VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

April 25, 2012

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

Serial No. 12-269
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, 2011 through December 31, 2011, which includes environmental monitoring for the Surry ISFSI.

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

Sincerely,

B. L. Stanley
Director Safety & Licensing
Surry Power Station

Attachment

Commitments made in this letter: None

IE25
NMSS26
NRR
NMSS

Received
in DCD
11/21/11

Serial No. 12-269
Docket Nos.: 50-280
50-281
72-2
72-55

cc: U. S. Nuclear Regulatory Commission
Region II
Marquis One Tower
245 Peachtree Center Ave., NE Suite 1200
Atlanta, Georgia 30303-1257

Director, Nuclear Material Safety and Safeguards
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555-0001

NRC Senior Resident Inspector
Surry Power Station

Director
Division of Radiological Health
109 Governor Street, Room 730
Richmond, Virginia 23219

Serial No. 12-269
Docket Nos.: 50-280
50-281
72-2
72-55

ATTACHMENT 1

2011 Annual Radiological Environmental Operating Report

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

Surry Power Station

2011 Annual Radiological Environmental Operating Report

Dominion®

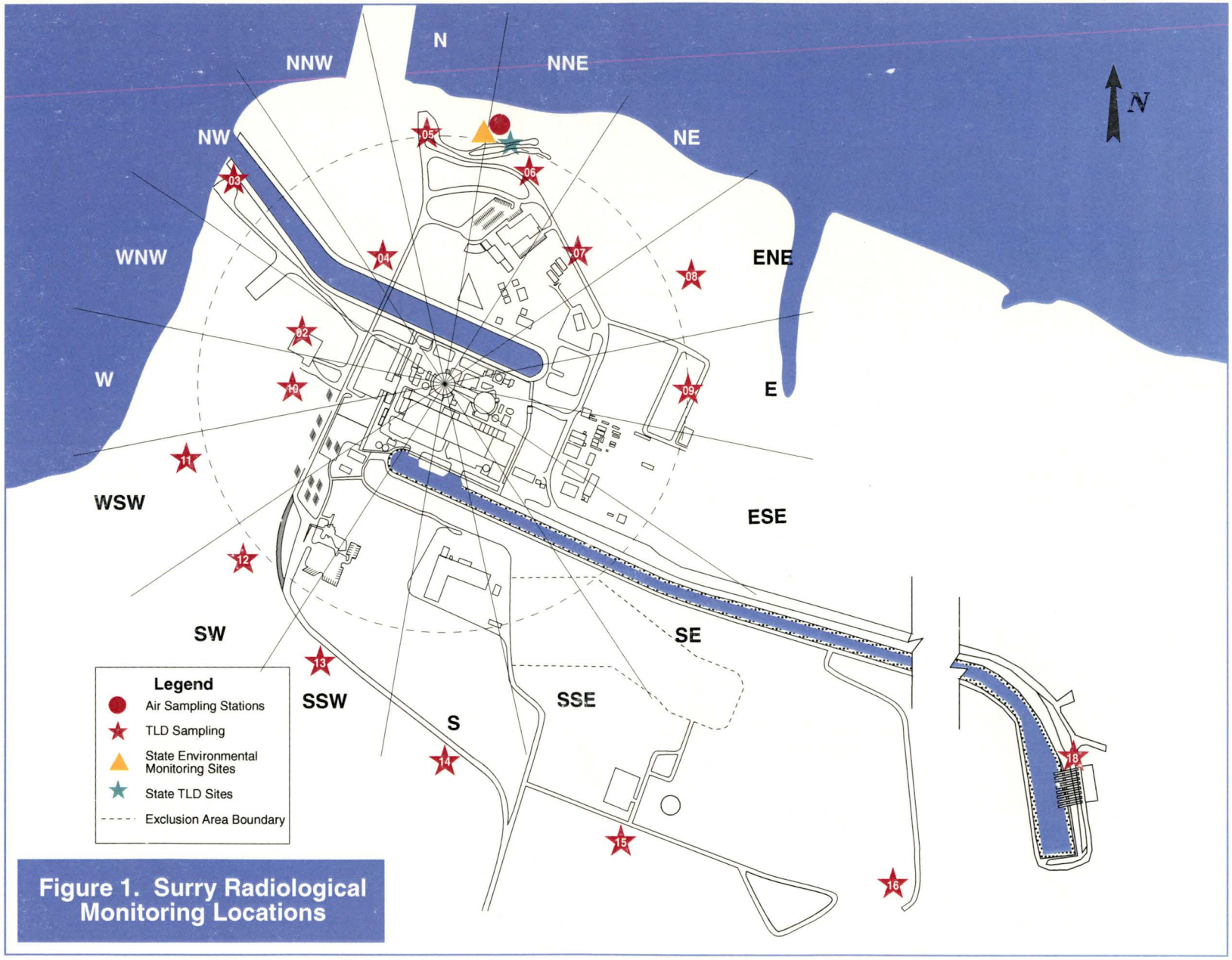

Figure 1. Surry Radiological Monitoring Locations

Graphics No. SV645F

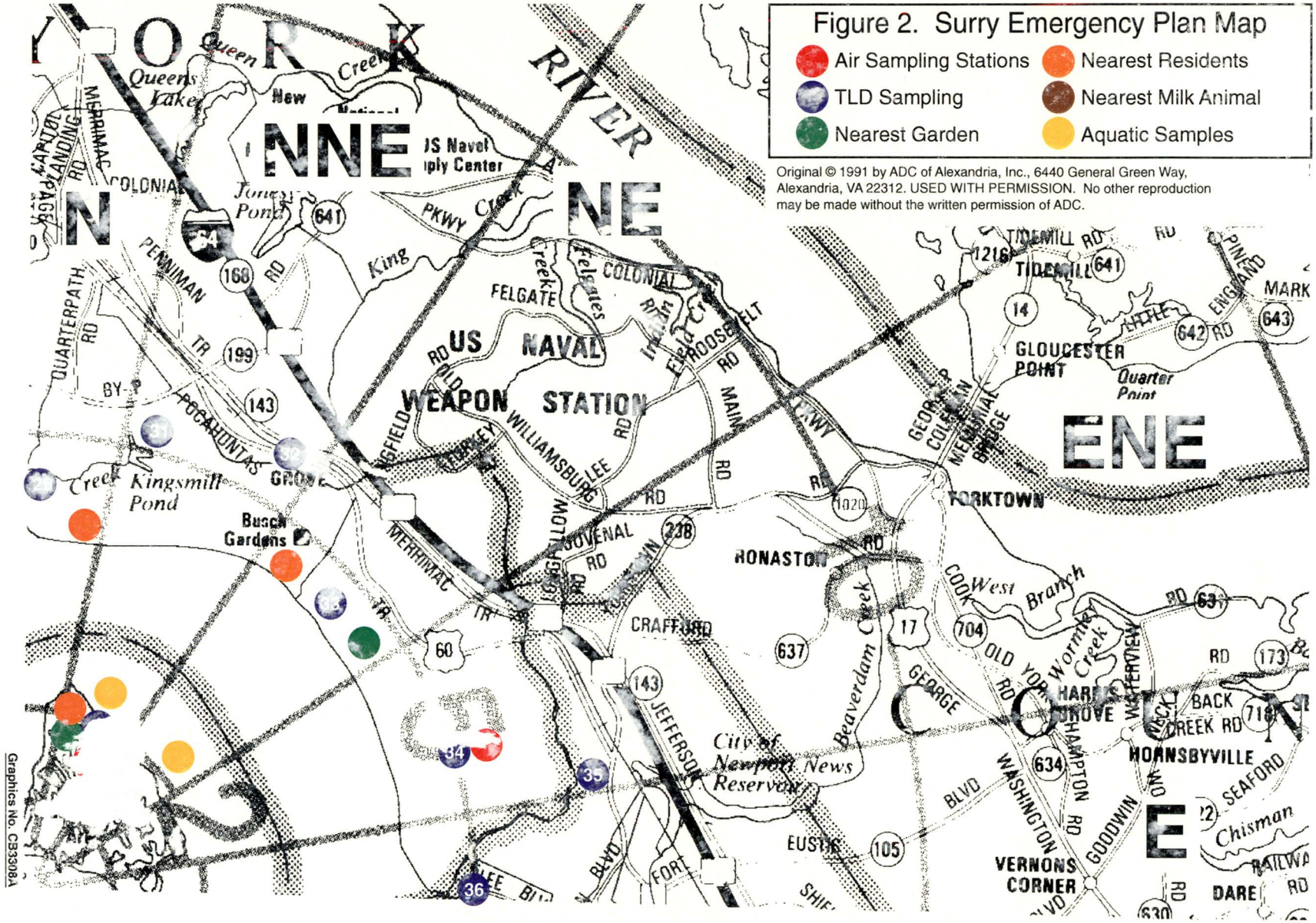
Figure 2. Surry Emergency Plan Map
Air Sampling Stations
Nearest Residents
TLD Sampling
Nearest Milk Animal
Nearest Garden
Aquatic Samples
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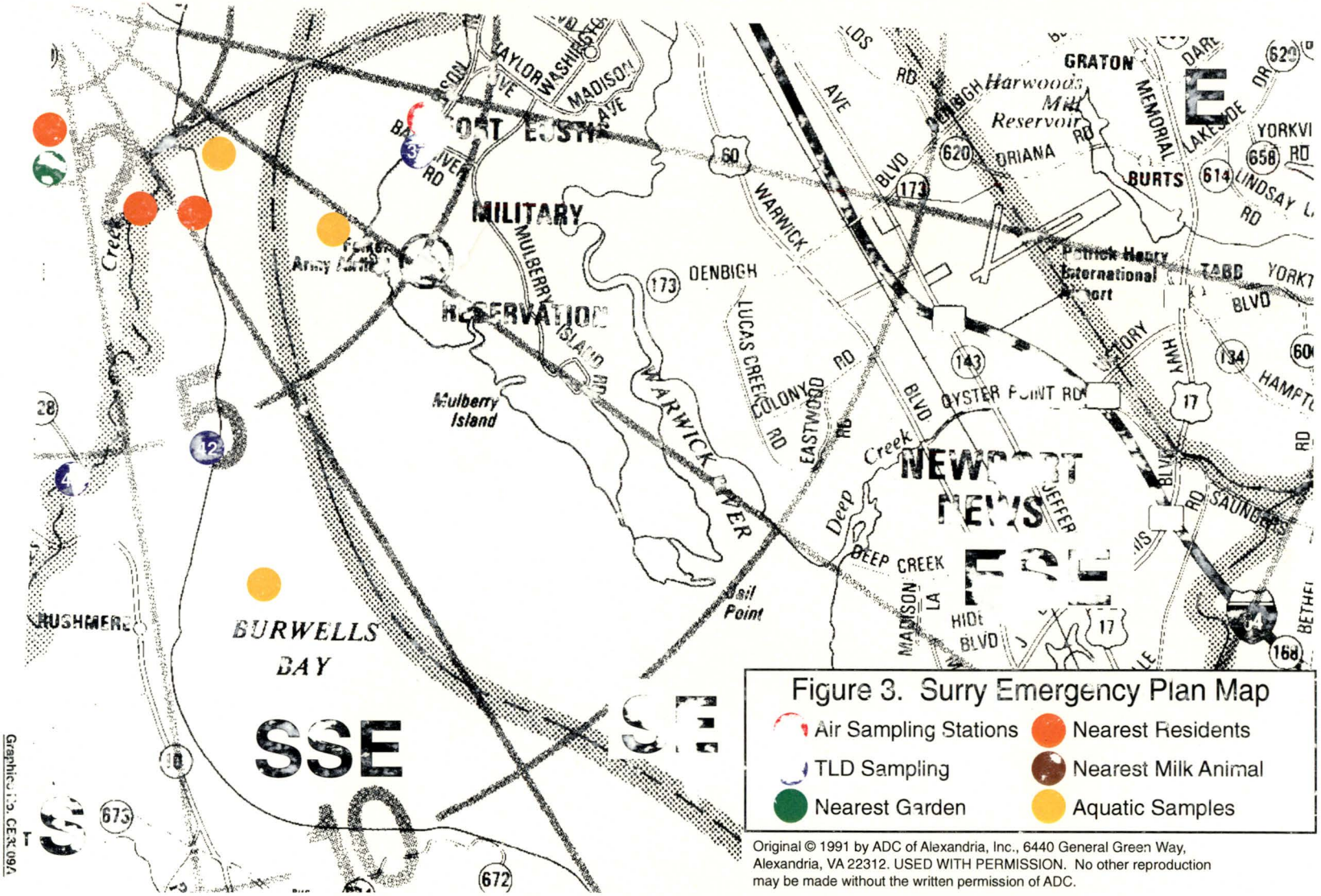
NNE
NE
ENE
E
US NAVAL WEAPON STATION
GLOUCESTER POINT
YORKTOWN
RONASTON
CRAFFORD
HORNSBYVILLE
VERNONS CORNER
City of Newport News Reservoir
Kingsmill Pond
Busch Gardens
Graphics No. CB3308A



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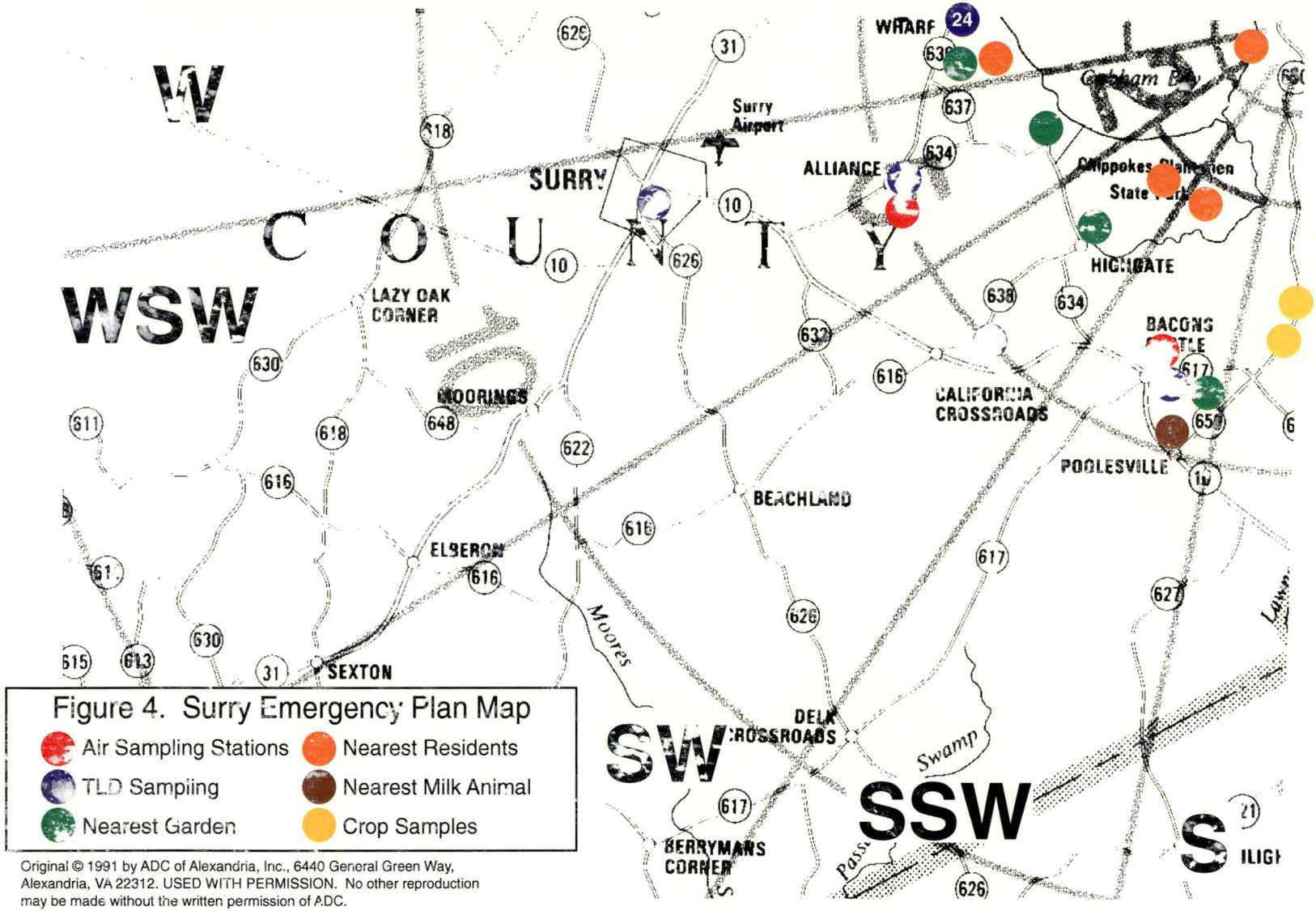

Figure 4. Surry Emergency Plan Map

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Graphics No. CB3310A

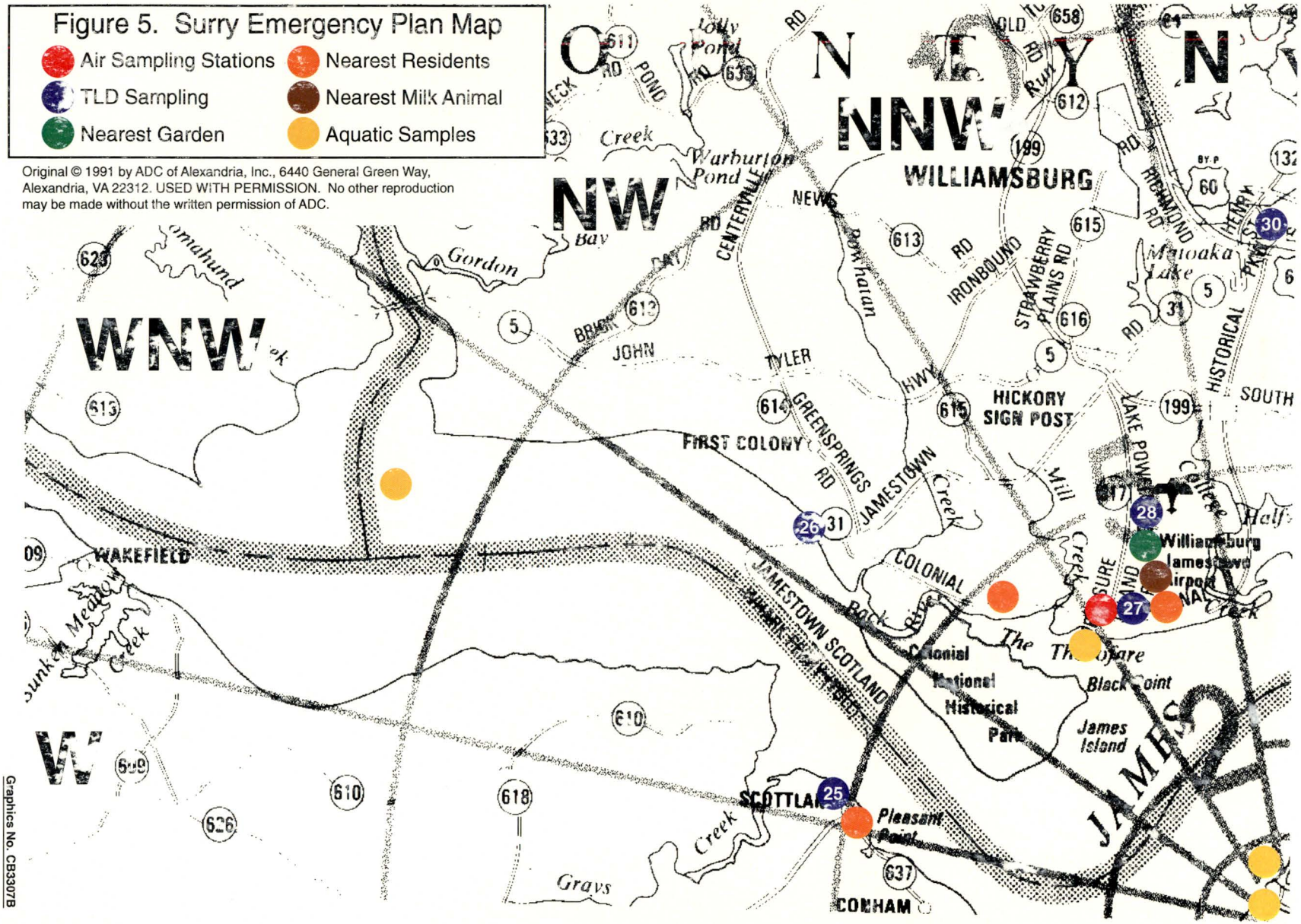
Figure 5. Surry Emergency Plan Map
Air Sampling Stations
Nearest Residents
TLD Sampling
Nearest Milk Animal
Nearest Garden
Aquatic Samples
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WILLIAMSBURG
HICKORY SIGN POST
FIRST COLONY
WAKEFIELD
SCOTTLAND
CONHAM
JAMESTOWN SCOTLAND
Colonial National Historical Park
James Island
Pleasant Point
Gordon Creek
Warburton Pond
Graphics No. CB3307B

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 - 2011
Docket No. 50-280-281 Page 1 of 7

Medium or Pathway Sampled (Units)	Analysis Type	Analysis Total No.	LLD	Indicator Locations Mean Range	Location with Highest Mean Name	Location with Highest Mean Distance Direction	Location with Highest Mean Mean Range	Control Locations Mean Range	Non-Routine Reported Measurements
Direct Radiation *TLD (mR/ Std Month)*	**Gamma**	164	2	**3.3 (152/152) (1.3 - 7.2)**	**STA-41**	**13.4 mi SSE**	**5.6 (3/4) (4.6 - 6.3)**	**3.7 (11/12) (2.2 - 6.3)**	0
Air Particulate *(1E-3 pCi/m3)*	**Gross Beta**	416	10	**16.6 (357/364) (4.2 - 37.3)**	**ALL**	**5.1 mi WSW**	**18.4 (51/52) (5.4 - 32.0)**	**15.8 (52/52) (3.9 - 32.6)**	0
	Gamma	32							
	Be-7	32		**145 (28/28) (91.2 - 188)**	**ALL**	**5.1 mi WSW**	**160 (4/4) (141 - 169)**	**133 (4/4) (96.3 - 172)**	0
	K-40	32		**16.8 (2/28) (11.5 - 22.1)**	**HIR**	**2.0 mi NNE**	**22.1 (1/4) (22.1 - 22.1)**	< 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	**92.3 (20/364) (19.6 - 151)**	**CP**	**3.7 mi NNW**	**119 (2/52) (117 - 121)**	**69.4 (3/52) (37.4 - 98.2)**	0
Milk *(pCi/Liter)*	**Strontium**	4							
	Sr-89	4		< LLD	N/A		< LLD	< LLD	0
	Sr-90	4		**1.19 (1/4) (1.19 - 1.19)**	**CP**	**3.7 mi NNW**	**1.19 (1/4) (1.19 - 1.19)**	N/A	0
	Gamma	36							
	K-40	36		**1305 (24/24) (944 - 1520)**	**CP**	**3.7 mi NNW**	**1359 (12/12) (1170 - 1520)**	**1263 (12/12) (1120 - 1460)**	0
	Th-228	36		**8.76 (1/24) (8.76 - 8.76)**	**EPPS**	**4.8 mi SSW**	**8.76 (1/24) (8.76 - 8.76)**	< LLD	0
	I-131	36	1	**9.88 (2/24) (4.75 - 15.0)**	**EPPS**	**4.8 mi SSW**	**15.0 (1/12) (15.0 - 15.0)**	**8.91 (1/12) (8.91 - 8.91)**	0
	Cs-134	36	15	< LLD	N/A		< LLD	< LLD	0
	Cs-137	36	18	< LLD	N/A		< LLD	< LLD	0

TABLE 3-1: RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

Surry Power Station, Surry County, Virginia - 2011
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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							
	Ba-140	36	60	< LLD	N/A		< LLD	< LLD	0
	La-140	36	15	< LLD	N/A		< LLD	< LLD	0
Food Products *(pCi/kg wet)*	**Gamma**	3							
	K-40	3		**7137 (3/3) (2660 - 15200)**	**Slade**	**3.2 mi S**	**15200 (1/1) (15200-15200)**	N/A	0
	I-131	3	60	< LLD	N/A		< LLD	N/A	0
	Cs-134	3	60	< LLD	N/A		< LLD	N/A	0
	Cs-137	3	80	< LLD	N/A		< LLD	N/A	0
Well Water *(pCi/Liter)*	**H-3**	12	2000	< LLD	N/A		< LLD	N/A	0
	Gamma	12							
	K-40	12		**58.5 (1/12) (58.5 - 58.5)**	**HIR**	**2.0 mi NNE**	**58.5 (1/12) (58.5 - 58.5)**	N/A	0
	Ra-226	12		**114 (1/12) (114 - 114)**	**CS**	**0.3 mi E**	**114 (1/12) (114 - 114)**	N/A	0
	Th-228	12		**17.6 (2/12) (9.92 - 25.3)**	**SS**	**0.1 mi SW**	**17.6 (2/12) (9.92 - 25.3)**	N/A	0
	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

TABLE 3-1: RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

Surry Power Station, Surry County, Virginia - 2011
Docket No. 50-280-281 Page 3 of 7

Medium or Pathway Sampled (Units)	Analysis Type	Analysis Total No.	LLD	Indicator Locations Mean Range	Location with Highest Mean Name	Location with Highest Mean Distance Direction	Location with Highest Mean Mean Range	Control Locations Mean Range	Non-Routine Reported Measurements
Well Water *(pCi/Liter)*	Zn-65	12	30	< LLD	N/A		< LLD	N/A	0
	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	**1270 (1/4) (1270 - 1270)**	**SD**	**0.4 mi NW**	**1270 (1/4) (1270 - 1270)**	< LLD	0
	Gamma	24							
	K-40	24		**95.5 (7/12) (32.5 - 157)**	**SD**	**0.4 mi NW**	**95.5 (7/12) (32.5 - 157)**	**82.7 (2/12) (68.4 - 97.0)**	0
	Th-228	24		**9.16 (1/12) (9.16 - 9.16)**	**SD**	**0.4 mi NW**	**9.16 (1/12) (9.16 - 9.16)**	**13.1 (2/12) (7.54 - 18.6)**	0
	Mn-54	24	15	< LLD	N/A		< LLD	< LLD	0
	Co-58	24	15	< LLD	N/A		< LLD	< LLD	0
	Fe-59	24	30	< LLD	N/A		< LLD	< LLD	0
	Co-60	24	15	< LLD	N/A		< LLD	< LLD	0
	Zn-65	24	30	< LLD	N/A		< LLD	< LLD	0

TABLE 3-1: RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

Surry Power Station, Surry County, Virginia - 2011
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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		**2300 (1/2) (2300 - 2300)**	**SD**	**1.3 mi NNW**	**2300 (1/2) (2300 - 2300)**	< LLD	0
	K-40	4		**18600 (2/2) (18000-19200)**	**SD**	**1.3 mi NNW**	**18600 (2/2) (18000-19200)**	**15900 (2/2) (12400-19400)**	0
	Cs-134	4	150	< LLD	N/A		< LLD	< LLD	0
	Cs-137	4	180	**206 (2/2) (204 - 208)**	**SD**	**1.3 mi NNW**	**206 (2/2) (204 - 208)**	**192 (2/2) (151 - 232)**	0
	Ra-226	4		**2605 (2/2) (2500 - 2710)**	**CHIC**	**11.2 mi WNW**	**2800 (2/2) (1050 - 4550)**	**2800 (2/2) (1050 - 4550)**	0
	Ac-228	4		< LLD	**CHIC**	**11.2 mi WNW**	**411 (1/2) (411 - 411)**	**411 (1/2) (411 - 411)**	0
	Th-228	4		**1490 (2/2) (1420 - 1560)**	**SD**	**1.3 mi NNW**	**1490 (2/2) (1420 - 1560)**	**1169 (2/2) (768 - 1570)**	0
	Th-232	4		**1240 (1/2) (1110 - 1370)**	**SD**	**1.3 mi NNW**	**1240 (1/2) (1110 - 1370)**	**1162 (2/2) (773 - 1550)**	0

TABLE 3-1: RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

Surry Power Station, Surry County, Virginia - 2011
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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)*	**Gamma**	4							
	K-40	4		**4760 (2/2) (2730 - 6790)**	**HIR**	**0.6 mi N**	**4760 (2/2) (2730 - 6790)**	**4500 (2/2) (2710 - 6290)**	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**	**1230 (1/2) (1230 - 1230)**	**1230 (1/2) (1230 - 1230)**	0
	Th-228	4		**174 (2/2) (138 - 210)**	**CHIC**	**11.2 mi WNW**	**369 (2/2) (289 - 448)**	**369 (2/2) (289 - 448)**	0
	Th-232	4		**204 (1/2) (204 - 204)**	**CHIC**	**11.2 mi WNW**	**346 (2/2) (267 - 425)**	**346 (2/2) (267 - 425)**	0
Fish *(pCi/kg wet)*	**Gamma**	4							
	K-40	4		**2543 (4/4) (1790 - 3850)**	**SD**	**1.3 mi NNW**	**2543 (4/4) (1790 - 3850)**	N/A	0
	Mn-54	4	130	< LLD	N/A		< LLD	N/A	0
	Co-58	4	130	< LLD	N/A		< LLD	N/A	0
	Fe-59	4	260	< LLD	N/A		< LLD	N/A	0
	Co-60	4	130	< LLD	N/A		< LLD	N/A	0
	Zn-65	4	260	< LLD	N/A		< LLD	N/A	0
	Cs-134	4	130	< LLD	N/A		< LLD	N/A	0
	Cs-137	4	150	< LLD	N/A		< LLD	N/A	0

TABLE 3-1: RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

Surry Power Station, Surry County, Virginia - 2011
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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**	4							
	K-40	4		**665 (2/4) (615 - 694)**	**POS**	**6.4 mi SSE**	**665 (2/4) (615 - 694)**	N/A	0
	Mn-54	4	130	< LLD	N/A		< LLD	N/A	0
	Fe-59	4	260	< LLD	N/A		< LLD	N/A	0
	Co-58	4	130	< 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
	Th-228	4		**88.6 (2/4) (56.1 - 121)**	**POS**	**6.4 mi SSE**	**88.6 (2/4) (56.1 - 121)**	N/A	0
Clams *(pCi/kg wet)*	**Gamma**	8							
	K-40	8		**987 (1/6) (987 - 987)**	**JI**	**3.9 mi NW**	**987 (1/6) (987 - 987)**	**750 (1/2) (750 - 750)**	0
	Mn-54	8	130	< LLD	N/A		< LLD	< LLD	0
	Co-58	8	130	< LLD	N/A		< LLD	< LLD	0
	Fe-59	8	260	< LLD	N/A		< LLD	< LLD	0
	Co-60	8	130	< LLD	N/A		< LLD	< LLD	0
	Zn-65	8	260	< 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)*	Cs-134	8	130	< LLD	N/A		< LLD	< LLD	0
	Cs-137	8	150	< LLD	N/A		< LLD	< LLD	0
Crabs *(pCi/kg wet)*	**Gamma**	1							
	K-40	1		**1750 (1/1) (1750 - 1750)**	**SD**	**1.3 mi NNW**	**1750 (1/1) (1750 - 1750)**	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 2011 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 - 2011

mR/Std Month ± 2 Sigma

STATION NUMBER	FIRST QUARTER	SECOND QUARTER	THIRD QUARTER	FOURTH QUARTER	AVERAGE ± 2 SIGMA
02	4.6 ± 0.6	4.0 ± 0.5	3.7 ± 0.6	5.3 ± 1.6	4.4 ± 1.4
03	4.7 ± 0.4	3.9 ± 0.9	3.9 ± 1.2	4.2 ± 1.1	4.2 ± 0.8
04	4.0 ± 0.3	3.4 ± 0.9	3.7 ± 1.3	4.1 ± 1.1	3.8 ± 0.6
05	4.0 ± 0.7	3.4 ± 0.6	3.1 ± 0.1	4.4 ± 0.6	3.7 ± 1.2
06	4.1 ± 0.1	3.5 ± 0.7	4.7 ± 0.6	4.7 ± 0.4	4.3 ± 1.1
07	3.9 ± 0.5	3.1 ± 0.2	3.7 ± 0.9	4.3 ± 1.4	3.8 ± 1.0
08	3.8 ± 1.0	3.7 ± 1.2	3.7 ± 0.4	4.7 ± 1.4	4.0 ± 1.0
09	4.4 ± 0.8	4.2 ± 0.8	4.8 ± 1.3	7.2 ± 1.1	5.2 ± 2.8
10	3.9 ± 0.3	3.3 ± 0.4	3.4 ± 0.4	4.8 ± 1.0	3.9 ± 1.4
11	2.9 ± 0.2	2.6 ± 0.3	2.9 ± 0.7	3.7 ± 0.2	3.0 ± 0.9
12	3.2 ± 0.5	2.8 ± 1.0	3.5 ± 0.5	3.9 ± 0.8	3.4 ± 0.9
13	3.9 ± 0.4	3.2 ± 0.4	3.8 ± 1.5	3.7 ± 0.4	3.7 ± 0.6
14	3.9 ± 0.5	3.3 ± 0.4	3.3 ± 1.1	3.8 ± 0.8	3.6 ± 0.6
15	4.5 ± 0.4	3.8 ± 0.2	4.0 ± 1.4	4.3 ± 0.7	4.2 ± 0.6
16	3.7 ± 0.3	3.0 ± 0.3	2.8 ± 0.7	3.7 ± 0.3	3.3 ± 0.9
18	2.5 ± 0.6	2.0 ± 0.3	2.1 ± 0.4	2.2 ± 0.3	2.2 ± 0.4
19	2.6 ± 0.2	2.7 ± 0.8	2.5 ± 0.6	3.2 ± 0.5	2.8 ± 0.6
20	2.6 ± 0.3	2.5 ± 0.5	2.0 ± 0.4	2.8 ± 1.4	2.5 ± 0.7
21	2.9 ± 0.5	2.4 ± 0.5	2.8 ± 0.8	3.1 ± 1.9	2.8 ± 0.6
22	2.0 ± 0.3	2.7 ± 0.4	1.4 ± 0.6	2.0 ± 0.5	2.0 ± 1.1
23	3.7 ± 0.4	3.8 ± 1.9	3.4 ± 1.6	5.3 ± 1.2	4.1 ± 1.7
24	2.7 ± 0.3	2.1 ± 0.3	2.3 ± 0.7	2.7 ± 0.4	2.5 ± 0.6
25	4.0 ± 0.5	3.1 ± 0.6	2.9 ± 0.4	4.4 ± 0.8	3.6 ± 1.4
26	4.1 ± 0.9	3.7 ± 1.3	2.9 ± 0.6	4.5 ± 0.9	3.8 ± 1.4
27	2.7 ± 0.6	2.4 ± 0.9	2.8 ± 1.6	2.9 ± 1.1	2.7 ± 0.4
28	2.5 ± 0.5	1.7 ± 0.2	1.9 ± 0.2	3.0 ± 1.1	2.3 ± 1.2
29	2.1 ± 0.3	2.2 ± 0.8	1.5 ± 0.5	2.3 ± 0.5	2.0 ± 0.7
30	2.5 ± 0.8	2.4 ± 1.4	1.9 ± 0.4	2.9 ± 0.7	2.4 ± 0.8
31	1.6 ± 0.2	1.3 ± 0.5	1.7 ± 1.0	1.7 ± 0.4	1.6 ± 0.4
32	2.9 ± 0.6	2.5 ± 0.4	2.7 ± 0.6	2.6 ± 0.7	2.7 ± 0.3
33	2.9 ± 0.5	2.6 ± 0.8	2.7 ± 1.2	2.3 ± 0.3	2.6 ± 0.5
34	2.8 ± 0.6	2.5 ± 0.6	3.3 ± 0.6	2.9 ± 0.6	2.9 ± 0.7
35	3.8 ± 0.5	3.3 ± 0.1	3.6 ± 1.2	4.6 ± 0.6	3.8 ± 1.1
36	4.0 ± 0.3	3.2 ± 0.3	3.3 ± 0.7	4.7 ± 1.3	3.8 ± 1.4
37	3.3 ± 0.8	3.0 ± 1.3	2.6 ± 1.1	2.9 ± 0.1	3.0 ± 0.6
38	5.7 ± 0.8	4.4 ± 0.8	4.4 ± 0.7	6.1 ± 1.0	5.2 ± 1.8
39-C	2.5 ± 0.3	2.2 ± 0.1	2.3 ± 0.2	2.9 ± 0.7	2.5 ± 0.6
40-C	3.5 ± 0.2	2.9 ± 0.4	3.0 ± 1.0	4.0 ± 1.1	3.4 ± 1.0
41-C	5.9 ± 0.5	4.6 ± 0.6	A	6.3 ± 0.6	5.6 ± 1.8
42	3.6 ± 1.3	2.5 ± 0.7	3.0 ± 0.3	3.5 ± 0.5	3.2 ± 1.0
43	2.5 ± 0.4	2.4 ± 0.3	2.0 ± 0.3	2.3 ± 0.9	2.3 ± 0.4

A - TLD missing

TABLE 3-3: GROSS BETA CONCENTRATION IN FILTERED AIR

Surry Power Station, Surry County, Virginia - 2011

1.0E-3 pCi/m3 ± 2 Sigma

COLLECTION DATE	SAMPLING LOCATIONS SS	HIR	BC	ALL	CP	BASF	FE	NN-C
January 04	7.44 ± 2.68	20.7 ± 3.5	20.4 ± 3.5	5.40 ± 2.50	17.7 ± 3.25	21.1 ± 3.38	20.2 ± 3.31	23.2 ± 3.48
January 11	6.76 ± 2.67	22.9 ± 3.5	25.8 ± 3.6	32.0 ± 3.85	22.5 ± 3.50	24.1 ± 3.55	22.7 ± 3.49	32.6 ± 3.92
January 18	5.75 ± 2.69	18.2 ± 3.4	21.4 ± 3.5	24.9 ± 3.59	19.5 ± 3.40	18.1 ± 3.37	17.2 ± 3.27	23.5 ± 3.61
January 25	16.3 ± 3.18	18.8 ± 3.2	22.8 ± 3.5	19.2 ± 3.28	21.3 ± 3.41	24.2 ± 3.53	20.2 ± 3.29	21.3 ± 3.34
February 01	16.7 ± 3.37	11.9 ± 3.07	18.2 ± 3.41	15.2 ± 3.28	19.0 ± 3.47	19.4 ± 3.5	13.7 ± 3.23	15.6 ± 3.24
February 08	14.3 ± 3.15	13.1 ± 3.02	13.4 ± 3.06	12.7 ± 3.03	15.9 ± 3.24	17.0 ± 3.3	16.8 ± 3.27	14.7 ± 3.11
February 15	10.7 ± 2.64	13.0 ± 2.73	15.5 ± 2.88	13.8 ± 2.79	13.4 ± 2.79	17.5 ± 3.0	14.5 ± 2.85	11.1 ± 2.60
February 22	13.5 ± 2.99	14.4 ± 2.99	13.5 ± 2.96	19.2 ± 3.44	15.4 ± 3.09	15.5 ± 3.1	15.9 ± 3.10	12.2 ± 2.84
March 01	11.8 ± 3.02	15.2 ± 3.14	14.5 ± 3.12	14.0 ± 3.22	14.2 ± 3.16	15.0 ± 3.2	11.2 ± 3.01	12.6 ± 3.01
March 08	10.6 ± 2.71	13.7 ± 2.80	11.6 ± 2.72	11.4 ± 2.74	14.2 ± 2.91	12.0 ± 2.8	8.20 ± 2.57	10.0 ± 2.61
March 15	10.5 ± 2.78	11.2 ± 2.74	11.6 ± 2.80	14.3 ± 3.05	12.9 ± 2.91	13.9 ± 3.0	10.6 ± 2.79	8.15 ± 2.57
March 21	13.7 ± 3.44	11.9 ± 3.25	13.4 ± 3.38	15.5 ± 3.95	13.1 ± 3.41	13.6 ± 3.4	14.1 ± 3.47	12.9 ± 3.30
March 28	30.2 ± 3.81	25.6 ± 3.52	27.2 ± 3.63	26.2 ± 3.74	28.7 ± 3.74	31.3 ± 3.8	26.7 ± 3.65	24.6 ± 3.48
Qtr. Avg. ± 2 s.d.	**12.9 ± 12.4**	**16.2 ± 9.25**	**17.6 ± 10.8**	**17.2 ± 14.1**	**17.5 ± 9.26**	**18.7 ± 10.8**	**16.3 ± 10.3**	**17.1 ± 14.5**
April 05	25.1 ± 3.41	18.4 ± 3.05	23.6 ± 3.31	30.8 ± 3.71	37.3 ± 3.87	26.7 ± 3.45	22.1 ± 3.27	20.5 ± 3.12
April 12	15.7 ± 2.82	17.7 ± 2.85	20.9 ± 3.04	19.8 ± 3.01	19.3 ± 3.01	19.0 ± 2.99	19.0 ± 3.01	15.3 ± 2.72
April 19	13.9 ± 3.05	14.7 ± 3.00	14.9 ± 2.92	19.0 ± 3.47	14.1 ± 2.92	16.4 ± 3.03	15.1 ± 2.97	12.5 ± 2.78
April 26	14.1 ± 3.21	13.5 ± 3.09	12.8 ± 3.10	18.2 ± 3.66	17.7 ± 3.38	17.7 ± 3.38	16.6 ± 3.33	12.9 ± 3.06
May 03	9.15 ± 2.78	9.42 ± 2.71	11.4 ± 2.86	11.6 ± 2.94	8.76 ± 2.75	9.29 ± 2.78	8.90 ± 2.76	8.16 ± 2.64
May 10	15.9 ± 2.88	15.2 ± 2.77	16.1 ± 2.86	17.7 ± 2.96	16.3 ± 2.90	17.0 ± 2.94	18.9 ± 3.04	13.3 ± 2.67
May 17	9.46 ± 2.43	9.42 ± 2.36	10.3 ± 2.45	11.5 ± 2.55	9.46 ± 2.43	11.5 ± 2.56	10.2 ± 2.48	7.73 ± 2.26
May 24	12.9 ± 3.02	13.4 ± 2.97	16.1 ± 3.14	12.1 ± 2.98	13.4 ± 3.05	13.5 ± 3.06	12.2 ± 2.99	12.6 ± 2.93
May 31	19.2 ± 2.91	17.0 ± 2.73	18.9 ± 2.87	20.6 ± 2.98	20.1 ± 2.96	20.4 ± 2.97	20.7 ± 2.99	14.7 ± 2.60
June 07	19.4 ± 3.46	16.7 ± 3.24	22.0 ± 3.51	19.9 ± 3.47	21.5 ± 3.54	23.7 ± 3.64	23.7 ± 3.64	16.8 ± 3.24
June 13	24.1 ± 3.58	21.8 ± 3.38	22.9 ± 3.48	26.5 ± 3.69	29.0 ± 3.82	25.2 ± 3.64	24.0 ± 3.77	17.1 ± 3.33
June 21	12.6 ± 2.39	11.4 ± 2.25	13.8 ± 2.42	15.4 ± 2.51	15.9 ± 2.56	16.7 ± 2.60	13.3 ± 2.41	12.2 ± 2.29
June 28	11.9 ± 2.99	12.5 ± 2.93	11.9 ± 2.94	11.7 ± 2.94	14.2 ± 3.11	13.6 ± 3.06	12.8 ± 3.02	11.9 ± 2.93
Qtr. Avg. ± 2 s.d.	**15.6 ± 10.1**	**14.7 ± 7.24**	**16.6 ± 9.24**	**18.1 ± 11.8**	**18.2 ± 15.6**	**17.7 ± 10.5**	**16.7 ± 10.2**	**13.5 ± 6.97**

TABLE 3-3: GROSS BETA CONCENTRATION IN FILTERED AIR

Surry Power Station, Surry County, Virginia - 2011

1.0E-3 pCi/m3 ± 2 Sigma

COLLECTION DATE	SAMPLING LOCATIONS SS	HIR	BC	ALL	CP	BASF	FE	NN-C
July 05	14.6 ± 2.81	14.0 ± 2.71	18.3 ± 2.96	18.3 ± 3.03	15.4 ± 2.85	19.3 ± 3.05	14.9 ± 2.82	15.8 ± 2.80
July 12	19.3 ± 3.38	15.6 ± 3.10	16.4 ± 3.18	17.9 ± 3.27	15.0 ± 3.16	22.2 ± 3.48	15.2 ± 3.14	12.8 ± 2.94
July 18	13.5 ± 3.26	12.0 ± 3.09	15.7 ± 3.32	19.2 ± 3.51	16.2 ± 3.39	18.6 ± 3.54	16.2 ± 3.40	14.3 ± 3.22
July 26	19.9 ± 2.87	18.7 ± 2.75	20.6 ± 2.87	24.4 ± 3.19	23.5 ± 3.10	27.6 ± 3.22	21.7 ± 2.94	17.0 ± 2.67
August 02	21.4 ± 3.45	15.3 ± 3.10	16.2 ± 3.17	17.5 ± 3.26	23.9 ± 3.59	27.8 ± 3.75	19.2 ± 3.36	16.2 ± 3.23
August 09	24.5 ± 3.52	19.5 ± 3.21	21.7 ± 3.33	28.5 ± 3.68	23.6 ± 3.48	31.0 ± 3.80	25.7 ± 3.57	20.8 ± 3.28
August 16	17.8 ± 3.24	15.2 ± 3.03	17.2 ± 3.20	20.0 ± 3.34	14.9 ± 3.09	19.3 ± 3.37	15.8 ± 3.18	16.9 ± 3.10
August 23	14.3 ± 2.89	11.8 ± 2.58	11.3 ± 2.53	19.0 ± 3.04	13.8 ± 2.66	22.4 ± 3.34	18.3 ± 3.00	13.8 ± 2.66
August 30	12.5 ± 3.34	10.8 ± 3.17	12.3 ± 3.74	13.9 ± 4.11	10.7 ± 4.04	13.7 ± 3.38	10.6 ± 3.22	10.5 ± 2.71
September 06	12.9 ± 3.09	11.6 ± 2.93	12.7 ± 3.01	15.7 ± 3.61	10.3 ± 4.19	9.50 ± 2.88	11.5 ± 3.01	8.12 ± 2.81
September 13	20.0 ± 3.39	13.9 ± 3.02	14.9 ± 3.08	15.0 ± 3.22	15.9 ± 3.20	14.6 ± 3.09	17.1 ± 3.23	15.1 ± 3.02
September 20	18.5 ± 3.12	17.6 ± 3.00	18.7 ± 3.08	18.8 ± 3.12	17.4 ± 2.97	15.0 ± 2.93	17.2 ± 3.03	14.7 ± 2.84
September 27	3.30 ± 2.63	4.22 ± 2.59	1.76 ± 2.47	2.66 ± 2.58	3.62 ± 2.55	2.35 ± 2.56	3.91 ± 2.65	3.87 ± 2.58
Qtr. Avg. ± 2 s.d.	**17.4 ± 7.66**	**13.9 ± 7.98**	**16.3 ± 6.45**	**19.0 ± 8.03**	**16.7 ± 9.35**	**20.1 ± 12.9**	**17.0 ± 8.21**	**13.8 ± 8.64**
October 04	12.1 ± 3.04	7.29 ± 2.45	12.4 ± 2.78	12.9 ± 3.23	10.5 ± 2.61	10.5 ± 2.66	12.1 ± 2.75	13.6 ± 2.97
October 11	17.5 ± 2.77	17.5 ± 2.89	22.8 ± 3.20	20.0 ± 3.09	18.5 ± 2.97	17.3 ± 2.95	16.3 ± 2.94	24.7 ± 3.81
October 17	20.8 ± 3.53	19.9 ± 3.40	21.3 ± 3.51	25.6 ± 3.70	21.0 ± 3.52	18.8 ± 3.39	23.5 ± 3.65	25.4 ± 4.04
October 25	16.8 ± 2.69	13.4 ± 2.44	20.1 ± 2.81	23.5 ± 2.97	18.8 ± 2.76	14.3 ± 2.53	17.5 ± 2.73	23.0 ± 3.51
November 01	20.7 ± 3.27	16.4 ± 2.98	20.3 ± 3.21	27.0 ± 3.52	20.9 ± 3.24	16.1 ± 3.00	18.8 ± 3.17	29.6 ± 4.48
November 08	18.7 ± 3.04	5.06 ± 2.18	15.8 ± 2.84	16.3 ± 2.88	15.4 ± 2.84	13.3 ± 2.72	10.2 ± 2.57	14.8 ± 2.77
November 15	16.0 ± 3.17	A	18.8 ± 3.24	24.2 ± 3.49	21.1 ± 3.38	12.9 ± 2.98	16.5 ± 3.19	22.8 ± 3.75
November 22	15.2 ± 3.14	14.2 ± 3.08	18.9 ± 3.26	17.1 ± 3.14	21.1 ± 3.40	13.0 ± 2.97	13.9 ± 3.04	16.9 ± 3.11
November 29	11.4 ± 2.63	16.3 ± 2.91	14.9 ± 2.78	18.1 ± 2.93	13.4 ± 2.74	9.46 ± 2.46	12.5 ± 2.68	16.4 ± 3.34
December 06	13.3 ± 2.73	13.3 ± 2.72	12.9 ± 2.65	15.3 ± 2.76	9.12 ± 2.43	12.3 ± 2.58	12.9 ± 2.67	11.7 ± 2.60
December 13	14.5 ± 2.83	17.4 ± 2.97	16.2 ± 2.91	17.3 ± 2.92	15.3 ± 2.88	14.0 ± 2.74	13.2 ± 2.75	13.4 ± 2.76
December 20	18.4 ± 3.18	15.8 ± 3.04	17.1 ± 3.06	13.4 ± 2.84	15.4 ± 2.98	12.0 ± 2.74	16.7 ± 3.06	20.0 ± 3.19
December 27	13.3 ± 2.72	13.4 ± 2.70	13.5 ± 2.66	18.6 ± 2.93	12.1 ± 2.61	12.3 ± 2.58	14.4 ± 2.76	13.8 ± 2.69
A - Sampler inoperable due to worn vanes								
Qtr. Avg. ± 2 s.d.	**16.1 ± 6.19**	**14.2 ± 8.50**	**17.3 ± 6.71**	**19.2 ± 9.17**	**16.4 ± 8.45**	**13.6 ± 5.20**	**15.3 ± 6.97**	**18.9 ± 11.4**
Ann. Avg. ± 2 s.d	**15.5 ± 9.71**	**14.7 ± 8.22**	**17.0 ± 8.33**	**18.4 ± 10.9**	**17.2 ± 10.8**	**17.4 ± 11.1**	**16.3 ± 8.86**	**15.8 ± 11.4**

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

Surry Power Station, Surry County, Virginia - 2011

1.0E-3 pCi/m3 ± 2 Sigma

COLLECTION DATE	SAMPLING LOCATIONS							
	SS	**HIR**	**BC**	**ALL**	**CP**	**BASF**	**FE**	**NN-C**
January 04	6.85 ± 24.2	6.93 ± 24.5	6.81 ± 24.1	6.70 ± 23.7	18.7 ± 17.9	18.3 ± 17.4	18.1 ± 17.3	18.2 ± 17.4
January 11	6.23 ± 14.5	6.37 ± 14.9	6.34 ± 14.8	6.25 ± 14.6	1.68 ± 16.1	1.66 ± 16.0	1.66 ± 16.0	1.67 ± 16.1
January 18	-15.6 ± 25.8	-15.8 ± 26.1	-15.7 ± 25.9	-15.5 ± 25.5	11.7 ± 22.5	11.8 ± 22.7	11.5 ± 22.2	11.7 ± 22.6
January 25	10.3 ± 16.3	10.0 ± 15.9	10.2 ± 16.2	10.1 ± 16.0	-0.71 ± 14.7	-0.71 ± 14.6	-0.69 ± 14.2	-0.69 ± 14.2
February 01	12.2 ± 19.4	11.9 ± 18.8	12.1 ± 19.2	12.1 ± 19.2	-32.7 ± 31.9	-32.6 ± 31.8	-32.5 ± 31.8	-31.4 ± 30.6
February 08	-2.96 ± 13.2	-2.87 ± 12.8	-2.90 ± 13.0	-2.91 ± 13.0	-1.42 ± 19.5	-1.42 ± 19.4	-1.41 ± 19.4	-1.37 ± 18.8
February 15	-0.81 ± 7.31	-0.79 ± 7.13	-0.80 ± 7.19	-0.80 ± 7.19	3.27 ± 13.0	3.26 ± 12.9	3.26 ± 13.0	3.15 ± 12.5
February 22	0.12 ± 11.7	0.12 ± 11.4	0.12 ± 11.5	0.13 ± 12.5	4.82 ± 14.7	4.86 ± 14.8	4.78 ± 14.6	4.62 ± 14.1
March 01	24.5 ± 28.6	23.9 ± 28.0	24.0 ± 28.1	25.3 ± 29.6	-4.47 ± 33.6	-4.46 ± 33.5	-4.45 ± 33.4	-4.31 ± 32.3
March 08	-0.16 ± 14.0	-0.15 ± 13.5	-0.15 ± 13.7	-0.15 ± 13.9	1.94 ± 19.9	1.94 ± 19.9	1.94 ± 19.9	1.87 ± 19.2
March 15	4.59 ± 15.6	4.42 ± 15.0	4.48 ± 15.2	4.69 ± 16.0	9.77 ± 15.0	9.82 ± 15.1	9.75 ± 15.0	9.38 ± 14.4
March 21	23.3 ± 16.7	22.5 ± 16.1	22.9 ± 16.3	26.7 ± 19.1	27.3 ± 21.2	27.3 ± 21.2	27.2 ± 21.1	26.2 ± 20.4
March 28	*109 ± 31.3*	*117 ± 20.2*	*114 ± 18.9*	*49.9 ± 16.3*	*117 ± 28.3*	*119 ± 25.0*	*111 ± 20.6*	*98.2 ± 23.3*
Qtr. Avg. ± 2 s.d.	**109 ± 31.3**	**117 ± 20.2**	**114 ± 18.9**	**50 ± 16.3**	**117 ± 28.3**	**119 ± 25.0**	**111 ± 20.6**	**98 ± 23.3**
April 05	*123 ± 17.8*	*93.9 ± 22.4*	*126 ± 21.0*	*142 ± 20.0*	*121 ± 24.6*	*151 ± 21.4*	*130 ± 18.9*	*72.6 ± 18.4*
April 12	*45.9 ± 18.6*	*29.7 ± 16.2*	*19.6 ± 17.3*	*38.8 ± 21.6*	23.5 ± 23.5	*41.5 ± 14.4*	*47.6 ± 18.1*	*37.4 ± 18.6*
April 19	4.28 ± 6.14	9.44 ± 8.24	2.27 ± 7.30	6.04 ± 6.20	-2.83 ± 11.6	11.8 ± 9.54	-3.77 ± 9.23	-0.91 ± 10.8
April 26	3.60 ± 12.2	3.48 ± 11.8	3.53 ± 12.0	3.95 ± 13.4	15.6 ± 18.8	15.6 ± 18.7	15.6 ± 18.8	15.0 ± 18.0
May 03	-4.65 ± 17.2	-4.48 ± 16.6	-4.56 ± 16.8	-4.71 ± 17.4	-9.84 ± 18.2	-9.81 ± 18.1	-9.79 ± 18.1	-9.45 ± 17.5
May 10	-2.80 ± 11.5	-2.70 ± 11.1	-1.51 ± 6.19	-2.77 ± 11.4	6.38 ± 10.9	6.37 ± 10.9	6.36 ± 10.9	6.12 ± 10.5
May 17	3.10 ± 21.6	2.99 ± 20.8	3.04 ± 21.2	3.08 ± 21.4	-21.2 ± 34.8	-21.2 ± 34.8	-21.1 ± 34.7	-20.4 ± 33.5
May 24	13.0 ± 32.5	12.6 ± 31.4	12.8 ± 31.8	13.0 ± 32.3	-21.9 ± 37.0	-21.9 ± 37.0	-21.8 ± 36.9	-21.0 ± 35.6
May 31	10.1 ± 39.1	9.76 ± 37.7	9.93 ± 38.3	10.1 ± 38.9	-6.49 ± 32.7	-6.48 ± 32.6	-6.47 ± 32.6	-6.23 ± 31.4
June 07	1.11 ± 37.0	1.07 ± 35.7	1.08 ± 36.2	1.10 ± 36.7	6.06 ± 21.7	6.05 ± 21.6	6.04 ± 21.6	5.81 ± 20.8
June 13	-0.09 ± 18.3	-0.08 ± 17.7	-0.08 ± 18.0	-0.08 ± 18.2	2.36 ± 20.2	2.36 ± 20.3	2.36 ± 20.2	2.27 ± 19.5
June 21	2.17 ± 16.9	2.08 ± 16.2	2.12 ± 16.5	2.13 ± 16.6	-8.48 ± 21.0	-8.46 ± 20.9	-8.40 ± 20.8	-8.09 ± 20.0
June 28	2.71 ± 14.8	2.61 ± 14.3	2.65 ± 14.5	2.65 ± 14.5	13.7 ± 18.7	13.6 ± 18.5	13.6 ± 18.5	13.2 ± 18.1
Qtr. Avg. ± 2 s.d.	**84.5 ± 109**	**61.8 ± 90.8**	**72.8 ± 150**	**90.4 ± 146**	**121 ± 24.6**	**96.3 ± 155**	**88.8 ± 117**	**55.0 ± 49.8**

Italicized data is attributed to the Fukushima Daiichi nuclear event

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

Surry Power Station, Surry County, Virginia - 2011

1.0E-3 pCi/m3 ± 2 Sigma

COLLECTION DATE	SAMPLING LOCATIONS							
	SS	HIR	BC	ALL	CP	BASF	FE	NN-C
July 05	-28.3 ± 25.9	-27.3 ± 24.9	-27.6 ± 25.2	-28.5 ± 26.0	-13.0 ± 40.6	-12.9 ± 40.3	-13.0 ± 40.5	-12.5 ± 39.0
July 12	-2.48 ± 30.3	-2.38 ± 29.1	-2.42 ± 29.6	-2.43 ± 29.7	5.80 ± 28.3	5.73 ± 27.9	5.71 ± 27.8	5.51 ± 26.9
July 18	-11.8 ± 14.3	-11.4 ± 13.8	-11.5 ± 14.0	-11.6 ± 14.0	2.29 ± 28.7	2.32 ± 29.1	2.30 ± 28.8	2.21 ± 27.7
July 26	-7.83 ± 37.0	-7.58 ± 35.8	-7.68 ± 36.3	-8.25 ± 39.0	-2.77 ± 26.0	-2.69 ± 25.2	-2.65 ± 24.8	-2.56 ± 24.0
August 02	0.04 ± 5.44	0.04 ± 5.29	0.04 ± 5.36	0.04 ± 5.43	6.05 ± 10.2	6.03 ± 10.2	6.00 ± 10.1	5.98 ± 10.1
August 09	3.65 ± 19.6	3.52 ± 18.9	3.54 ± 19.1	3.61 ± 19.4	2.42 ± 7.10	2.41 ± 7.09	2.40 ± 7.05	2.32 ± 6.83
August 16	-15.1 ± 34.9	-14.5 ± 33.6	-15.0 ± 34.7	-15.0 ± 34.7	3.92 ± 24.3	4.03 ± 24.9	3.98 ± 24.7	3.76 ± 23.3
August 23	2.44 ± 25.6	2.24 ± 23.4	2.22 ± 23.2	2.31 ± 24.1	-33.2 ± 29.9	-36.8 ± 33.2	-34.7 ± 31.2	-33.1 ± 29.8
August 30	-7.64 ± 9.6	-7.44 ± 9.35	-8.82 ± 11.1	-9.62 ± 12.1	-0.15 ± 8.46	-0.12 ± 6.41	-0.12 ± 6.43	-0.09 ± 5.15
September 06	10.5 ± 20.5	10.1 ± 19.7	10.2 ± 19.9	12.2 ± 23.6	-4.81 ± 19.8	-3.48 ± 14.3	-3.51 ± 14.5	-3.47 ± 14.3
September 13	-1.87 ± 16.5	-1.81 ± 15.9	-1.82 ± 16.0	-1.92 ± 16.9	9.56 ± 17.4	9.33 ± 17.0	9.39 ± 17.1	8.93 ± 16.2
September 20	5.29 ± 29.0	5.10 ± 27.9	5.14 ± 28.1	5.23 ± 28.6	2.74 ± 20.7	2.83 ± 21.5	2.81 ± 21.3	2.72 ± 20.6
September 27	1.48 ± 7.21	1.42 ± 6.93	1.44 ± 7.02	0.63 ± 3.06	15.9 ± 24.7	16.5 ± 25.5	16.5 ± 25.5	15.9 ± 24.7
October 04	-16.3 ± 43.8	-13.7 ± 36.8	-13.9 ± 37.2	-16.7 ± 44.8	-14.7 ± 36.5	-15.0 ± 37.2	-15.0 ± 37.1	-16.0 ± 39.6
October 11	3.87 ± 15.1	3.98 ± 15.5	4.06 ± 15.9	4.11 ± 16.0	7.28 ± 27.4	7.42 ± 27.9	7.56 ± 28.5	9.13 ± 34.4
October 17	-10.7 ± 13.3	-10.3 ± 12.8	-10.4 ± 13.0	-10.3 ± 12.9	-8.73 ± 18.3	-8.65 ± 18.1	-8.73 ± 18.3	-9.74 ± 20.4
October 25	2.86 ± 16.5	2.75 ± 15.9	2.80 ± 16.1	2.80 ± 16.2	13.3 ± 12.9	13.3 ± 12.8	13.5 ± 13.0	17.2 ± 16.6
November 01	5.05 ± 22.9	4.86 ± 22.0	4.95 ± 22.4	4.94 ± 22.4	-5.46 ± 19.5	-5.43 ± 19.4	-5.52 ± 19.7	-7.41 ± 26.4
November 08	-2.10 ± 20.7	-2.02 ± 19.9	-2.04 ± 20.1	-2.05 ± 20.2	-3.38 ± 17.8	-3.37 ± 17.7	-3.41 ± 18.0	-3.29 ± 17.3
November 15	-3.48 ± 10.5	A	-3.38 ± 10.2	-3.39 ± 10.2	2.55 ± 13.1	2.54 ± 13.1	2.57 ± 13.2	2.84 ± 14.6
November 22	-0.01 ± 13.9	-0.01 ± 13.8	-0.01 ± 13.5	-0.01 ± 13.3	6.54 ± 18.4	6.45 ± 18.1	6.49 ± 18.3	6.24 ± 17.6
November 29	-10.2 ± 20.5	-10.2 ± 20.5	-10.0 ± 20.0	-9.84 ± 19.7	-3.06 ± 27.8	-2.98 ± 27.1	-3.03 ± 27.5	-3.68 ± 33.4
December 06	6.55 ± 18.0	6.51 ± 17.9	6.37 ± 17.5	6.27 ± 17.2	-1.03 ± 16.6	-1.01 ± 16.2	-1.03 ± 16.5	-1.03 ± 16.4
December 13	5.54 ± 18.3	5.51 ± 18.2	5.49 ± 18.1	5.38 ± 17.7	-8.01 ± 18.3	-7.75 ± 17.7	-7.95 ± 18.1	-7.91 ± 18.0
December 20	6.95 ± 15.1	6.91 ± 15.0	6.76 ± 14.6	6.67 ± 14.4	9.80 ± 15.8	9.52 ± 15.3	9.83 ± 15.8	9.66 ± 15.5
December 27	1.11 ± 14.0	1.09 ± 13.8	1.07 ± 13.5	1.07 ± 13.4	-1.05 ± 15.9	-1.02 ± 15.4	-1.06 ± 15.9	-1.04 ± 15.6

A - Sampler inoperable due to worn vanes

TABLE 3-5: GAMMA EMITTER CONCENTRATION IN FILTERED AIR

Surry Power Station, Surry County, Virginia - 2011

1.0E-3 pCi/m3 ± 2 Sigma

SAMPLING LOCATIONS	NUCLIDE	FIRST QUARTER	SECOND QUARTER	THIRD QUARTER	FOURTH QUARTER	AVERAGE ± 2 SIGMA
SS	Cs-134	1.18 ± 0.64	2.28 ± 1.35	1.39 ± 1.38	-1.00 ± 0.62	
	Cs-137	0.00 ± 0.87	0.45 ± 0.81	0.41 ± 0.92	0.20 ± 0.45	
	Be-7	91.2 ± 26.8	164 ± 38.4	131 ± 35.5	127 ± 20.6	128 ± 59.6
HIR	Cs-134	1.17 ± 0.67	0.26 ± 1.14	0.24 ± 1.28	0.03 ± 0.60	
	Cs-137	0.26 ± 0.65	0.71 ± 1.01	0.29 ± 0.94	0.02 ± 0.47	
	Be-7	118 ± 23.3	160 ± 38.1	138 ± 33.0	147 ± 23.9	141 ± 35.3
	K-40		22.1 ± 18.0			22.1 ± 18.0
BC	Cs-134	0.55 ± 0.69	0.58 ± 1.17	1.48 ± 1.09	-0.31 ± 0.51	
	Cs-137	0.64 ± 0.73	-0.05 ± 1.13	0.48 ± 0.85	0.60 ± 0.44	
	Be-7	120 ± 29.0	158 ± 47.1	147 ± 35.7	135 ± 22.3	140 ± 32.6
ALL	Cs-134	1.35 ± 0.93	0.50 ± 1.34	1.45 ± 1.04	-0.84 ± 0.72	
	Cs-137	0.20 ± 1.06	0.21 ± 0.88	-0.29 ± 0.74	-0.40 ± 0.69	
	Be-7	161 ± 34.9	169 ± 37.5	141 ± 30.0	169 ± 32.6	160 ± 26.4
CP	Cs-134	0.32 ± 0.94	1.44 ± 1.04	1.44 ± 1.17	-0.65 ± 0.73	
	Cs-137	0.02 ± 0.99	1.52 ± 1.03	0.65 ± 0.84	0.05 ± 0.53	
	Be-7	163 ± 35.6	182 ± 39.1	113 ± 31.1	166 ± 26.5	156 ± 60
BASF	Cs-134	0.35 ± 0.67	-0.01 ± 1.20	0.55 ± 1.13	-0.38 ± 0.60	
	Cs-137	-0.42 ± 0.75	0.24 ± 1.05	0.08 ± 0.67	0.35 ± 0.51	
	Be-7	128 ± 25.9	188 ± 46.6	127 ± 30.1	138 ± 23.0	145 ± 57.9
	K-40				11.5 ± 10.8	11.5 ± 10.8
FE	Cs-134	0.19 ± 0.80	0.37 ± 0.69	1.17 ± 1.13	0.07 ± 0.69	
	Cs-137	0.09 ± 0.83	1.07 ± 0.61	-0.15 ± 0.89	0.16 ± 0.65	
	Be-7	128 ± 28.4	185 ± 32.6	134 ± 40.6	121 ± 28.5	142 ± 58.3
NN-C	Cs-134	0.15 ± 0.93	1.15 ± 0.83	0.73 ± 0.97	-0.08 ± 0.85	
	Cs-137	0.58 ± 0.94	0.85 ± 0.77	-0.17 ± 0.75	0.57 ± 0.84	
	Be-7	130 ± 29.9	96.3 ± 30.2	133 ± 35.6	172 ± 31.3	133 ± 61.9

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

Surry Power Station, Surry County, Virginia - 2011

pCi/Liter ± 2 Sigma

NUCLIDE	EPPS	COLONIAL PARKWAY	WILLIAMS-C
JANUARY			
Cs-134	-2.18 ± 5.75	-1.07 ± 3.25	0.09 ± 2.41
Cs-137	-4.16 ± 3.77	-0.95 ± 3.22	0.36 ± 2.59
Ba-140	2.99 ± 20.7	-5.33 ± 17.1	-6.05 ± 13.2
La-140	0.40 ± 5.03	1.62 ± 5.39	-0.70 ± 4.05
I-131	0.03 ± 0.34	0.13 ± 0.31	-0.16 ± 0.29
K-40	944 ± 127	1170 ± 111	1160 ± 96.2
FEBRUARY			
Cs-134	-0.14 ± 1.23	0.09 ± 1.07	0.57 ± 2.16
Cs-137	0.94 ± 1.50	-0.19 ± 1.51	-0.07 ± 2.04
Ba-140	1.58 ± 7.0	-0.05 ± 6.6	-2.57 ± 10.9
La-140	0.10 ± 2.24	0.47 ± 2.30	-1.37 ± 2.73
I-131	-0.10 ± 0.45	0.21 ± 0.44	-0.19 ± 0.39
K-40	1210 ± 101	1310 ± 95.2	1330 ± 82.8
Th-228	8.76 ± 7.64		
MARCH			
Cs-134	-0.80 ± 3.51	-6.56 ± 3.34	-4.25 ± 3.20
Cs-137	2.01 ± 3.38	1.76 ± 3.30	-0.58 ± 3.43
Ba-140	9.41 ± 16.4	3.12 ± 16.0	1.56 ± 16.7
La-140	2.30 ± 4.66	-0.66 ± 5.55	-1.31 ± 3.89
I-131	-0.04 ± 0.24	0.00 ± 0.24	-0.15 ± 0.21
K-40	1220 ± 116	1370 ± 118	1260 ± 125
Sr-89		2.08 ± 2.27	
Sr-90		0.63 ± 0.57	
APRIL			
Cs-134	1.78 ± 4.78	-0.92 ± 4.00	3.29 ± 4.02
Cs-137	2.77 ± 4.78	1.53 ± 4.36	1.90 ± 4.02
Ba-140	21.7 ± 34.9	4.81 ± 25.1	7.78 ± 24.9
La-140	-5.10 ± 9.68	3.01 ± 7.78	1.63 ± 5.9
I-131	*15.0 ± 0.59*	*4.75 ± 0.84*	*8.91 ± 0.45*
K-40	1410 ± 156	1330 ± 143	1290 ± 144

Italicized data is attributed to the Fukushima Daiichi nuclear event

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

Surry Power Station, Surry County, Virginia - 2011

pCi/Liter ± 2 Sigma

NUCLIDE	EPPS	COLONIAL PARKWAY	WILLIAMS-C
MAY			
Cs-134	0.12 ± 2.87	-3.98 ± 3.99	-6.80 ± 3.61
Cs-137	4.35 ± 2.95	0.56 ± 4.02	0.23 ± 3.57
Ba-140	7.59 ± 19.30	-7.82 ± 17.10	3.15 ± 20.70
La-140	2.96 ± 5.19	-3.73 ± 4.78	3.29 ± 6.55
I-131	0.02 ± 0.54	-0.05 ± 0.36	0.50 ± 0.57
K-40	1270 ± 118	1370 ± 137	1270 ± 121
JUNE			
Cs-134	0.72 ± 4.48	-3.01 ± 4.74	-1.37 ± 3.70
Cs-137	0.98 ± 4.32	0.94 ± 4.19	-1.81 ± 3.61
Ba-140	-12.2 ± 28.9	2.18 ± 24.8	-33.8 ± 25.2
La-140	0.69 ± 8.24	0.10 ± 8.35	-1.67 ± 6.75
I-131	0.07 ± 0.41	-0.60 ± 0.44	-0.31 ± 0.40
K-40	1470 ± 162	1300 ± 153	1250 ± 153
Sr-89		2.18 ± 1.98	
Sr-90		0.04 ± 0.34	
JULY			
Cs-134	0.74 ± 4.85	-6.56 ± 6.28	0.37 ± 4.72
Cs-137	-5.57 ± 5.23	2.96 ± 5.59	2.92 ± 4.50
Ba-140	-3.99 ± 25.7	0.88 ± 30.9	-9.50 ± 25.3
La-140	-0.37 ± 7.55	-1.90 ± 7.19	-3.40 ± 7.08
I-131	-0.07 ± 0.41	-0.50 ± 0.52	-0.54 ± 0.45
K-40	1220 ± 184	1420 ± 206	1460 ± 165
AUGUST			
Cs-134	3.04 ± 3.70	1.12 ± 4.86	2.16 ± 5.49
Cs-137	0.98 ± 4.62	2.13 ± 5.43	0.24 ± 5.44
Ba-140	5.0 ± 16.4	-1.13 ± 20.7	-13.90 ± 19.2
La-140	-5.79 ± 5.03	4.13 ± 5.54	0.31 ± 7.36
I-131	-0.14 ± 0.36	-0.35 ± 0.37	-0.55 ± 0.41
K-40	1430 ± 176	1370 ± 186	1210 ± 184

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

Surry Power Station, Surry County, Virginia - 2011

pCi/Liter ± 2 Sigma

NUCLIDE	EPPS	COLONIAL PARKWAY	WILLIAMS-C
SEPTEMBER			
Cs-134	-5.61 ± 4.38	0.06 ± 4.59	-1.59 ± 3.89
Cs-137	4.63 ± 5.13	2.21 ± 5.01	1.53 ± 4.43
Ba-140	9.82 ± 21.1	13.40 ± 19.4	4.51 ± 14.7
La-140	-1.20 ± 4.79	-1.26 ± 6.28	-7.27 ± 6.68
I-131	0.13 ± 0.37	0.13 ± 0.49	-0.07 ± 0.35
K-40	1100 ± 173	1520 ± 185	1170 ± 193
Sr-89		1.70 ± 2.23	
Sr-90		0.19 ± 0.37	
OCTOBER			
Cs-134	-6.60 ± 4.64	1.31 ± 5.52	2.26 ± 4.91
Cs-137	-0.30 ± 4.22	2.03 ± 5.18	5.49 ± 5.56
Ba-140	7.31 ± 17.6	8.24 ± 20.6	-4.61 ± 24.5
La-140	2.36 ± 6.01	-3.73 ± 4.69	-7.01 ± 7.53
I-131	0.02 ± 0.41	-0.14 ± 0.39	-0.25 ± 0.41
K-40	1280 ± 175	1370 ± 205	1250 ± 205
NOVEMBER			
Cs-134	-5.71 ± 3.24	0.20 ± 3.14	2.29 ± 4.46
Cs-137	0.12 ± 2.90	0.07 ± 3.19	-2.77 ± 5.45
Ba-140	-2.45 ± 13.3	-7.99 ± 15.0	2.10 ± 25.4
La-140	-3.68 ± 4.37	-4.17 ± 4.65	2.13 ± 8.16
I-131	-0.20 ± 0.45	-0.08 ± 0.40	-0.54 ± 0.43
K-40	1240 ± 127	1340 ± 119	1120 ± 168
DECEMBER			
Cs-134	2.36 ± 2.92	-4.44 ± 4.02	-6.02 ± 3.61
Cs-137	0.89 ± 3.38	-3.05 ± 3.95	0.28 ± 3.47
Ba-140	-8.92 ± 15.2	14.10 ± 16.1	-2.21 ± 15.8
La-140	-0.12 ± 4.23	-2.39 ± 4.99	-2.35 ± 4.16
I-131	0.20 ± 0.50	-0.14 ± 0.50	0.22 ± 0.55
K-40	1210 ± 118	1400 ± 161	1390 ± 151
Sr-89		0.01 ± 2.13	
Sr-90		1.19 ± 0.65	

TABLE 3-7: GAMMA EMITTER CONCENTRATION IN FOOD PRODUCTS

Surry Power Station, Surry County, Virginia - 2011

pCi/kg (wet) ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	SAMPLE TYPE	Cs-134	Cs-137	I-131	K-40
BROCK	11/10/2011	Corn	-24.1 ± 12.8	0.47 ± 10.0	3.93 ± 15.6	2660 ± 375
FARM	11/10/2011	Peanuts	-5.08 ± 16.9	16.2 ± 16.2	-9.85 ± 23.0	3550 ± 526
SLADE FARM	11/10/2011	Soybeans	-5.62 ± 11.6	-7.00 ± 12.5	-18.9 ± 18.3	15200 ± 821

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

Surry Power Station, Surry County, Virginia - 2011

pCi/Liter ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPE				
		Mn-54	**Fe-59**	**Co-58**	**Co-60**	**Zn-65**
SS	3/28/2011	-0.21 ± 2.98	1.56 ± 5.77	-0.13 ± 3.24	-0.40 ± 2.88	8.29 ± 5.61
	6/21/2011	0.17 ± 2.67	-1.05 ± 5.64	-0.81 ± 2.80	-0.48 ± 2.63	-7.95 ± 6.63
	9/20/2011	0.91 ± 2.55	0.51 ± 6.21	0.32 ± 3.46	-0.15 ± 3.32	-8.38 ± 7.50
	12/12/2011	-4.61 ± 3.05	-1.63 ± 6.41	1.47 ± 3.32	0.53 ± 2.89	0.82 ± 7.21
		Zr-95	**Nb-95**	**I-131**	**Cs-134**	**Cs-137**
	3/28/2011	-0.26 ± 5.37	0.34 ± 2.91	-0.17 ± 0.54	5.46 ± 6.38	-0.35 ± 3.13
	6/21/2011	-2.12 ± 5.26	-3.78 ± 2.82	-0.24 ± 0.52	0.48 ± 2.91	0.651 ± 2.89
	9/20/2011	0.47 ± 5.46	-0.94 ± 3.16	-0.39 ± 0.24	-3.66 ± 3.41	-0.49 ± 3.60
	12/12/2011	-2.72 ± 5.76	1.52 ± 3.14	-0.93 ± 0.46	1.26 ± 3.66	-0.69 ± 3.56
		Ba-140	**La-140**	**H-3**	**Th-228**	
	3/28/2011	-10.7 ± 18.0	-0.83 ± 5.28	-197 ± 596	9.92 ± 6.65	
	6/21/2011	-9.67 ± 15.4	-0.26 ± 4.07	703 ± 1070		
	9/20/2011	5.79 ± 11.6	2.11 ± 5.07	-368 ± 417		
	12/12/2011	-4.86 ± 16.9	-1.92 ± 3.84	-615 ± 1080	25.3 ± 12.8	
		Mn-54	**Fe-59**	**Co-58**	**Co-60**	**Zn-65**
HIR	3/28/2011	-0.48 ± 2.04	-0.87 ± 4.36	0.18 ± 2.15	-1.23 ± 2.06	-7.16 ± 4.37
	6/21/2011	-3.14 ± 2.42	3.18 ± 6.53	0.94 ± 3.16	2.38 ± 2.95	-2.13 ± 6.80
	9/20/2011	-1.87 ± 3.95	-0.88 ± 7.79	-3.73 ± 3.44	1.81 ± 3.83	-0.74 ± 9.09
	12/12/2011	0.49 ± 2.64	-3.40 ± 4.66	2.6 ± 2.47	1.60 ± 2.35	-2.84 ± 5.37
		Zr-95	**Nb-95**	**I-131**	**Cs-134**	**Cs-137**
	3/28/2011	2.07 ± 3.78	-1.12 ± 2.02	-0.16 ± 0.46	-6.21 ± 2.30	-0.99 ± 1.94
	6/21/2011	-1.31 ± 4.90	-0.59 ± 3.31	0.33 ± 0.49	-1.06 ± 2.87	-1.95 ± 2.89
	9/20/2011	0.96 ± 6.09	-0.40 ± 3.90	-0.43 ± 0.38	-1.20 ± 4.10	-1.17 ± 3.41
	12/12/2011	-1.9 ± 4.39	-1.18 ± 2.42	0.58 ± 0.48	-0.34 ± 3.49	-0.38 ± 2.87
		Ba-140	**La-140**	**H-3**	**K-40**	
	3/28/2011	2.42 ± 12.1	-2.40 ± 3.79	-401 ± 581		
	6/21/2011	7.11 ± 15.6	1.47 ± 5.23	592 ± 1040		
	9/20/2011	8.44 ± 17.7	-0.16 ± 4.95	92.5 ± 464	58.5 ± 53.4	
	12/12/2011	0.06 ± 12.7	-2.53 ± 3.10	298 ± 1180		

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

Surry Power Station, Surry County, Virginia - 2011

pCi/Liter ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPE				
		Mn-54	**Fe-59**	**Co-58**	**Co-60**	**Zn-65**
CS	3/28/2011	-1.03 ± 1.87	2.29 ± 4.15	-0.62 ± 2.05	-1.48 ± 1.96	0.11 ± 4.15
	6/21/2011	-2.07 ± 2.64	-2.82 ± 5.14	2.01 ± 2.57	1.04 ± 2.57	0.24 ± 4.54
	9/20/2011	-0.38 ± 2.64	5.69 ± 5.82	1.09 ± 2.97	-0.28 ± 2.84	1.38 ± 5.21
	12/12/2011	2.70 ± 3.48	-0.15 ± 5.54	-0.59 ± 3.18	-0.50 ± 3.29	-7.02 ± 7.22
		Zr-95	**Nb-95**	**I-131**	**Cs-134**	**Cs-137**
	3/28/2011	-1.30 ± 3.32	-0.71 ± 2.17	-0.25 ± 0.49	-1.35 ± 2.25	-3.27 ± 2.13
	6/21/2011	-0.07 ± 4.71	0.19 ± 2.80	-0.16 ± 0.41	1.33 ± 2.73	0.64 ± 2.63
	9/20/2011	2.37 ± 5.21	1.12 ± 3.35	-0.02 ± 0.40	-0.60 ± 3.62	1.00 ± 3.07
	12/12/2011	2.55 ± 5.51	1.80 ± 3.23	-0.42 ± 0.48	1.87 ± 3.20	-0.13 ± 3.59
		Ba-140	**La-140**	**H-3**	**Ra-226**	
	3/28/2011	-4.38 ± 11.7	-1.34 ± 3.48	268 ± 623		
	6/21/2011	-1.42 ± 16.0	-0.14 ± 4.51	398 ± 1010	114 ± 99.8	
	9/20/2011	-15.6 ± 12.5	5.08 ± 4.43	4.85 ± 457		
	12/12/2011	-3.76 ± 17.3	-3.10 ± 5.14	-269 ± 1140		

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

Surry Power Station, Surry County, Virginia - 2011

pCi/Liter ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPE				
		Mn-54	**Fe-59**	**Co-58**	**Co-60**	**Zn-65**
SD	1/11/2011	-0.48 ± 2.62	2.08 ± 5.31	-0.26 ± 3.25	0.67 ± 2.71	-4.44 ± 7.93
	2/15/2011	1.22 ± 2.84	-2.00 ± 5.60	1.12 ± 2.99	-0.64 ± 3.07	-5.14 ± 6.51
	3/15/2011	-0.05 ± 1.45	-0.56 ± 2.49	0.85 ± 1.53	-0.71 ± 1.19	4.38 ± 2.60
	4/12/2011	-0.85 ± 1.76	2.54 ± 3.70	-0.33 ± 1.80	0.13 ± 1.75	-1.76 ± 3.19
	5/17/2011	1.80 ± 2.95	4.55 ± 7.24	-0.54 ± 3.06	3.22 ± 3.51	-2.18 ± 6.51
	6/21/2011	1.28 ± 1.16	0.88 ± 2.49	0.61 ± 1.32	0.39 ± 1.09	-0.56 ± 2.53
	7/18/2011	-1.06 ± 2.35	-2.97 ± 4.36	1.72 ± 2.67	0.20 ± 2.28	-1.67 ± 4.82
	8/16/2011	-1.23 ± 3.12	-2.93 ± 7.01	1.63 ± 3.43	-1.29 ± 3.65	-6.12 ± 8.42
	9/20/2011	-0.63 ± 2.51	1.47 ± 4.76	-0.22 ± 2.69	-0.09 ± 2.19	-1.35 ± 4.80
	10/11/2011	1.54 ± 3.11	5.80 ± 5.46	2.03 ± 3.18	1.98 ± 2.96	-4.16 ± 8.30
	11/15/2011	0.42 ± 1.31	-0.48 ± 3.24	-0.93 ± 1.42	1.37 ± 1.66	-3.05 ± 3.17
	12/13/2011	1.81 ± 2.91	0.75 ± 5.42	-1.16 ± 2.69	-3.11 ± 3.14	-5.44 ± 6.57
		Zr-95	**Nb-95**	**I-131**	**Cs-134**	**Cs-137**
	1/11/2011	4.05 ± 4.89	2.12 ± 2.90	-2.94 ± 5.62	0.51 ± 3.16	-1.50 ± 3.04
	2/15/2011	2.60 ± 4.62	0.18 ± 2.73	-4.45 ± 5.53	-3.96 ± 3.23	-0.13 ± 3.14
	3/15/2011	-1.28 ± 2.24	-0.10 ± 1.43	6.65 ± 3.72	0.57 ± 1.34	0.60 ± 1.22
	4/12/2011	1.01 ± 3.32	0.41 ± 1.94	-0.04 ± 5.98	0.65 ± 2.62	0.15 ± 1.81
	5/17/2011	-3.84 ± 5.55	-1.16 ± 3.27	-1.14 ± 5.74	-2.66 ± 2.84	-1.07 ± 3.32
	6/21/2011	0.31 ± 2.11	0.98 ± 1.22	2.28 ± 5.00	-0.26 ± 1.08	-0.55 ± 1.20
	7/18/2011	2.75 ± 4.86	1.18 ± 2.57	0.24 ± 4.69	-4.28 ± 2.59	1.02 ± 2.66
	8/16/2011	2.28 ± 5.09	-0.04 ± 3.69	1.31 ± 5.66	-0.29 ± 3.58	0.94 ± 2.83
	9/20/2011	0.31 ± 4.38	0.82 ± 2.78	0.07 ± 4.27	1.29 ± 2.92	1.02 ± 2.52
	10/11/2011	1.93 ± 5.54	-0.75 ± 3.51	-0.23 ± 4.97	1.38 ± 3.08	0.68 ± 3.36
	11/15/2011	-0.49 ± 2.67	0.57 ± 1.52	0.20 ± 5.57	-1.67 ± 1.47	2.78 ± 1.64
	12/13/2011	-3.88 ± 4.63	0.65 ± 2.68	-0.77 ± 3.40	-4.47 ± 2.87	-0.63 ± 2.90
		Ba-140	**La-140**	**H-3**	**K-40**	**Th-228**
	1/11/2011	-1.44 ± 14.2	-0.10 ± 4.07		117 ± 54.1	
	2/15/2011	4.53 ± 15.9	0.22 ± 4.06		157 ± 69.8	
	3/15/2011	-0.96 ± 9.25	-1.77 ± 3.15	185 ± 881		9.16 ± 5.36
	4/12/2011	3.32 ± 12.8	0.95 ± 3.28		32.5 ± 29.6	
	5/17/2011	8.79 ± 15.9	-6.43 ± 6.13			
	6/21/2011	-0.02 ± 11.0	-2.34 ± 2.88	1270 ± 654	82.3 ± 50.7	
	7/18/2011	-13.0 ± 12.4	3.79 ± 3.48		102 ± 62.3	
	8/16/2011	-6.54 ± 15.9	1.08 ± 5.10		119 ± 59.3	
	9/20/2011	1.64 ± 10.3	-3.09 ± 3.77	-54.2 ± 462		
	10/11/2011	-1.28 ± 12.6	-5.17 ± 4.47		58.6 ± 42.9	
	11/15/2011	-7.06 ± 11.6	-1.05 ± 3.62			
	12/13/2011	-5.12 ± 10.7	0.23 ± 3.35	-105 ± 619		

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

Surry Power Station, Surry County, Virginia - 2011

pCi/Liter ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPES				
		Mn-54	**Fe-59**	**Co-58**	**Co-60**	**Zn-65**
SW-C	1/11/2011	0.66 ± 2.45	-2.79 ± 4.55	-1.20 ± 2.66	0.94 ± 2.24	0.03 ± 5.65
	2/15/2011	1.33 ± 2.70	6.13 ± 5.48	-3.27 ± 2.54	0.45 ± 2.50	-3.79 ± 5.68
	3/15/2011	1.90 ± 2.44	-0.87 ± 5.65	3.17 ± 2.30	0.73 ± 2.93	1.24 ± 4.50
	4/12/2011	0.34 ± 1.67	0.94 ± 4.00	0.81 ± 1.79	0.05 ± 1.58	-2.32 ± 3.70
	5/17/2011	0.12 ± 0.57	0.60 ± 1.56	-0.19 ± 0.68	0.11 ± 0.60	-0.37 ± 1.20
	6/28/2011	1.56 ± 1.84	2.20 ± 4.26	-0.22 ± 1.90	1.26 ± 2.03	-5.91 ± 4.14
	7/18/2011	-0.56 ± 2.75	2.31 ± 5.81	-1.94 ± 2.94	0.86 ± 2.46	0.57 ± 6.43
	8/16/2011	0.43 ± 2.77	1.43 ± 6.55	-1.81 ± 3.56	2.79 ± 2.85	-0.42 ± 7.83
	9/20/2011	0.82 ± 2.90	0.44 ± 6.97	0.17 ± 2.73	-2.95 ± 3.51	-5.99 ± 8.67
	10/11/2011	-0.16 ± 2.35	1.33 ± 4.99	-0.72 ± 2.72	-0.43 ± 2.61	-8.67 ± 6.35
	11/15/2011	1.69 ± 1.69	1.46 ± 4.11	1.04 ± 2.00	1.28 ± 2.00	-4.67 ± 4.21
	12/13/2011	-0.07 ± 2.66	-0.68 ± 5.75	-0.60 ± 2.24	0.12 ± 2.71	-7.43 ± 6.08
		Zr-95	**Nb-95**	**I-131**	**Cs-134**	**Cs-137**
	1/11/2011	1.96 ± 3.97	5.04 ± 2.92	2.08 ± 5.05	-0.13 ± 3.02	-0.37 ± 2.53
	2/15/2011	-0.17 ± 4.63	-0.17 ± 2.49	-0.51 ± 3.93	-2.78 ± 2.85	-1.49 ± 2.79
	3/15/2011	0.74 ± 4.44	1.24 ± 2.67	2.71 ± 5.74	-0.16 ± 2.35	0.12 ± 2.65
	4/12/2011	-0.06 ± 3.14	0.04 ± 1.82	0.02 ± 6.03	-0.13 ± 1.87	-0.74 ± 1.86
	5/17/2011	-0.24 ± 1.19	-0.13 ± 0.65	-2.14 ± 4.39	-0.09 ± 0.59	0.52 ± 0.59
	6/28/2011	-0.28 ± 3.35	0.64 ± 1.90	-2.94 ± 5.44	-3.84 ± 1.80	1.15 ± 1.91
	7/18/2011	1.50 ± 5.10	0.79 ± 2.85	-7.08 ± 5.51	0.89 ± 3.44	0.05 ± 2.94
	8/16/2011	-1.30 ± 6.36	0.53 ± 3.84	-4.94 ± 6.53	1.36 ± 3.62	-0.78 ± 3.74
	9/20/2011	0.75 ± 5.07	0.53 ± 3.71	1.20 ± 4.97	0.11 ± 3.38	1.31 ± 3.16
	10/11/2011	-3.75 ± 4.41	1.60 ± 2.76	0.14 ± 4.49	0.03 ± 2.96	-0.92 ± 2.43
	11/15/2011	1.11 ± 2.97	-2.08 ± 1.89	2.33 ± 5.37	0.39 ± 1.57	0.95 ± 1.52
	12/13/2011	1.39 ± 4.31	-0.03 ± 2.69	0.88 ± 3.62	-3.99 ± 3.03	-0.15 ± 2.84
		Ba-140	**La-140**	**H-3**	**K-40**	**Th-228**
	1/11/2011	-3.36 ± 12.6	-3.63 ± 4.41			7.54 ± 6.18
	2/15/2011	-8.40 ± 13.6	0.74 ± 3.92			
	3/15/2011	-1.01 ± 15.7	-0.52 ± 4.64	543 ± 911		18.6 ± 10.8
	4/12/2011	4.39 ± 13.9	-0.45 ± 3.62			
	5/17/2011	-0.48 ± 8.32	0.14 ± 2.33			
	6/28/2011	-3.63 ± 12.6	-0.51 ± 3.85	-38.9 ± 732		
	7/18/2011	4.73 ± 14.8	-2.16 ± 4.22			
	8/16/2011	-14.1 ± 16.2	-0.27 ± 5.53		97.0 ± 62.3	
	9/20/2011	-18.0 ± 15.4	-4.49 ± 5.21	-277 ± 431		
	10/11/2011	1.10 ± 12.6	-0.82 ± 3.17		68.4 ± 60.2	
	11/15/2011	-1.48 ± 11.7	3.69 ± 4.78			
	12/13/2011	-0.55 ± 10.8	-1.83 ± 3.57	-90.1 ± 403		

TABLE 3-10: GAMMA EMITTER CONCENTRATIONS IN SILT

Surry Power Station, Surry County, Virginia - 2011

pCi/kg (dry) ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPE				
		Cs-134	**Cs-137**	**K-40**	**Ra-226**	**Th-228**
SD	3/17/2011	-3.97 ± 45	208 ± 61.2	18000 ± 1700	2710 ± 1540	1420 ± 126
	9/21/2011	-17.7 ± 71.6	204 ± 114	19200 ± 2150	2500 ± 1980	1560 ± 177
		Th-232	**Be-7**			
	3/17/2011	1370 ± 205				
	9/21/2011	1110 ± 292	2300 ± 1020			
		Cs-134	**Cs-137**	**K-40**	**Ra-226**	**Th-228**
CHIC-C	3/17/2011	2.85 ± 25.9	151 ± 55.2	12400 ± 1160	1050 ± 914	768 ± 116
	9/21/2011	1.04 ± 36.2	232 ± 70.3	19400 ± 1150	4550 ± 1070	1570 ± 94.2
		Th-232	**Ac-228**			
	3/17/2011	773 170	411 ± 297			
	9/21/2011	1550 ± 144				

TABLE 3-11: GAMMA EMITTER CONCENTRATIONS IN SHORELINE SEDIMENT

Surry Power Station, Surry County, Virginia - 2011

pCi/kg (dry) ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPE				
		Cs-134	**Cs-137**	**K-40**	**Th-228**	**Th-232**
HIR	2/22/2011	13.9 ± 19.0	16.2 ± 23.3	2730 ± 576	210 ± 50.5	204 ± 97.4
	8/16/2011	-9.2 ± 19.6	8.88 ± 15.4	6790 ± 746	138 ± 61.4	
CHIC-C	2/22/2011	1.52 ± 24.7	-18.6 ± 25.4	6290 ± 808	289 ± 48.6	267 ± 83.3
	8/16/2011	-9.83 ± 29.2	6.62 ± 27.5	2710 ± 729	448 ± 118	425 ± 167
		Ra-226				
	2/22/2011					
	8/16/2011	1230 ± 1100				

TABLE 3-12: GAMMA EMITTER CONCENTRATION IN FISH

Surry Power Station, Surry County, Virginia - 2011

pCi/kg (wet) ± 2 Sigma

SAMPLING LOCATION	COLLECTION DATE	SAMPLE TYPE	ISOTOPE			
			K-40	**Co-58**	**Co-60**	**Cs-134**
SD	4/6/2011	Catfish	3850 ± 1010	14.50 ± 35.20	24.90 ± 36.80	-63.2 ± 34.2
	4/6/2011	White Perch	2380 ± 899	20.8 ± 39.9	30.7 ± 49.2	-26.3 ± 51.6
	10/25/2011	Catfish	2150 ± 676	-14.4 ± 33.20	-17.8 ± 28.3	-22.3 ± 35.4
	10/25/2011	White Perch	1790 ± 739	-3.23 ± 24.9	-25.8 ± 30.30	-3.63 ± 30.4
			Cs-137	**Fe-59**	**Mn-54**	**Zn-65**
	4/6/2011	Catfish	12.7 ± 34	-11.9 ± 61.9	3.45 ± 31.1	-68.6 ± 71.6
	4/6/2011	White Perch	14.6 ± 49.3	67.4 ± 88.6	-10.6 ± 41.4	-94.5 ± 95.1
	10/25/2011	Catfish	42.6 ± 32	16.50 ± 70.30	12.4 ± 28.4	-75.9 ± 73.6
	10/25/2011	White Perch	12.8 ± 25	5.46 ± 58.6	-5.62 ± 22.20	-41.9 ± 55.4

TABLE 3-13: GAMMA EMITTER CONCENTRATIONS IN OYSTERS

Surry Power Station, Surry County, Virginia - 2011

pCi/kg (wet) ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPE			
		Co-58	**Co-60**	**Cs-134**	**Cs-137**
POS	3/17/2011	-23.9 ± 31.3	-0.93 ± 21.9	6.12 ± 26.3	-11.2 ± 22.3
	9/20/2011	-27.3 ± 31.4	-0.61 ± 27.5	11.9 ± 28.9	-6.08 ± 23.0
		Fe-59	**Mn-54**	**Zn-65**	**K-40**
	3/17/2011	-17.5 ± 64.2	0.92 ± 22.4	28.0 ± 50.9	694 ± 481
	9/20/2011	44.7 ± 60.3	-17.0 ± 24.6	6.18 ± 65.3	615 ± 459
		Th-228			
	3/17/2011	56.1 ± 55.8			
	9/20/2011	121 ± 58.6			
		Co-58	**Co-60**	**Cs-134**	**Cs-137**
MP	3/17/2011	-5.71 ± 33.0	4.91 ± 28.3	-3.62 ± 28.1	-5.13 ± 27.3
	9/20/2011	3.92 ± 47.3	29.7 ± 27.6	2.4 ± 34.4	-29.6 ± 46.1
		Fe-59	**Mn-54**	**Zn-65**	
	3/17/2011	3.95 ± 74.8	-6.35 ± 26.9	42.4 ± 60.0	
	9/20/2011	-10.0 ± 94.3	-37.6 ± 41.9	-119 ± 125	

TABLE 3-14: GAMMA EMITTER CONCENTRATIONS IN CLAMS

Surry Power Station, Surry County, Virginia - 2011

pCi/kg (wet) ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPE			
		Co-58	**Co-60**	**Cs-134**	**Cs-137**
JI	3/17/2011	-13.9 ± 30.7	-8.43 ± 21.6	-24.5 ± 25.1	6.32 ± 22.3
	9/21/2011	36.6 ± 50.5	8.99 ± 41.6	-14.1 ± 37.3	20.3 ± 40.0
		Fe-59	**Mn-54**	**Zn-65**	**K-40**
	3/17/2011	-10.6 ± 60.0	-4.36 ± 23.4	-77.40 ± 49.5	987 ± 474
	9/21/2011	87.2 ± 101	-1.51 ± 39.70	-80.50 ± 107	
		Co-58	**Co-60**	**Cs-134**	**Cs-137**
SD	3/17/2011	2.13 ± 29.9	10.90 ± 25.7	-18.20 ± 26.0	31.70 ± 24.7
	9/21/2011	-17.30 ± 42.70	56.30 ± 48.90	13.50 ± 46.40	-28.60 ± 39
		Fe-59	**Mn-54**	**Zn-65**	
	3/17/2011	-22.3 ± 55.2	5.53 ± 23.0	-58.4 ± 53.7	
	9/21/2011	0.00 ± 107	33.4 ± 45.5	48.2 ± 91.9	
		Co-58	**Co-60**	**Cs-134**	**Cs-137**
LC	3/17/2011	-18.1 ± 30.1	-1.77 ± 27.4	-10.2 ± 28.1	-7.06 ± 26.5
	9/20/2011	-2.84 ± 36.3	1.47 ± 26.5	-24.8 ± 34.7	3.37 ± 27.6
		Fe-59	**Mn-54**	**Zn-65**	
	3/17/2011	0.15 ± 78.4	0.40 ± 27.5	-45.7 ± 67.0	
	9/20/2011	-18.3 ± 79.6	-14.4 ± 32.3	-60.9 ± 71.5	
		Co-58	**Co-60**	**Cs-134**	**Cs-137**
CHIC-C	3/17/2011	-19.7 ± 27.5	9.10 ± 24.0	0.26 ± 25.9	14.5 ± 22.1
	9/21/2011	-8.07 ± 39.0	25.9 ± 35.0	-30.8 ± 35.9	-24.3 ± 37.4
		Fe-59	**Mn-54**	**Zn-65**	**K-40**
	3/17/2011	-11.3 ± 62.3	15.2 ± 20.4	-6.44 ± 49.5	
	9/21/2011	43.4 ± 81.7	-24.1 ± 35.9	51.5 ± 65.4	750 ± 650

TABLE 3-15: GAMMA EMITTER CONCENTRATIONS IN CRABS

Surry Power Station, Surry County, Virginia - 2011

pCi/kg (wet) ± 2 Sigma

SAMPLING LOCATIONS	COLLECTION DATE	ISOTOPE			
		K-40	**Co-58**	**Co-60**	**Cs-134**
SD	6/8/2011	1750 ± 660	1.73 ± 33.9	3.10 ± 25.4	15.4 ± 32.0
		Cs-137	**Fe-59**	**Mn-54**	**Zn-65**
		-27.7 ± 29.5	-111 ± 85.6	3.42 ± 28.9	28.6 ± 64.0

4. DISCUSSION OF RESULTS

Data from the radiological analyses of environmental media collected during 2011 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.

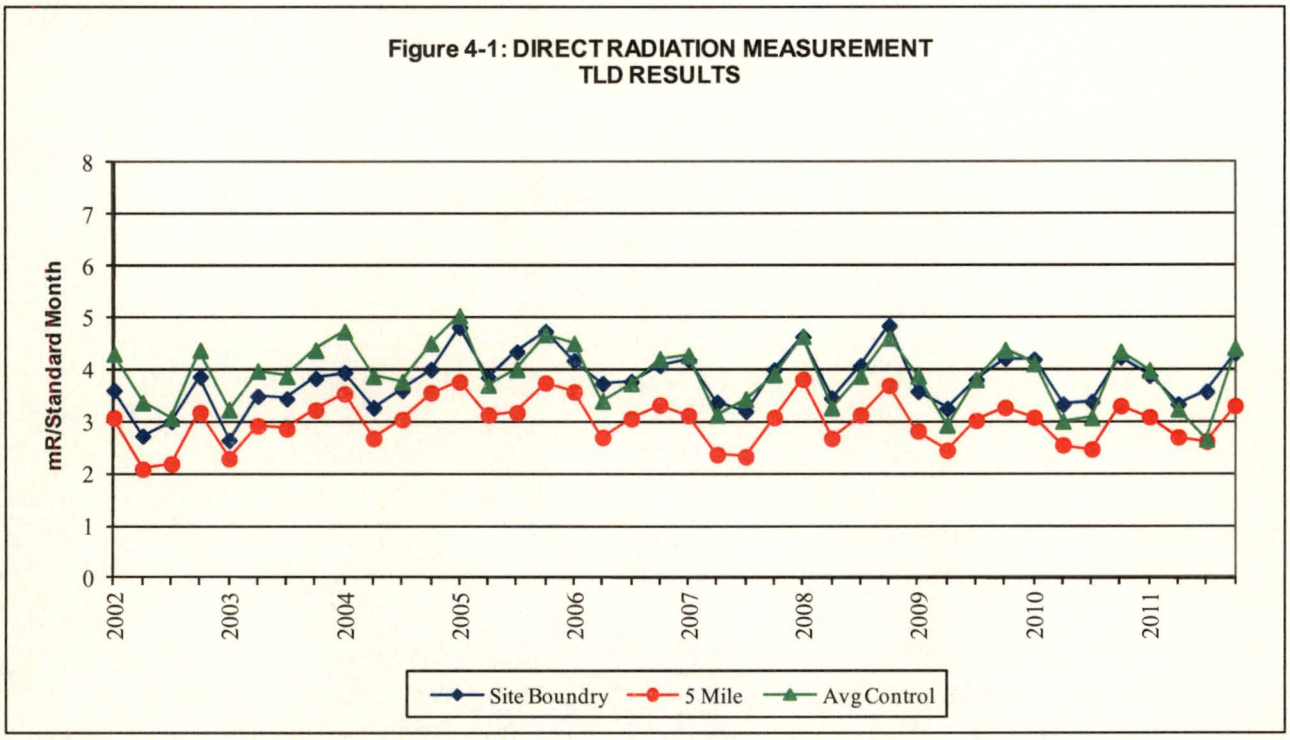
The predominant radioactivity detected throughout 2011 was from external sources, such as fallout from nuclear weapons tests (cesium-137, strontium-90), iodine-131 from the Fukushima Daiichi accident and naturally occurring radionuclides. Naturally occurring nuclides such as beryllium-7, potassium-40, 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 2011 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.



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.

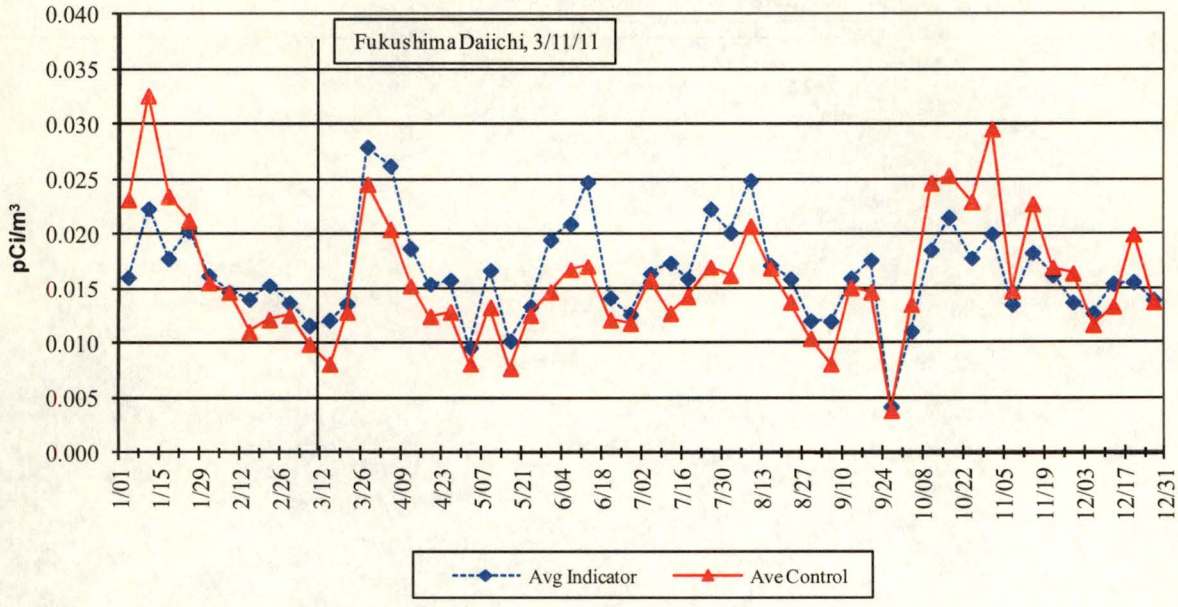
Although Figure 4-2 may present otherwise, the gross beta analyses for the period of mid March through mid April, the period of potential influence from the Fukushima Daiichi incident, indicate no positive correlation to the incident based on a review of the most recent 5 year trend. Gross beta concentrations can be variable within a given year and from year to year. For reference, the highest average gross beta detected by Surry Power Station due to the Chernobyl incident was 0.226 pCi/m^3.

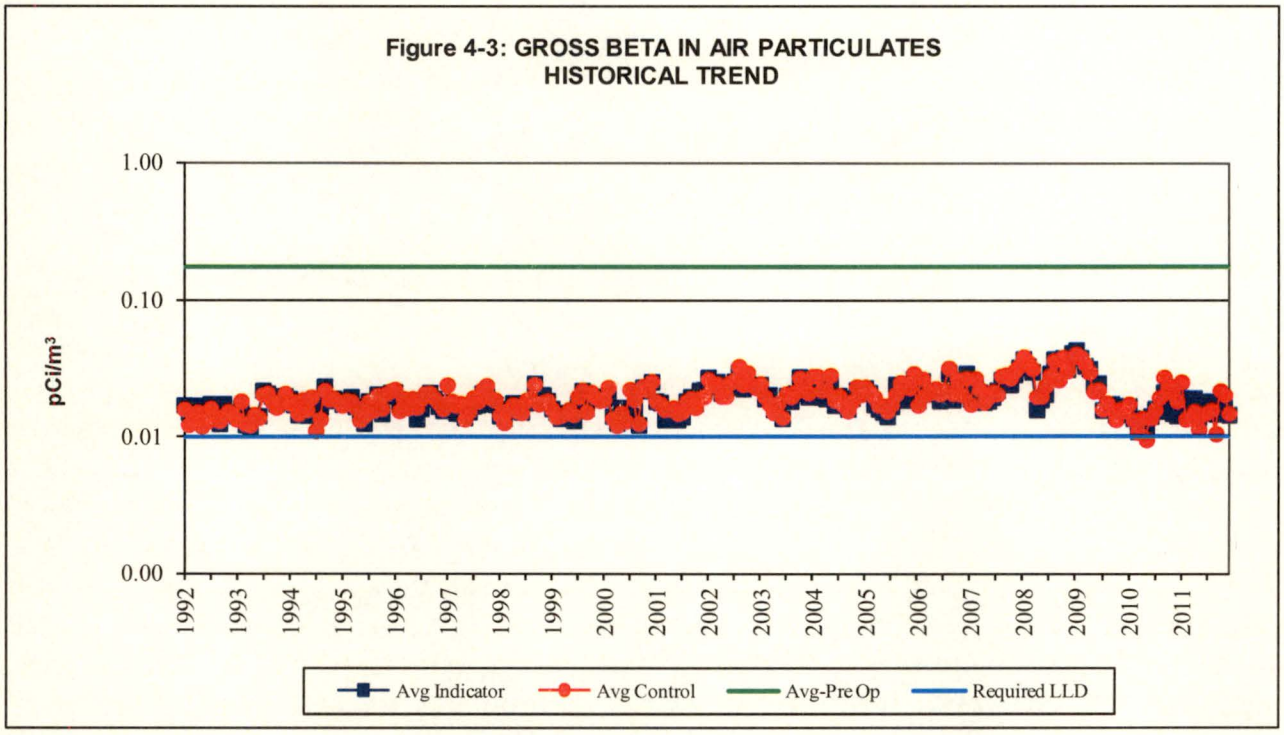
Year	Indicator Average	Indicator High	Indicator Low	Control Average	Control High	Control Low
2007	0.020	0.026	0.013	0.020	0.023	0.017
2008	0.018	0.038	0.003	0.020	0.031	0.011
2009	0.030	0.041	0.017	0.028	0.035	0.022
2010	0.012	0.017	0.008	0.012	0.015	0.009
2011	0.020	0.037	0.012	0.017	0.025	0.013

Gross beta concetration is pCi/m^3

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: 2011 GROSS BETA IN AIR PARTICULATES

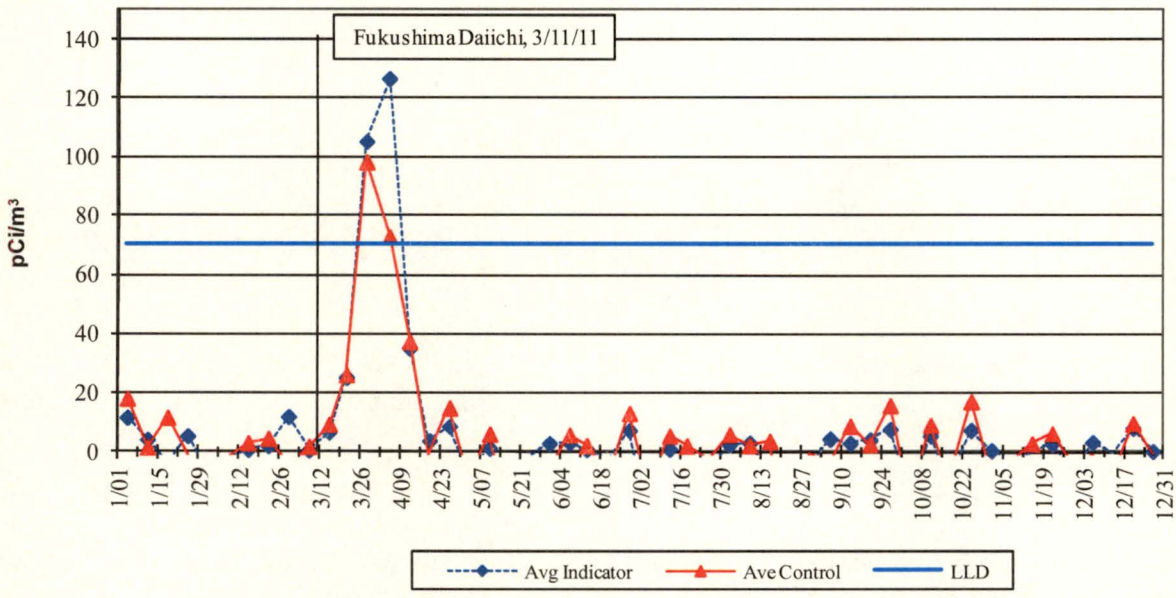




4.3 Airborne Radioiodine

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. Iodine-131 was detected in both the indicator and control locations for the sampling weeks beginning March 21, 2011 and ending April 12, 2011 (see Figure 4-4). During this period, the average indicator concentration was 0.092 pCi/m^3 (0.012 – 0.151) and the average control concentration was 0.069 pCi/m^3 (0.037 - 0.098). All other results in 2011 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. For reference, the highest average iodine-131 detected by Surry Power Station due to the Chernobyl incident was 0.94 pCi/m^3. The iodine-131 detected in 2011 is attributed to the Fukushima Daiichi nuclear incident.

Figure 4-4: 2011 Airborne Iodine-131



4.4 Air Particulate Gamma

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

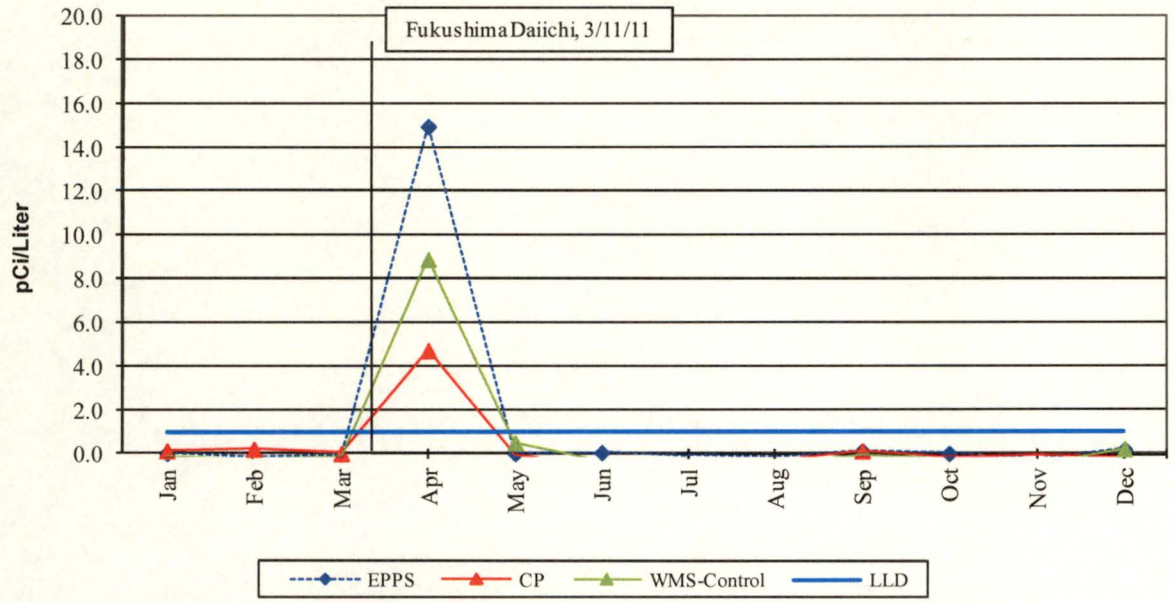
Analysis results for cow milk are contained in Table 3-6. Iodine-131 was detected in both the indicator and control locations for the month of April 12, 2011. The average indicator concentration was 9.88 pCi/Liter (4.75 – 15.0) and the control concentration was 8.91 pCi/Liter. All other results in 2011 indicated a lack of

detectable iodine-131 above the LLD of 1 pCi/L (see Figure 4-5). For reference, the highest iodine-131 detected in milk due to the Chernobyl incident was 61.2 pCi/Liter. The iodine-131 detected in 2011 is attributed to the Fukushima Daiichi nuclear incident.

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 2011.

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. Sr-90 was detected in one of the four composites analyzed at a concentration of 1.19 pCi/L. 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. The Sr-90 detected is a product of nuclear weapons testing fallout which has been well documented.

Figure 4-5: 2011 Iodine-131 in Milk



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. No station related radioactivity was detected.

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. Naturally occurring potassium-40 and radium-226 were detected in one sample each while thorium-228 was detected in two samples. 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 1,270 pCi/liter. This concentration represents 4.2% 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 and thorium-228 were detected in some samples. No station related radioactivity was detected.

4.9 Silt

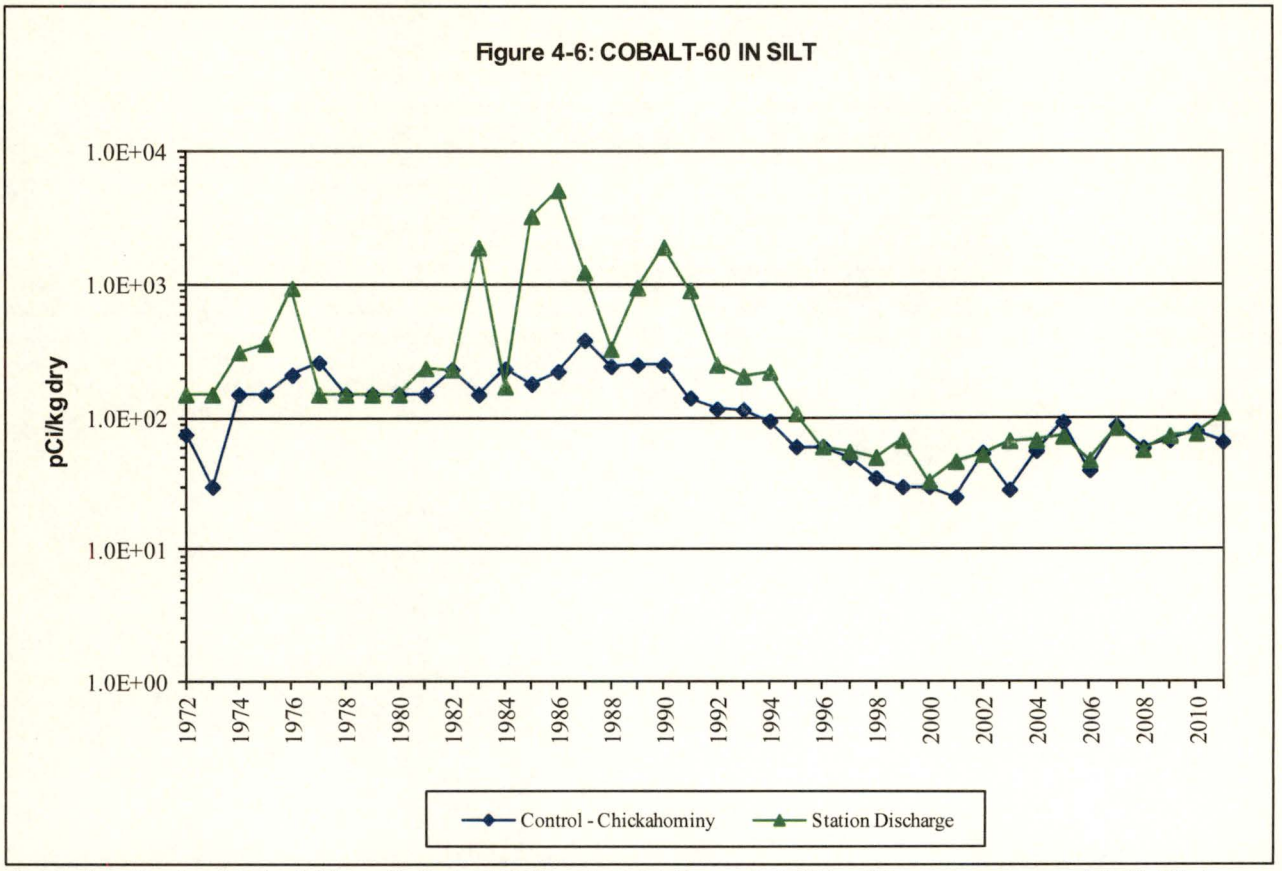
Silt is sampled to evaluate any buildup of radionuclides in the environment due to the operation of the station. Sampling of this pathway provides a good indication of the dispersion effects of effluents to the river. Buildup of radionuclides in silt could indirectly lead to increasing radioactivity 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 potassium-40, radium-226, thorium-228 and thorium-232 were detected. Historically, cobalt-60 has been detected in samples obtained from the indicator location (SD). Cobalt-60 has not

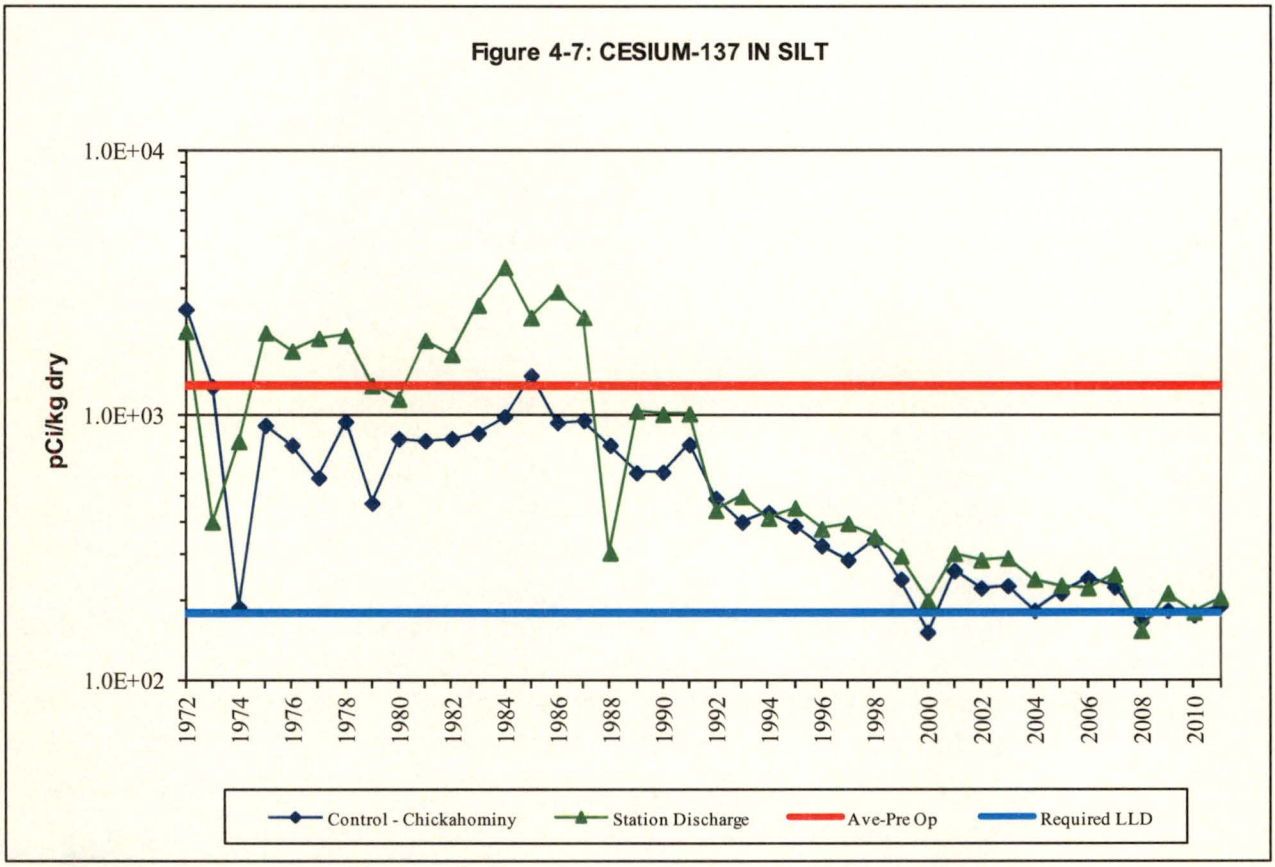
been detected since 2003. Trend graphs of cobalt-60 and cesium-137 in silt appear in Figures 4-6 and 4-7.

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 4-7. In 2011, cesium-137 was detected with an average indicator location concentration of 181 pCi/kg and an average control location concentration of 177 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 4-7.

Figure 4-6: COBALT-60 IN SILT



Chickahominy had detectable activity in 1982 and 1984 through 1994. Other years were <MDC, Minimum Detectable Concentration. Station Discharge was <MDC activity 1996 through 1998 and 2004 through 2011.



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 are collected from two 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 and thorium-228. 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 was 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 two REMP exceptions for scheduled sampling and analysis during 2011.

1. The 3rd quarter control environmental TLD (#41) was missing when TLDs were collected. Therefore, there was no gamma dose evaluation available at this location for the 3rd quarter.
2. The HIR air sampler was found inoperable for the sampling week of November 15th. Therefore, there was no gross beta and iodine-131 sample analyses for this time period. The sampler malfunctioned due to worn pump carbon vanes.

During the March 2008 clam sampling campaign, clams were not found at the Hog Island Point sample location. An alternate sampling location, Jamestown Island, was selected and sampled throughout 2008. In 2011, clams continued to be sampled at the Jamestown Island location in place of the Hog Island Point location which continued to indicate no shell stock recovery.

6. CONCLUSIONS

The results of the 2011 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 with the exception of the March and April samples that indicated the presence of iodine-131 due to the Fukushima Daiichi nuclear incident in Japan. 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 2011 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 with the exception of the April samples that indicated the presence of iodine-131 due to the Fukushima Daiichi nuclear incident in Japan. Naturally occurring potassium-40 and thorium-228 were detected at a similar level when compared to the average of the previous year.

  Strontium-90 was detected in one of four samples this year at a concentration of 1.19 pCi/L. Strontium-90 is not a component of station effluents, but rather, a product of nuclear weapons testing fallout.

- **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 2011.

- **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 and thorium-228 were detected. Tritium was detected in one of eight samples with a concentration of 1,270 pCi/liter. This represents 4.2% 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.

REFERENCES

References

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

2. United States Nuclear Regulatory Commission, Regulatory Guide 1.109, Rev. 1, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10CFR50, Appendix I", October 1977.

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

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

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

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

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

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

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

APPENDICES

APPENDIX A: LAND USE CENSUS

Year 2011

*LAND USE CENSUS**

Surry Power Station, Surry County, Virginia

January 1 to December 31, 2011 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	3.0 @ 143°	(a)	(a)	(a)
H	SSE	2.7 @ 158°	(a)	(a)	(a)
J	S	1.7 @ 181°	2.0 @ 183°	(a)	(a)
K	SSW	2.3 @ 212°	4.3 @ 193°	4.8 @ 200°	(a)
L	SW	2.3 @ 221°	3.6 @ 223°	(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 2011

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 2011. Five 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 11-13, Eckert & Ziegler Analytics Sample E7461-396 failed Cr-51 in milk. The TBE Cr-51 in milk result of 398 pCi/L was higher than the known value of 298 pCi/L, resulting in a found to known ratio of 1.34. There was a slightly high bias in all the gamma activities. The June gamma results in milk (E7852-396) did not show a high bias. No further action was taken as historically milk gamma results have been within acceptance criteria and there had never been a Cr-51 failure.

2. NCR 11-11, DOE MAPEP Sample 11-RdF24 failed Sr-90 in air particulate filter. TBE did not report a Sr-90 concentration. DOE MAPEP evaluated the non-report as a failure.
3. NCR 11-11, DOE MAPEP Sample 11-GrF24 failed gross alpha in air particulate filter. The gross alpha result of 0.101 Bq/sample was lower than the known value of 0.659 Bq/sample, which exceeded the lower control limit of 0.198 Bq/sample. The air particulate filter was counted on the wrong side. The filter was turned over and reanalyzed with results meeting the acceptance criteria. The lab technician received supplemental training for gross alpha on filter analysis.
4. NCR 11-08, ERA Sample RAD-85 failed gross alpha in water. The gross alpha result of 64.1 pCi/L was higher than the known value of 50.1 pCi/L, which exceeded the upper control limit of 62.9 pCi/L. The solids on the planchet exceeded 100 mg, which was beyond the range of the efficiency curve. The lab technician received supplemental training for gross alpha in water analysis.
5. NCR 11-16, ERA Sample RAD-87 failed Sr-89 in water. The Sr-89 result of 81.0 pCi/L was evaluated as not acceptable based on the acceptance range of 56.9 – 77.9. The TBE to ERA ratio was 1.16 of the known value of 69.7. Since this falls within 20% of the known value, TBE considers this an acceptable result. No corrective action is required.

ECKERT & ZIEGLER ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
March 2011	E7460-396	Milk	Sr-89	pCi/L	98.8	97.4	1.01	A
			Sr-90	pCi/L	15.2	15.8	0.96	A
	E7461-396	Milk	I-131	pCi/L	92.9	96.9	0.96	A
			Cr-51	pCi/L	398	298	1.34	N (1)
			Cs-134	pCi/L	130	130	1.00	A
			Cs-137	pCi/L	232	205	1.13	A
			Co-58	pCi/L	121	113	1.07	A
			Mn-54	pCi/L	289	266	1.09	A
			Fe-59	pCi/L	201	175	1.15	A
			Zn-65	pCi/L	287	261	1.10	A
			Co-60	pCi/L	186	172	1.08	A
	E7463-396	Filter	Cr-51	pCi	243	215	1.13	A
			Cs-134	pCi	85.0	94.2	0.90	A
			Cs-137	pCi	168	148	1.14	A
			Co-58	pCi	89.2	81.8	1.09	A
			Mn-54	pCi	171	192	0.89	A
			Fe-59	pCi	129	126	1.02	A
			Zn-65	pCi	159	189	0.84	A
			Co-60	pCi	132	124	1.06	A
	E7462-396	Charcoal	I-131	pCi	96.5	96.3	1.00	A
June 2011	E7851-396	Milk	Sr-89	pCi/L	96.7	103	0.94	A
			Sr-90	pCi/L	13.8	15.6	0.88	A
	E7852-396	Milk	I-131	pCi/L	110	103.0	1.07	A
			Ce-141	pCi/L	68.1	79.9	0.85	A
			Cr-51	pCi/L	186	206	0.90	A
			Cs-134	pCi/L	164	190	0.86	A
			Cs-137	pCi/L	140	138	1.01	A
			Co-58	pCi/L	141	152	0.93	A
			Mn-54	pCi/L	136	138	0.99	A
			Fe-59	pCi/L	128	123	1.04	A
			Zn-65	pCi/L	263	261	1.01	A
			Co-60	pCi/L	189	195	0.97	A
	E7853-396	Charcoal	I-131	pCi	76.2	86.1	0.89	A

Footnotes are on page 3 of 3.

ECKERT & ZIEGLER ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES
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Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
June 2011	E7854-396	Filter	Ce-141	pCi	49.9	42.9	1.16	A
			Cr-51	pCi	95.6	110	0.87	A
			Cs-134	pCi	104	102	1.02	A
			Cs-137	pCi	83.8	74.0	1.13	A
			Co-58	pCi	90.7	81.3	1.12	A
			Mn-54	pCi	74.5	73.9	1.01	A
			Fe-59	pCi	62.0	66.1	0.94	A
			Zn-65	pCi	140	140	1.00	A
			Co-60	pCi	119	104	1.14	A
September 2011	E8070-396	Milk	Sr-89	pCi/L	102	90.8	1.12	A
			Sr-90	pCi/L	13.2	14.7	0.90	A
	E8071-396	Milk	I-131	pCi/L	74.2	89.2	0.83	A
			Ce-141	pCi/L	66.9	66.7	1.00	A
			Cr-51	pCi/L	249	226	1.10	A
			Cs-134	pCi/L	116	128	0.91	A
			Cs-137	pCi/L	106	114	0.93	A
			Co-58	pCi/L	95.4	97.5	0.98	A
			Mn-54	pCi/L	147	151	0.97	A
			Fe-59	pCi/L	53.1	54.8	0.97	A
			Zn-65	pCi/L	175	180	0.97	A
			Co-60	pCi/L	150	157	0.96	A
	E8073-396	Filter	Ce-141	pCi	66.6	67.5	0.99	A
			Cr-51	pCi	263	229	1.15	A
			Cs-134	pCi	139	130	1.07	A
			Cs-137	pCi	110	115	0.96	A
			Co-58	pCi	108	98.6	1.10	A
			Mn-54	pCi	152	153	0.99	A
			Fe-59	pCi	57.5	55.5	1.04	A
			Zn-65	pCi	190	183	1.04	A
			Co-60	pCi	156	159	0.98	A
	E8072-396	Charcoal	I-131	pCi	77.6	80.6	0.96	A
December, 2011	E8230-396	Milk	Sr-89	pCi/L	93.3	93.1	1.00	A
			Sr-90	pCi/L	12.7	15.4	0.82	A
	E8232-396	Charcoal	I-131	pCi	100	89.5	1.12	A

Footnotes are on page 3 of 3.

ECKERT & ZIEGLER ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES
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Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
December, 2011	E8231-396	Milk	I-131	pCi/L	82.5	90.2	0.91	A
			Cr-51	pCi/L	465	566	0.82	A
			Cs-134	pCi/L	142	171	0.83	A
			Cs-137	pCi/L	185	210	0.88	A
			Co-58	pCi/L	177	221	0.80	A
			Mn-54	pCi/L	208	241	0.86	A
			Fe-59	pCi/L	164	183	0.90	A
			Zn-65	pCi/L	259	291	0.89	A
			Co-60	pCi/L	224	270	0.83	A
	E8233-396	Filter	Cr-51	pCi	344	368	0.93	A
			Cs-134	pCi	105	111	0.95	A
			Cs-137	pCi	129	137	0.94	A
			Co-58	pCi	145	144	1.01	A
			Mn-54	pCi	137	157	0.87	A
			Fe-59	pCi	119	119	1.00	A
			Zn-65	pCi	145	190	0.76	W
			Co-60	pCi	168	176	0.95	A

(1) NCR 11-13

(a) Teledyne Brown Engineering reported result.

(b) The Eckert & Ziegler 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 Eckert & Ziegler Analytics results.

(d) Eckert & Ziegler 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. Two consecutive Warning evaluations require an investigation. 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

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Range	Evaluation (c)
March 2011	11-MaW24	Water	Cs-134	Bq/L	19.1	21.5	15.1 - 28.0	A
			Cs-137	Bq/L	29.0	29.4	20.6 - 38.2	A
			Co-57	Bq/L	0.139		(1)	A
			Co-60	Bq/L	23.9	24.6	17.2 - 32.0	A
			H-3	Bq/L	265	243	170 - 316	A
			Mn-54	Bq/L	31.8	31.6	22.1 - 41.1	A
			K-40	Bq/L	94.8	91	64 - 118	A
			Sr-90	Bq/L	9.64	8.72	6.10 - 11.34	A
			Zn-65	Bq/L	-0.142		(1)	A
	11-GrW24	Water	Gr-A	Bq/L	0.767	1.136	0.341 - 1.931	A
			Gr-B	Bq/L	3.43	2.96	1.48 - 4.44	A
	11-RdF24	Filter	Cs-134	Bq/sample	3.26	3.49	2.44 - 4.54	A
			Cs-137	Bq/sample	2.36	2.28	1.60 - 2.96	A
			Co-57	Bq/sample	3.30	3.33	2.33 - 4.33	A
			Co-60	Bq/sample	0.0765		(1)	A
			Mn-54	Bq/sample	2.84	2.64	1.85 - 3.43	A
			Sr-90	Bq/sample	NR	1.36	0.95 - 1.77	N (2)
			Zn-65	Bq/sample	3.30	3.18	2.23 - 4.13	A
	11-GrF24	Filter	Gr-A	Bq/sample	0.101	0.659	0.198 - 1.120	N (3)
			Gr-B	Bq/sample	1.23	1.323	0.662 - 1.985	A
September 2011	11-MaW25	Water	Cs-134	Bq/L	16.0	19.1	13.4 - 24.8	A
			Cs-137	Bq/L	0.0043		(1)	A
			Co-57	Bq/L	33.1	36.6	25.6 - 47.6	A
			Co-60	Bq/L	26.9	29.3	20.5 - 38.1	A
			H-3	Bq/L	1011	1014	710 - 1318	A
			Mn-54	Bq/L	23.2	25.0	17.5 - 32.5	A
			K-40	Bq/L	147	156	109 - 203	A
			Sr-90	Bq/L	15.8	14.2	9.9 - 18.5	A
			Zn-65	Bq/L	27.3	28.5	20.0 - 37.1	A
	11-GrW25	Water	Gr-A	Bq/L	0.894	0.866	0.260 - 1.472	A
			Gr-B	Bq/L	5.87	4.81	2.41 - 7.22	A

Footnotes are on page 2 of 2.

DOE's MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Control Limits	Evaluation (c)
September 2011	11-RdF25	Filter	Cs-134	Bq/sample	-0.043		(1)	A
			Cs-137	Bq/sample	3.09	2.60	1.82 - 3.38	A
			Co-57	Bq/sample	5.36	5.09	3.56 - 6.62	A
			Co-60	Bq/sample	3.41	3.20	2.24 - 4.16	A
			Mn-54	Bq/sample	0.067		(1)	A
			Sr-90	Bq/sample	1.84	1.67	1.17 - 2.17	A
			Zn-65	Bq/sample	5.17	4.11	2.88 - 5.34	W
	11-GrF25	Filter	Gr-A	Bq/sample	0.0058		(1)	A
			Gr-B	Bq/sample	-0.01		(1)	A

(1) False positive test
(2) NCR 11-11
(3) NCR 11-11
(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. Two consecutive Warning evaluations require an investigation. N = Not Acceptable

ERA ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE QC SPIKE PROGRAM
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Control Limits	Evaluation (c)
May 2011	RAD-85	Water	Sr-89	pCi/L	59.8	63.2	51.1 - 71.2	A
			Sr-90	pCi/L	42.5	42.5	31.3 - 48.8	A
			Ba-133	pCi/L	73.3	75.3	63.0 - 82.8	A
			Cs-134	pCi/L	64.9	72.9	59.5 - 80.2	A
			Cs-137	pCi/L	74.6	77.0	69.3 - 87.4	A
			Co-60	pCi/L	87.8	88.8	79.9 - 100	A
			Zn-65	pCi/L	103	98.9	89.0 - 118	A
			Gr-A	pCi/L	64.1	50.1	26.1 - 62.9	N (1)
			Gr-B	pCi/L	51.8	49.8	33.8 - 56.9	A
			I-131	pCi/L	27.4	27.5	22.9 - 32.3	A
			U-Nat	pCi/L	38.5	39.8	32.2 - 44.4	A
			H-3	pCi/L	10057	10200	8870 - 11200	A
	MRAD-14	Filter	Gr-A	pCi/filter	79.7	74.3	38.5 - 112	A
November 2011	RAD-87	Water	Sr-89	pCi/L	81.0	69.7	56.9 - 77.9	N (2)
			Sr-90	pCi/L	35.5	41.4	30.2 - 47.2	A
			Ba-133	pCi/L	90.7	96.9	81.8 - 106	A
			Cs-134	pCi/L	36.6	33.4	26.3 - 36.7	A
			Cs-137	pCi/L	44.7	44.3	39.4 - 51.7	A
			Co-60	pCi/L	118.7	119	107 - 133	A
			Zn-65	pCi/L	80.2	76.8	68.9 - 92.5	A
			Gr-A	pCi/L	34.2	53.2	27.8 - 66.6	A
			Gr-B	pCi/L	39.3	45.9	30.9 - 53.1	A
			I-131	pCi/L	22.9	27.5	22.9 - 32.3	A
			U-Nat	pCi/L	46.8	48.6	39.4 - 54.0	A
			H-3	pCi/L	15733	17400	15200 - 19100	A
	MRAD-15	Filter	Gr-A	pCi/filter	44.6	58.4	30.3 - 87.8	A

(1) NCR 11-08
(2) NCR 11-16
(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 Lim