

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF HEALTH

OFFICE OF RADIOLOGICAL HEALTH
109 Governor Street, 7th Floor, Richmond, Virginia 23219
Office (804) 864-8150
Fax (804) 864-8175

**ENVIRONMENTAL
RADIATION
MONITORING
PROGRAM**

**2016
1st QUARTER REPORT**



COMMONWEALTH OF VIRGINIA
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Sampling Locations

Sampling Locations for Surry Nuclear Power Station



Photo courtesy of Dominion Power

LOCATION	TYPE	FREQUENCY
<u>Milk</u>		
M-66 Surry County - W.B. Epps Dairy	Raw	Quarterly
<u>Air</u>		
A-20 Surry Power Station	Air Particulate	Weekly
A-44 Jamestown State Park - Historical Site	Air Particulate	Weekly
<u>Charcoal Filter</u>		
C-20 Surry Power Station	Release Gas	Weekly
C-44 Jamestown State Park - Historical Site	Release Gas	Weekly
<u>Dosimeters</u>		
D-20 Surry Power Station	Gamma in Air	Quarterly
D-41 Surry Lebanon Baptist Church	Gamma in Air	Quarterly
D-42 Surry County - Lawnes Creek	Gamma in Air	Quarterly
D-43 Surry County - Route 628	Gamma in Air	Quarterly
D-44 Jamestown State Park - Historical Site	Gamma in Air	Quarterly
D-45 Newport News - Lee Hall	Gamma in Air	Quarterly
D-73 Naval Weapons Station - Enlisted Quarters	Gamma in Air	Quarterly
D-76 Newport News - Fort Eustis	Gamma in Air	Quarterly
D-77 Williamsburg - Busch Gardens	Gamma in Air	Quarterly
D-78 Williamsburg - Williamsburg Airport	Gamma in Air	Quarterly
D-79 Surry County - Scotland Wharf	Gamma in Air	Quarterly
D-80 Surry County - Bacon's Castle	Gamma in Air	Quarterly
D-81 Surry County - Alliance	Gamma in Air	Quarterly
D-82 Surry County - Hog Point	Gamma in Air	Quarterly
<u>Silt</u>		
S-17 James River - 1/2 Mile Off Discharge Canal	Silt	2x per year
<u>Fish</u>		
F-17 James River - 1/2 Mile Off Discharge Canal	Edible Fish	2x per year
R-17 James River - Various Locations	Shellfish	Annually
<u>Surface Water</u>		
W-19 Surry Discharge Canal	Surface Water	Weekly
W-79 James River - Scotland Wharf	Surface Water	Weekly
W-79A James River - Robious Landing	Surface Water	Weekly
<u>Vegetation</u>		
V-96D Surry County - local farms	Edible Vegetation	2x per year

Sampling Locations for North Anna Nuclear Power Station



Photo courtesy of Dominion Power

LOCATION	TYPE	FREQUENCY
<u>Milk</u>		
M-29 Louisa County - Lakeside Dairy	Raw	Quarterly
<u>Air</u>		
A-88 Louisa County Route 700/North Anna Power Station	Air Particulate	Weekly
A-86 Louisa County – Bumpass Volunteer Fire	Air Particulate	Weekly
<u>Charcoal Filter</u>		
C-88 Louisa County Route 700/North Anna Power Station	Release Gas	Weekly
C-86 Louisa County – Bumpass Volunteer Fire	Release Gas	Weekly
<u>Dosimeters</u>		
D-35 NAPS	Gamma in Air	Quarterly
D-50 Louisa County – Mineral	Gamma in Air	Quarterly
D-51 Louisa County - Wares Crossroads	Gamma in Air	Quarterly
D-52 Spotsylvania - Good Hope Church	Gamma in Air	Quarterly
D-53 Spotsylvania - Route 614	Gamma in Air	Quarterly
D-54 Louisa County - Frederick's Hall	Gamma in Air	Quarterly
D-84 Louisa County - Route 685	Gamma in Air	Quarterly
D-85 Spotsylvania Co. - Route 713	Gamma in Air	Quarterly
D-86 Louisa County – Bumpass Volunteer Fire	Gamma in Air	Quarterly
D-87 Spotsylvania Co. - Levy	Gamma in Air	Quarterly
D-88 Louisa Co. - Rt. 700 (near station)	Gamma in Air	Quarterly
D-89 Louisa County - Aspen Hill	Gamma in Air	Quarterly
<u>Fish</u>		
F-24 North Anna Lake - Second Cooling Lagoon	Edible Fish	2x per year
<u>Soil</u>		
S-24 NAPS Waste Treatment shoreline soil	Soil	2x per year
<u>Surface Water</u>		
W-27 Lake Anna - Route 522	Surface Water	Weekly
W-33 North Anna Discharge Canal	Surface Water	Weekly
<u>Vegetation</u>		
V-98 Louisa County – local farms	Edible Vegetation	2x per year

Sampling Locations - Babcock & Wilcox

SAMPLE	LOCATION	TYPE	FREQUENCY
<u>AIR</u>			
A-101	Eastern Site Boundary Ball field	Air Particulate	Quarterly
<u>SURFACE WATER</u>			
W-101	Eastern Site Boundary Ball field	Surface Water	Annually
W-102A	James River Riverside Park	Surface Water	Annually
<u>SOIL</u>			
S-101	Eastern Site Boundary Ball field	Soil	Annually
S-102A	James River Riverside Park	Soil	Annually
<u>VEGETATION</u>			
V-101	Eastern Site Boundary Ball field	Grass	Annually
V-102	James River Riverside Park	Grass	Annually

Other Sampling Locations in Virginia

LOCATION	TYPE	FREQUENCY
<u>Air</u>		
<i>Control/naturally occurring background</i>		
A-40 Pocahontas State Park	Air Particulate	Weekly
<u>Charcoal Filter</u>		
<i>Control/naturally occurring background</i>		
C-40 Pocahontas State Park	Air Particulate	Weekly
<u>Dosimeters</u>		
<i>Control/naturally occurring background</i>		
D-40 Pocahontas State Park	Air Gamma	Quarterly
<u>Silt</u>		
S-15 James River - NNSB - Pier 1	Silt	Quarterly
S-16 James River - NNSB- Shipway 11	Silt	Quarterly
S-18 Elizabeth River - NNSY - Drydock #8	Silt	Quarterly
S-19 Elizabeth River - NNSY - Drydock #4	Silt	Quarterly
S-20 Elizabeth River - NNSY - Wet Slip #1	Silt	Quarterly
<u>Surface Water</u>		
W-15 James River - NNSB- Pier 1	Surface Water	Quarterly
W-16 James River - NNSB- Shipway 11	Surface Water	Quarterly
W-37 Elizabeth River - NNSY - Drydock #8	Surface Water	Quarterly
W-38 Elizabeth River - NNSY - Drydock #4	Surface Water	Quarterly
W-39 Elizabeth River - NNSY - Wet Slip #1	Surface Water	Quarterly

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**MINIMUM
DETECTABLE
ACTIVITY
"MDA"**

Minimum Detectable Activity (MDA), as used in this report, is defined as the lowest level of radioactivity that can be consistently and accurately detected in a given sample.

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Analytical Results

Virginia Department of Health

AIR PARTICULATE

January 1, 2016 through March 31, 2016

FIRST QUARTER REPORT 2016

Location: Pocahontas State Park (Control)

Week #	Station	Date		Gross Beta Activity pCi/meter ³		
		Start	Stop			
1	A-40	12/28/15	- 1/4/16	0.03	+/-	0.01
2	A-40	1/4/16	- 1/11/16	0.03	+/-	0.0047
3	A-40	1/11/16	- 1/20/16	0.05	+/-	0.007
4	A-40	1/20/16	- 1/26/16	0.03	+/-	0.004
5	A-40	1/26/16	- 2/1/16	0.04	+/-	0.007
6 ¹	A-40		-		+/-	
7 ²	A-40	2/1/16	- 2/16/16	0.03	+/-	0.004
8	A-40	2/16/16	- 2/22/16	0.04	+/-	0.006
9	A-40	2/22/16	- 2/29/16	0.03	+/-	0.005
10	A-40	2/29/16	- 3/7/16	0.05	+/-	0.01
11	A-40	3/7/16	- 3/14/16	0.03	+/-	0.004
12	A-40	3/14/16	- 3/21/16	0.03	+/-	0.01
13	A-40	3/21/16	- 3/28/16	0.03	+/-	0.01

¹ Due to a North Anna Power Station Full Scale Exercise, no samples were analyzed.

² Due to 15 day collection period, sample results are lower than normal.

Virginia Department of Health

AIR PARTICULATE

January 1, 2016 through March 31, 2016

FIRST QUARTER REPORT 2016

Location: Surry Power Station – on site

Week #	Station	Start	Date		Gross Beta Activity pCi/meter ³		
				Stop			
1	A-20	12/28/15	-	1/4/16	0.02	+/-	0.004
2	A-20	1/4/16	-	1/11/16	0.03	+/-	0.0047
3	A-20	1/11/16	-	1/19/16	0.04	+/-	0.005
4	A-20	1/19/16	-	1/26/16	0.03	+/-	0.005
5	A-20	1/26/16	-	2/1/16	0.05	+/-	0.007
6 ¹	A-20		-			+/-	
7 ²	A-20	2/1/16	-	2/16/16	0.03	+/-	0.004
8	A-20	2/16/16	-	2/22/16	0.06	+/-	0.009
9	A-20	2/22/16	-	2/29/16	0.14	+/-	0.02
10	A-20	2/29/16	-	3/7/16	0.03	+/-	0.005
11	A-20	3/7/16	-	3/14/16	0.03	+/-	0.004
12	A-20	3/14/16	-	3/21/16	0.03	+/-	0.004
13	A-20	3/21/16	-	3/28/16	0.03	+/-	0.004

¹ Due to a North Anna Power Station Full Scale Exercise, no samples were analyzed.

² Due to 15 day collection period, sample results are lower than normal.

Virginia Department of Health

AIR PARTICULATE

January 1, 2016 through March 31, 2016

FIRST QUARTER REPORT 2016

Location: Jamestown State Park & Historical Site

Week #	Station	Start	Date		Gross Beta Activity pCi/meter ³	Gross Beta Activity pCi/meter ³	
			Stop				
1	A-44	12/28/15	-	1/4/16	0.03	+/-	0.004
2	A-44	1/4/16	-	1/11/16	0.02	+/-	0.0037
3	A-44	1/11/16	-	1/19/16	0.03	+/-	0.004
4	A-44	1/19/16	-	1/26/16	0.03	+/-	0.004
5	A-44	1/26/16	-	2/1/16	0.04	+/-	0.006
6 ¹	A-44		-			+/-	
7 ²	A-44	2/1/16	-	2/16/16	0.02	+/-	0.003
8	A-44	2/16/16	-	2/22/16	0.03	+/-	0.005
9	A-44	2/22/16	-	2/29/16	0.03	+/-	0.004
10	A-44	2/29/16	-	3/7/16	0.02	+/-	0.003
11	A-44	3/7/16	-	3/14/16	0.02	+/-	0.003
12	A-44	3/14/16	-	3/21/16	0.02	+/-	0.003
13	A-44	3/21/16	-	3/28/16	0.02	+/-	0.003

¹ Due to a North Anna Power Station Full Scale Exercise, no samples were analyzed.

² Due to 15 day collection period, sample results are lower than normal.

Virginia Department of Health

AIR PARTICULATE

January 1, 2016 through March 31, 2016

FIRST QUARTER REPORT 2016

Location: Louisa County / Bumpass Volunteer Fire Station

Week #	Station	Start	Date		Gross Beta Activity pCi/meter ³		
				Stop			
1	A-86	12/28/15	-	1/4/16	0.04	+/-	0.01
2	A-86	1/4/16	-	1/11/16	0.02	+/-	0.0036
3	A-86	1/11/16	-	1/19/16	0.05	+/-	0.007
4	A-86	1/19/16	-	1/26/16	0.03	+/-	0.004
5	A-86	1/26/16	-	2/1/16	0.04	+/-	0.006
6 ¹	A-86		-			+/-	
7 ²	A-86	2/1/16	-	2/16/16	0.03	+/-	0.004
8	A-86	2/16/16	-	2/22/16	0.04	+/-	0.006
9	A-86	2/22/16	-	2/29/16	0.04	+/-	0.01
10	A-86	2/29/16	-	3/7/16	0.04	+/-	0.01
11	A-86	3/7/16	-	3/14/16	0.03	+/-	0.004
12	A-86	3/14/16	-	3/21/16	0.03	+/-	0.01
13	A-86	3/21/16	-	3/28/16	0.03	+/-	0.005

¹ Due to a North Anna Power Station Full Scale Exercise, no samples were analyzed.

² Due to 15 day collection period, sample results are lower than normal.

Virginia Department of Health

AIR PARTICULATE

January 1, 2016 through March 31, 2016

FIRST QUARTER REPORT 2016

Location: Louisa County Route 700 / North Anna Power Station

Week #	Station	Date			Gross Beta Activity		
		Start	Stop		pCi/meter ³		
1	A-88	12/28/15	-	1/4/16	0.03	+/-	0.01
2	A-88	1/4/16	-	1/11/16	0.02	+/-	0.0037
3	A-88	1/11/16	-	1/19/16	0.04	+/-	0.006
4	A-88	1/19/16	-	1/26/16	0.03	+/-	0.004
5	A-88	1/26/16	-	2/1/16	0.04	+/-	0.006
6 ¹	A-88		-			+/-	
7 ²	A-88	2/1/16	-	2/16/16	0.02	+/-	0.003
8	A-88	2/16/16	-	2/22/16	0.04	+/-	0.007
9	A-88	2/22/16	-	2/29/16	0.04	+/-	0.01
10	A-88	2/29/16	-	3/7/16	0.03	+/-	0.005
11	A-88	3/7/16	-	3/14/16	0.03	+/-	0.004
12	A-88	3/14/16	-	3/21/16	0.04	+/-	0.01
13	A-88	3/21/16	-	3/28/16	0.03	+/-	0.004

¹ Due to a North Anna Power Station Full Scale Exercise, no samples were analyzed.

² Due to 15 day collection period, results are lower than normal.

Virginia Department of Health

AMBIENT GAMMA EXPOSURE¹

January 1, 2016 through March 31, 2016

FIRST QUARTER REPORT 2016

Location	Station	Net Exposure Rate mR/Std Qtr +/- 2S.D.		
Pocahontas State Park (Control)	D-40	31.30	+/-	11.19
Surry Power Station	D-20	19.06	+/-	8.73
North Anna Power Station	D-35	23.65	+/-	9.73
Surry – Lebanon Baptist Church	D-41	17.36	+/-	8.33
Surry – Lawnes Creek	D-42	20.98	+/-	9.16
Surry – Route 628	D-43	19.66	+/-	8.87
Jamestown – Historical site	D-44	21.16	+/-	9.20
Newport News - Lee Hall	D-45	24.70	+/-	9.94
Louisa County - Mineral	D-50	20.53	+/-	9.06
Louisa County – Wares Crossroads	D-51	20.45	+/-	9.05
Louisa County – Good Hope Church	D-52	22.48	+/-	9.48
Spotsylvania Route 614	D-53	19.58	+/-	8.85
Louisa County – Fred Hall	D-54	19.96	+/-	8.94
Naval Weapons Station – 1	D-73	16.93	+/-	8.23
Newport News – Fort Eustis	D-76	20.69	+/-	9.10
Williamsburg – Busch Gardens	D-77	22.61	+/-	9.51
Williamsburg – Airport	D-78	17.67	+/-	8.41
Surry – Scotland Wharf	D-79	17.40	+/-	8.34
Surry – Bacon's Castle	D-80	16.84	+/-	8.21
Surry – Alliance	D-81	19.13	+/-	8.75
Surry – Hog Point	D-82	19.01	+/-	8.72
Louisa County – Route 685	D-84	20.42	+/-	9.04
Spotsylvania – Route 713	D-85	20.85	+/-	9.13
Louisa County – Bumpass Fire Dept.	D-86	23.22	+/-	9.64
Spotsylvania – Levy	D-87	21.94	+/-	9.37
Louisa County – Route 700	D-88	22.62	+/-	9.51
Louisa County – Aspen Hill	D-89	26.95	+/-	10.38
Radiological Health	Control 1	12.95	+/-	7.20
Radiological Health	Control 2	13.83	+/-	7.44

¹ Dosimeters were collected after a 7 week sample period.

Virginia Department of Health

FISH

January 1, 2016 through March 31, 2016

FIRST QUARTER REPORT 2016

Location Type of fish	Date Collected	Isotope	pCi/gram
Bi-Annual North Anna 2 nd Cooling Lagoon F-24	N/A	Ba-140	
		Cs-134	
		Cs-137	
		Co-58	
		Co-60	
		I-131	
		Fe-59	
		Mn-54	
		Ru-106	
		Ag-110M	
		Zn-65	
		Nb-95	
		Surry Discharge Canal F-17	N/A
Cs-134			
Cs-137			
Co-58			
Co-60			
I-131			
Fe-59			
Mn-54			
Ru-106			
Ag-110M			
Zn-65			
Nb-95			

N/A-Samples not collected this quarter.

Note: Fish samples collected during the 2nd and 4th quarter.

Virginia Department of Health

SHELLFISH

January 1, 2016 through March 31, 2016

FIRST QUARTER REPORT 2016

Location Type of fish	Date Collected	Isotope	pCi/gram
Surry Power Station R-17 (Clams and Oysters)	N/A	Ba-140	
		Cs-134	
		Cs-137	
		Co-58	
		Co-60	
		I-131	
		Fe-59	
		Mn-54	
		Ru-106	
		Ag-110M	
		Zn-65	
		Nb-95	

N/A-Samples not collected this quarter.

Note: Shellfish are collected annually when available.

Virginia Department of Health

Milk¹

January 1, 2016 through March 31, 2016

FIRST QUARTER REPORT 2016

Louisa County - Lakeside Dairy M-29	
1st Quarter Date:	
Isotope	Results - pCi/liter
Ba-140	
Cs-134	
Cs-137	
K-40*	
I-131	
Sr-89	
Sr-90	
Surry County - Epps Dairy M-66	
1st Quarter Date:	
Isotope	Results - pCi/liter
Ba-140	
Cs-134	
Cs-137	
K-40*	
I-131	
Sr-89	
Sr-90	

*K-40 data is reported in units of grams/liter.

¹ Results have not been received from the Division of Consolidated Laboratory Services.

Virginia Department of Health

Gamma & Radiogas in Air

January 1, 2016 through March 31, 2016

FIRST QUARTER REPORT 2016

Location: Pocahontas State Park (Control)

Week #	Station	Date			Cs-134 Activity pCi/meter ³	Cs-137 Activity pCi/meter ³	I-131 Activity pCi/meter ³
		Start		Ended			
1	C-40	12/28/15	-	1/4/16	<MDA	<MDA	<MDA
2	C-40	1/4/16	-	1/11/16	<MDA	<MDA	<MDA
3 ¹	C-40	1/11/16	-	1/20/16			
4	C-40	1/20/16	-	1/26/16	<MDA	<MDA	<MDA
5	C-40	1/26/16	-	2/1/16	<MDA	<MDA	<MDA
6 ²	C-40		-				
7	C-40	2/1/16	-	2/16/16	<MDA	<MDA	<MDA
8	C-40	2/16/16	-	2/22/16	<MDA	<MDA	<MDA
9	C-40	2/22/16	-	2/29/16	<MDA	<MDA	<MDA
10	C-40	2/29/16	-	3/7/16	<MDA	<MDA	<MDA
11	C-40	3/7/16	-	3/14/16	<MDA	<MDA	<MDA
12	C-40	3/14/16	-	3/21/16	<MDA	<MDA	<MDA
13	C-40	3/21/16	-	3/28/16	<MDA	<MDA	<MDA

¹ Due to state holiday and weather closings there was insufficient time to analyze this sample.

² Due to a North Anna Power Station Full Scale Exercise, no samples were analyzed.

Virginia Department of Health

Gamma & Radiogas in Air

January 1, 2016 through March 31, 2016

FIRST QUARTER REPORT 2016

Location: Surry Power Station – on site

Week #	Station	Date		Cs-134 Activity pCi/meter ³	Cs-137 Activity pCi/meter ³	I-131 Activity pCi/meter ³	
		Start	Ended				
1	C-20	12/28/15	-	1/4/16	<MDA	<MDA	<MDA
2	C-20	1/4/16	-	1/11/16	<MDA	<MDA	<MDA
3	C-20	1/11/16	-	1/19/16	<MDA	<MDA	<MDA
4	C-20	1/19/16	-	1/26/16	<MDA	<MDA	<MDA
5	C-20	1/26/16	-	2/1/16	<MDA	<MDA	<MDA
6 ¹	C-20		-				
7	C-20	2/8/16	-	2/16/16	<MDA	<MDA	<MDA
8	C-20	2/16/16	-	2/22/16	<MDA	<MDA	<MDA
9	C-20	2/22/16	-	2/29/16	<MDA	<MDA	<MDA
10	C-20	2/29/16	-	3/7/16	<MDA	<MDA	<MDA
11	C-20	3/7/16	-	3/14/16	<MDA	<MDA	<MDA
12	C-20	3/14/16	-	3/21/16	<MDA	<MDA	<MDA
13	C-20	3/21/16	-	3/28/16	1.39E-01	<MDA	<MDA

¹ Due to a North Anna Power Station Full Scale Exercise, no samples were analyzed.

Virginia Department of Health

Gamma & Radiogas in Air

January 1, 2016 through March 31, 2016

FIRST QUARTER REPORT 2016

Location: Jamestown State Park & Historical Site

Week #	Station	Date		Cs-134 Activity pCi/meter ³	Cs-137 Activity pCi/meter ³	I-131 Activity pCi/meter ³	
		Start	Ended				
1	C-44	12/28/15	-	1/4/16	<MDA	<MDA	<MDA
2	C-44	1/4/16	-	1/11/16	<MDA	<MDA	<MDA
3 ¹	C-44	1/11/16	-	1/19/16			
4	C-44	1/19/16	-	1/26/16	<MDA	<MDA	<MDA
5	C-44	1/26/16	-	2/1/16	<MDA	<MDA	<MDA
6 ²	C-44		-				
7	C-44	2/1/16	-	2/16/16	<MDA	<MDA	<MDA
8	C-44	2/16/16	-	2/22/16	<MDA	<MDA	<MDA
9	C-44	2/22/16	-	2/29/16	<MDA	<MDA	<MDA
10	C-44	2/29/16	-	3/7/16	<MDA	<MDA	<MDA
11	C-44	3/7/16	-	3/14/16	<MDA	<MDA	<MDA
12	C-44	3/14/16	-	3/21/16	<MDA	<MDA	<MDA
13	C-44	3/21/16	-	3/28/16	<MDA	<MDA	<MDA

¹ Due to state holiday and weather closings there was insufficient time to analyze this sample.

² Due to a North Anna Power Station Full Scale Exercise, no samples were analyzed.

Virginia Department of Health

Gamma & Radiogas in Air

January 1, 2016 through March 31, 2016

FIRST QUARTER REPORT 2016

Location: Louisa County / Bumpass Volunteer Fire Station

Week #	Station	Date		Cs-134 Activity pCi/meter ³	Cs-137 Activity pCi/meter ³	I-131 Activity pCi/meter ³	
		Start	Ended				
1	C-86	12/28/15	-	1/4/16	<MDA	<MDA	<MDA
2	C-86	1/4/16	-	1/11/16	<MDA	<MDA	<MDA
3	C-86	1/11/16	-	1/19/16	<MDA	<MDA	<MDA
4	C-86	1/19/16	-	1/26/16	<MDA	<MDA	<MDA
5	C-86	1/26/16	-	2/1/16	<MDA	<MDA	<MDA
6 ¹	C-86		-				
7	C-86	2/1/16	-	2/16/16	<MDA	<MDA	<MDA
8	C-86	2/16/16	-	2/22/16	<MDA	<MDA	<MDA
9	C-86	2/22/16	-	2/29/16	<MDA	<MDA	<MDA
10	C-86	2/29/16	-	3/7/16	<MDA	<MDA	<MDA
11	C-86	3/7/16	-	3/14/16	<MDA	<MDA	<MDA
12	C-86	3/14/16	-	3/21/16	<MDA	<MDA	<MDA
13	C-86	3/21/16	-	3/28/16	<MDA	<MDA	<MDA

¹ Due to a North Anna Power Station Full Scale Exercise, no samples were analyzed.

Virginia Department of Health

Gamma & Radiogas in Air

January 1, 2016 through March 31, 2016

FIRST QUARTER REPORT 2016

Location: Louisa County Route 700 / North Anna Power Station

Week #	Station	Date		Cs-134 Activity pCi/meter ³	Cs-137 Activity pCi/meter ³	I-131 Activity pCi/meter ³	
		Start	Ended				
1	C-88	12/28/15	-	1/4/16	<MDA	3.27E-2	<MDA
2	C-88	1/4/16	-	1/11/16	<MDA	<MDA	<MDA
3	C-88	1/11/16	-	1/19/16	<MDA	<MDA	<MDA
4	C-88	1/19/16	-	1/26/16	<MDA	<MDA	<MDA
5	C-88	1/26/16	-	2/1/16	<MDA	<MDA	<MDA
6 ¹	C-88		-				
7	C-88	2/1/16	-	2/16/16	<MDA	<MDA	<MDA
8	C-88	2/16/16	-	2/22/16	<MDA	<MDA	<MDA
9	C-88	2/22/16	-	2/29/16	<MDA	<MDA	<MDA
10	C-88	2/29/16	-	3/7/16	<MDA	<MDA	<MDA
11	C-88	3/7/16	-	3/14/16	<MDA	<MDA	<MDA
12	C-88	3/14/16	-	3/21/16	<MDA	<MDA	<MDA
13	C-88	3/21/16	-	3/28/16	<MDA	<MDA	<MDA

¹ Due to a North Anna Power Station Full Scale Exercise, no samples were analyzed.

Virginia Department of Health

Silt¹

January 1, 2016 through March 31, 2016

FIRST QUARTER REPORT 2016

Location	Date collected	Gross Beta pCi/gram of Silt
James River Pier 1 Newport News Shipyard S-15	3/17/16	
James River Shipway 11 Newport News Shipyard S-16	3/17/16	

¹ Results for Silt samples have not been received from the Division of Consolidated Laboratory Services.

Virginia Department of Health

Silt¹

January 1, 2016 through March 31, 2016

FIRST QUARTER REPORT 2016

Elizabeth River – Dry Dock #8 Norfolk Naval Shipyard S-18
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Quarter	Date collected	Gamma Activity – pCi/gram (wet)				Gross Beta pCi/gram (DRY)	Gross Alpha pCi/gram (DRY)
		Cs-134	Cs-137	Co-58	C0-60		

1st	3/17/16						
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Elizabeth River – Dry Dock #4 Norfolk Naval Shipyard S-19
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Quarter	Date collected	Gamma Activity – pCi/gram (wet)				Gross Beta pCi/gram (DRY)	Gross Alpha pCi/gram (DRY)
		Cs-134	Cs-137	Co-58	C0-60		

1st	3/17/16						
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Elizabeth River – Wet slip #1 Norfolk Naval Shipyard S-20
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Quarter	Date collected	Gamma Activity – pCi/gram (wet)				Gross Beta pCi/gram (DRY)	Gross Alpha pCi/gram (DRY)
		Cs-134	Cs-137	Co-58	C0-60		

1st	3/17/16						
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¹ Results for Silt samples have not been received from the Division of Consolidated Laboratory Services.

Virginia Department of Health

Silt

January 1, 2016 through March 31, 2016

FIRST QUARTER REPORT 2016

James River – Surry Power Station Discharge Canal S-17

Quarter	Date collected	Gamma Activity – pCi/gram (wet)				Gross Beta pCi/gram (DRY)
		Cs-134	Cs-137	Co-58	Co-60	
1st	N/A					

North Anna Power Waste Treatment S-24

Quarter	Date collected	Gamma Activity – pCi/gram (wet)				Gross Beta pCi/gram (DRY)
		Cs-134	Cs-137	Co-58	Co-60	
1st	N/A					

N/A: Sample was not collected this quarter.

Note: Silt samples are collected bi-annually.

Virginia Department of Health

SURFACE WATER¹

January 1, 2016 through March 31, 2016

FIRST QUARTER REPORT 2016

<p style="text-align: center;">James River – Pier 1 Newport News Shipyard W-15A</p>
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Qtr	Date collected	Gamma Activity – pCi/liter					Gross Beta pCi/liter
		Ba-140	Cs-137	I-131	Mn-54	Zn-65	
1st	3/17/16						

<p style="text-align: center;">James River – Shipway #11 Newport News Shipyard W-16</p>
--

Qtr	Date collected	Gamma Activity – pCi/liter					Gross Beta pCi/liter
		Ba-140	Cs-137	I-131	Mn-54	Zn-65	
1st	3/17/16						

¹ Results for Surface Water samples have not been received from the Division of Consolidated Laboratory Services.

Virginia Department of Health

SURFACE WATER¹

January 1, 2016 through March 31, 2016

FIRST QUARTER REPORT 2016

**Elizabeth River – Dry Dock #4
Norfolk Naval Shipyard W-37**

Qtr	Date collected	Gamma Activity – pCi/liter						Gross Beta	Gross Alpha
		Ba-140	Cs-137	I-131	Mn-54	Zn-65	Zr95/Nb95		
1st	3/17/16								

**Elizabeth River – Wet Slip #1
Norfolk Naval Shipyard W-38**

Qtr	Date collected	Gamma Activity – pCi/liter						Gross Beta	Gross Alpha
		Ba-140	Cs-137	I-131	Mn-54	Zn-65	Zr95/Nb95		
1st	3/17/16								

**Elizabeth River – Dry Dock #8
Norfolk Naval Shipyard W-39**

Qtr	Date collected	Gamma Activity – pCi/liter						Gross Beta	Gross Alpha
		Ba-140	Cs-137	I-131	Mn-54	Zn-65	Zr95/Nb95		
1st	3/17/16								

¹ Results for Surface Water samples have not been received from the Division of Consolidated Laboratory Services.

Virginia Department of Health

SURFACE WATER

January 1, 2016 through March 31, 2016

Surry Power Station – Discharge Canal - W-19
Gamma, Beta, and Tritium Activity – pCi/liter

Date	Ba-140	Cs-134	Cs-137	Co-58	Co-60	I-131	Mn-54	Zn-65	Zr/Nb 95	Gross Beta	H3 Activity
1/4/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA
1/11/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA
1/19/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA
1/26/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	1802 +/- 85
2/1/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	375 +/- 42
2/8/16 ¹											
2/16/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	375 +/- 42
2/16/16D ²											
2/22/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA
2/29/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA
3/7/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	375 +/- 43
3/14/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	1319 +/- 74
3/21/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA
3/28/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	450 +/- 42

D = sample analyzed by DCLS

¹ Due to a North Anna Power Station Full Scale Exercise, no samples were analyzed.

² Results have not been received from the Division of Consolidated Laboratory Services.

Virginia Department of Health

SURFACE WATER

January 1, 2016 through March 31, 2016

**North Anna River - W-27 / baseline
Gamma, Beta and Tritium Activity – pCi/liter**

Date	Ba-140	Cs-134	Cs-137	Co-58	Co-60	I-131	Mn-54	Zn-65	Zr/Nb 95	Gross Beta	H3 Activity
1/4/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA
1/11/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	2778 +/- 104
1/19/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	225 +/- 30
1/26/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	751 +/- 52
2/1/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	601 +/- 52
2/8/16 ¹											
2/16/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA
2/16/16D ²											
2/22/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA
2/29/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA
3/7/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA
3/14/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	676 +/- 52
3/21/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	375 +/- 43
3/28/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	450 +/- 42

D = sample analyzed by DCLS

¹ Due to a North Anna Power Station Full Scale Exercise, no samples were analyzed.

² Results have not been received from the Division of Consolidated Laboratory Services.

Virginia Department of Health

SURFACE WATER

January 1, 2016 through March 31, 2016

North Anna Power Station – Discharge Canal - W-33
Gamma, Beta and Tritium Activity – pCi/liter

Date	Ba-140	Cs-134	Cs-137	Co-58	Co-60	I-131	Mn-54	Zn-65	Zr/Nb-95	Gross Beta	H3 Activity
1/4/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA		2553 +/- 104
1/11/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA		<MDA
1/19/16 ¹	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA		18243 +/- 271
1/26/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA		3003 +/- 109
2/1/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA		3378 +/- 116
2/8/16 ²											
2/16/16 ³	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA		13063 +/- 230
2/16/16 ⁴											
2/22/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA		5105 +/- 144
2/29/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA		4279 +/- 134
3/7/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA		5931 +/- 156
3/14/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA		5556 +/- 150
3/21/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA		5856 +/- 157
3/28/16 ⁵	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA		6607 +/- 161

D = sample analyzed by DCLS

¹ Elevated tritium level was due to release of a Boron Recovery Tank from 1/11/-16-1/14/16 per North Anna Power Station count room personnel.

² Due to a North Anna Power Station Full Scale Exercise, no samples were analyzed.

³ Elevated tritium level was due to a release at the time of sampling as confirmed by North Anna Power Station personnel.

⁴ Results have not been received from the Division of Consolidated Laboratory Services.

⁵ Elevated tritium level was due to refueling and maintenance outage activities at North Anna Power Station. Two new samples were analyzed and confirmed these results.

Virginia Department of Health

SURFACE WATER

January 1, 2016 through March 31, 2016

Surry Power Station - James River @ Robious Landing-W-79A
Gamma, Beta and Tritium Activity – pCi/liter

Date	Ba-140	Cs-134	Cs-137	Co-58	Co-60	I-131	Mn-54	Zn-65	Zr/Nb 95	Gross Beta	H3 Activity
1/4/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA		300 +/- 30
1/11/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA		<MDA
1/19/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA		<MDA
1/26/16 ¹	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA		526 +/- 43
2/1/16 ²	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA		300 +/- 30
2/8/16 ³											
2/16/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA		<MDA
2/16/16D ⁴											
2/22/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA		<MDA
2/29/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA		<MDA
3/7/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA		<MDA
3/14/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA		375 +/- 42
3/21/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA		225 +/- 30
3/28/16	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA	<MDA		450 +/- 42

D = Sample analyzed by DCLS

¹ The sample was collected at an alternate control site (W-79) due to safety concerns caused by inclement weather at the primary control site.

² The sample was collected at an alternate control site (W-79) due to safety concerns caused by inclement weather at the primary control site.

³ Due to a North Anna Power Station Full Scale Exercise, no samples were analyzed.

⁴ Results have not been received from the Division of Consolidated Laboratory Services.

Virginia Department of Health

VEGETATION

January 1, 2016 through March 31, 2016

FIRST QUARTER REPORT 2016

Location	Date collected	Type	Isotope	Results pCi/Gram (wet weight)
Surry County Private garden V-96	N/A	Mixed Greens	I-131 Cs-134 Cs-137	
Louisa County Private Garden V-98	N/A	Mixed Greens	I-131 Cs-134 Cs-137	

N/A: Sample not collected this quarter.

Note: Vegetation is collected bi-annually when available.

COMMONWEALTH OF VIRGINIA

DEPARTMENT OF HEALTH

OFFICE OF RADIOLOGICAL HEALTH

109 Governor Street, 7th Floor, Richmond, Virginia 23218-2448

Office (804) 864-8150

Fax (804) 864-8175

BABCOCK & WILCOX

Virginia Department of Health

Babcock & Wilcox

AIR PARTICULATE COMPOSITE SAMPLES

January 1, 2016 through March 31, 2016

FIRST QUARTER REPORT 2016

Eastern Site Boundary – Ball field A-101						
Quarter	Start	Date		Gross Alpha Activity		
		Stop	pCi/meter ³			
1st	1/13/16	-	1/19/16	0.001	+/-	0.0004

SOIL

January 1, 2016 through March 31, 2016

FIRST QUARTER REPORT 2016

Location	Date	Distance & Direction	Type	Alpha Activity
				pCi/gram
Eastern Site Boundary Ball field S-101	N/A	Site Boundary	Soil	+/-
James River Shoreline Near Six Mile Bridge "control" S-102a	N/A	1.5 miles SW	Soil	+/-

N/A: Sample not collected this quarter.

Note: Uranium separation followed by alpha counting.

Virginia Department of Health

Babcock & Wilcox

SURFACE WATER

January 1, 2016 through March 31, 2016

FIRST QUARTER REPORT 2016

Location	Date	Distance & Direction	Alpha Activity pCi/gram
James River Shoreline Near Ball field at eastern site boundary W-101	N/A	Approx. 3 miles downstream	+/-
James River Shoreline Near Six Mile Bridge "control" W-102	N/A	Approx 1.5 Miles upstream	+/-

N/A: Sample not collected this quarter.

VEGETATION

January 1, 2016 through March 31, 2016

FIRST QUARTER REPORT 2016

Location	Date	Type	Distance & Direction	Alpha Activity pCi/gram
Eastern site boundary Ball field V-101	N/A	Vegetation	Approx. 3 miles downstream	+/-
James River Shoreline off Rt. 460 "control" V-102	N/A	Vegetation	Approx 4.5 Miles SW	+/-

N/A: Sample not collected this quarter.

Note: Uranium separation followed by alpha counting.

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF HEALTH

OFFICE OF RADIOLOGICAL HEALTH
109 Governor Street, 7th Floor, Richmond, Virginia 23219
Office (804) 864-8150
Fax (804) 864-8175

**EMERGENCY
PREPAREDNESS**

EMERGENCY PREPAREDNESS

The Office of Radiological Health (ORH) located within the Virginia Department of Health (VDH) is one of the lead response agencies for emergencies involving the potential or actual release of radioactive materials. Overall, state level emergency response is described in the Commonwealth of Virginia Radiological Emergency Response Plan (COVRERP), which is developed and maintained by the Virginia Department of Emergency Management (VDEM). In addition to generic guidelines for responding to any major radiological emergency, the response procedures contain segments addressing response to several specific types of radiological incidents. This includes sections which provide information needed for response to Licensee and Transportation accidents. Other sections contain background information and response guidance for accidents at fixed nuclear facilities. Plans are also being developed to respond to possible radiological terrorist attacks, which may include detonation of a radiological dispersion device (RDD aka “dirty bomb”), an improvised nuclear device (IND), or a military grade nuclear warhead.

When responding to any radiological emergency, the primary tasks of the Office of Radiological Health are to locate, identify, and predict the impact of any radioactive materials released to the environment. Based on the predicted or known impact, ORH then recommends appropriate measures to protect the public. ORH would also be tasked with helping to supervise the cleanup of radiological contamination and ensuring the proper disposal of radioactive waste. An ORH duty officer maintains 24-hour coverage to provide initial assessment/assistance for local responders and may also initiate the mobilization/deployment of other trained staff to respond to a radiological emergency when needed.

Under the provisions of current Federal Emergency Management Agency (FEMA) regulations, ORH conducts or participates in periodic drills that are designed to provide team training and to test emergency plans and procedures. The scope of these drills ranges from receiving and acknowledging simulated emergency communications to full-scale team deployment.

Federal regulations for commercial nuclear power generating facilities stipulate that a full-scale exercise involving appropriate local government participation and testing all significant response elements must be conducted and evaluated every other year. Because there are two such facilities, Surry and North Anna Nuclear Power Stations, Commonwealth of Virginia agencies will perform exercise activities on a yearly basis, alternating between the sites each year.