

**BRUNSWICK**

**NUCLEAR**

**PLANT**

## **BRUNSWICK NUCLEAR PLANT SOUTHPORT, BRUNSWICK COUNTY**

Progress Energy operates the Brunswick Nuclear Plant (BNP) located approximately 2.5 miles north of Southport, North Carolina. The plant consists of two boiling water reactors each with a net design rating of 821 megawatts-electrical and uses the Cape Fear River as its source for condenser cooling water. Commercial production was initiated by Unit 2 on Nov. 3, 1975, and by Unit 1 on March 18, 1977.

The average gross beta concentration measured in 520 air particulate samples collected during the 2008 environmental surveillance year was  $1.71\text{E-}02$  picocuries per cubic meter ( $\text{pCi/m}^3$ ). The analyses of the NCRPS air particulate samples collected show gross beta activity levels, which are within the levels of indicative of normal background and do not indicate any unusual activity.

A monthly composite gamma analysis of radionuclides was not performed by the North Carolina State Lab for Public Health for the year 2008. However, this analysis has been rectified moving forward and data shown reflects the analysis performed by Progress Energy. Quarterly composite results identified the cosmogenic product Beryllium – 7 (Be-7) and naturally occurring Potassium 40 (K-40). All levels for Be-7 and K-40 were less than  $1.44\text{E-}01$   $\text{pCi/m}^3$  and less than  $1.04\text{E-}01$  picoCuries per cubic meter ( $\text{pCi/m}^3$ ) respectively in the composites. Various other progeny radionuclides were found, none were above  $2.08\text{E-}02$   $\text{pCi/m}^3$ , and most found were well below  $1.0\text{E-}02$   $\text{pCi/m}^3$ . All of which are normal background levels and a part of the earth's naturally occurring radioactive material, commonly referred to as NORM.

All air canisters analyzed for Iodine 131 (I-131) were found to have results between less than  $3.00\text{E-}03$  and  $7.044\text{E-}01$   $\text{pCi/m}^3$ .

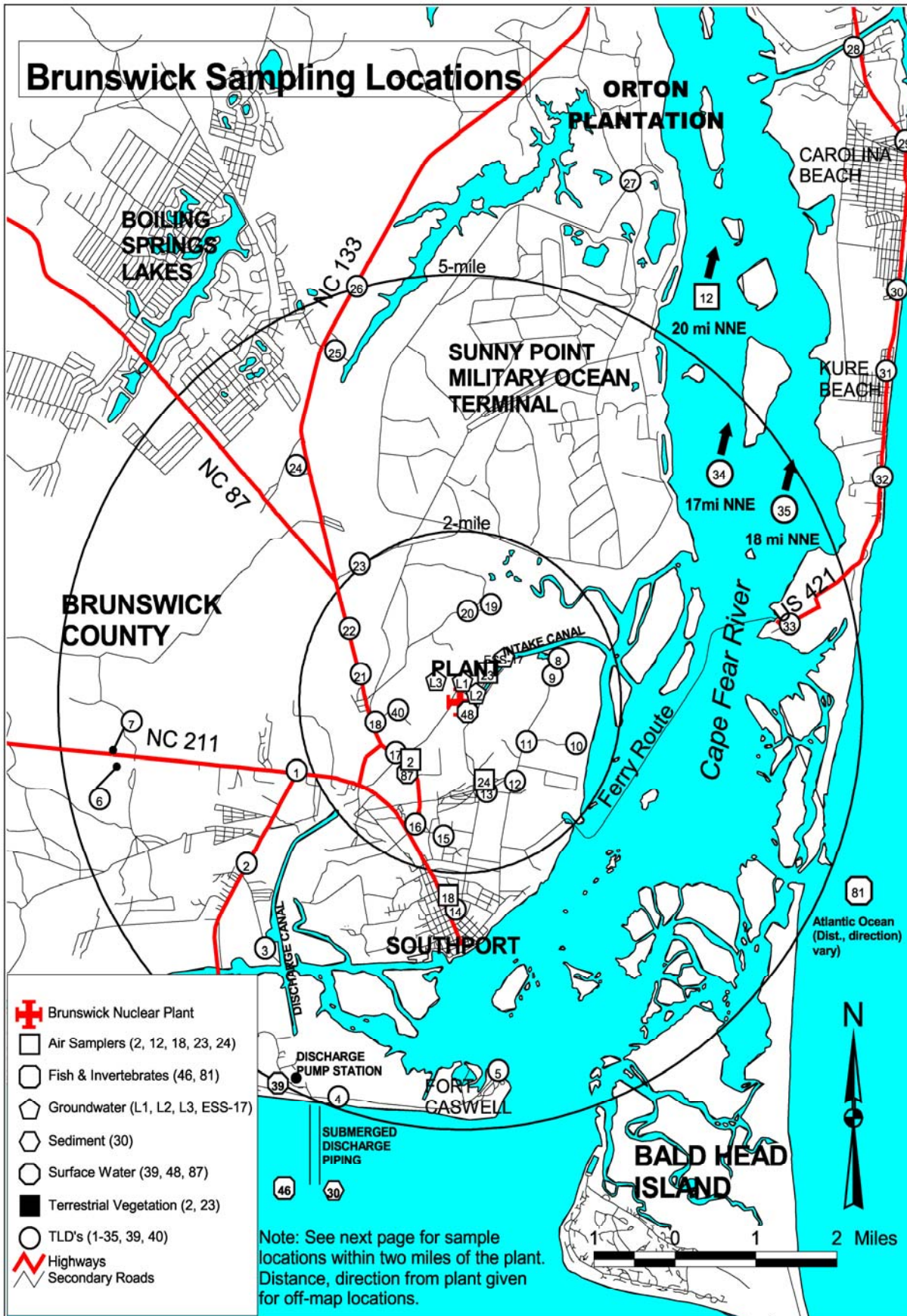
Results for the monthly surface water composites collected during 2008 show that Tritium (H-3) levels are below the investigation level of 1000  $\text{pCi/l}$  (See Appendix A). Naturally occurring Potassium 40 (K-40) was evident in samples collected. The highest levels detected were less than  $6.77\text{E+}02$   $\text{pCi/l}$  for both the indicator and control sites. Low level iodine (LLI) was only identified in the indicator sites samples at trace levels less than  $7.20\text{E-}01$   $\text{pCi/l}$ . Three independent surface water surveillance locations were sampled in 2008. All radionuclides detected are background.

Fish and invertebrate samples are collected on a semi-annual basis, and the first collection was in May of 2008. Gamma Isotopic results for the indicator location show no results for Cs-137, and K-40 with maximum levels less than  $4.08$   $\text{pCi/g-wet}$  for all three-sample types. The results for the control location revealed Cs-137 to be a maximum  $<1.83\text{E-}02$   $\text{pCi/g-wet}$ ; this is less than the investigation level of 1  $\text{pCi/g-wet}$ . Similar results were found during the second collection of fish and invertebrates in October 2008. Gamma isotopic results for both the indicator and control locations show Cs-137 with levels less than detectable and K-40 values no more than  $4.11$   $\text{pCi/g-wet}$  for all three-sample types.

Vegetation samples were collected on a bi-annual basis and indicated the presence of typical annual occurrences of K-40 and the cosmogenic product Be-7. Soil sediment is also collected

twice per year and a gamma analysis performed on each sample. One collection was not analyzed, and results for the sample collected in May detected no presence of abnormal activity.

There are 37 different locations around Brunswick Nuclear Plant, outside of the site boundary, where NCRPS personnel place NCRPS TLDs. Twenty-six of these locations are within a five-mile radius of the plant itself. NCRPS TLD results for Brunswick Nuclear Plant were in general agreement with collected Brunswick Nuclear Plant. TLD results throughout the 2008 calendar year. Thermoluminescent dosimetry results for 2008 produced a yearly average exposure of 36.8 millRoentgen (mR) for all sites. This is less than the statewide average of 75 mR/year.





**Section 2: Brunswick Steam Electric Plant, Southport, North Carolina****Air Particulate - Gross Beta, (pCi/m<sup>3</sup>)**

Date	<u>Indicator (BR-APLV-23)<sup>a</sup></u>				<u>Control (BR-APLV-12)<sup>a</sup></u>			
	<u>All measurements x 10<sup>-2</sup> pCi/m<sup>3</sup></u>				<u>All measurements x 10<sup>-2</sup> pCi/m<sup>3</sup></u>			
	<u>RPS</u>		<u>BNP</u>		<u>RPS</u>		<u>BNP</u>	
<u>Meas.</u>	<u>Error</u>	<u>Meas.</u>	<u>Error</u>	<u>Meas.</u>	<u>Error</u>	<u>Meas.</u>	<u>Error</u>	
1/2/08	nc	-	nc	-	nc	-	nc	-
1/7/08	2.68	0.05	2.92	0.37	3.29	0.06	2.83	0.36
1/14/08	1.41	0.07	0.97	0.26	1.31	0.07	0.96	0.27
1/21/08	1.33	0.04	1.65	0.31	1.78	0.05	2.13	0.35
1/28/08	1.28	0.06	2.90	0.37	1.98	0.05	3.00	0.38
2/4/08	1.66	0.07	2.52	0.34	1.99	0.09	2.72	0.36
2/11/08	2.33	0.05	1.98	0.32	2.45	0.08	1.92	0.33
2/18/08	2.80	0.05	2.22	0.33	3.45	0.05	2.09	0.33
2/25/08	1.81	0.07	1.67	0.29	1.78	0.06	1.57	0.29
3/3/08	1.21	0.06	1.82	0.30	1.64	0.09	1.73	0.30
3/10/08	1.75	0.07	1.61	0.29	2.31	0.06	1.72	0.30
3/17/08	1.79	0.06	2.11	0.32	2.53	0.07	2.43	0.35
3/24/08	1.01	0.07	1.83	0.30	1.73	0.06	1.91	0.31
3/31/08	0.86	0.05	2.20	0.32	1.32	0.05	2.20	0.33
4/7/08	1.43	0.05	1.10	0.27	1.68	0.09	1.14	0.27
4/14/08	1.51	0.04	0.71	0.25	1.81	0.08	0.88	0.26
4/21/08	0.97	0.05	2.23	0.33	1.10	0.06	1.80	0.30
4/28/08	0.70	0.03	2.11	0.33	0.86	0.06	1.97	0.33
5/5/08	1.47	0.07	2.22	0.33	1.81	0.09	2.19	0.33
5/12/08	1.49	0.06	2.03	0.33	1.65	0.07	2.10	0.33
5/19/08	1.08	0.05	1.43	0.29	1.68	0.07	1.02	0.27
5/26/08	1.67	0.07	1.99	0.30	1.72	0.08	1.97	0.30
6/2/08	1.15	0.05	1.26	0.32	1.68	0.07	1.37	0.34
6/9/08	1.19	0.05	1.74	0.30	1.66	0.07	1.81	0.31
6/16/08	1.78	0.07	2.04	0.32	2.31	0.09	2.40	0.35
6/23/08	1.51	0.06	1.33	0.35	nc	-	1.41	0.31
6/30/08	1.64	0.07	1.79	0.31	1.54	0.08	2.02	0.33
7/7/08	0.78	0.03	1.45	0.29	1.46	0.07	1.63	0.31
7/14/08	0.99	0.05	0.94	0.27	1.60	0.07	1.12	0.27
7/21/08	1.16	0.05	1.11	0.26	2.10	0.09	1.49	0.30
7/28/08	2.18	0.09	2.55	0.33	2.26	0.01	2.75	0.36
8/4/08	1.31	0.06	1.44	0.28	2.03	0.09	1.60	0.30
8/11/08	2.00	0.08	2.08	0.31	3.13	0.01	2.47	0.36
8/18/08	1.59	0.07	1.44	0.28	2.21	0.09	1.48	0.25
8/25/08	0.73	0.03	1.79	0.29	1.80	0.08	1.96	0.29
9/1/08	1.13	0.05	1.08	0.27	1.83	0.08	0.99	0.25
9/8/08	1.62	0.07	1.86	0.30	2.34	0.01	2.11	0.32
9/15/08	0.88	0.04	1.15	0.26	1.06	0.05	1.07	0.26
9/22/08	1.21	0.06	1.36	0.30	1.98	0.08	1.47	0.29
9/29/08	1.67	0.07	1.80	0.31	2.16	0.09	1.60	0.30
10/6/08	1.92	0.08	2.13	0.32	2.75	0.01	1.95	0.32
10/13/08	2.19	0.09	2.25	0.32	nc	-	2.09	0.32
10/20/08	2.17	0.08	2.50	0.28	2.51	0.09	1.96	0.31
10/27/08	1.29	0.06	1.27	0.31	1.81	0.08	1.35	0.29
11/3/08	1.45	0.06	1.93	0.32	2.09	0.09	2.02	0.32
11/10/08	1.68	0.07	2.17	0.28	nc	-	2.00	0.33
11/17/08	1.04	0.05	1.30	0.31	2.04	0.08	1.30	0.30
11/24/08	1.19	0.05	1.76	0.34	1.74	0.08	1.59	0.31
12/1/08	2.33	0.09	2.54	0.33	3.02	0.01	3.09	0.39
12/8/08	1.95	0.08	2.12	0.30	2.52	0.01	1.74	0.33
12/15/08	1.13	0.05	1.46	0.30	1.51	0.07	1.32	0.30
12/22/08	1.39	0.06	1.82	0.34	1.96	0.8	1.45	0.30

**Air Particulate - Gross Beta, (pCi/m<sup>3</sup>)**

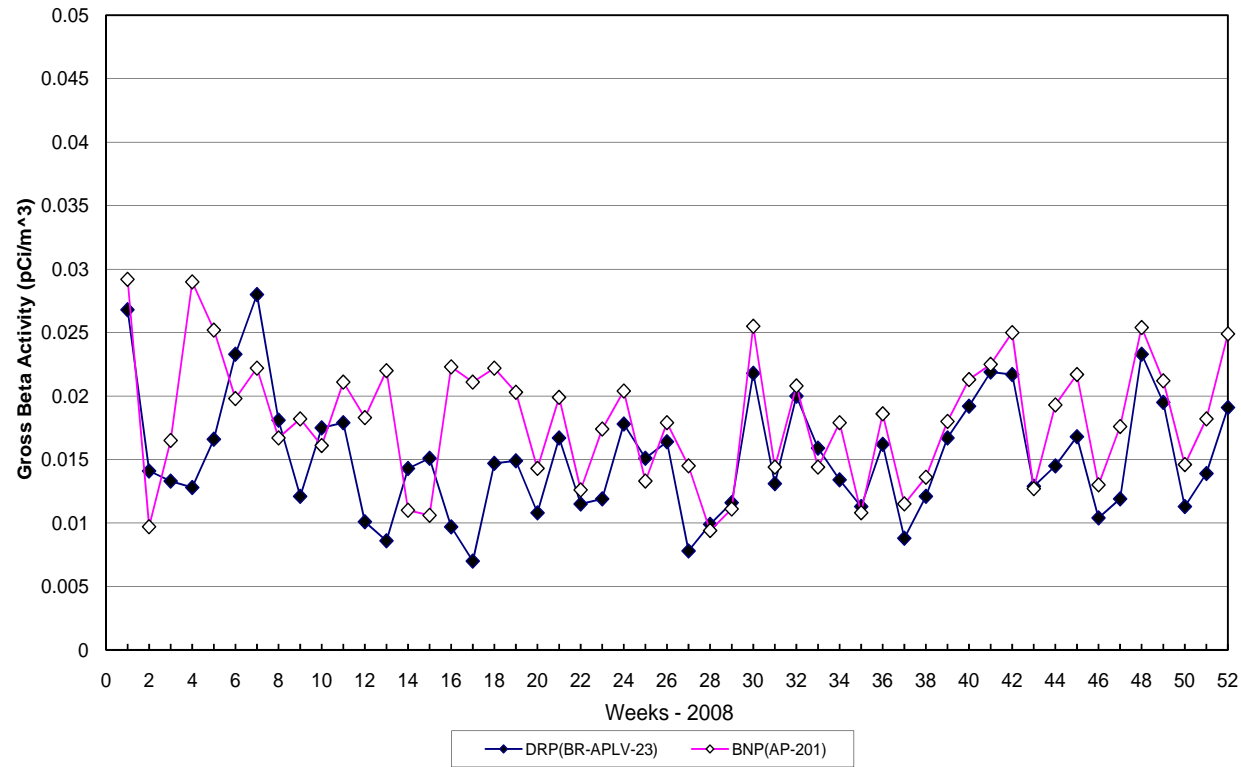
<b>Date</b>	<b>Indicator (BR-APLV-23)<sup>a</sup></b>				<b>Control (BR-APLV-12)<sup>a</sup></b>			
	<b>All measurements x 10<sup>-2</sup> pCi/m<sup>3</sup></b>				<b>All measurements x 10<sup>-2</sup> pCi/m<sup>3</sup></b>			
	<b>RPS</b>		<b>BNP</b>		<b>RPS</b>		<b>BNP</b>	
	<b>Meas.</b>	<b>Error</b>	<b>Meas.</b>	<b>Error</b>	<b>Meas.</b>	<b>Error</b>	<b>Meas.</b>	<b>Error</b>
12/29/08	1.91	0.09	2.49	0.37	2.35	0.09	2.49	0.33
Average	1.63		1.93		1.99		1.83	
% Diff.	16.8				8.37			

<sup>a</sup>Duplicate sampling at NCRPS Site BR-APLV-23 (BNP Site AP-201), 0.6 mi. NE of plant at the plant intake canal, the Point of Maximum Airborne Concentration (PMAC). NCRPS Control Site BR-APLV-12 is on roof of New Hanover Co. Health Dept. in Wilmington, N.C. BNP Control Site AP-204 is at the Sutton Plant on the outskirts of Wilmington, N.C.

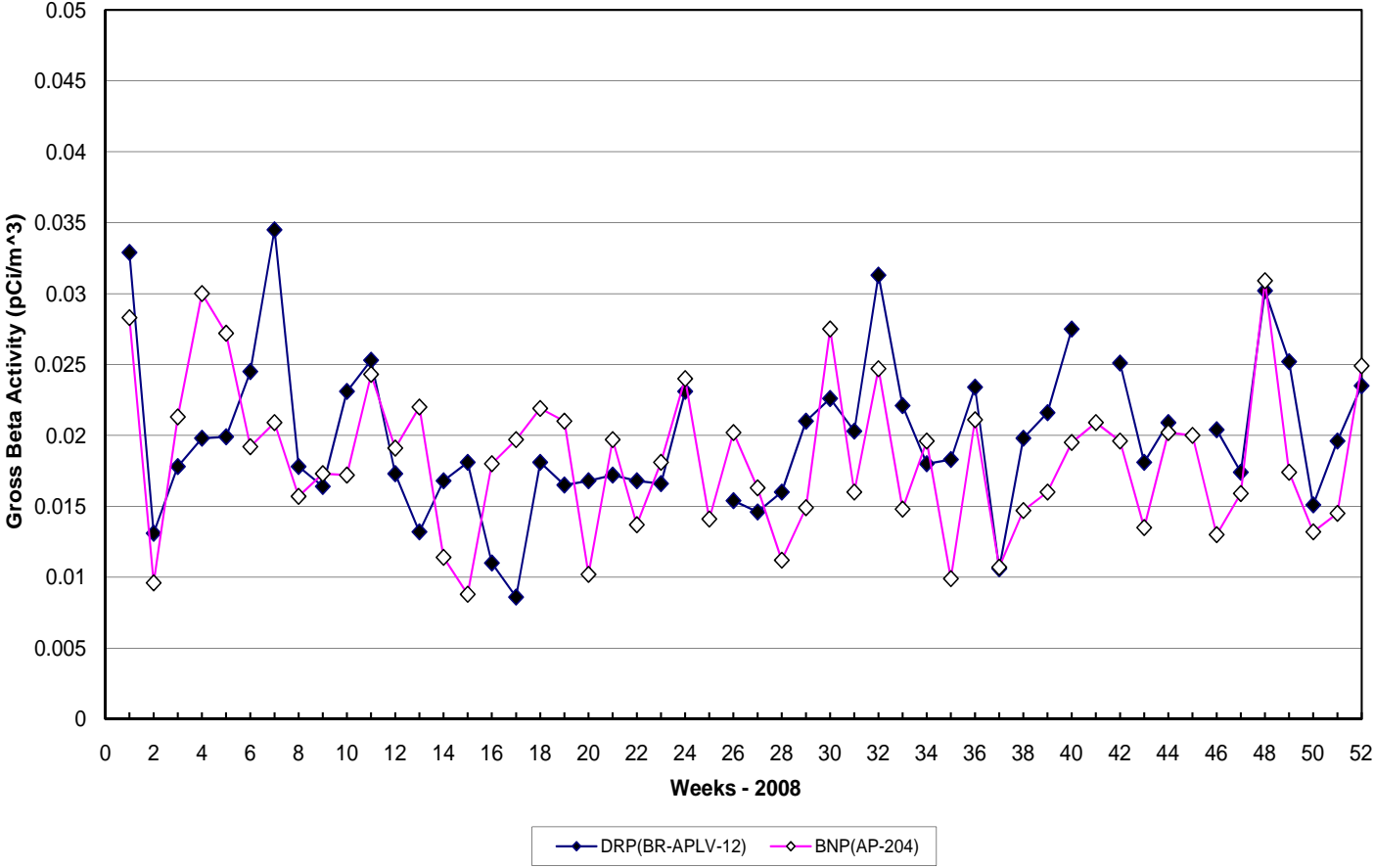
<sup>nc</sup> Sample was either not collected (due to in climate weather, holiday or other unforeseen reason), lost, or not analyzed by lab

# BRUNSWICK NUCLEAR PLANT

## INDICATOR SITES

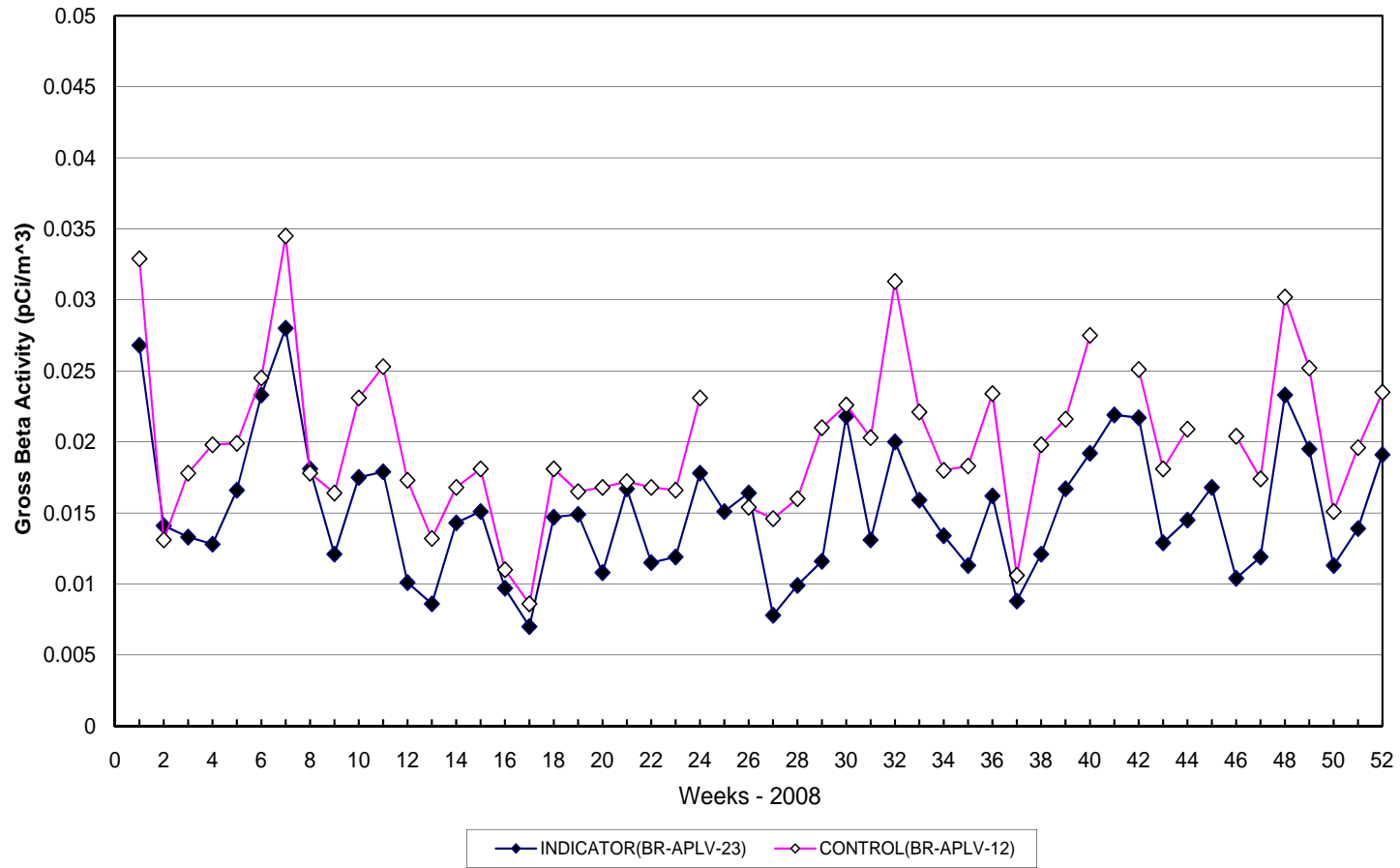


# BRUNSWICK NUCLEAR PLANT CONTROL SITES



# BRUNSWICK NUCLEAR PLANT

## DRP - INDICATOR vs CONTROL



Air Particulate - Gross Beta, (pCi/m<sup>3</sup>)

Date	BR-APLV-02 <sup>a</sup>				BR-APLV-18 <sup>a</sup>				BR-APLV-24 <sup>a</sup>			
	All measurements x 10 <sup>-2</sup> pCi/m <sup>3</sup>				All measurements x 10 <sup>-2</sup> pCi/m <sup>3</sup>				All measurements x 10 <sup>-2</sup> pCi/m <sup>3</sup>			
	RPS		BNP		RPS		BNP		RPS		BNP	
	Meas.	Error	Meas.	Error	Meas.	Error	Meas.	Error	Meas.	Error	Meas.	Error
1/2/08	nc	-	nc	-	nc	-	nc	-	nc	-	nc	-
1/7/08	1.55	0.11	3.20	0.40	1.48	0.09	3.02	0.38	1.47	0.07	3.01	0.37
1/14/08	1.77	0.09	0.75	0.25	1.23	0.07	0.94	0.26	2.01	0.08	0.91	0.27
1/21/08	2.12	0.08	1.82	0.31	2.09	0.11	1.93	0.32	2.09	0.07	1.63	0.32
1/28/08	1.44	0.11	3.14	0.37	1.41	0.09	2.89	0.37	1.41	0.10	3.06	0.38
2/4/08	1.23	0.06	2.79	0.35	1.34	0.11	2.97	0.7	1.32	0.08	2.20	0.34
2/11/08	1.54	0.11	1.98	0.34	1.62	0.09	1.71	0.31	1.56	0.14	1.70	0.33
2/18/08	1.21	0.08	1.55	0.29	1.55	0.09	1.86	0.31	1.45	0.10	1.86	0.32
2/25/08	1.86	0.06	1.89	0.30	1.91	0.07	1.68	0.29	1.74	0.07	1.86	0.31
3/3/08	1.41	0.08	2.21	0.32	1.55	0.08	2.27	0.32	1.03	0.09	1.77	0.30
3/10/08	1.20	0.07	1.79	0.29	1.54	0.08	1.84	0.30	1.30	0.11	1.72	0.30
3/17/08	1.37	0.07	2.08	0.32	1.44	0.07	2.22	0.33	1.27	0.09	2.59	0.36
3/24/08	nc	-	1.75	0.31	nc	-	1.81	0.30	nc	-	1.68	0.30
3/31/08	0.93	0.06	2.20	0.33	1.15	0.06	2.24	0.33	1.10	0.08	1.85	0.31
4/7/08	1.44	0.07	0.98	0.26	1.59	0.07	1.19	0.27	nc	-	0.97	0.26
4/14/08	1.14	0.07	0.61	0.25	1.12	0.07	0.96	0.27	0.96	0.10	0.70	0.25
4/21/08	0.78	0.06	2.04	0.32	0.79	0.08	2.26	0.33	0.73	0.09	2.25	0.33
4/28/08	1.27	0.05	2.16	0.33	1.57	0.03	2.12	0.33	1.35	0.08	2.22	0.34
5/5/008	1.15	0.07	2.23	0.34	1.45	0.17	2.03	0.32	1.25	0.12	2.51	0.35
5/12/08	1.29	0.07	1.99	0.33	1.34	0.07	1.76	0.31	1.19	0.05	2.03	0.33
5/19/08	1.19	0.07	1.52	0.29	1.26	0.07	1.61	0.29	1.09	0.12	1.65	0.30
5/26/08	0.84	0.08	1.89	0.29	1.24	0.06	2.24	0.31	0.97	0.13	2.12	0.30
6/2/08	0.79	0.07	1.19	0.32	0.87	0.08	1.45	0.32	0.81	0.13	1.36	0.33
6/9/08	1.09	0.05	1.75	0.30	1.19	0.09	1.24	0.27	1.08	0.10	1.64	0.30
6/16/08	1.08	0.06	2.25	0.34	1.36	0.08	2.25	0.33	1.21	0.12	1.94	0.33
6/23/08	0.77	0.06	1.69	0.32	0.97	0.07	1.46	0.29	0.65	0.13	1.53	0.31
6/30/08	0.83	0.05	1.76	0.31	0.91	0.07	1.91	0.31	0.80	0.13	2.14	0.33
7/7/08	1.44	0.05	1.30	0.28	1.67	0.07	1.40	0.28	1.49	0.14	1.44	0.29
7/14/08	0.82	0.08	1.38	0.28	0.77	0.07	1.13	0.25	0.84	0.09	1.15	0.26
7/21/08	1.73	0.08	1.26	0.28	2.19	0.06	1.26	0.27	1.86	0.09	1.44	0.9
7/28/08	0.90	0.07	2.27	0.32	0.20	0.06	2.41	0.32	0.86	0.08	2.77	0.34
8/4/08	nc	-	1.68	0.30	nc	-	1.57	0.28	nc	-	1.61	0.29
8/11/08	1.05	0.06	2.45	0.34	1.21	0.08	2.26	0.32	1.13	0.06	2.55	0.34
8/18/08	nc	-	1.79	0.31	nc	-	1.90	0.30	nc	-	2.15	0.33
8/25/08	1.24	0.08	2.23	0.32	1.33	0.03	1.25	0.31	1.19	0.09	2.38	0.33
9/1/08	0.46	0.07	1.27	0.28	0.50	0.09	2.17	0.27	0.46	0.08	1.49	0.30
9/8/08	1.27	0.06	1.77	0.30	1.38	0.08	1.25	0.30	1.20	0.07	2.20	0.33
9/15/08	1.70	0.07	1.09	0.27	1.81	0.07	1.83	0.25	1.46	0.08	1.24	0.28
9/22/08	1.55	0.07	1.50	0.9	1.69	0.08	0.98	0.28	1.47	0.08	1.52	0.29
9/29/08	1.20	0.06	1.75	0.31	1.17	0.07	1.36	0.30	1.10	0.06	2.03	0.33
10/6/08	1.94	0.07	2.03	0.32	2.43	0.04	1.72	0.34	2.23	0.05	2.48	0.35
10/13/08	1.22	0.08	2.44	0.34	1.16	0.08	2.55	0.31	1.13	0.07	2.76	0.36
10/20/08	1.40	0.09	2.56	0.34	1.57	0.07	2.11	0.33	1.50	0.12	2.64	0.35
10/27/08	1.77	0.07	1.52	0.30	1.77	0.07	2.62	0.29	1.63	0.11	1.57	0.30
11/3/08	1.40	0.08	2.06	0.32	1.53	0.07	1.48	0.32	1.39	0.08	1.87	0.31
11/10/08	1.69	0.08	1.63	0.31	1.81	0.07	2.17	0.33	1.63	0.09	1.81	0.32
11/17/08	1.39	0.07	0.71	0.25	0.29	0.07	2.12	0.27	1.37	0.08	1.30	0.29
11/24/08	1.46	0.10	1.88	0.33	1.76	0.08	1.07	0.31	1.66	0.05	1.74	0.32
12/1/08	2.08	0.09	2.71	0.36	2.21	0.05	1.82	0.35	2.39	0.08	2.95	0.37
12/8/08	1.46	0.10	2.09	0.34	1.57	0.16	2.80	0.33	1.72	0.11	2.17	0.34
12/15/08	1.22	0.08	1.33	0.30	1.31	0.09	2.13	0.30	1.22	0.06	1.55	0.31
12/22/08	1.82	0.07	1.58	0.30	1.68	0.07	1.51	0.29	1.61	0.05	2.06	0.33
12/29/08	2.04	0.09	2.57	0.36	1.85	0.08	1.59	0.35	1.95	0.05	2.77	0.36

**Air Particulate - Gross Beta, (pCi/m<sup>3</sup>)**

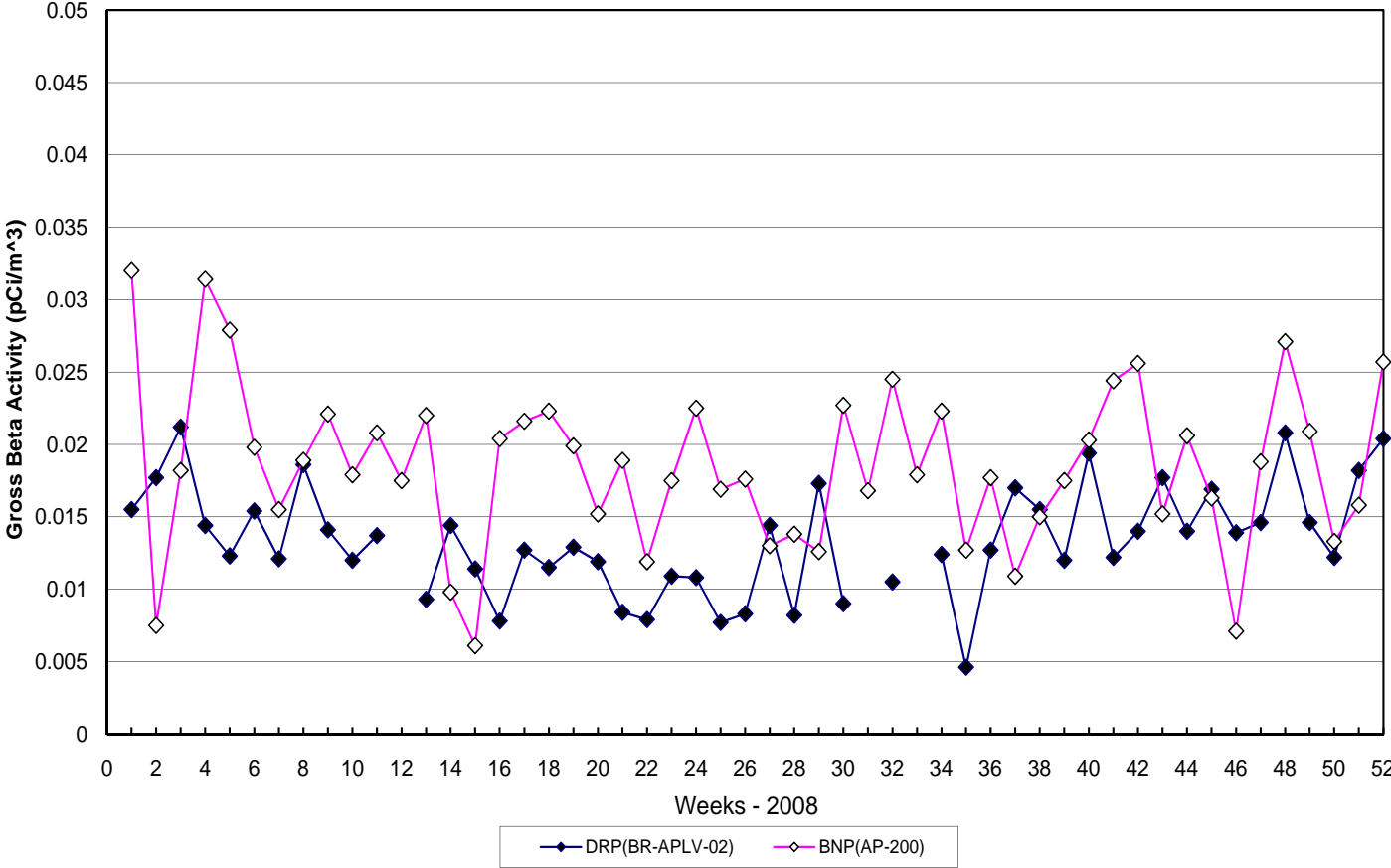
<u>Date</u>	<u>BR-APLV-02<sup>a</sup></u>				<u>BR-APLV-18<sup>a</sup></u>				<u>BR-APLV-24<sup>a</sup></u>			
	<u>All measurements x 10<sup>-2</sup> pCi/m<sup>3</sup></u>				<u>All measurements x 10<sup>-2</sup> pCi/m<sup>3</sup></u>				<u>All measurements x 10<sup>-2</sup> pCi/m<sup>3</sup></u>			
	<u>RPS</u>		<u>BNP</u>		<u>RPS</u>		<u>BNP</u>		<u>RPS</u>		<u>BNP</u>	
	<u>Meas.</u>	<u>Error</u>	<u>Meas.</u>	<u>Error</u>	<u>Meas.</u>	<u>Error</u>	<u>Meas.</u>	<u>Error</u>	<u>Meas.</u>	<u>Error</u>	<u>Meas.</u>	<u>Error</u>
Average	1.34		1.85		1.40		1.85		1.34		0.07	
% Diff.		31.9			27.6				35.8			

<sup>a</sup> Split sampling at NCDRP Sites BR-APLV- 02 (BNP Site 200) located at the CP&L Visitor’s Center on Hwy 87 (1.0 mi SW of plant), BR-APLV-18 (BNP Site 203) located at the Southport Public Works substation (2.3 mi SSW of plant), BR APLV-24 (BNP Site 202) located at the substation at the plant construction entrance(1.0 mi S of plant), NCDRP Site BR-APLV-71 is 0.9 mi. NW of plant on Bethel Church Road on power line right-of-way; there is no BNP sampler at this location.

<sup>nc</sup> Sample was either not collected (due to in climate weather, holiday or other unforeseen reason), lost, or not analyzed by lab.

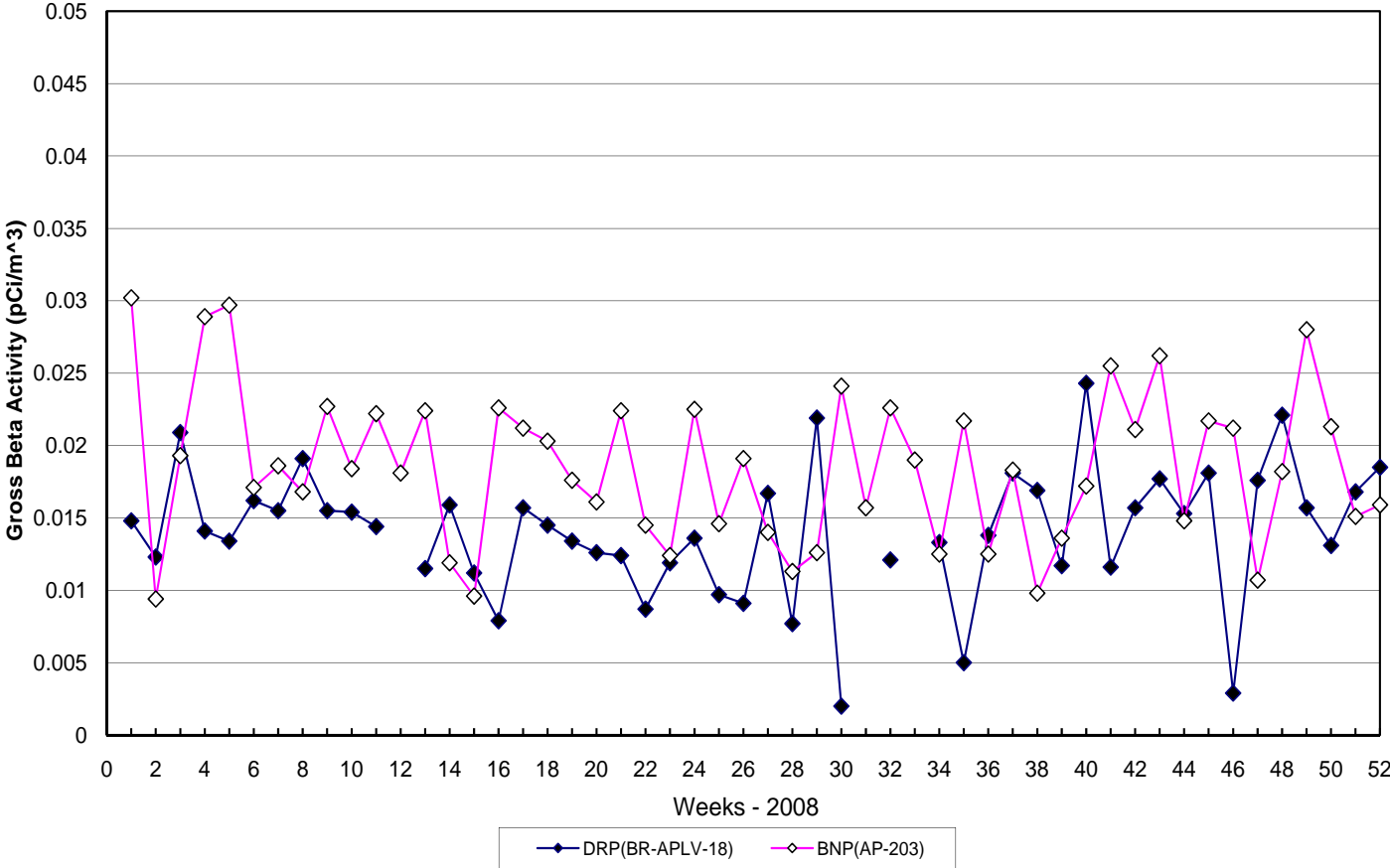
# BRUNSWICK NUCLEAR PLANT

VISITOR'S CENTER



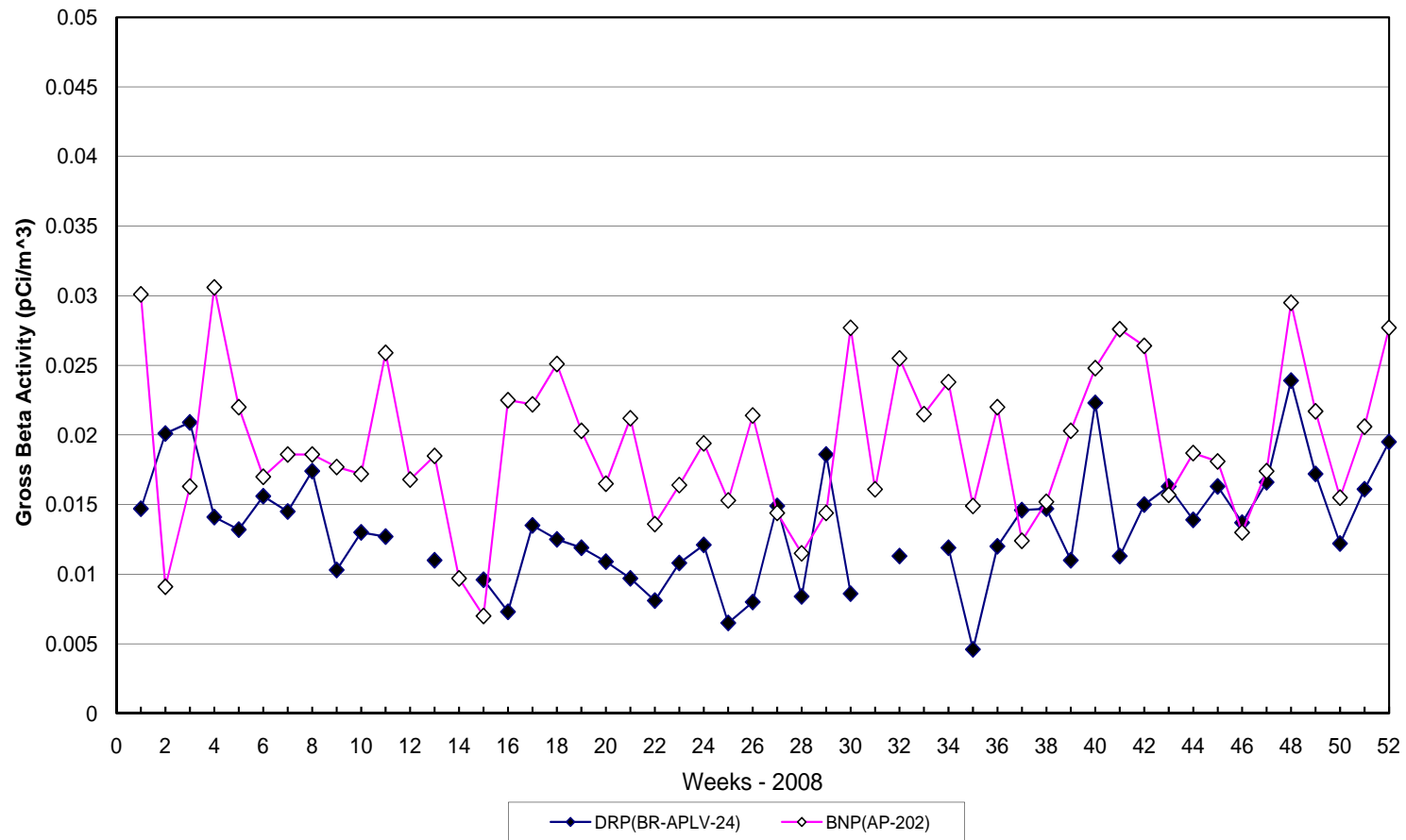
# BRUNSWICK NUCLEAR PLANT

## SOUTHPORT PUBLIC WORKS



# BRUNSWICK NUCLEAR PLANT

## CONSTRUCTION ROAD SUBSTATION



Air Particulate – Radioiodine, (pCi/m<sup>3</sup>)

Date	<u>Indicator (BR-APCC-23)<sup>a</sup></u>				<u>Control (BR-APCC-12)<sup>a</sup></u>			
	<u>All measurements x 10<sup>-2</sup> pCi/m<sup>3</sup></u>				<u>All measurements x 10<sup>-2</sup> pCi/m<sup>3</sup></u>			
	<u>RPS</u>		<u>BNP</u>		<u>RPS</u>		<u>BNP</u>	
<u>Meas.</u>	<u>Error</u>	<u>Meas.</u>	<u>Error</u>	<u>Meas.</u>	<u>Error</u>	<u>Meas.</u>	<u>Error</u>	
1/2/08	nc		nc		nc		nc	
1/7/08	<3.26		<1.97		<1.26		<2.43	
1/14/08	<133		<1.71		<2.00		<2.26	
1/21/08	nc		<2.09		<0.70		<2.48	
1/28/08	<1.54		<1.86		<0.84		<2.31	
2/4/08	<4.52		<1.54		<1.61		<2.06	
2/11/08	<3.43		<2.14		<2.43		<1.79	
2/18/08	<6.16		<1.96		<2.40		<1.92	
2/25/08	<4.23		<2.53		<2.97		<2.65	
3/3/08	<4.01		<2.31		<1.79		<2.09	
3/10/08	<3.70		<1.34		<3.50		<2.73	
3/17/08	<5.61		<2.00		<3.72		<2.09	
3/24/08	<6.24		<1.47		<5.31		<1.86	
3/31/08	<8.12		<1.51		<5.16		<2.26	
4/7/08	<6.77		<2.07		<4.14		<2.12	
4/14/08	<4.53		<2.22		<2.39		<2.41	
4/21/08	<8.92		<2.26		<6.60		<2.58	
4/28/08	<5.90		<2.06		<4.76		<2.95	
5/5/008	<3.83		<3.49		<36.3		<4.18	
5/12/08	<0.48		<1.83		nc		<1.53	
5/19/08	nc		<2.78		nc		<1.87	
5/26/08	nc		<1.52		nc		<1.52	
6/2/08	nc		<3.51		<0.94		<4.08	
6/9/08	nc		<2.21		<55.7		<2.01	
6/16/08	nc		<2.14		nc		<9.86	
6/23/08	nc		<2.25		<93.5		<1.79	
6/30/08	<87.3		<3.32		<67.9		<3.00	
7/7/08	<5.10		<2.92		<5.50		<2.32	
7/14/08	<4.80		<2.60		<3.10		<4.26	
7/21/08	<3.80		<2.68		<2.50		<3.44	
7/28/08	<3.00		<1.80		<2.00		<2.09	
8/4/08	<2.10		<2.26		<1.70		<2.48	
8/11/08	<1.50		<2.61		<1.20		<3.01	
8/18/08	<1.00		<1.70		<1.00		<1.93	
8/25/08	<8.93		<1.65		nc		<1.99	
9/1/08	<5.93		<2.96		nc		<3.73	
9/8/08	<4.95		<2.21		nc		<2.30	
9/15/08	<5.40		<2.43		<0.30		<1.64	
9/22/08	<10.3		<1.87		<1.00		<2.42	
9/29/08	<7.48		<1.90		<0.50		<1.91	
10/6/08	<4.85		<2.85		<0.40		<2.34	
10/13/08	<11.5		<1.75		<3.55		<2.78	
10/20/08	<8.46		<2.09		<5.81		<2.31	
10/27/08	<14.6		<1.76		<5.97		<2.87	
11/3/08	<9.81		<1.55		<6.84		<2.35	
11/10/08	<23.3		<2.21		<9.36		<2.70	
11/17/08	<23.2		<2.00		nc		<2.93	
11/24/08	<8.48		<2.37		nc		<2.58	
12/1/08	<9.00		<1.48		<3.77		<2.04	
12/8/08	<31.4		<1.94		<19.8		<2.77	
12/15/08	<105.0		<1.78		<74.0		<2.01	
12/22/08	<50.9		<3.74		<81.1		<3.19	
12/29/08	<60.2		<3.35		nc		<3.15	

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<sup>a</sup> Duplicate sampling at NCRPS Site BR-APCC-23 (BNP Site AP-201), 0.6 mi. NE of plant at the plant intake canal, the Point of Maximum Airborne Concentration (PMAC). NCRPS Control Site BR-APCC-12 is on roof of New Hanover Co. Health Dept. in Wilmington, N.C. BNP Control Site AC-204 is at the Sutton Plant on the outskirts of Wilmington, N.C.

<sup>bc</sup> Sample was either not collected (due to in climate weather, holiday or other unforeseen reason), lost, or not analyzed by lab.

Air Particulate - Gamma, (pCi/m<sup>3</sup>)

Date	Isotope	<u>Indicator (BR-APLV-23)<sup>a</sup></u>				<u>Control (BR-APLV-12)<sup>a</sup></u>			
		<u>All measurements x 10<sup>-2</sup> pCi/m<sup>3</sup></u>				<u>All measurements x 10<sup>-2</sup> pCi/m<sup>3</sup></u>			
		<u>RPS</u>		<u>BNP</u>		<u>RPS</u>		<u>BNP</u>	
	<u>Meas.</u>	<u>Error</u>	<u>Meas.</u>	<u>Error</u>	<u>Meas.</u>	<u>Error</u>	<u>Meas.</u>	<u>Error</u>	
2/18/08	K-40	na	na	2.77	0.99	na	na	-	-
	Pb-214	na	na	0.24	0.13	na	na	0.37	0.13
	Bi-214	na	na	-	-	na	na	0.48	0.16
	Pb-212	na	na	-	-	na	na	0.09	0.07
	Be-7	na	na	14.4	1.50	na	na	14.0	1.75
	na	na	na			na	na		
5/19/08	K-40	na	na	8.04	1.68	na	na	6.25	1.60
	Bi-214	na	na	0.27	0.15	na	na	0.64	0.20
	Pb-214	na	na	-	-	na	na	0.46	0.16
	Be-7	na	na	12.5	2.12	na	na	11.8	2.12
	na	na	na			na	na		
8/18/08	Be-7	na	na	9.68	1.97	na	na	11.0	1.65
	K-40	na	na	6.88	1.56	na	na	2.30	0.92
	Ra-226	na	na	-	-	na	na	1.86	0.95
	Pb-214	na	na	-	-	na	na	0.55	0.15
	Pb-212	na	na	-	-	na	na	0.12	0.06
	Th-234	na	na	-	-	na	na	1.22	1.06
	Bi-214	na	na	3.78	0.21	na	na	0.50	0.14
	na	na	na			na	na		
11/17/08	K-40	na	na	10.4	1.79	na	na	-	-
	Th-234	na	na	-	-	na	na	2.08	1.18
	Tl-208	na	na	-	-	na	na	0.08	0.07
	Pb-212	na	na	0.16	0.08	na	na	0.29	0.09
	Bi-214	na	na	0.39	0.20	na	na	0.52	0.15
	Pb-214	na	na	0.38	0.17	na	na	0.49	0.11
	Be-7	na	na	12.1	2.14	na	na	12.9	1.65

<sup>a</sup> Duplicate sampling at NCRPS Site BR-APLV-23 (BNP Site AP-201), 0.6 mi. NE of plant at the plant intake canal, the Point of Maximum Airborne Concentration (PMAC). NCRPS Control Site BR-APLV-12 is on roof of New Hanover Co. Health Dept. in Wilmington, N.C. BNP Control Site AP-204 is at the Sutton Plant on the outskirts of Wilmington, N.C.

<sup>na</sup> Gamma analysis was not performed by the North Carolina State Laboratory for Public Health.

## Surface Water - Tritium, Low-Level Iodine, and Gamma, (pCi/l)

Date	Isotope	<u>Indicator (BR-SW-39)<sup>a</sup></u>				<u>Control (BR-SW-48)<sup>b</sup></u>			
		<u>All measurements in pCi/l</u>				<u>All measurements in pCi/l</u>			
		<u>RPS</u>		<u>BNP</u>		<u>RPS</u>		<u>BNP</u>	
		<u>Meas.</u>	<u>Error</u>	<u>Meas.</u>	<u>Error</u>	<u>Meas.</u>	<u>Error</u>	<u>Meas.</u>	<u>Error</u>
January	LLI	nc	nc						
	K-40	nc	nc			nc	nc		
	H-3	nc	nc		< 2.88E+02	nc	nc		< 2.88E+02
February	LLI	nc	nc			nc	nc		
	K-40	nc	nc			nc	nc		
	H-3	nc	nc		< 3.01E+02	nc	nc		< 3.01E+02
March	LLI	nc	nc			nc	nc		
	K-40	nc	nc			nc	nc		
	H-3	nc	nc		< 3.02E+02	nc	nc		< 3.00E+02
April	LLI	nc	nc			nc	nc		
	K-40	nc	nc	6.26E+02	9.90E+01	nc	nc	1.18E+02	8.65E+01
	H-3	nc	nc		< 2.89E+02	nc	nc		< 2.90E+02
May	LLI	nc	nc			nc	nc		
	K-40	nc	nc	3.68E+02	1.16E+02	nc	nc	2.87E+02	8.91E+01
	H-3	nc	nc		< 2.99E+02	nc	nc		< 2.99E+02
June	LLI	0.40	0.48			nc	nc		
	K-40	677	44.0	2.77E+02	8.56E+01	258.0	15	2.69E+02	1.03E+02
	H-3	435	214.8		< 2.95E+02	435.0	213.3		< 2.95E+02
July	LLI	nc	nc			nc	nc		
	K-40	nc	nc	2.82E+02	1.13E+02	nc	nc	2.93E+02	1.17E+02
	H-3	nc	nc		< 2.97E+02	nc	nc		< 2.97E+02
August	LLI	0.72	0.72			nc	nc		
	K-40	521.0	40.0	6.69E+02	1.38E+02	604	29	3.13E+02	1.10E+02
	H-3	nc	nc		< 3.01E+02	427.0	210.7		< 3.00E+02
September	LLI	0.00	0.72			nc	nc		
	K-40	500.0	37.0	1.64E+02	1.05E+02	676	32	3.71E+02	1.13E+02
	H-3	495	459.9		< 3.17E+02	0.0	206.8		< 3.16E+02
October	LLI	nc	nc			nc	nc		
	K-40	nc	nc	3.27E+02	1.12E+02	204	17.0	3.44E+02	1.15E+02
	H-3	nc	nc		< 3.09E+02	nc	nc		< 3.09E+02
November	LLI	0.54	0.40			nc	nc		
	K-40	304	42.0	3.18E+02	1.22E+02	300	19.0	3.28E+02	8.23E+01
	H-3	319	157.3		< 2.92E+02	0.0	151.7		< 2.91E+02
December	LLI	nc	nc			nc	nc		
	K-40	nc	nc	3.19E+02	1.17E+02	nc	nc		
	H-3	nc	nc		< 2.92E+02	nc	nc		

<sup>a</sup> Split sampling of monthly composite at NCRPS Site BR-SW-39 (BNP Site SW-401) located at the discharge canal approximately 4.9 mi. SSW of the plant.

<sup>b</sup> Split sampling of monthly composite at NCRPS Site BR-SW-48 (BNP Site SW-400) located at the intake canal approximately 0.7 mi. NE of the plant.

<sup>nc</sup> Sample was either not collected (due to in climate weather, holiday or other unforeseen reason), lost, or not analyzed by lab.

**Surface Water – Tritium, Gamma, and Gross Beta, pCi/l**

		<u>BR-SW-87<sup>a</sup></u>	
		<u>All measurements in pCi/l</u>	
		<u>RPS</u>	
<u>Date</u>	<u>Isotope</u>	<u>Meas.</u>	<u>Error.</u>
3/10/08	H-3	295.0	122.0
	K-40	2.07E+02	1.45E+01
	Beta		
9/15/08	H-3	284.0	141.0
	K-40	-	-
	Beta	-	-

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<sup>a</sup> NCRPS Site BR-SW-87 located at the discharge canal, accessed from visitor center approximately 1.0 mi. SSW of the plant.

**Fish – Gamma, (pCi/g)**

<b>Date</b>	<b>Isotope</b>	<b>Indicator (BR-FL-46)<sup>a</sup></b>				<b>Control (BR-FL-81)<sup>b</sup></b>			
		<b>All measurements in pCi/g-wet</b>				<b>All measurements in pCi/g-wet</b>			
		<b>RPS</b>		<b>BNP</b>		<b>RPS</b>		<b>BNP</b>	
		<b>Meas.</b>	<b>Error</b>	<b>Meas.</b>	<b>Error</b>	<b>Meas.</b>	<b>Error</b>	<b>Meas.</b>	<b>Error</b>
5/22/08	K-40	2.10E+00	1.84E-01	1.42E+00	9.08E-01	2.62E+00	2.22E-01	2.88E+00	1.14E+00
Invertebrates	Cs-137	-	-			<1.83E-02			
5/22/08	K-40	4.08E+00	1.95E-01	3.36E+00	1.06E+00	5.10E+00	2.22E-01	4.89E+00	1.06E+00
Free Swimmer	Cs-137	-	-			<1.76E-02			
5/22/08	K-40	3.48E+00	2.29E-01	3.49E+00	9.25E-01	1.69E+00	8.98E-02	4.88E+00	1.16E+00
Bottom Feeder	Cs-137	-	-			< 8.32E-03			
10/15/08	K-40	2.33E+00	1.61E-01	2.06E+00	1.22E+00	2.92E+00	1.43E-01	1.61E+00	6.31E-01
Invertebrates	Cs-137	-	-			<1.13E-02			
10/15/08	K-40	3.93E+00	2.15E-01	4.39E+00	9.30E-01	5.26E+00	3.16E-01	5.02E+00	1.24E+00
Free Swimmer	Cs-137	-	-			<2.42E-02			
10/15/08	K-40	4.11E+00	2.65E-01	2.52E+00	6.80E-01	2.77E+00	2.36E-01	3.04E+00	1.05E+00
Bottom Feeder	Cs-137	-	-			<2.12E-02			

<sup>a</sup> Split samples are collected in the Atlantic Ocean near the discharge location approximately 5.5 mi SSW of the plant. Free swimmers (NCRPS site BR-FL-46A/BNP site FI-700), bottom feeders (NCRPS site BR-FL-46B/BNP site FI-701), and invertebrates (NCRPS site BR-FL-46C/BNP site FI-702), are collected at this site.

<sup>b</sup> Split samples are collected in the Atlantic Ocean at no fixed location. Free swimmers (NCRPS site BR-FL-81A/BNP site FI-703), bottom feeders (NCRPS site BR-FL-81B/BNP site FI-704), and invertebrates NCRPS site BR-FL-81C/BNP site FI-705), are collected at this site.

**Sediment – Gamma, (pCi/g)**

<u>Date</u>	<u>Isotope</u>	<u>Indicator (BR-SD-30)<sup>a</sup></u>			
		<u>RPS (pCi/g-dry)</u>		<u>BNP (pCi/g-dry)</u>	
		<u>Meas.</u>	<u>Error</u>	<u>Meas.</u>	<u>Error</u>
5/21/08	K-40	1.05E+00	1.26E-01	9.91E-01	3.82E-01
	Tl-208			3.48E-02	2.13E-02
	Pb-214			1.36E-01	4.77E-02
	Co-60	<1.58E-02			

<sup>a</sup> Split sampling at NCRPS Site BR-SD-30 (BNP Site SS-500), located approximately 4.9 mi SSW of the plant.

### Terrestrial Vegetation - Alpha, Beta, and Gamma, (pCi/g)

		<b>BR-TV-23<sup>a</sup></b>			
		<u>All measurements in pCi/g</u>			
<u>Date</u>	<u>Isotope</u>	<u>RPS</u>		<u>BNP</u>	
		<u>Meas.</u>	<u>Error</u>	<u>Meas.</u>	<u>Error</u>
5/1/08	Be-7	2.47E+00	1.10E-01	1.88E+00	2.36E-01
	K-40	3.40E+00	1.64E-01	2.66E+00	5.00E-01
	Cs-137	-	-	-	-
8/4/08	Be-7	2.28E-00	1.20E-01	6.83E-01	2.33E+01
	K-40	2.24E+00	1.20E-01	1.82E+00	4.09E-01
	Cs-137	-	-	-	-

### Terrestrial Vegetation - Alpha, Beta, and Gamma, (pCi/g)

		<b>BR-TV-02<sup>b</sup></b>	
		<u>All measurements in pCi/g</u>	
<u>Date</u>	<u>Isotope</u>	<u>RPS</u>	
		<u>Meas.</u>	<u>Error</u>
4/9/08	Alpha	3.80E-01	5.90E-01
	Beta	1.46E+00	6.90E-01
	Be-7	1.11E+00	2.76E-01
	K-40	3.56E+00	1.35E-01
	Cs-137	<1.10E-02	
9/24/08	K-40	3.10E+00	3.38E-01
	Cs-137	<3.17E-02	

<sup>a</sup> Sampling at NCRPS Site BR-TV-23 (BNP Site BL-800) located at the intake canal onsite 0.6 mi. NE of plant.

<sup>b</sup> Sampling at NCRPS Site BR-TV-02 located 1.0 mi. SW of plant at Visitor's Center.

TLD, mR/year

<u>Loc #</u>	<u>Location</u>	<u>All readings in mR/year.</u>							
		<u>1<sup>st</sup> Qtr</u>		<u>2<sup>nd</sup> Qtr</u>		<u>3<sup>rd</sup> Qtr</u>		<u>4<sup>th</sup> Qtr</u>	
		<u>Meas</u>	<u>Error</u>	<u>Meas</u>	<u>Error</u>	<u>Meas</u>	<u>Error</u>	<u>Meas</u>	<u>Error</u>
1	BEMC substation NC 133	37.4	3.4	36.3	1.3	27.6	2.4	36.3	2.2
2	NC 133 and SR #1101	35.2	2.5	36.6	1.6	26.2	2.4	Missing	
3	Standard Products	33.0	2.2	32.4	1.6	25.4	1.2	Missing	
4	Caswell Beach	40.5	3.6	38.6	1.3	34.2	3.7	50.8	5.2
5	Fort Caswell dock	35.8	1.0	40.7	2.1	27.7	3.0	Missing	
6	South Brunswick County landfill	33.6	2.5	33.2	4.2	25.6	2.8	Missing	
7	Brunswick County landfill on NC 211	31.4	1.4	34.9	1.9	23.6	2.4	40.0	1.3
8	SR #1528 (intake canal)	Missing		39.0	2.6	28.9	2.3	Missing	
9	SR #1528 (south of intake canal)	Missing		38.0	2.7	30.6	2.5	Missing	
10	SR #1534	42.2	1.3	45.7	1.4	30.9	2.0	49.4	1.0
11	SR #1528 and SR #1534	40.1	1.1	48.0	3.6	29.6	2.0	49.5	3.1
12	SR #1528 (substation)	35.1	2.1	38.6	2.0	Missing		44.3	2.5
13	SR #1527	36.0	2.1	39.8	5.0	28.1	1.8	43.8	1.4
14	East Leonard and North Atlantic Strs.	32.7	2.0	34.7	1.3	25.6	1.5	Missing	
15	East 11 <sup>th</sup> Street	33.6	2.6	40.3	3.6	25.8	3.3	Missing	
16	NC 87 (north of NC 211)	31.2	3.6	35.5	2.8	24.7	3.3	Missing	
17	NC 87 and BNP access road	36.1	1.3	42.7	1.3	29.3	1.5	Missing	
18	NC 87 (0.5 mile north of access road)	34.8	2.2	39.0	1.1	32.7	3.9	Missing	
19	SR #1525 (2.0 miles east of NC 87)	33.8	2.8	41.1	4.1	26.7	1.7	Missing	
20	SR #1525 (1.6 miles east of NC 87)	36.0	2.3	39.4	2.2	25.8	3.5	41.7	3.0
21	NC 87 (0.3 mile north of SR #1525)	34.0	3.5	30.3	4.1	26.0	1.9	35.6	1.8
22	NC 87 (0.7 mile north of SR #1525)	37.0	2.0	42.6	2.2	31.0	3.3	41.6	2.0
23	Sunny Point access road	34.4	1.2	40.9	3.5	30.5	3.1	38.9	2.8
24	Boiling Springs Lakes	32.7	2.5	35.0	4.0	23.8	1.2	Missing	
25	NC 133 and Orton Creek	37.8	5.0	42.9	4.9	27.4	1.6	47.6	4.7
26	NC 133 (2.0 miles north of Orton Cr.)	34.4	2.1	34.3	3.9	26.7	3.6	Missing	
27	Sunny Point (north gate)	29.8	1.3	34.7	2.2	22.8	1.5	40.4	2.3
28	US 421 (Snow Cut)	32.6	2.8	36.6	1.2	26.3	1.5	Missing	
29	US 421 and Lumberton Street	37.9	2.7	44.6	1.1	27.7	1.3	44.3	1.9
30	US 421 and Ocean View Drive	36.1	1.7	41.8	2.6	34.1	1.6	46.3	1.4
31	Kure Beach water tower	33.3	1.8	40.7	2.1	28.8	2.6	46.8	3.6
32	Fort Fisher Air Force Base	44.8	2.4	46.3	2.0	24.6	2.2	53.0	1.8
33	Federal Point ferry landing	33.1	3.4	35.8	1.9	34.1	2.3	39.2	2.9
34	Shipyard Boulevard and Worth Drive	42.4	3.0	44.4	2.2	35.3	2.4	Missing	
35	Shipyard Boulevard and Newkirk Ave.	36.2	2.2	38.9	0.7	26.8	1.9	39.7	1.6
39	Antioch Baptist Church	36.7	1.1	42.0	1.8	32.1	1.4	Missing	
40	0.5 miles east of NC 87	35.5	2.5	45.8	2.2	34.0	4.2	47.9	3.7
	Quarterly Average, All Sites	35.6		39.2		28.4		43.9	
	Yearly Average, All Sites	36.8							