VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

April 26, 2014

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

Serial No. 14-192
SS&L/JSA R0
Docket Nos. 50-280
50-281
72-2
72-55
License Nos. DPR-32
DPR-37
SNM-2501

Gentlemen:

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, 2013 through December 31, 2013, which includes environmental monitoring for the Surry ISFSI.

If you have any further questions, please contact Jason Eggart at 757-365-2010.

Sincerely,

Douglas C. Lawrence
Director Safety & Licensing
Surry Power Station

Attachment

Commitments made in this letter: None

IE25
NMSS26

Serial No. 14-192
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72-2
72-55

cc: U. S. Nuclear Regulatory Commission
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Serial No. 14-192
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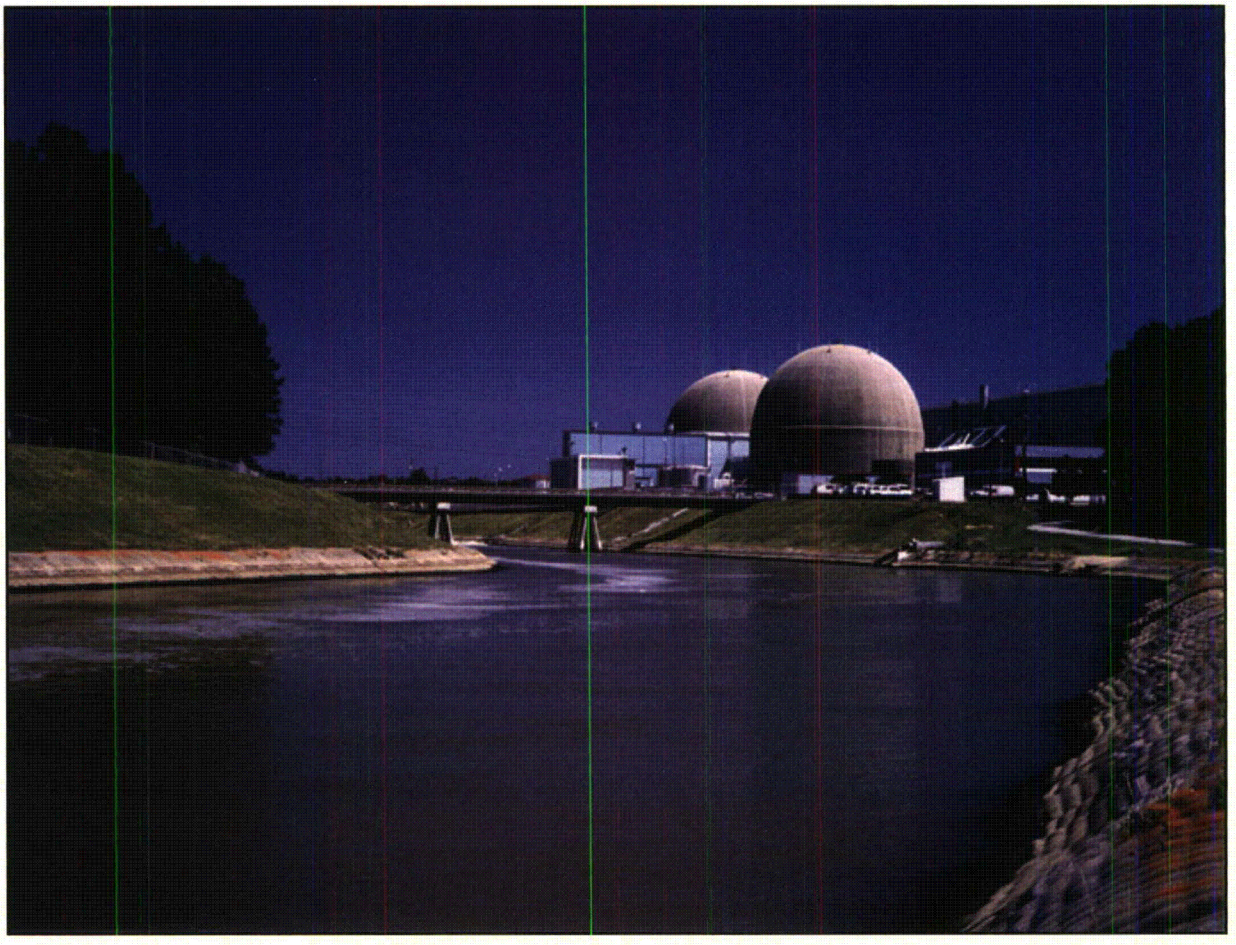
ATTACHMENT 1

2013 Annual Radiological Environmental Operating Report

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

Surry Power Station



2013 Annual Radiological Environmental Operating Report

Dominion®

Dominion

Surry Power Station

Radiological Environmental Monitoring Program

January 1, 2013 to December 31, 2013

Annual Radiological Environmental Operating Report

Surry Power Station

January 1, 2013 to December 31, 2013

Prepared by: _____
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PREFACE

This report is submitted as required by Technical Specification 6.6.B.2, Annual Radiological Environmental Operating Report, for Surry, Units 1 and 2, Virginia Electric and Power Company Docket Nos. 50-280 and 50-281.

1. EXECUTIVE SUMMARY

This document is a detailed report of the 2013 Surry Power Station Radiological Environmental Monitoring Program (REMP). Radioactivity levels from January 1 through December 31, 2013, 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. A number of 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 Global Dosimetry Solutions, Inc. 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 2013 airborne results were similar 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 potassium-40, 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. Tritium was detected in one of eight river water samples at 5.4% of the USNRC reporting level, that sample being from the discharge canal. No other man-made radionuclides were detected in river water. Silt samples indicated the presence of cesium-137 and naturally occurring radionuclides. The cesium-137 activity was present in the control and indicator locations and is attributable to global fallout from past nuclear weapons testing and nuclear accidents such as Chernobyl. Shoreline sediment, which may provide a direct exposure pathway, contained no station related radionuclides. Naturally occurring radionuclides such as potassium-40, 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 2013 milk samples and has not been detected in milk prior to or since the 1986 Chernobyl accident. Strontium-90 was also not detected in milk samples in 2013. No man-made radionuclides were detected in food product samples. Consistent with historical data, naturally occurring potassium-40 was detected in milk and food products. The direct exposure pathway measures environmental radiation doses using TLDs. TLD results have remained relatively constant over the years.

During 2013, 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 2013 was 0.129 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 also demonstrate the adequacy of radioactive effluent controls at Surry Power Station.

2. PROGRAM DESCRIPTION

2.1 Introduction

This report documents the 2013 Surry Power Station operational Radiological Environmental Monitoring Program (REMP). The Dominion 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 is 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. Global Dosimetry Solutions Incorporated 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 2013 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 2013 sampling program for Surry Power Station. All samples listed in Table 2-1 are taken at indicator locations except those labeled "control." Dominion personnel collect all samples listed in Table 2-1.

Table 2-2 summarizes the analysis program conducted by Teledyne Brown Engineering and Global Dosimetry Solutions for Surry Power Station. All samples, with the exception of the TLDs, are shipped to Teledyne Brown Engineering, located in Knoxville, TN, for analysis. The TLDs are shipped to Global Dosimetry Solutions, located in Costa Mesa, CA, for processing.

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

Table 2-1

SURRY - 2013

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 mile
	Route 633	(21)	4.9	SW	227°	Quarterly	Apx. 5 mile
	Alliance	(22)	5.1	WSW	247°	Quarterly	Apx. 5 mile
	Surry	(23)	7.7	WSW	256°	Quarterly	Population Center
	Route 636 and 637	(24)	4.0	W	270°	Quarterly	Apx. 5 mile
	Scotland Wharf	(25)	5.0	WNW	284°	Quarterly	Apx. 5 mile
	Jamestown	(26)	6.3	NW	308°	Quarterly	Apx. 5 mile
	Colonial Parkway	(27)	3.8	NNW	333°	Quarterly	Apx. 5 mile
	Route 617 and 618	(28)	4.9	NNW	340°	Quarterly	Apx. 5 mile
	Kingsmill	(29)	4.6	N	2°	Quarterly	Apx. 5 mile
	Williamsburg	(30)	7.8	N	0°	Quarterly	Population Center
	Kingsmill North	(31)	5.5	NNE	12°	Quarterly	Apx. 5 mile
	Budweiser	(32)	5.8	NNE	27°	Quarterly	Population Center
	Water Plant	(33)	5.0	NE	46°	Quarterly	Apx. 5 mile

Table 2-1

SURRY - 2013
RADIOLOGICAL SAMPLING STATIONS
DISTANCE AND DIRECTION FROM UNIT NO. 1

Sample Media	Location	Station	Distance Miles	Direction	Degrees	Collection Frequency	Remarks
Environmental	BASF	(34)	5.1	ENE	70°	Quarterly	Apx. 5 mile
TLDs	Lee Hall	(35)	7.1	ENE	75°	Quarterly	Population Center
	Goose Island	(36)	5.1	E	90°	Quarterly	Apx. 5 mile
	Fort Eustis	(37)	4.9	ESE	104°	Quarterly	Apx. 5 mile
	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 mile
	Route 628	(43)	5.1	S	177°	Quarterly	Apx. 5 mile
Air Charcoal	Surry Station	(SS)	0.3	NNE	18°	Weekly	Site boundary location with highest D/Q
and **Particulate**	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	Hog Island Reserve	(HIR)	0.6	N	7°	Semi-Annually	
Sediment	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)	1.3	NNW	341°	Semi-Annually	

Table 2-1

SURRY - 2013

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	
	Williams	(WMS)	27.5	S	175°	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	
	Lawne's Creek	(LC)	2.4	SE	131°		
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	Brock's Farm	(BROCK)	3.8	S	183°	Annually	
(Corn, Peanuts, Soybeans)	Slade's Farm	(SLADE)	3.2	S	179°	Annually	

Table 2-2

SURRY - 2013

SAMPLE ANALYSIS PROGRAM

SAMPLE MEDIA	FREQUENCY	ANALYSIS	LLD*	REPORT UNITS
Thermoluminescent Dosimetry (TLD)	Quarterly	Gamma Dose	2	mR/Std. Month
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 - 2013

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 - 2013

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 ar 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

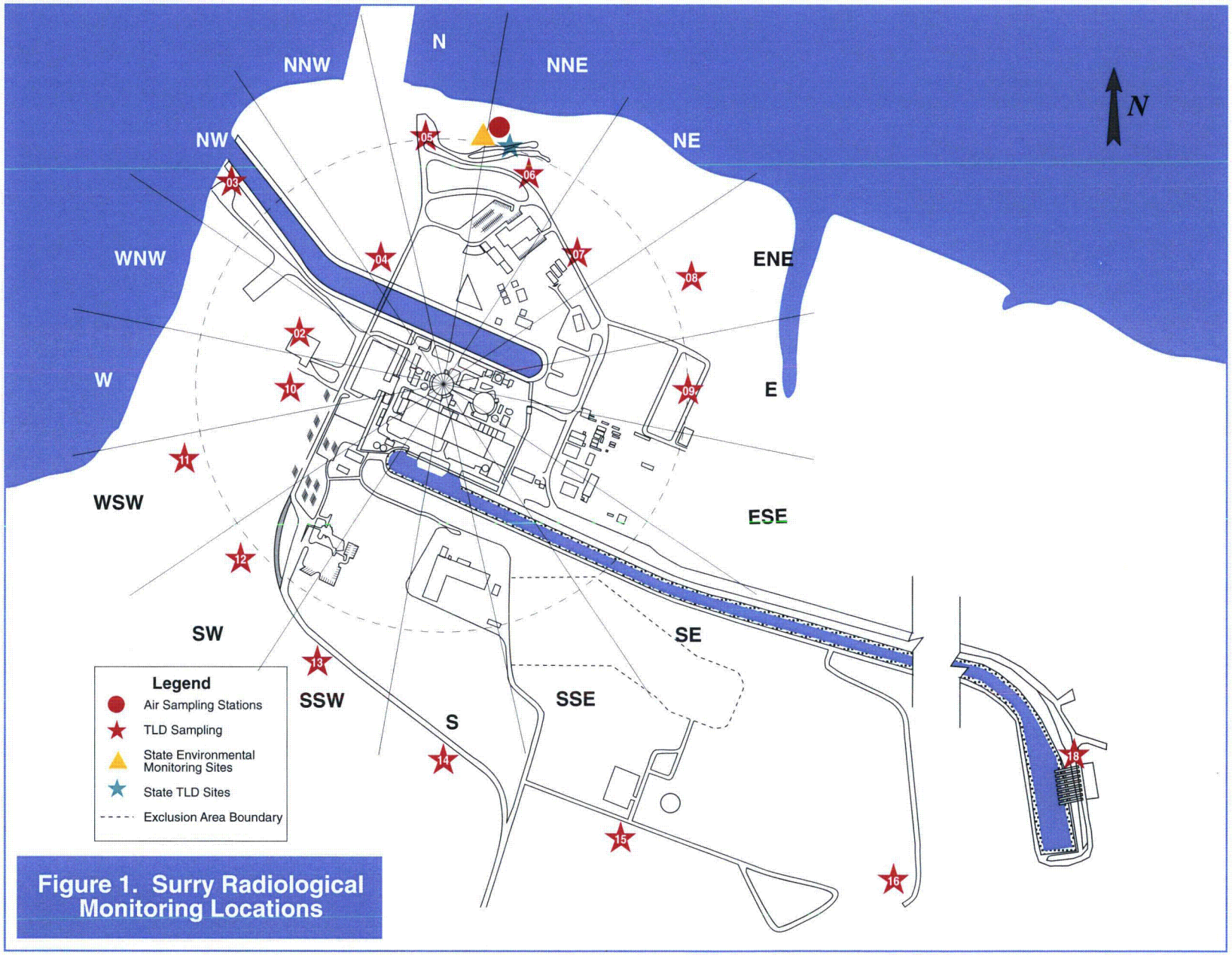

Figure 1. Surry Radiological Monitoring Locations

Graphics No. SV645F

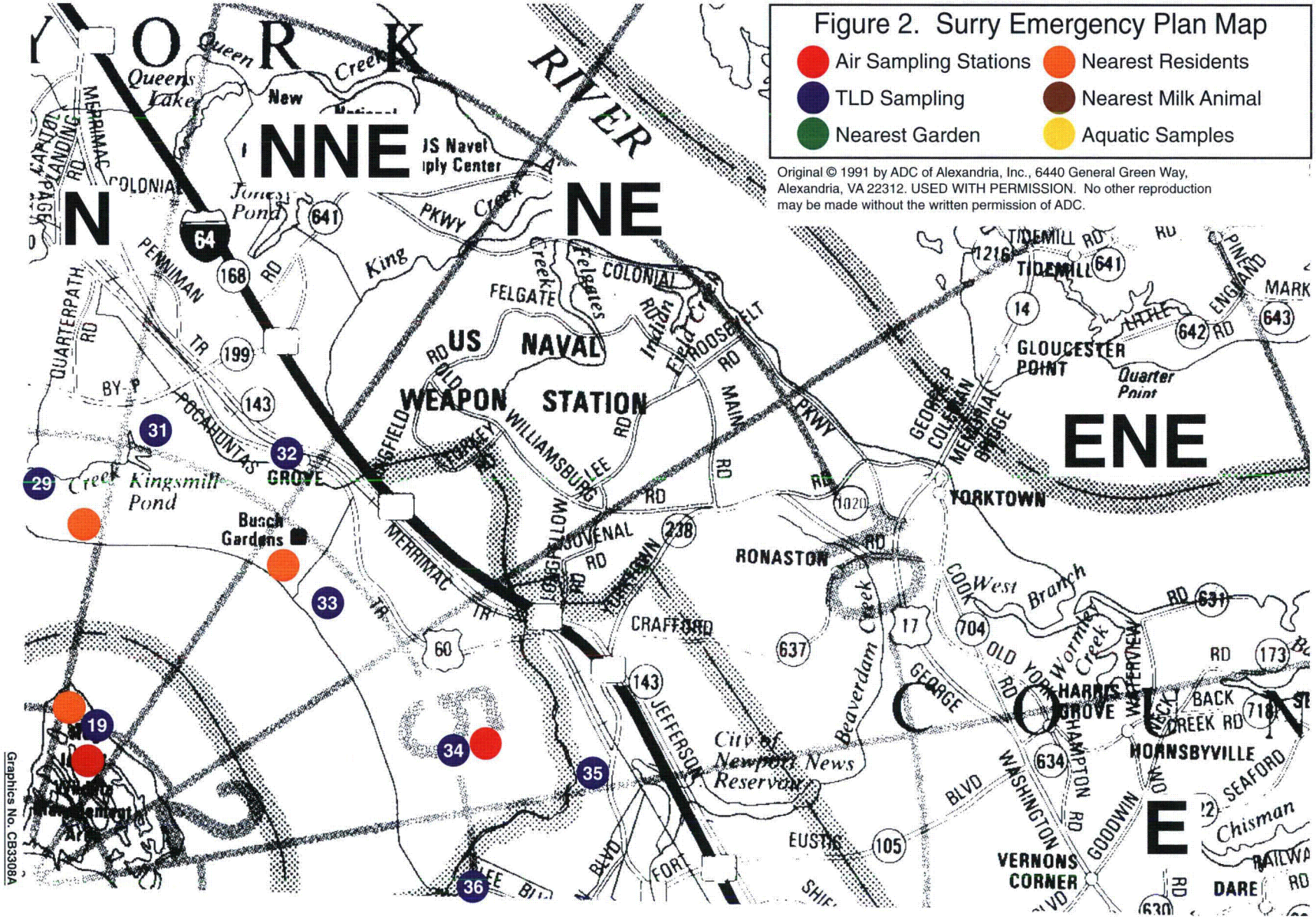
Figure 2. Surry Emergency Plan Map
Air Sampling Stations
Nearest Residents
TLD Sampling
Nearest Milk Animal
Nearest Garden
Aquatic Samples
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NNE
NE
ENE
E
N
US NAVAL WEAPON STATION
YORKTOWN
GLOUCESTER POINT
RONASTON
CRAFFORD
HORNSBYVILLE
VERNONS CORNER
City of Newport News Reservoir
Kingsmill Pond
Busch Gardens
Graphics No. CB3308A

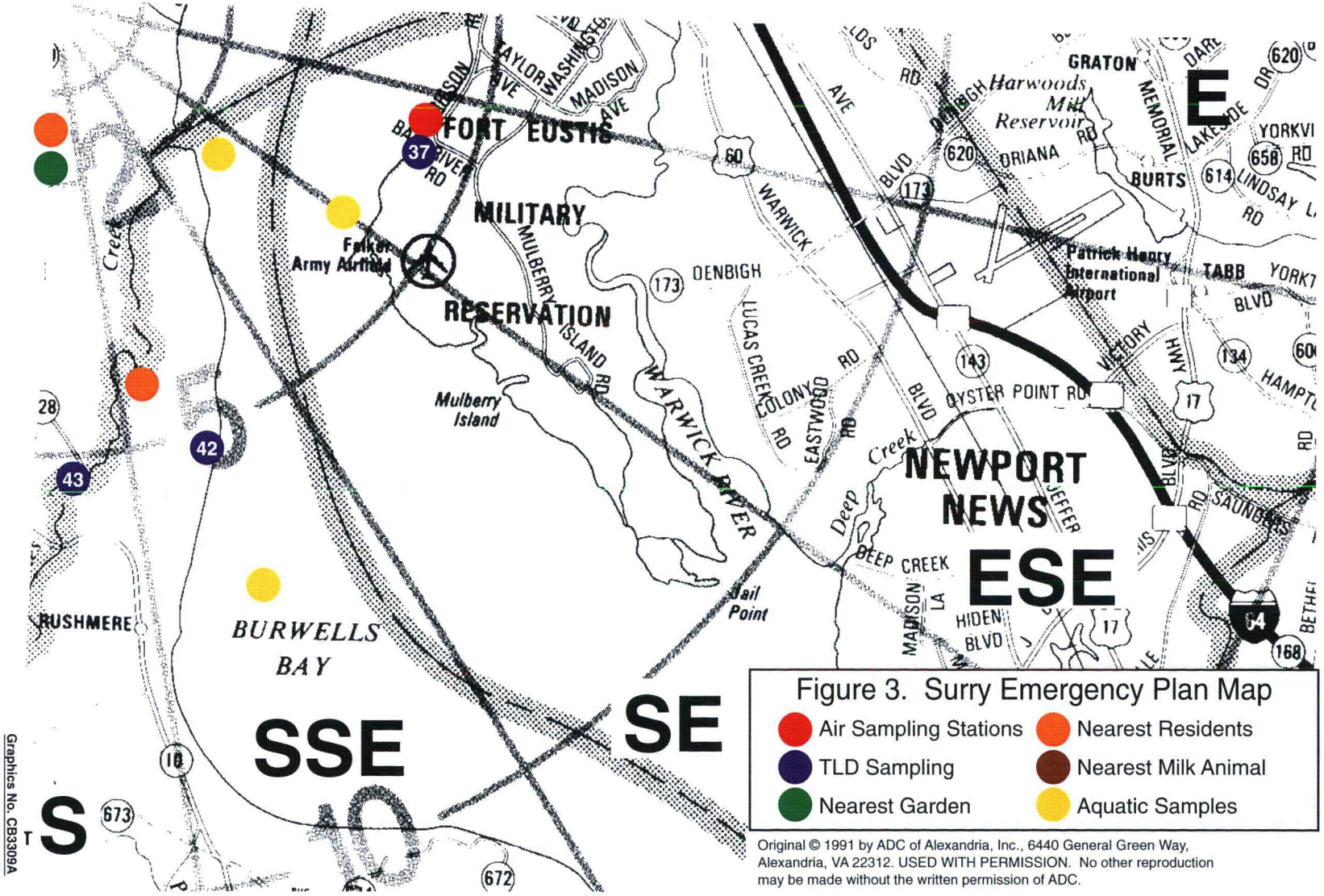


Figure 3. Surry Emergency Plan Map

- Air Sampling Stations
- Nearest Residents
- TLD Sampling
- Nearest Milk Animal
- Nearest Garden
- Aquatic Samples

Graphics No. CB3309A

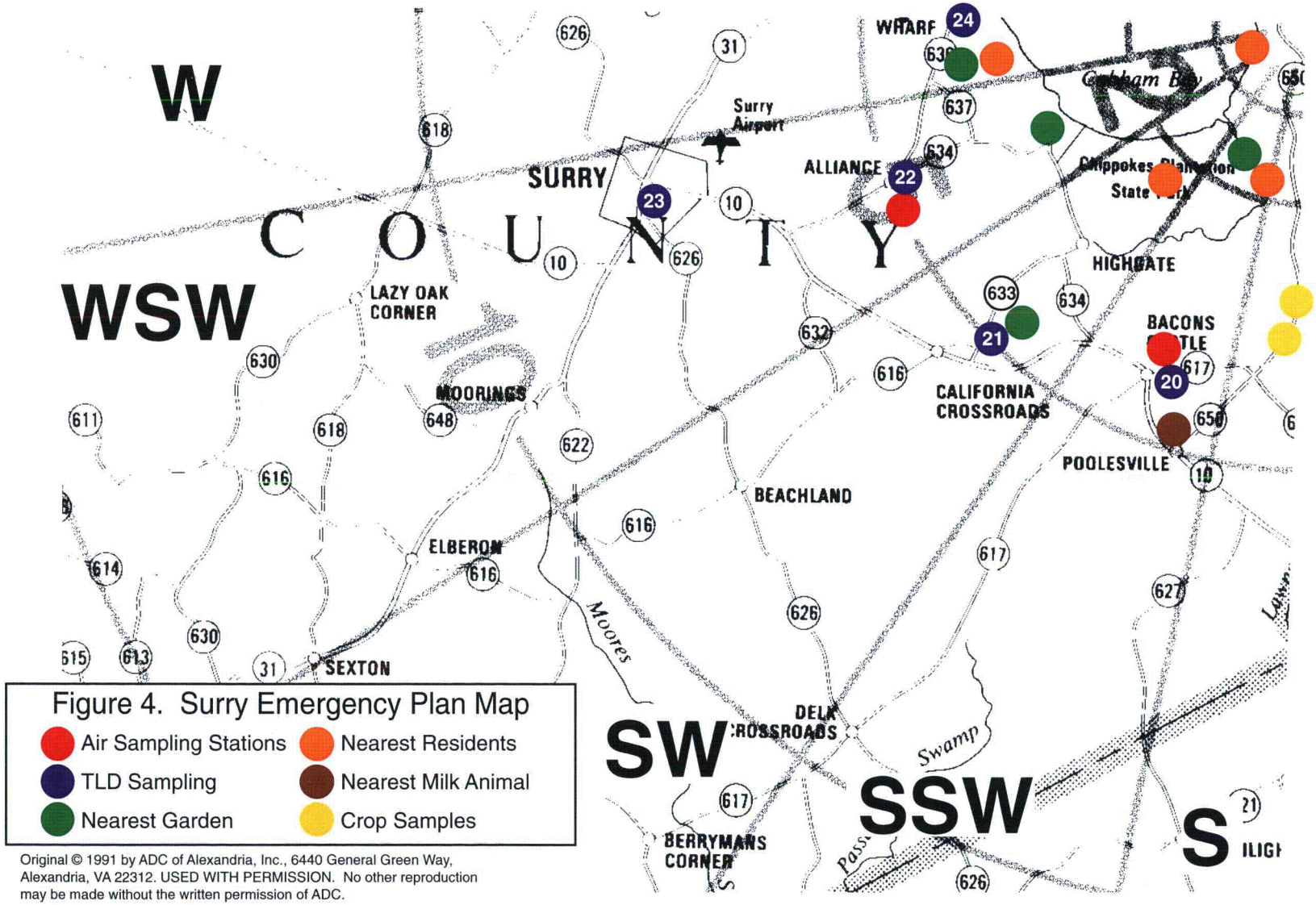
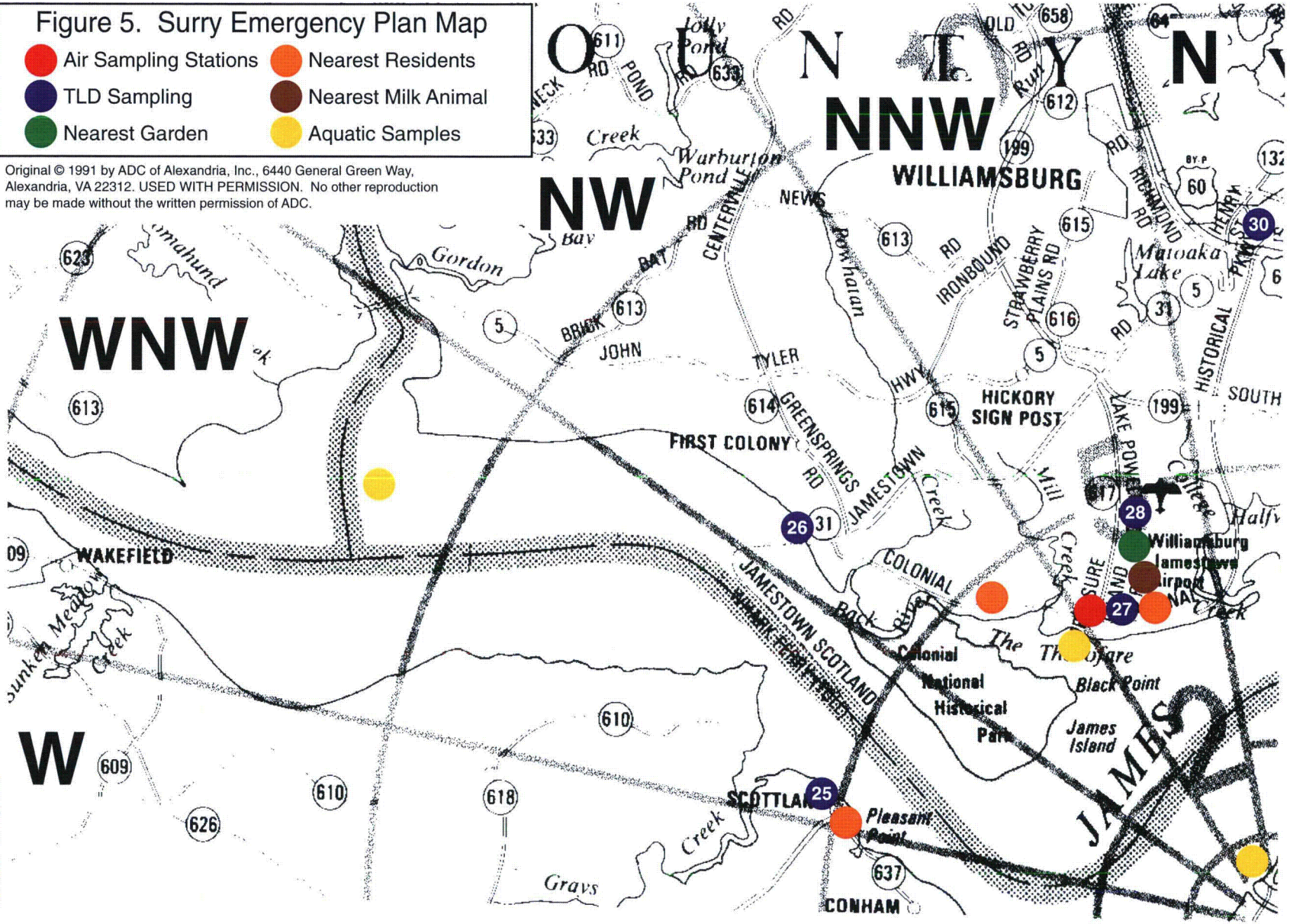


Figure 4. Surry Emergency Plan Map

- Air Sampling Stations
- Nearest Residents
- TLD Sampling
- Nearest Milk Animal
- Nearest Garden
- Crop Samples

Figure 5. Surry Emergency Plan Map

- Air Sampling Stations
- TLD Sampling
- Nearest Garden
- Nearest Residents
- Nearest Milk Animal
- Aquatic Samples



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 given in Section 4.

TABLE 3-1: RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

Surry Power Station, Surry County, Virginia - 2013
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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 Month)*	**Gamma**	164	2	**5.5 (146/152) (3.9 - 7.9)**	**STA-9**	**0.3 mi E**	**7.8 (4/4) (7.6 - 7.9)**	**5.8 (12/12) (4.3 - 7.5)**	0
Air Particulate *(1E-3 pCi/m3)*	**Gross Beta**	416	10	**14.0 (364/364) (4.71 - 36.0)**	**ALL**	**5.1 mi WSW**	**15.5 (52/52) (5.71 - 31.3)**	**15.2 (52/52) (6.20 - 36.7)**	0
	Gamma	32							
	Be-7	32		**117 (28/28) (63.8 - 166)**	**ALL**	**5.1 mi WSW**	**134 (4/4) (105 - 166)**	**119 (4/4) (92.0 - 147)**	0
	K-40	32		**35.1 (3/28) (21.9 - 57.5)**	**HIR**	**2.0 mi NNE**	**57.5 (1/4) (57.5 - 57.5)**	< 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		< LLD	N/A		< LLD	< LLD	0
	Gamma	36							
	K-40	36		**1328 (24/24) (977 - 1460)**	**CP**	**3.7 mi NNW**	**1338 (12/12) (1220 - 1460)**	**1302 (12/12) (1160 - 1420)**	0
	Th-228	36		**9.07 (1/24) (9.07 - 9.07)**	**WMS**	**27.5 mi S**	**16.5 (1/24) (16.5 - 16.5)**	**16.5 (1/12) (16.5 - 16.5)**	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

TABLE 3-1: RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

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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
Milk *(pCi/Liter)*	**Gamma**	36							
	La-140	36	15	< LLD	N/A		< LLD	< LLD	0
Food Products *(pCi/kg wet)*	**Gamma**	3							
	K-40	3		**7377 (3/3) (2980 - 14500)**	**Slade**	**3.2 mi S**	**14500 (1/1) (14500-14500)**	N/A	0
	Be-7	3		**201 (1/3) (201 - 201)**	**Brock**	**3.8 mi S**	**201 (1/3) (201 - 201)**	N/A	
	Th-228	3		**17.5 (2/3) (12.4 - 22.5)**	**Brock**	**3.8 mi S**	**22.5 (1/2) (22.5 - 22.5)**		
	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

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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	**1610 (1/4) (1610 - 1610)**	**SD**	**0.4 mi NW**	**1610 (1/4) (1610 - 1610)**	N/A	0
	Gamma	24							
	K-40	24		**89.2 (9/12) (54.1 - 125)**	**SD**	**0.4 mi NW**	**89.2 (9/12) (54.1 - 125)**	**70.1 (5/12) (52.9 - 88.6)**	0
	Ra-226	24		< LLD	**SW**	**4.9 mi WNW**	**77.5 (1/12) (77.5 - 77.5)**	**77.5 (1/12) (77.5 - 77.5)**	0
	Th-228	24		**6.58 (1/12) (6.58 - 6.58)**	**SD**	**0.4 mi NW**	**6.58 (1/12) (6.58 - 6.58)**	< 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

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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**	4							
	Be-7	4		**1780 (1/2) (1780 - 1780)**	**SD**	**1.3 mi NNW**	**1780 (1/2) (1780 - 1780)**	< LLD	0
	K-40	4		**17800 (2/2) (15400-20200)**	**SD**	**1.3 mi NNW**	**17800 (2/2) (15400-20200)**	**18050 (2/2) (17200-18900)**	0
	Cs-134	4	150	< LLD	N/A		< LLD	< LLD	0
	Cs-137	4	180	**142 (2/2) (121 - 163)**	**SD**	**1.3 mi NNW**	**142 (2/2) (121 - 163)**	**206 (2/2) (175 - 206)**	0
	Ra-226	4		**3760 (2/2) (2210 - 5310)**	**SD**	**1.3 mi NNW**	**3760 (2/2) (2210 - 5310)**	**3040 (2/2) (2520 - 3560)**	0
	Ac-228	4		**384 (1/2) (384 - 384)**	**SD**	**1.3 mi NNW**	**384 (1/2) (384 - 384)**	< LLD	
	Th-228	4		**1425 (2/2) (1200 - 1650)**	**SD**	**1.3 mi NNW**	**1425 (2/2) (1200 - 1650)**	**1485 (2/2) (1290 - 1680)**	0
	Th-232	4		**1318 (2/2) (995 - 1640)**	**SD**	**1.3 mi NNW**	**1318 (2/2) (995 - 1640)**	**1205 (2/2) (1040 - 1370)**	0

TABLE 3-1: RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

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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		**6085 (2/2) (5440 - 6730)**	**HIR**	**0.6 mi N**	**6085 (2/2) (5440 - 6730)**	**2410 (2/2) (1970 - 2850)**	0
	Cs-134	4	150	< LLD	N/A		< LLD	< LLD	0
	Cs-137	4	180	< LLD	N/A		< LLD	< LLD	0
	Ra-226	4		< LLD	**CHIC**	**11.2 mi WNW**	**4280 (1/2) (4280 - 4280)**	**4280 (1/2) (4280 - 4280)**	0
	Th-228	4		**223 (2/2) (131 - 314)**	**CHIC**	**11.2 mi WNW**	**2643 (2/2) (415 - 4870)**	**2643 (2/2) (415 - 4870)**	0
	Th-232	4		**235 (1/2) (235 - 235)**	**CHIC**	**11.2 mi WNW**	**2639 (2/2) (398 - 4880)**	**2639 (2/2) (398 - 4880)**	0
Fish *(pCi/kg wet)*	**Gamma**	4							
	K-40	4		**2370 (4/4) (2060 - 2820)**	**SD**	**1.3 mi NNW**	**2370 (4/4) (2060 - 2820)**	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

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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 *(pCi/kg wet)*	**Gamma**	6							
	K-40	6		**728 (4/6) (608 - 943)**	**LC**	**2.4 mi SE**	**841 (2/2) (738 - 943)**	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		**576 (2/4) (473 - 679)**	**JI**	**3.9 mi NW**	**679 (1/2) (679 - 679)**	**461 (1/2) (461 - 461)**	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

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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
Clams *(pCi/kg wet)*	**Gamma**	6							
	Th-228	6		**152 (1/4) (152 - 152)**	**JI**	**3.9 mi NW**	**152 (1/4) (152 - 152)**	**95.2 (1/2) (95.2 - 95.2)**	0
Crabs *(pCi/kg wet)*	**Gamma**	1							
	K-40	1		**2670 (1/1) (2670 - 2670)**	**SD**	**1.3 mi NNW**	**2670 (1/1) (2670 - 2670)**	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 2013 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.

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. Cow 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 - 2013

mR/Std Month ± 2 Sigma

STATION NUMBER	FIRST QUARTER	SECOND QUARTER	THIRD QUARTER	FOURTH QUARTER	AVERAGE ± 2 SIGMA
02	6.2 ± 0.6	6.1 ± 0.5	6.5 ± 1.0	6.9 ± 0.8	6.4 ± 0.7
03	6.4 ± 0.7	6.6 ± 1.5	6.5 ± 1.0	6.6 ± 0.8	6.5 ± 0.2
04	5.8 ± 0.9	5.8 ± 0.4	6.1 ± 0.6	6.3 ± 0.6	6.0 ± 0.5
05	5.9 ± 0.3	6.1 ± 0.6	6.3 ± 1.2	6.4 ± 0.7	6.2 ± 0.4
06	5.9 ± 0.4	5.9 ± 0.8	6.4 ± 1.3	6.3 ± 0.9	6.1 ± 0.5
07	5.9 ± 0.6	5.9 ± 0.4	6.4 ± 0.4	6.4 ± 1.1	6.2 ± 0.6
08	5.4 ± 0.7	5.4 ± 0.8	5.8 ± 0.9	5.8 ± 0.5	5.6 ± 0.5
09	7.8 ± 1.0	7.6 ± 1.2	7.8 ± 0.9	7.9 ± 1.1	7.8 ± 0.3
10	5.9 ± 1.0	6.2 ± 1.1	6.3 ± 1.3	6.4 ± 0.8	6.2 ± 0.4
11	5.1 ± 0.7	5.2 ± 0.2	5.3 ± 0.5	5.5 ± 0.5	5.3 ± 0.3
12	5.3 ± 0.7	5.4 ± 0.3	6.2 ± 1.8	5.9 ± 0.7	5.7 ± 0.8
13	5.7 ± 0.7	6.0 ± 1.2	6.2 ± 0.4	6.3 ± 0.8	6.1 ± 0.5
14	5.6 ± 0.7	6.0 ± 1.1	5.7 ± 1.4	6.4 ± 1.4	5.9 ± 0.7
15	5.8 ± 0.5	6.2 ± 1.4	6.4 ± 0.8	6.4 ± 0.7	6.2 ± 0.6
16	5.4 ± 0.9	5.5 ± 0.6	6.0 ± 0.5	6.0 ± 1.0	5.7 ± 0.6
18	4.6 ± 0.6	4.7 ± 0.4	4.8 ± 0.5	5.0 ± 0.7	4.8 ± 0.3
19	4.9 ± 0.8	4.8 ± 0.4	5.4 ± 0.7	5.3 ± 0.8	5.1 ± 0.6
20	4.7 ± 0.7	4.7 ± 0.5	4.9 ± 0.6	4.9 ± 0.4	4.8 ± 0.2
21	4.7 ± 0.4	4.9 ± 0.7	5.1 ± 0.9	5.3 ± 1.4	5.0 ± 0.5
22	4.3 ± 0.7	4.2 ± 0.4	4.3 ± 0.5	4.4 ± 0.9	4.3 ± 0.2
23	5.8 ± 0.9	5.9 ± 0.6	6.0 ± 0.8	6.1 ± 1.5	6.0 ± 0.3
24	4.6 ± 0.4	4.8 ± 0.6	5.0 ± 0.8	5.1 ± 0.4	4.9 ± 0.4
25	5.6 ± 0.1	6.1 ± 1.1	5.9 ± 0.6	A	5.9 ± 0.5
26	5.7 ± 0.5	5.8 ± 0.3	6.2 ± 1.3	6.3 ± 0.9	6.0 ± 0.6
27	4.6 ± 0.5	4.8 ± 0.5	5.0 ± 0.4	5.0 ± 1.2	4.9 ± 0.4
28	4.7 ± 0.5	4.8 ± 0.7	4.8 ± 0.3	4.9 ± 0.7	4.8 ± 0.2
29	4.2 ± 0.6	4.4 ± 1.0	4.5 ± 0.9	4.7 ± 0.9	4.5 ± 0.4
30	4.6 ± 0.7	5.1 ± 0.6	4.9 ± 0.4	4.9 ± 0.6	4.9 ± 0.4
31	3.9 ± 0.6	4.2 ± 0.6	4.1 ± 0.8	4.5 ± 1.9	4.2 ± 0.5
32	4.8 ± 0.4	5.1 ± 0.6	4.9 ± 0.6	5.0 ± 0.7	5.0 ± 0.3
33	4.5 ± 0.3	4.8 ± 0.4	4.6 ± 0.3	4.9 ± 0.9	4.7 ± 0.4
34	5.1 ± 0.4	5.0 ± 0.5	5.4 ± 0.7	5.4 ± 0.3	5.2 ± 0.4
35	5.5 ± 0.3	5.6 ± 0.9	5.7 ± 0.6	6.0 ± 0.4	5.7 ± 0.4
36	5.9 ± 0.6	6.0 ± 1.6	6.0 ± 0.9	6.3 ± 0.9	6.1 ± 0.3
37	4.9 ± 0.5	4.8 ± 0.7	5.2 ± 0.9	5.3 ± 1.3	5.1 ± 0.5
38	6.9 ± 1.0	7.1 ± 1.7	7.4 ± 0.9	7.4 ± 1.2	7.2 ± 0.5
39-C	4.7 ± 0.6	4.3 ± 0.2	5.0 ± 0.8	5.0 ± 0.4	4.8 ± 0.7
40-C	5.1 ± 0.5	5.1 ± 0.7	5.5 ± 0.9	5.6 ± 0.7	5.3 ± 0.5
41-C	6.8 ± 0.8	7.2 ± 1.6	7.4 ± 1.1	7.5 ± 1.0	7.2 ± 0.6
42	5.0 ± 0.7	4.9 ± 0.9	5.6 ± 1.2	5.7 ± 0.8	5.3 ± 0.8
43	4.5 ± 0.5	4.5 ± 0.8	4.8 ± 1.2	5.2 ± 1.0	4.8 ± 0.7

A - TLD found missing at collection.

TABLE 3-3: GROSS BETA CONCENTRATION IN FILTERED AIR

Surry Power Station, Surry County, Virginia - 2013

1.0E-3 pCi/m3 ± 2 Sigma

COLLECTION DATE	SAMPLING LOCATIONS SS	HIR	BC	ALL	CP	BASF	FE	NN-C
January 08	28.8 ± 3.23	26.0 ± 3.10	30.8 ± 3.36	31.3 ± 3.27	36.0 ± 3.51	32.6 ± 3.32	35.7 ± 3.51	36.7 ± 3.55
January 15	18.3 ± 3.25	15.8 ± 3.11	15.9 ± 3.13	21.0 ± 3.31	26.1 ± 3.61	21.3 ± 33.50	23.0 ± 3.49	19.5 ± 3.36
January 22	13.2 ± 2.74	14.7 ± 2.78	14.6 ± 2.81	17.5 ± 2.92	13.6 ± 2.79	16.3 ± 2.88	15.0 ± 2.85	18.2 ± 3.04
January 29	21.5 ± 3.18	19.4 ± 3.02	20.3 ± 3.10	21.7 ± 3.14	26.2 ± 4.02	19.0 ± 3.01	20.1 ± 3.08	25.9 ± 3.43
February 05	20.2 ± 3.12	16.2 ± 2.87	18.2 ± 3.04	24.3 ± 3.26	23.7 ± 3.86	21.8 ± 3.15	20.0 ± 3.09	20.8 ± 3.17
February 12	12.1 ± 2.80	10.50 ± 2.67	13.6 ± 2.89	15.2 ± 2.92	14.8 ± 2.96	14.5 ± 2.90	13.4 ± 2.86	15.6 ± 3.01
February 19	11.6 ± 2.71	13.0 ± 2.75	13.3 ± 2.81	17.5 ± 2.98	15.1 ± 2.91	14.3 ± 2.82	16.1 ± 2.95	17.0 ± 3.05
February 26	10.8 ± 2.72	11.2 ± 2.71	12.2 ± 2.82	10.1 ± 2.65	10.3 ± 2.72	11.0 ± 2.70	10.7 ± 2.72	11.1 ± 2.79
March 05	6.40 ± 2.33	6.69 ± 2.30	9.14 ± 2.50	9.78 ± 2.49	10.4 ± 2.56	7.87 ± 2.38	8.04 ± 2.41	8.70 ± 2.50
March 12	7.75 ± 2.39	6.75 ± 2.29	7.04 ± 2.34	7.95 ± 2.36	7.07 ± 2.33	9.10 ± 2.44	7.18 ± 2.35	11.0 ± 2.62
March 18	15.7 ± 3.59	11.4 ± 3.32	14.9 ± 3.55	13.4 ± 3.41	13.7 ± 3.47	13.8 ± 3.43	14.2 ± 3.49	16.8 ± 3.69
March 26	9.26 ± 2.32	8.96 ± 2.27	10.1 ± 2.37	12.1 ± 2.44	9.10 ± 2.30	12.7 ± 2.49	13.1 ± 2.53	11.4 ± 2.47
Qtr. Avg. ± 2 s.d.	**14.6 ± 13.07**	**13.4 ± 11.06**	**15.0 ± 12.41**	**16.8 ± 13.72**	**17.2 ± 17.62**	**16.2 ± 13.56**	**16.4 ± 15.46**	**17.7 ± 15.45**
April 02	5.82 ± 2.46	9.06 ± 2.62	10.1 ± 2.72	10.0 ± 2.65	8.45 ± 2.60	8.49 ± 2.57	8.35 ± 2.60	6.97 ± 2.55
April 09	13.9 ± 2.71	14.8 ± 2.73	16.3 ± 2.83	18.8 ± 2.93	17.4 ± 2.87	19.2 ± 2.94	19.6 ± 2.99	19.0 ± 2.97
April 16	12.2 ± 2.61	11.4 ± 2.54	13.0 ± 2.64	13.0 ± 2.61	12.7 ± 2.62	11.2 ± 2.54	10.8 ± 2.52	12.8 ± 2.71
April 23	9.78 ± 2.89	8.88 ± 2.80	11.3 ± 2.97	13.4 ± 3.02	9.94 ± 2.88	13.6 ± 3.04	10.3 ± 2.90	13.4 ± 3.11
April 30	12.9 ± 2.70	11.7 ± 2.61	13.5 ± 2.75	13.7 ± 2.71	11.0 ± 2.58	13.0 ± 2.67	12.0 ± 2.65	14.3 ± 2.83
May 07	6.71 ± 2.41	7.12 ± 2.41	5.42 ± 2.34	5.71 ± 2.30	5.92 ± 2.33	7.95 ± 2.46	5.79 ± 2.35	6.45 ± 2.41
May 14	8.86 ± 2.67	8.93 ± 2.64	12.4 ± 2.89	11.4 ± 2.78	7.29 ± 2.57	10.4 ± 2.72	11.0 ± 2.79	12.3 ± 2.91
May 21	13.6 ± 2.99	13.8 ± 2.95	13.8 ± 2.99	17.6 ± 3.13	13.7 ± 2.97	14.4 ± 2.99	15.9 ± 3.09	17.6 ± 3.19
May 28	8.33 ± 2.40	7.85 ± 2.35	8.50 ± 2.42	12.0 ± 2.60	6.99 ± 2.30	10.3 ± 2.51	8.66 ± 2.43	10.1 ± 2.55
June 04	9.23 ± 2.54	9.46 ± 2.51	9.48 ± 2.54	13.1 ± 2.73	12.3 ± 2.70	8.88 ± 2.48	12.6 ± 2.72	12.3 ± 2.71
June 10	7.98 ± 2.80	5.59 ± 2.59	7.96 ± 2.79	7.07 ± 2.68	7.03 ± 2.75	6.78 ± 2.65	7.27 ± 2.76	8.03 ± 2.82
June 17	12.3 ± 2.78	12.2 ± 2.73	14.4 ± 2.80	15.5 ± 2.81	16.1 ± 3.29	11.2 ± 2.58	14.1 ± 2.81	14.3 ± 2.80
June 24	8.76 ± 2.42	9.78 ± 2.44	8.33 ± 2.40	10.9 ± 2.51	8.2 ± 2.40	12.3 ± 2.61	11.7 ± 2.62	10.2 ± 2.53
Qtr. Avg. ± 2 s.d.	**10.0 ± 5.33**	**10.04 ± 5.26**	**11.1 ± 6.23**	**12.5 ± 7.38**	**10.5 ± 7.37**	**11.4 ± 6.54**	**11.4 ± 7.39**	**12.1 ± 7.58**

TABLE 3-3: GROSS BETA CONCENTRATION IN FILTERED AIR

Surry Power Station, Surry County, Virginia - 2013

1.0E-3 pCi/m3 ± 2 Sigma

COLLECTION DATE	SAMPLING LOCATIONS SS	HIR	BC	ALL	CP	BASF	FE	NN-C
July 02	9.65 ± 2.21	11.0 ± 2.31	8.85 ± 2.22	11.3 ± 2.32	12.7 ± 2.44	11.4 ± 2.33	10.9 ± 2.33	10.5 ± 2.32
July 09	7.00 ± 2.68	4.71 ± 2.41	5.73 ± 2.52	7.63 ± 2.58	6.10 ± 2.53	4.96 ± 2.44	5.11 ± 2.48	6.50 ± 2.59
July 15	6.35 ± 2.55	6.37 ± 2.53	8.26 ± 2.69	7.81 ± 2.61	7.93 ± 2.65	8.53 ± 2.68	8.17 ± 2.68	7.73 ± 2.63
July 23	10.6 ± 2.09	9.33 ± 19.8	10.8 ± 2.08	10.8 ± 2.05	11.2 ± 2.10	12.0 ± 2.14	12.3 ± 2.17	10.3 ± 2.05
July 30	13.3 ± 2.87	9.91 ± 2.62	11.4 ± 2.75	11.8 ± 2.73	10.1 ± 2.68	12.5 ± 2.80	12.1 ± 2.79	13.1 ± 2.84
August 06	18.7 ± 3.03	11.5 ± 2.58	15.3 ± 2.83	16.4 ± 2.86	11.6 ± 2.60	15.6 ± 2.82	18.0 ± 2.96	12.6 ± 2.63
August 13	16.8 ± 3.00	11.1 ± 2.64	12.8 ± 2.84	14.6 ± 2.89	12.9 ± 2.74	14.6 ± 2.84	14.9 ± 2.86	16.0 ± 2.97
August 20	8.68 ± 2.41	5.71 ± 2.16	8.03 ± 2.34	10.2 ± 2.45	8.33 ± 2.34	7.29 ± 2.26	9.66 ± 2.43	9.51 ± 2.41
August 26	14.8 ± 3.06	10.5 ± 2.73	11.4 ± 2.82	13.3 ± 2.89	12.0 ± 2.85	11.9 ± 2.84	12.6 ± 2.90	13.7 ± 2.94
September 03	21.4 ± 3.12	16.3 ± 2.82	18.3 ± 2.95	22.3 ± 3.09	19.2 ± 2.99	16.1 ± 2.83	23.3 ± 3.18	19.9 ± 2.99
September 10	23.7 ± 3.27	16.5 ± 2.84	16.1 ± 2.85	18.1 ± 2.93	17.4 ± 2.92	17.1 ± 2.89	19.9 ± 3.06	17.7 ± 2.91
September 17	26.7 ± 3.47	18.1 ± 3.00	23.4 ± 3.30	22.5 ± 3.21	19.9 ± 3.12	24.0 ± 3.29	24.0 ± 3.32	25.7 ± 3.36
September 24	14.9 ± 2.96	10.3 ± 2.63	10.2 ± 2.66	12.5 ± 2.76	9.38 ± 2.61	10.1 ± 2.62	9.78 ± 2.63	11.8 ± 2.72
Qtr. Avg. ± 2 s.d.	**14.8 ± 12.91**	**10.87 ± 8.22**	**12.4 ± 9.67**	**13.8 ± 9.7**	**12.2 ± 8.57**	**12.8 ± 9.78**	**13.9 ± 11.6**	**13.5 ± 10.57**
October 01	14.6 ± 2.71	9.69 ± 2.34	11.7 ± 2.51	11.5 ± 2.46	12.2 ± 2.53	11.0 ± 2.44	13.5 ± 2.62	13.6 ± 2.57
October 08	31.8 ± 3.62	21.8 ± 3.09	26.4 ± 3.35	31.2 ± 3.55	22.2 ± 3.13	28 ± 3.37	24.2 ± 3.22	27.2 ± 3.33
October 15	6.83 ± 2.51	6.65 ± 2.44	5.09 ± 2.30	8.22 ± 2.49	5.22 ± 2.30	6.39 ± 2.37	6.58 ± 2.42	6.20 ± 2.32
October 22	22.0 ± 3.22	14.8 ± 2.78	16.5 ± 2.92	16.4 ± 2.89	14.6 ± 2.79	17.4 ± 2.93	15.8 ± 2.87	17.2 ± 2.95
October 29	24.0 ± 3.30	16.1 ± 2.86	20.5 ± 3.12	23.1 ± 3.23	18.6 ± 3.02	19.5 ± 3.03	19.8 ± 3.09	23.1 ± 3.21
November 05	27.1 ± 3.37	18.3 ± 2.9	23.2 ± 3.19	26.7 ± 3.32	20.2 ± 3.03	21 ± 3.06	19.8 ± 3.02	25.3 ± 3.22
November 12	17.7 ± 2.89	11.7 ± 2.52	15.7 ± 2.79	17.9 ± 2.88	13.5 ± 2.65	15.1 ± 2.72	15.3 ± 2.74	17.9 ± 2.88
November 19	16.2 ± 2.96	9.13 ± 2.50	10.8 ± 2.64	11.6 ± 2.68	9.16 ± 2.54	9.24 ± 2.55	10.2 ± 2.62	10.5 ± 2.59
November 26	10.1 ± 2.63	8.25 ± 2.45	7.70 ± 2.45	12.4 ± 2.72	9.09 ± 2.53	9.20 ± 2.53	10.0 ± 2.60	11.6 ± 2.67
December 03	25.8 ± 3.48	14.4 ± 2.84	17.1 ± 3.02	22.4 ± 3.26	17.3 ± 3.02	15.9 ± 2.92	15.3 ± 2.91	17.6 ± 3.02
December 10	18.4 ± 3.15	11.0 ± 2.69	15.5 ± 2.98	18.3 ± 3.10	13.9 ± 2.88	14.4 ± 2.89	12.2 ± 2.80	14.7 ± 2.88
December 16	26.9 ± 3.82	17.7 ± 3.29	23.5 ± 3.64	22.1 ± 3.53	22.9 ± 3.60	18.9 ± 3.37	24.4 ± 3.68	22.9 ± 3.58
December 23	17.2 ± 3.10	11.4 ± 2.73	13.1 ± 2.92	17.0 ± 3.10	13.2 ± 2.92	10.3 ± 2.72	12.1 ± 2.86	15.1 ± 2.15
December 31	24.6 ± 2.97	15.4 ± 2.45	19.5 ± 2.67	21.8 ± 2.77	20.5 ± 2.71	18.1 ± 2.57	19.7 ± 2.67	21.1 ± 2.71
Qtr. Avg. ± 2 s.d.	**20.2 ± 14.1**	**13.3 ± 8.66**	**16.2 ± 12.3**	**18.6 ± 12.8**	**15.2 ± 10.7**	**15.3 ± 11.6**	**15.6 ± 10.7**	**17.4 ± 12.0**
Ann. Avg. ± 2 s.d	**15.0 ± 13.73**	**11.90 ± 8.76**	**13.7 ± 10.95**	**15.5 ± 11.9**	**13.7 ± 12.3**	**13.9 ± 11.0**	**14.3 ± 11.8**	**15.2 ± 12.3**

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

Surry Power Station, Surry County, Virginia - 2013

1.0E-3 pCi/m3 ± 2 Sigma

COLLECTION DATE	SAMPLING LOCATIONS							
	SS	HIR	BC	ALL	CP	BASF	FE	NN-C
January 08	14.0 ± 25.2	13.9 ± 25.0	14.2 ± 25.6	13.5 ± 24.3	-6.29 ± 24.6	-6.12 ± 2.39	-6.32 ± 24.7	-6.30 ± 24.6
January 15	3.16 ± 22.2	3.14 ± 22.1	3.16 ± 22.2	3.08 ± 21.7	-6.16 ± 24.3	-6.00 ± 23.7	-6.16 ± 24.3	-6.19 ± 24.5
January 22	5.59 ± 17.0	5.45 ± 16.6	5.55 ± 16.9	5.43 ± 16.5	12.6 ± 16.9	12.2 ± 16.3	12.5 ± 16.6	12.5 ± 16.7
January 29	-4.76 ± 16.9	-4.62 ± 16.4	-4.72 ± 16.7	-4.63 ± 16.4	3.56 ± 19.9	2.71 ± 15.1	2.72 ± 15.2	2.80 ± 15.6
February 05	2.62 ± 19.1	2.55 ± 18.7	2.64 ± 19.3	2.54 ± 18.6	-10.3 ± 21.2	-7.94 ± 16.3	-8.04 ± 16.5	-8.16 ± 16.8
February 12	±	±	±	±	±	±	±	±
February 19	-14.6 ± 13.9	-14.4 ± 13.6	-14.7 ± 13.9	-14.3 ± 13.6	-7.30 ± 15.1	-7.10 ± 14.7	-7.24 ± 15.0	-7.39 ± 15.3
February 26	6.77 ± 18.1	6.65 ± 17.7	6.82 ± 18.2	6.64 ± 17.7	-2.83 ± 16.7	-2.76 ± 16.2	-2.80 ± 16.5	-2.85 ± 16.8
March 05	-13.6 ± 21.3	-13.3 ± 20.8	-13.6 ± 21.3	-13.3 ± 20.7	7.00 ± 13.3	6.87 ± 13.1	6.94 ± 13.2	7.09 ± 13.5
March 12	0.55 ± 10.0	0.54 ± 9.80	0.55 ± 10.0	0.54 ± 9.76	7.68 ± 22.8	7.57 ± 22.5	7.69 ± 22.9	7.80 ± 23.2
March 18	-1.09 ± 15.1	-1.07 ± 14.8	-1.09 ± 15.1	-1.06 ± 14.7	6.24 ± 17.9	6.14 ± 17.6	6.22 ± 17.8	6.33 ± 18.1
March 26	-6.94 ± 11.3	-6.81 ± 11.2	-6.96 ± 11.3	-6.78 ± 11.0	9.48 ± 12.9	9.39 ± 12.7	9.45 ± 12.8	9.60 ± 13.0
April 02	-4.38 ± 17.1	-4.30 ± 16.7	-4.38 ± 17.1	-4.25 ± 16.6	-9.71 ± 21.1	-9.55 ± 20.8	-9.72 ± 21.1	-9.83 ± 21.4
April 09	-11.0 ± 22.3	-10.8 ± 21.9	-10.9 ± 22.1	-10.7 ± 21.7	9.82 ± 22.3	9.67 ± 23.0	9.81 ± 23.3	9.79 ± 23.2
April 16	-4.35 ± 12.5	-4.32 ± 12.4	-4.31 ± 12.4	-4.24 ± 12.2	0.84 ± 13.2	0.85 ± 13.3	0.85 ± 13.3	0.87 ± 13.7
April 23	-8.47 ± 20.9	-8.35 ± 20.6	-8.46 ± 20.9	-8.26 ± 20.4	14.3 ± 17.9	14.1 ± 17.7	14.3 ± 17.9	14.5 ± 18.2
April 30	-4.19 ± 18.6	-4.14 ± 18.3	-4.20 ± 18.6	-4.08 ± 18.1	-6.30 ± 16.8	-6.19 ± 16.5	-6.28 ± 16.8	-6.42 ± 17.1
May 07	9.96 ± 10.4	9.78 ± 10.2	9.98 ± 10.4	9.68 ± 10.1	-0.27 ± 10.5	-0.27 ± 10.5	-0.28 ± 10.7	-0.28 ± 10.7
May 14	-8.22 ± 12.2	-8.07 ± 12.0	-8.28 ± 12.3	-8.05 ± 12.0	-6.91 ± 15.2	-6.79 ± 14.9	-6.90 ± 15.2	-7.40 ± 15.5
May 21	-6.95 ± 22.9	-6.82 ± 22.5	-6.92 ± 22.9	-6.77 ± 22.3	4.54 ± 21.8	4.50 ± 21.6	4.55 ± 21.9	4.56 ± 21.9
May 28	-10.7 ± 22.2	-10.5 ± 21.9	-10.7 ± 22.2	-10.5 ± 21.9	16.0 ± 21.0	16.0 ± 21.0	16.1 ± 21.2	16.3 ± 21.4
June 05	-9.68 ± 15.9	-9.45 ± 15.5	-9.62 ± 15.8	-9.52 ± 15.6	-1.98 ± 11.7	-1.95 ± 11.5	-1.98 ± 11.7	-1.97 ± 11.7
June 10	10.2 ± 24.2	10.5 ± 23.7	-8.00 ± 28.9	10.4 ± 23.5	-7.03 ± 24.0	-6.76 ± 23.1	-6.97 ± 23.8	-6.96 ± 23.8
June 17	-0.08 ± 12.6	-0.08 ± 12.4	-0.08 ± 12.0	-0.08 ± 11.6	5.10 ± 15.5	4.18 ± 12.7	4.31 ± 13.1	4.23 ± 12.9
June 24	-7.35 ± 15.3	-7.19 ± 14.9	-7.36 ± 15.3	-7.16 ± 14.9	6.09 ± 13.9	5.94 ± 13.5	6.09 ± 13.9	6.09 ± 13.9

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

Surry Power Station, Surry County, Virginia - 2013

1.0E-3 pCi/m3 ± 2 Sigma

COLLECTION DATE	SAMPLING LOCATIONS							
	SS	HIR	BC	ALL	CP	BASF	FE	NN-C
July 02	11.1 ± 23.7	11.4 ± 24.3	11.6 ± 24.8	11.3 ± 24.2	4.60 ± 29.6	4.48 ± 28.8	4.56 ± 29.2	4.58 ± 29.5
July 09	-8.65 ± 25.8	-8.27 ± 24.7	-8.42 ± 25.1	-8.21 ± 24.5	-0.50 ± 23.9	-0.50 ± 23.6	-0.50 ± 23.9	-0.50 ± 24
July 15	-1.57 ± 14.4	-1.55 ± 14.3	-1.57 ± 14.4	-1.53 ± 14.1	-9.03 ± 14.1	-8.93 ± 14.0	-9.06 ± 14.1	-8.92 ± 13.9
July 23	6.48 ± 13.8	6.32 ± 13.5	6.39 ± 13.6	6.23 ± 13.3	-2.91 ± 14.5	-2.90 ± 14.4	-2.93 ± 14.6	-2.90 ± 14.4
July 30	-9.09 ± 32.1	-8.86 ± 31.3	-8.99 ± 31.8	-8.83 ± 31.2	10.7 ± 22.0	10.6 ± 21.8	10.7 ± 22.0	10.6 ± 21.8
August 06	-14.8 ± 24.1	-14.5 ± 23.6	-14.7 ± 23.9	-14.5 ± 23.6	15.4 ± 20.3	15.3 ± 20.1	15.4 ± 20.2	15.1 ± 19.8
August 13	-15.4 ± 16.6	-15.1 ± 16.3	-15.8 ± 17.0	-15.4 ± 16.6	2.44 ± 18.2	2.44 ± 18.2	2.44 ± 18.2	2.49 ± 18.5
August 20	-12.7 ± 16.0	-12.4 ± 15.6	-12.5 ± 15.7	-12.3 ± 15.5	-8.13 ± 18.4	-8.08 ± 18.3	-8.14 ± 18.5	-8.06 ± 18.3
August 26	-2.12 ± 18.5	-2.05 ± 17.9	-2.09 ± 18.2	-2.04 ± 17.8	8.35 ± 17.7	8.30 ± 17.6	8.36 ± 17.7	8.23 ± 17.5
September 03	17.5 ± 22.9	17 ± 22.3	17.3 ± 22.7	16.9 ± 22.1	-4.87 ± 20.2	-4.83 ± 20.1	-4.86 ± 20.2	-4.77 ± 19.8
September 10	19.4 ± 25.1	18.9 ± 24.5	19.2 ± 24.8	18.9 ± 24.4	31.5 ± 30.4	31.3 ± 30.2	31.5 ± 30.4	30.9 ± 29.8
September 17	-0.75 ± 16.8	-0.73 ± 16.4	-0.74 ± 16.6	-0.72 ± 16.3	1.40 ± 15.9	1.37 ± 15.6	1.39 ± 15.8	1.37 ± 15.5
September 24	6.57 ± 22.7	6.37 ± 22.1	6.47 ± 22.4	6.35 ± 22.0	-20.5 ± 22.2	-20.1 ± 21.8	-20.4 ± 22.2	-20.0 ± 21.8
October 01	14.9 ± 28.3	14.4 ± 27.4	14.6 ± 27.9	14.3 ± 27.3	-8.57 ± 29.0	-8.46 ± 28.6	-8.56 ± 28.9	-8.28 ± 28.0
October 08	24.2 ± 24.2	23.5 ± 23.4	23.9 ± 23.9	23.7 ± 23.6	-5.99 ± 24.3	-5.90 ± 23.9	-5.94 ± 24.0	-5.84 ± 23.6
October 15	-2.11 ± 11.2	-2.05 ± 10.9	-2.01 ± 10.7	-1.99 ± 10.6	-5.18 ± 10.7	-5.13 ± 10.6	-5.21 ± 10.8	-5.00 ± 10.3
October 22	22.4 ± 20.4	21.8 ± 19.8	22.2 ± 20.2	22.0 ± 20.0	12.5 ± 18.0	12.3 ± 17.8	12.4 ± 18.0	12.4 ± 17.9
October 29	-18.4 ± 39.6	-18 ± 38.6	-18.2 ± 39.2	-18.2 ± 39.0	-0.85 ± 36.3	-0.84 ± 35.7	-0.85 ± 36.3	-0.84 ± 35.6
November 05	-22.8 ± 35.1	-22.4 ± 34.5	-22.9 ± 35.3	-22.5 ± 34.6	-3.72 ± 40.1	-3.69 ± 39.9	-3.72 ± 40.2	-3.57 ± 38.6
November 12	1.30 ± 20.4	1.28 ± 20.0	1.30 ± 20.4	1.28 ± 20.2	0.73 ± 20.1	0.72 ± 19.9	0.72 ± 19.9	0.72 ± 19.8
November 19	-3.68 ± 18.1	-3.57 ± 17.5	-3.63 ± 17.8	-3.62 ± 17.8	-5.05 ± 21.8	-5.04 ± 21.7	-5.08 ± 21.9	-4.92 ± 21.2
November 26	-5.84 ± 39.0	-5.67 ± 37.8	-5.77 ± 38.5	-5.70 ± 38.0	-0.67 ± 41.0	-0.66 ± 40.8	-0.67 ± 41.1	-0.65 ± 40.3
December 03	4.55 ± 32.9	4.43 ± 32.0	4.49 ± 32.4	4.42 ± 31.9	-7.08 ± 33.4	-7.01 ± 33.0	-7.08 ± 33.3	-6.99 ± 32.9
December 10	-14.0 ± 25.7	-13.6 ± 24.9	-13.8 ± 25.5	-13.7 ± 25.2	-16.1 ± 20.0	-15.9 ± 19.8	-16.2 ± 20.0	-15.7 ± 19.5
December 16	-28.4 ± 29.8	-27.6 ± 29.0	-28.1 ± 29.5	-27.6 ± 29.0	-19.7 ± 28.8	-19.4 ± 28.4	-19.6 ± 28.7	-19.3 ± 28.2
December 24	17.0 ± 30.4	16.6 ± 29.7	17.5 ± 31.3	17.3 ± 30.8	-10.3 ± 28.5	-10.2 ± 28.1	-10.3 ± 28.4	-10.1 ± 27.9
December 31	-30.8 ± 43.0	-30.2 ± 42.3	-30.2 ± 42.1	-29.8 ± 41.6	-25.9 ± 33.4	-25.6 ± 33.0	-25.8 ± 33.3	-25.3 ± 32.7

TABLE 3-5: GAMMA EMITTER CONCENTRATION IN FILTERED AIR

Surry Power Station, Surry County, Virginia - 2013

1.0E-3 pCi/m3 ± 2 Sigma

SAMPLING LOCATIONS	NUCLIDE	FIRST QUARTER	SECOND QUARTER	THIRD QUARTER	FOURTH QUARTER	AVERAGE ± 2 SIGMA
SS	Cs-134	-0.52 ± 0.53	-0.36 ± 0.88	-0.15 ± 0.57	0.31 ± 0.57	
	Cs-137	0.05 ± 0.38	0.31 ± 0.75	0.09 ± 0.60	-0.21 ± 0.51	
	Be-7	104 ± 25.3	130 ± 26.9	129 ± 24.5	146 ± 26.1	127 ± 34.7
	K-40		21.9 ± 13.2			21.9 ± 13.2
HIR	Cs-134	0.16 ± 0.56	1.02 ± 0.95	0.58 ± 0.77	-0.10 ± 1.17	
	Cs-137	0.00 ± 0.37	0.17 ± 0.94	-0.49 ± 0.68	0.22 ± 1.09	
	Be-7	63.8 ± 22.8	106 ± 25.9	97.0 ± 19.9	77.3 ± 27.8	86 ± 38.1
	K-40			57.7 ± 15.8		57.7 ± 15.8
BC	Cs-134	1.12 ± 0.92	1.94 ± 1.11	-0.15 ± 0.80	-0.81 ± 0.87	
	Cs-137	-0.13 ± 0.66	-0.21 ± 1.00	0.32 ± 0.58	-0.12 ± 0.85	
	Be-7	105 ± 22.4	126 ± 30.1	153 ± 29.1	102 ± 26.3	122 ± 47.1
ALL	Cs-134	-1.25 ± 0.66	0.21 ± 0.59	-0.05 ± 0.61	0.89 ± 0.89	
	Cs-137	-0.20 ± 0.59	0.57 ± 0.74	0.08 ± 0.60	0.45 ± 0.86	
	Be-7	120 ± 30.3	166 ± 26.5	105 ± 22.7	143 ± 28.6	134 ± 53.4
	K-40				25.8 ± 15.5	25.8 ± 15.5
CP	Cs-134	1.79 ± 1.39	-0.26 ± 0.54	1.06 ± 1.14	0.61 ± 1.08	
	Cs-137	-0.78 ± 1.28	0.27 ± 0.56	-1.05 ± 1.22	0.07 ± 0.96	
	Be-7	112 ± 40.3	136 ± 23.3	105 ± 26.4	86.8 ± 34.7	110 ± 40.7
BASF	Cs-134	0.66 ± 0.96	0.82 ± 0.71	-0.06 ± 0.80	0.14 ± 0.58	
	Cs-137	-1.41 ± 0.83	-0.22 ± 0.55	-0.08 ± 0.65	-0.15 ± 0.60	
	Be-7	127 ± 29.5	137 ± 22.7	127 ± 23.7	114 ± 21.8	126 ± 18.9
FE	Cs-134	0.83 ± 1.11	-0.06 ± 0.76	0.09 ± 0.60	0.75 ± 1.11	
	Cs-137	-0.22 ± 1.03	0.28 ± 0.79	0.00 ± 0.51	-0.38 ± 1.18	
	Be-7	99.6 ± 37.3	144 ± 27.1	116 ± 21.9	98.3 ± 33.4	114 ± 42.5
NN-C	Cs-134	-0.23 ± 0.50	0.32 ± 0.76	0.99 ± 0.78	-0.03 ± 0.84	
	Cs-137	-0.21 ± 0.47	-0.16 ± 0.60	-0.28 ± 0.79	0.85 ± 0.83	
	Be-7	105 ± 29.2	147 ± 29.1	130 ± 23.0	92.0 ± 23.3	119 ± 49.4

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

Surry Power Station, Surry County, Virginia - 2013

pCi/Liter ± 2 Sigma

NUCLIDE	EPPS	COLONIAL PARKWAY	WILLIAMS-C
JANUARY			
Cs-134	-1.88 ± 4.34	-0.35 ± 5.68	-3.32 ± 4.61
Cs-137	-0.58 ± 3.92	-0.75 ± 5.14	-0.38 ± 4.11
Ba-140	14.4 ± 22.8	-4.30 ± 27.6	0.32 ± 20.2
La-140	-0.48 ± 5.45	3.58 ± 8.40	2.22 ± 7.02
I-131	-0.08 ± 0.39	0.10 ± 0.43	0.34 ± 0.34
K-40	1270 ± 151	1260 ± 171	1160 ± 150
FEBRUARY			
Cs-134	-3.32 ± 4.63	-8.88 ± 4.21	-0.72 ± 3.73
Cs-137	-1.30 ± 3.94	1.42 ± 3.53	-0.33 ± 3.41
Ba-140	4.34 ± 20.1	26.0 ± 22.1	-2.24 ± 17.1
La-140	0.60 ± 6.24	0.69 ± 6.65	-4.55 ± 5.51
I-131	0.03 ± 0.35	0.10 ± 0.36	0.14 ± 0.34
K-40	1410.0 ± 157	1290 ± 164	1340 ± 139
MARCH			
Cs-134	-1.34 ± 2.32	-5.95 ± 2.95	-1.35 ± 4.09
Cs-137	0.53 ± 1.69	-0.14 ± 2.83	3.94 ± 4.07
Ba-140	-1.97 ± 9.0	2.00 ± 13.6	-17.0 ± 22.6
La-140	0.7 ± 2.51	-0.6 ± 4.23	-2.47 ± 5.43
I-131	0.29 ± 0.35	-0.15 ± 0.38	-1.03 ± 0.47
K-40	1270 ± 81	1360 ± 110	1310 ± 163
Sr-89		3.04 ± 2.87	
Sr-90		0.75 ± 0.58	
APRIL			
Cs-134	0.90 ± 3.46	1.28 ± 2.87	-1.63 ± 2.52
Cs-137	-1.06 ± 3.12	-0.11 ± 2.84	0.94 ± 2.30
Ba-140	-1.9 ± 15.2	-5.04 ± 15.2	0.79 ± 13.2
La-140	0.44 ± 5.17	-0.32 ± 4.83	0.39 ± 3.49
I-131	-0.18 ± 0.32	-0.16 ± 0.34	0.00 ± 0.30
K-40	1330 ± 120	1260 ± 110	1420 ± 105

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

Surry Power Station, Surry County, Virginia - 2013

pCi/Liter ± 2 Sigma

NUCLIDE	EPPS	COLONIAL PARKWAY	WILLIAMS-C
MAY			
Cs-134	-2.63 ± 3.19	-1.27 ± 4.23	0.76 ± 3.89
Cs-137	3.30 ± 3.42	-2.29 ± 3.80	-1.49 ± 3.69
Ba-140	2.18 ± 17.4	8.07 ± 20.3	-1.80 ± 18.9
La-140	1.95 ± 6.07	-0.96 ± 5.17	-4.18 ± 4.56
I-131	-0.16 ± 0.41	-0.26 ± 0.40	-0.08 ± 0.42
K-40	1440 ± 151	1260 ± 140	1210 ± 122
Th-228			16.5 ± 11.2
JUNE			
Cs-134	-1.67 ± 4.38	-0.85 ± 4.79	0.57 ± 3.45
Cs-137	1.23 ± 4.16	1.29 ± 5.19	-0.52 ± 3.00
Ba-140	9.77 ± 21.4	13.50 ± 28.2	0.95 ± 14.4
La-140	2.72 ± 6.48	-7.34 ± 6.82	-1.63 ± 3.72
I-131	-0.17 ± 0.55	0.66 ± 0.52	-0.05 ± 0.39
K-40	1360 ± 148	1220 ± 166	1370 ± 108
Sr-89		1.99 ± 1.91	
Sr-90		-0.75 ± 0.53	
JULY			
Cs-134	0.66 ± 2.40	1.73 ± 2.10	-0.91 ± 3.50
Cs-137	-0.16 ± 2.52	0.71 ± 2.10	-1.23 ± 2.43
Ba-140	-5.1 ± 18.0	6.02 ± 13.6	0.66 ± 18.3
La-140	0.91 ± 6.33	1.17 ± 4.35	0.63 ± 4.47
I-131	0.02 ± 0.32	0.10 ± 0.32	-0.02 ± 0.39
K-40	1390 ± 102	1390 ± 89.7	1320 ± 87.3
AUGUST			
Cs-134	-4.09 ± 4.22	-4.77 ± 3.72	-0.64 ± 4.59
Cs-137	1.17 ± 4.20	4.00 ± 4.16	6.10 ± 4.00
Ba-140	-12.0 ± 19.1	15.6 ± 22.7	2.01 ± 21.3
La-140	3.22 ± 6.00	1.18 ± 5.56	-3.36 ± 7.38
I-131	0.41 ± 0.48	0.58 ± 0.54	0.23 ± 0.47
K-40	1360 ± 150	1460 ± 168	1320 ± 147

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

Surry Power Station, Surry County, Virginia - 2013

pCi/Liter ± 2 Sigma

NUCLIDE	EPPS	COLONIAL PARKWAY	WILLIAMS-C
SEPTEMBER			
Cs-134	1.48 ± 4.12	-6.38 ± 3.80	-2.16 ± 3.88
Cs-137	-0.02 ± 4.73	0.93 ± 3.90	1.92 ± 3.86
Ba-140	12.2 ± 27.0	13.5 ± 23.6	-5.74 ± 24.2
La-140	-4.13 ± 9.37	4.72 ± 7.37	-0.71 ± 7.21
I-131	-0.07 ± 0.34	0.12 ± 0.37	0.19 ± 0.33
K-40	1240 ± 159	1340 ± 148	1360 ± 144
Sr-89		3.35 ± 2.56	
Sr-90		-0.56 ± 0.42	
OCTOBER			
Cs-134	0.43 ± 3.97	-1.25 ± 4.41	4.32 ± 4.03
Cs-137	3.56 ± 4.09	-1.65 ± 4.20	1.15 ± 4.62
Ba-140	4.29 ± 25.0	18.50 ± 27.2	-14.0 ± 27.9
La-140	1.41 ± 5.57	-0.65 ± 5.84	-1.77 ± 7.62
I-131	-0.87 ± 0.48	0.11 ± 0.48	0.07 ± 0.40
K-40	1390 ± 138	1430 ± 153	1320 ± 147
NOVEMBER			
Cs-134	-0.67 ± 3.23	0.56 ± 2.47	-3.28 ± 4.64
Cs-137	-0.44 ± 3.10	-0.48 ± 2.51	-2.19 ± 5.19
Ba-140	-9.03 ± 35.5	-2.25 ± 26.8	-2.47 ± 24.5
La-140	-7.64 ± 9.59	-5.07 ± 7.87	-5.75 ± 8.22
I-131	-0.40 ± 0.44	0.09 ± 0.42	0.11 ± 0.24
K-40	1370 ± 103	1390 ± 97.4	1290 ± 189
DECEMBER			
Cs-134	-1.85 ± 4.33	-3.59 ± 3.68	-0.03 ± 3.78
Cs-137	0.25 ± 4.65	-1.09 ± 4.04	1.26 ± 3.28
Ba-140	-8.83 ± 25.5	-3.30 ± 22.8	10.40 ± 22.7
La-140	5.39 ± 7.55	-0.64 ± 6.02	2.52 ± 4.21
I-131	0.31 ± 0.34	-0.30 ± 0.41	-0.59 ± 0.34
K-40	977 ± 164	1400 ± 165	1200 ± 145
Sr-89		4.08 ± 2.88	
Sr-90		0.62 ± 0.43	

TABLE 3-7: GAMMA EMITTER CONCENTRATION IN FOOD PRODUCTS

Surry Power Station, Surry County, Virginia - 2013

pCi/kg (wet) ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	SAMPLE TYPE	ISOTOPE				
			Cs-134	**Cs-137**	**I-131**	**K-40**	
BROCK FARM	11/1/2013	Corn	17.0 ± 6.44	2.71 ± 5.4	12.30 ± 26.5	2980 ± 144	
			Cs-134	**Cs-137**	**I-131**	**K-40**	**Be-7**
	11/1/2013	Peanuts	-0.97 ± 4.62	5.13 ± 4.39	-5.16 ± 22.6	4650 ± 170	201 ± 67.8
			Th-228				
			22.5 ± 9.84				
			Cs-134	**Cs-137**	**I-131**	**K-40**	**Th-228**
SLADE FARM	11/11/2013	Soybeans	-5.23 ± 4.76	7.52 ± 5.25	-1.5 ± 10.4	14500 ± 287	12.4 ± 10.8

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

Surry Power Station, Surry County, Virginia - 2013

pCi/Liter ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPE				
		Mn-54	**Co-58**	**Fe-59**	**Co-60**	**Zn-65**
SS	3/12/2013	0.93 ± 2.72	0.96 ± 3.62	-0.54 ± 5.70	0.58 ± 3.72	-5.14 ± 7.54
	6/10/2013	-0.68 ± 3.21	-0.83 ± 2.90	0.67 ± 4.79	0.48 ± 3.01	-6.46 ± 6.85
	9/4/2013	2.96 ± 3.42	-0.20 ± 3.74	3.69 ± 8.25	2.23 ± 4.21	-4.31 ± 7.42
	12/10/2013	0.59 ± 3.30	-3.01 ± 3.56	-0.95 ± 6.25	-1.91 ± 2.80	7.50 ± 8.57
		Nb-95	**Zr-95**	**I-131**	**Cs-134**	**Cs-137**
	3/12/2013	1.89 ± 3.70	-2.51 ± 6.20	-0.61 ± 5.64	1.17 ± 3.43	-3.72 ± 3.72
	6/10/2013	-0.23 ± 3.25	0.57 ± 4.46	0.00 ± 0.29	1.21 ± 2.94	-0.28 ± 3.19
	9/4/2013	1.43 ± 4.23	-5.12 ± 6.09	-0.03 ± 0.36	-9.52 ± 3.79	-3.08 ± 3.42
	12/10/2013	3.05 ± 3.87	-3.79 ± 6.42	-0.35 ± 0.35	-2.56 ± 3.52	1.63 ± 3.65
		Ba-140	**La-140**	**H-3**		
	3/12/2013	-10.4 ± 15.10	-0.55 ± 5.45	90.70 ± 494		
	6/10/2013	4.81 ± 14.4	-3.44 ± 5.61	6.70 ± 501		
	9/4/2013	-4.49 ± 25.7	-8.00 ± 9.90	-38.3 ± 506		
	12/10/2013	5.83 ± 17.4	3.03 ± 6.51	-172 ± 504		
		Mn-54	**Co-58**	**Fe-59**	**Co-60**	**Zn-65**
HIR	3/12/2013	1.17 ± 3.82	-1.85 ± 3.15	-0.43 ± 8.37	3.87 ± 4.32	-5.43 ± 10.50
	6/10/2013	1.53 ± 2.76	1.07 ± 2.75	4.95 ± 5.75	-1.38 ± 2.91	-9.22 ± 6.26
	9/10/2013	0.06 ± 3.09	-0.66 ± 3.35	1.44 ± 6.74	-1.16 ± 3.79	-4.15 ± 7.13
	12/10/2013	2.30 ± 3.78	-1.42 ± 3.72	-0.84 ± 7.41	2.28 ± 4.17	-2.19 ± 9.04
		Nb-95	**Zr-95**	**I-131**	**Cs-134**	**Cs-137**
	3/12/2013	-0.72 ± 3.93	-6.03 ± 7.21	-0.44 ± 5.89	-4.26 ± 4.10	-0.31 ± 4.00
	6/10/2013	1.66 ± 2.61	0.90 ± 4.55	0.23 ± 0.32	0.64 ± 3.25	3.57 ± 3.27
	9/10/2013	-1.03 ± 3.88	-0.55 ± 5.91	-0.12 ± 0.34	1.60 ± 3.89	-2.36 ± 3.30
	12/10/2013	0.78 ± 4.18	-1.12 ± 7.17	0.16 ± 0.37	-1.16 ± 3.88	1.14 ± 3.78
		Ba-140	**La-140**	**H-3**		
	3/12/2013	7.11 ± 17.3	0.60 ± 5.94	220 ± 504		
	6/10/2013	-6.71 ± 14.8	-2.42 ± 4.77	-26.7 ± 495		
	9/10/2013	8.56 ± 15.7	-0.75 ± 6.37	-207 ± 498		
	12/10/2013	-2.85 ± 17.6	-0.02 ± 5.86	310 ± 444		

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

Surry Power Station, Surry County, Virginia - 2013

pCi/Liter ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPE				
		Mn-54	**Co-58**	**Fe-59**	**Co-60**	**Zn-65**
CS	3/12/2013	0.457 ± 2.72	0.34 ± 2.54	1.44 ± 6.30	-1.27 ± 2.97	-5.83 ± 7.08
	6/10/2013	0.76 ± 2.61	-1.77 ± 2.67	-1.08 ± 2.85	-0.49 ± 3.19	-4.31 ± 6.44
	9/4/2013	0.71 ± 3.24	-1.34 ± 3.72	-0.32 ± 7.19	1.46 ± 3.73	-1.34 ± 6.55
	12/10/2013	-1.91 ± 3.18	-0.03 ± 3.33	3.63 ± 7.55	2.07 ± 3.65	-3.57 ± 8.22
		Nb-95	**Zr-95**	**I-131**	**Cs-134**	**Cs-137**
	3/12/2013	0.51 ± 2.68	0.63 ± 5.23	-1.52 ± 5.16	-1.18 ± 4.52	2.05 ± 3.46
	6/10/2013	-1.44 ± 2.82	-4.57 ± 4.52	0.46 ± 0.29	-0.89 ± 2.79	0.86 ± 3.18
	9/4/2013	1.24 ± 4.32	3.84 ± 5.86	-0.16 ± 0.43	-6.93 ± 4.10	1.01 ± 4.14
	12/10/2013	2.18 ± 4.14	-2.85 ± 5.87	0.07 ± 0.36	-5.68 ± 3.36	-0.76 ± 3.67
		Ba-140	**La-140**	**H-3**		
	3/12/2013	-2.25 ± 14.4	0.40 ± 3.84	694 ± 540		
	6/10/2013	-7.56 ± 13.3	2.95 ± 4.68	305 ± 533		
	9/4/2013	15.7 ± 27.1	-0.53 ± 7.33	-223 ± 489		
	12/10/2013	15.7 ± 17.1	1.05 ± 6.31	148 ± 428		

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

Surry Power Station, Surry County, Virginia - 2013

pCi/Liter ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPE				
		Mn-54	**Co-58**	**Fe-59**	**Co-60**	**Zn-65**
SD	1/15/2013	0.50 ± 1.01	0.06 ± 1.11	2.26 ± 2.48	-0.01 ± 1.34	0.18 ± 2.40
	2/12/2013	-1.06 ± 2.57	-0.54 ± 2.46	0.26 ± 5.23	-1.09 ± 2.65	-8.2 ± 5.41
	3/12/2013	0.74 ± 1.94	0.52 ± 2.03	-0.44 ± 3.79	1.01 ± 1.92	-0.68 ± 4.67
	4/8/2013	1.20 ± 2.22	0.97 ± 2.07	-2.84 ± 4.60	-0.35 ± 2.16	0.50 ± 5.51
	5/21/2013	0.42 ± 1.08	0.82 ± 1.10	0.58 ± 2.22	0.35 ± 1.10	-7.63 ± 2.45
	6/10/2013	-1.14 ± 2.54	-0.25 ± 2.68	2.32 ± 5.40	1.49 ± 2.83	-1.21 ± 5.49
	7/8/2013	0.15 ± 1.87	0.05 ± 2.00	1.09 ± 3.93	-1.36 ± 1.68	-4.02 ± 4.23
	8/13/2013	-0.34 ± 2.31	-0.86 ± 2.68	-1.33 ± 6.05	-0.91 ± 2.75	-7.71 ± 6.01
	9/17/2013	1.46 ± 2.63	-0.55 ± 2.72	0.54 ± 5.14	-1.43 ± 2.82	-6.11 ± 6.04
	10/7/2013	1.79 ± 1.77	-1.79 ± 1.86	1.19 ± 3.97	0.34 ± 1.89	-3.24 ± 3.88
	11/11/2013	3.18 ± 2.84	-0.24 ± 3.27	1.90 ± 5.56	-0.86 ± 3.51	-3.89 ± 7.73
	12/10/2013	2.92 ± 3.51	3.36 ± 3.49	-4.72 ± 6.92	2.69 ± 3.38	-8.47 ± 10.10
		Nb-95	**Zr-95**	**I-131**	**Cs-134**	**Cs-137**
	1/15/2013	0.65 ± 1.12	-1.06 ± 1.97	-3.01 ± 4.09	0.09 ± 1.16	0.48 ± 1.17
	2/12/2013	-0.14 ± 2.15	3.67 ± 4.42	4.53 ± 5.16	1.11 ± 2.40	-0.66 ± 2.55
	3/12/2013	2.78 ± 2.07	0.36 ± 3.56	-1.41 ± 3.47	-3.00 ± 2.43	-0.02 ± 2.17
	4/8/2013	1.73 ± 2.40	-1.08 ± 4.02	5.58 ± 4.15	-1.54 ± 3.00	0.15 ± 2.29
	5/21/2013	-0.60 ± 1.18	2.65 ± 1.96	0.09 ± 2.35	-0.82 ± 1.24	-0.63 ± 1.18
	6/10/2013	2.26 ± 3.38	-1.04 ± 5.54	-1.02 ± 5.47	0.45 ± 3.14	0.31 ± 2.66
	7/8/2013	0.78 ± 2.28	-0.24 ± 3.85	-0.24 ± 3.60	-0.55 ± 2.25	0.91 ± 1.95
	8/13/2013	1.70 ± 2.76	0.90 ± 4.88	3.55 ± 5.59	0.12 ± 3.11	1.39 ± 2.62
	9/17/2013	-0.67 ± 2.74	4.93 ± 5.20	0.01 ± 5.35	-0.05 ± 3.09	-0.35 ± 2.87
	10/7/2013	1.54 ± 1.83	2.11 ± 3.38	-0.18 ± 4.34	-3.77 ± 2.02	-0.40 ± 1.86
	11/11/2013	1.97 ± 3.16	-1.76 ± 5.45	0.73 ± 5.33	3.53 ± 3.52	1.27 ± 3.32
	12/10/2013	-1.79 ± 2.95	-3.06 ± 6.04	-0.74 ± 0.96	-2.04 ± 3.70	-0.45 ± 3.36
		Ba-140	**La-140**	**H-3**	**K-40**	**Th-228**
	1/15/2013	-4.26 ± 8.06	-0.88 ± 2.28		114 ± 27.4	
	2/12/2013	-3.39 ± 13.2	2.20 ± 4.67		87.1 ± 51.7	
	3/12/2013	-6.96 ± 10.0	-2.86 ± 3.04	151 ± 547	83.9 ± 44.8	6.58 ± 5.27
	4/8/2013	-16.4 ± 11.5	0.89 ± 2.86			
	5/21/2013	2.64 ± 5.89	-0.09 ± 1.86			
	6/10/2013	3.36 ± 13.6	3.27 ± 5.23	-46.9 ± 491		
	7/8/2013	0.45 ± 10.2	-0.41 ± 3.21		54.1 ± 31.7	
	8/13/2013	-10.5 ± 13.4	0.78 ± 4.10		60.0 ± 54.3	
	9/17/2013	2.30 ± 13.3	-1.91 ± 5.12	1610 ± 605	87.3 ± 59.3	
	10/7/2013	8.33 ± 10.9	-1.12 ± 3.14		103 ± 40.6	
	11/11/2013	-5.94 ± 14.9	1.75 ± 5.26		125 ± 75.1	
	12/10/2013	5.12 ± 18.6	0.69 ± 6.99	77.4 ± 729	88.7 ± 58.5	

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

Surry Power Station, Surry County, Virginia - 2013

pCi/Liter ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPES				
		Mn-54	**Co-58**	**Fe-59**	**Co-60**	**Zn-65**
SW-C	1/15/2013	-0.01 ± 1.77	-1.07 ± 1.89	1.43 ± 3.80	1.55 ± 1.74	1.57 ± 3.81
	2/12/2013	-0.96 ± 2.52	1.65 ± 2.60	5.20 ± 5.37	0.74 ± 2.66	-7.76 ± 6.66
	3/12/2013	-0.98 ± 2.41	-0.01 ± 2.55	-3.09 ± 5.66	-0.91 ± 2.31	-7.06 ± 5.87
	4/9/2013	1.90 ± 2.67	-1.32 ± 2.70	-1.70 ± 5.56	-0.15 ± 2.61	-2.63 ± 5.67
	5/21/2013	0.65 ± 1.10	-0.27 ± 1.17	1.48 ± 2.60	0.42 ± 1.12	-3.11 ± 2.66
	6/10/2013	0.30 ± 2.82	-1.96 ± 3.02	1.74 ± 5.97	-1.52 ± 2.90	-4.62 ± 5.18
	7/8/2013	1.71 ± 3.30	2.50 ± 3.64	-1.86 ± 7.05	-0.57 ± 4.02	-0.49 ± 7.89
	8/13/2013	0.32 ± 2.94	1.77 ± 3.11	-1.81 ± 5.79	0.29 ± 2.99	-2.32 ± 6.31
	9/17/2013	-2.10 ± 2.81	-0.34 ± 2.53	2.16 ± 5.48	0.85 ± 2.56	-3.54 ± 5.27
	10/8/2013	-0.43 ± 1.74	1.46 ± 1.72	-1.81 ± 3.46	1.41 ± 1.72	-0.81 ± 3.30
	11/12/2013	-0.09 ± 2.89	1.28 ± 3.07	2.61 ± 6.47	-1.93 ± 3.86	-3.65 ± 7.40
	12/10/2013	1.96 ± 3.38	0.86 ± 3.95	-0.26 ± 7.23	0.06 ± 3.23	-4.47 ± 8.36
		Nb-95	**Zr-95**	**I-131**	**Cs-134**	**Cs-137**
	1/15/2013	0.77 ± 1.97	1.28 ± 3.43	-6.01 ± 6.11	-1.01 ± 1.97	-0.04 ± 1.91
	2/12/2013	-0.83 ± 2.74	-1.26 ± 4.90	1.30 ± 5.66	-6.89 ± 3.28	1.86 ± 2.79
	3/12/2013	-0.94 ± 2.34	1.07 ± 4.59	1.17 ± 4.65	-1.74 ± 2.87	-1.57 ± 2.64
	4/9/2013	0.38 ± 2.63	1.34 ± 4.62	-2.15 ± 4.32	-2.59 ± 2.96	-0.66 ± 2.70
	5/21/2013	0.91 ± 1.19	0.91 ± 2.08	-0.93 ± 2.46	0.75 ± 1.22	-0.11 ± 1.22
	6/10/2013	1.31 ± 3.09	-0.52 ± 4.76	2.27 ± 5.95	-3.25 ± 3.33	-2.93 ± 3.20
	7/8/2013	-0.82 ± 3.84	0.39 ± 6.78	1.34 ± 5.26	-3.60 ± 3.47	0.97 ± 3.70
	8/13/2013	1.49 ± 3.06	5.74 ± 4.84	-2.58 ± 5.90	0.33 ± 3.35	0.71 ± 3.00
	9/17/2013	-2.88 ± 2.83	-0.74 ± 4.83	4.87 ± 5.26	-3.20 ± 2.96	-0.86 ± 2.90
	10/8/2013	0.39 ± 1.78	-0.25 ± 3.14	-1.64 ± 3.52	0.77 ± 1.86	1.15 ± 1.78
	11/12/2013	-0.24 ± 3.03	-4.01 ± 5.33	3.45 ± 5.34	1.36 ± 2.95	0.39 ± 3.08
	12/10/2013	-1.13 ± 3.30	5.08 ± 6.14	-6.03 ± 6.70	-3.93 ± 4.23	-2.27 ± 3.63
		Ba-140	**La-140**	**H-3**	**K-40**	**Ra-226**
	1/15/2013	-5.01 ± 12.3	1.28 ± 4.21		61.1 ± 45.5	77.5 ± 65.1
	2/12/2013	0.86 ± 15.9	0.41 ± 4.35			
	3/12/2013	8.47 ± 13.0	1.50 ± 3.82	-327 ± 514		
	4/9/2013	-3.22 ± 12.0	1.27 ± 4.71			
	5/21/2013	-2.44 ± 6.2	-1.03 ± 1.98			
	6/10/2013	-9.11 ± 16.2	-1.30 ± 4.06	115 ± 496		
	7/8/2013	-7.67 ± 17.0	1.57 ± 5.93			
	8/13/2013	1.86 ± 16.1	-1.14 ± 3.66		70.5 ± 64.5	
	9/17/2013	-0.97 ± 14.9	-3.31 ± 4.15	541 ± 518	52.9 ± 25.2	
	10/8/2013	-3.32 ± 9.46	-0.65 ± 2.52		88.6 ± 35.9	
	11/12/2013	10.1 ± 14.4	-0.85 ± 4.72			
	12/10/2013	-0.18 ± 18.9	3.93 ± 4.91	460 ± 775	77.2 ± 62.2	

TABLE 3-10: GAMMA EMITTER CONCENTRATIONS IN SILT

Surry Power Station, Surry County, Virginia - 2013

pCi/kg (dry) ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPE				
		Cs-134	**Cs-137**	**K-40**	**Th-232**	**Th-228**
SD	3/14/2013	-8.36 ± 34.3	121 ± 48.6	15400 ± 1210	995 ± 166	1200 ± 944
	9/18/2013	-12.3 ± 57.0	163 ± 102	20200 ± 1990	1640 ± 246	1650 ± 159
		Ra-226	**Be-7**	**Ac-228**		
	3/14/2013	2210 ± 837		384 ± 316		
	9/18/2013	5310 ± 2350	1780 ± 980			
		Cs-134	**Cs-137**	**K-40**	**Th-232**	**Th-228**
CHIC-C	3/14/2013	19.1 ± 48.5	175 ± 96.6	17200 ± 1710	1040 ± 221	1290 ± 159
	9/18/2013	45.9 ± 68.6	237 ± 98.8	18900 ± 2020	1370 ± 330	1680 ± 167
		Ra-226				
	3/14/2013	2520 ± 1230				
	9/18/2013	3560 ± 2600				

TABLE 3-11: GAMMA EMITTER CONCENTRATIONS IN SHORELINE SEDIMENT

Surry Power Station, Surry County, Virginia - 2013

pCi/kg (dry) ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPE				
		Cs-134	**Cs-137**	**K-40**	**Th-228**	**Th-232**
HIR	2/12/2013	4.99 ± 19.9	11.9 ± 20.1	6730 ± 774	131 ± 40.4	
	8/20/2013	1.98 ± 20.6	-15.2 ± 20.7	5440 ± 627	314 ± 45.7	235 ± 89.9
CHIC-C	2/12/2013	-1.75 ± 23.1	13.3 ± 22.6	2850 ± 478	415 ± 57.0	398 ± 105
	8/20/2013	26.9 ± 44.3	-50.8 ± 44.1	1970 ± 797	4870 ± 158	4880 ± 245
		Ra-226				
	2/12/2013					
	8/20/2013	4280 ± 1420				

TABLE 3-12: GAMMA EMITTER CONCENTRATION IN FISH

Surry Power Station, Surry County, Virginia - 2013

pCi/kg (wet) ± 2 Sigma

SAMPLING LOCATION	COLLECTION DATE	SAMPLE TYPE	ISOTOPE			
			K-40	**Mn-54**	**Co-58**	**Fe-59**
SD	4/9/2013	Catfish	2820 ± 1150	4.65 ± 54.3	-71.5 ± 61.8	25.6 ± 127
	4/9/2013	White Perch	2260 ± 1260	-10.2 ± 44.7	2.96 ± 56.6	-12.4 ± 122
	10/1/2013	Catfish	2340 ± 760	16.2 ± 40.8	-31.9 ± 43.3	31.2 ± 91.5
	10/1/2013	White Perch	2060 ± 1230	-3.05 ± 45.7	3.86 ± 49.8	48.2 ± 112
			Co-60	**Zn-65**	**Cs-134**	**Cs-137**
	4/9/2013	Catfish	30.4 ± 57.3	-21.9 ± 109	-34.2 ± 58.6	6.44 ± 50.5
	4/9/2013	White Perch	18.8 ± 50.2	101 ± 75.8	-11.6 ± 53.1	35.3 ± 52.2
	10/1/2013	Catfish	-27.1 ± 38.9	-66.3 ± 98.3	23.0 ± 45.0	12.4 ± 41.9
	10/1/2013	White Perch	-20.3 ± 41.8	-46.1 ± 93.0	-16.9 ± 54.6	-6.98 ± 36.4

TABLE 3-13: GAMMA EMITTER CONCENTRATIONS IN OYSTERS

Surry Power Station, Surry County, Virginia - 2013

pCi/kg (wet) ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPE			
		Mn-54	**Co-58**	**Fe-59**	**Co-60**
POS	3/13/2013	-15.2 ± 20.9	5.88 ± 25.3	-20.3 ± 46.8	-12.8 ± 21.7
	9/19/2013	-16.4 ± 32.0	-12.1 ± 38.5	-35.2 ± 86.0	-33.50 ± 29.7
		Zn-65	**Cs-134**	**Cs-137**	**K-40**
	3/13/2013	17.2 ± 44.8	-6.23 ± 23.4	6.65 ± 19.1	623 ± 418
	9/19/2013	-32.5 ± 64.4	-11.5 ± 34.2	7.54 ± 31.5	
		Mn-54	**Co-58**	**Fe-59**	**Co-60**
MP	3/13/2013	10.80 ± 21.3	-20.0 ± 23.7	20.9 ± 51.4	-0.39 ± 22.4
	9/19/2013	0.33 ± 32.2	9.55 ± 45.8	-30.1 ± 94.4	10.7 ± 32.4
		Zn-65	**Cs-134**	**Cs-137**	**K-40**
	3/13/2013	-28.4 ± 52.9	-46.30 ± 27.3	7.2 ± 22.3	608 ± 444
	9/19/2013	32.2 ± 64.6	4.42 ± 36.1	29.5 ± 33.2	
		Mn-54	**Co-58**	**Fe-59**	**Co-60**
LC	3/13/2013	-10.3 ± 22.3	2.18 ± 26.4	-4.23 ± 60.0	-4.45 ± 19.0
	9/19/2013	11.1 ± 21.1	-19.6 ± 25.1	29.4 ± 68.6	-15.6 ± 20.9
		Zn-65	**Cs-134**	**Cs-137**	**K-40**
	3/13/2013	-4.25 ± 52.2	-14.7 ± 25.9	4.03 ± 22.9	943 ± 464
	9/19/2013	-56.0 ± 53.1	-20.8 ± 23.7	-11.7 ± 19.8	738 ± 400

TABLE 3-14: GAMMA EMITTER CONCENTRATIONS IN CLAMS

Surry Power Station, Surry County, Virginia - 2013

pCi/kg (wet) ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPE			
		Mn-54	**Co-58**	**Fe-59**	**Co-60**
JI	3/14/2013	17.00 ± 22.9	2.8 ± 21.9	-7.9 ± 48.4	7.65 ± 19.8
	9/18/2013	14.8 ± 24.5	46.8 ± 35.5	-98.5 ± 72.9	11.9 ± 23.5
		Zn-65	**Cs-134**	**Cs-137**	**K-40**
	3/14/2013	21.8 ± 40.5	13.90 ± 23.7	-9.5 ± 22.4	
	9/18/2013	9.27 ± 48.7	-11.5 ± 30.2	21.50 ± 26.6	679 ± 567
		Th-228			
	3/14/2013				
	9/18/2013	152 ± 101			
		Mn-54	**Co-58**	**Fe-59**	**Co-60**
SD	3/14/2013	3.46 ± 21.8	-13.8 ± 23.4	33.1 ± 48.8	10.3 ± 21.6
	9/18/2013	-21.8 ± 20.2	16.2 ± 28.0	21.1 ± 76.3	9.64 ± 23.1
		Zn-65	**Cs-134**	**Cs-137**	**K-40**
	3/14/2013	20.20 ± 49.6	-5.96 ± 27.4	-4.97 ± 23.5	
	9/18/2013	-17.2 ± 55.3	10.4 ± 27.9	-8.29 ± 21.4	473 ± 467
		Mn-54	**Co-58**	**Fe-59**	**Co-60**
CHIC-C	3/14/2013	7.54 ± 21.4	-4.87 ± 22.9	-23.1 ± 45.6	-3.39 ± 21.3
	9/18/2013	-4.94 ± 24.0	-6.37 ± 36.3	-13.6 ± 78.7	-2.22 ± 20.2
		Zn-65	**Cs-134**	**Cs-137**	**K-40**
	3/14/2013	22.3 ± 40.0	-3.39 ± 26.7	-22.5 ± 21.7	461 ± 369
	9/18/2013	1.46 ± 62.1	-55.3 ± 30.7	-0.93 ± 22.3	
		Th-228			
	3/14/2013	95.2 ± 67.8			
	9/18/2013				

TABLE 3-15: GAMMA EMITTER CONCENTRATIONS IN CRABS

Surry Power Station, Surry County, Virginia - 2013

pCi/kg (wet) ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPE			
		K-40	**Mn-54**	**Co-58**	**Fe-59**
SD	7/10/2013	2670 ± 683	11.10 ± 29.8	-13.40 ± 28.0	-24.6 ± 60.5
		Co-60	**Zn-65**	**Cs-134**	**Cs-137**
		7.35 ± 34.5	-91.0 ± 63.7	23.40 ± 32.3	9.35 ± 31.8

4. DISCUSSION OF RESULTS

Data from the radiological analyses of environmental media collected during 2013 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 2013 was from external sources, such as fallout from nuclear weapons tests (cesium-137) and naturally occurring radionuclides. Naturally occurring nuclides such as beryllium-7, potassium-40, radium-226, thorium-228 and thorium-232 were detected in numerous samples.

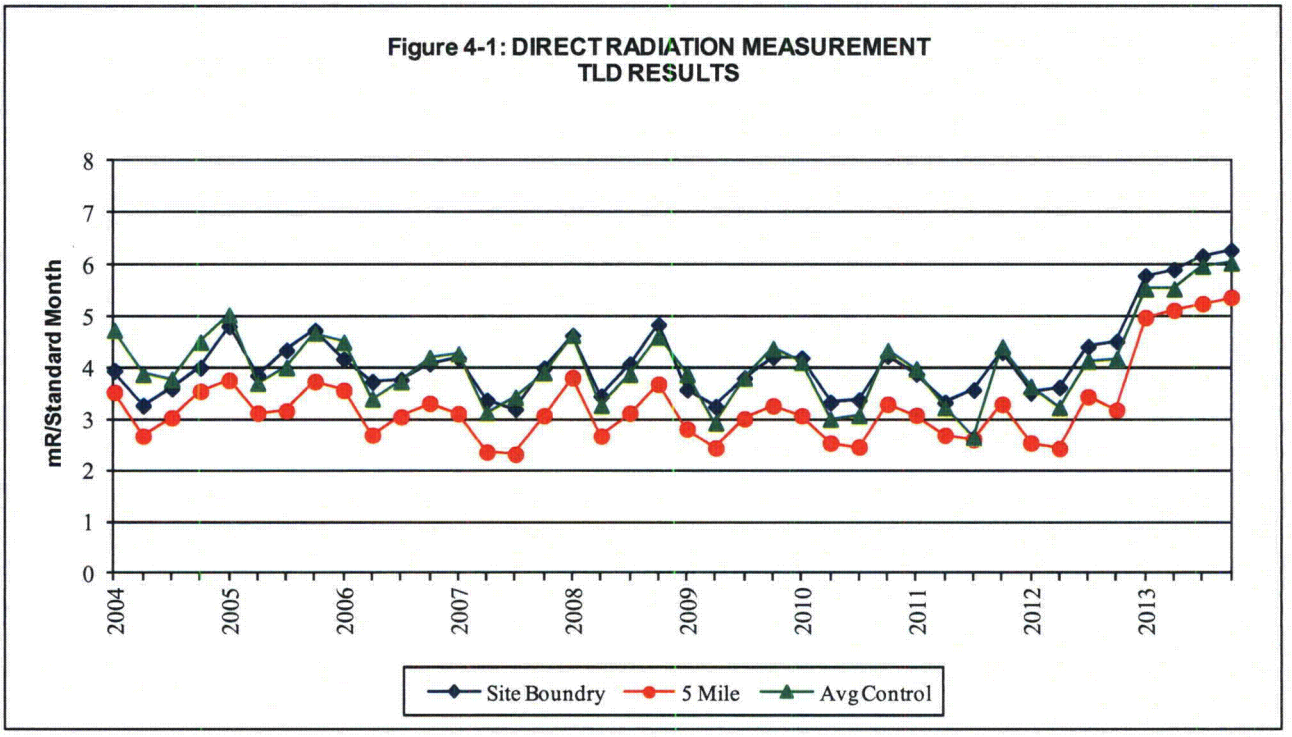
The following is a discussion and summary of the results of the environmental measurements taken during the 2013 reporting period.

4.1 Gamma Exposure Rate

A thermoluminescent dosimeter (TLD) is an inorganic crystal used to detect ambient radiation. Two TLDs, made of CaF and LiF elements and specifically designed for environmental monitoring, are deployed at each sampling location. TLDs are placed in two concentric rings around the station. The inner ring is located 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. Figure 4-1 shows a historical trend of TLD exposure rate measurements, comparing the average of indicator TLDs located near the site boundary and at 5 miles to the average of all control TLD locations. Control and indicator averages indicate a steady relationship. In 2013, Panasonic UD-814 environmental TLDs replaced Harshaw environmental TLDs that were used since 2001. Benchmarking showed that Panasonic UD-814 TLDs were the industry best environmental TLD with improved precision over the Harshaw TLDs. Along with implementing new environmental

TLDs in 2013, an improved method for calculating control dosimeter dose was implemented to estimate transit dose. A program review found that control dosimeters cannot be used directly to assess the transit dose, since control dosimeters also accrue dose from cosmic radiation while stored in the shielded storage cask/cave. Therefore, additional calculations must be made in order to determine the transit dose component. This transit dose component was determined by processing the control dosimeters, and subtracting out the monitoring period storage dose. Previously, control dosimeters were assumed to be a direct measurement of transit dose which resulted in a non-conservative (lower) result of reported field doses. The field dose with the replacement TLDs is higher than that of the previously used TLDs as the greater precision and accuracy of the replacement TLD along with improved control dosimeter dose provides a more representative response to ambient radiation



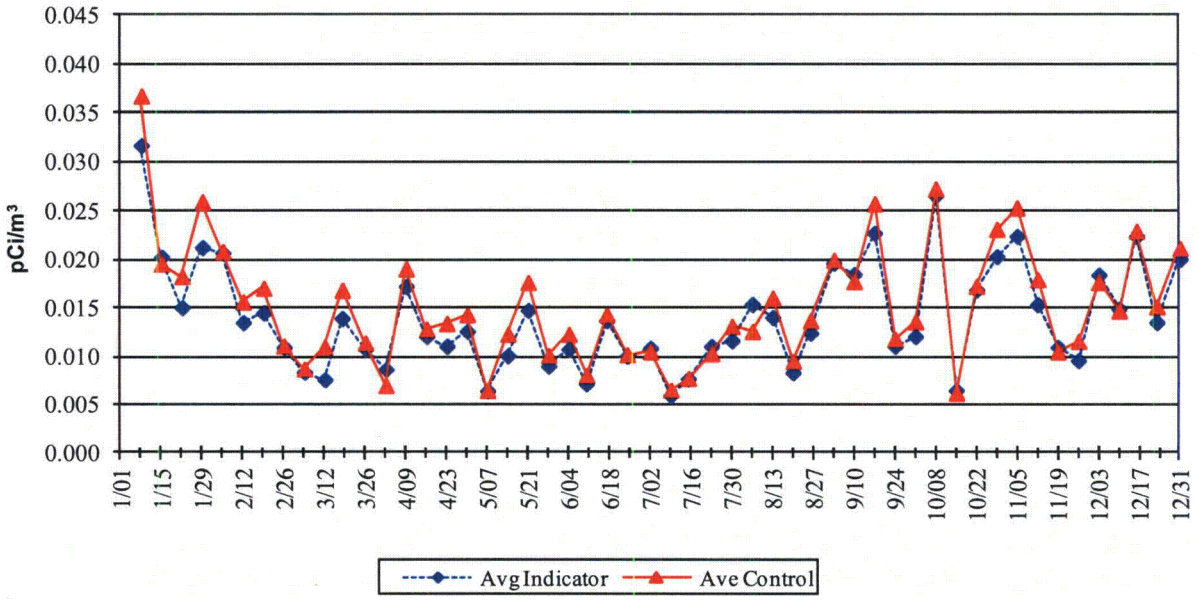
4.2 Airborne Gross Beta

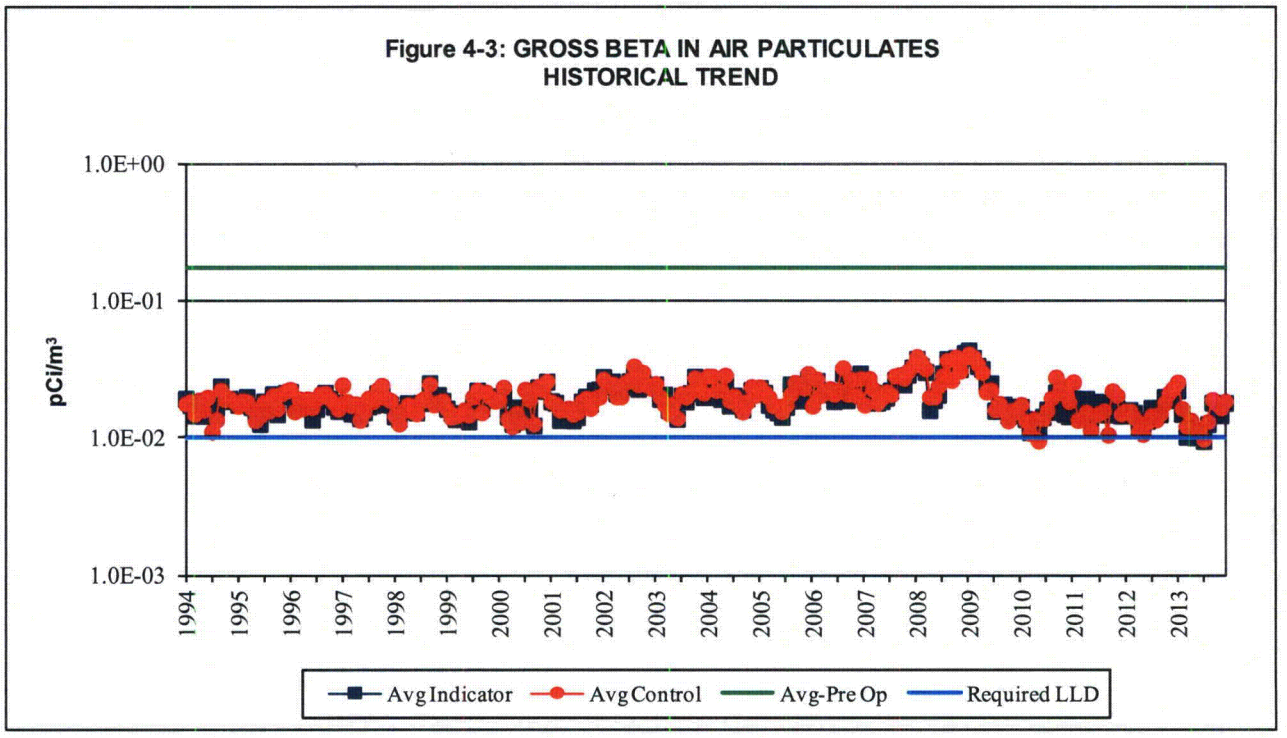
Air is continuously sampled by passing it through glass fiber particulate filters. The filters collect airborne particulate radionuclides. Once a week the samples are collected and analyzed for gross beta activity. Results of the weekly gross beta analyses are presented in Table 3-3. A review of the results from control and indicator locations continues to show no significant variation in measured activities (see Figure 4-2 and 4-3). This indicates that any station contribution 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 with the exception of the Chernobyl accident in 1986, airborne gross beta results have remained steady.

Figure 4-2: 2013 GROSS BETA IN AIR PARTICULATES





4.3 Airborne Radioiodine

Air is also continuously sampled for radioiodines by passing it 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. These results are similar to pre-operational data and the results of samples taken prior to and after the 1986 accident in the Soviet Union at Chernobyl and the Fukushima Daiichi nuclear incident in 2011.

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 potassium-40 and beryllium-7, which is produced by cosmic processes. No man-made radionuclides were identified. These analyses confirm the lack of station effects.

4.5 Cow Milk

Analysis of milk samples is generally the most sensitive indicator of fission product existence in the terrestrial environment. This, in combination with the fact that consumption of milk is significant, results in this pathway usually being the most critical from the plant release viewpoint. This pathway also shows measurable amounts of nuclear weapons testing fallout. Therefore, this media needs to be evaluated very carefully when trying to determine if there is any station effect.

Results of gamma spectroscopy indicate no other detectable station related radioactivity in the milk samples. In years past, cesium-137 has been detected sporadically. The occurrences were attributed to residual global fallout from past atmospheric weapons testing. Cs-137 was not detected at a level above the LLD in 2013.

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 was detected in the four composites analyzed. This is the second year since at least 1990 that strontium-90 has not been detected in at least one composite sample. The average Sr-90 concentration for the ten year period of 2002 to 2011 is 1.77 pCi/L. Sr-90 is not a component of the station radiological effluents and is a product of nuclear weapons testing fallout which has been well documented.

4.6 Food Products

Three samples were collected and analyzed by gamma spectroscopy. The results of the analyses are presented in Table 3-7. As expected, naturally occurring potassium-40 was detected in all samples. The average concentration is consistent with that observed in previous years. Thorium-228 was also detected at typical historical concentrations. No station related radioactivity was detected. Berillium-7 was detected in one sample.

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 and analyzes for gamma radiation and for tritium. The results of these analyses are presented in Table 3-8. Consistent with past monitoring, no station related radioactivity was detected. No gamma emitting isotopes were detected during the pre-operational period.

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. With the exception of natural products, no other gamma emitters were detected. Tritium was detected in one of eight samples at 1,610 pCi/liter. This concentration represents 5.4% of the 30,000 pCi/liter NRC reporting level concentration. The tritium was detected at the station discharge canal indicator sample location. The water in the discharge canal is further diluted by the river water beyond the discharge structure. No tritium or gamma emitting radionuclides were detected in the control river water samples. Naturally occurring potassium-40, radium-226 and thorium-228 were detected in some samples. No station related radioactivity was detected.

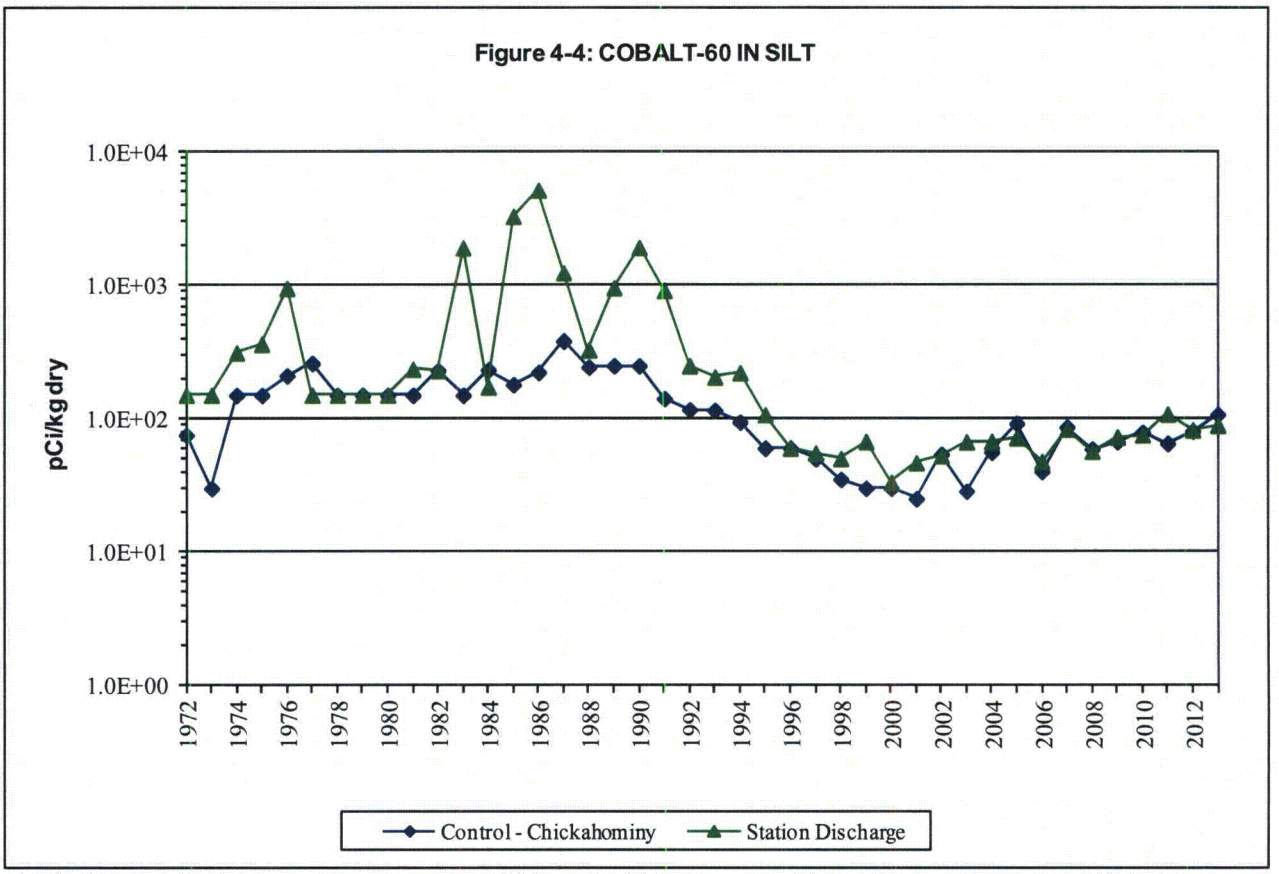
4.9 Silt

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.

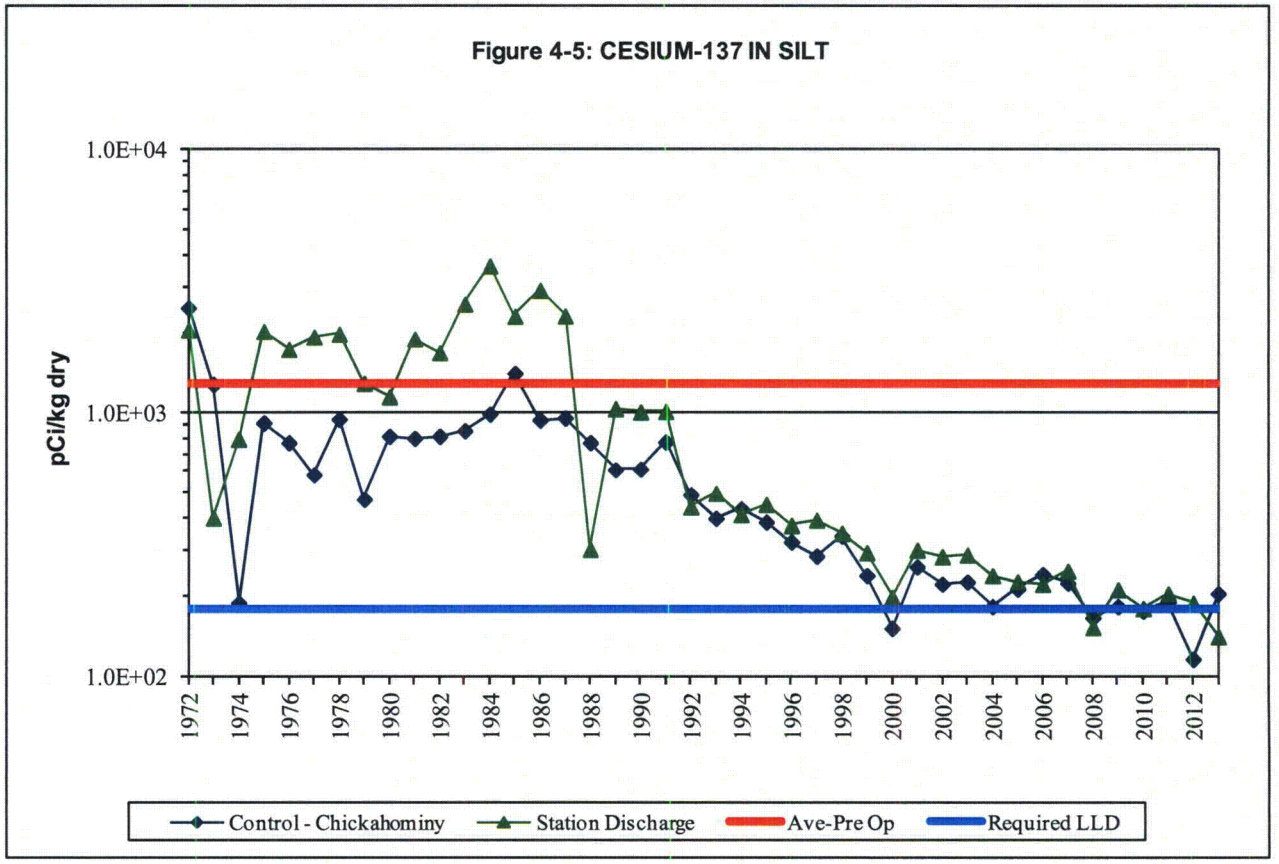
Samples of silt are collected from two locations, one upstream and one downstream of the station. The results of the gamma spectroscopy analyses are presented in Table 3-10. Naturally occurring beryllium-7, potassium-40, radium-226, thorium-228, actinium-228 and thorium-232 were detected. Historically, cobalt-60 has been detected in samples obtained from the indicator location (SD). Cobalt-60 has not been detected since 2003. Trend graphs of cobalt-60 and cesium-137 in silt appear in Figures 4-4 and 4-5.

Cesium-137 was detected, as expected, in both the control and indicator samples. The levels detected indicate a continual decreasing trend seen for over a decade. The detection of cesium-137 in both the control and indicator samples and decreasing levels indicate that the presence of cesium-137 is the result of accumulation and runoff into the river of residual weapons testing fallout. Its global presence has been well documented. During the pre-operational period, cesium-137 was detected in most silt samples with an average concentration as indicated in Figure 4-5. In 2013, cesium-137 was detected with an average indicator location concentration of 142 pCi/kg and an average control location concentration of 206 pCi/kg. These activities continue to represent fallout from nuclear weapons testing. Both indicator and control cesium-137 activities trend

closely as shown in Figure 4-5.



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 2013.



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, thorium-228 and thorium-232 were detected at concentrations equivalent to normal background activities. The activities of these radionuclides indicate a steady trend. There were no radionuclides attributable to the operation of the station found 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. These results are the same as 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.

There were no gamma emitting radionuclides detected in oysters sampled except for naturally occurring potassium-40. No station related radioactivity has been detected in this media since 1991. The absence of station related radionuclides is attributable to the replacement of steam generators in 1982 and past improvements made to liquid effluent treatment systems.

4.13 Clams

Clams are analyzed from four different locations. The results of the gamma spectroscopy analyses are presented in Table 3-14. Like oysters, no station related radioactivity was detected. Naturally occurring potassium-40 and thorium-228 were detected.

4.14 Crabs

A crab sample was collected in June 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 were detected in the sample. This is consistent with pre-operational data and data collected over the past decade.

5. PROGRAM EXCEPTIONS

There were three REMP exceptions for scheduled sampling and analysis during 2013.

1. The Lawne's Creek clam sample station did not produce a sample during the spring shellfish sampling campaign. Finding clams at this station had been increasingly difficult over the past three to five years. Oysters were discovered in the same Lawne's Creek area and a sample of those oysters was obtained. The REMP sampling program has been changed to replace the clam sample with the oysters found in the same Lawne's Creek area.
2. The 4th quarter indicator environmental TLD #25 was missing when TLDs were collected. Therefore, there was no gamma dose evaluation available at this location for the 4th quarter.
3. The 1/8/13 Colonial Parkway (CP) milk sample was not analyzed to the required 15 pCi/Liter LLD for lanthanum-140. The reported LLD was 15.1 pCi/Liter. A software variable that controls the confidence level setting for Minimum Detectable Concentration (MDC) for one particular detector at the TBE laboratory was not set with the appropriate value to meet the 95% confidence level concentration criteria. The variable was set at a default value of 3.29 vice 4.66. Activity and 2 sigma uncertainty results are correct. The TBE laboratory initiated Non-Conformance Report 13-07 to document this issue. A revised analytical report was issued by TBE to document the actual MDC and the MDC variable now appears on the TBE laboratory analytical reports for review and verification by laboratory personnel.

6. CONCLUSIONS

The results of the 2013 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** - Control and indicator location averages continue to indicate a steady relationship and trend over the long term.

- **Airborne Exposure Pathway** - Analysis of charcoal cartridge samples for radioiodines indicated no positive activity was detected. Quarterly gamma isotopic analyses of the composite particulate samples identified only naturally occurring beryllium-7. Air particulate gross beta concentrations at all of the indicator locations for 2013 trend well with the control location.

- **Milk** - Milk samples are an important indicator measuring the effect of radioactive iodine and radionuclides in airborne releases. Cesium-137 and iodine-131 were not 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 not detected in any samples this year. Although Strontium-90 is not a component of station effluents, but rather, a product of nuclear weapons testing fallout, this is only the second year that it was not detected.

- **Food Products** - As expected, naturally occurring potassium-40 was detected in all three samples. In the past, cesium-137 has occasionally been detected in these samples and is attributable to global fallout from past nuclear weapons testing. Cesium-137 was not detected in any of the three samples collected in 2013.

- **Well Water** - Well water samples were analyzed and the analyses indicated that there were no man-made radionuclides present. This trend is consistent throughout the monitoring period. No radioactivity attributable to the operation of the station was identified.

- **River Water** - All river water samples were analyzed for gamma emitting radionuclides. The naturally occurring radionuclides potassium-40, radium-226 and thorium-228 were detected. Tritium was detected in one of eight samples with a concentration of 1.610 pCi/liter. This represents 5.4% of the NRC reporting level concentration. Because river water is not used for drinking water or for crop irrigation, there is a reduced dose consequence to the public from this pathway.

- **Silt** - Cesium-137 was detected in both the control and indicator samples. The presence of cesium-137 is attributable to residual weapons testing fallout; its presence has been well documented. Cobalt-60 has not been detected since 2003.

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

Aquatic Biota

- **Fish** - As expected, naturally occurring potassium-40 was detected. There were no other gamma emitting radionuclides detected in any of the fish samples.

- **Oysters and Clams** – Other than naturally occurring potassium-40 and thorium-228, there were no other gamma emitting radionuclides detected in any of the oyster or clam samples.

- **Crabs** – Naturally occurring potassium-40 was detected. No other gamma emitting radionuclides were detected.

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References

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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.

9. NCRP Report No. 160, "Ionizing Radiation Exposure of the Population of the United States," March 2009.

APPENDICES

APPENDIX A: LAND USE CENSUS

Year 2013

*LAND USE CENSUS**

Surry Power Station, Surry County, Virginia

January 1 to December 31, 2013 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°	(a)	(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	2.3 @ 221°	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 2013

INTRODUCTION

This appendix covers the Interlaboratory Comparison Program (ICP) of Teledyne Brown Engineering (TBE). TBE use QA/QC samples provided by Eckert & Ziegler Analytics, Inc., Environmental Resource Associates (ERA) and the Mixed Analyte Performance Evaluation Program (MAPEP) to monitor the quality of analytical processing associated with the REMP. Each provider has a documented Quality Assurance program and the capability to prepare Quality Control materials traceable to the National Institute of Standards and Technology (NIST). The providers supply the samples to TBE, and upon receipt, the laboratories perform the analyses in a normal manner. The results are then reported to the provider for evaluation. The suite of QA/QC samples is designed to provide sample media and radionuclide combinations that are offered by the providers and included in the REMP and typically includes:

- milk for gamma nuclides and low-level iodine-131 analyses,
- milk for Sr-89 and Sr-90 analyses,
- water for gamma nuclides, low-level iodine-131, and gross beta analyses,
- water for tritium, Sr-89, and Sr-90 analyses,
- cartridge for I-131 analyses,
- air filter for gamma nuclide, gross beta, and Sr-90 analyses.

The accuracy of each result reported to Eckert & Ziegler Analytics, Inc. is measured by the ratio of the TBE result to the known value. Accuracy for all other results is based on statistically derived acceptance ranges calculated by the providers. An investigation is undertaken whenever the ratio or reported result fell outside of the acceptance range.

RESULTS

The TBE ICP results are included in the following tables for the first through the fourth quarters of 2013. Three analyses did not meet the acceptance criteria. TBE initiated non-conformance reports (NCRs) to document and address the analyses. The results of the NCRs are as follows.

1. NCR 13-14, MAPEP filter sample 12-RdF29 failed Cs-134. The TBE value of -0.570 Bq/sample was evaluated as a failed false positive test based on MAPAP's evaluation of the result as a significant negative value at 3 standard deviations. The reported value was a calculated forced activity performed by the gamma software because the nuclide was not detected. No follow-on actions were deemed necessary by TBE.
2. NCR 13-15, Eckert & Ziegler Analytics Milk sample E10646 failed Sr-89 and Sr-90. The TBE analyses failed low. TBE determined the cause to be analyst error. Sample reanalysis with a different analyst was performed and

the results were acceptable. The first analyst is on an extended leave of absence and could not be retrained. TBE also determined the error was specific to sample E10646 only. TBE client samples for the associated time period were evaluated and TBE determined no client samples were affected by this failure.

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Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
March 2013	E10477	Milk	Sr-89	pCi/L	120	99.7	1.20	A
			Sr-90	pCi/L	9.21	11.0	0.84	A
	E10478	Milk	I-131	pCi/L	87.1	100	0.87	A
			Ce-141	pCi/L	186	187	0.99	A
			Cr-51	pCi/L	463	472	0.98	A
			Cs-134	pCi/L	201	214	0.94	A
			Cs-137	pCi/L	262	266	0.98	A
			Co-58	pCi/L	200	208	0.96	A
			Mn-54	pCi/L	215	208	1.03	A
			Fe-59	pCi/L	266	252	1.06	A
			Zn-65	pCi/L	311	301	1.03	A
			Co-60	pCi/L	384	400	0.96	A
	E10480	Filter	Ce-141	pCi	95.3	95.6	1.00	A
			Cr-51	pCi	264	241	1.10	A
			Cs-134	pCi	123	109	1.13	A
			Cs-137	pCi	142	136	1.04	A
			Co-58	pCi	112	106	1.06	A
			Mn-54	pCi	115	106	1.08	A
			Fe-59	pCi	139	129	1.08	A
			Zn-65	pCi	163	153	1.07	A
			Co-60	pCi	212	204	1.04	A
	E10479	Charcoal	I-131	pCi	90.1	92.6	0.97	A
June 2013	E10564	Milk	Sr-89	pCi/L	110	95.0	1.16	A
			Sr-90	pCi/L	15.8	17.0	0.93	A
	E10545	Milk	I-131	pCi/L	92.6	95.5	0.97	A
			Ce-141	pCi/L	83.1	90.4	0.92	A
			Cr-51	pCi/L	253	250	1.01	A
			Cs-134	pCi/L	118	125	0.94	A
			Cs-137	pCi/L	143	151	0.95	A
			Co-58	pCi/L	87.1	94.0	0.93	A
			Mn-54	pCi/L	171	172	0.99	A
			Fe-59	pCi/L	125	120	1.04	A
			Zn-65	pCi/L	220	217	1.01	A
			Co-60	pCi/L	169	175	0.97	A

Footnotes are on page 3 of 3.

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Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
June 2013	E10547	Filter	Ce-141	pCi	56.8	56.7	1.00	A
			Cr-51	pCi	168	157	1.07	A
			Cs-134	pCi	85.2	78.4	1.09	A
			Cs-137	pCi	101	94.6	1.07	A
			Co-58	pCi	62.7	58.9	1.06	A
			Mn-54	pCi	125	108	1.16	A
			Fe-59	pCi	85.7	75.0	1.14	A
			Zn-65	pCi	169	136	1.24	W
			Co-60	pCi	116	110	1.05	A
	E10546	Charcoal	I-131	pCi	86.5	89.7	0.96	A
September 2013	E10646	Milk	Sr-89	pCi/L	63.9	96.0	0.67	N (1)
			Sr-90	pCi/L	8.88	13.2	0.67	N (1)
	E10647	Milk	I-131	pCi/L	93.9	98.3	0.96	A
			Ce-141	pCi/L				NA (2)
			Cr-51	pCi/L	272	277	0.98	A
			Cs-134	pCi/L	150	172	0.87	A
			Cs-137	pCi/L	125	131	0.95	A
			Co-58	pCi/L	105	108	0.97	A
			Mn-54	pCi/L	138	139	0.99	A
			Fe-59	pCi/L	125	130	0.96	A
			Zn-65	pCi/L	264	266	0.99	A
			Co-60	pCi/L	187	196	0.95	A
	E10672	Filter	Ce-141	pCi				NA (2)
			Cr-51	pCi	208	223	0.93	A
			Cs-134	pCi	143	139	1.03	A
			Cs-137	pCi	106	105	1.01	A
			Co-58	pCi	97.0	86.5	1.12	A
			Mn-54	pCi	116	112	1.04	A
			Fe-59	pCi	98.6	105	0.94	A
			Zn-65	pCi	219	214	1.02	A
			Co-60	pCi	166	158	1.05	A
	E10648	Charcoal	I-131	pCi	76.3	71.7	1.06	A
December 2013	E10774	Milk	Sr-89	pCi/L	97.3	93.8	1.04	A
			Sr-90	pCi/L	13.3	12.9	1.03	A

Footnotes are on page 3 of 3.

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Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
December 2013	E10775	Milk	I-131	pCi/L	89.7	96.1	0.93	A
			Ce-141	pCi/L	99.8	110	0.91	A
			Cr-51	pCi/L	297	297	1.00	A
			Cs-134	pCi/L	129	142	0.91	A
			Cs-137	pCi/L	126	126	1.00	A
			Co-58	pCi/L	116	112	1.04	A
			Mn-54	pCi/L	167	168	0.99	A
			Fe-59	pCi/L	117	110	1.06	A
			Zn-65	pCi/L	757	741	1.02	A
			Co-60	pCi/L	141	147	0.96	A
	E10777	Filter	Ce-141	pCi	85.1	88.0	0.97	A
			Cr-51	pCi	278	238	1.17	A
			Cs-134	pCi	123	114	1.08	A
			Cs-137	pCi	102	101	1.01	A
			Co-58	pCi	84.4	89.9	0.94	A
			Mn-54	pCi	132	135	0.98	A
			Fe-59	pCi	101	88.3	1.14	A
			Zn-65	pCi	506	595	0.85	A
			Co-60	pCi	118	118	1.00	A
	E10776	Charcoal	I-131	pCi	84.7	80.5	1.05	A

(1) Milk, Sr-89/90 - The failure was due to analyst error. No client samples were affected by this failure. NCR 13-15

(2) The sample was not spiked with Ce-141

(a) Teledyne Brown Engineering reported result.

(b) 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.

(c) Ratio of Teledyne Brown Engineering to Analytics results.

(d) 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.

DOE's MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES
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Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Range	Evaluation (c)
March 2013	13-MaW28	Water	Cs-134	Bq/L	21.0	24.4	17.1 - 31.7	A
			Cs-137	Bq/L	0.0446		(1)	A
			Co-57	Bq/L	28.3	30.9	21.6 - 40.2	A
			Co-60	Bq/L	18.2	19.56	13.69 - 25.43	A
			H-3	Bq/L	506	507	355 - 659	A
			Mn-54	Bq/L	25.7	27.4	19.2 - 35.6	A
			K-40	Bq/L	2.09		(1)	A
			Sr-90	Bq/L	10.5	10.5	7.4 - 13.7	A
			Zn-65	Bq/L	29.2	30.4	21.3 - 39.5	A
	13-GrW28	Water	Gr-A	Bq/L	2.74	2.31	0.69 - 3.93	A
			Gr-B	Bq/L	15.6	13.0	6.5 - 19.5	A
	13-RdF28	Filter	Cs-134	Bq/sample	1.73	1.78	1.25 - 2.31	A
			Cs-137	Bq/sample	2.73	2.60	1.82 - 3.38	A
			Co-57	Bq/sample	2.38	2.36	1.65 - 3.07	A
			Co-60	Bq/sample	0.0302		(1)	A
			Mn-54	Bq/sample	4.36	4.26	2.98 - 5.54	A
			Sr-90	Bq/sample	1.43	1.49	1.04 - 1.94	A
			Zn-65	Bq/sample	3.14	3.13	2.19 - 4.07	A
	13-GrF28	Filter	Gr-A	Bq/sample	0.767	1.20	0.36 - 2.04	A
			Gr-B	Bq/sample	0.871	0.85	0.43 - 1.28	A
September 2013	13-MaW29	Water	Cs-134	Bq/L	29.1	30.0	21.0 - 39.0	A
			Cs-137	Bq/L	34.5	31.6	22.1 - 41.1	A
			Co-57	Bq/L	0.0358		(1)	A
			Co-60	Bq/L	24.6	23.58	16.51 - 30.65	A
			H-3	Bq/L	2.45		(1)	A
			Mn-54	Bq/L	0.0337		(1)	A
			K-40	Bq/L	0.193		(1)	A
			Sr-90	Bq/L	9.12	7.22	5.05 - 9.39	W
			Zn-65	Bq/L	38.1	34.6	24.2 - 45.0	A
	13-GrW29	Water	Gr-A	Bq/L	1.13	0.701	0.210 - 1.192	A
			Gr-B	Bq/L	7.61	5.94	2.97 - 8.91	A

DOE's MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES
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Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Range	Evaluation (c)
September 2013	13-RdF29	Filter	Cs-134	Bq/sample	-0.570		(1)	N (2)
			Cs-137	Bq/sample	2.85	2.7	1.9 - 3.5	A
			Co-57	Bq/sample	3.30	3.4	2.4 - 4.4	A
			Co-60	Bq/sample	2.41	2.3	1.6 - 3.0	A
			Mn-54	Bq/sample	3.65	3.5	2.5 - 4.6	A
			Sr-90	Bq/sample	1.40	1.81	1.27 - 2.35	W
			Zn-65	Bq/sample	2.90	2.7	1.9 - 3.5	A
	13-GrF29	Filter	Gr-A	Bq/sample	0.872	0.9	0.3 - 1.5	A
			Gr-B	Bq/sample	1.57	1.63	0.82 - 2.45	A

(1) False positive test.

(2) AP, Cs-134 - MAPEP evaluated the -0.570 as a failed false positive test. No client samples were affected by these failures. NCR 13-04

(a) Teledyne Brown Engineering reported result.

(b) 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.

(c) DOE/MAPEP evaluation: A=acceptable, W=acceptable with warning, N=not acceptable.

ERA ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES
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Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Limits	Evaluation (c)
May 2013	RAD-93	Water	Sr-89	pCi/L	48.3	41.3	31.6 - 48.4	A
			Sr-90	pCi/L	19.3	23.9	17.2 - 28.0	A
			Ba-133	pCi/L	81.9	82.1	69.0 - 90.3	A
			Cs-134	pCi/L	40.9	42.8	34.2 - 47.1	A
			Cs-137	pCi/L	44.0	41.7	37.0 - 48.8	A
			Co-60	pCi/L	61.9	65.9	59.3 - 75.0	A
			Zn-65	pCi/L	202	189	170 - 222	A
			Gr-A	pCi/L	34.2	40.8	21.1 - 51.9	A
			Gr-B	pCi/L	18.0	21.6	13.0 - 29.7	A
			I-131	pCi/L	23.8	23.8	19.7 - 28.3	A
			U-Nat	pCi/L	60.4	61.2	49.8 - 67.9	A
			H-3	pCi/L	3970	4050	3450 - 4460	A
	MRAD-18	Filter	Gr-A	pCi/filter	Lost during processing			
November 2013	RAD-95	Water	Sr-89	pCi/L	25.5	21.9	14.4 - 28.2	A
			Sr-90	pCi/L	14.3	18.1	12.8 - 21.5	A
			Ba-133	pCi/L	57.2	54.2	44.7 - 59.9	A
			Cs-134	pCi/L	83.3	86.7	71.1 - 95.4	A
			Cs-137	pCi/L	201	206	185 - 228	A
			Co-60	pCi/L	104	102	91.8 - 114	A
			Zn-65	pCi/L	361	333	300 - 389	A
			Gr-A	pCi/L	29.5	42.8	22.2 - 54.3	A
			Gr-B	pCi/L	30.1	32.2	20.8 - 39.9	A
			I-131	pCi/L	23.1	23.6	19.6 - 28.0	A
			U-Nat	pCi/L	5.53	6.24	47.0 - 7.44	A
			H-3	pCi/L	17650	17700	15500 - 19500	A
	MRAD-19	Filter	Gr-A	pCi/filter	33.0	83.0	27.8 - 129	A

(a) Teledyne Brown Engineering reported result.

(b) 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.

(c) ERA evaluation: A=acceptable. Reported result falls within the Warning Limits. NA=not acceptable. Reported result falls outside of the Control Limits. CE=check for Error. Reported result falls within the Control Limits and outside of the Warning Limit.