± 4.81	-4.41 ± 5.10	2.00 ± 4.73
Cs-137	3.62 ± 4.09	4.69 ± 4.90	0.77 ± 4.98
Ba-140	3.24 ± 17.7	7.22 ± 15.7	-0.25 ± 16.3
La-140	1.24 ± 6.28	1.23 ± 4.00	-2.61 ± 4.67
I-131	0.46 ± 0.51	0.20 ± 0.45	0.14 ± 0.42
K-40	**1170** ± 202	**1300** ± 193	**1050** ± 168
Sr-89		2.13 ± 2.89	
Sr-90		**1.42** ± 0.52	
OCTOBER			
Cs-134	1.49 ± 4.39	3.78 ± 5.39	0.63 ± 5.15
Cs-137	1.77 ± 4.29	0.51 ± 5.38	-1.48 ± 4.51
Ba-140	-6.76 ± 15.4	0.26 ± 18.6	9.30 ± 17.7
La-140	3.44 ± 5.09	1.05 ± 6.27	2.66 ± 5.17
I-131	0.31 ± 0.50	0.21 ± 0.39	0.29 ± 0.46
K-40	**1380** ± 197	**1210** ± 183	**1210** ± 169
NOVEMBER			
Cs-134	-0.84 ± 5.29	1.29 ± 5.55	4.50 ± 5.12
Cs-137	-0.83 ± 4.02	-2.45 ± 4.63	-0.48 ± 4.43
Ba-140	0.05 ± 18.9	-9.83 ± 17.0	-3.86 ± 17.9
La-140	2.80 ± 5.71	-1.57 ± 4.82	0.33 ± 5.51
I-131	0.56 ± .52 **A**	0.61 ± 0.52 **A**	0.20 ± 0.48
K-40	**1330** ± 158	**1230** ± 180	**1130** ± 157
DECEMBER			
Cs-134	-3.45 ± 6.29	0.46 ± 5.56	4.79 ± 5.76
Cs-137	0.68 ± 4.55	-4.97 ± 5.34	3.10 ± 4.87
Ba-140	-19.6 ± 19.7	7.42 ± 22.4	8.52 ± 20.1
La-140	1.80 ± 4.43	-1.96 ± 5.81	-2.80 ± 5.90
I-131	0.22 ± 0.41	0.10 ± 0.43	-0.06 ± 0.47
K-40	**1280** ± 180	**1290** ± 190	**1130** ± 197
Sr-89		0.24 ± 2.40	
Sr-90		**1.48** ± 0.59	

*Sr-89/90 analysis performed quarterly on location Colonial Parkway only.
A: <MDC

TABLE 3-7: GAMMA EMITTER CONCENTRATION IN FOOD PRODUCTS

Surry Power Station, Surry County, Virginia - 2020

pCi/kg (wet) ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	SAMPLE TYPE	ISOTOPE			
			Cs-134	**Cs-137**	**I-131**	**K-40**
BROCK	11/17/2020	Peanuts	7.04 ± 6.62 **A**	5.33 ± 5.97	-7.74 ± 35.8	**5640** ± 271
FARM	11/17/2020	Corn	2.89 ± 4.86	2.23 ± 4.62	33.7 ± 28.1 **A**	**2580** ± 164
			Cs-134	**Cs-137**	**I-131**	**K-40**
SLADE FARM	12/1/2020	Soybeans	8.51 ± 17.8	-8.04 ± 17.7	6.96 ± 25.9	**13300** ± 1000

A: <MDC

TABLE 3-8: GAMMA EMITTER AND TRITIUM CONCENTRATIONS IN WELL WATER

Surry Power Station, Surry County, Virginia - 2020

pCi/Liter ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPE				
		Mn-54	**Co-58**	**Fe-59**	**Co-60**	**Zn-65**
SS	3/24/2020	-1.75 ± 4.36	2.60 ± 4.72	-0.38 ± 9.13	2.29 ± 4.32	-16.2 ± 10.6
	6/2/2020	-0.58 ± 4.56	-0.07 ± 4.02	-1.10 ± 6.59	-2.58 ± 5.19	-8.05 ± 8.50
	9/1/2020	-0.46 ± 3.48	0.51 ± 3.35	1.48 ± 10.0	1.09 ± 2.95	-3.22 ± 9.03
	12/1/2020	-1.23 ± 3.33	1.05 ± 3.02	2.01 ± 7.37	0.22 ± 3.02	-6.97 ± 7.92
		Nb-95	**Zr-95**	**I-131**	**Cs-134**	**Cs-137**
	3/24/2020	-0.48 ± 4.54	-1.44 ± 7.77	0.04 ± 0.35	0.05 ± 4.27	0.71 ± 4.82
	6/2/2020	-1.11 ± 3.17	-4.61 ± 6.15	-0.09 ± 0.46	-1.36 ± 4.40	1.08 ± 3.70
	9/1/2020	0.90 ± 3.92	-1.31 ± 6.06	-0.11 ± 0.33	-0.22 ± 3.74	2.26 ± 4.03
	12/1/2020	0.18 ± 3.70	-3.47 ± 6.68	0.29 ± 0.44	1.31 ± 3.88	3.82 ± 3.57 **A**
		Ba-140	**La-140**	**H-3**		
	3/24/2020	4.01 ± 17.3	6.06 ± 7.11	89.2 ± 608		
	6/2/2020	-12.8 ± 15.2	-0.92 ± 3.87	-70.5 ± 398		
	9/1/2020	-6.73 ± 17.8	1.75 ± 5.19	64.3 ± 417		
	12/1/2020	11.4 ± 13.6	-1.39 ± 3.54	-10.0 ± 418		
		Mn-54	**Co-58**	**Fe-59**	**Co-60**	**Zn-65**
HIR	3/24/2020	1.63 ± 3.79	-1.09 ± 3.53	2.99 ± 6.99	-3.35 ± 3.84	-4.28 ± 6.76
	6/2/2020	0.60 ± 2.93	-0.85 ± 2.78	7.61 ± 7.29 **A**	1.28 ± 3.15	-6.33 ± 7.52
	9/1/2020	1.57 ± 3.28	-1.41 ± 2.82	3.97 ± 7.50	1.63 ± 4.47	3.55 ± 7.64
	12/1/2020	0.89 ± 3.68	0.37 ± 3.35	-6.76 ± 8.15	0.37 ± 4.58	-4.11 ± 9.16
		Nb-95	**Zr-95**	**I-131**	**Cs-134**	**Cs-137**
	3/24/2020	1.62 ± 3.60	-0.37 ± 6.27	-0.13 ± 0.32	-0.40 ± 3.91	0.23 ± 3.97
	6/2/2020	-0.97 ± 2.34	-0.59 ± 5.12	0.57 ± 0.47 **A**	-0.97 ± 3.77	-0.23 ± 3.59
	9/1/2020	0.20 ± 3.73	3.25 ± 6.74	0.57 ± 0.49 **A**	1.50 ± 4.04	1.70 ± 3.85
	12/1/2020	-3.51 ± 3.49	2.33 ± 6.06	0.01 ± 0.50	1.72 ± 4.27	1.10 ± 3.49
		Ba-140	**La-140**	**H-3**		
	3/24/2020	0.82 ± 16.6	2.37 ± 4.36	-140 ± 603		
	6/2/2020	-3.71 ± 11.6	0.42 ± 4.51	-10.8 ± 400		
	9/1/2020	1.51 ± 14.4	2.30 ± 3.40	50.1 ± 421		
	12/1/2020	-6.07 ± 16.8	3.94 ± 4.81	34.9 ± 420		

A: < MDC

TABLE 3-8: GAMMA EMITTER AND TRITIUM CONCENTRATIONS IN WELL WATER

Surry Power Station, Surry County, Virginia - 2020

pCi/Liter ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPE				
		Mn-54	**Co-58**	**Fe-59**	**Co-60**	**Zn-65**
TC	3/24/2020	1.66 ± 3.45	1.32 ± 3.88	4.70 ± 7.40	1.50 ± 3.98	5.46 ± 8.47
	6/2/2020	0.42 ± 3.31	-1.89 ± 2.80	1.38 ± 5.15	3.18 ± 3.18	-4.23 ± 8.54
	9/1/2020	-0.05 ± 3.78	2.21 ± 4.94	-4.26 ± 8.72	0.55 ± 4.24	-11.5 ± 11.7
	12/1/2020	-1.49 ± 3.90	2.73 ± 4.23	2.33 ± 7.26	-0.04 ± 3.97	-10.5 ± 9.74
		Nb-95	**Zr-95**	**I-131**	**Cs-134**	**Cs-137**
	3/24/2020	1.49 ± 3.92	-0.82 ± 6.41	0.09 ± 0.45	-1.49 ± 3.13	-1.84 ± 4.47
	6/2/2020	0.20 ± 3.01	-0.31 ± 5.26	-0.09 ± 0.44	0.56 ± 3.60	-1.85 ± 3.37
	9/1/2020	-2.13 ± 4.88	-1.96 ± 8.31	0.30 ± 0.41	-1.73 ± 4.28	-3.85 ± 5.54
	12/1/2020	-2.66 ± 3.96	-4.25 ± 7.54	0.03 ± 0.46	-0.11 ± 4.64	1.13 ± 4.77
		Ba-140	**La-140**	**H-3**		
	3/24/2020	1.15 ± 16.3	4.36 ± 4.69	116 ± 619		
	6/2/2020	-1.83 ± 12.7	1.01 ± 3.66	346 ± 427		
	9/1/2020	-2.95 ± 14.8	0.19 ± 4.69	-54.1 ± 405		
	12/1/2020	5.39 ± 16.6	-0.78 ± 5.44	50.1 ± 424		

TABLE 3-9: GAMMA EMITTER AND TRITIUM CONCENTRATIONS IN RIVER WATER

Surry Power Station, Surry County, Virginia - 2020

pCi/Liter ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPE				
		Mn-54	**Co-58**	**Fe-59**	**Co-60**	**Zn-65**
SD	1/7/2020	0.10 ± 2.13	-1.27 ± 2.30	-0.88 ± 4.14	0.21 ± 2.30	-2.82 ± 4.46
	2/4/2020	1.38 ± 4.07	-2.61 ± 3.80	6.21 ± 7.80	1.82 ± 4.57	-6.24 ± 10.1
	3/10/2020	-0.20 ± 4.61	-2.21 ± 4.02	0.00 ± 6.98	-3.20 ± 6.11	-7.57 ± 8.18
	4/7/2020	-3.56 ± 4.01	4.15 ± 3.93 **A**	3.48 ± 7.57	0.64 ± 3.88	-2.58 ± 7.67
	5/5/2020	-2.41 ± 3.13	-2.94 ± 3.44	2.52 ± 7.42	2.10 ± 4.00	-8.08 ± 8.39
	6/2/2020	-1.33 ± 3.41	-2.31 ± 3.76	2.65 ± 7.18	-2.66 ± 3.17	-0.07 ± 8.65
	7/7/2020	-2.33 ± 3.67	-4.50 ± 4.10	-5.26 ± 6.63	0.37 ± 3.78	-9.58 ± 8.77
	8/3/2020	1.94 ± 4.08	0.42 ± 3.64	4.40 ± 7.87	-2.29 ± 3.41	-3.04 ± 7.82
	9/1/2020	-2.05 ± 4.27	1.00 ± 3.40	-4.74 ± 7.85	2.09 ± 5.27	-2.44 ± 9.27
	10/6/2020	-2.09 ± 3.60	-0.11 ± 3.62	-0.94 ± 8.03	-0.24 ± 3.96	-10.0 ± 9.54
	11/3/2020	-2.01 ± 3.50	-2.84 ± 3.51	-2.00 ± 8.30	-0.25 ± 5.34	1.72 ± 8.92
	12/1/2020	-0.87 ± 3.24	0.85 ± 4.10	8.34 ± 6.49 **A**	1.66 ± 3.64	-4.70 ± 8.93
		Nb-95	**Zr-95**	**I-131**	**Cs-134**	**Cs-137**
	1/7/2020	1.96 ± 2.27	-1.76 ± 3.93	-1.19 ± 3.33	0.64 ± 2.31	0.23 ± 2.16
	2/4/2020	6.68 ± 4.36 **A**	3.47 ± 7.19	4.06 ± 4.76	-0.20 ± 3.97	-0.77 ± 4.05
	3/10/2020	4.78 ± 4.34 **A**	-3.29 ± 7.73	-1.33 ± 3.88	3.83 ± 4.33	-0.18 ± 4.38
	4/7/2020	0.26 ± 3.53	-3.64 ± 6.15	-2.43 ± 5.04	0.36 ± 3.96	-3.94 ± 4.10
	5/5/2020	-3.21 ± 3.67	-4.23 ± 5.78	-3.73 ± 4.48	-0.63 ± 3.73	-2.05 ± 3.71
	6/2/2020	1.33 ± 3.55	-5.71 ± 5.81	-4.79 ± 4.48	-4.78 ± 4.19	0.21 ± 3.14
	7/7/2020	-0.97 ± 3.92	-3.21 ± 6.37	-0.08 ± 5.83	1.25 ± 3.67	-2.11 ± 4.18
	8/3/2020	2.81 ± 4.03	-4.13 ± 5.71	-1.01 ± 4.32	2.87 ± 4.08	-0.04 ± 3.93
	9/1/2020	1.89 ± 4.54	1.54 ± 6.81	-1.42 ± 4.23	-3.51 ± 4.71	-2.63 ± 4.30
	10/6/2020	3.16 ± 3.43	2.12 ± 5.70	-1.04 ± 4.27	-2.59 ± 4.08	0.43 ± 3.99
	11/3/2020	-0.27 ± 2.69	-0.69 ± 6.47	-1.82 ± 4.95	-1.95 ± 4.43	1.75 ± 4.69
	12/1/2020	-3.10 ± 3.89	3.94 ± 7.59	1.25 ± 4.16	-0.32 ± 3.49	2.66 ± 3.94
		Ba-140	**La-140**	**H-3**		
	1/7/2020	0.36 ± 9.69	-1.60 ± 3.19			
	2/4/2020	-4.50 ± 15.1	2.18 ± 5.49			
	3/10/2020	-6.07 ± 16.9	2.11 ± 5.80	-85.1 ± 449		
	4/7/2020	-3.43 ± 15.4	-0.19 ± 4.93			
	5/5/2020	1.17 ± 15.4	-0.92 ± 4.61			
	6/2/2020	8.08 ± 14.7	-2.27 ± 4.53	-140 ± 441		
	7/7/2020	1.83 ± 16.2	-5.85 ± 4.87			
	8/3/2020	2.46 ± 12.9	2.93 ± 3.54			
	9/1/2020	-14.9 ± 16.3	-5.42 ± 6.97	98.7 ± 460		
	10/6/2020	-5.84 ± 12.8	1.48 ± 5.03			
	11/3/2020	9.88 ± 14.6	-1.96 ± 6.75			
	12/1/2020	-9.74 ± 14.4	2.18 ± 4.52	-262 ± 560		

A: < MDC

TABLE 3-9: GAMMA EMITTER AND TRITIUM CONCENTRATIONS IN RIVER WATER

Surry Power Station, Surry County, Virginia - 2020

pCi/Liter ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPES				
		Mn-54	**Co-58**	**Fe-59**	**Co-60**	**Zn-65**
SW-C	1/7/2020	-2.07 ± 2.03	0.05 ± 1.85	-0.49 ± 4.50	1.54 ± 2.06	0.85 ± 5.07
	2/4/2020	2.76 ± 4.00	-0.32 ± 3.78	-0.57 ± 7.34	2.98 ± 3.95	-2.27 ± 9.37
	3/10/2020	0.65 ± 4.57	-1.58 ± 3.98	3.96 ± 7.89	-2.49 ± 3.85	0.90 ± 8.83
	4/7/2020	-0.07 ± 3.80	0.30 ± 3.16	2.79 ± 5.55	-0.55 ± 2.84	0.54 ± 8.22
	5/5/2020	0.53 ± 3.42	-0.49 ± 3.42	1.85 ± 7.12	-0.84 ± 3.85	1.38 ± 6.73
	6/2/2020	-1.61 ± 3.50	-0.24 ± 4.45	-2.91 ± 9.32	2.20 ± 4.42	-0.10 ± 8.47
	7/7/2020	-0.32 ± 3.83	-0.05 ± 3.64	0.69 ± 6.46	0.17 ± 4.09	-12.3 ± 10.0
	8/3/2020	1.71 ± 4.83	2.78 ± 3.67	2.28 ± 8.62	0.85 ± 5.05	-2.04 ± 8.93
	9/1/2020	2.30 ± 3.59	2.15 ± 3.65	-0.50 ± 7.71	0.56 ± 3.52	-1.10 ± 8.67
	10/6/2020	0.41 ± 3.58	-1.29 ± 3.33	1.88 ± 6.57	0.26 ± 3.34	-6.72 ± 9.24
	11/3/2020	-0.69 ± 3.64	1.91 ± 4.37	-2.69 ± 7.80	-0.98 ± 4.35	0.87 ± 9.07
	12/1/2020	-1.00 ± 3.56	-1.08 ± 3.72	1.74 ± 5.19	2.07 ± 3.58	-2.16 ± 7.42
		Nb-95	**Zr-95**	**I-131**	**Cs-134**	**Cs-137**
	1/7/2020	0.31 ± 1.96	2.02 ± 3.97	-1.48 ± 3.34	-0.90 ± 2.17	-0.06 ± 2.13
	2/4/2020	-0.63 ± 4.01	-4.04 ± 5.43	2.63 ± 4.43	0.66 ± 3.86	-3.98 ± 4.39
	3/10/2020	0.19 ± 4.13	-1.31 ± 6.64	-1.18 ± 5.58	3.61 ± 4.75	0.44 ± 4.33
	4/7/2020	0.86 ± 3.43	-4.25 ± 6.01	-3.09 ± 4.03	0.27 ± 3.53	0.95 ± 3.11
	5/5/2020	-1.63 ± 3.14	1.91 ± 5.70	-4.16 ± 4.85	0.80 ± 3.60	-0.87 ± 3.23
	6/2/2020	-0.19 ± 4.30	0.48 ± 8.66	-1.49 ± 4.85	4.10 ± 5.31	3.35 ± 4.55
	7/7/2020	1.20 ± 4.35	-1.76 ± 6.83	-0.04 ± 6.05	1.63 ± 3.72	-1.02 ± 3.93
	8/3/2020	-0.91 ± 3.74	8.98 ± 6.85 **A**	-0.40 ± 4.14	3.10 ± 3.94	-2.85 ± 3.82
	9/1/2020	4.13 ± 3.43 **A**	0.14 ± 6.61	2.29 ± 4.48	2.50 ± 4.23	-1.44 ± 3.71
	10/6/2020	3.01 ± 3.90	0.26 ± 6.65	1.09 ± 4.02	-2.77 ± 3.21	1.98 ± 3.90
	11/3/2020	2.78 ± 4.05	-0.92 ± 6.05	-4.90 ± 5.57	2.67 ± 4.07	2.68 ± 3.61
	12/1/2020	3.00 ± 3.88	2.78 ± 5.58	-1.23 ± 4.42	2.56 ± 3.81	1.87 ± 3.74
		Ba-140	**La-140**	**H-3**	**K-40**	**Th-232**
	1/7/2020	-2.30 ± 9.37	-0.20 ± 3.14		**61.9** ± 57.6	8.75 ± 7.60 **A**
	2/4/2020	-5.59 ± 14.6	0.37 ± 5.26			
	3/10/2020	-1.56 ± 16.1	-0.45 ± 4.70	-384 ± 418		
	4/7/2020	5.12 ± 13.4	-1.32 ± 4.56			
	5/5/2020	-0.81 ± 13.3	-0.11 ± 5.07			
	6/2/2020	13.1 ± 14.8	-2.71 ± 4.97	-239 ± 434		
	7/7/2020	-12.3 ± 16.5	-4.29 ± 7.05			
	8/3/2020	-5.09 ± 14.4	1.87 ± 6.15			
	9/1/2020	0.42 ± 14.3	0.68 ± 4.31	158 ± 456		
	10/6/2020	5.99 ± 12.7	1.39 ± 6.41			
	11/3/2020	-16.2 ± 13.6	-2.71 ± 5.00			
	12/1/2020	0.51 ± 13.8	-3.85 ± 3.93	-31.9 ± 577		

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TABLE 3-10: GAMMA EMITTER CONCENTRATIONS IN SILT

Surry Power Station, Surry County, Virginia - 2020

pCi/kg (dry) ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPE				
		Cs-134	**Cs-137**	**K-40**	**Th-228**	**Th-232**
SD	3/17/2020	34.4 ± 68.7	88.2 ± 66.9 **A**	**14500** ± 1840	**1090** ± 180	**1250** ± 207
	9/22/2020	41.5 ± 37.4 **A**	**163** ± 49.4	**13900** ± 1010	**865** ± 101	
		Ra-226	**Be-7**	**Ac-228**		
	3/17/2020	**2460** ± 1600				
	9/22/2020	**2390** ± 1110	**2800** ± 812	**922** ± 206		
		Cs-134	**Cs-137**	**K-40**	**Th-228**	**Th-232**
CHIC-C	3/17/2020	39.5 ± 62.7	83.1 ± 66.5 **A**	**14900** ± 1780	**1040** ± 174	**970** ± 242
	9/23/2020	54.6 ± 62.1	62.0 ± 61.1 **A**	**14000** ± 2020	**781** ± 157	
		Ra-226	**Ac-228**			
	3/17/2020	**2740** ± 1560	**1170** ± 578			
	9/23/2020	**1610** ± 1610	**973** ± 315			
		Cs-134	**Cs-137**	**K-40**	**Th-228**	**Th-232**
SI	3/18/2020	64.7 ± 59.2 **A**	116 ± 66.8 **A**	**16600** ± 1950	**911** ± 163	
	9/23/2020	9.79 ± 59.6	123 ± 67.8 **A**	**14000** ± 1920	**819** ± 163	**822** ± 250
		Ra-226	**Be-7**	**Ac-228**		
	3/18/2020			**1180** ± 301		
	9/23/2020	**2590** ± 1350	**2440** ± 960	**1260** ± 276		

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TABLE 3-11: GAMMA EMITTER CONCENTRATIONS IN SHORELINE SEDIMENT

Surry Power Station, Surry County, Virginia - 2020

pCi/kg (dry) ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPE				
		Cs-134	**Cs-137**	**K-40**	**Ra-226**	**Th-228**
HIR	2/4/2020	-6.37 ± 23.9	-10.7 ± 24.0	**4760** ± 848	431 ± 420 **A**	**136** ± 66.2
	8/3/2020	9.97 ± 25.1	-7.90 ± 22.8	**4450** ± 874	598 ± 427 **A**	**240** ± 58.3
		Th-232				
	8/3/2020	**234** ± 84.7				
		Cs-134	**Cs-137**	**K-40**	**Ra-226**	**Th-228**
CHIC-C	2/4/2020	-0.53 ± 28.2	18.5 ± 29.6	**2860** ± 738		**141** ± 76.0
	8/3/2020	30.4 ± 27.0 **A**	-6.11 ± 23.9	**1370** ± 511	**1400** ± 869	**348** ± 109
		Th-232	**Ac-228**			
		139 ± 135 **A**				
	8/3/2020	**376** ± 131	**629** ± 296			

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TABLE 3-12: GAMMA EMITTER CONCENTRATION IN FISH

Surry Power Station, Surry County, Virginia - 2020

pCi/kg (wet) ± 2 Sigma

SAMPLING LOCATION	COLLECTION DATE	SAMPLE TYPE	ISOTOPE			
			K-40	**Mn-54**	**Co-58**	**Fe-59**
SD	4/6/2020	Catfish	**1730** ± 854	6.40 ± 32.9	-8.33 ± 38.3	94.7 ± 82.8 **A**
	4/6/2020	Game fish	**1700** ± 545	8.95 ± 20.9	2.88 ± 20.2	-26.8 ± 45.7
	10/6/2020	Catfish	**1570** ± 672	25.9 ± 31.1	-27.6 ± 43.1	31.2 ± 58.8
	10/6/2020	Game fish	**1800** ± 802	-5.13 ± 34.4	9.95 ± 32.6	27.1 ± 69.6
			Co-60	**Zn-65**	**Cs-134**	**Cs-137**
	4/6/2020	Catfish	11.0 ± 55.0	14.3 ± 102	-3.27 ± 40.6	6.31 ± 42.4
	4/6/2020	Game fish	3.46 ± 22.9	-75.4 ± 49.1	5.07 ± 21.2	3.94 ± 21.7
	10/6/2020	Catfish	14.0 ± 43.7	-23.9 ± 83.3	3.12 ± 32.2	17.5 ± 36.4
	10/6/2020	Game fish	8.19 ± 31.0	-53.8 ± 84.9	12.3 ± 34.7	18.6 ± 31.0

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TABLE 3-13: GAMMA EMITTER CONCENTRATIONS IN OYSTERS

Surry Power Station, Surry County, Virginia - 2020

pCi/kg (wet) ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPE			
		Mn-54	**Co-58**	**Fe-59**	**Co-60**
POS	3/19/2020	-9.79 ± 44.8	4.08 ± 57.1	-18.9 ± 134	-20.1 ± 45.9
	9/24/2020	13.1 ± 42.7	-24.0 ± 45.5	-18.4 ± 125	4.37 ± 48.4
		Zn-65	**Cs-134**	**Cs-137**	
		-61.9 ± 102	-6.52 ± 48.8	14.9 ± 45.9	
		-46.5 ± 106	13.3 ± 40.5	-0.41 ± 44.4	
		Mn-54	**Co-58**	**Fe-59**	**Co-60**
MP	3/19/2020	-13.0 ± 36.3	26.8 ± 37.8	34.6 ± 77.3	-18.1 ± 26.4
	9/23/2020	21.7 ± 33.8	20.0 ± 44.9	49.0 ± 91.2	-0.58 ± 37.9
		Zn-65	**Cs-134**	**Cs-137**	
		-18.5 ± 87.3	25.1 ± 36.2	-1.81 ± 34.4	
		-49.0 ± 63.5	38.2 ± 34.8 **A**	-6.93 ± 32.1	
		Mn-54	**Co-58**	**Fe-59**	**Co-60**
SHI	3/19/2020	-24.6 ± 40.9	14.9 ± 48.9	10.2 ± 125	-27.5 ± 37.3
	9/24/2020	-21.6 ± 33.2	-17.2 ± 32.0	-4.73 ± 72.6	4.18 ± 39.2
		Zn-65	**Cs-134**	**Cs-137**	
		-127 ± 103	-9.58 ± 40.3	31.9 ± 44.1	
		17.8 ± 82.4	-1.75 ± 34.9	-6.92 ± 35.4	

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TABLE 3-14: GAMMA EMITTER CONCENTRATIONS IN CLAMS

Surry Power Station, Surry County, Virginia - 2020

pCi/kg (wet) ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPE			
		Mn-54	**Co-58**	**Fe-59**	**Co-60**
JI	3/18/2020	12.3 ± 34.9	-33.0 ± 44.8	-101 ± 112	-6.46 ± 33.2
	9/23/2020	21.3 ± 30.8	-18.1 ± 34.8	-57.4 ± 87.8	4.27 ± 30.5
		Zn-65	**Cs-134**	**Cs-137**	
	3/18/2020	-47.4 ± 79.8	3.61 ± 32.3	16.1 ± 33.1	
	9/23/2020	-35.1 ± 75.6	-9.52 ± 22.6	2.09 ± 30.5	
		Mn-54	**Co-58**	**Fe-59**	**Co-60**
SD	3/17/2020	-14.2 ± 46.5	-17.3 ± 52.1	156 ± 120 **A**	-11.6 ± 41.0
	9/22/2020	14.5 ± 40.4	-28.1 ± 50.4	-116 ± 102.0	3.67 ± 40.7
		Zn-65	**Cs-134**	**Cs-137**	
	3/17/2020	-55.6 ± 98.5	20.4 ± 47.1	-2.64 ± 40.6	
	9/22/2020	-25.8 ± 88.3	29.5 ± 37.8	10.1 ± 39.9	
		Mn-54	**Co-58**	**Fe-59**	**Co-60**
CHIC-C	3/17/2020	-9.77 ± 35.1	-0.56 ± 43.7	65.0 ± 106	-9.84 ± 37.0
	9/23/2020	14.0 ± 27.6	-4.91 ± 35.6	13.9 ± 74.3	3.43 ± 27.1
		Zn-65	**Cs-134**	**Cs-137**	
	3/17/2020	-93.9 ± 103.0	-7.92 ± 32.3	26.5 ± 35.9	
	9/23/2020	-25.8 ± 85.2	-6.47 ± 32.5	-11.5 ± 30.4	

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TABLE 3-15: GAMMA EMITTER CONCENTRATIONS IN CRABS

Surry Power Station, Surry County, Virginia - 2020

pCi/kg (wet) ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPE			
		K-40	**Mn-54**	**Co-58**	**Fe-59**
SD	6/24/2020	**1850** ± 519	12.1 ± 22.3	-5.90 ± 20.2	21.7 ± 49.6
		Co-60	**Zn-65**	**Cs-134**	**Cs-137**
	6/24/2020	6.08 ± 21.0	-33.5 ± 51.5	-25.0 ± 25.0	-8.96 ± 21.9

4. DISCUSSION OF RESULTS

Data from the radiological analyses of environmental media collected during 2020 and tabulated in Section 3, are discussed below. The procedures and specifications followed in the laboratory for these analyses are as required in the Teledyne Brown Engineering quality assurance manuals and laboratory procedures. In addition to internal quality control measures performed by the laboratories, they also participate in an Interlaboratory Comparison Program. Participation in this program ensures that independent checks on the precision and accuracy of the measurements of radioactive material in environmental samples are performed. The results of the Interlaboratory Comparison Program are provided in Appendix B.

The predominant radioactivity detected throughout 2020 was from external sources, such as fallout from nuclear weapons tests (cesium-137) and naturally occurring radionuclides. Naturally occurring nuclides, such as beryllium-7, radium-226, actinium-228, thorium-228, thorium-232 and potassium-40, were detected in numerous samples.

The following is a discussion and summary of the results of the environmental measurements taken during the 2020 reporting period.

4.1 Gamma Exposure Rate

A thermoluminescent dosimeter (TLD) is an inorganic crystal used to detect ambient radiation. These TLDs are made of CaF and LiF compounds and are specifically designed for environmental monitoring. Three TLDs are deployed at each sampling location. TLDs are placed in two concentric rings around the station. The inner ring is in the vicinity of the site boundary, and the outer ring is located at approximately five miles from the station. TLDs are also placed in special interest areas, such as population centers and nearby residences. Additional TLDs serve as controls. Ambient radiation comes from naturally occurring radioisotopes in the air and soil, radiation from cosmic origin, fallout from nuclear weapons testing, station effluents and direct radiation from the station.

The results of the TLD analyses are presented in Table 3-2. There was no detectable external dose to members of the public from Surry Power Station in 2020. The results of the TLD analyses shown in Table 3-2 comply with Section 7 of ANSI/HPS N13.37-2014 to ensure accurate environmental results. The long-term integrity of each field monitoring location is accomplished by a thorough, documented evaluation of the location for changes that could impact data quality in accordance with Section 7.1 of the ANSI Standard. Since off-site processing of TLDs is used, extraneous dose received prior to and after removal from the field is quantified in compliance with Section 7.2 of the ANSI Standard. Data analysis for Table 3-2 was performed in accordance with Section 7.3 of the ANSI Standard. This includes normalizing results to a standard 91-day quarterly monitoring period, determination of the baseline background dose for each monitoring location and determination of the smallest facility-related dose that can be detected above the baseline background.

4.2 Airborne Gross Beta

Air is continuously sampled by passing through glass fiber particulate filters. The filters collect airborne particulate radionuclides. Once a week the samples are collected and analyzed for gross beta activity. Results of the weekly gross beta analyses are presented in Table 3-3. A review of the results from control and indicator locations continues to show no significant variation in measured activities. Refer to Figures 4.1 and 4.2 for details. Data presented in these figures indicate that any contribution from station related activities is not measurable.

Gross beta activity found during the pre-operational and early operating period of Surry Power Station was higher because of nuclear weapons testing. During that time, nearly 740 nuclear weapons were tested worldwide. In 1985 weapons testing ceased, and except for the Chernobyl accident in 1986, airborne gross beta results have remained steady.

Figure 4-1:
2020 GROSS BETA IN AIR PARTICULATES

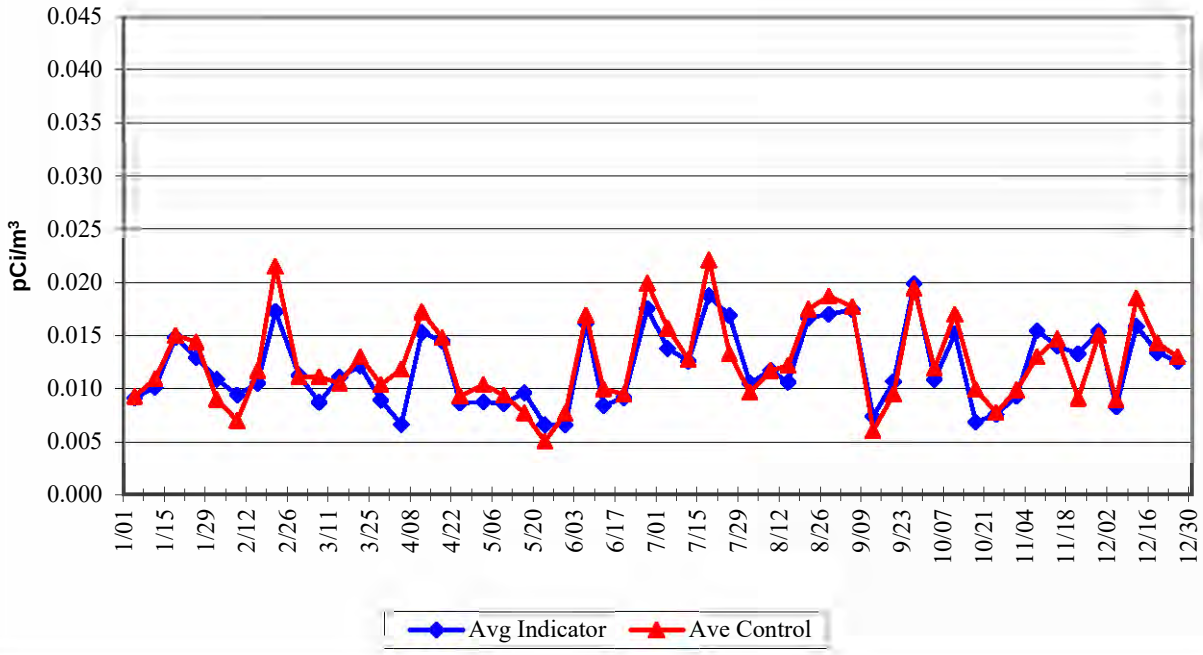
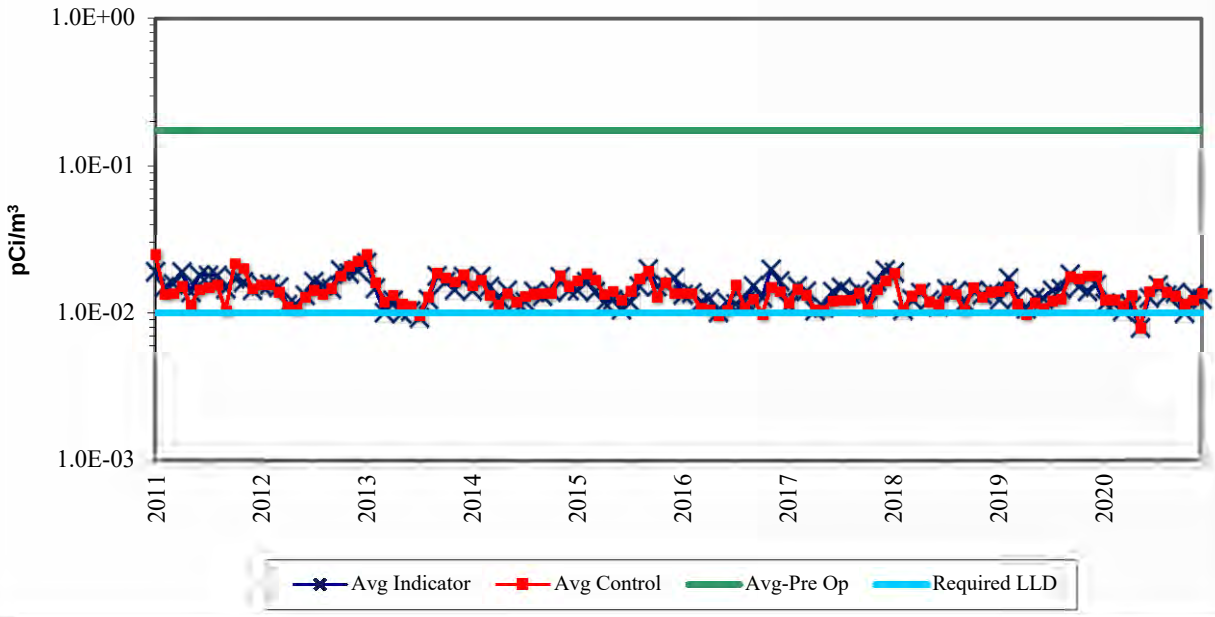


Figure 4-2:
GROSS BETA IN AIR PARTICULATES
10 YEAR HISTORICAL TREND



4.3 Airborne Radioiodine

Air is also continuously sampled for radioiodine by passing air through charcoal cartridges. Once a week, the charcoal cartridge samples are collected and analyzed. The results of the analyses are presented in Table 3-4. All results are below the lower limit of detection. No positive iodine-131 was detected in air samples in 2020.

4.4 Air Particulate Gamma

The air particulate filters from the weekly gross beta analyses are composited by location and analyzed quarterly by gamma spectroscopy. The results are listed in Table 3-5. The results indicate the presence of naturally occurring beryllium-7, which is produced by cosmic processes. No man-made radionuclides were identified. These analyses confirm there are no effects from station effluents.

4.5 Animal Milk

Analysis of milk samples is generally the most sensitive indicator of fission product existence in the terrestrial environment. This, in combination with the significant human consumption of milk, results in this pathway often being the most critical as it relates to station radiological effluents. This pathway also shows measurable amounts of nuclear weapons testing fallout. Therefore, this media needs to be carefully evaluated when determining the effects from station effluents.

Results of gamma spectroscopy indicate no detectable station related radioactivity was identified in milk samples in 2020. The results of the analyses are presented in Table 3-6. In years past, cesium-137 had been detected sporadically. The occurrences were attributed to residual global fallout from past atmospheric weapons testing. In 2020, cesium-137 was not detected at a level above the LLD.

At the request of the Commonwealth of Virginia, a quarterly composite sample is prepared from the monthly milk samples from the Colonial Parkway collection station. The composite samples are analyzed for strontium-89 and strontium-90. No strontium-89 was detected in the four composites analyzed. Strontium-90 was detected in all four composite samples, with an average concentration of 1.68 pCi/L. Strontium-90 is not a component of station radiological effluents and is a product of nuclear weapons testing fallout.

4.6 Food Products

Three food product samples (corn, peanuts, and soybeans) were collected and analyzed by gamma spectroscopy. The results of the analyses are presented in Table 3-7. As expected, only naturally occurring potassium-40 was detected in all samples. No station related radioactivity was detected in this pathway.

4.7 Well Water

Well water is not considered to be affected by station operations because there are no discharges made to this pathway. However, Surry Power Station monitors well water quarterly at three indicator locations. Well water samples are analyzed for gamma radiation and tritium. The results of these analyses are presented in Table 3-8. No positive tritium or station related radioactivity was detected in 2020. Historically, during the pre-operational period, no gamma emitting isotopes were detected.

4.8 River Water

Samples of the James River water are collected monthly and the results are presented in Table 3-9. All samples are analyzed by gamma spectroscopy. The monthly samples are also composited and analyzed for tritium on a quarterly basis. No positive tritium was detected in this pathway. Only naturally occurring potassium-40 was detected. No station related radioactivity was detected.

4.9 Silt

Silt is sampled to evaluate any buildup of radionuclides in the environment due to the operation of the station. Sampling of this pathway provides a good indication of the dispersion effects of effluents to the river. Buildup of radionuclides in silt could indirectly lead to increasing radioactivity levels in clams, oysters, crabs, and fish.

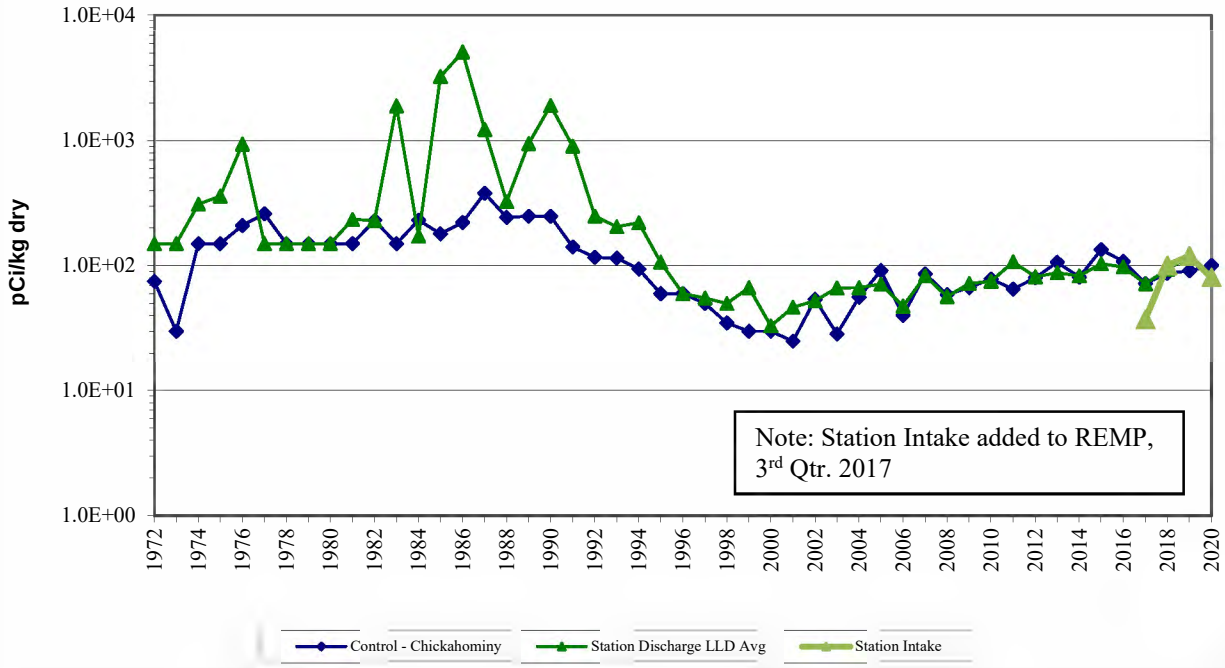
Samples of silt are collected from three locations, one upstream, one downstream of the station and one in the dredge area of the station intake. The station intake silt sample was added in third quarter of 2017 to provide data for future station intake dredging operations. The results of the gamma spectroscopy analyses are presented in Table 3-10. Naturally occurring beryllium-7, potassium-40, radium-226, actinium-228, thorium-228, and thorium-232 were detected. Historically, cobalt-60 has been detected in samples obtained from the station discharge indicator location. Cobalt-60 has not been detected since 2003. A trend of cesium-137 and cobalt-60 concentrations is graphed and presented in Figures 4-4 and 4-5. For three decades, the general concentration for cesium-137 has continued to decrease. This trend is the calculated average of the semi-annual analysis results.

An increase in cesium-137 concentration was observed in the Station Discharge indicator samples in 2018 and 2019. In 2019, the concentration of cesium-137 was reduced in the station's liquid waste effluent. The trend in the Station Discharge silt concentration decreased in 2020. This decreasing trend was expected to trail behind the reduced concentration in liquid waste effluent. The cesium-137 concentration for the control location and both indicator locations all show a decreasing trend in 2020.

The Station Intake indicator sample was added to the REMP in 2017. The additional sample is collected in the dredge channel area at the station intake. The dredge channel is approximately 150' wide and 1750' in length. This location was added to support future station intake channel dredging operations. The trend for the station intake is currently being established and carefully monitored.
The presence of cesium-137 in indicator location, Station Intake, and control location, Chick is indicative of the accumulation, through runoff, of cesium-137 into the James River from residual weapons testing fallout. Samples collected from the James River, during the pre-operational period, indicated the presence of cesium-137. The pre-operational average cesium-137 concentration is indicated in Figure 4-5.

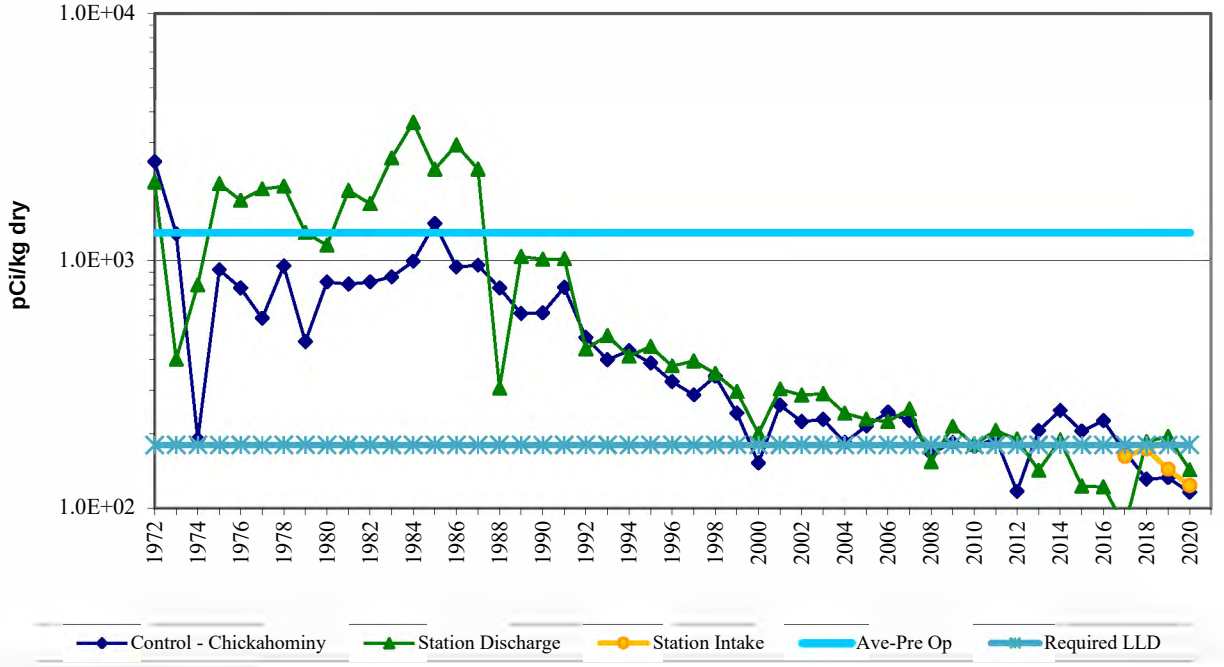
The highest silt indicator location in 2020 is the Station Discharge with a cesium-137 concentration of 163 pCi/kg. This concentration remains consistent with aquatic sediment samples collected in control locations of the James River.

Figure 4-4:
COBALT-60 IN SILT



Chickahominy had detectable activity in 1982 and 1984 through 1994. Other years were <MDC, Minimum Detectable Concentration. Station Discharge was <MDC activity 1996 through 1998 and 2004 through 2020.

Figure 4-5:
CESIUM-137 IN SILT



4.10 Shoreline Sediment

Shoreline sediment, unlike river silt, may provide a direct dose to humans. Buildup of radionuclides along the shoreline may provide a source of direct exposure for those using the area for commercial and recreational uses. The results are presented in Table 3-11.

The naturally occurring radionuclides potassium-40, radium-226, actinium-228, thorium-228, and thorium-232 were detected at concentrations equivalent to normal background activities. There were no radionuclides attributable to the operation of the station detected in any shoreline sediment samples.

4.11 Fish

The radioactivity measured in fish sampled from the Station Discharge Canal and analyzed by gamma spectroscopy is presented in Table 3-12. The 2020 results are similar to those seen over the last decade. No activity was observed in this media except for naturally occurring potassium-40.

4.12 Oysters

Oysters were collected from three different locations. The results of the oyster analyses are presented in Table 3-13. No gamma emitting radionuclides were detected in oysters sampled in 2020. No station related radioactivity has been detected in this media since 1991.

4.13 Clams

Clams are analyzed from three different locations. The results of the gamma spectroscopy analyses are presented in Table 3-14. No gamma emitting radionuclides related to station effluents were detected in clams sampled in 2020.

4.14 Crabs

An annual crab sample was collected from the Station Discharge Canal and analyzed by gamma spectroscopy. The results of the analysis are presented in Table 3-15. Other than naturally occurring potassium-40, no other gamma emitting radionuclides related to station effluents were detected in crabs sampled in 2020. This is consistent with pre-operational data and data collected over the past decade.

5. PROGRAM EXCEPTIONS

There were four exceptions to the REMP sampling schedule in 2020. The four exceptions are detailed below:

1. Milk from the Beachy Farm control location was seasonally unavailable during the months of January and February of 2020. During these two months the dairy farmer experienced a reduction in milking animals, the animal's diet was reduced, and the birth and nursing of a new calve resulted in limited milk being available for human consumption. Milk collection from Beachy Farm resumed in March 2020.

2. The Bacon's Castle (BC) air sample particulate filter was invalid for the collection period 3/31/2020 – 4/7/2020. A visual inspection of the particulate filter identified very little particulate material was deposited on the patch. Teledyne Brown Engineering (TBE) validated through analysis that the particulate sample was invalid. TBE removed the sample from the quarterly composite group.

3. One of the three James River Bridge (JRB) TLDs (#39) was missing when preparing the environmental TLDs for shipment to the vendor for processing. The remaining two TLDs were shipped to the vendor and processed.

4. The Colonial Parkway (CP) milk sample from October 2020 was not found at the vendor lab when creating the 4th quarter Sr-89/90 composite. The composite is composed of November and December samples only.

The one exception to the Interlaboratory Comparison Program (ICP) for 2020 is listed below.

1. Vendor did not perform Interlaboratory Comparison Program analyses within frequency as required by VPAP-2103S (semi-annually) for Milk (I-131, Gamma, and Sr89/90) and Air Particulate (Gamma and Sr-89/90). The vendor (TBE) did not complete the first set of analyses for 2020 until September "due to unforeseen circumstances between TBE's home business office and Analytics". The ICP analysis was performed again in December.

6. CONCLUSIONS

The results of the 2020 Radiological Environmental Monitoring Program for Surry Power Station have been presented in previous sections. This section presents conclusions for each pathway.

- **Direct Radiation Exposure Pathway** - There was no detectable external dose to members of the public from Surry Power Station in 2020.
  Note: The units for the Direct Radiation Exposure Pathway as presented in Table 3-1 are now recorded in units of mRem/Standard Quarter to match units in the Gamma Exposure Rate recorded in Table 3-2.

- **Airborne Exposure Pathway** – Radioiodine analysis of charcoal cartridge samples indicated that no positive activity was detected. Quarterly gamma isotopic analyses of the composite particulate samples identified only naturally occurring beryllium-7. All indicator locations for air particulate gross beta concentrations trend well with the control locations. The effluent data was reviewed for the period of interest and concluded the station contribution is not measurable.

- **Milk** - Milk samples are an important indicator measuring the effect of radioactive iodine and radionuclides in airborne releases. No positive cesium-137 or iodine-131 activity was detected in any of the thirty-six samples. Naturally occurring potassium-40 was detected at a similar level when compared to the averages of the previous years.

  Strontium-90 was detected in four samples at an average concentration of 1.68 pCi/L. Strontium-90 is not a component of station effluents, but rather, a product of nuclear weapons testing fallout.

- **Food Products** – Only naturally occurring potassium-40 was detected in all three food product samples. In the past, cesium-137 had occasionally been detected in these samples and is attributable to global fallout from past nuclear weapons testing. No positive cesium-137 activity was detected in food product samples in 2020.

- **Well Water** - Well water samples were analyzed for gamma emitting radionuclides and tritium. Well water sample analyses indicate no radioactivity was attributable to the operation of the station.

- **River Water** - River water samples were analyzed for gamma emitting radionuclides and tritium. Only naturally occurring potassium-40 was detected. No positive tritium activity was detected.

- **Silt** – No radioactivity attributable to the operation of the station was detected in the control location. Only naturally occurring potassium-40, radium-226, thouium-228, thorium-232, and actinium-228 were detected.

  The indicator sample with the highest concentration of cesium-137 during 2020 is the station discharge sample, with a concentration of 163 pCi/kg. This concentration is consistent with aquatic sediment samples collected in control locations of the James River. Naturally occurring potassium-40, radium-226, thouium-228, thorium-232, and actinium-228 were also detected.

- **Shoreline Sediment** - There were no radionuclides attributable to the operation of Surry Power Station identified in any sample. Naturally occurring radionuclides were detected at concentrations equivalent to normal background activities.

Aquatic Biota

- **Fish** – Only naturally occurring potassium-40 was detected. There were no other positive gamma emitting radionuclides detected in any of the fish samples.

- **Oysters** – No positive gamma emitting radionuclides were detected in any of the oyster samples.

- **Clams -** No positive gamma emitting radionuclides were detected in any of the clam samples.

- **Crabs** – Other than naturally occurring potassium-40, there were no other positive gamma emitting radionuclides detected in any of the clam samples.

REFERENCES

References

1. NUREG-0472, "Radiological Effluent Technical Specifications for PWRs", Draft Rev. 3, March 1982.

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3. United States Nuclear Regulatory Commission, Regulatory Guide 4.8, "Environmental Technical Specifications for Nuclear Power Plants", December 1975.

4. United States Nuclear Regulatory Commission Branch Technical Position, "Acceptable Radiological Environmental Monitoring Program", Rev. 1, November 1979.

5. Dominion, Station Administrative Procedure, VPAP-2103S, “Offsite Dose Calculation Manual (Surry)”.

6. Virginia Electric and Power Company, Surry Power Station Technical Specifications, Units 1 and 2.

7. HASL-300, Environmental Measurements Laboratory, “EML Procedures Manual,” 27th Edition, Volume 1, February 1992.

8. NUREG/CR-4007, “Lower Limit of Detection: Definition and Elaboration of a Proposed Position for Radiological Effluent and Environmental Measurements,” September 1984.

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APPENDICES

APPENDIX A: LAND USE CENSUS

Year 2020

*LAND USE CENSUS**

Surry Power Station, Surry County, Virginia

January 1 - December 31, 2020 Page 1 of 1

Sector	Direction	Nearest Resident	Nearest Garden **	Nearest Cow	Nearest Goat
A	N	4.1 @ 10°	(a)	(a)	(a)
B	NNE	1.9 @ 32°	(a)	(a)	(a)
C	NE	4.7 @ 35°	(a)	(a)	(a)
D	ENE	(a)	(a)	(a)	(a)
E	E	(a)	(a)	(a)	(a)
F	ESE	(a)	(a)	(a)	(a)
G	SE	2.8 @ 142°	(a)	(a)	(a)
H	SSE	2.7 @ 158°	2.7 @ 158°	(a)	(a)
J	S	1.7 @ 181°	2.0 @ 183°	(a)	(a)
K	SSW	1.9 @ 192°	1.9 @ 192°	4.8 @ 200°	(a)
L	SW	1.2 @ 216°	4.7 @ 228°	(a)	(a)
M	WSW	0.4 @ 244°	3.6 @ 245°	(a)	(a)
N	W	3.1 @ 260°	3.4 @ 260°	(a)	(a)
P	WNW	4.9 @ 283°	(a)	(a)	(a)
Q	NW	4.6 @ 321°	(a)	(a)	(a)
R	NNW	3.8 @ 338°	4.4 @ 334°	3.7 @ 336°	(a)

* Locations are listed by miles and degrees heading relative to true north from center of Unit 1 Containment.

** Area greater than 50 m^2 and contains broadleaf vegetation.

(a) None

APPENDIX B: SUMMARY OF INTERLABORATORY COMPARISONS

Year 2020

INTRODUCTION

The TBE Laboratory analyzed Performance Evaluation (PE) samples of air particulate (AP), air iodine, milk, soil, vegetation, and water matrices for various analytes. The PE samples supplied by Analytics Inc., Environmental Resource Associates (ERA) and Department of Energy (DOE) Mixed Analyte Performance Evaluation Program (MAPEP), were evaluated against the following pre-set acceptance criteria:

A. Analytics Evaluation Criteria

Analytics' evaluation report provides a ratio of TBE's result and Analytics' known value. Since flag values are not assigned by Analytics, TBE evaluates the reported ratios based on internal QC requirements based on the DOE MAPEP criteria.

B. ERA Evaluation Criteria

ERA's evaluation report provides an acceptance range for control and warning limits with associated flag values. ERA's acceptance limits are established per the US EPA, National Environmental Laboratory Accreditation Conference (NELAC), state-specific Performance Testing (PT) program requirements or ERA's SOP for the Generation of Performance Acceptance Limits, as applicable. The acceptance limits are either determined by a regression equation specific to each analyte or a fixed percentage limit promulgated under the appropriate regulatory document.

C. DOE Evaluation Criteria

MAPEP's evaluation report provides an acceptance range with associated flag values. MAPEP defines three levels of performance:

- Acceptable (flag = "A") - result within ± 20% of the reference value
- Acceptable with Warning (flag = "W") - result falls in the ± 20% to ± 30% of the reference value
- Not Acceptable (flag = "N") - bias is greater than 30% of the reference value

Note: The Department of Energy (DOE) Mixed Analyte Performance Evaluation Program (MAPEP) samples are created to mimic conditions found at DOE sites which do not resemble typical environmental samples obtained at commercial nuclear power facilities.

RESULTS

For the TBE laboratory, 126 out of 133 analyses performed met the specified acceptance criteria. Seven analyses did not meet the specified acceptance criteria for the following reasons and were addressed through the TBE Corrective Action Program. A summary is found below:

1. The MAPEP February 2020 AP U-233/234 and U-238 results were evaluated as *Not Acceptable*. The reported value for U-233/234 was 0.0416 ± 0.0102 Bq/sample and the known result was 0.075 Bq/sample (acceptance range 0.053 - 0.098). The reported value for U-238 was 0.0388 ± 0.00991 Bq/sample and the known result was 0.078 Bq/sample (acceptance range 0.055 - 0.101). This sample was run as the workgroup duplicate and had RPD's of 10.4% (U-234) and 11.7% (U-238). After the known results were obtained, the sample was relogged. The filter was completely digested with tracer added originally; the R1 results were almost identical. It was concluded that the recorded tracer amount was actually double, causing the results to be skewed. Lab worksheets have been modified to verify actual tracer amount vs. LIMS data. TBE changed vendors for this cross-check to ERA MRAD during the 2nd half of 2020. Results were acceptable at 97.8% for U-234 and 106% for U-238. (NCR 20-13)

2. The Analytics September 2020 milk Sr-89 result was evaluated as *Not Acceptable*. The reported value was 62.8 pCi/L and the known result was 95.4 (66%). All QC data was reviewed and there were no anomalies. This was the first failure for milk Sr-89 since 2013 and there have only been 3 upper/lower boundary warnings since that time. It is believed that there may have been some Sr-89 loss during sample prep. The December 2020 result was at 92% of the known. (NCR 20-19)

3. The ERA October 2020 water I-131 result was evaluated as *Not Acceptable*. The reported value was 22.9 pCi/L and the known result was 28.2 (acceptance range 23.5 - 33.1). The reported result was 81% of the known, which passes TBE QC criteria. This was the first failure for water I-131. (NCR 20-17)

4. The ERA October 2020 water Gross Alpha and Gross Beta results were evaluated as *Not Acceptable*. The reported/acceptable values and ranges are as follows:

	Reported	Known	Range
Gross Alpha	40.0	26.2	13.3 - 34.7
Gross Beta	47.5	69.1	48.0 - 76.0

   All QC data was reviewed with no anomalies and a cause for failure could not be determined. This was the first failure for water Gross Beta. A Quick Response follow-up cross-check was analyzed as soon as possible with acceptable results at 96.8% for Gross Alpha and 102% for Gross Beta. (NCR 20-18)

5. The MAPEP August 2020 soil Ni-63 result was evaluated as *Not Acceptable*. The reported value was 438 ± 21.1 Bq/kg and the known result was 980 Bq/kg (acceptance range 686 - 1274). It is believed that some Ni-63 loss occurred during the sample prep step. (NCR 20-20)

The Inter-Laboratory Comparison Program provides evidence of "in control" counting systems and methods, and that the laboratories are producing accurate and reliable data.

A.1 Analytics Environmental Radioactivity Cross Check Program
Teledyne Brown Engineering Environmental Services

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Value	Known Value [(a)]	Ratio of TBE to Known Result	Evaluation [(b)]
September 2020	E13247	Milk	Sr-89	pCi/L	62.8	95.4	0.66	N[(1)]
			Sr-90	pCi/L	12.0	12.8	0.94	A
	E13248	Milk	Ce-141	pCi/L	156	150	1.04	A
			Co-58	pCi/L	172	180	0.96	A
			Co-60	pCi/L	369	379	0.97	A
			Cr-51	pCi/L	372	372	1.00	A
			Cs-134	pCi/L	171	200	0.85	A
			Cs-137	pCi/L	241	250	0.96	A
			Fe-59	pCi/L	217	200	1.08	A
			I-131	pCi/L	84.6	95.0	0.89	A
			Mn-54	pCi/L	175	180	0.97	A
			Zn-65	pCi/L	252	270	0.93	A
	E13249	Charcoal	I-131	pCi	70.2	75.8	0.93	A
	E13250	AP	Ce-141	pCi	101	101	1.00	A
			Co-58	pCi	111	120	0.92	A
			Co-60	pCi	249	254	0.98	A
			Cr-51	pCi	287	249	1.15	A
			Cs-134	pCi	114	134	0.85	A
			Cs-137	pCi	159	168	0.95	A
			Fe-59	pCi	127	134	0.95	A
			Mn-54	pCi	114	121	0.94	A
			Zn-65	pCi	168	181	0.93	A
	E13251	Soil	Ce-141	pCi/g	0.241	0.191	1.26	W
			Co-58	pCi/g	0.211	0.228	0.93	A
			Co-60	pCi/g	0.466	0.481	0.97	A
			Cr-51	pCi/g	0.450	0.472	0.95	A
			Cs-134	pCi/g	0.273	0.254	1.07	A
			Cs-137	pCi/g	0.370	0.390	0.95	A
			Fe-59	pCi/g	0.233	0.254	0.92	A
			Mn-54	pCi/g	0.217	0.229	0.95	A
			Zn-65	pCi/g	0.368	0.343	1.07	A
	E13252	AP	Sr-89	pCi	79.9	100.0	0.80	A
			Sr-90	pCi	12.1	13.4	0.90	A

(a) The Analytics known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation

(b) Analytics evaluation based on TBE internal QC limits:

A = Acceptable - reported result falls within ratio limits of 0.80-1.20

W = Acceptable with warning - reported result falls within 0.70-0.80 or 1.20-1.30

N = Not Acceptable - reported result falls outside the ratio limits of < 0.70 and > 1.30

*(1) See **NCR 20-19***

A.1 Analytics Environmental Radioactivity Cross Check Program
Teledyne Brown Engineering Environmental Services

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Value	Known Value [a]	Ratio of TBE to Known Result	Evaluation [b]
December 2020	E13254	Milk	Sr-89	pCi/L	82.2	89.7	0.92	A
			Sr-90	pCi/L	12.4	13.0	0.96	A
	E13255	Milk	Ce-141	pCi/L	91.1	100	0.91	A
			Co-58	pCi/L	77.5	84.3	0.92	A
			Co-60	pCi/L	147	152	0.97	A
			Cr-51	pCi/L	259	253	1.02	A
			Cs-134	pCi/L	97.1	108	0.90	A
			Cs-137	pCi/L	117	127	0.92	A
			Fe-59	pCi/L	114	112	1.02	A
			I-131	pCi/L	84.3	91.9	0.92	A
			Mn-54	pCi/L	137	143	0.96	A
			Zn-65	pCi/L	175	190	0.92	A
	E13256	Charcoal	I-131	pCi	70.2	78.2	0.90	A
	E13257A	AP	Ce-141	pCi	67.4	74.6	0.90	A
			Co-58	pCi	57.9	62.9	0.92	A
			Co-60	pCi	108	113	0.95	A
			Cr-51	pCi	162	189	0.86	A
			Cs-134	pCi	68.1	80.4	0.85	A
			Cs-137	pCi	82.4	95.0	0.87	A
			Fe-59	pCi	80.5	83.7	0.96	A
			Mn-54	pCi	102	107	0.95	A
			Zn-65	pCi	115	142	0.81	A
	E13258	Soil	Ce-141	pCi/g	0.167	0.170	0.98	A
			Co-58	pCi/g	0.125	0.143	0.87	A
			Co-60	pCi/g	0.245	0.257	0.95	A
			Cr-51	pCi/g	0.393	0.429	0.92	A
			Cs-134	pCi/g	0.147	0.183	0.80	A
			Cs-137	pCi/g	0.260	0.288	0.90	A
			Fe-59	pCi/g	0.199	0.190	1.05	A
			Mn-54	pCi/g	0.229	0.243	0.94	A
			Zn-65	pCi/g	0.320	0.322	0.99	A
	E13259	AP	Sr-89	pCi	85.0	78.6	1.08	A
			Sr-90	pCi	13.1	11.4	1.15	A

(a) The Analytics known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation

(b) Analytics evaluation based on TBE internal QC limits:

A = Acceptable - reported result falls within ratio limits of 0.80-1.20

W = Acceptable with warning - reported result falls within 0.70-0.80 or 1.20-1.30

N = Not Acceptable - reported result falls outside the ratio limits of < 0.70 and > 1.30

A.2 DOE's Mixed Analyte Performance Evaluation Program (MAPEP)
Teledyne Brown Engineering Environmental Services

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Value	Known Value [(a)]	Acceptance Range	Evaluation [(b)]
February 2020	20-GrF42	AP	Gross Alpha	Bq/sample	0.676	1.24	0.37 - 2.11	A
			Gross Beta	Bq/sample	2.03	2.00	1.00 - 3.00	A
	20-MaS42	Soil	Ni-63	Bq/kg	0.01		*(1)*	A
			Sr-90	Bq/kg	348	340	238 - 442	A
	20-MaW42	Water	Ni-63	Bq/L	11.6	11.1	7.8 - 14.4	A
			Pu-238	Bq/L	0.926	0.94	0.66 - 1.22	A
			Pu-239/240	Bq/L	0.712	0.737	0.516 - 0.958	A
	20-RdF42	AP	U-234/233	Bq/sample	0.0416	0.075	0.053 - 0.098	N[(3)]
			U-238	Bq/sample	0.0388	0.078	0.055 - 0.101	N[(3)]
	20-RdV42	Vegetation	Cs-134	Bq/sample	3.23	3.82	2.67 - 4.97	A
			Cs-137	Bq/sample	2.64	2.77	1.94 - 3.60	A
			Co-57	Bq/sample	0.0281		*(1)*	A
			Co-60	Bq/sample	2.62	2.79	1.95 - 3.63	A
			Mn-54	Bq/sample	4.3	4.58	3.21 - 5.95	A
			Sr-90	Bq/sample	0.396	0.492	0.344 - 0.640	A
			Zn-65	Bq/sample	3.93	3.79	2.65 - 4.93	A
August 2020	20-GrF43	AP	Gross Alpha	Bq/sample	0.267	0.528	0.158 - 0.989	A
			Gross Beta	Bq/sample	0.939	0.915	0.458 - 1.373	A
	20-MaS43	Soil	Ni-63	Bq/kg	438	980	686 - 1274	N[(4)]
			Tc-99	Bq/kg	1.11		*(1)*	A
	20-MaW43	Water	Ni-63	Bq/L	0.175		*(1)*	A
			Tc-99	Bq/L	8.8	9.4	6.6 - 12.2	A
	20-RdV43	Vegetation	Cs-134	Bq/sample	3.635	4.94	3.46 - 6.42	W
			Cs-137	Bq/sample	0.0341		*(1)*	A
			Co-57	Bq/sample	5.855	6.67	4.67 - 8.67	W
			Co-60	Bq/sample	3.122	4.13	2.89 - 5.37	W
			Mn-54	Bq/sample	4.524	5.84	4.09 - 7.59	A
			Sr-90	Bq/sample	1.01	1.39	0.97 - 1.81	W
			Zn-65	Bq/sample	4.706	6.38	4.47 - 8.29	W

(a) The MAPEP known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation

(b) DOE/MAPEP evaluation:

A = Acceptable - reported result falls within ratio limits of 0.80-1.20

W = Acceptable with warning - reported result falls within 0.70-0.80 or 1.20-1.30

N = Not Acceptable - reported result falls outside the ratio limits of < 0.70 and > 1.30

(1) False positive test

(2) Sensitivity evaluation

*(3) See **NCR 20-13***

*(4) See **NCR 20-20***

A.3 ERA Environmental Radioactivity Cross Check Program
Teledyne Brown Engineering Environmental Services

Month/Year	Identification Number	Matrix	Nuclide	Units	TBE Value	Known Value [a]	Acceptance Limits	Evaluation [b]
March 2020	MRAD-32	Water	Am-241	pCi/L	52.5	45.3	31.1 - 57.9	A
			Fe-55	pCi/L	155	152	89.3 - 221	A
			Pu-238	pCi/L	34.0	36.4	21.9 - 47.2	A
			Pu-239	pCi/L	30.9	33.6	20.8 - 41.4	A
April 2020	RAD-121	Water	Ba-133	pCi/L	41.8	41.8	34.0- 46.7	A
			Cs-134	pCi/L	42.9	46.3	37.1 - 50.9	A
			Cs-137	pCi/L	226	234	211 - 259	A
			Co-60	pCi/L	52.4	50.3	45.3 - 57.9	A
			Zn-65	pCi/L	83.3	86.8	78.1 - 104	A
			GR-A	pCi/L	20.1	23.6	11.9 - 31.6	A
			GR-B	pCi/L	45.6	60.5	41.7 - 67.2	A
			U-Nat	pCi/L	18.45	18.6	14.9 - 20.9	A
			H-3	pCi/L	14200	14100	12300 - 15500	A
			Sr-89	pCi/L	58.0	60.1	48.3 - 67.9	A
			Sr-90	pCi/L	34.1	44.7	33.0 - 51.2	A
			I-131	pCi/L	27.4	28.9	24.1 - 33.8	A
September 2020	MRAD-33	Soil	Sr-90	pCi/Kg	4360	4980	1550 - 7760	A
		AP	Fe-55	pCi/Filter	189	407	149 - 649	A
			U-234	pCi/Filter	17.9	18.3	13.6 - 21.4	A
			U-238	pCi/Filter	19.1	18.1	13.7 - 21.6	A
		Water	Am-241	pCi/L	160	176	121 - 225	A
			Fe-55	pCi/L	299	298	175 - 433	A
			Pu-238	pCi/L	200	191	115 - 247	A
			Pu-239	pCi/L	105	100	61.9 - 123	A
October 2020	RAD-123	Water	Ba-133	pCi/L	37.1	37.0	29.8 - 41.6	A
			Cs-134	pCi/L	50.6	52.7	42.5 - 58.0	A
			Cs-137	pCi/L	131	131	118 - 146	A
			Co-60	pCi/L	62.9	60.5	54.4 - 69.1	A
			Zn-65	pCi/L	167	162	146 - 191	A
			GR-A	pCi/L	40.0	26.2	13.3 - 34.7	N(1)
			GR-B	pCi/L	47.5	69.1	48.0 - 76.0	N(1)
			U-Nat	pCi/L	17.2	20.3	16.3 - 22.7	A
			H-3	pCi/L	23800	23200	20,300 - 25,500	A
			Sr-89	pCi/L	41.1	43.3	33.4 - 50.5	A
			Sr-90	pCi/L	28.5	30.2	22.0 - 35.0	A
			I-131	pCi/L	22.9	28.2	23.5 - 33.1	N(2)
November 2020	QR111920K	Water	GR-A	pCi/L	50.7	52.4	27.3 - 65.6	A
			GR-B	pCi/L	24.9	24.3	15.0 - 32.3	A

(a) The ERA known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation.

(b) ERA evaluation:

A = Acceptable - Reported value falls within the Acceptance Limits

N = Not Acceptable - Reported value falls outside of the Acceptance Limits

*(1) See **NCR 20-18***

*(2) See **NCR 20-17***