

VIRGINIA ELECTRIC AND POWER COMPANY  
RICHMOND, VIRGINIA 23261

April 28, 2008

United States Nuclear Regulatory Commission  
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**VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)**  
**NORTH ANNA POWER STATION UNIT NOS. 1 AND 2**  
**INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI)**  
**ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT**

In accordance with North Anna Units 1 and 2 Technical Specification 5.6.2 and the North Anna Independent Spent Fuel Storage Installation Technical Specifications, enclosed is the 2007 Annual Radiological Environmental Operating Report.

If you have any questions or require additional information, please contact Page Kemp at (540) 894-2295.

Very truly yours,



Daniel G. Stoddard  
Site Vice President

Enclosure

Commitments made in this letter: None

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NHSS

*Dominion*  
*North Anna Power Station*  
*Radiological Environmental Monitoring Program*  
*January 1, 2007 to December 31, 2007*

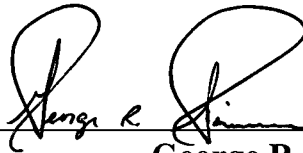
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**Dominion, North Anna Power Station**

***Annual Radiological Environmental Operating Report***

***North Anna Power Station***

***January 1, 2007 to December 31, 2007***

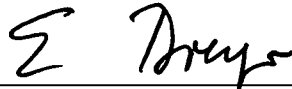
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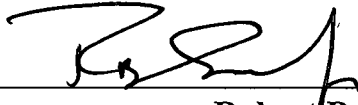
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## 1. EXECUTIVE SUMMARY

This document is a detailed report of the 2007 North Anna Nuclear Power Station Radiological Environmental Monitoring Program (REMP). It is submitted in accordance with North Anna Unit 1 and 2 Technical Specification 5.6.2 and North Anna Independent Spent Fuel Storage Installation (ISFSI) Technical Specification 5.5.2b. Radioactivity levels from January 1 through December 31, 2007, in water, silt, shoreline sediment, milk, aquatic biota, food products, vegetation, and direct exposure pathways have been analyzed, evaluated and summarized. The REMP is designed to confirm that radiological effluent releases are As Low As is Reasonably Achievable (ALARA), no undue environmental effects occur and the health and safety of the public are protected. The program also detects any unexpected environmental processes that could allow radiation accumulations in the environment or food pathway chains.

Radiation and radioactivity in the environment is monitored within a 25-mile radius of the station. North Anna Power Station personnel collect a variety of samples within this area. A number of sampling locations for each medium are selected using available meteorological, land use, and water use data. Two types of samples are obtained. The first type, control samples, are collected from areas that are beyond the measurable influence of North Anna Power Station or any other nuclear facility. These samples are used as reference data. Normal background radiation levels, or radiation present due to causes other than North Anna Power Station, can be compared to the environment surrounding the station. Indicator samples are the second sample type obtained. These samples show how much radiation is contributed to the environment by the station. Indicator samples are taken from areas close to the station where any station contribution will be at the highest concentration.

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

Global Dosimetry Solutions provided thermoluminescent dosimetry (TLD) services and AREVA Environmental Laboratory provided radioanalytical services. Participation in an Interlaboratory Comparison Program provides an independent check of sample measurement precision and accuracy. Typically, radioactivity levels in the environment are so low that analysis values frequently fall below the minimum detection limits of state-of-the-art measurement methods. Because of this, the Nuclear Regulatory Commission (NRC) requires that equipment used for

radiological environmental monitoring must be able to detect specified minimum Lower Limits of Detection (LLDs). This ensures that analyses are as accurate as possible. The NRC also mandates a reporting level for certain radionuclides. Licensed nuclear facilities must report the radionuclide activities in those environmental samples that are equal to or greater than the specified reporting level. Environmental radiation levels are sometimes referred to as a percent of the reporting level.

Analytical results are reported for all possible radiation exposure pathways to man. These pathways include airborne, water, aquatic, terrestrial, and direct radiation exposure. The airborne exposure pathway includes radioactive airborne iodine and particulates, and precipitation. The 2007 airborne results were similar to previous years. No plant related radioactivity was detected and fallout or natural radioactivity levels remained at levels consistent with past years' results.

Water and aquatic exposure pathway samples include surface, river and well water, silt and shoreline sediments, and fish. No plant related isotopes were detected in Lake Anna surface water except for tritium. The average tritium activity in surface water for 2007 was 3810 pCi/liter. River water collected from the North Anna River, 5.8 miles downstream of the site had an average tritium level of 3638 pCi/liter. No plant related radioisotopes were detected in well water. This trend is consistent throughout the environmental operational monitoring program. Both silt samples indicated the presence of naturally occurring potassium-40 and thorium-228 at levels consistent with the natural background. Shoreline soil, which may provide a direct exposure pathway, indicated the presence of K-40 and Th-228 also at levels consistent with natural levels. Cs-137 was detected in the control location sediment sample at 86 pCi/kg. Cs-137 was detected in one shoreline soil sample at 134 pCi/kg. This Cs-137 level is consistent with historic levels. The terrestrial exposure pathway includes milk and food/vegetation products. Iodine-131 was not detected in any 2007 milk samples and has not been detected in milk prior to or since the 1986 Chernobyl accident. No plant related radioisotopes were detected in any milk samples. Naturally occurring beryllium-7, potassium-40 and thorium 228 were detected at environmental levels consistent with historical data. No plant related isotopes were detected. Low levels of Cs-137 have been detected intermittently in past years. The direct exposure pathway measures environmental radiation doses by use of thermoluminescent dosimeters (TLDs). TLD results have remained essentially constant over the years.

During 2007, as in previous years, operation of the North Anna Power Station and the Independent Spent Fuel Storage Installation (ISFSI) created no adverse environmental effects or health hazards. The maximum dose calculated for a hypothetical individual at the station site boundary due to liquid and gaseous

effluents released from the station during 2007 was 0.62 millirem. For reference, this dose may be compared to the 360 millirem average annual exposure to every person in the United States from natural and man-made sources. Natural sources in the environment provide approximately 82% of radiation exposure to man, while nuclear power contributes less than 0.1%. These results demonstrate not only compliance with federal and state regulations but also demonstrate the adequacy of radioactive effluent control at North Anna Power Station.

## 2. PROGRAM DESCRIPTION

### *2.1 Introduction*

This report documents the 2007 North Anna Power Station operational Radiological Environmental Monitoring Program (REMP).

The North Anna Power Station of Dominion Virginia Power Company is located on Lake Anna in Mineral, Virginia, approximately 35 miles southwest of Fredericksburg, Virginia. The site consists of two units, each with a pressurized water reactor (PWR) nuclear steam supply system and turbine generator furnished by Westinghouse Electric Corporation. Each unit was designed with a gross electrical output of 979 megawatts electric (MWe). Unit 1 achieved commercial operation on June 6, 1978 and Unit 2 on December 14, 1980. An independent spent fuel storage facility was licensed for dry cask storage of spent fuel in 1998.

The United States Nuclear Regulatory Commission (USNRC) regulations require that nuclear power plants be designed, constructed, and operated to keep levels of radioactive material in effluents to unrestricted areas as low as is reasonably achievable (ALARA). To ensure these criteria are met, the operating license for North Anna Power Station includes Technical Specifications, which address the release of radioactive effluents. In-plant monitoring is used to ensure release limits are not exceeded. As a precaution against unexpected or undefined environmental processes which might allow undue accumulation of radioactivity in the environment, a program for monitoring the plant environs is also included in North Anna Power Station Offsite Dose Calculation Manual (ODCM).

North Anna Power Station is responsible for collecting the various indicator and control environmental samples. Global Dosimetry Solutions is responsible for processing the TLDs. AREVA Environmental Laboratory is responsible for sample analyses. The results of the analyses are used to determine if changes in radioactivity levels may be attributable to station operations. Measured values are compared with control levels, which vary with time due to external events, such as cosmic ray bombardment, nuclear weapons test fallout and seasonal variations of naturally occurring radioisotopes. Data collected prior to station operation is used to indicate the degree of natural variation to be expected. This pre-operational data is compared with data collected during the operational phase to assist in evaluating any radiological impact of station operation.

Occasional samples of environment media show the presence of man-made isotopes. As a method of referencing the measured radionuclide concentrations in the sample media to a dose consequence to man, the data is compared to the reporting level concentrations listed in the USNRC Regulatory Guide 4.8 and



North Anna's ODCM. These concentrations are based upon the annual dose commitment recommended by 10CFR50, Appendix I, to meet the criterion of "As Low As Is Reasonably Achievable".

This report documents the results of the Radiological Environmental Monitoring Program for 2007 and satisfies the following objectives of the program:

- To provide measurements of radiation and of radioactive materials in those exposure pathways and for those radionuclides that lead to the highest potential radiation exposure of the maximum exposed member of the public resulting from station operations.
- To supplement the radiological effluent monitoring program by verifying that radioactive effluents are within allowable limits.
- To identify changes in radioactivity in the environment.
- To verify that station operations have no detrimental effect on the health and safety of the public.

## ***2.2 Sampling and Analysis Program***

Table 2-1 summarizes the 2007 sampling program for North Anna Power Station. All samples listed in Table 2-1 are taken at indicator locations except those labeled "control." The North Anna Radiological Monitoring Locations maps denote sample locations for North Anna Power Station. The locations are color coded to designate sample types. Table 2-2 summarizes the analysis program conducted by AREVA Environmental Laboratory for North Anna Power Station during the year 2007.

**TABLE 2-1**  
**North Anna Power Station - 2007**  
**RADIOLOGICAL SAMPLING STATION**  
**DISTANCE AND DIRECTION FROM UNIT NO. 1**

Sample Media	Location	Station	Distance	Direction	Degrees	Collection	Remarks
						Frequency	
Environmental	NAPS Sewage Treatment Plant	01	0.20	NE	42°	Quarterly & Annually	
Thermoluminescent	Fredericks Hall	02	5.30	SSW	203°	Quarterly & Annually	
Dosimetry (TLD)	Mineral, Va	03	7.10	WSW	243°	Quarterly & Annually	
	Wares Crossroads	04	5.10	WNW	287°	Quarterly & Annually	
	Route 752	05	4.20	NNE	20°	Quarterly & Annually	
	Sturgeon's Creek Marina	05A	2.04	N	11°	Quarterly & Annually	
	Levy, VA	06	4.70	ESE	115°	Quarterly & Annually	
	Bumpass, VA	07	7.30	SSE	167°	Quarterly & Annually	
	End of Route 685	21	1.00	WNW	301°	Quarterly & Annually	
	Route 700	22	1.00	WSW	242°	Quarterly & Annually	
	"Aspen Hills"	23	0.93	SSE	158°	Quarterly & Annually	
	Orange, VA	24	22.00	NW	325°	Quarterly & Annually	Control
	Bearing Cooling Tower	N-1/33	0.06	N	10°	Quarterly	
	Sturgeon's, Creek Marina	N-2/34	2.04	N	11°	Quarterly	
	Parking Lot "C" (on-site)	NNE-3/35	0.24	NNE	32°	Quarterly	
	Good Hope Church	NNE-4/36	3.77	NNE	25°	Quarterly	
	Parking Lot "B"	NE-5/37	0.20	NE	42°	Quarterly	
	Lake Anna Marina (Bogg's Dr)	NE-6/38	1.46	NE	34°	Quarterly	
	Weather Tower Fence	ENE-7/39	0.36	ENE	74°	Quarterly	
	Route 689	ENE-8/40	2.43	ENE	65°	Quarterly	
	Near Training Facility	E-9/41	0.30	E	91°	Quarterly	
	"Morning Glory Hill"	E-10/42	2.85	E	93°	Quarterly	
	Island Dike	ESE-11/43	0.12	ESE	103°	Quarterly	
	Route 622	ESE-12/44	4.70	ESE	115°	Quarterly	
	DVP Biology Lab	SE-13/45	0.64	SE	138°	Quarterly	
Route 701 (Dam Entrance)	SE-14/46	5.88	SE	137°	Quarterly		
"Aspen Hills"	SSE-15/47	0.93	SSE	158°	Quarterly		
Elk Creek	SSE-16/48	2.33	SSE	165°	Quarterly		
NAPS Access Rd.	S-17/49	0.47	S	173°	Quarterly		

\* In October 1991 the Surface Water Sample location at station 09 was moved to 09A.  
\*\* Shoreline soil was changed from station 09 to 08 effective with the August 1996 sample.  
\*\*\* Air Sample Station at 01A was added in October 2007

**TABLE 2-1**  
**North Anna Power Station - 2007**  
**RADIOLOGICAL SAMPLING STATION**  
**DISTANCE AND DIRECTION FROM UNIT NO. 1**

Sample Media	Location	Station	Distance	Direction	Degrees	Collection Frequency	Remarks
<b>Environmental</b>	Elk Creek Church	S-18/50	1.55	S	178°	Quarterly	
<b>Thermoluminescent Dosimetry (TLD)</b>	NAPS Access Rd.	SSW-19/51	0.42	SSW	197°	Quarterly	
	Route 618	SSW-20/52	5.30	SSW	205°	Quarterly	
	500kv Tower	SW-21/53	0.6	SW	218°	Quarterly	
	Route 700	SW-22/54	3.96	SW	232°	Quarterly	
	NAPS Radio Tower	WSW-23/55	0.38	WSW	237°	Quarterly	
	Route 700 (Exclusion Boundary)	WSW-24/56	1.00	WSW	242°	Quarterly	
	South Gate Switchyard	W-25/57	0.32	W	279°	Quarterly	
	Route 685	W-26/58	1.55	W	274°	Quarterly	
	End of Route 685	WNW-27/59	1.00	WNW	301°	Quarterly	
	Route 685	WNW-28/60	1.40	WNW	303°	Quarterly	
	North Gate - Construction Side Laydown Area	NW-29/61	0.45	NW	321°	Quarterly	
	Lake Anna Campground	NW-30/62	2.54	NW	319°	Quarterly	
	#1/#2 Intake	NNW-31/63	0.07	NNW	349°	Quarterly	
	Route 208	NNW-32/64	2.21	NNW	344°	Quarterly	
	Bumpass Post Office	C-1/2	7.30	SSE	167°	Quarterly	Control
	Orange, VA	C-3/4	22.00	NW	325°	Quarterly	Control
	Mineral, VA	C-5/6	7.10	WSW	243°	Quarterly	Control
	Louisa, VA	C-7/8	11.54	WSW	257°	Quarterly	Control
<b>Airborne Particulate and Radioiodine</b>	NAPS Sewage Treatment Plant	01	0.20	NE	42°	Weekly	
	Biology Lab***	01A	0.64	SE	138°	Weekly	
	Mineral, VA	03	7.10	WSW	243°	Weekly	
	Wares Crossroads	04	5.10	WNW	287°	Weekly	
	Route 752	05	4.20	NNE	20°	Weekly	
	Sturgeon's Creek Marina	05A	2.04	N	11°	Weekly	
	Levy, VA	06	4.70	ESE	115°	Weekly	
	Bumpass, VA	07	7.30	SSE	167°	Weekly	

\* In October 1991 the Surface Water Sample location at station 09 was moved to 09A.  
\*\* Shoreline soil was changed from station 09 to 08 effective with the August 1996 sample.  
\*\*\* Air Sample Station at 01A was added in October 2007

**TABLE 1-1**  
**North Anna Power Station - 2007**  
**RADIOLOGICAL SAMPLING STATION**  
**DISTANCE AND DIRECTION FROM UNIT NO. 1**

<b>Sample Media</b>	<b>Location</b>	<b>Station</b>	<b>Distance</b>	<b>Direction</b>	<b>Degrees</b>	<b>Collection Frequency</b>	<b>Remarks</b>
<b>Airborne Particulate and Radioiodine</b>	End of Route 685	21	1.00	WNW	301°	Weekly	
	Route 700	22	1.00	WSW	242°	Weekly	
	"Aspen Hills"	23	0.93	SSE	158°	Weekly	
	Orange, VA	24	22.00	NW	325°	Weekly	Control
<b>Surface Water</b>	Waste Heat Treatment Facility (Second Cooling Lagoon)	08	3.37	SSE	148°	Monthly	
	*Lake Anna (upstream) (Route 669 Bridge)	09A	12.90	WNW	295°	Monthly	Control
<b>River Water</b>	North Anna River (downstream)	11	5.80	SE	128°	Monthly	
<b>Ground Water (Well Water)</b>	Biology Lab	01A	0.64	SE	138°	Quarterly	
<b>Precipitation</b>	Biology Lab	01A	0.64	SE	138°	Monthly	
<b>Aquatic Sediment</b>	Waste Heat Treatment Facility (Second Cooling Lagoon)	08	3.37	SSE	148°	Semi-Annually	
	Lake Anna (upstream) (Route 669 Bridge)	09A	12.90	WNW	295°	Semi-Annually	Control
	North Anna River (downstream)	11	5.80	SE	128°	Semi-Annually	
<b>Shoreline Soil</b>	Waste Heat Treatment Facility (Second Cooling Lagoon)	08 **	3.37	SSE	148°	Semi-Annually	
<b>Soil</b>	NAPS Sewage Treatment Plant	01	0.20	NE	42°	Once/3 years	
	Fredericks Hall	02	5.30	SSW	203°	Once/3 years	
	Mineral, VA	03	7.10	WSW	243°	Once/3 years	
	Wares Crossroads	04	5.10	WNW	287°	Once/3 years	

\* In October 1991 the Surface Water Sample location at station 09 was moved to 09A.  
 \*\* Shoreline soil was changed from station 09 to 08 effective with the August 1996 sample.  
 \*\*\* Air Sample Station at 01A was added in October 2007

**TABLE 1**  
**North Anna Power Station - 2007**  
**RADIOLOGICAL SAMPLING STATION**  
**DISTANCE AND DIRECTION FROM UNIT NO. 1**

Sample Media	Location	Station	Distance	Direction	Degrees	Collection	Remarks
						Frequency	
<b>Soil</b>	Route 752	05	4.20	NNE	20°	Once/3 years	
	Sturgeon's Creek Marina	05A	2.04	N	11°	Once/3 years	
	Levy, VA	06	4.70	ESE	115°	Once/3 years	
	Bumpass, VA	07	7.30	SSE	167°	Once/3 years	
	End of Route 685	21	1.00	WNW	301°	Once/3 years	
	Route 700 (Exclusion Boundary)	22	1.00	WSW	242°	Once/3 years	
	"Aspen Hills"	23	0.93	SSE	158°	Once/3 years	
	Orange, VA	24	22.00	NW	325°	Once/3 years	Control
<b>Milk</b>	Holladay Dairy (R.C. Goodwin)	12	8.30	NW	310°	Monthly	
	Terrell's Dairy (Fredericks Hall)	13	5.60	SSW	205°	Monthly	
	Anderson's Farm	27	2.49	ENE	66°	Monthly	
<b>Fish</b>	Waste Heat Treatment Facility (Second Cooling Lagoon)	08	3.37	SSE	148°	Semi-Annually	
	Lake Orange	25	16.5	NW	312°	Semi-Annually	Control
<b>Food Products</b> (Broadleaf Vegetation)	Bel Aire Plantation	14	1.20	NE	43°	Monthly if available or at harvest	
	Route 614	15	1.37	SE	133°	Monthly if available or at harvest	
	Route 629/522	16	12.60	NW	314°	Monthly if available or at harvest	Control
	Aspen Hills	23	0.93	SSE	158°	Monthly if available or at harvest	

\* In October 1991 the Surface Water Sample location at station 09 was moved to 09A.  
\*\* Shoreline soil was changed from station 09 to 08 effective with the August 1996 sample.  
\*\*\* Air Sample Station at 01A was added in October 2007

**TABLE 2-2**  
**North Anna Power Station**  
**SAMPLE ANALYSIS PROGRAM**

<b>SAMPLE MEDIA</b>	<b>FREQUENCY</b>	<b>ANALYSIS</b>	<b>LLD</b>	<b>REPORT UNITS</b>	
<b>Thermoluminescent Dosimetry (TLD)</b>					
(84 TLDs)	Quarterly	Gamma Dose	2 mR±2mR	mR/std. Month	
(12 TLDs)	Annually	Gamma Dose	2 mR±2mR	mR/std. Month	
<b>Airborne Radioiodine</b>	Weekly	I-131	0.07	pCi/m <sup>3</sup>	
<b>Airborne Particulate</b>	Weekly	Gross Beta	0.01	pCi/m <sup>3</sup>	
	Quarterly (a)	Gamma Isotopic		pCi/m <sup>3</sup>	
		Cs-134	0.05		
		Cs-137	0.06		
2 <sup>nd</sup> Quarter Composite	Sr-89	(b)	pCi/m <sup>3</sup>		
	Sr-90	(b)			
<b>Surface Water</b>	Monthly	I-131	1(c)	pCi/L	
		Gamma Isotopic		pCi/L	
		Mn-54	15		
		Fe-59	30		
		Co-58	15		
		Co-60	15		
		Zn-65	30		
		Zr-95	30		
		Nb-95	15		
		Cs-134	15		
		Cs-137	18		
		Ba-140	60		
		La-140	15		
		Quarterly(a)	Tritium (H-3)	2000	pCi/L
		2 <sup>nd</sup> Quarter	Sr-89	(b)	pCi/L
	Composite	Sr-90	(b)		
	<b>River Water</b>	Monthly	I-131	1(c)	pCi/L
Gamma Isotopic				pCi/L	
Mn-54			15		
Fe-59			30		
Co-58			15		
Co-60			15		
Zn-65			30		
Zr-95			30		
Nb-95			15		
Cs-134			15		
Cs-137			18		
Ba-140			60		
La-140			15		

\*LLDs indicate those levels to which environmental samples are required to be analyzed. Actual analysis of samples may be lower than the listed values.

- (a) Quarterly composite of each location's samples are used for the required analysis
- (b) There are no required LLDs for Sr-89/90
- (c) LLD for non-drinking water is 10 pCi/liter.

**TABLE 2-2**  
**North Anna Power Station**  
**SAMPLE ANALYSIS PROGRAM**

<b>SAMPLE MEDIA</b>	<b>FREQUENCY</b>	<b>ANALYSIS</b>	<b>LLD</b>	<b>REPORT UNITS</b>
<b>River Water</b>	Quarterly(a)	Tritium (H-3)	2000	pCi/L
	2 <sup>nd</sup> Quarter	Sr-89	(b)	pCi/L
	Composite	Sr-90	(b)	
<b>Ground Water (Well Water)</b>	Quarterly	Gamma Isotopic		pCi/L
		Mn-54	15	
		Fe-59	30	
		Co-58	15	
		Co-60	15	
		Zn-65	30	
		Zr-95	30	
		Nb-95	15	
		I-131	1(c)	
		Cs-134	15	
		Cs-137	18	
		Ba-140	60	
		La-140	15	
	Quarterly(a)	Tritium (H-3)	2000	pCi/L
	2 <sup>nd</sup> Quarter	Sr-89	(b)	pCi/L
	Sr-90	(b)		
<b>Aquatic Sediment</b>	Semi-Annually	Gamma Isotopic		pCi/kg (dry)
		Cs-134	150	
		Cs-137	180	
	Annually	Sr-89	(b)	pCi/kg (dry)
		Sr-90	(b)	
<b>Precipitation</b>	Monthly	Gross Beta	4	pCi/L
	Semi-Annual	Gamma Isotopic		pCi/L
	Composite	Mn-54	15	
		Fe-59	30	
		Co-58	15	
		Co-60	15	
		Zn-65	30	
		Zr-95	30	
		Nb-95	15	
		I-131	1(c)	
		Cs-134	15	
		Cs-137	18	
		Ba-140	60	
		La-140	15	
		<b>Shoreline Soil</b>	Semi-Annually	Gamma Isotopic
Cs-134	150			
Cs-137	180			
Annually	Sr-89		(b)	pCi/kg (dry)
	Sr-90		(b)	

\*LLDs indicate those levels to which environmental samples are required to be analyzed. Actual analysis of samples may be lower than the listed values.

(a) Quarterly composite of each location's samples are used for the required analysis

(b) There are no required LLDs for Sr-89/90

(c) LLD for non-drinking water is 10 pCi/liter.

**TABLE 2-2**  
**North Anna Power Station**  
**SAMPLE ANALYSIS PROGRAM**

<b>SAMPLE MEDIA</b>	<b>FREQUENCY</b>	<b>ANALYSIS</b>	<b>LLD</b>	<b>REPORT UNITS</b>
<b>Soil</b>	Once per 3 years	Gamma Isotopic		pCi/kg (dry)
		Cs-134	150	
		Cs-137	180	
		Sr-89	(b)	pCi/kg (dry)
		Sr-90	(b)	
<b>Milk</b>	Monthly	I-131	1	pCi/L
	Monthly	Gamma Isotopic		
		Cs-134	15	
		Cs-137	18	
		Ba-140	60	
		La-140	15	
	Quarterly	Sr-89	(b)	pCi/L
		Sr-90	(b)	
<b>Fish</b>	Semi-Annually	Gamma Isotopic		pCi/kg (wet)
		Mn-54	130	
		Fe-59	260	
		Co-58	130	
		Co-60	130	
		Zn-65	260	
		Cs-134	130	
		Cs-137	150	
<b>Food Products (Broadleaf Vegetation)</b>	Monthly, if available, or at harvest	Gamma Isotopic		pCi/kg (wet)
		Cs-134	60	
		Cs-137	80	
		I-131	60	

\*LLDs indicate those levels to which environmental samples are required to be analyzed. Actual analysis of samples may be lower than the listed values.

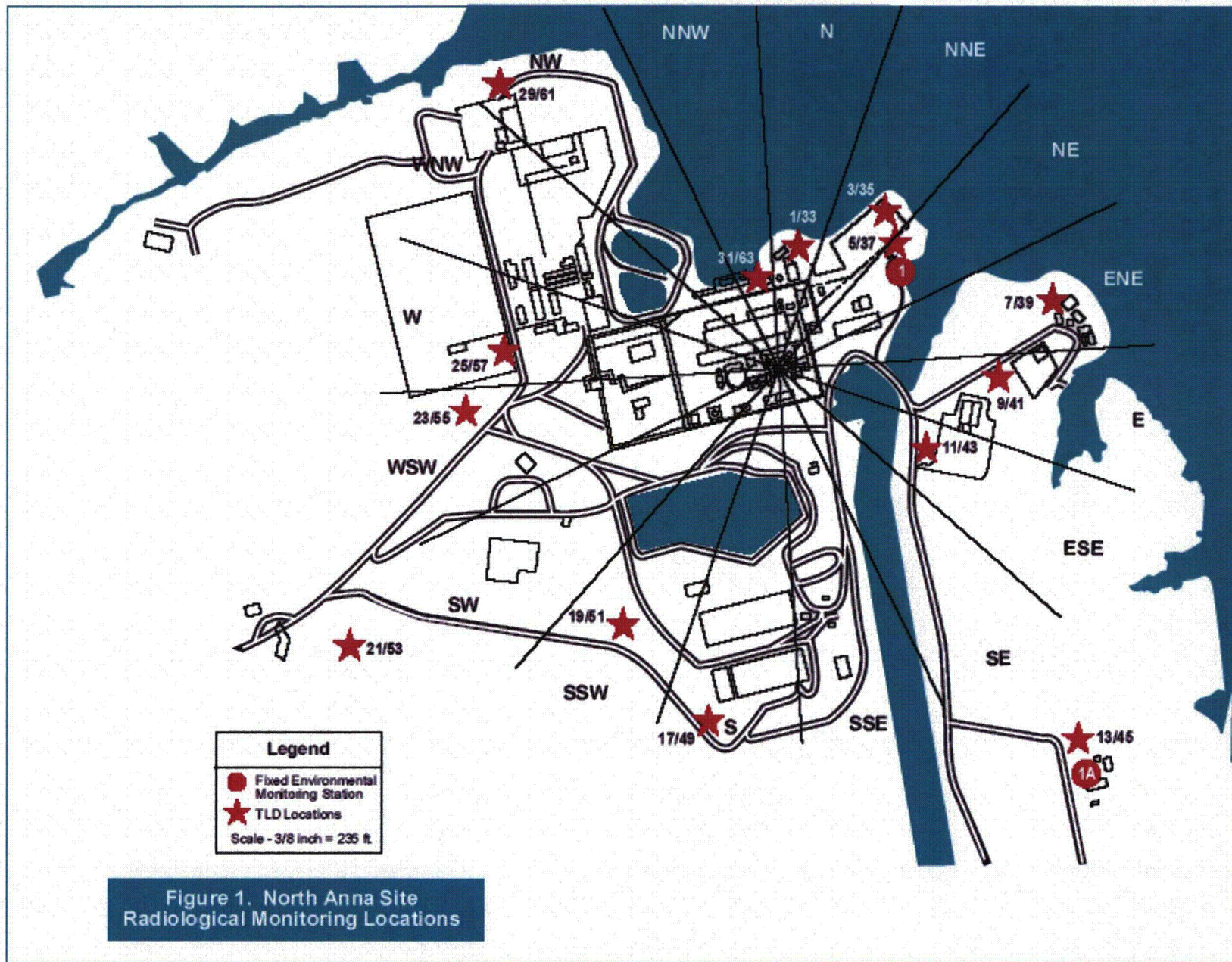
- (a) Quarterly composite of each location's samples are used for the required analysis
- (b) There are no required LLDs for Sr-89/90
- (c) LLD for non-drinking water is 10 pCi/liter.



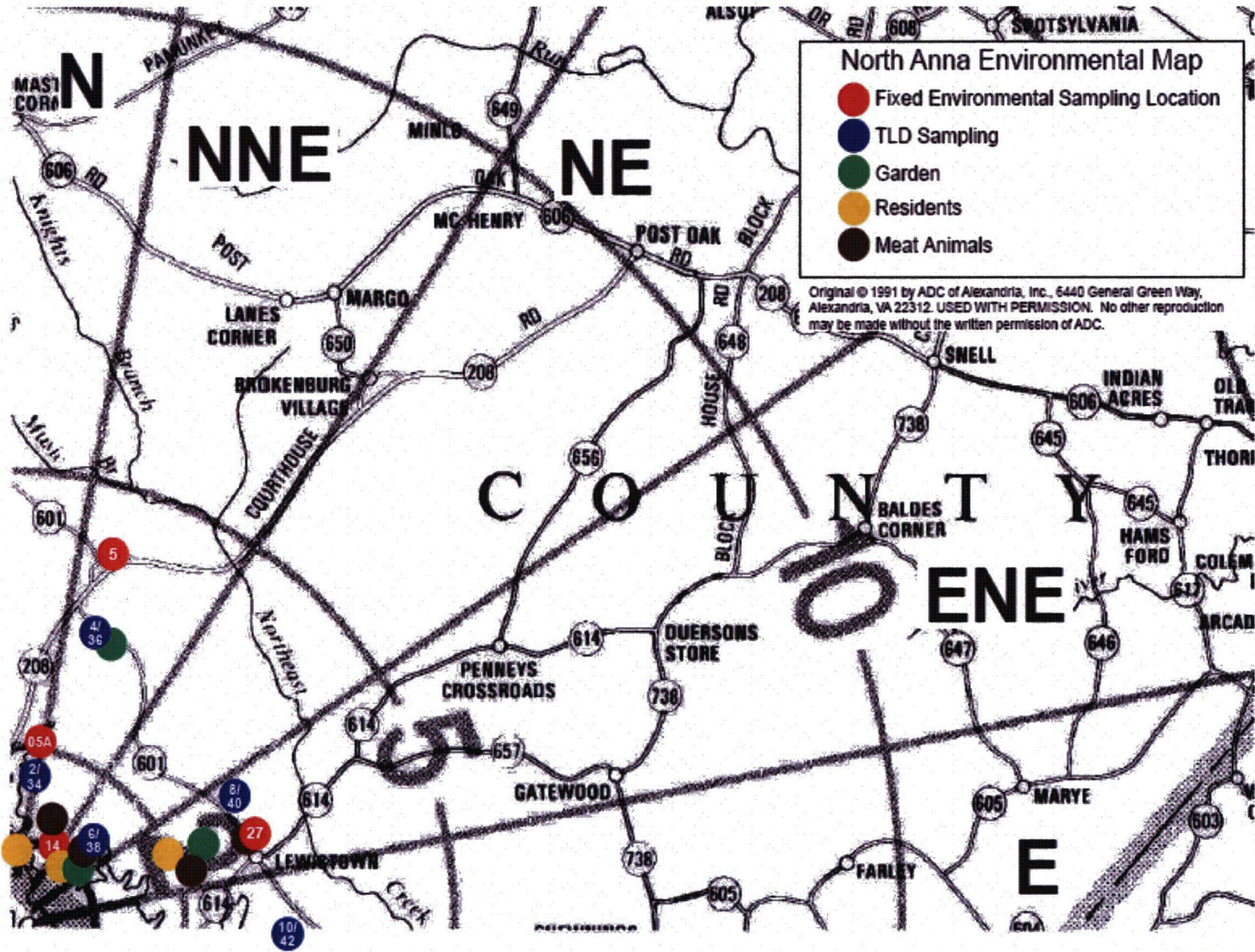
**Legend For The North Anna Power Station  
Environmental Monitoring Stations Overview Maps**

Map Designation	Environmental Station Identification	Map Designation	Environmental Station
1 (a)	01,NE-5/37	27	27-Milk
1A	01A,SE-13/45	7/8	C-7/8
2 (a)	02,SSW-20/52	1/33	N-1/33
3 (a)	03,C-5/6	31/63	NNW-31/63
4 (a)	04	29/61	NW-29/61
5 (a)	05	3/35	NNE-3/35
5A (a)	05A,N-2/34	7/39	ENE-7/39
6 (a)	06,ESE-12/44	9/41	E-9/41
7 (a)	07,C-1/2	11/43	ESE-11/43
8	08-Water, Fish Sediment, Shoreline Soil	17/49 19/51	S-17/49 SSW-19/51
9A	09A-Water sample, sediment	21/53	SW-21/53
11	11-River Water, Sediment	23/55	WSW-23/55
12	12-Milk	25/57	W-25/57
13	13-Milk	16/48	SSE-16/48
14	14-Vegetation, NE-6/38	18/50	S-18/50
15	Vegetation	14/46	SE-14/46
16	Vegetation	22/54	SW-22/54
21 (a)	21,WNW-27/59	26/58	W-26/58
22 (a)	22,WSW-24/56	28/60	WNW-28/60
23 (a)	23-SSE-15/47	32/64	NNW-32/64
24 (a)(b)	24,C-3/4	8/40	ENE-8/40
25 (c)	25-Fish	4/36	NNE-4/36
26	26-Vegetation	10/42	E-10/42

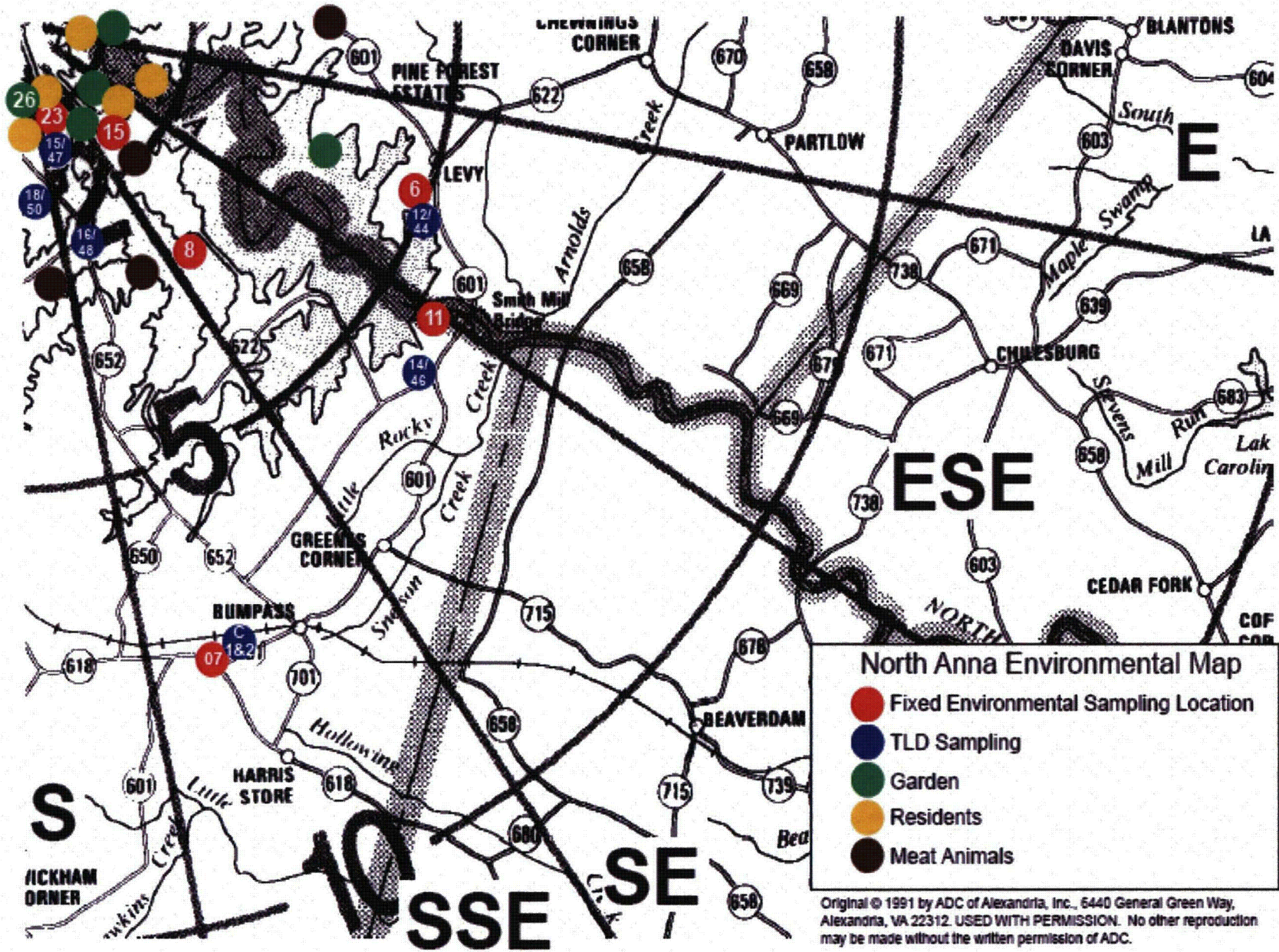
(a) Indicates air sample station, annual and quarterly TLD, Triennial soil.  
(b) In Orange  
(c) In Lake Orange

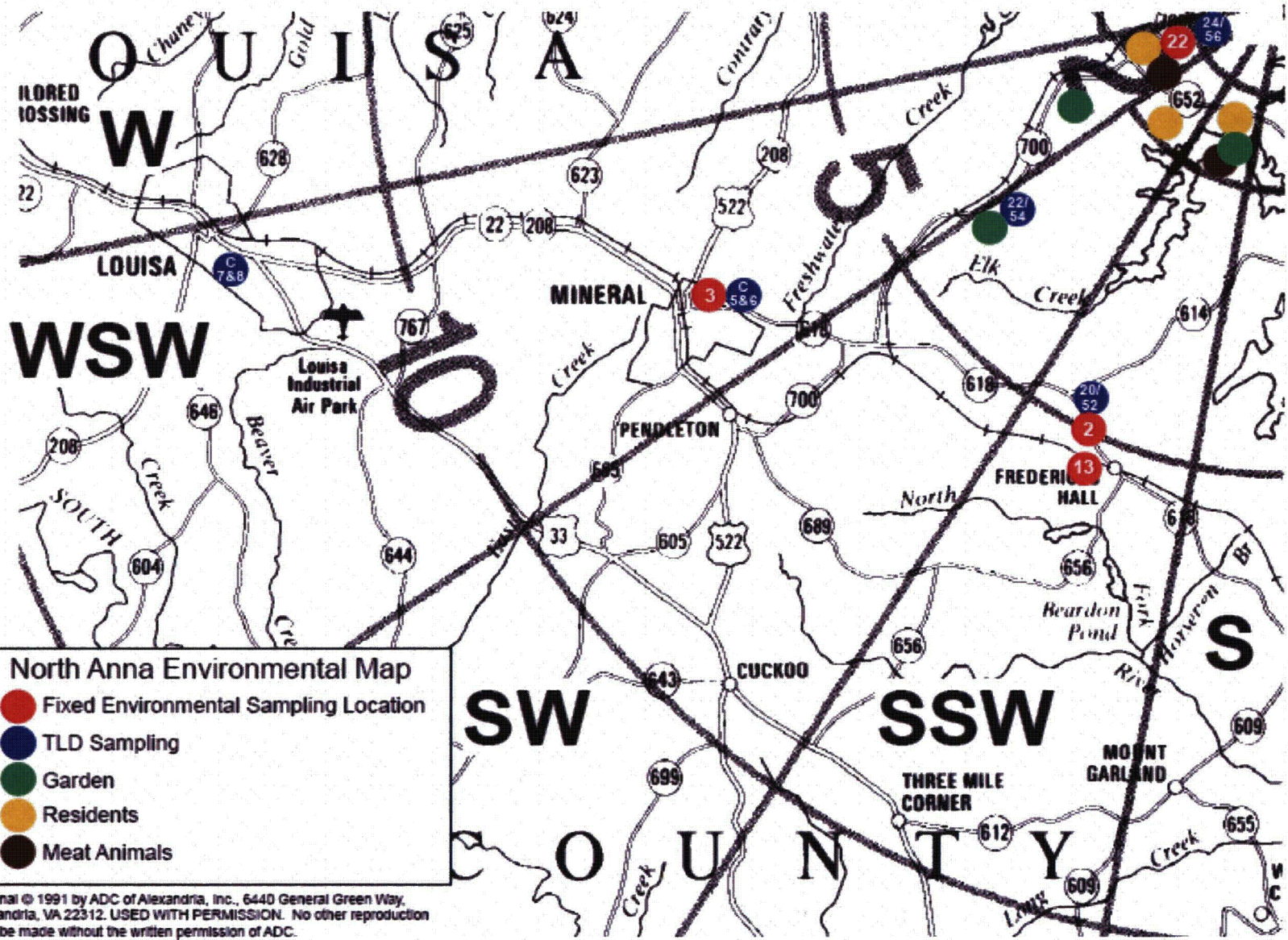


3799AS



CB3280C



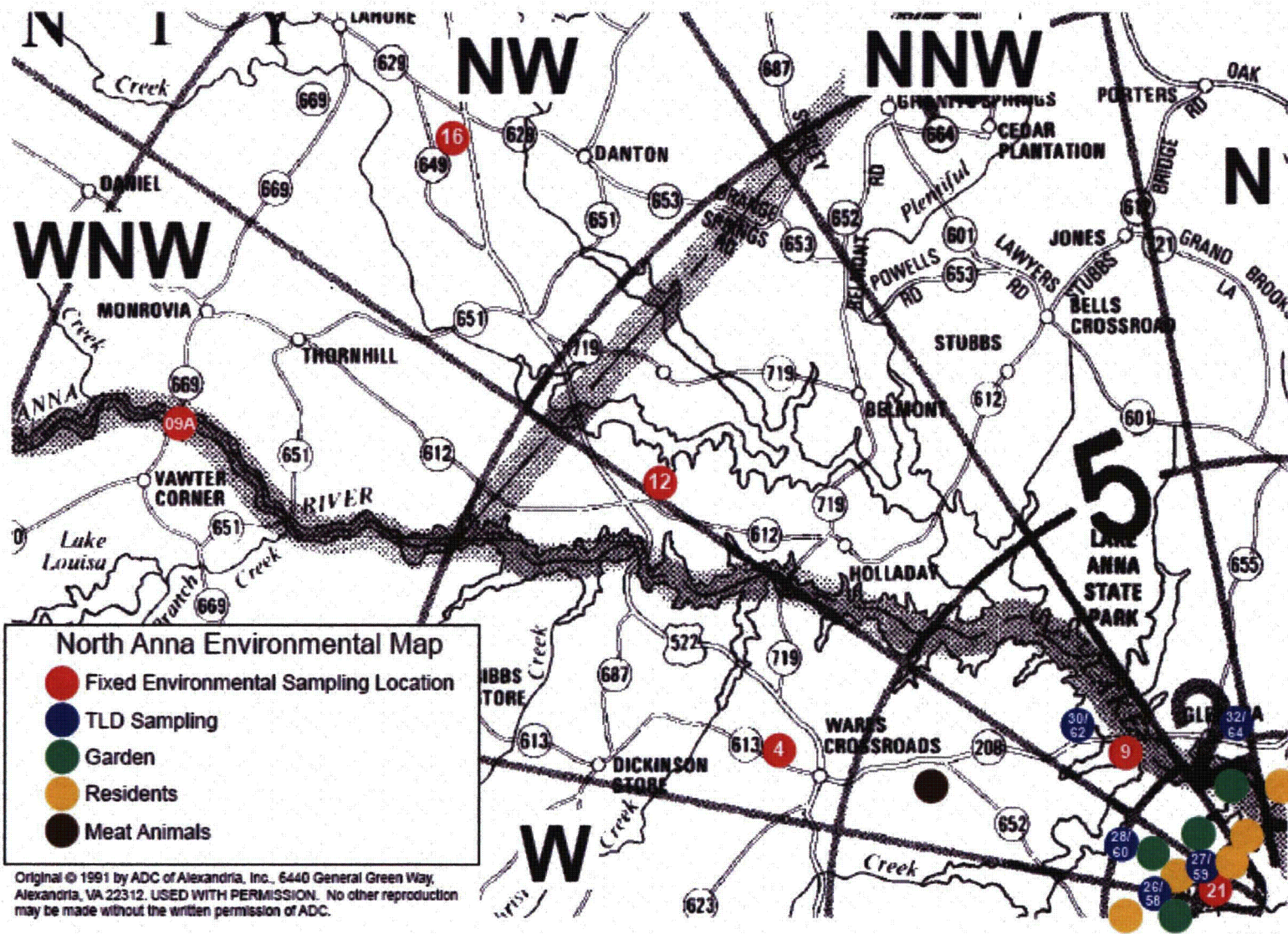


**North Anna Environmental Map**

- Fixed Environmental Sampling Location
- TLD Sampling
- Garden
- Residents
- Meat Animals

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CB8283D



### 3. ANALYTICAL RESULTS

#### 3.1 *Summary of Results*

In accordance with the North Anna 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", Rev. 1, November 1979. The LLD listed value is taken from the ODCM. For radioanalytic analyses, the values listed in the columns indicated as "Mean/Range" include only positive results. Results are considered positive when the measured value exceeds 1.5 times the listed  $2\sigma$  error (i.e., the measured value exceeds  $3\sigma$ ). For TLDs the mean and range include all values.

A more detailed analysis of the data is given in Section 4 where a discussion of the variations in the data explains many aspects that are not evident in the Summary Table because of the basic limitation of data summaries.

**TABLE 3-1  
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY**

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Medium or Pathway Sampled (Unit)	Analysis		LLD (pCi/unit)	All Indicator Locations	Location with Highest Mean			Control Location	Non-routine Reported Measurements
	Type	Total No.		Mean Range	Name	Distance Direction	Mean Range	Mean Range	
<b>Direct Radiation</b> (mR/std. Month) (Sector TLDs)	Gamma Dose	288	2	5.2(256/256) (1.3-47.3)	19/51 <sup>(1)</sup>	0.42 mi. SSW	31.9(8/8) (17.2-47.3)	3.1(32/32) (2.0-4.1)	0
<b>Direct Radiation</b> (mR/std. Month) (Emergency Sector TLDs)	Gamma Dose	40	2	4.9(40/40) (2.8-9.1)	09/10	0.37 mi. ENE	7.2(8/8) (5.4-9.1)	3.1(32/32) (2.0-4.1)	0
<b>Direct Radiation</b> (mR/std. month) (Environmental TLDs)	Gamma Dose	48	2	3.4(44/44) (1.3-5.8)	23	0.93 mi. SSE	4.9(4/4) (4.4-5.6)	3.4(4/4) (3.0-3.8)	0
<b>Direct Radiation</b> (mR/std. Month) (Annual TLDs)	Gamma Dose	12	2	3.4(11/11) (1.8-5.2)	23	0.93 mi. SSE	5.2(1/1) (5.2)	3.3(1/1) (3.3)	0
<b>Airborne Particulates</b> (1E-03 pCi/m <sup>3</sup> )	Gross Beta	637**	0.01	28.8(585/585) (9.6-70.2)	01A	0.64 mi. SE	35.9(13/13) (17.1-53.3)	26.4(52/52) (6.1-43.4)	0
<b>Air Iodine</b> (pCi/m <sup>3</sup> )	I-131	637	0.07	(0/585)	N/A	N/A	N/A	(0/52)	0
<b>Airborne Particulates</b> (1E-03 pCi/m <sup>3</sup> )	Gamma	50**							
	Be-7	50**	-	148.8(45/45) (91-218)	03	7.1 mi. WSW	176(4/4) (150-210)	127.8(4/4) (91-150)	1
	Cs-134	50**	0.05	(0/45)	N/A	N/A	N/A	(0/4)	1
	Cs-137	50**	0.06	(0/45)	N/A	N/A	N/A	(0/4)	1

(1) 19/51 located onsite near ISFSI.

\*\* Analysis of 08/15/07 sample from Station 21 included in total number of analyses, but not in calculation of means or ranges.



**TABLE 3-1  
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Medium or Pathway Sampled (Unit)	Analysis		LLD (pCi/unit)	All Indicator Locations	Location with Highest Mean			Control Location	Non-routine Reported Measurements	
	Type	Total No.		Mean Range	Name	Distance Direction	Mean Range	Mean Range		
Airborne Particulates (1E-03 pCi/m <sup>3</sup> )	Sr-89	12	-	(0/11)	N/A	N/A	N/A	(0/1)	0	
	Sr-90	12	-	(0/11)	N/A	N/A	N/A	(0/1)	0	
Soil (pCi/Kg) (dry)	Triennial Gamma	12								
	Be-7	12	-	10725(2/11) (850-20600)	05A	2.04 mi. N	20600(1/1) (20600)	(0/1)	0	
	K-40	12	-	12264(11/11) (4670-23800)	21	1.00 mi. WNW	23800(1/1) (23800)	5900(1/1) (5900)	0	
	Cs-134	12	150	(0/11)	N/A	N/A	N/A	(0/1)	0	
	Cs-137	12	180	270(3/11) 186-325	03	7.1 mi. WSW	325(1/1) (325)	(0/1)	0	
	Th-228	12	-	1056(11/11) (440-2170)	22	0.93 mi. SSE	2170(1/1) (2170)	1110(1/1) (1110)	0	
	Sr-89	13	-	N/A	N/A	N/A	N/A	(0/1)	0	
	Sr-90	13	-	400(2/12) (390-410)	05	4.2 mi. NNE	400(2/12) 390-410	(0/1)	0	
	Precipitation (pCi/liter)	Monthly Gross Beta	12	4	12.2(9/12) (7-22.5)	01A	0.64 mi. SE	12.2(9/12) (7-22.5)	N/A	0
		Semiannual Gamma	2							
Be-7		2	-	24.0(1/2) (24.0)	01A	0.64 mi. SE	24.0(1/2) (24.0)	N/A	0	
Mn-54		2	15	(0/2)	N/A	N/A	N/A	N/A	0	
Fe-59		2	30	(0/2)	N/A	N/A	N/A	N/A	0	
Co-58		2	15	(0/2)	N/A	N/A	N/A	N/A	0	
Co-60	2	15	(0/2)	N/A	N/A	N/A	N/A	0		

**TABLE 3-1  
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Medium or Pathway Sampled (Unit)	Analysis		LLD (pCi/unit)	All Indicator Locations	Location with Highest Mean			Control Location	Non-routine Reported Measurements
	Type	Total No.		Mean Range	Name	Distance Direction	Mean Range	Mean Range	
<b>Precipitation</b> (pCi/liter)	Zn-65	2	30	(0/2)	N/A	N/A	N/A	N/A	0
	Zr-95	2	30	(0/2)	N/A	N/A	N/A	N/A	0
	Nb-95	2	15	(0/2)	N/A	N/A	N/A	N/A	0
	I-131	2	10	(0/2)	N/A	N/A	N/A	N/A	0
	Cs-134	2	15	(0/2)	N/A	N/A	N/A	N/A	0
	Cs-137	2	18	(0/2)	N/A	N/A	N/A	N/A	0
	Ba-140	2	60	(0/2)	N/A	N/A	N/A	N/A	0
	La-140	2	15	(0/2)	N/A	N/A	N/A	N/A	0
<b>Milk</b> (pCi/liter)	Gamma	24							
	K-40	24	-	1384(24/24) (1210-1600)	12	8.3 mi. NW	1415(12/12) (1230-1600)	N/A	0
	I-131	24	1	(0/24)	N/A	N/A	N/A	N/A	0
	Cs-134	24	15	(0/24)	N/A	N/A	N/A	N/A	0
	Cs-137	24	18	(0/24)	N/A	N/A	N/A	N/A	0
	Ba-140	24	60	(0/24)	N/A	N/A	N/A	N/A	0
	La-140	24	15	(0/24)	N/A	N/A	N/A	N/A	0
	Sr-89 (Quarterly)	8	-	(0/8)	N/A	N/A	N/A	N/A	0

**TABLE 3-1  
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY**

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Medium or Pathway Sampled (Unit)	Analysis		LLD (pCi/unit)	All Indicator Locations	Location with Highest Mean			Control Location	Non-routine Reported Measurements
	Type	Total No.		Mean Range	Name	Distance Direction	Mean Range	Mean Range	
Milk (pCi/liter)	Sr-90	8	-	(0/8)	N/A	N/A	N/A	N/A	0
	(Quarterly)								
Food Vegetation (pCi/kg) (wet)	Gamma	30							
	Be-7	30	-	2599(23/24) (1060-8350)	14	varies NE	3073(6/6) (1560-8350)	3533(6/6) (1650-7330)	0
	K-40	30	-	8128(23/24) (3320-17600)	14	varies NE	9613(6/6) (3320-17600)	9982(6/6) (4540-23600)	0
	I-131	30	60	(0/24)	N/A	N/A	N/A	(0/6)	0
	Cs-134	30	60	(0/24)	N/A	N/A	N/A	(0/6)	0
	Cs-137	30	80	(0/24)	N/A	N/A	N/A	(0/6)	0
	Th-228	30	-	338(8/24) (210-770)	23	varies SSE	373(4/6) (210-770)	278(1/6) (278)	0
	Tritium	4	2000	(0/4)	01A	0.64 mi. SE	N/A	N/A	0
Ground Well Water (pCi/liter)	Gamma	4							
	Mn-54	4	15	(0/4)	N/A	N/A	N/A	N/A	0
	Fe-59	4	30	(0/4)	N/A	N/A	N/A	N/A	0
	Co-58	4	15	(0/4)	N/A	N/A	N/A	N/A	0
	Co-60	4	15	(0/4)	N/A	N/A	N/A	N/A	0

**TABLE 3-1**  
**RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY**

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Medium or Pathway Sampled (Unit)	Analysis		LLD (pCi/unit)	All Indicator Locations	Location with Highest Mean			Control Location	Non-routine Reported Measurements
	Type	Total No.		Mean Range	Name	Distance Direction	Mean Range	Mean Range	
<b>Ground Well Water</b> (pCi/liter)	Zn-65	4	30	(0/4)	N/A	N/A	N/A	N/A	0
	Zr-95	4	30	(0/4)	N/A	N/A	N/A	N/A	0
	Nb-95	4	15	(0/4)	N/A	N/A	N/A	N/A	0
	I-131	4	1	(0/4)	N/A	N/A	N/A	N/A	0
	Cs-134	4	15	(0/4)	N/A	N/A	N/A	N/A	0
	Cs-137	4	18	(0/4)	N/A	N/A	N/A	N/A	0
	Ba-140	4	60	(0/4)	N/A	N/A	N/A	N/A	0
	La-140	4	15	(0/4)	N/A	N/A	N/A	N/A	0
	Sr-89	1	-	(0/1)	N/A	N/A	N/A	N/A	0
	Sr-90	1	-	(0/1)	N/A	N/A	N/A	N/A	0
<b>River Water</b> (pCi/liter)	Tritium	4	2000	3638(4/4) (2900-4400)	11	5.80 mi. SE	3638(4/4) (2900-4400)	(0/4)*	0
	Gamma	12							
	Mn-54	12	15	(0/12)	N/A	N/A	N/A	(0/12)*	0
	Fe-59	12	30	(0/12)	N/A	N/A	N/A	(0/12)*	0

Results of surface water taken at Location 09A used as control value for river water.

**TABLE 3-1  
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Medium or Pathway Sampled (Unit)	Analysis		LLD (pCi/unit )	All Indicator Locations	Location with Highest Mean			Control Location	Non- routine
	Type	Total No.		Mean Range	Name	Distance Direction	Mean Range	Mean Range	Reported Measure- ments
River Water (pCi/liter)	Co-58	12	15	(0/12)	N/A	N/A	N/A	(0/12)	0
	Co-60	12	15	(0/12)	N/A	N/A	N/A	(0/12)	0
	Zn-65	12	30	(0/12)	N/A	N/A	N/A	(0/12)	0
	Zr-95	12	30	(0/12)	N/A	N/A	N/A	(0/12)	0
	Nb-95	12	15	(0/12)	N/A	N/A	N/A	(0/12)	0
	I-131	12	1	(0/12)	N/A	N/A	N/A	(0/12)	0
	Cs-134	12	15	(0/12)	N/A	N/A	N/A	(0/12)	0
	Cs-137	12	18	(0/12)	N/A	N/A	N/A	(0/12)	0
	Ba-140	12	60	(0/12)	N/A	N/A	N/A	(0/12)	0
	La-140	12	15	(0/12)	N/A	N/A	N/A	(0/12)	0
	Sr-89	1	-	(0/1)	N/A	N/A	N/A	(0/1)	0
	Sr-90	1	-	(0/1)	N/A	N/A	N/A	(0/1)	0

**TABLE 3-1**  
**RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY**  
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Medium or Pathway Sampled (Unit)	Analysis		LLD (pCi/unit)	All Indicator Locations	Location with Highest Mean			Control Location	Non-routine Reported Measurements
	Type	Total No.		Mean Range	Name	Distance Direction	Mean Range	Mean Range	
Surface Water (pCi/liter)	Tritium	8	2000	3810(4/4) (3300-4500)	08	3.37 mi. SSE	3810(4/4) (3300-4500)	(0/4)	0
	Gamma	24							
	Mn-54	24	15	(0/12)	N/A	N/A	N/A	(0/12)	0
	Fe-59	24	30	(0/12)	N/A	N/A	N/A	(0/12)	0
	Co-58	24	15	(0/12)	N/A	N/A	N/A	(0/12)	0
	Co-60	24	15	(0/12)	N/A	N/A	N/A	(0/12)	0
	Zn-65	24	30	(0/12)	N/A	N/A	N/A	(0/12)	0
	Zr-95	24	30	(0/12)	N/A	N/A	N/A	(0/12)	0
	Nb-95	24	15	(0/12)	N/A	N/A	N/A	(0/12)	0
	I-131	24	1	(0/12)	N/A	N/A	N/A	(0/12)	0
	Cs-134	24	15	(0/12)	N/A	N/A	N/A	(0/12)	0
	Cs-137	24	18	(0/12)	N/A	N/A	N/A	(0/12)	0
	Ba-140	24	60	(0/12)	N/A	N/A	N/A	(0/12)	0

**TABLE 3-1  
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Medium or Pathway Sampled (Unit)	Analysis		LLD (pCi/unit)	All Indicator Locations	Location with Highest Mean			Control Location	Non-routine Reported Measurements
	Type	Total No.		Mean Range	Name	Distance Direction	Mean Range	Mean Range	
Surface Water (pCi/liter)	La-140	24	15	(0/12)	N/A	N/A	N/A	(0/12)	0
	Sr-89	1	-	(0/1)	N/A	N/A	N/A	(0/1)	0
	Sr-90	1	-	(0/1)	N/A	N/A	N/A	(0/1)	0
Sediment Silt (pCi/kg) (dry)	Gamma	6							
	K-40	6	-	12650(4/4) (6300-15700)	11	5.80 mi. SSE	14300(2/2) (13500-15100)	10750(2/2) (9800-11700)	0
	Cs-134	6	150	(0/4)	N/A	N/A	N/A	(0/2)	0
	Cs-137	6	180	(0/4)	N/A	N/A	N/A	86(1/2) (86)	0
	Th-228	6	-	1245(4/4) (930-1890)	08	3.37 mi. SSE	1410(2/2) (930-1890)	630(2/2) (580-680)	0
	Sr-89 (Annually)	3	-	(0/2)	N/A	N/A	N/A	(0/1)	0
	Sr-90 (Annually)	3	-	(0/2)	N/A	N/A	N/A	(0/1)	0
	Gamma	2							
Shoreline Soil (pCi/kg) (dry)	K-40	2	-	2280(2/2) (2250-2310)	08	3.37 mi. SSE	2280(2/2) (2250-2310)	N/A	0
	Th-228	2	-	440(1/2) (440)	08	3.37 mi. SSE	440(1/2) (440)	N/A	0
	Cs-134	2	150	(0/2)	N/A	N/A	N/A	N/A	0
	Cs-137	2	180	134(1/2) (134)	08	3.37 mi. SSE	134(1/2) (134)	N/A	0

**TABLE 3-1  
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Medium or Pathway Sampled (Unit)	Analysis		LLD (pCi/unit)	All Indicator Locations	Location with Highest Mean			Control Location	Non-routine Reported Measurements
	Type	Total No.		Mean Range	Name	Distance Direction	Mean Range	Mean Range	
Shoreline Soil (pCi/kg) (dry)	Sr-89 (Annually)	1	-	(0/1)	N/A	N/A	N/A	N/A	0
	Sr-90 (Annually)	1	-	(0/1)	N/A	N/A	N/A	N/A	0
Fish (pCi/kg) (wet)	Gamma	8							
	K-40	8	-	1430(4/4) (1120-1820)	08	3.37 mi. SSE	1430(4/4) (1120-1820)	1363(4/4) (1150-1610)	0
	Mn-54	8	130	(0/4)	N/A	N/A	N/A	(0/4)	0
	Fe-59	8	260	(0/4)	N/A	N/A	N/A	(0/4)	0
	Co-58	8	130	(0/4)	N/A	N/A	N/A	(0/4)	0
	Co-60	8	130	(0/4)	N/A	N/A	N/A	(0/4)	0
	Zn-65	8	260	(0/4)	N/A	N/A	N/A	(0/4)	0
	Cs-134	8	130	(0/4)	N/A	N/A	N/A	(0/4)	0



### 3.2 Analytical Results of 2007 REMP Samples

Radiological analyses of environmental media characteristically approach and frequently fall below the detection limits of state-of-the-art measurement methods. The data reported in the following tables are strictly counting statistics. The reported error is two times the standard deviation ( $2\sigma$ ) 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 1.5 times the listed  $2\sigma$  error (i.e., the measured value exceeds  $3\sigma$ ).

Because of counting statistics, negative values, zeros and numbers below the Minimum Detectable Level (MDL) are statistically valid pieces of data<sup>1</sup>. For the purposes of this report all valid data are presented in order to indicate any background biases. AREVA Environmental Laboratory's 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 North Anna ODCM.

Data are given according to sample type as indicated below.

1. Gamma Exposure Rate
2. Air Particulates, Gross Beta Radioactivity
3. Air Particulates, Weekly I-131
4. Air Particulates, Quantitative Gamma Spectra
5. Air Particulate Strontium
6. Soil
7. Precipitation
8. Cow Milk
9. Food Products and Vegetation
10. Well Water
11. River Water
12. Surface Water
13. Bottom Sediment/Silt
14. Shoreline Soil
15. Fish

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<sup>1</sup> Analytical results are handled as recommended by HASL ("*Reporting of Analytical Results from HASL*," letter by Leo B. Higginbotham) and NUREG/CR-4007 (Sept. 1984).

**TABLE #3-2**  
**DIRECT RADIATION MEASUREMENTS - SECTOR QUARTERLY TLD RESULTS**

mR/Std. Month (30.4 days) ± 2 Sigma

Page 1 of 4

Station Name	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Quarterly* Average +/- 2 s.d.
	01/03/2007 03/28/2007	03/28/2007 06/28/2007	06/28/2007 09/27/2007	09/27/2007 12/27/2007	
N-1	4.1	4.0	3.5	5.0	4.3 ± 1.8
N-33	4.2	3.4	3.8	6.1	
N-2	2.6	3.2	3.0	4.1	3.1 ± 1.2
N-34	2.6	2.3	2.8	3.8	
NNE-3	6.8	4.2	5.1	7.1	6.0 ± 2.4
NNE-35	6.7	5.5	5.1	7.6	
NNE-4	3.9	5.5	3.9	6.0	4.6 ± 1.6
NNE 36	4.0	4.7	4.0	4.8	
NE-5	4.6	3.9	3.3	5.1	4.5 ± 1.6
NE-37	4.6	3.7	4.7	5.7	
NE-6	3.3	2.5	3.4	4.3	3.4 ± 1.5
NE-38	3.7	2.4	3.4	4.4	
ENE-7	6.4	4.1	5.4	6.2	5.3 ± 2.2
ENE-39	4.6	3.7	5.3	6.7	
ENE-8	2.6	2.2	3.1	4.4	2.9 ± 1.6
ENE-40	2.6	1.8	2.9	3.6	
E-9	5.5	5.3	4.9	6.6	5.3 ± 2.1
E-41	5.4	3.3	4.9	6.5	
E-10	3.9	4.8	4.5	6.2	4.7 ± 1.9
E-42	4.6	3.3	4.3	5.7	
ESE-11	3.7	3.4	4.0	5.1	4.2 ± 1.6
ESE-43	5.1	3.3	4.1	5.2	
ESE-12	3.9	4.9	4.2	5.6	4.7 ± 1.3
ESE-44	4.5	4.3	4.6	5.6	
SE-13	3.6	3.4	4.2	5.5	4.2 ± 1.7
SE-45	4.4	3.0	4.2	5.2	
SE-14	5.8	6.3	6.1	8.0	6.7 ± 1.7
SE-46	6.9	6.6	5.8	7.8	
SSE-15	4.6	4.3	4.7	5.6	4.8 ± 1.3
SSE-47	4.8	3.9	4.8	6.0	
SSE-16	2.7	2.6	2.8	3.8	3.2 ± 1.1
SSE-48	3.3	3.0	3.0	4.1	

\* Average of collocated TLDs.

**TABLE #3-2**  
**DIRECT RADIATION MEASUREMENTS - SECTOR QUARTERLY TLD RESULTS**

mR/Std. Month (30.4 days) ± 2 Sigma

Page 2 of 4

Station Name	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Quarterly* Average +/- 2 s.d.
	01/03/2007 03/28/2007	03/28/2007 06/28/2007	06/28/2007 09/27/2007	09/27/2007 12/27/2007	
S-17	6.7	8.0	8.3	8.7	7.7 ± 1.5
S-49	7.9	6.6	7.4	8.1	
S-18	2.1	2.1	1.3	3.1	2.1 ± 1.3
S-50	2.0	1.3	2.4	2.7	
SSW-19	46.9	18.3	17.2	19.0	31.9 ± 28.9
SSW-51	47.3	39.3	47.3	19.9	
SSW-20	2.0	2.9	1.8	2.8	2.4 ± 1.0
SSW-52	2.3	2.3	2.0	3.3	
SW-21	4.3	4.9	4.4	5.5	4.7 ± 1.1
SW-53	3.9	4.6	4.4	5.5	
SW-22	4.9	4.0	4.3	4.7	4.3 ± 1.1
SW-54	3.7	3.5	4.2	4.9	
WSW-23	4.6	4.6	5.0	6.2	5.3 ± 1.5
WSW-55	5.0	5.8	5.0	6.5	
WSW-24	3.9	3.9	4.2	4.8	4.4 ± 0.8
WSW-56	4.6	4.8	4.3	4.9	
W-25	7.1	5.5	6.5	7.6	6.6 ± 1.7
W-57	7.2	5.4	6.0	7.1	
W-26	2.6	2.5	2.9	3.6	2.9 ± 1.0
W-58	2.5	2.5	2.8	3.7	
WNW-27	2.7	2.8	3.1	4.0	3.1 ± 1.1
WNW-59	2.7	2.5	3.2	3.8	
WNW-28	3.1	2.7	2.8	3.3	3.0 ± 0.6
WNW-60	2.6	3.1	3.1	3.5	
NW-29	5.8	5.3	6.3	7.6	6.2 ± 1.9
NW-61	5.5	5.0	6.8	7.3	
NW-30	2.0	1.6	2.3	3.0	2.2 ± 1.2
NW-62	3.0	1.4	2.3	2.0	
NNW-31	3.4	2.6	3.1	3.9	3.4 ± 1.4
NNW-63	3.0	2.7	3.7	4.7	
NNW-32	3.1	3.0	3.9	5.1	3.8 ± 1.5
NNW-64	4.2	3.0	3.5	4.3	
Average					5.2 ± 5.6

**TABLE #3-2**  
**DIRECT RADIATION MEASUREMENTS - SECTOR QUARTERLY TLD RESULTS**

mR/Std. Month (30.4 days) ± 2 Sigma

Page 3 of 4

Station Name	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Quarterly* Average +/- 2 s.d.
	01/03/2007 03/28/2007	03/28/2007 06/28/2007	06/28/2007 09/27/2007	09/27/2007 12/27/2007	
EP5A-01**	4.7	3.8	4.1	5.9	4.5 +/- 1.6
EP5A-02**	4.2	3.6	4.6	5.4	
EP5F-03**	4.1	3.8	4.7	5.4	4.5 +/- 1.2
EP5F-04**	4.6	3.6	4.2	5.2	
EP5R-05**	4.2	3.5	5.0	4.8	4.3 +/- 1.4
EP5R-06**	4.3	3.5	3.8	5.4	
EP5J-07**	3.6	3.2	3.8	4.8	4.1 +/- 1.8
EP5J-08**	5.1	2.8	4.6	4.9	
EP5P-09**	7.1	5.4	6.8	8.9	7.2 +/- 2.9
EP5P-10**	8.4	5.6	6.6	9.1	
Average					4.9 +/- 1.5
C-1	3.7	3.2	3.1	3.6	3.3 +/- 0.8
C-2	2.6	3.0	3.2	3.8	
C-3	2.8	2.7	2.3	4.1	2.9 +/- 1.4
C-4	2.8	2.3	2.4	4.0	
C-5	2.6	2.8	2.6	3.1	2.6 +/- 0.8
C-6	2.1	2.0	2.3	3.0	
C-7	4.0	3.3	3.3	4.0	3.6 +/- 0.8
C-8	3.8	3.1	3.3	4.1	
Average					3.1 +/- 1.2

\*Average of collocated TLDs

\*\* Emergency Plan TLDs.

**TABLE #3-2**  
**DIRECT RADIATION MEASUREMENTS - SECTOR QUARTERLY TLD RESULTS**

mR/Std. Month (30.4 days) ± 2 Sigma

Page 4 of 4

Station Name	First Quarter 01/03/2007 03/28/2007	Second Quarter 03/28/2007 06/28/2007	Third Quarter 06/28/2007 09/27/2007	Fourth Quarter 09/27/2007 12/27/2007	Location Average +/- 2 s.d.	Annual TLD
STA-01	4.1	3.5	3.3	4.8	3.9 ± 1.4	4.0
STA-02	2.5	1.3	1.6	3.3	2.2 ± 1.8	2.4
STA-03	2.0	1.3	2.3	3.1	2.2 ± 1.5	1.8
STA-04	2.4	1.6	2.5	3.3	2.5 ± 1.4	2.0
STA-05	2.9	3.1	3.7	4.2	3.5 ± 1.2	3.4
STA-05A	2.5	3.3	2.3	3.6	2.9 ± 1.2	2.6
STA-06	4.8	4.0	4.6	5.8	4.8 ± 1.5	4.5
STA-07	4.0	3.2	3.1	4.2	3.6 ± 1.1	3.6
STA-21	2.4	2.1	2.7	3.6	2.7 ± 1.3	3.3
STA-22	5.1	4.3	4.4	4.8	4.7 ± 0.7	4.3
STA-23	4.4	5.2	4.4	5.6	4.9 ± 1.2	5.2
Average ± 2 s.d.					3.4 ± 2.6	3.4 ± 2.2
STA-24*	3.7	3.0	3.0	3.8	3.4 ± 0.9	3.3

\* Control

**Table 3-3**  
**Air Particulate**  
**Gross Beta Radioactivity**  
 [x 10<sup>-3</sup> pCi/m<sup>3</sup>]

Period Ending	Station 01		Station <sup>(1)</sup> 01A		Station 02		Station 03		Station 04		Station 05		Station 05A	
01/03/07	44.5	+/- 5.5	+/-		35.5	+/- 5.0	32.8	+/- 4.9	40.2	+/- 5.2	34.7	+/- 5.0	33.8	+/- 5.0
01/10/07	21.3	+/- 4.7	+/-		23	+/- 4.9	23	+/- 4.8	22.1	+/- 4.8	18.8	+/- 4.7	21	+/- 4.8
01/17/07	21.5	+/- 4.5	+/-		22	+/- 4.7	19.5	+/- 4.5	23.8	+/- 4.7	21	+/- 4.6	24.4	+/- 4.7
01/24/07	15.8	+/- 4.5	+/-		18.3	+/- 4.6	22.6	+/- 4.8	21.6	+/- 4.7	15.2	+/- 4.4	24.4	+/- 4.8
02/01/07	36.6	+/- 2.7	+/-		33.8	+/- 2.6	30.7	+/- 2.5	34.4	+/- 2.6	26.2	+/- 4.7	22.4	+/- 2.3
02/08/07	43.1	+/- 5.4	+/-		35.2	+/- 5.2	35	+/- 5.2	32.7	+/- 5.1	34.1	+/- 5.1	35.3	+/- 5.2
02/15/07	34.3	+/- 5.3	+/-		32.5	+/- 5.3	21.9	+/- 4.7	14.6	+/- 4.3	23.3	+/- 4.7	29	+/- 5.0
02/21/07	28.5	+/- 5.3	+/-		28.6	+/- 5.3	15.2	+/- 4.5	31	+/- 5.3	23.7	+/- 5.0	26.5	+/- 5.2
03/01/07	19.8	+/- 4.0	+/-		18.1	+/- 4.0	19.9	+/- 4.0	18.6	+/- 4.0	20	+/- 4.0	17.5	+/- 3.9
03/07/07	23.2	+/- 5.2	+/-		22.6	+/- 5.2	24.7	+/- 5.3	28.1	+/- 5.5	19.6	+/- 5.0	25.8	+/- 5.3
03/14/07	35	+/- 5.1	+/-		36	+/- 5.1	31.3	+/- 4.9	28.8	+/- 4.8	33.5	+/- 5.0	38.2	+/- 5.2
03/21/07	22	+/- 4.6	+/-		17.9	+/- 4.5	22.2	+/- 4.7	21	+/- 4.6	19.4	+/- 4.5	27.5	+/- 4.9
03/28/07	26.3	+/- 4.7	+/-		25	+/- 4.6	28.9	+/- 4.8	18.8	+/- 4.3	28.8	+/- 4.8	27	+/- 4.7
04/04/07	28.1	+/- 4.8	+/-		28.5	+/- 4.9	29.1	+/- 4.9	9.6	+/- 4.1	24.7	+/- 4.7	34.8	+/- 5.2
04/11/07	22.4	+/- 4.6	+/-		20.8	+/- 4.5	26.4	+/- 4.8	22.3	+/- 4.7	26.8	+/- 4.9	29.6	+/- 5.0
04/18/07	14.2	+/- 4.3	+/-		15.1	+/- 4.4	20.7	+/- 4.6	17.7	+/- 4.5	13	+/- 4.2	14.2	+/- 4.3
04/25/07	22.4	+/- 4.5	+/-		21.9	+/- 4.5	22.6	+/- 4.6	23.2	+/- 4.6	18.9	+/- 4.4	23.9	+/- 4.6
05/02/07	21.3	+/- 4.5	+/-		22.9	+/- 4.6	26.3	+/- 4.7	24.9	+/- 4.7	23.3	+/- 4.6	28.3	+/- 4.8
05/10/07	14.7	+/- 3.5	+/-		15.7	+/- 3.5	17.3	+/- 3.6	16.9	+/- 3.6	16.3	+/- 3.6	19.6	+/- 3.8
05/17/07	18.3	+/- 4.6	+/-		19.5	+/- 4.8	25.1	+/- 4.9	20.3	+/- 4.7	20.2	+/- 4.7	28.7	+/- 5.1
05/23/07	20.3	+/- 4.9	+/-		24.5	+/- 5.1	26.4	+/- 5.2	21.4	+/- 5.0	24.7	+/- 5.2	26.8	+/- 5.3
05/30/07	32	+/- 5.6	+/-		32.7	+/- 5.2	36.5	+/- 5.5	36.2	+/- 5.4	31.4	+/- 5.2	41.7	+/- 5.6
06/07/07	22.7	+/- 4.1	+/-		26.4	+/- 4.3	21.2	+/- 4.0	24.3	+/- 4.2	25.7	+/- 4.2	29.8	+/- 4.4
06/13/07	20	+/- 5.2	+/-		26.7	+/- 5.6	24.8	+/- 5.4	24.8	+/- 5.4	26.5	+/- 5.5	31	+/- 5.8
06/20/07	22.5	+/- 4.6	+/-		24.4	+/- 4.8	23.9	+/- 4.8	23.9	+/- 4.8	25.2	+/- 4.9	22.9	+/- 4.8
06/27/07	28.8	+/- 4.9	+/-		28.6	+/- 4.4	23.5	+/- 4.5	24.9	+/- 4.5	30.3	+/- 4.8	29.5	+/- 4.7

(1) Sampler installed in October 2007  
 \* Station 2 collected 06/28/07

**Table 3-3**  
**Air Particulate**  
**Gross Beta Radioactivity**  
 [ $\times 10^{-3}$  pCi/m<sup>3</sup>]

Period Ending	Station 06		Station 07		Station 21		Station 22		Station 23		Station 24	
01/03/07	36.8	+/- 5.1	35.2	+/- 5.0	28.2	+/- 4.7	31.6	+/- 4.9	35.2	+/- 5.2	32.9	+/- 4.9
01/10/07	19.5	+/- 4.7	19.4	+/- 4.7	19	+/- 4.7	19.6	+/- 4.7	17.6	+/- 4.6	26.7	+/- 5.0
01/17/07	17.7	+/- 4.4	23.9	+/- 4.7	22.7	+/- 4.6	21.7	+/- 4.6	21.8	+/- 4.6	27.1	+/- 4.9
01/24/07	16.1	+/- 4.4	22.8	+/- 4.8	19	+/- 4.6	20.2	+/- 4.6	23.1	+/- 4.8	26.2	+/- 4.9
02/01/07	35	+/- 2.7	24.4	+/- 2.4	31.9	+/- 2.6	35.3	+/- 2.7	32.2	+/- 2.6	39.2	+/- 2.8
02/08/07	30.3	+/- 4.9	34	+/- 5.1	21.4	+/- 4.5	38.5	+/- 5.3	40.9	+/- 5.4	39	+/- 5.4
02/15/07	27.3	+/- 4.9	33	+/- 5.4	30.6	+/- 5.0	28.8	+/- 5.0	27.1	+/- 5.6	28.9	+/- 5.0
02/21/07	31.7	+/- 5.4	36.1	+/- 5.7	31	+/- 5.4	26.7	+/- 5.2	30.3	+/- 5.7	28.8	+/- 5.3
03/01/07	21.6	+/- 4.2	20.6	+/- 4.1	16.5	+/- 3.9	20.4	+/- 4.0	20	+/- 4.0	18.2	+/- 4.0
03/07/07	27.4	+/- 5.4	23.5	+/- 5.2	23.9	+/- 5.3	22.8	+/- 5.2	23	+/- 5.2	22.7	+/- 5.2
03/14/07	27.2	+/- 4.7	30	+/- 4.9	32.8	+/- 5.0	31.2	+/- 4.9	29.6	+/- 4.9	39.5	+/- 5.3
03/21/07	23.1	+/- 4.7	24.7	+/- 4.8	23.5	+/- 4.7	23.5	+/- 4.7	24.2	+/- 4.7	21.3	+/- 4.6
03/28/07	24.3	+/- 4.6	26.2	+/- 4.7	32.3	+/- 5.0	27.4	+/- 4.7	34.3	+/- 5.1	25.6	+/- 4.6
04/04/07	26.1	+/- 4.8	24.8	+/- 4.7	28.4	+/- 4.8	30.6	+/- 4.9	28.1	+/- 4.8	21.7	+/- 4.6
04/11/07	19.1	+/- 4.5	23.3	+/- 4.7	24.3	+/- 4.7	25.8	+/- 4.8	30.5	+/- 5.0	21.9	+/- 4.6
04/18/07	11.3	+/- 4.1	12.5	+/- 4.2	14.7	+/- 4.3	16.4	+/- 4.4	18	+/- 4.5	14.7	+/- 4.3
04/25/07	19.5	+/- 4.4	25.1	+/- 4.6	22.8	+/- 4.6	21.5	+/- 4.5	24	+/- 4.5	21.1	+/- 4.5
05/02/07	26.2	+/- 4.8	20.5	+/- 4.5	15.9	+/- 4.2	32.5	+/- 5.1	23	+/- 4.6	25	+/- 4.7
05/10/07	14.2	+/- 3.4	12.9	+/- 3.4	17.1	+/- 3.6	23.3	+/- 4.0	17.1	+/- 3.6	6.1	+/- 3.2
05/17/07	22.4	+/- 4.8	20.4	+/- 4.8	22.7	+/- 4.8	29.1	+/- 5.1	28.8	+/- 5.2	9.3	+/- 4.1
05/23/07	23.7	+/- 5.1	23.1	+/- 5.0	22.4	+/- 5.0	25.9	+/- 5.2	24.4	+/- 5.1	4.7	+/- 4.1
05/30/07	28.7	+/- 5.1	30	+/- 5.1	27.8	+/- 5.2	29.1	+/- 5.2	38.7	+/- 5.6	10.1	+/- 4.9
06/07/07	22	+/- 4.1	19.7	+/- 3.9	22.8	+/- 4.1	27.9	+/- 4.3	30	+/- 4.5	25	+/- 4.3
06/13/07	24.6	+/- 5.5	24.2	+/- 5.5	18.7	+/- 5.2	25.9	+/- 5.5	22.2	+/- 5.4	20.2	+/- 5.2
06/20/07	22	+/- 4.7	24.5	+/- 4.8	19.4	+/- 4.5	24	+/- 4.7	21.9	+/- 4.6	22.4	+/- 4.8
06/27/07*	26.9	+/- 4.3	25.2	+/- 4.3	25.9	+/- 4.7	23.3	+/- 4.6	24.9	+/- 4.6	21.1	+/- 4.4

\*Stations 06 & 07 collected 06/28/07

**Table 3-3**  
**Air Particulate**  
**Gross Beta Radioactivity**  
**[x 10<sup>-3</sup> pCi/m<sup>3</sup>]**

Period Ending	Station 01			Station <sup>(1)</sup> 01A			Station 02			Station 03			Station 04			Station 05			Station 05A		
07/04/07	39.2	+/-	5.4		+/-		18.4	+/-	4.9	23.2	+/-	4.8	18	+/-	4.5	20.5	+/-	4.6	25.2	+/-	4.8
07/11/07	63.9	+/-	6.2		+/-		30.1	+/-	4.9	35.1	+/-	5.1	33.9	+/-	5.1	42.1	+/-	5.4	33.7	+/-	5.1
07/18/07	38.7	+/-	5.3		+/-		37.1	+/-	5.3	29.1	+/-	5.0	26.7	+/-	4.8	33	+/-	5.1	35.4	+/-	5.2
07/26/07	28.6	+/-	4.5		+/-		22.6	+/-	4.2	21.1	+/-	4.1	23.4	+/-	4.2	24	+/-	4.2	24.4	+/-	4.3
08/01/07	29.5	+/-	5.2		+/-		27.7	+/-	5.0	28.7	+/-	5.1	30.6	+/-	5.3	29.6	+/-	5.2	33.9	+/-	5.4
08/08/07	41.9	+/-	5.4		+/-		45.4	+/-	5.5	43.6	+/-	5.5	35.7	+/-	5.1	51.1	+/-	5.8	52	+/-	5.8
08/15/07	23.8	+/-	4.6		+/-		27.9	+/-	4.8	19	+/-	4.3	22.7	+/-	4.5	24.2	+/-	4.6	24	+/-	4.5
08/23/07	28.6	+/-	4.8		+/-		21.6	+/-	4.3	26.3	+/-	4.4	21.6	+/-	4.6	26.8	+/-	4.9	26.3	+/-	4.9
08/29/07	20.6	+/-	4.7		+/-		23	+/-	5.2	29.9	+/-	5.6	15.2	+/-	4.4	26.3	+/-	4.9	19.8	+/-	4.6
09/05/07	31.1	+/-	5.1		+/-		34.2	+/-	5.2	28.8	+/-	4.9	29.6	+/-	5.0	38.7	+/-	5.4	33.4	+/-	5.2
09/12/07	39.9	+/-	5.4		+/-		40.6	+/-	5.3	42.9	+/-	5.5	38.6	+/-	5.3	41.3	+/-	5.4	42.6	+/-	5.5
09/19/07	24.5	+/-	4.7		+/-		27.1	+/-	4.9	23.4	+/-	4.6	18.9	+/-	4.5	26.7	+/-	4.8	24.4	+/-	4.7
09/27/07	29.8	+/-	4.8		+/-		29.3	+/-	4.3	33.1	+/-	5.0	37.8	+/-	5.1	28.6	+/-	4.6	34.4	+/-	5.0
10/03/07	23.4	+/-	3.3	29.2	+/-	9.1	27.7	+/-	3.8	33.7	+/-	3.6	30.6	+/-	3.6	35.3	+/-	3.7	33.3	+/-	3.6
10/10/07	22.2	+/-	4.5	21.7	+/-	4.6	29.5	+/-	5.0	19.7	+/-	4.5	23.2	+/-	4.7	25.9	+/-	4.8	26.6	+/-	4.8
10/17/07	39.4	+/-	5.5	45.4	+/-	6.0	39.3	+/-	5.5	30	+/-	5.1	33.6	+/-	5.2	38.3	+/-	5.4	32.9	+/-	5.2
10/24/07	46.6	+/-	5.8	44.4	+/-	5.7	41.7	+/-	5.6	39.6	+/-	5.5	40.1	+/-	5.5	41.4	+/-	5.5	46.9	+/-	5.8
11/01/07	20.2	+/-	4.3	17.1	+/-	4.1	17.6	+/-	4.1	17.1	+/-	4.1	14.1	+/-	4.0	16.8	+/-	4.1	21.8	+/-	4.3
11/07/07	30.2	+/-	5.2	33.1	+/-	5.3	27.4	+/-	5.0	29.3	+/-	5.1	35.4	+/-	5.4	22.7	+/-	4.7	32.6	+/-	5.3
11/15/07	50.6	+/-	5.4	49.1	+/-	5.3	41.8	+/-	5.0	41.6	+/-	5.0	46.5	+/-	5.2	47.9	+/-	5.2	41.5	+/-	5.0
11/21/07	40.1	+/-	5.7	34.0	+/-	5.5	24.1	+/-	5.2	27.6	+/-	5.2	27.9	+/-	5.3	22.8	+/-	5.0	33.2	+/-	5.5
11/28/07	32.3	+/-	5.0	35.6	+/-	5.1	27.2	+/-	4.6	25.9	+/-	4.6	30.7	+/-	4.8	30.2	+/-	4.8	27.6	+/-	4.7
12/05/07	42.5	+/-	5.4	35.0	+/-	5.0	32.4	+/-	4.9	33.4	+/-	5.0	39.3	+/-	5.3	28.8	+/-	4.7	38.2	+/-	5.2
12/12/07	43	+/-	5.4	46.1	+/-	5.5	43.5	+/-	5.4	40.2	+/-	5.3	36.5	+/-	5.0	42.5	+/-	5.3	32	+/-	4.9
12/19/07	28	+/-	4.7	22.3	+/-	4.4	23.1	+/-	4.5	18.3	+/-	4.2	19.2	+/-	4.2	26	+/-	4.6	25.4	+/-	4.6
12/26/07	32.1	+/-	5.1	53.3	+/-	5.9	50.5	+/-	5.7	39.6	+/-	5.3	40.7	+/-	5.4	43.1	+/-	5.4	45.6	+/-	5.6

(1) Sampler installed October 2007

08/22/2007 Stations 02 & 03 sampled on 08/23/07

09/26/2007 Station 02 sampled on 09/27/07



(2)

**Table 3-3**  
**Air Particulate**  
**Gross Beta Radioactivity**  
 [x 10<sup>-3</sup> pCi/m<sup>3</sup>]

Period Ending	Station 06		Station 07		Station 21		Station 22		Station 23		Station 24	
07/04/07	18.3 +/-	4.9	18.2 +/-	5.0	20.8 +/-	4.6	19.3 +/-	4.5	21.6 +/-	4.8	19.4 +/-	4.5
07/11/07	31.5 +/-	5.0	33.3 +/-	5.1	31.1 +/-	4.9	37.2 +/-	5.2	33.9 +/-	5.1	34.3 +/-	5.1
07/18/07	32.9 +/-	5.1	32 +/-	5.1	30.7 +/-	5.0	27 +/-	4.8	37.1 +/-	5.4	31 +/-	5.0
07/26/07	20.5 +/-	4.1	21.5 +/-	4.1	22.4 +/-	4.2	21.7 +/-	4.1	21.5 +/-	4.1	22 +/-	4.2
08/01/07	27.8 +/-	5.1	25.7 +/-	4.9	28.2 +/-	5.1	27.8 +/-	5.1	32.7 +/-	5.3	27.9 +/-	5.2
08/08/07	44.9 +/-	5.5	43.4 +/-	5.5	37.4 +/-	5.2	48.5 +/-	5.7	46.6 +/-	5.6	43.4 +/-	5.5
08/15/07	17.9 +/-	4.2	21.3 +/-	4.4	1720* +/-	70.0	28.6 +/-	5.1	22.1 +/-	4.5	22.1 +/-	4.4
08/23/07	25.1 +/-	4.9	24.2 +/-	4.9	18.5 +/-	4.9	27.9 +/-	4.8	21.9 +/-	4.3	21.1 +/-	4.6
08/29/07	14.5 +/-	4.2	17 +/-	4.3	23 +/-	5.3	22.7 +/-	4.8	24.9 +/-	5.3	21 +/-	3.6
09/05/07	48.3 +/-	5.3	39.6 +/-	5.4	33.3 +/-	5.1	37.9 +/-	5.3	39.3 +/-	5.5	36.6 +/-	5.3
09/12/07	37.2 +/-	5.3	39.1 +/-	5.3	34.6 +/-	5.2	1.5 +/-	3.5	40.3 +/-	5.3	36.2 +/-	5.3
09/19/07	24.8 +/-	4.8	25.1 +/-	4.8	28.4 +/-	4.9	70.2 +/-	6.6	23.4 +/-	4.7	28.4 +/-	4.9
09/27/07	32.1 +/-	4.8	36.8 +/-	5.0	30.7 +/-	4.8	41.4 +/-	4.9	32.2 +/-	4.5	27.4 +/-	4.6
10/03/07	30.8 +/-	3.6	40.7 +/-	3.9	34.4 +/-	3.7	31 +/-	4.0	30 +/-	3.9	28.8 +/-	3.5
10/10/07	22.6 +/-	4.6	20.8 +/-	4.6	17.6 +/-	4.4	26.3 +/-	4.7	34.2 +/-	4.9	31.9 +/-	5.0
10/17/07	35.1 +/-	5.3	31.9 +/-	5.2	34.2 +/-	5.3	33.2 +/-	5.2	33 +/-	5.2	36 +/-	5.3
10/24/07	39.9 +/-	5.4	43.2 +/-	5.6	42.4 +/-	5.6	38.7 +/-	5.4	40 +/-	5.5	38.9 +/-	5.4
11/01/07	18.1 +/-	4.2	15.7 +/-	4.1	22 +/-	4.3	17.9 +/-	4.1	17.3 +/-	4.1	21.8 +/-	4.3
11/07/07	23.2 +/-	4.8	21.8 +/-	4.7	26.3 +/-	5.0	31.6 +/-	5.3	30.4 +/-	5.3	27.6 +/-	5.0
11/15/07	46.7 +/-	5.2	31.2 +/-	4.6	44.1 +/-	5.1	48 +/-	5.3	44.4 +/-	5.0	41.6 +/-	5.0
11/21/07	32.7 +/-	5.6	25.2 +/-	5.2	27.2 +/-	5.1	33.1 +/-	5.4	24 +/-	5.1	27.9 +/-	5.4
11/28/07	28.3 +/-	4.7	24.9 +/-	4.5	32.8 +/-	5.0	25 +/-	4.6	31.5 +/-	4.8	26.3 +/-	4.5
12/05/07	34.9 +/-	5.0	26.9 +/-	4.6	31.1 +/-	4.8	35.8 +/-	5.1	31.2 +/-	4.9	23.2 +/-	4.4
12/12/07	47.4 +/-	5.6	43.1 +/-	5.4	35.4 +/-	5.0	40.9 +/-	5.3	33.2 +/-	4.9	43 +/-	5.3
12/19/07	18.1 +/-	4.2	23.2 +/-	4.4	21.4 +/-	4.4	24.7 +/-	4.5	26.9 +/-	4.7	14.8 +/-	4.0
12/26/07	40.4 +/-	5.3	30.6 +/-	4.9	44 +/-	5.5	32.5 +/-	5.1	40.5 +/-	5.5	38.8 +/-	5.3

08/15/2007 Station 21 had low volume.

08/22/2007 Stations 21 & 23 sampled on 08/23/07

09/26/2007 Stations 22 & 23 sampled on 09/27/07

\* Not included in average. Greater than 10 times average. Gamma spectrometry performed on filter.

**Table 3-4**  
**Airborne Iodine**  
**I - 131**  
**[x 10<sup>-3</sup> pCi/m<sup>3</sup>]**

Period Ending	Station 01		Station <sup>(1)</sup> 01A		Station 02		Station 03		Station 04		Station 05		Station 05A						
01/03/07	-3	+/-	14	+/-	-2	+/-	13	-2	+/-	16	11	+/-	15	2	+/-	15	-6	+/-	17
01/10/07	0	+/-	13	+/-	-3	+/-	15	-3	+/-	14	-6	+/-	15	-2	+/-	17	2	+/-	20
01/17/07	-8	+/-	16	+/-	6	+/-	17	5	+/-	12	-9	+/-	16	3	+/-	18	11	+/-	17
01/24/07	6	+/-	15	+/-	-8	+/-	16	-9	+/-	17	-9	+/-	16	-14	+/-	17	-3	+/-	16
02/01/07	0	+/-	16	+/-	5	+/-	14	5	+/-	12	0	+/-	13	-6	+/-	24	-3	+/-	12
02/08/07	1	+/-	14	+/-	4	+/-	14	3	+/-	14	7	+/-	14	4	+/-	11	8	+/-	14
02/15/07	-6	+/-	16	+/-	-4	+/-	15	-6	+/-	14	-9	+/-	13	0	+/-	15	-7	+/-	15
02/21/07	-2	+/-	20	+/-	2	+/-	18	9	+/-	19	2	+/-	17	0	+/-	21	-14	+/-	23
03/01/07	-3	+/-	13	+/-	12	+/-	15	-4	+/-	11	-5	+/-	12	3	+/-	13	-1	+/-	14
03/07/07	-11	+/-	13	+/-	2	+/-	14	5	+/-	16	-8	+/-	14	6	+/-	14	3	+/-	12
03/14/07	-2	+/-	17	+/-	6	+/-	16	-6	+/-	14	-8	+/-	17	-2	+/-	15	-2	+/-	15
03/21/07	-3	+/-	17	+/-	-2	+/-	18	7	+/-	18	2	+/-	18	3	+/-	15	-12	+/-	18
03/28/07	-8	+/-	15	+/-	-5	+/-	19	-25	+/-	19	-8	+/-	16	-3	+/-	18	8	+/-	16
04/04/07	1	+/-	13	+/-	-4	+/-	15	4	+/-	13	-15	+/-	14	6	+/-	14	-6	+/-	14
04/11/07	5	+/-	14	+/-	5	+/-	16	9	+/-	17	3	+/-	17	-8	+/-	18	-13	+/-	19
04/18/07	5	+/-	14	+/-	-8	+/-	13	-2	+/-	14	2	+/-	12	6	+/-	15	-9	+/-	17
04/25/07	-2	+/-	17	+/-	17	+/-	15	12	+/-	18	3	+/-	14	-13	+/-	13	-8	+/-	17
05/02/07	17	+/-	21	+/-	6	+/-	19	-2	+/-	19	-7	+/-	17	-13	+/-	19	-2	+/-	18
05/10/07	9	+/-	16	+/-	11	+/-	14	-12	+/-	15	3	+/-	16	-2	+/-	15	3	+/-	11
05/17/07	-6	+/-	14	+/-	-9	+/-	18	9	+/-	16	-1	+/-	15	3	+/-	14	-6	+/-	13
05/23/07	2	+/-	15	+/-	2	+/-	18	-9	+/-	22	-2	+/-	15	11	+/-	16	-31	+/-	18
05/30/07	-2	+/-	14	+/-	2	+/-	16	-16	+/-	17	-7	+/-	15	7	+/-	13	12	+/-	18
06/07/07	1	+/-	15	+/-	4	+/-	13	-4	+/-	13	9	+/-	16	-14	+/-	13	-3	+/-	11
06/13/07	-4	+/-	12	+/-	0.3	+/-	9.5	4	+/-	16	-12	+/-	14	-3	+/-	12	-5	+/-	13
06/20/07	3	+/-	22	+/-	5	+/-	24	-29	+/-	25	0	+/-	27	8	+/-	29	0	+/-	29
06/27/07*	-12	+/-	24	+/-	13	+/-	20	20	+/-	26	-7	+/-	25	2	+/-	20	0	+/-	27

(1) Sampler installed October 2007

\*Station 2 Collected 06/28/07

**Table 3-4**  
**Airborne Iodine**  
**I - 131**  
**[x 10<sup>-3</sup> pCi/m<sup>3</sup>]**

Period Ending	Station 06		Station 07		Station 21		Station 22		Station 23		Station 24	
01/03/07	-3 +/-	13	-3 +/-	17	5 +/-	15	-3 +/-	14	-2 +/-	17	-17 +/-	16
01/10/07	3 +/-	15	-2 +/-	15	5 +/-	16	3 +/-	14	0 +/-	18	16 +/-	18
01/17/07	-8 +/-	16	-11 +/-	14	3 +/-	15	-3 +/-	18	-6 +/-	18	6 +/-	16
01/24/07	-6 +/-	15	0 +/-	18	5 +/-	17	9 +/-	19	3 +/-	14	-8 +/-	14
02/01/07	-3 +/-	14	3 +/-	13	10 +/-	12	0 +/-	11	3 +/-	12	1 +/-	14
02/08/07	1 +/-	10	1 +/-	16	9 +/-	15	-6 +/-	12	-1 +/-	12	-1 +/-	15
02/15/07	3 +/-	12	-12 +/-	16	1 +/-	17	16 +/-	16	3 +/-	16	-1 +/-	13
02/21/07	-17 +/-	19	6 +/-	20	4 +/-	21	4 +/-	21	-13 +/-	27	12 +/-	21
03/01/07	-4 +/-	13	-1 +/-	12	-3 +/-	14	3 +/-	13	-9 +/-	14	7 +/-	15
03/07/07	11 +/-	16	-1 +/-	18	-7 +/-	15	15 +/-	18	-11 +/-	16	-7 +/-	15
03/14/07	-6 +/-	16	5 +/-	17	5 +/-	14	16 +/-	14	-3 +/-	14	-6 +/-	13
03/21/07	-14 +/-	16	2 +/-	13	-2 +/-	15	-3 +/-	17	0 +/-	17	11 +/-	17
03/28/07	-11 +/-	14	8 +/-	17	3 +/-	18	16 +/-	15	3 +/-	14	6 +/-	16
04/04/07	-1.5 +/-	10	3 +/-	13	0 +/-	16	-3 +/-	16	-1 +/-	15	5 +/-	13
04/11/07	5 +/-	16	3 +/-	14	-5 +/-	16	-8 +/-	14	5 +/-	17	8 +/-	15
04/18/07	3 +/-	15	-8 +/-	18	0 +/-	16	8 +/-	15	-16 +/-	16	6 +/-	16
04/25/07	0 +/-	16	12 +/-	18	2 +/-	18	-14 +/-	19	2 +/-	17	3 +/-	19
05/02/07	-8 +/-	16	4 +/-	16	2 +/-	16	-2 +/-	18	21 +/-	16	2 +/-	15
05/10/07	12 +/-	16	14 +/-	15	-8 +/-	15	6 +/-	16	11 +/-	12	25 +/-	29
05/17/07	8 +/-	17	10 +/-	14	-9 +/-	13	7 +/-	15	3 +/-	17	-3 +/-	10
05/23/07	4 +/-	18	4 +/-	13	-13 +/-	17	-31 +/-	18	18 +/-	15	4 +/-	16
05/30/07	-7 +/-	18	3 +/-	16	-7 +/-	17	9 +/-	15	-2 +/-	18	8 +/-	21
06/07/07	-14 +/-	15	3 +/-	14	-4 +/-	13	-4 +/-	14	-5 +/-	12	2 +/-	15
06/13/07	4 +/-	12	-6 +/-	16	-5 +/-	14	-11 +/-	15	0 +/-	14	-3 +/-	16
06/20/07	-16 +/-	24	-5 +/-	24	-8 +/-	25	8 +/-	20	-16 +/-	21	5 +/-	21
06/27/07*	6 +/-	18	-6 +/-	20	16 +/-	22	9 +/-	24	-14 +/-	25	7 +/-	24

\*Stations 06 & 07 collected 06/28/07

**Table 3-4**  
**Airborne Iodine**  
**I - 131**  
**[x 10<sup>-3</sup> pCi/m<sup>3</sup>]**

Period Ending	Station 01		Station <sup>(1)</sup> 01A		Station 02		Station 03		Station 04		Station 05		Station 05A								
07/04/07	0	+/-	21	+/-	15	+/-	19	-9	+/-	20	-13	+/-	25	3	+/-	31	7	+/-	19		
07/11/07	-2	+/-	16	+/-	9	+/-	21	6	+/-	15	-2	+/-	15	-13	+/-	16	6	+/-	16		
07/18/07	4	+/-	18	+/-	15	+/-	15	2	+/-	16	0	+/-	20	-7	+/-	20	2	+/-	18		
07/26/07	0	+/-	14	+/-	0	+/-	15	7	+/-	13	-10	+/-	12	-3	+/-	18	9	+/-	13		
08/01/07	-18	+/-	23	+/-	-6	+/-	21	-9	+/-	24	-19	+/-	23	-9	+/-	24	-9	+/-	26		
08/08/07	2	+/-	13	+/-	-6	+/-	14	-12	+/-	13	-3	+/-	14	2	+/-	16	8	+/-	14		
08/15/07	13	+/-	14	+/-	-9	+/-	17	6	+/-	15	-13	+/-	15	0	+/-	15	8	+/-	17		
08/22/07	6	+/-	14	+/-	0	+/-	11	13	+/-	12	-2	+/-	13	13	+/-	19	-17	+/-	13		
08/29/07	2	+/-	17	+/-	10	+/-	20	-21	+/-	18	6	+/-	14	-15	+/-	18	-8	+/-	19		
09/05/07	-2	+/-	17	+/-	-5	+/-	16	0	+/-	14	2	+/-	19	17	+/-	20	-9	+/-	17		
09/12/07	-2	+/-	15	+/-	10	+/-	15	11	+/-	18	11	+/-	15	8	+/-	13	16	+/-	15		
09/19/07	4	+/-	12	+/-	-13	+/-	15	-10	+/-	12	-1	+/-	16	-1	+/-	15	-1	+/-	15		
09/26/07	0	+/-	15	+/-	9	+/-	15	-13	+/-	20	2	+/-	14	-14	+/-	20	2	+/-	17		
10/03/07	-8	+/-	14	5	+/-	36	0	+/-	19	3	+/-	16	-10	+/-	15	-2	+/-	13	-3	+/-	16
10/10/07	7	+/-	14	16	+/-	15	-6	+/-	14	-1	+/-	16	-12	+/-	14	-3	+/-	13	6	+/-	15
10/17/07	0	+/-	16	2	+/-	14	-1	+/-	12	0	+/-	17	-3	+/-	15	0	+/-	14	-1	+/-	12
10/24/07	-6	+/-	14	3	+/-	12	-4	+/-	12	-10	+/-	14	-4	+/-	13	9	+/-	15	-9	+/-	14
11/01/07	0	+/-	12	0	+/-	13	10	+/-	13	9	+/-	15	-6	+/-	13	-9	+/-	17	1	+/-	14
11/07/07	-5	+/-	12	0	+/-	14	0	+/-	14	-5	+/-	14	21	+/-	14	-9	+/-	15	-2	+/-	15
11/15/07	-7	+/-	17	-2	+/-	16	14	+/-	19	-5	+/-	17	2	+/-	18	14	+/-	18	7	+/-	13
11/21/07	0	+/-	22	-11	+/-	22	-14	+/-	23	-14	+/-	20	25	+/-	25	-14	+/-	28	0	+/-	25
11/28/07	-4	+/-	22	-14	+/-	21	-10	+/-	17	-10	+/-	19	2	+/-	16	-3	+/-	19	10	+/-	21
12/05/07	14	+/-	17	5	+/-	19	-6	+/-	17	-13	+/-	17	0	+/-	17	-13	+/-	17	6	+/-	18
12/12/07	6	+/-	26	-2	+/-	19	-28	+/-	24	0	+/-	25	16	+/-	21	18	+/-	20	4	+/-	22
12/19/07	-26	+/-	26	-8	+/-	26	2	+/-	27	-10	+/-	25	-4	+/-	28	-8	+/-	28	8	+/-	29
12/26/07	9	+/-	26	20	+/-	26	-17	+/-	20	-7	+/-	24	4	+/-	20	4	+/-	21	-4	+/-	21

(1) Sampler installed October 2007

08/22/2007 Stations 02 & 03 sampled on 08/23/07

09/26/2007 Station 02 sampled on 09/27/07

**Table 3-4**  
**Airborne Iodine**  
**I - 131**  
**[x 10<sup>-3</sup> pCi/m<sup>3</sup>]**

Period Ending	Station 06		Station 07		Station 21		Station 22		Station 23		Station 24							
07/04/07	-20	+/-	25	6	+/-	24	2	+/-	17	-15	+/-	22	4	+/-	20	-2	+/-	22
07/11/07	17	+/-	19	-6	+/-	16	2	+/-	20	-11	+/-	16	6	+/-	16	13	+/-	17
07/18/07	-2	+/-	22	-2	+/-	17	0	+/-	18	11	+/-	16	10	+/-	17	2	+/-	19
07/26/07	12	+/-	14	-3	+/-	15	-2	+/-	12	-3	+/-	17	11	+/-	15	-4	+/-	14
08/01/07	-15	+/-	20	18	+/-	20	25	+/-	28	-16	+/-	24	-21	+/-	22	-13	+/-	20
08/08/07	6	+/-	16	2	+/-	17	11	+/-	15	-6	+/-	15	3	+/-	13	8	+/-	15
08/15/07	5	+/-	12	-10	+/-	14	90	+/-	2300	-5	+/-	15	10	+/-	15	16	+/-	15
08/22/07	3	+/-	10	3	+/-	10	-2	+/-	13	0	+/-	17	7	+/-	13	-5	+/-	15
08/29/07	12	+/-	19	-10	+/-	19	4	+/-	22	-12	+/-	19	6	+/-	20	8	+/-	20
09/05/07	10	+/-	33	0	+/-	15	-14	+/-	14	-7	+/-	16	-4	+/-	14	3	+/-	15
09/12/07	7	+/-	15	-3	+/-	15	7	+/-	18	-7	+/-	16	-10	+/-	14	7	+/-	15
09/19/07	0	+/-	12	7	+/-	14	0	+/-	15	12	+/-	16	-1	+/-	12	-1	+/-	14
09/26/07	2	+/-	17	-7	+/-	18	6	+/-	18	2	+/-	14	-6	+/-	17	-19	+/-	18
10/03/07	-7	+/-	17	0	+/-	16	6	+/-	16	16	+/-	17	11	+/-	17	5	+/-	21
10/10/07	-7	+/-	12	0	+/-	17	7	+/-	16	-1	+/-	13	3	+/-	13	1	+/-	13
10/17/07	-4	+/-	16	-3	+/-	15	6	+/-	14	-13	+/-	14	-1	+/-	14	16	+/-	16
10/24/07	3	+/-	12	-7	+/-	13	-7	+/-	15	6	+/-	14	-1	+/-	16	3	+/-	15
11/01/07	-4	+/-	16	1	+/-	13	4	+/-	13	-3	+/-	17	-3	+/-	15	3	+/-	16
11/07/07	1	+/-	16	-7	+/-	15	5	+/-	14	-10	+/-	16	-1	+/-	17	-11	+/-	16
11/15/07	0	+/-	12	-5	+/-	18	12	+/-	17	-7	+/-	11	0	+/-	19	6	+/-	19
11/21/07	-3	+/-	27	6	+/-	24	-8	+/-	29	8	+/-	16	-17	+/-	25	-3	+/-	22
11/28/07	3	+/-	18	-2	+/-	21	-7	+/-	20	-2	+/-	18	2	+/-	20	-5	+/-	16
12/05/07	6	+/-	15	-11	+/-	18	0	+/-	19	-5	+/-	19	3	+/-	18	5	+/-	17
12/12/07	4	+/-	21	0	+/-	23	-2	+/-	23	-8	+/-	21	6	+/-	19	0	+/-	19
12/19/07	6	+/-	29	12	+/-	28	8	+/-	28	14	+/-	23	-8	+/-	27	17	+/-	27
12/26/07	7	+/-	19	24	+/-	24	-11	+/-	22	-23	+/-	22	-9	+/-	23	4	+/-	27

08/15/2007 Station 21 had low volume.

08/22/2007 Stations 21 & 23 sampled on 08/23/07

09/26/2007 Stations 22 & 23 sampled on 09/27/07

Table 3-5

Airborne Particulate  
Gamma Spectra and Strontium  
[x 10<sup>-3</sup> pCi/m<sup>3</sup>]

Quarter 1

Sampling Location	Be-7		K-40		Cs-134		Cs-137	
01	160	+/- 32	-2.4	+/- 8.4	-0.25	+/- 0.62	0.39	+/- 0.69
01A*		+/-		+/-		+/-		+/-
02	150	+/- 33	-8.9	+/- 9.4	0.18	+/- 0.71	0.09	+/- 0.73
03	150	+/- 34	1.7	+/- 8.9	-0.13	+/- 0.73	-0.29	+/- 0.69
04	129	+/- 33	-13.0	+/- 8.0	-0.55	+/- 0.71	0.29	+/- 0.72
05	138	+/- 32	-8.2	+/- 8.7	-0.25	+/- 0.73	0.37	+/- 0.88
05A	135	+/- 34	0.2	+/- 7.6	-0.06	+/- 0.56	-0.68	+/- 0.70
06	112	+/- 29	-6	+/- 10	0.04	+/- 0.52	0.09	+/- 0.73
07	136	+/- 33	-1	+/- 8.9	-0.33	+/- 0.78	0.15	+/- 0.47
21	140	+/- 32	-2	+/- 10	-0.47	+/- 0.61	0.05	+/- 0.51
22	132	+/- 33	-9.3	+/- 6.7	-0.38	+/- 0.50	0.71	+/- 0.58
23	156	+/- 35	-8.2	+/- 6.3	0.52	+/- 0.76	0.8	+/- 0.68
24	140	+/- 36	-12.9	+/- 8.9	0.17	+/- 0.64	0.09	+/- 0.72

Quarter 2

Sampling Location	Be-7		K-40		Cs-134		Cs-137		Sr-89		Sr-90	
01	163	+/- 38	10	+/- 11	-0.23	+/- 0.77	-0.08	+/- 0.62	-20.3	+/- 8.8	-0.3	+/- 1.8
01A*		+/-		+/-		+/-		+/-	x	+/- y	x	+/- y
02	174	+/- 39	-6.4	+/- 8.6	0.14	+/- 0.48	-0.45	+/- 0.57	-9.1	+/- 7.0	-0.4	+/- 1.4
03	210	+/- 42	-5.2	+/- 8.3	-0.44	+/- 0.75	0.02	+/- 0.65	-18	+/- 10	-1	+/- 2.2
04	196	+/- 40	5	+/- 11	-0.37	+/- 0.59	-0.71	+/- 0.81	-16.1	+/- 7.7	-0.7	+/- 1.6
05	165	+/- 40	0	+/- 10	0.29	+/- 0.69	-0.09	+/- 0.68	-15.2	+/- 8.7	-0.1	+/- 1.7
05A	218	+/- 43	6	+/- 11	-0.01	+/- 0.77	-0.14	+/- 0.45	-9.7	+/- 9.6	-0.7	+/- 2.1
06	164	+/- 37	0.3	+/- 9.2	0.61	+/- 0.73	-0.03	+/- 0.080	-24.5	+/- 9.5	-1.9	+/- 1.8
07	130	+/- 37	2	+/- 10	0.41	+/- 0.78	-0.28	+/- 0.68	-11.8	+/- 8.7	-0.6	+/- 1.7
21	148	+/- 37	3	+/- 9.4	-0.16	+/- 0.60	0.02	+/- 0.65	-21	+/- 10	-0.4	+/- 2.0
22	175	+/- 41	5.7	+/- 9.5	0.49	+/- 0.63	-0.09	+/- 0.68	-13	+/- 11	-0.3	+/- 2.2
23	202	+/- 43	0.2	+/- 8.5	-0.24	+/- 0.70	0.2	+/- 0.70	-15	+/- 13	-1	+/- 2.6
24	150	+/- 38	1.7	+/- 9.5	-0.06	+/- 0.60	0.24	+/- 0.61	-22.9	+/- 9.9	-0.3	+/- 2.0

\* Sampler installed October 2007  
Sr-89/90 sampled in 2nd Qtr.

**Table 3-5**  
**Airborne Particulate and Strontium**  
**Gamma Spectra**  
 [x 10<sup>-3</sup> pCi/m<sup>3</sup>]

Quarter 3

Sampling Location	Be-7		K-40		Cs-134		Cs-137		
01	152	+/- 56	14	+/- 15	0.28	+/- 0.96	0.8	+/- 1.1	
01A*		+/-		+/-		+/-		+/-	
02	179	+/- 53	2	+/- 15	0.28	+/- 0.96	-0.06	+/- 0.78	
03	177	+/- 44	2	+/- 11	0.25	+/- 0.83	0.43	+/- 0.70	
04	124	+/- 31	-2.3	+/- 7.6	0	+/- 0.53	-0.22	+/- 0.64	
05	146	+/- 46	0	+/- 11	0.19	+/- 0.82	-0.17	+/- 0.77	
05A	125	+/- 38	-3.3	+/- 7.2	-0.9	+/- 1.1	-0.15	+/- 0.30	
06	119	+/- 36	-1	+/- 5.6	0.37	+/- 0.83	0.31	+/- 0.76	
07	147	+/- 40	0	+/- 12	-0.34	+/- 0.72	-0.2	+/- 0.59	
21	168	+/- 36	-2.5	+/- 8	0.29	+/- 0.71	0.04	+/- 0.53	
22	205	+/- 46	0	+/- 11	0.001	+/- 0.067	0	+/- 0.69	
23	125	+/- 38	2	+/- 10	0.16	+/- 0.69	0.29	+/- 0.59	
24	130	+/- 38	10	+/- 12	-0.48	+/- 0.78	0.43	+/- 0.70	

Quarter 4

Sampling Location	Be-7		K-40		Cs-134		Cs-137		
01	110	+/- 45	15	+/- 16	-0.45	+/- 0.92	-0.23	+/- 0.74	
01A	111	+/- 49	6	+/- 13	0.63	+/- 0.88	-0.08	+/- 0.85	
02	117	+/- 46	-5	+/- 13	0.07	+/- 0.88	-0.1	+/- 0.93	
03	167	+/- 48	-1	+/- 11	-0.12	+/- 0.79	-0.4	+/- 0.82	
04	109	+/- 46	-5.0	+/- 11	0.3	+/- 1.3	-0.08	+/- 0.80	
05	151	+/- 48	-5	+/- 13	0.5	+/- 1.1	0.5	+/- 1.0	
05A	116	+/- 40	6.0	+/- 11	1.2	+/- 1.1	-0.58	+/- 0.89	
06	148	+/- 50	-8.3	+/- 4.6	0.6	+/- 0.83	-0.25	+/- 0.88	
07	91	+/- 40	-5	+/- 11	-0.12	+/- 0.79	0.7	+/- 1.0	
21	113	+/- 40	1	+/- 10	0.43	+/- 0.90	-0.05	+/- 0.65	
22	109	+/- 43	2	+/- 15	-0.08	+/- 1.2	0.43	+/- 0.71	
23	158	+/- 50	-6	+/- 6.7	-0.63	+/- 0.99	0.91	+/- 0.75	
24	91	+/- 41	-1	+/- 13	0.76	+/- 0.76	0.43	+/- 0.70	

\*Sampler installed October 2007

**Table 3-5**  
**Airborne Particulate and Strontium**  
**Gamma Spectra**  
**[x 10<sup>-3</sup> pCi/m<sup>3</sup>]**  
**Station Averages**

Sampling Location	Be-7	K-40	Cs-134	Cs-137
01	146.3 +/- 42.8			
01A	111.0 +/- 12.3			
02	155.0 +/- 42.8			
03	176.0 +/- 42.0			
04	139.5 +/- 37.5			
05	150.0 +/- 41.5			
05A	148.5 +/- 38.8			
06	135.8 +/- 38.0			
07	126.0 +/- 37.5			
21	154.0 +/- 34.3			
22	155.3 +/- 40.8			
23	160.3 +/- 41.5			
Average	148.8 +/- 37.5			
Control Location				
24	127.8 +/- 41.5			

Sampling Location	Be-7	K-40	Cs-134	Cs-137
21*	6700 +/- 2300	700 +/- 3400	200 +/- 180	120 +/- 180

\* AP filter analysis of 08/15/07 sample due to high gross beta.



**Table 3-6**  
Soil  
Gamma Spectra and Strontium  
[pCi/kg]

Station	Sr-89			Sr-90			Be-7			K-40			Cs-134			Cs-137			Th-228		
01	-50	+/-	270	-60	+/-	130	200	+/-	300	16000	+/-	1500	-7	+/-	29	43	+/-	36	440	+/-	140
02	-660	+/-	560	120	+/-	150	60	+/-	210	9110	+/-	760	-43	+/-	86	300	+/-	45	551	+/-	99
03	-200	+/-	200	-20	+/-	120	180	+/-	310	5230	+/-	920	-29	+/-	29	325	+/-	68	620	+/-	150
04	-410	+/-	540	50	+/-	140	180	+/-	300	4670	+/-	860	-17	+/-	27	186	+/-	63	690	+/-	150
05*	-190	+/-	230	390	+/-	150	850	+/-	280	14230	+/-	890	1	+/-	73	15	+/-	22	585	+/-	82
05A	-260	+/-	220	70	+/-	120	20600	+/-	1800	7900	+/-	1700	-33	+/-	74	17	+/-	75	720	+/-	320
06	-470	+/-	350	200	+/-	140	550	+/-	600	11200	+/-	1600	20	+/-	46	75	+/-	62	1420	+/-	250
07	30	+/-	370	20	+/-	140	70	+/-	300	4860	+/-	810	0	+/-	29	80	+/-	56	1330	+/-	150
21	-270	+/-	380	80	+/-	130	540	+/-	430	23800	+/-	1900	6	+/-	42	-55	+/-	45	1080	+/-	210
22	-110	+/-	460	60	+/-	120	210	+/-	400	17100	+/-	1500	-21	+/-	41	25	+/-	54	2170	+/-	200
23	190	+/-	310	110	+/-	110	-110	+/-	430	20800	+/-	1700	58	+/-	48	75	+/-	72	2010	+/-	210
Average				390	+/-	132	10725	+/-	487	12264	+/-	1285				270	+/-	54	1056	+/-	178
										Control Location											
24	-190	+/-	350	-10	+/-	120	-310	+/-	400	5900	+/-	1100	-8	+/-	36	3	+/-	52	1110	+/-	210

05\* Re-analysis of Sample performed 10/14/07 Sr-89: -240+/-290 Sr-90: 410+/-160

**Table 3-7**  
**Precipitation**  
**Gamma Spectra**  
**[pCi/L]**

06/28/2007

Sampling Location	Be-7	K-40	Cr-51	Mn-54	Fe-59	Co-58	Co-60
01A	14 +/- 10	7 +/- 12	1 +/- 15	0.45 +/- 0.65	0.5 +/- 2.5	0.26 +/- 0.88	-0.31 +/- 0.68
	Zn-65	Zr-95	Nb-95	Ru-103	Ru-106	Sb-125	I-131
01A	-0.2 +/- 1.5	-0.3 +/- 1.6	0.7 +/- 1.6	-0.5 +/- 1.2	0 +/- 6.5	0.7 +/- 1.8	-4 +/- 20
	Cs-134	Cs-137	Ba-140	La-140	Th-228		
01A	0.1 +/- 0.67	0.27 +/- 0.66	0.9 +/- 5.6	1 +/- 6.4	3.2 +/- 2.3		

12/26/2007

Sampling Location	Be-7	K-40	Cr-51	Mn-54	Fe-59	Co-58	Co-60
01A	24 +/- 13	5 +/- 44	3 +/- 21.0	-0.9 +/- 2.3	1.1 +/- 5.4	-0.2 +/- 2.3	2.2 +/- 2.8
	Zn-65	Zr-95	Nb-95	Ru-103	Ru-106	Sb-125	I-131
01A	-5 +/- 5.0	2.4 +/- 4.8	-1.3 +/- 2.9	0 +/- 2.5	5 +/- 20	-1.7 +/- 5.5	0.8 +/- 5.4
	Cs-134	Cs-137	Ba-140	La-140	Th-228		
01A	-0.6 +/- 2.4	1.5 +/- 2.1	4 +/- 7.0	4 +/- 7.0	6.2 +/- 8.0		

**Table 3-7**  
**Precipitation**  
**Gross Beta**  
**[pCi/L]**

Sampling Date	Gross Beta	Rainfall (inches)
01/31/07	7 +/- 2.3	3.37
03/01/07	8.3 +/- 2.4	1.65
03/28/07	0 +/- 1.5	3.56
04/25/07	2.7 +/- 1.9	2.86
05/30/07	22.5 +/- 3.5	2.10
06/28/07	19.5 +/- 3.3	2.03
07/26/07	11 +/- 2.7	1.55
08/29/07	12 +/- 2.6	2.72
09/27/07	9.9 +/- 2.6	1.07
11/01/07	1.4 +/- 1.7	5.12
11/28/07	10.5 +/- 2.6	0.91
12/26/07	9 +/- 2.6	1.52
Average	12.2 +/- 2.7	Total 28.46

**Table 3-8**  
Milk  
Gamma Spectra and Strontium  
[pCi/L]

Date	K-40		Sr-89		Sr-90		I-131		Cs-134		Cs-137		Ba-140		Station 12 La-140	
01/17/07	1490	+/- 130					-0.113	+/- 0.039	4.2	+/- 3.7	1.1	+/- 3.2	-0.4	+/- 6.0	-0.5	+/- 6.9
02/21/07	1440	+/- 150					0.18	+/- 0.30	-3.1	+/- 3.8	-3	+/- 3.9	1.6	+/- 6.1	1.8	+/- 7.0
03/21/07	1380	+/- 160	0.7	+/- 4.4	0.9	+/- 1.1	0.14	+/- 0.31	1.2	+/- 5.0	0.3	+/- 4.8	6.6	+/- 7.7	7.5	+/- 8.8
04/18/07	1330	+/- 130					-0.207	+/- 0.068	1.5	+/- 3.3	0.6	+/- 4.0	-2.4	+/- 4.7	-2.8	+/- 5.4
05/23/07	1395	+/- 83					-0.14	+/- 0.046	1.3	+/- 2.5	0.5	+/- 2.2	-1.7	+/- 4.1	-2	+/- 4.7
06/20/07	1440	+/- 110	0.1	+/- 4.4	0	+/- 0.95	0.11	+/- 0.32	3.5	+/- 3.4	1.3	+/- 2.8	0.4	+/- 6.0	0.5	+/- 6.9
07/18/07	1400	+/- 130					0.31	+/- 0.45	3.9	+/- 3.5	0.5	+/- 3.4	0.5	+/- 6.5	0.6	+/- 7.5
08/22/07	1600	+/- 240					-0.073	+/- 0.025	1.6	+/- 5.7	-1	+/- 6.4	4.3	+/- 6.9	4.9	+/- 7.9
09/19/07	1580	+/- 200	-0.4	+/- 2.9	0.86	+/- 0.62	-0.178	+/- 0.048	-3.1	+/- 6.2	0.2	+/- 4.7	0.9	+/- 6.4	1	+/- 7.3
10/24/07	1280	+/- 170					0.16	+/- 0.39	-2.4	+/- 5.2	1	+/- 4.7	-4.7	+/- 6.3	-4.7	+/- 6.3
11/21/07	1230	+/- 110					0.08	+/- 0.38	2.4	+/- 3.1	2.6	+/- 2.7	-2.3	+/- 7.8	-2.3	+/- 7.8
12/19/07	1420	+/- 130	0.7	+/- 2.8	-0.57	+/- 0.98	0.09	+/- 0.34	0.2	+/- 3.2	1.8	+/- 3.4	0.5	+/- 6.5	0.5	+/- 6.5
Average	1415	+/- 145														

Date	K-40		Sr-89		Sr-90		I-131		Cs-134		Cs-137		Ba-140		Station 13 La-140	
01/17/07	1380	+/- 110					0.02	+/- 0.27	-0.6	+/- 3.1	1.1	+/- 3.1	2.8	+/- 4.2	3.2	+/- 4.8
02/21/07	1460	+/- 160					0.11	+/- 0.31	-0.4	+/- 4.3	0.2	+/- 3.9	0.6	+/- 6.7	-0.7	+/- 7.7
03/21/07	1380	+/- 120	1.3	+/- 4.4	1.2	+/- 1.1	0.28	+/- 0.42	-1.4	+/- 3.4	0.6	+/- 3.3	0	+/- 6.3	0	+/- 7.3
04/18/07	1240	+/- 130					0.13	+/- 0.42	3.1	+/- 3.7	-0.2	+/- 3.9	1	+/- 5.8	1.1	+/- 6.7
05/23/07	1257	+/- 79					-0.07	+/- 0.23	0	+/- 2.3	-0.5	+/- 2.1	3.1	+/- 3.9	3.6	+/- 4.4
06/20/07	1410	+/- 110	-0.6	+/- 4.4	0.63	+/- 0.98	-0.07	+/- 0.27	0.5	+/- 3.2	0.9	+/- 3.0	3.7	+/- 6.2	4.3	+/- 7.1
07/18/07	1430	+/- 160					0.01	+/- 0.29	-1.5	+/- 4.2	-1.2	+/- 4.0	4.5	+/- 6.7	5.2	+/- 7.7
08/22/07	1210	+/- 130					-0.073	+/- 0.025	1.5	+/- 3.6	0.8	+/- 3.5	-2.3	+/- 6.6	-2.7	+/- 7.6
09/19/07	1460	+/- 160	-2.6	+/- 4.6	-0.3	+/- 1.0	-0.115	+/- 0.039	-0.3	+/- 4.6	2.3	+/- 4.0	-2.3	+/- 6.3	-2.6	+/- 7.2
10/24/07	1420	+/- 180					0.16	+/- 0.38	-1.5	+/- 5.5	-0.9	+/- 4.2	-3.5	+/- 5.0	-3.5	+/- 5.0
11/21/07	1310	+/- 120					-0.02	+/- 0.20	2.1	+/- 3.5	-0.4	+/- 3.7	4.7	+/- 7.8	4.7	+/- 7.8
12/19/07	1274	+/- 86	-0.2	+/- 3.1	0.52	+/- 0.90	0.34	+/- 0.52	-0.3	+/- 2.4	-0.6	+/- 1.9	-4.7	+/- 6.8	-4.7	+/- 6.8
Average	1353	+/- 129														
Overall Avg.	1384	+/- 137														

**Table 3-9**  
**Food and Vegetation**  
**Gamma Spectra**  
**[pCi/kg]**

Sampling Location	Sampling Date	Be-7		K-40		I-131		Cs-134		Cs-137		Th-228	
14	05/10/07	8350	+/- 510	5530	+/- 640	3	+/- 24	22	+/- 28	17	+/- 24	310	+/- 110
15		1510	+/- 340	10990	+/- 770	-1	+/- 26	37	+/- 26	-5	+/- 26	150	+/- 150
23		4290	+/- 510	8850	+/- 770	-13	+/- 20	29	+/- 32	-8	+/- 27	210	+/- 130
26		5250	+/- 510	10240	+/- 770	3	+/- 20	-1	+/- 33	35	+/- 31	150	+/- 140
14	06/13/07	2020	+/- 560	16500	+/- 1100	12	+/- 25	31	+/- 36	42	+/- 41	20	+/- 150
15		1060	+/- 410	11080	+/- 930	16	+/- 26	24	+/- 32	-2	+/- 26	90	+/- 150
23		2410	+/- 570	8950	+/- 990	32	+/- 34	37	+/- 35	37	+/- 34	70	+/- 180
26		1330	+/- 400	1070	+/- 940	11	+/- 23	27	+/- 32	4	+/- 26	310	+/- 110
14	07/11/07	2570	+/- 420	17600	+/- 1100	-4.8	+/- 2.1	11	+/- 32	18	+/- 28	120	+/- 160
15		3920	+/- 390	11210	+/- 720	15	+/- 28	14	+/- 26	5	+/- 24	140	+/- 110
23		3170	+/- 490	8500	+/- 890	-10	+/- 13	-10	+/- 33	26	+/- 28	220	+/- 120
26		4080	+/- 650	11000	+/- 1100	2	+/- 15	47	+/- 38	-2	+/- 35	60	+/- 160
14	08/08/07	2360	+/- 410	7900	+/- 870	14	+/- 24	16	+/- 34	17	+/- 29	80	+/- 170
15		3640	+/- 560	7990	+/- 980	0	+/- 18	33	+/- 34	-33	+/- 38	140	+/- 190
23		2390	+/- 460	9550	+/- 830	4	+/- 24	31	+/- 34	-15	+/- 28	290	+/- 130
26		2150	+/- 360	7500	+/- 630	9	+/- 27	20	+/- 25	26	+/- 25	110	+/- 120
14	09/12/07	1560	+/- 430	5150	+/- 680	-4	+/- 27	26	+/- 29	-32	+/- 28	400	+/- 120
15		1810	+/- 430	6010	+/- 650	-21	+/- 20	13	+/- 26	-11	+/- 25	160	+/- 120
23		2220	+/- 350	5040	+/- 500	-31	+/- 22	-1	+/- 22	-1	+/- 20	61	+/- 97
26		2130	+/- 350	4150	+/- 510	-3	+/- 26	25	+/- 27	-14	+/- 27	564	+/- 86
14	10/10/07	1580	+/- 370	5000	+/- 640	-17.9	+/- 5.8	2	+/- 21	-14	+/- 25	100	+/- 110
15		1380	+/- 400	4780	+/- 730	-2	+/- 23	14	+/- 29	-5	+/- 32	180	+/- 150
23		750	+/- 660	3320	+/- 710	8	+/- 20	52	+/- 36	-2	+/- 35	770	+/- 130
26		1240	+/- 330	2210	+/- 580	-7	+/- 18	-14	+/- 32	-17	+/- 25	-30	+/- 100
Average		2599	+/- 450	8128	+/- 794							338	+/- 133

**Table 3-9**  
**Food and**  
**Vegetation**  
**Gamma Spectra**  
**[pCi/kg]**

Indicator  
 Location  
 Averages

Sample Location	Be-7		K-40		I-131		Cs-134		Cs-137		Th-228		
14	3073	+/-	450	9613	+/-	838	+/-	+/-	+/-	+/-	355.0	+/-	137
15	2220	+/-	422	8678	+/-	797	+/-	+/-	+/-	+/-		+/-	
23	2896	+/-	508	7368	+/-	782	+/-	+/-	+/-	+/-	372.5	+/-	131
26	2697	+/-	433	7020	+/-	755	+/-	+/-	+/-	+/-	250.0	+/-	119

Control  
 Location

	Be-7		K-40		I-131		Cs-134		Cs-137		Th-228								
16	05/10/07	5720	+/-	550	4540	+/-	670	-19	+/-	15	-11	+/-	33	6	+/-	34	140	+/-	140
	06/13/07	3030	+/-	50	11230	+/-	940	8	+/-	26	25	+/-	35	-28	+/-	30	90	+/-	190
	07/11/07	7330	+/-	460	5420	+/-	560	12	+/-	25	32	+/-	26	16	+/-	25	120	+/-	130
	08/08/07	1650	+/-	350	9080	+/-	710	-13	+/-	20	13	+/-	28	-16	+/-	24	278	+/-	91
	09/12/07	1650	+/-	420	23600	+/-	1100	2	+/-	28	-3	+/-	33	25	+/-	29	160	+/-	150
	10/10/07	1820	+/-	500	6020	+/-	910	2	+/-	25	29	+/-	33	-9	+/-	29	180	+/-	160
	Average	3533	+/-	388.3	9982	+/-	815										278	+/-	143.5

**Table 3-10**  
**Well Water**  
**Gamma Spectra, Strontium, and Tritium**  
**[pCi/L]**

Sampling Date	H-3		Be-7		K-40		Sr-89		Sr-90		I-131		Ba-140		Station 01A Th-228	
03/28/07	-20	+/- 870	-23	+/- 26	7	+/- 44	[a]		[a]		1.2	+/- 5.8	2.3	+/- 4.2	0	+/- 11
06/28/07	570	+/- 830	-0.7	+/- 7.4	6	+/- 13	-2.4	+/- 4.4	0.51	+/- 0.91	3.2	+/- 4.3	1	+/- 2.3	-1.2	+/- 3.8
09/27/07	-640	+/- 880	-8	+/- 19	-18	+/- 29	[a]		[a]		-1.7	+/- 5.1	2.4	+/- 4.8	-2.5	+/- 6.1
12/26/07	280	+/- 900	17	+/- 16	48	+/- 32	[a]		[a]		0.7	+/- 5.4	-1.1	+/- 5.4	6	+/- 13

[a] Sr-89/90 analyses performed on the second quarter sample.

**Table 3-11**  
**River Water**  
**Gamma Spectra, Strontium, and Tritium**  
**[pCi/L]**

Sampling Date	Station 11																	
	H-3		Be-7		K-40		Sr-89		Sr-90		I-131		Cs-137		Ba-140		Th-228	
01/11/07	[b]		1 +/-	14	14 +/-	22	[a]	[a]	-0.181 +/-	0.062	0.2 +/-	1.5	1.1 +/-	3.4	-2.7 +/-	6.2		
02/15/07	[b]		9 +/-	16	-5 +/-	35	[a]	[a]	-0.53 +/-	0.52	2 +/-	2.0	-1.7 +/-	4.7	6.3 +/-	6.9		
03/13/07	4400 +/-	1200	38 +/-	25	-6 +/-	47	[a]	[a]	0.14 +/-	0.33	0.8 +/-	2.8	-0.9 +/-	4.5	-4 +/-	11.0		
04/12/07	[b]		-1 +/-	14	-3 +/-	23	[a]	[a]	-0.05 +/-	0.25	0.7 +/-	1.5	0.3 +/-	4.4	-1.9 +/-	6.8		
05/14/07	[b]		0 +/-	8.7	6 +/-	13	[a]	[a]	0.12 +/-	0.43	-0.74 +/-	0.88	1.1 +/-	2.7	2.4 +/-	3.2		
06/14/07	3740 +/-	960	1 +/-	11	3 +/-	14	-0.6 +/-	4.4	0.45 +/-	0.88	-0.09 +/-	0.21	0.4 +/-	1.0	0.7 +/-	3.1	2.8 +/-	3.5
07/13/07	[b]		-5.1 +/-	7.6	5 +/-	12	[a]	[a]	0.33 +/-	0.51	0.57 +/-	0.74	1 +/-	2.1	3.3 +/-	2.4		
08/13/07	[b]		-15 +/-	23	28 +/-	43	[a]	[a]	-0.08 +/-	0.027	-1.7 +/-	2.9	-4.2 +/-	4.2	-6 +/-	10.0		
09/13/07	2900 +/-	1000	-1 +/-	18	-7 +/-	25	[a]	[a]	0.15 +/-	0.45	0.3 +/-	1.6	-2.4 +/-	3.9	2.3 +/-	6.4		
10/15/07	[b]		-4 +/-	20	0 +/-	37	[a]	[a]	-0.076 +/-	0.022	-1.3 +/-	2.1	2.7 +/-	4.4	-3.5 +/-	9.7		
11/15/07	[b]		1 +/-	16	2 +/-	29	[a]	[a]	-0.1 +/-	0.25	-1.1 +/-	2.4	1.9 +/-	4.7	5.4 +/-	9.1		
12/19/07	3510 +/-	990	1 +/-	26	80 +/-	40	[a]	[a]	0.07 +/-	0.34	-0.8 +/-	2.8	3.8 +/-	6.5	7 +/-	11.0		
Average	3638 +/-	1038	38 +/-	25														

[a] Sr-89/90 analyses performed on the second quarter sample.

[b] Tritium analyses on quarterly composite.



**Table 3-12**  
**Surface Water**  
**Gamma Spectra, Strontium, Tritium**

Date	[pCi/L]																Station 08	
	H-3		Sr-89		Sr-90		Be-7		K-40		I-131		Cs-137		Ba-140		Th-228	
01/11/07	[b]		[a]		[a]		3 +/-	19	29 +/-	33	-0.176 +/-	0.060	0.1 +/-	2.0	-1 +/-	4.6	2 +/-	10
02/15/07	[b]		[a]		[a]		3 +/-	27	-4 +/-	43	0.25 +/-	0.46	1.5 +/-	2.9	1.3 +/-	5.8	-6 +/-	12
03/13/07	4500 +/-	1200	[a]		[a]		-4 +/-	26	-5 +/-	48	0.14 +/-	0.33	-1.3 +/-	3.1	-4.1 +/-	5.9	-5 +/-	12
04/12/07	[b]		[a]		[a]		0 +/-	20	5 +/-	26	0.14 +/-	0.46	-0.4 +/-	1.6	-2.3 +/-	4.7	-1.7 +/-	7.0
05/14/07	[b]		[a]		[a]		21 +/-	18	5 +/-	28	0.42 +/-	0.55	0.2 +/-	1.6	3.6 +/-	5.2	-1.2 +/-	6.7
06/14/07	3440 +/-	960	-1.4 +/-	4.8	0.4 +/-	1.0	-21 +/-	22	-9 +/-	33	0 +/-	0.28	-0.7 +/-	2.1	0.7 +/-	5.4	-2.4 +/-	7.9
07/13/07	[b]		[a]		[a]		2 +/-	24	24 +/-	43	0.08 +/-	0.27	2.6 +/-	2.3	2.9 +/-	6.3	3 +/-	9.0
08/13/07	[b]		[a]		[a]		19 +/-	35	31 +/-	57	-0.083 +/-	0.028	-0.5 +/-	3.9	-4.3 +/-	5.4	6 +/-	15
09/13/07	3300 +/-	1000	[a]		[a]		12 +/-	23	20 +/-	41	0.24 +/-	0.49	1.2 +/-	2.9	9.1 +/-	6.4	-4 +/-	9.6
10/15/07	[b]		[a]		[a]		-2 +/-	21	12 +/-	50	-0.072 +/-	0.021	0.7 +/-	2.4	0.9 +/-	5.3	12.8 +/-	9.9
11/15/07	[b]		[a]		[a]		-1 +/-	20	16 +/-	39	0.14 +/-	0.43	-0.1 +/-	2.0	0 +/-	4.4	-1.6 +/-	9.3
12/19/07	4000 +/-	1000	[a]		[a]		9 +/-	26	-32 +/-	58	-0.115 +/-	0.046	2 +/-	2.8	-5.5 +/-	6.9	-4 +/-	14
Average	3810 +/-	1040																

Date	[pCi/L]																Station 09A	
	H-3		Sr-89		Sr-90		Be-7		K-40		I-131		Cs-137		Ba-140		Th-228	
01/11/07	[b]		[a]		[a]		11 +/-	18	4 +/-	31	-0.176 +/-	0.060	0.7 +/-	2.1	2 +/-	4.2	6.6 +/-	7.6
02/15/07	[b]		[a]		[a]		4 +/-	26	14 +/-	39	-0.02 +/-	0.27	0.9 +/-	2.5	1.6 +/-	4.6	4 +/-	14
03/13/07	-570 +/-	940	[a]		[a]		-36 +/-	32	-3 +/-	59	-0.089 +/-	0.032	-0.4 +/-	5.0	0.8 +/-	6.5	0 +/-	17
04/12/07	[b]		[a]		[a]		-5 +/-	24	-12 +/-	41	-0.11 +/-	0.27	1.6 +/-	2.6	4.6 +/-	6.6	-2 +/-	12
05/14/07	[b]		[a]		[a]		-8 +/-	17	-13 +/-	21	0.22 +/-	0.50	-0.3 +/-	1.8	-1.2 +/-	4.7	-0.6 +/-	6.6
06/14/07	600 +/-	850	-8.1 +/-	4.1	0.41 +/-	0.81	9 +/-	20	0 +/-	28	0.1 +/-	0.38	1.7 +/-	1.8	4.1 +/-	5.8	-1 +/-	8.1
07/13/07	[b]		[a]		[a]		-5 +/-	17	-38 +/-	24	0.33 +/-	0.45	0.2 +/-	2.0	-1.6 +/-	6.0	2.9 +/-	8.5
08/13/07	[b]		[a]		[a]		-14 +/-	30	6 +/-	68	-0.01 +/-	0.22	-1.8 +/-	3.9	0.1 +/-	5.1	-5 +/-	15
09/13/07	-340 +/-	890	[a]		[a]		4 +/-	19	-4 +/-	22	-0.21 +/-	0.22	0.6 +/-	1.9	1.4 +/-	4.0	2.9 +/-	7.0
10/15/07	[b]		[a]		[a]		1 +/-	22	12 +/-	48	0.07 +/-	0.30	0.5 +/-	2.8	0.9 +/-	4.5	-5 +/-	12
11/15/07	[b]		[a]		[a]		3 +/-	24	-1 +/-	41	0.03 +/-	0.38	-0.6 +/-	2.8	-7.5 +/-	6.0	12 +/-	11
12/19/07	620 +/-	880	[a]		[a]		-12 +/-	22	3 +/-	44	-0.03 +/-	0.27	0.7 +/-	2.6	4.3 +/-	5.3	1 +/-	11

[a] Sr-89/90 analyses performed on the second quarter sample.

[b] Tritium analyses on quarterly composite.

**Table 3-13**  
**Sediment Silt**  
**Gamma Spectra and Strontium**  
**[pCi/Kg]**

Date	Sr-89		Sr-90		Be-7		K-40		Mn-54	
03/13/2007										
10/15/2007										
Station 09A*	[a]		[a]		120 +/-	410	9800 +/-	1800	-6 +/-	51
	-230 +/-	200	40 +/-	130	10 +/-	270	11700 +/-	1000	27 +/-	31
Average							10750 +/-	1400		
Station 08	[a]		[a]		210 +/-	370	6300 +/-	1300	47 +/-	48
	-80 +/-	230	-30 +/-	170	320 +/-	410	15700 +/-	1800	55 +/-	56
Station 11	[a]		[a]		-90 +/-	440	13500 +/-	2300	69 +/-	60
	-110 +/-	230	-30 +/-	150	-150 +/-	380	15100 +/-	1400	-11 +/-	40
Average							12650 +/-	1700		

Date	Co-58		Co-60		Cs-134		Cs-137		Th-228	
03/13/2007										
10/15/2007										
Station 09A*	-25 +/-	37	-12 +/-	46	0 +/-	81	17 +/-	48	580 +/-	230
	-26 +/-	29	-10 +/-	26	29 +/-	37	86 +/-	42	680 +/-	130
Average							86 +/-	42	630 +/-	180
Station 08	0 +/-	40	0 +/-	44	20 +/-	44	7 +/-	55	930 +/-	250
	-7 +/-	53	-56 +/-	48	32 +/-	53	26 +/-	55	1890 +/-	260
Station 11	-14 +/-	51	5 +/-	61	21 +/-	58	19 +/-	66	1140 +/-	330
	-51 +/-	42	27 +/-	38	39 +/-	45	-12 +/-	45	1020 +/-	180
Average									1245 +/-	255

\* Control Location  
[a] Sr-89/90 analyses performed annually.

**Table 3-14**  
 Shoreline Soil  
 Gamma Spectra and Strontium  
 [pCi/Kg]

Sample Date	Sr-89			Sr-90			Be-7			K-40			Mn-54		
03/13/2007															
10/15/2007															
Station 08	[a]			[a]			70 +/- 190			2310 +/- 510			5 +/- 24		
	-60 +/- 280			-10 +/- 150			90 +/- 200			2250 +/- 500			2 +/- 23		
Average										2280 +/- 505					
Sample Date	Co-58			Co-60			Cs-134			Cs-137			Th-228		
03/13/2007															
10/15/2007															
Station 08	-29 +/- 22			4 +/- 21			-9 +/- 22			134 +/- 40			440 +/- 100		
	10 +/- 24			32 +/- 23			0 +/- 21			-4 +/- 23			440 +/- 100		
Average										134 +/- 40			440 +/- 100		

[a] Sr-89/90 analyses performed annually.

**Table 3-15**  
**Fish**  
**Gamma Spectra**  
**[pCi/Kg]**

Sampling													Fish [a] Station 08			
Date	K-40		Mn-54		Fe-59		Co-58		Co-60		Zn-65		Cs-134		Cs-137	
03/13/07	1570	+/- 510	5	+/- 19	31	+/- 57	-7	+/- 23	15	+/- 23	-17	+/- 46	10	+/- 24	1	+/- 23
10/16/07	1820	+/- 570	-12	+/- 24	-14	+/- 57	-5	+/- 18	11	+/- 17	-13	+/- 45	22	+/- 18	23	+/- 23
Average	1695	+/- 540														

Sampling													Fish [a] Station 25			
Date	K-40		Mn-54		Fe-59		Co-58		Co-60		Zn-65		Cs-134		Cs-137	
03/14/07	1150	+/- 390	-13	+/- 21	14	+/- 37	5	+/- 20	3	+/- 16	-17	+/- 41	0	+/- 22	-4	+/- 15
10/17/07	1610	+/- 610	4	+/- 25	-59	+/- 75	3	+/- 22	11	+/- 22	0	+/- 55	2	+/- 28	-3	+/- 22
Average	1380	+/- 500														

Sampling													Catfish [b] Station 08			
Date	K-40		Mn-54		Fe-59		Co-58		Co-60		Zn-65		Cs-134		Cs-137	
03/14/07	1120	+/- 440	-7	+/- 18	-5	+/- 42	15	+/- 18	1	+/- 19	0	+/- 43	4	+/- 18	2	+/- 19
10/17/07	1210	+/- 640	15	+/- 30	15	+/- 66	-21	+/- 27	-31	+/- 25	-8	+/- 73	-29	+/- 22	31	+/- 31
Average	1165	+/- 540														

Sampling													Catfish [b] Station 25			
Date	K-40		Mn-54		Fe-59		Co-58		Co-60		Zn-65		Cs-134		Cs-137	
03/14/07	1080	+/- 470	-6	+/- 19	41	+/- 48	14	+/- 20	7	+/- 24	-15	+/- 45	-19	+/- 20	-12	+/- 21
10/19/07	1610	+/- 650	6	+/- 24	17	+/- 53	8	+/- 29	2	+/- 29	-24	+/- 62	-20	+/- 21	0	+/- 23
Average	1345	+/- 560														

[a] Non-bottom dwelling species of gamefish.

[b] Bottom dwelling species of fish.

## 4. DISCUSSION OF RESULTS

Data from the radiological analyses of environmental media collected during 2007 and tabulated in Section 3, are discussed below. Except for TLDs, AREVA Environmental Laboratory analyzed all samples throughout the year. The procedures and specifications followed for these analyses are as required in the AREVA Environmental Laboratory quality assurance manuals and laboratory procedures. In addition to internal quality control measurements performed by each laboratory, 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 Programs are provided in Appendix B.

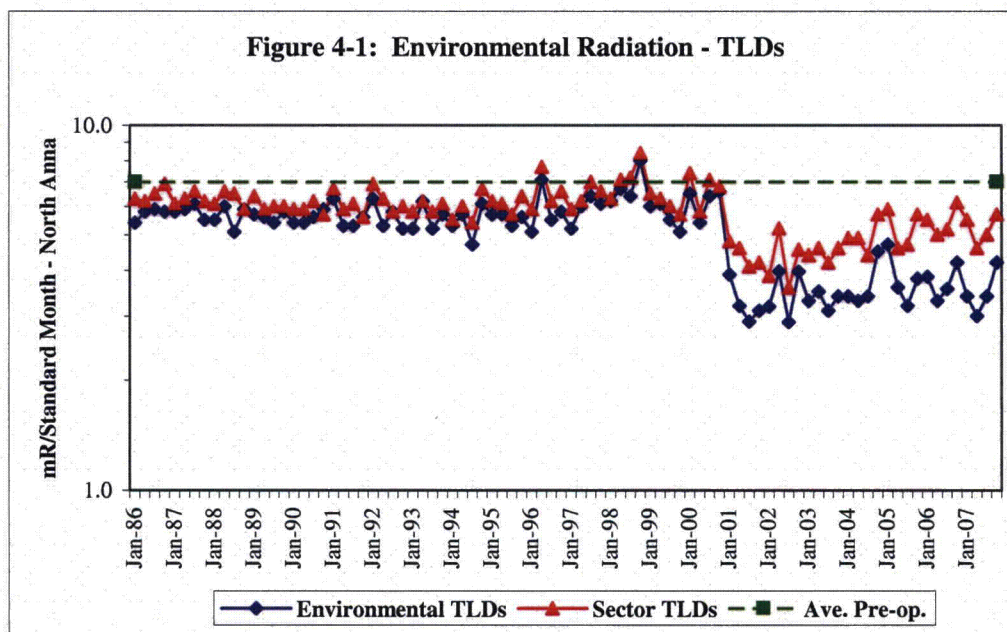
The predominant radioactivity detected throughout 2007 was that from external sources, such as fallout from nuclear weapons tests and naturally occurring radionuclides. Naturally occurring nuclides such as Be-7, K-40, and Th-228 were detected in numerous samples. Th-228 results were variable and are generally at levels higher than plant related radionuclides.

The following is a discussion and summary of the results of the environmental measurements taken during the 2007 reporting period.

### *4.1 Gamma Exposure Rate*

A thermoluminescent dosimeter (TLD) is an inorganic crystal used to detect ambient radiation. TLDs are placed in two concentric rings around the station. The inner ring is located at 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 areas 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 analyses are presented in Table 3-2. Figure 4-1 shows the historical trend of TLD exposure rate measurements. Control and indicator averages indicate a steady relationship. Two dosimeters made of CaF and LiF sensitive elements are deployed at each sampling location. These TLDs replaced the previously used CaSO<sub>4</sub>:Dy in Teflon TLDs in January 2001. The dose with the replacement TLDs is lower than that of the previously used TLDs. This will continue to be monitored.



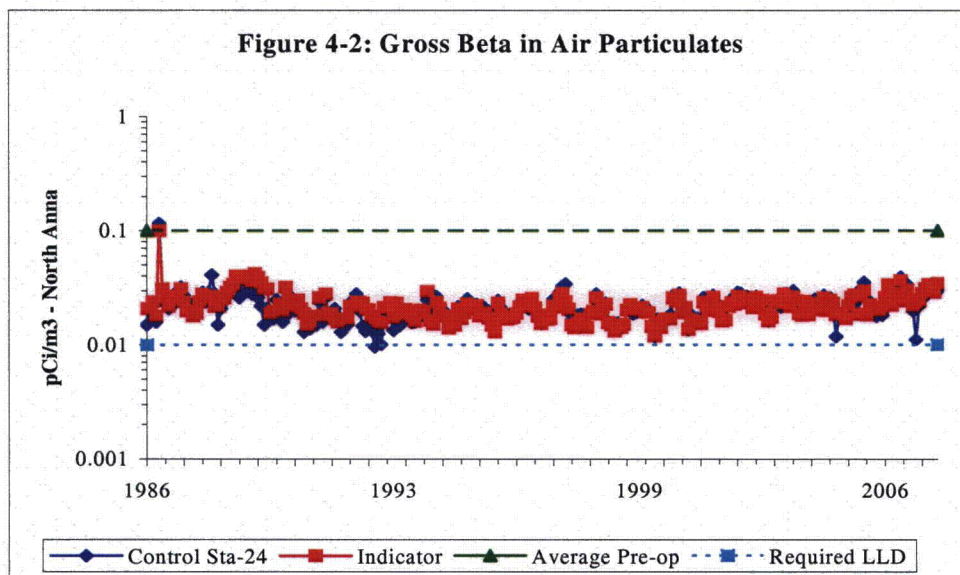
Sector TLDs are deployed quarterly at thirty-two locations in the environs of the North Anna site. Two badges are placed at each location. The average level of the 32 locations (two badges at each location) was 5.2 mR/standard month with a range of 1.3 to 47.3 mR/standard month. The highest quarterly average reading for any single location was obtained at location SSW-19/51. These values were 31.9 mR/standard month. This location is on site directly across the access road from the Independent Spent Fuel Storage Facility. The higher values can thus be attributed to the spent fuel stored in the ISFSI. Quarterly and annual TLDs are also located at each of the twelve environmental air sampling stations. For the eleven locations within 10 miles of the station the average quarterly reading was 3.4 mR/standard month with a range of 1.3 to 5.8 mR/standard month. The average annual reading for these locations was 3.4 mR/standard month with a range of from 1.8 to 5.2 mR/standard month. The control location showed a quarterly average of 3.4 mR/standard month with a range of 3.0 to 3.8 mR/standard month. Its annual reading was 3.3 mR/standard month. Eight other TLDs, designated C-1 thru C-8, were collected quarterly from four locations and showed an average reading of 3.1 mR/standard month with a range of 2.0 to 4.1 mR/standard month. During the pre-operational period (starting in 1977) the doses were measured between 4.3 and 8.8 mR/standard month.

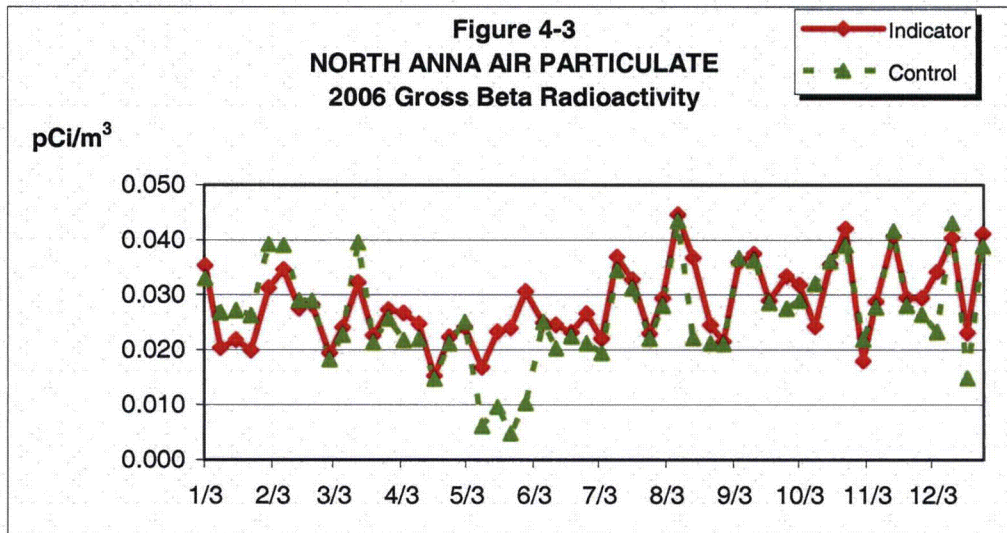
## 4.2 Airborne Gross Beta

Results of the weekly gross beta analyses are presented in Table 3-3. A review of the historical plot in Figure 4-2, indicates gross beta activity levels have remained relatively unchanged. Inner and outer ring monitoring locations continue to show no significant variation in measured activities (see Figure 4-3). This indicates that any station contribution is not measurable.

Gross beta activity found during the pre-operational and early operating period of North Anna 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. During the preoperational period of July 1, 1974 through March 31, 1978 gross beta activities ranged from a low of 0.005 pCi/m<sup>3</sup> to a high of 0.75 pCi/m<sup>3</sup>.

One anomalous result was observed on 08/15/07 sample at Station 21. A value of 1.72 pCi/m<sup>3</sup> was obtained. The sample was analyzed for gamma emitters. Only Be-7, a naturally occurring isotope, was identified as being present at a level of 6.7 pCi/m<sup>3</sup>. During this collection period this sampler had also malfunctioned, and the volume was estimated at 3 m<sup>3</sup>, which could have lead to the apparently high results. A review of the releases that occurred during this time period did not indicate any releases which could have contributed to these results.





### 4.3 Airborne Radioiodine

Charcoal cartridges are used to collect airborne radioiodine. Once a week the samples are collected and analyzed. The results of the analyses are presented in Table 3-4. All results are below the lower limit of detection with no positive activity 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.

### 4.4 Air Particulate Gamma

The air particulate filters that are utilized for the weekly gross beta analyses are composited by location and analyzed quarterly by gamma spectrometry. The results are listed in Table 3-5. The results indicate the presence of naturally occurring Be-7, which is produced by cosmic processes. Examination of pre-operational data indicates comparable measurements of Be-7, as would be expected. No other positive results were seen. As discussed in section 4.2 above one weekly sample was analyzed for gamma emitters and only Be-7 was detected. These analyses indicate the lack of station effects.

### 4.5 Air Particulate Strontium

Strontium-89 and 90 analyses were performed on the second quarter composites of air particulate filters from all twelve monitoring stations. The results are listed in Table 3-5. There was no detection of these fission products at any of the indicator or control stations.



#### **4.6 Soil**

Soil samples, which are collected every three years from twelve stations, were collected in 2007 and the results displayed on Table 3-6. The soil indicated positive results for naturally occurring Be-7, K-40, and Th-228. Low levels of Cs-137 ranging from 186 - 325 pCi/kg were detected on 3 of 11 samples from indicator locations. Cs-137 is typically seen in some of these samples. The number of locations at which Cs-137 has been seen and the levels at which it has been detected has decreased steadily over the life of the plant. This is an indication that the Cs-137 being detected is due to fallout from atmospheric weapons testing and not attributable to plant activities. Sr-90 was detected in one location at a level of 390 pCi/kg. The sample was re-analyzed and the value was confirmed at a level of 410 pCi/kg. Sr-90 has been detected at comparable levels in some previous years' samples. No analyses of gaseous effluents showed a positive indication for Sr-90, and the likely origin is fallout from past atmospheric weapons testing.

#### **4.7 Precipitation**

A sample of rain water was collected monthly at on-site station 01A and analyzed for gross beta activity. The results are presented in Table 3-7. 12 precipitation samples were obtained in 2007. Nine of the twelve precipitation samples showed positive results in 2007. The average annual gross beta activity was 12.2 pCi/liter with a range from 7 to 22.5 pCi/liter. Semi-annual composites were prepared and analyzed for gamma emitting isotopes. No positive indications of plant related gamma emitting radioisotopes were observed in the semi-annual composite samples for 2007. Naturally occurring Be-7 was detected at a level of 24 pCi/L in one sample. During the pre-operational period gross beta activity in rain water was expressed in nCi per square meter of the collector surface, thus a direct comparison can not be made to the 2007 period. During the pre-operational period, tritium was measured in over half of the few quarterly composites made. This tritium activity ranged from 100 to 330 pCi/liter.

#### **4.8 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 a critical pathway 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 plant effect.

Analysis results for cow milk are contained in Table 3-8. All results show no detectable I-131 above the LLD of 1 pCi/l. Results of gamma ray spectroscopy indicate no detectable plant related radioactivity in the milk samples. Naturally occurring K-40 was detected in all samples. In years past, Cs-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 2007.

Once each quarter a sample from each of the two collection stations is analyzed for strontium-89 and strontium-90. Neither Sr-89 nor Sr-90 was detected. Sr-90 has been observed in the past. Pre-operational levels of 2.2 to 5.4 pCi/liter were measured for Sr-90. There has been a long-term activity trend for Sr-90 showing a continuous decline. It should be noted that strontium-90 is not a part of station effluents. Its detection is the product of nuclear weapons testing fallout. This conclusion can be made based upon the fact that Sr-89 and Sr-90 have not been detected in gaseous effluents released from the station in many years, and the trend of consistent declining levels since the pre-operational period.

#### ***4.9 Food Products and Vegetation***

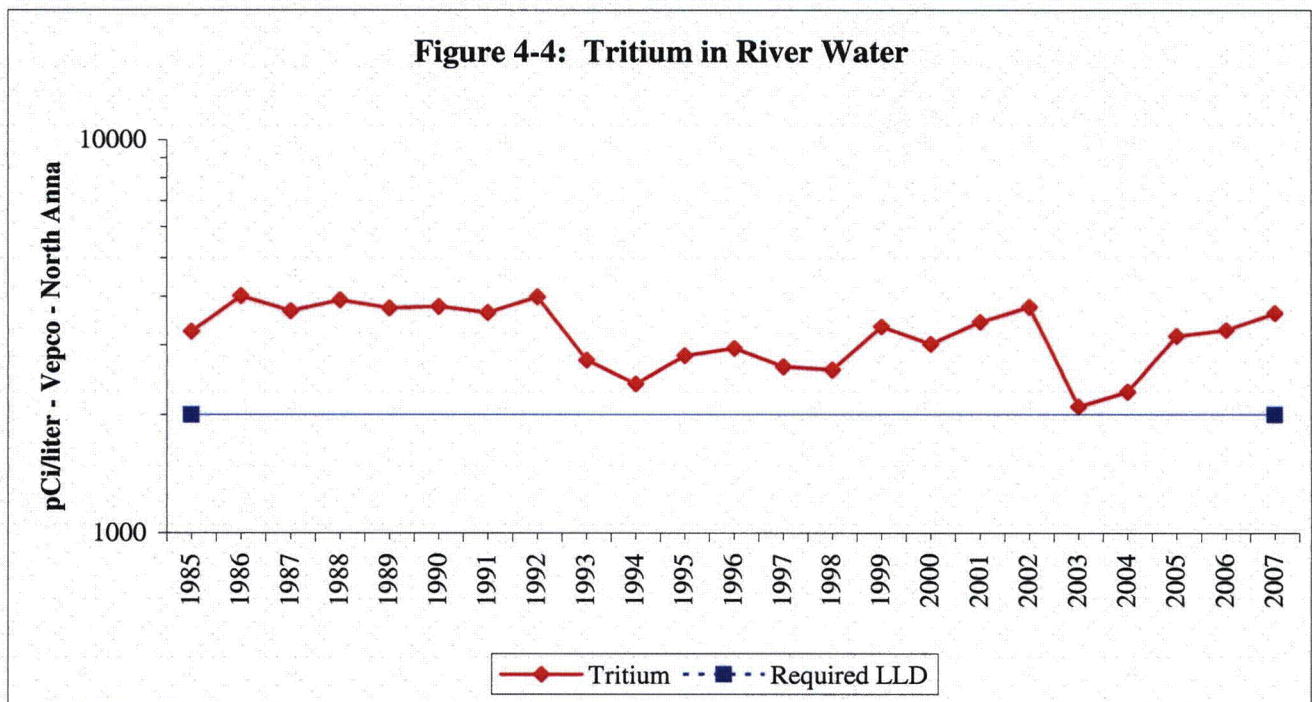
Food/vegetation samples were collected from five locations and analyzed by gamma spectrometry. The results of the analyses are presented in Table 3-9. No plant related isotopes were detected in any samples. As expected, naturally occurring potassium-40 was detected in all samples, cosmogenic beryllium-7 was detected in most samples, and thorium-228 was detected in some samples.

#### ***4.10 Well Water***

Water was sampled quarterly from the on site well at the metrology laboratory. These samples were analyzed for gamma radiation and for tritium. The second quarter sample was analyzed for strontium-89 and strontium-90. The results of these analyses are presented in Table 3-10. Consistent with past monitoring, no plant related radioactivity was detected. No gamma emitting isotopes were detected during the pre-operational period.

#### 4.11 River Water

A sample of water from the North Anna River was collected monthly. The analyses are presented in Table 3-11. All monthly samples are analyzed by gamma spectroscopy. The monthly samples were composited quarterly and analyzed for tritium, the second quarter samples were additionally analyzed for strontium-89 and strontium-90. No gamma emitting radioisotopes were detected in any of the samples. There was no measured activity of strontium-89 or strontium-90. Tritium was measured in all four samples with an average annual concentration of 3638 pCi/liter and a range of 2900 to 4400 pCi/liter. These levels are comparable to those observed in previous years, see Figure 4-4. No river water samples were collected during the pre-operational period.

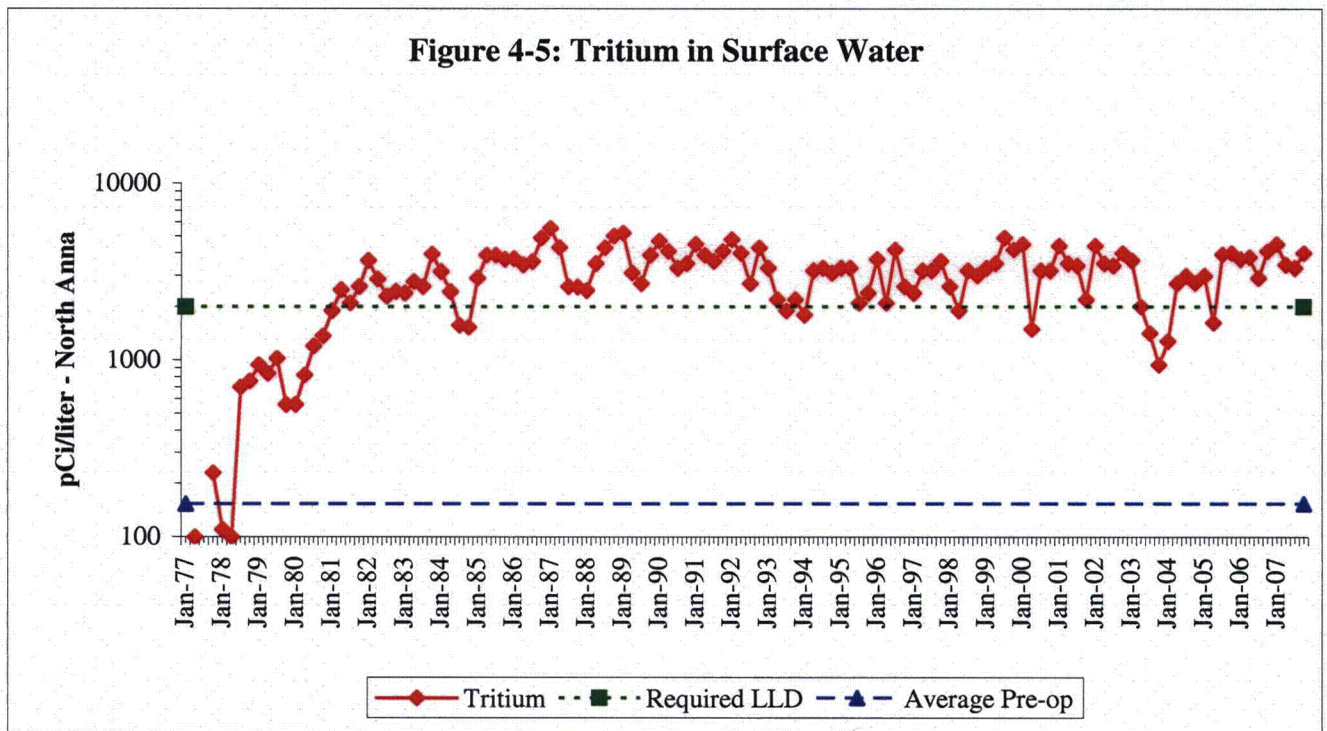


#### 4.12 Surface Water

Samples of surface water were collected monthly from two stations, an indicator station located at the discharge lagoon and a control station located 12.9 miles WNW. The samples were analyzed by gamma ray spectrometry and for iodine-131 by radiochemical separation. A quarterly composite from each station was prepared and analyzed for tritium, and the second quarter samples were additionally analyzed for strontium-89 and strontium-90. The results are

presented in Table 3-12.

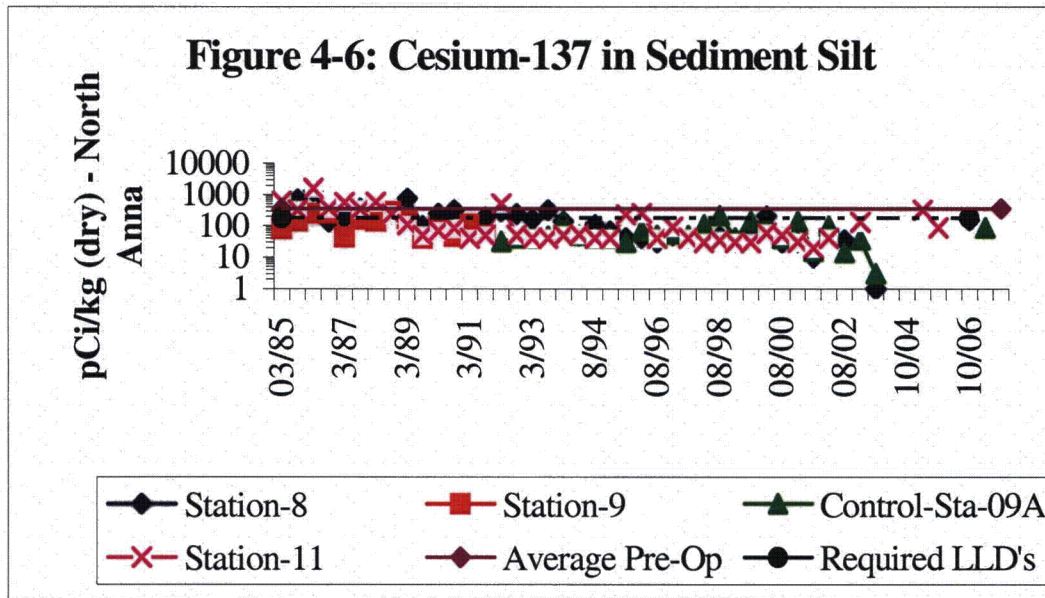
Neither gamma emitting radioisotopes nor iodine were detected in any of the samples. No tritium was detected at the control location. The average level of tritium activity at the indicator station was 3810 pCi/liter with a range of 3300 to 4500 pCi/liter. Levels of tritium have been increasing since 1978 when the average level was below 300 pCi/liter. Levels measured at the indicator location (Station 8) are comparable to those measured since 1986, see Figure 4-5. During the pre-operational period tritium was measured in several samples with concentrations between 90 and 250 pCi/liter.



### 4.13 Bottom Sediment

Bottom sediment or silt is sampled to evaluate any buildup of radionuclides in the environment due to the operation of the station. Buildup of radionuclides in bottom sediment could indirectly lead to increasing radioactivity levels in fish.

Sediment samples were collected during March and October from each of three locations and were analyzed by gamma spectrometry. The October samples were analyzed for strontium-89 and strontium-90. The results are presented in Table 3-13. Figure 4-6 shows the historical trend of Cs-137 in sediments.



No Cesium-137 was detected in the indicator locations. In 2007, one sediment sample from the control location showed Cs-137 level of 86 pCi/kg. The detection of Cs-137 in bottom sediment is historically common with positive indications usually apparent in both indicator and control samples. The detection of Cs-137 is the result of accumulation and runoff into the lake of residual weapons testing fallout; its global presence has been well documented. During the pre-operational period sediment samples were analyzed by gamma ray spectroscopy.

There was no measurable amount of strontium-89 or 90 in aquatic sediment/silt. A number of naturally occurring radioisotopes were detected in these samples at background levels.

#### 4.14 Shoreline Soil

Shoreline soil/sediment, unlike bottom sediment, may provide a direct dose to humans. Buildup of radioisotopes along the shoreline may provide a source of direct exposure for those using the area for commercial and recreational uses. Samples of shoreline soil were collected in March and October from indicator station 08. The samples were analyzed by gamma ray spectrometry. The October sample was analyzed for strontium-89 and strontium-90. The results are presented in Table 3-14.

Naturally occurring radioisotopes were detected at concentrations equivalent to normal background activities. The activities of these radioisotopes indicate a steady trend. Cesium-137 was detected in 2007 in one sample at a level of 134 pCi/kg, but has also been detected intermittently in the past at comparable levels. No Strontium was detected. Strontium-90 is often detected in this media, however as discussed previously, the presence of Sr-90 and Cs-137 is attributed to accumulation of residual global fallout from past atmospheric weapons testing.

#### ***4.15 Fish***

Four sample sets of fish, two from Lake Anna and two from the control station, Lake Orange, were collected during 2007 and analyzed by gamma spectroscopy. Each sample set consisted of a sample of game species and a sample of bottom-dwelling species, which were analyzed separately. The results are presented in Table 3-15. Except for naturally occurring K-40, no other nuclide was observed in this media in 2007. Only Cs-137 was measured in pre-operational environmental fish samples.

## 5. PROGRAM EXCEPTIONS

### REMP Exceptions for Scheduled Sampling and Analysis During 2007 – North Anna

Location	Description	Date of Sampling	Reason(s) for Loss/Exception
Sta. 14-16, 23, 26)	Vegetation	01/10/07	Seasonal Unavailability.
Sta. 27	Milk	01/17/07	Milk animal no longer present.
Sta. 05	Air Particulate and Iodine	02/01/07	Sampler malfunction. LLD achieved.
Sta. 14-16, 23, 26	Vegetation	02/14/07	Seasonal Unavailability.
Sta. 27	Milk	02/21/07	Milk animal no longer present.
Sta. 14-16, 23, 26	Vegetation	03/14/07	Seasonal Unavailability.
Sta. 27	Milk	03/21/07	Milk animal no longer present.
Sta. 14-16, 23, 26	Vegetation	04/11/07	Seasonal Unavailability.
Sta. 27	Milk	04/18/07	Milk animal no longer present.
Sta. 24	Air Particulate and Iodine	05/10/07	Sampler malfunction. LLD achieved.
Sta. 24	Air Particulate and Iodine	05/23/07	Breaker/GFCI failure. LLD achieved.
Sta. 24	Air Particulate and Iodine	05/30/07	Sampler malfunction. LLD achieved.
Sta. 07	Air Iodine and Particulate	07/04/07	Sampler malfunction. LLD achieved.
Sta.21	Air Particulate and Iodine	08/15/07	Sampler malfunction. LLD not achieved
Sta.06	Air Particulate and Iodine	09/05/07	Sampler malfunction. LLD achieved
Sta.01A	Air Particulate and Iodine	10/03/07	Initial Sampler startup. Low volume - Particulate LLD not achieved.
Sta. 14-16, 23, 24	Vegetation	11/14/07	Seasonal Unavailability.
Sta. 14-16, 23, 24	Vegetation	12/12/07	Seasonal Unavailability.

## REFERENCES



## *References*

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4. Virginia Electric and Power Company, North Anna Technical Procedure, HP-3051.010, "Radiological Environmental Monitoring Program".
5. Title 10 Code of Federal Regulation, Part 50 (10CFR50), "Domestic Licensing of Production and Utilization Facilities".
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10. "Technical Specifications for North Anna Independent Spent Fuel Storage Installation (ISFSI)".
11. HASL-300, Environmental Measurements Laboratory, "EML Procedures Manual," 27<sup>th</sup> Edition, Volume 1, February 1992.
12. NUREG/CR-4007, "Lower Limit of Detection: Definition and Elaboration of a Proposed Position for Radiological Effluent and Environmental Measurements," September 1984.

**APPENDICES**

APPENDIX A: LAND USE CENSUS

Year 2007

## LAND USE CENSUS

North Anna Power Station  
North Anna County, Virginia

January 1 to December 31, 2007

Direction	Distance (miles)					
	Nearest Site Boundary	Nearest Resident	Nearest Garden (> 50m <sup>2</sup> )	Nearest Meat Animal	Nearest Milch Cow	Nearest Milch Goat
N	0.9	1.5	1.8	None	None	None
NNE	0.9	0.9	3.1	1.5	None	None
NE	0.8	0.9	0.9	1.5	None	None
ENE	0.8	2.1	2.1	2.5	None	None
E	0.8	1.3	1.3	3.5	None	None
ESE	0.9	1.7	1.7	None	None	None
SE	0.9	1.4	1.4	1.5	None	None
SSE	0.9	1.0	1.0	2.8	None	None
S	0.9	1.1	1.0	2.8	None	None
SSW	1.0	1.4	1.4	1.9	None	None
SW	1.1	1.7	3.1	None	None	None
WSW	1.1	1.6	1.6	1.6	None	None
W	1.1	1.5	1.5	None	None	None
WNW	1.0	1.1	2.6	3.9	None	None
NW	1.0	1.0	1.6	None	None	None
NNW	0.9	1.0	1.1	None	None	None

2006 to 2007 Land Use Census Changes			
Nearest	Direction	2006 Distance	2007 Distance
<b>Site Boundary</b>	<i>None</i>		
<b>Resident</b>	<i>None</i>		
<b>Garden</b>			
	NNE	3.4	3.1
	S	1.2	1.0
	SW	3.9	3.1
	WSW	2.7	1.6
	W	2.0	1.5
	WNW	1.7	2.6
	NW	1.1	1.6
<b>Meat Animal</b>	<i>None</i>		
<b>Milch Cow</b>	<i>None</i>		
<b>Milch Goat</b>	<i>None</i>		

**APPENDIX B: SUMMARY OF INTERLABORATORY COMPARISONS**

**YEAR 2007**

## **INTRODUCTION**

This appendix covers the Intercomparison Program of the AREVA ANP Environmental Laboratory as required by technical specifications for the Radiological Environmental Monitoring Program (REMP). AREVA uses QA/QC samples provided by Eckert & Zeigler Analytics, Inc to monitor the quality of analytical processing associated with the REMP. The suite of E & Z Analytics QA/QC samples are designed to be comparable with the pre-1996 US EPA Interlaboratory Cross-Check Program in terms of sample number, matrices, and nuclides. It was modified to more closely match the media mix presently being processed by AREVA and includes:

- milk for gamma (10 nuclides) and low-level (LL) Iodine-131 analyses once per quarter,
- milk for Sr-89 and Sr-90 analyses during the 1st and 3rd quarters,
- water for gamma (10 nuclides) and low-level (LL) Iodine-131 analyses during the 1st and 3rd quarters,
- water for Sr-89 and Sr-90 analyses during the 4th quarter,
- water tritium analysis during the 2nd and 4th quarters,
- air filter for gamma (9 nuclides) analyses during the 2nd quarter, and
- air filter for gross beta analysis during the 1st and 3rd quarters.

In addition to the E & Z Analytics Intercomparison Program, AREVA ANP also participates in other intercomparison programs which include radionuclides and media similar to those required by the REMP. These programs are the National Institute of Standards and Technology (NIST) Measurement Assurance Program (MAP), the Environmental Resource Associates (ERA) Proficiency Test (PT) Program, the Department of Energy (DOE) Quality Assessment Program (QAP), and the Mixed Analyte Performance Evaluation Program (MAPEP).

## **RESULTS**

Intercomparison program results are evaluated using AREVA ANP's internal bias acceptance criterion. The criterion is defined as within 25% of the known strontium value for samples containing both Sr-89 and Sr-90 and within 15% of the known value for other radionuclides, or within two sigma of the known value. Any sample analysis result that does not pass the criteria is investigated by AREVA ANP.

Eckert and Ziegler Analytics Intercomparison Program results are included on pages 80 through 85 for the 4th quarter of 2006 through the fourth quarter of 2007. There were two disagreements on the results received to date. Condition reports 08-01, 08-02, 08-10 and 08-11 were generated. CR 08-01 remains open.

The mean bias (-17.7%) for gross alpha on the third quarter 2007 E & Z Analytics Environmental Cross Check filter samples was outside the E-Lab accuracy criterion of +/- 15%. An eight year historical trend of this analysis showed a mean bias of approximately -4%. The 4<sup>th</sup> quarter 2007 filter samples were within the acceptance criteria. A review and reanalysis of the third quarter samples is in progress. CR 08-02 remains open. The mean biases on E & Z Analytics 2nd quarter 2007 Environmental Cross Check samples were outside the E-Lab +/- 15% accuracy criterion for two gamma emitting radionuclides, Cr-51 on the filter (-15.75%) and Ce-141 in milk (-16.25%). A review and reanalysis of the samples is in progress. CR-08-10 remains open. The Sr-89/90 results on the 4<sup>th</sup> quarter 2007 filter analysis being 0.45 and 0.44 of known value. An investigation is in progress. CR 08-11 remains open. The mean biases for Fe-59, Zn-65 and Co-60 on the 4<sup>th</sup> quarter 2007 filter analysis were outside the E-Lab +/- 15% at -17%. An investigation is in progress.

Condition Report 06-16 was generated in 2006 and was still open at the time of the 2006 report. CR 06-16 was re-eluted and acceptable results were obtained. This CR has been closed, with the corrective action being to update background and blanks on a more frequent basis. In the DOE program all results were in agreement. Condition Reports 06-19, 06-20, and 06-21 were generated in 2006 and were open at the time of the 2006 report. 06-19 error was attributed to a non-homogeneous sample. The corrective action was to count these samples on an elevated geometry to reduce these effects. CR 06-20 was closed on 11/29/2007. After ruling out detector operation, efficiency calibration, and counting statistics as reasons for the failure, the apparent cause was postulated to be an incorrect weight used in the original analysis. The chemist was coached to take greater care in preparing samples for analysis. 06-21 was closed on 11/29/2007. The original Sr-90 analysis of an MAPEP filter sample fell within the MAPEP "Warning" range. A review of previous third party QC filter analyses for Sr-90 did not show a history of failures. An additional MAPEP filter was obtained and analyzed with acceptable results. A review of the original analysis did not identify a cause for the original low bias.

The results of the any analyses not available at the time of submission of this report and any open corrective actions will be included in the 2008 report.



**AREVA FOURTH QUARTER 2006 ENVIRONMENTAL LABORATORY  
ECKERT & ZIEGLER ANALYTICS RADIOLOGICAL ENVIRONMENTAL CROSS-CHECK  
PERFORMANCE EVALUATION**

Sample Number	Quarter/ Year	Sample Media	Nuclide	Units	Reported Value	Known Value	Ratio E-LAB/ Analytics	Evaluation
E5222-162	4th/2006	Water	H-3	pCi/L	14570	14800	0.99	Agreement
E5223-162	4th/2006	Water	Sr-89	pCi/L	68.8	72.6	0.95	Agreement
E5223-162	4th/2006	Water	Sr-90	pCi/L	5.56	5.9	0.94	Agreement
E5224-162	4th/2006	Filter	Gross Alpha	pCi	63.3	67.2	0.94	Agreement
E5224-162	4th/2006	Filter	Gross Beta	pCi	209.6	203	1.03	Agreement
E5225-162	4th/2006	Filter	Ce-141	pCi	179.0	185	0.97	Agreement
E5225-162	4th/2006	Filter	Cr-51	pCi	277.9	273	1.02	Agreement
E5225-162	4th/2006	Filter	Cs-134	pCi	89.1	92.7	0.96	Agreement
E5225-162	4th/2006	Filter	Cs-137	pCi	158.8	149	1.06	Agreement
E5225-162	4th/2006	Filter	Co-58	pCi	54.0	52.8	1.02	Agreement
E5225-162	4th/2006	Filter	Mn-54	pCi	71.2	69.8	1.02	Agreement
E5225-162	4th/2006	Filter	Fe-59	pCi	51.0	50.2	1.02	Agreement
E5225-162	4th/2006	Filter	Zn-65	pCi	104.3	103	1.01	Agreement
E5225-162	4th/2006	Filter	Co-60	pCi	166.7	177	0.94	Agreement
E5226-162	4th/2006	Filter	Sr-89	pCi	69.5	74.2	0.94	Agreement
E5226-162	4th/2006	Filter	Sr-90	pCi	6.46	6.06	1.07	Agreement
E5227-162	4th/2006	Milk	I-131LL	pCi/L	71.0	70.8	1.00	Agreement
E5227-162	4th/2006	Milk	I-131	pCi/L	64.8	70.8	0.91	Agreement
E5227-162	4th/2006	Milk	Ce-141	pCi/L	277.7	294	0.94	Agreement
E5227-162	4th/2006	Milk	Cr-51	pCi/L	430.7	433	0.99	Agreement
E5227-162	4th/2006	Milk	Cs-134	pCi/L	141.4	147	0.96	Agreement
E5227-162	4th/2006	Milk	Cs-137	pCi/L	233.9	237	0.99	Agreement
E5227-162	4th/2006	Milk	Co-58	pCi/L	83.1	83.8	0.99	Agreement
E5227-162	4th/2006	Milk	Mn-54	pCi/L	110.6	111	1.00	Agreement
E5227-162	4th/2006	Milk	Fe-59	pCi/L	82.3	79.7	1.03	Agreement
E5227-162	4th/2006	Milk	Zn-65	pCi/L	171.4	164	1.05	Agreement
E5227-162	4th/2006	Milk	Co-60	pCi/L	273.1	281	0.97	Agreement
E5228-162	4th/2006	Charcoal	I-131	pCi	84.2	87.1	0.97	Agreement

**AREVA 2007 ENVIRONMENTAL LABORATORY  
EKERT & ZIEGLER ANALYTICS ENVIRONMENTAL CROSS CHECK PROGRAM  
PERFORMANCE EVALUATION**

Sample Number	Quarter/ Year	Sample Media	Nuclide	Units	Reported Value	Known Value	Ratio E-LAB/ Analytics	Evaluation
E5238-162	1st/2007	Water	Gross Alpha	pCi/L	117	112	1.05	Agreement
E5238-162	1st/2007	Water	Gross Beta	pCi/L	104	100	1.04	Agreement
E5239-162	1st/2007	Water	I-131LL	pCi/L	88.3	89.8	0.98	Agreement
E5239-162	1st/2007	Water	I-131	pCi/L	74.3	89.8	0.83	Agreement
E5239-162	1st/2007	Water	Ce-141	pCi/L	257	258	1.00	Agreement
E5239-162	1st/2007	Water	Cr-51	pCi/L	218	213	1.02	Agreement
E5239-162	1st/2007	Water	Cs-134	pCi/L	93.6	97.1	0.96	Agreement
E5239-162	1st/2007	Water	Cs-137	pCi/L	197	204	0.97	Agreement
E5239-162	1st/2007	Water	Co-58	pCi/L	86.2	85.8	1.00	Agreement
E5239-162	1st/2007	Water	Mn-54	pCi/L	155	158	0.98	Agreement
E5239-162	1st/2007	Water	Fe-59	pCi/L	87.1	91.7	0.95	Agreement
E5239-162	1st/2007	Water	Zn-85	pCi/L	886	869	1.02	Agreement
E5239-162	1st/2007	Water	Co-60	pCi/L	131	132	0.99	Agreement
E5240-162	1st/2007	Water	Sr-89	pCi/L	127	137	0.92	Agreement
E5240-162	1st/2007	Water	Sr-90	pCi/L	9.39	9.99	0.94	Agreement
E5241-162	1st/2007	Charcoal	I-131	pCi	67.6	70.2	0.96	Agreement
E5242-162	1st/2007	Filter	Gross Alpha	pCi	67.2	69.1	0.97	Agreement
E5242-162	1st/2007	Filter	Gross Beta	pCi	69.4	61.9	1.12	Agreement
E5243-162	1st/2007	Milk	I-131LL	pCi/L	85.1	85.2	1.00	Agreement
E5243-162	1st/2007	Milk	I-131	pCi/L	75.4	85.2	0.88	Agreement
E5243-162	1st/2007	Milk	Ce-141	pCi/L	294	297	0.99	Agreement
E5243-162	1st/2007	Milk	Cr-51	pCi/L	226	245	0.92	Agreement
E5243-162	1st/2007	Milk	Cs-134	pCi/L	104	112	0.93	Agreement
E5243-162	1st/2007	Milk	Cs-137	pCi/L	228	234	0.97	Agreement
E5243-162	1st/2007	Milk	Co-58	pCi/L	98.1	98.8	0.99	Agreement
E5243-162	1st/2007	Milk	Mn-54	pCi/L	184	182	1.01	Agreement
E5243-162	1st/2007	Milk	Fe-59	pCi/L	109	106	1.03	Agreement
E5243-162	1st/2007	Milk	Zn-85	pCi/L	1041	1000	1.04	Agreement
E5243-162	1st/2007	Milk	Co-60	pCi/L	148	152	0.98	Agreement
E5244-162	1st/2007	Milk	Sr-89	pCi/L	126	137	0.92	Agreement
E5244-162	1st/2007	Milk	Sr-90	pCi/L	8.85	10	0.88	Agreement

**AREVA 2007 ENVIRONMENTAL LABORATORY  
ECKERT & ZIEGLER ANALYTICS RADIOLOGICAL ENVIRONMENTAL CROSS-CHECK  
PERFORMANCE EVALUATION**

Sample Number	Quarter/ Year	Sample Media	Nuclide	Units	Reported Value	Known Value	Ratio E-LAB/ Analytics	Evaluation
E5334-162	2nd/2007	Water	H-3	pCi/L	8520	9040	0.94	Agreement
E5335-162	2nd/2007	Filter	Gross Alpha	pCi	122.7	125	0.98	Agreement
E5335-162	2nd/2007	Filter	Gross Beta	pCi	127	112	1.13	Agreement
E5335-162	2nd/2007	Filter	Ce-141	pCi	94.1	107	0.88	Agreement
E5335-162	2nd/2007	Filter	Cr-51	pCi	230	273	0.84	Non-Agreement (1)
E5335-162	2nd/2007	Filter	Cs-134	pCi	114.3	129	0.89	Agreement
E5335-162	2nd/2007	Filter	Cs-137	pCi	88.3	90.1	0.98	Agreement
E5335-162	2nd/2007	Filter	Co-58	pCi	98.4	106	0.93	Agreement
E5335-162	2nd/2007	Filter	Mn-54	pCi	83.3	88.5	0.94	Agreement
E5335-162	2nd/2007	Filter	Fe-59	pCi	79	89.0	0.89	Agreement
E5335-162	2nd/2007	Filter	Zn-65	pCi	167	176	0.94	Agreement
E5335-162	2nd/2007	Filter	Co-60	pCi	112	127	0.89	Agreement
E5337-162	2nd/2007	Filter	Sr-89	pCi	71.4	91.2	0.78	Agreement
E5337-162	2nd/2007	Filter	Sr-90	pCi	10.1	12.4	0.82	Agreement
E5338-162	2nd/2007	MLk	I-131LL	pCi/L	73.5	70.1	1.05	Agreement
E5338-162	2nd/2007	MLk	I-131	pCi/L	75	70.1	1.07	Agreement
E5338-162	2nd/2007	MLk	Ce-141	pCi/L	168	200	0.84	Non-Agreement (2)
E5338-162	2nd/2007	MLk	Cr-51	pCi/L	447	512	0.87	Agreement
E5338-162	2nd/2007	MLk	Cs-134	pCi/L	223	242	0.92	Agreement
E5338-162	2nd/2007	MLk	Cs-137	pCi/L	165	169	0.98	Agreement
E5338-162	2nd/2007	MLk	Co-58	pCi/L	203	198	1.02	Agreement
E5338-162	2nd/2007	MLk	Mn-54	pCi/L	178	166	1.07	Agreement
E5338-162	2nd/2007	MLk	Fe-59	pCi/L	170	167	1.02	Agreement
E5338-162	2nd/2007	MLk	Zn-65	pCi/L	343	334	1.03	Agreement
E5338-162	2nd/2007	MLk	Co-60	pCi/L	238	238	1.00	Agreement

(1) Cr-51 on filter outside of acceptance limit. CR 08-02 generated.

(2) Ce-141 in milk outside of acceptance limit. CR 08-02 generated.

**AREVA 2007 ENVIRONMENTAL LABORATORY  
ECKERT & ZIEGLER ANALYTICS RADIOLOGICAL ENVIRONMENTAL CROSS-CHECK  
PERFORMANCE EVALUATION**

Sample Number	Quarter/ Year	Sample Media	Nuclide	Units	Reported Value	Known Value	Ratio E-LAB/ Analytics	Evaluation
E5430-162	3rd /2007	Water	Gross Alpha	pCi/L	112	109	1.03	Agreement
E5430-162	3rd /2007	Water	Gross Beta	pCi/L	218	214	1.02	Agreement
E5431-162	3rd /2007	Water	I-131LL	pCi/L	83.4	80.1	1.04	Agreement
E5431-162	3rd /2007	Water	I-131	pCi/L	80.2	80.1	1.00	Agreement
E5431-162	3rd /2007	Water	Ce-141	pCi/L	178	182	0.97	Agreement
E5431-162	3rd /2007	Water	Cr-51	pCi/L	228	249	0.92	Agreement
E5431-162	3rd /2007	Water	Cs-134	pCi/L	111	127	0.87	Agreement
E5431-162	3rd /2007	Water	Cs-137	pCi/L	112	112	1.00	Agreement
E5431-162	3rd /2007	Water	Co-58	pCi/L	94.3	98.1	0.98	Agreement
E5431-162	3rd /2007	Water	Mn-54	pCi/L	141	144	0.98	Agreement
E5431-162	3rd /2007	Water	Fe-59	pCi/L	94.8	95.1	1.00	Agreement
E5431-162	3rd /2007	Water	Zn-65	pCi/L	188	174	1.07	Agreement
E5431-162	3rd /2007	Water	Co-60	pCi/L	120	127	0.94	Agreement
E5432-162	3rd /2007	Charcoal	I-131	pCi	66.5	69.6	0.98	Agreement
E5433-162	3rd /2007	Filter	Gross Alpha	pCi	86.4	105	0.82	Non-Agreement (3)
E5433-162	3rd /2007	Filter	Gross Beta	pCi	190	198	0.97	Agreement
E5434-162	3rd /2007	Milk	I-131LL	pCi/L	87.2	85.2	1.02	Agreement
E5434-162	3rd /2007	Milk	I-131	pCi/L	82.9	85.2	0.97	Agreement
E5434-162	3rd /2007	Milk	Ce-141	pCi/L	198	211	0.93	Agreement
E5434-162	3rd /2007	Milk	Cr-51	pCi/L	282	289	0.97	Agreement
E5434-162	3rd /2007	Milk	Cs-134	pCi/L	141	147	0.96	Agreement
E5434-162	3rd /2007	Milk	Cs-137	pCi/L	126	131	0.96	Agreement
E5434-162	3rd /2007	Milk	Co-58	pCi/L	111	114	0.97	Agreement
E5434-162	3rd /2007	Milk	Mn-54	pCi/L	171	168	1.02	Agreement
E5434-162	3rd /2007	Milk	Fe-59	pCi/L	112	111	1.01	Agreement
E5434-162	3rd /2007	Milk	Zn-65	pCi/L	212	202	1.05	Agreement
E5434-162	3rd /2007	Milk	Co-60	pCi/L	145	146	0.98	Agreement
E5435-162	3rd /2007	Milk	Sr-90	pCi/L	89.2	94.9	0.94	Agreement
E5435-162	3rd /2007	Milk	Sr-90	pCi/L	12.9	13.1	0.98	Agreement

(3) Gross alpha on filter outside of acceptance limit. CR 08-01 generated.

**AREVA 2007 ENVIRONMENTAL LABORATORY  
ECKERT & ZIEGLER ANALYTICS RADIOLOGICAL ENVIRONMENTAL CROSS-CHECK  
PERFORMANCE EVALUATION**

Sample Number	Quarter/ Year	Sample Media	Nuclide	Units	Reported Value	Known Value	Ratio E-LAB/ Analytics	Evaluation
E5527-162	4 <sup>TH</sup> /2007	Water	H-3	pCi/L	9003	9030	1.00	Agreement
E5528-162	4 <sup>TH</sup> /2007	Water	Sr-89	pCi/L	87.1	94.9	0.92	Agreement
E5528-162	4 <sup>TH</sup> /2007	Water	Sr-90	pCi/L	14.4	15.4	0.93	Agreement
E5530-162	4 <sup>TH</sup> /2007	Filter	Gross Alpha	pCi	102.7	120	0.86	Agreement
E5530-162	4 <sup>TH</sup> /2007	Filter	Gross Beta	pCi	166.1	152	1.09	Agreement
E5531-162	4 <sup>TH</sup> /2007	Filter	Ce-141	pCi	84.1	98.4	0.85	Agreement
E5531-162	4 <sup>TH</sup> /2007	Filter	Cr-51	pCi	311.7	358	0.87	Agreement
E5531-162	4 <sup>TH</sup> /2007	Filter	Cs-134	pCi	82.3	96.1	0.86	Agreement
E5531-162	4 <sup>TH</sup> /2007	Filter	Cs-137	pCi	108.9	116	0.94	Agreement
E5531-162	4 <sup>TH</sup> /2007	Filter	Co-58	pCi	107.5	122	0.88	Agreement
E5531-162	4 <sup>TH</sup> /2007	Filter	Mn-54	pCi	117.2	133	0.88	Agreement
E5531-162	4 <sup>TH</sup> /2007	Filter	Fe-59	pCi	86.6	104	0.83	Non -Agreement <sup>(2)</sup>
E5531-162	4 <sup>TH</sup> /2007	Filter	Zn-65	pCi	135.3	164	0.83	Non-Agreement <sup>(2)</sup>
E5531-162	4 <sup>TH</sup> /2007	Filter	Co-60	pCi	123.1	148	0.83	Non-Agreement <sup>(2)</sup>
E5532-162	4 <sup>TH</sup> /2007	Filter	Sr-89	pCi	45.9	102	0.45	Non-Agreement <sup>(1)</sup>
E5532-162	4 <sup>TH</sup> /2007	Filter	Sr-90	pCi	7.2	16.5	0.44	Non-Agreement <sup>(1)</sup>
E5533-162	4 <sup>TH</sup> /2007	Milk	I-131LL	pCi/L	59.2	60.8	0.97	Agreement
E5533-162	4 <sup>TH</sup> /2007	Milk	I-131	pCi/L	58.5	60.8	0.96	Agreement
E5533-162	4 <sup>TH</sup> /2007	Milk	Ce-141	pCi/L	136.0	141	0.97	Agreement
E5533-162	4 <sup>TH</sup> /2007	Milk	Cr-51	pCi/L	516.7	512	1.01	Agreement
E5533-162	4 <sup>TH</sup> /2007	Milk	Cs-134	pCi/L	137.0	137	1.00	Agreement
E5533-162	4 <sup>TH</sup> /2007	Milk	Cs-137	pCi/L	166.2	166	1.00	Agreement
E5533-162	4 <sup>TH</sup> /2007	Milk	Co-58	pCi/L	166.5	174	0.96	Agreement
E5533-162	4 <sup>TH</sup> /2007	Milk	Mn-54	pCi/L	200.9	190	1.06	Agreement
E5533-162	4 <sup>TH</sup> /2007	Milk	Fe-59	pCi/L	155.0	148	1.05	Agreement
E5533-162	4 <sup>TH</sup> /2007	Milk	Zn-65	pCi/L	222.9	234	0.95	Agreement
E5533-162	4 <sup>TH</sup> /2007	Milk	Co-60	pCi/L	205.1	211	0.97	Agreement
E5533-162	4 <sup>TH</sup> /2007	Charcoal	I-131	pCi	69.8	73.4	0.95	Agreement

(1) Sr-89/90 results low. CR 08-10 generated.

(2) Low bias, -17%. CR 08-11 generated.