VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

April 16, 2013

United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Serial No. 13-175
NAPS/JHL
Docket Nos. 50-338/339
72-16
72-56
License Nos. NPF-4/7
SNM-2507

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 Specification 5.5.2c, enclosed is the 2012 Annual Radiological Environmental Operating Report. The Radiological Environmental Operating Report provides the details associated with the Radiological Environmental Monitoring Program.

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

Very truly yours,

Gerald T. Bischof
Site Vice President

Enclosure

Commitments made in this letter: None

IE25
NMSS26

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

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

NRC Senior Resident Inspector
North Anna Power Station

Annual Radiological Environmental Operating Report

North Anna Power Station

January 1, 2012 to December 31, 2012

Prepared by: Leonard E. Oakes

Leonard E. Oakes
Supervisor Radiological Analysis and Instrumentation
Dominion North Anna Power Station

Reviewed by: George R Simmons

George R. Simmons
Supervisor Health Physics Technical Services
Dominion North Anna Power Station

Approved by: Robert B Evans Jr

Robert B. Evans, Jr.
Manager Radiological Protection and Chemistry
Dominion North Anna Power Station

North Anna Power Station

2012 Annual Radiological Environmental Operating Report

Dominion

North Anna Power Station

Radiological Environmental Monitoring Program

January 1, 2012 to December 31, 2012

Prepared by

Dominion, North Anna Power Station

Table of Contents

1. EXECUTIVE SUMMARY

This document is a detailed report of the 2012 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 5.5.2. Radioactivity levels from January 1 through December 31, 2012, 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 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. 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, Fukushima Daiichi or natural variation.

Global Dosimetry Solutions provided thermoluminescent dosimetry (TLD) services and Teledyne Brown Engineering Environmental Services 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 2012 airborne results were similar to previous years. Fallout or natural radioactivity levels remained at levels consistent with past years' results.

Water and aquatic exposure pathway samples include precipitation, surface, river and well water, silt and shoreline sediments, and fish. The average tritium activity in surface water for 2012 was 2600 pCi/liter. Zn-65 was reported in one precipitation water sample at the indicator location. However, the peak was not identified, but forced activity concentration calculation exceeded MDC and the 2 sigma error. This is considered a false positive. No plant related isotopes were reported in any other surface or river water. River water collected from the North Anna River, 5.8 miles downstream of the site had an average tritium level of 3050 pCi/liter. No plant related isotopes were detected in quarterly precipitation samples. Silt samples indicated the presence of naturally occurring potassium-40 and thorium and uranium decay daughters at levels consistent with the natural background. No plant related isotope was identified in any sample. Shoreline soil, which may provide a direct exposure pathway, indicated the presence of potassium-40 and thorium and uranium decay daughters also at levels consistent with natural levels. Cs-137 was detected in the control station at a level of 157 pCi/kg. During the preoperational phase Cs-137 was routinely detected and was attributed to fallout. This Cs-137 level is consistent with historic levels. No plant related isotope was detected in the indicator locations in shoreline soil. No plant related isotopes were detected in fish samples from either Lake Anna or the control location, Lake Orange.

Soil samples, which are collected every three years from twelve stations, were not collected in 2012.

The terrestrial exposure pathway includes milk and food/vegetation products. No plant related radioisotopes were detected in any milk samples. Naturally occurring beryllium-7, potassium-40 and radionuclides associated with the uranium and thorium series were detected at environmental levels consistent with historical data. Cs-137 was reported in one vegetation sample at the indicator location. However, the peak was not identified, but forced activity concentration calculation exceeded MDC and the 2 sigma error. This is considered a false positive. Therefore, no plant related isotopes were detected in any vegetation samples. 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 2012, 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 total body dose calculated for a hypothetical individual at the station site boundary due to liquid and gaseous effluents released from the station during 2012 was 0.27 millirem. For reference, this dose may be compared to the 625 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 2012 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 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 the 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 utilized for processing the TLDs. Teledyne Brown Engineering Environmental Services (TBE) is utilized 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 2012 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 2012 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 TBE for North Anna Power Station during the year 2012.

TABLE 2-1

North Anna Power Station – 2012

RADIOLOGICAL SAMPLING STATION

DISTANCE AND DIRECTION FROM UNIT NO. 1

Sample Media	Location	Station	Distance	Direction	Degrees	Collection Frequency	Remarks
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	0.36	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 – 2012

RADIOLOGICAL SAMPLING STATION

DISTANCE AND DIRECTION FROM UNIT NO. 1

Sample Media	Location	Station	Distance	Direction	Degrees	Collection Frequency	Remarks
Environmental	Elk Creek Church	S-18/50	1.55	S	178°	Quarterly	
Thermoluminescent	NAPS Access Rd.	SSW-19/51	0.24	SSW	197°	Quarterly	
Dosimetry (TLD)	Route 618	SSW-20/52	5.30	SSW	205°	Quarterly	
	500kv Tower	SW-21/53	0.60	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 - Laydown Area	NW-29/61	0.52	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	
	Orange, VA	C-3/4	22.00	NW	325°	Quarterly	Control
	Mineral, VA	C-5/6	7.10	WSW	243°	Quarterly	
	Louisa, VA	C-7/8	11.54	WSW	257°	Quarterly	Control
Airborne Particulate	NAPS Sewage Treatment Plant	01	0.20	NE	42°	Weekly	
and Radioiodine	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 2-1

North Anna Power Station – 2012

RADIOLOGICAL SAMPLING STATION

DISTANCE AND DIRECTION FROM UNIT NO. 1

Sample Media	Location	Station	Distance	Direction	Degrees	Collection Frequency	Remarks
Airborne Particulate	End of Route 685	21	1.00	WNW	301°	Weekly	
and Radioiodine	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
Surface Water	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
River Water	North Anna River (downstream)	11	5.80	SE	128°	Monthly	
Ground Water (Well Water)	Biology Lab	01A	0.64	SE	138°	Quarterly	
Precipitation	Biology Lab	01A	0.64	SE	138°	Monthly	
Aquatic Sediment	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	
Shoreline Soil	Waste Heat Treatment Facility (Second Cooling Lagoon)	08 **	3.37	SSE	148°	Semi-Annually	
Soil	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 2-1

North Anna Power Station – 2012

RADIOLOGICAL SAMPLING STATION

DISTANCE AND DIRECTION FROM UNIT NO. 1

Sample Media	Location	Station	Distance	Direction	Degrees	Collection Frequency	Remarks
Soil	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
Milk	Lakeside Dairy	12A	7.50	NW	310°	Monthly	
Fish	Waste Heat Treatment Facility (Second Cooling Lagoon)	08	3.37	SSE	148°	Semi-Annually	
	Lake Orange	25	16.5	NW	312°	Semi-Annually	Control
Food Products (Vegetation)	Stagecoach Road	14B	1.22	NNE	40°	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	
	"Historic Lane"	26	1.15	S	172 °	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

SAMPLE MEDIA	FREQUENCY	ANALYSIS	LLD	REPORT UNITS
Thermoluminescent Dosimetry (TLD)				
(84 TLDs)	Quarterly	Gamma Dose	2 mR±2mR	mR/std. Month
(12 TLDs)	Annually	Gamma Dose	2 mR±2mR	mR/std. Month
Airborne Radioiodine	Weekly	I-131	0.07	pCi/m^3
Airborne Particulate	Weekly	Gross Beta	0.01	pCi/m^3
	Quarterly (a)	Gamma Isotopic		pCi/m^3
		Cs-134	0.05	
		Cs-137	0.06	
	2^{nd} Quarter	Sr-89	(b)	pCi/m^3
	Composite	Sr-90	(b)	
Surface Water	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^{nd} Quarter	Sr-89	(b)	pCi/L
	Composite	Sr-90	(b)	
River Water	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	

*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

(d) LLD applied are those for water samples. However, since this is a semi-annual composite no LLD is applied for these nuclides due to their short half-lives.

TABLE 2-2
North Anna Power Station
SAMPLE ANALYSIS PROGRAM

SAMPLE MEDIA	FREQUENCY	ANALYSIS	LLD	REPORT UNITS
		La-140	15	
River Water	Quarterly(a)	Tritium (H-3)	2000	pCi/L
	2nd Quarter	Sr-89	(b)	pCi/L
	Composite	Sr-90	(b)	
Ground Water (Well Water)	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	10(c)	
		Cs-134	15	
		Cs-137	18	
		Ba-140	60	
		La-140	15	
	Quarterly(a)	Tritium (H-3)	2000	pCi/L
	2nd Quarter	Sr-89	(b)	pCi/L
		Sr-90	(b)	
Aquatic Sediment	Semi-Annually	Gamma Isotopic		pCi/kg (dry)
		Cs-134	150	
		Cs-137	180	
	Annually	Sr-89	(b)	pCi/kg (dry)
		Sr-90	(b)	
Precipitation	Monthly	Gross Beta	4	pCi/L
	Semi-Annual	Gamma Isotopic		pCi/L
	Composite (1)	Mn-54	15	
		Fe-59	30	
		Co-58	15	
		Co-60	15	
		Zn-65	30	
		Zr-95	30	
		Nb-95	15	
		I-131(d)		
		Cs-134	15	
		Cs-137	18	
		Ba-140(d)		
		La-140(d)		
Shoreline Soil	Semi-Annually	Gamma Isotopic		pCi/kg (dry)
		Cs-134	150	
		Cs-137	180	

*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

(d) LLD applied are those for water samples. However, since this is a semi-annual composite no LLD is applied for these nuclides due to their short half-lives.

TABLE 2-2
North Anna Power Station
SAMPLE ANALYSIS PROGRAM

SAMPLE MEDIA	FREQUENCY	ANALYSIS	LLD	REPORT UNITS
	Annually	Sr-89	(b)	pCi/kg (dry)
		Sr-90	(b)	
Soil	Once per 3 years	Gamma Isotopic		pCi/kg (dry)
		Cs-134	150	
		Cs-137	180	
		Sr-89	(b)	pCi/kg (dry)
		Sr-90	(b)	
Milk	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)	
Fish	Semi-Annually	Gamma Isotopic		pCi/kg (wet)
		Mn-54	130	
		Fe-59	260	
		Co-58	130	
		Co-60	130	
		Zn-65	260	
		Cs-134	130	
		Cs-137	150	
Food Products (Broadleaf Vegetation)	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
(d) LLD applied are those for water samples. However, since this is a semi-annual composite no LLD is applied for these nuclides due to their short half-lives.

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

Map Designation	Environmental Station Identification	Map Designation	Environmental Station Identification
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,	17/49	S-17/49
	Shoreline Soil	19/51	SSW-19/51
9A	09A-Water sample, Sediment	21/53	SW-21/53
11	11-River Water, Sediment	23/55	WSW-23/55
12A	12A-Milk	25/57	W-25/57
14B	14B-Vegetation	16/48	SSE-16/48
15	15-Vegetation	14/46	SE-14/46
16	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

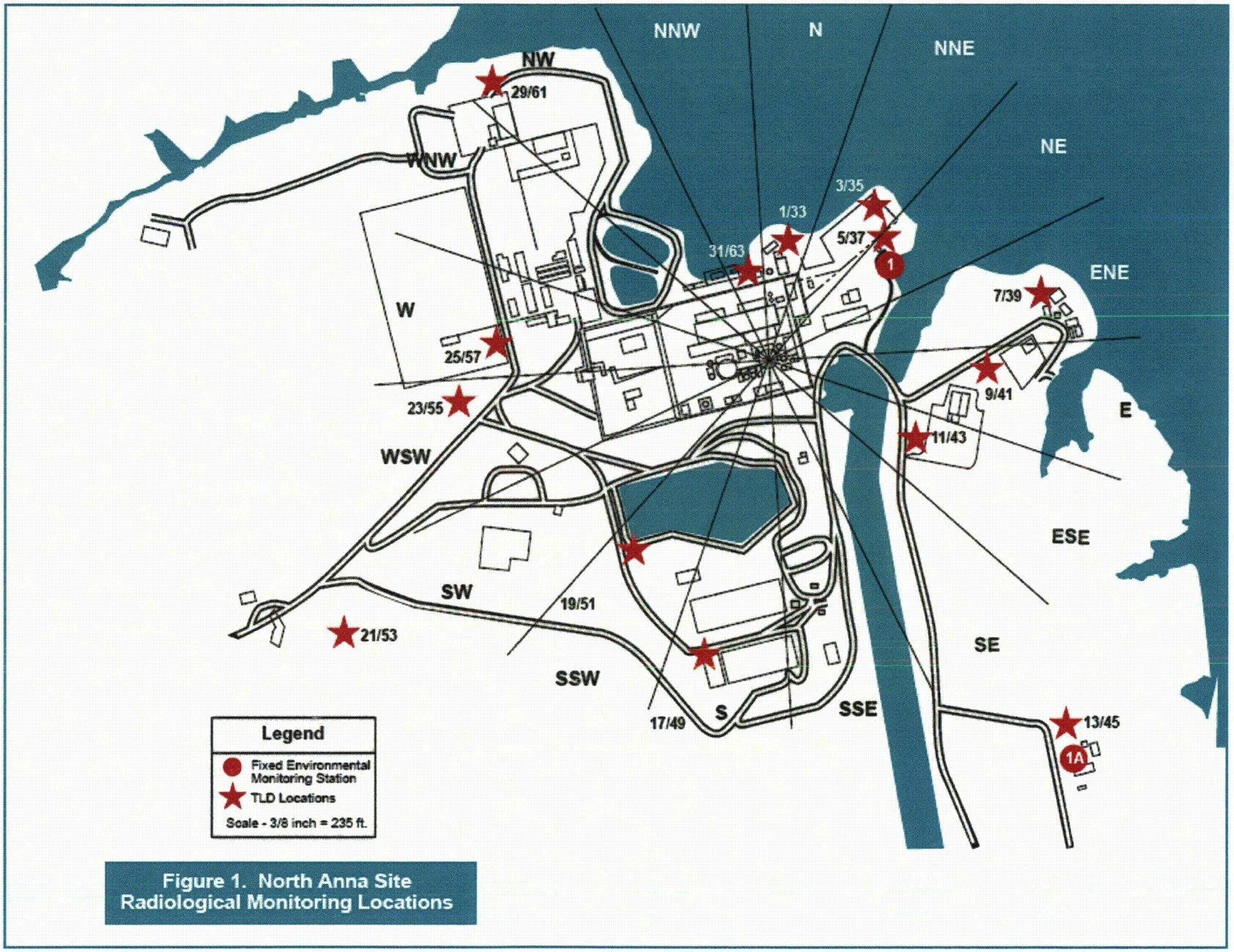
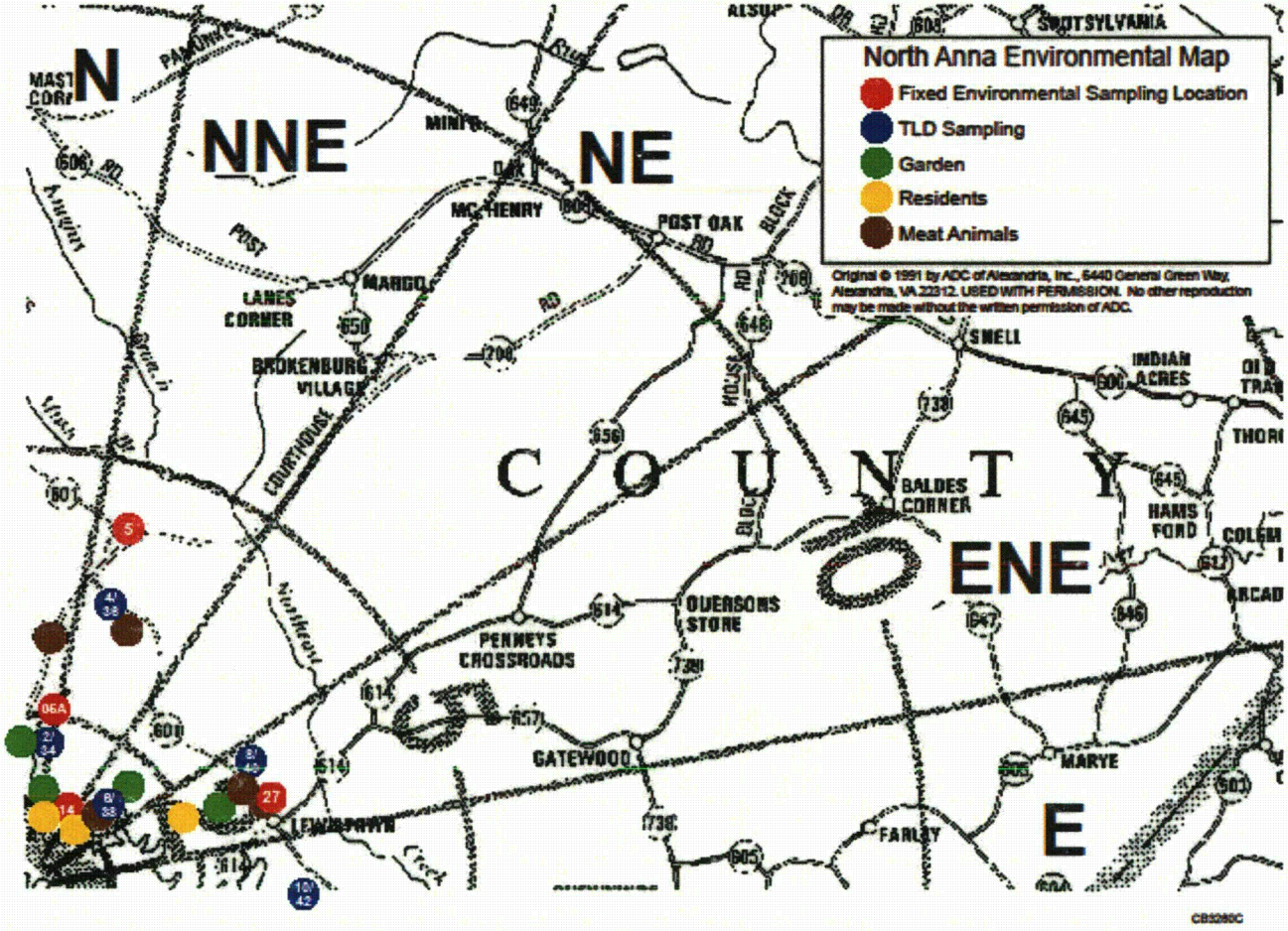
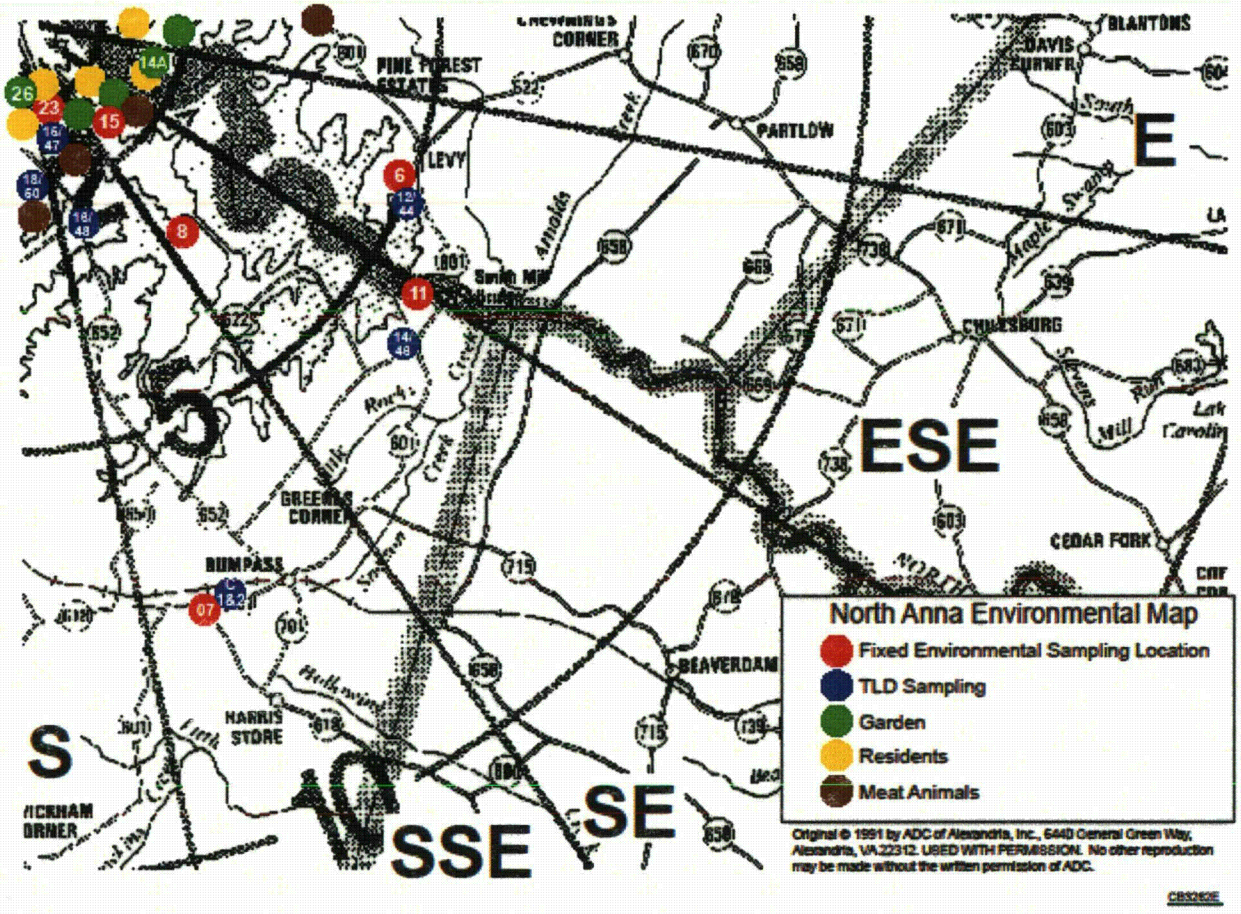
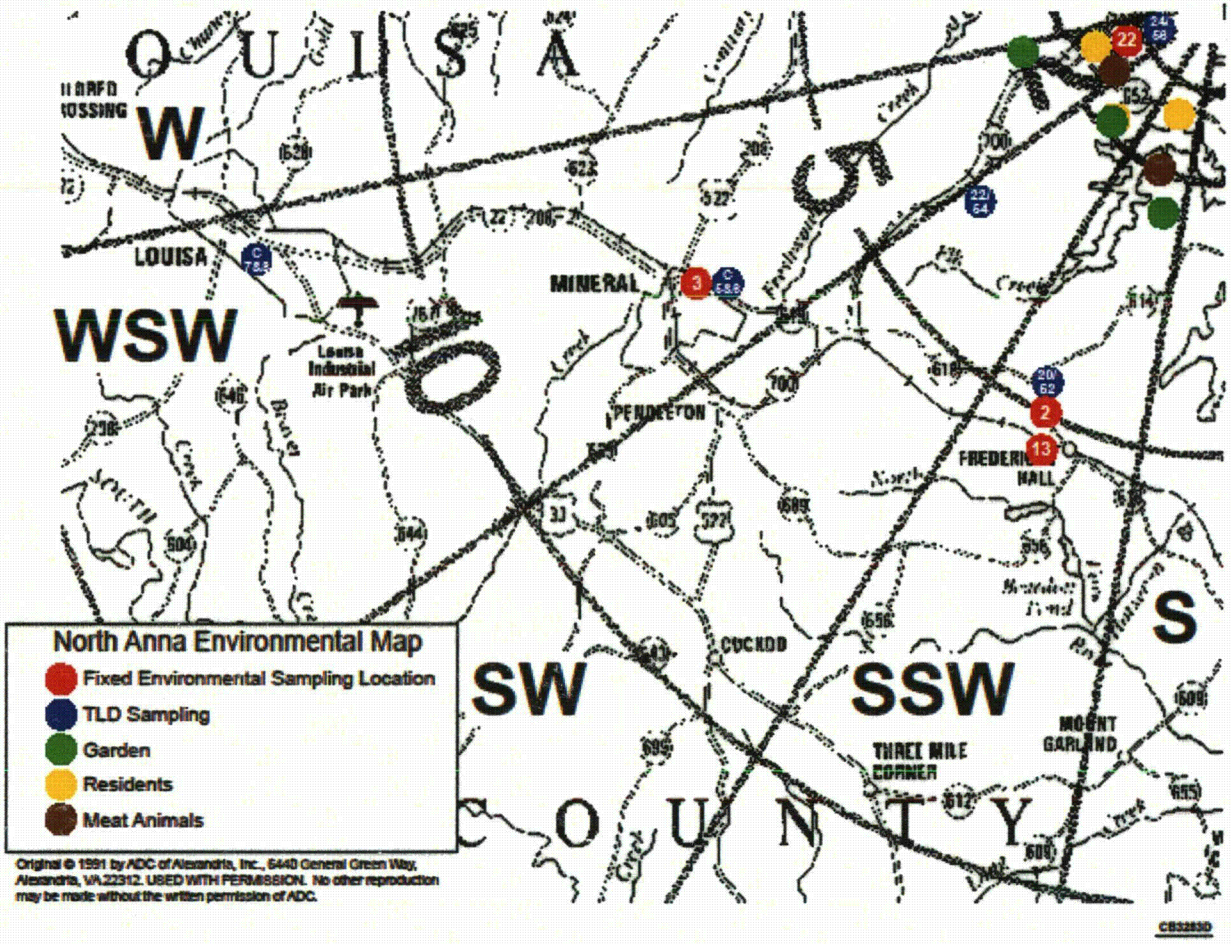
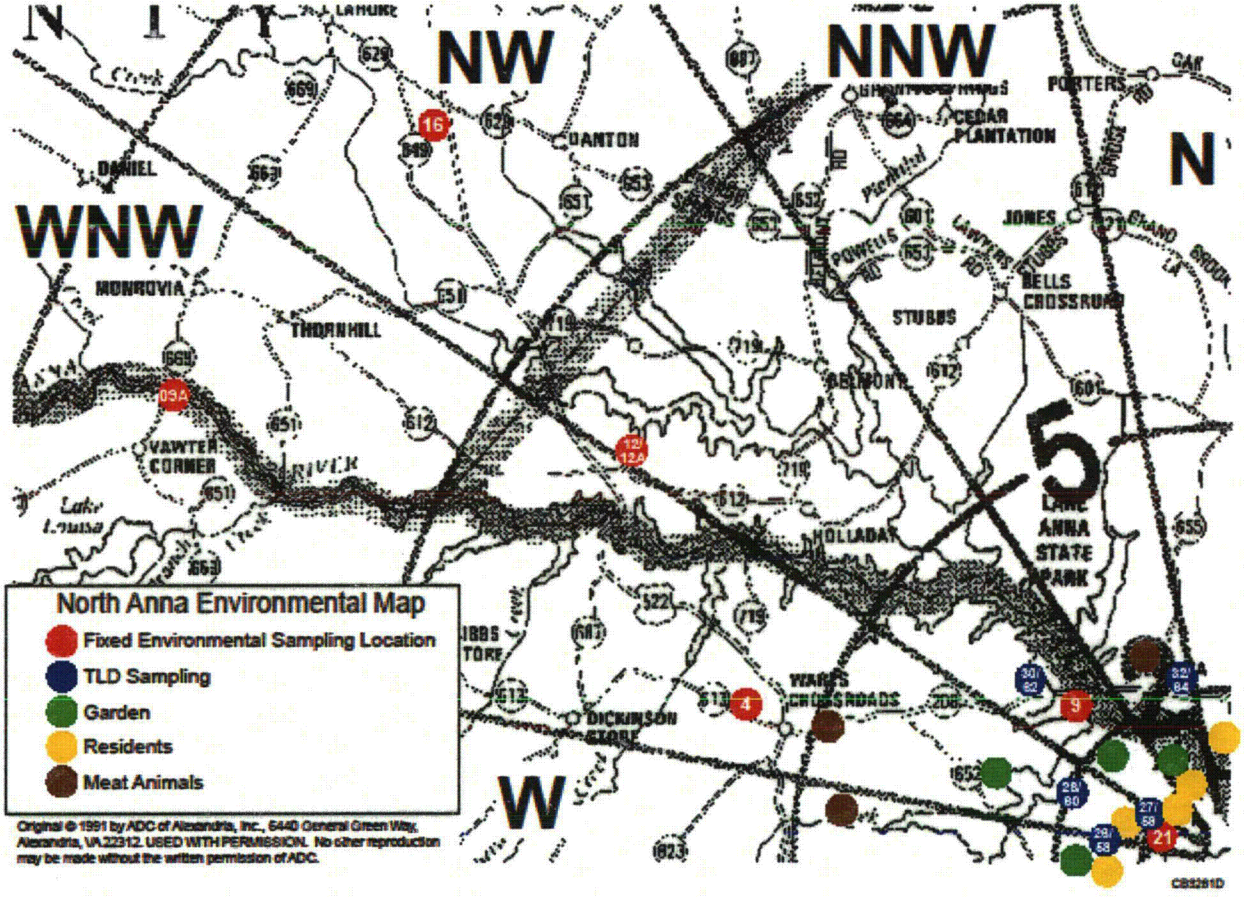


Figure 1. North Anna Site Radiological Monitoring Locations


North Anna Environmental Map
Fixed Environmental Sampling Location
TLD Sampling
Garden
Residents
Meat Animals
Original © 1991 by ADC of Alexandria, Inc., 5440 General Green Way, Alexandria, VA 22312. USED WITH PERMISSION. No other reproduction may be made without the written permission of ADC.
N
NNE
NE
ENE
E
COUNTY
MCHENRY
POST OAK
MARGO
LANES CORNER
BROKENBURG VILLAGE
COURTHOUSE
SNELL
INDIAN ACRES
BALDES CORNER
HAMS FORD
OVERSONS STORE
PERREYS CROSSROADS
GATEWOOD
MARYE
FARLEY
SPOTSYLVANIA
CB3280C


North Anna Environmental Map
Fixed Environmental Sampling Location
TLD Sampling
Garden
Residents
Meat Animals
ESE
SE
SSE
S
E
5
10
PINE FOREST ESTATES
LEVY
PARTLOW
DAVIS CORNER
BLANTONS
CHULASBURG
CEDAR FORK
BEAVERDAM
HARRIS STORE
BUMPASS
GREENES CORNER
Original © 1991 by ADC of Alexandria, Inc., 6440 General Green Way, Alexandria, VA 22312. USED WITH PERMISSION. No other reproduction may be made without the written permission of ADC.
CB3262E


LOUISA
MINERAL
PENDLETON
CUCKOO
THREE MILE CORNER
MOUNT GARLAND
W
WSW
SW
SSW
S
North Anna Environmental Map
Fixed Environmental Sampling Location
TLD Sampling
Garden
Residents
Meat Animals
Original © 1991 by ADC of Alexandria, Inc., 6440 General Green Way, Alexandria, VA 22312. USED WITH PERMISSION. No other reproduction may be made without the written permission of ADC.
CB3283D


NW
NNW
WNW
N
W
DANTON
CEDAR PLANTATION
JONES
BELLS CROSSROADS
STUBBS
MONROVIA
THORNHILL
DANIEL
POWELLS
LAWYERS
BELMONT
HOLLADAY
WARES CROSSROADS
DICKINSON STORE
VAWTER CORNER
RIVER
Lake Louisa
LAKE ANNA STATE PARK
5
North Anna Environmental Map
Fixed Environmental Sampling Location
TLD Sampling
Garden
Residents
Meat Animals
Original © 1991 by ADC of Alexandria, Inc., 6440 General Green Way, Alexandria, VA 22312. USED WITH PERMISSION. No other reproduction may be made without the written permission of ADC.
CB3281D

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 any results above the Minimum Detectable Concentration, MDC. Results are considered true positives when the measured value exceeds both the MDC and the 2σ error. 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

North Anna Nuclear Power Station, Louisa County, Virginia – 2012

Docket No. 50-338/339 Page 1 of 9

Medium or Pathway Sampled (Unit)	Analysis		LLD[1] (pCi/unit)	All Indicator Locations	Indicator Location with Highest Mean			Control Location	Non-routine
	Type	Total No.		Mean Range	Name	Distance Direction	Mean Range	Mean Range	Reported Measure-ments
Direct Radiation (mR/std. Month) (Sector TLDs)	Gamma Dose	256	2	4.2(256/256) (1.4-8.6)	29/61	0.52 mi. NW	7.0(8/8) (5.3-8.5)	3.2(16/16)* (2.2-3.8)	0
Direct Radiation (mR/std. Month) (Pre-operational TLDs)	Gamma Dose	32	2	2.5(16/16) (1.1-3.7)	C-1/2	7.3 mi. SSE	3.0 (8/8) (2.0-3.7)	3.2(16/16)* (2.2-3.8)	0
Direct Radiation (mR/std. Month) (Emergency Sector TLDs)	Gamma Dose	40	2	4.9(40/40) (2.9-8.3)	EPSP-09/10	0.37 mi. ENE	7.2(8/8) (6.1-8.3)	3.2(16/16)* (2.2-3.8)	0
Direct Radiation (mR/std. month) (Environmental TLDs)	Gamma Dose	48	2	3.2(44/44) (2.1-4.5)	06	4.7 mi. ESE	4.5(4/4) (3.6-4.9)	3.0(4/4) (2.1-3.8)	0
Direct Radiation (mR/std. Month) (Annual TLDs)	Gamma Dose	12	2	4.0(11/11) (3.0-6.1)	01	0.20 mi. NE	6.1(1/1) (6.1)	3.4(1/1) (3.4)	0
Airborne Particulates (1E-03 pCi/m^3)	Gross Beta	676	0.01	16.0(623/624) (3.03-36.8)	05	0.2 mi. NNE	18.4(51/52) (6.65-36.8)	15.5(52/52) (6.89-31.9)	0
Air Iodine (pCi/m^3)	I-131	676	0.07	(0/624)	N/A	N/A.	N/A	N/A	0
Airborne Particulates (1E-03 pCi/m^3)	Gamma	52							
	Be-7	52	-	137(48/48) (80.7-430)	21	1.0 mi. WNW	208(4/4) (98.4-430)	121(4/4) (105-147)	0
	Cs-134	52	0.05	(0/48)	N/A	N/A	N/A	(0/4)	0

(1) mR/std month for TLDs

* C-3/4, -7/8 used as control locations

Table 3-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

North Anna Nuclear Power Station, Louisa County, Virginia – 2012

Docket No. 50-338/339 Page 2 of 9

Medium or Pathway Sampled (Unit)	Analysis Type	Analysis Total No.	LLD (pCi/unit)	All Indicator Locations Mean Range	Indicator Location with Highest Mean Name	Indicator Location with Highest Mean Distance Direction	Indicator Location with Highest Mean Mean Range	Control Location Mean Range	Non-routine Reported Measure-ments
Airborne Particulates	Cs-137	52	0.06	(0/48)	N/A	N/A	N/A	(0/4)	0
(1E-03 pCi/m^3)	Sr-89	13	-	(0/12)	N/A	N/A	N/A	(0/1)	0
	Sr-90	13	-	(0/12)	N/A	N/A	N/A	(0/1)	0
Soil*	Triennial								
(pCi/Kg) (dry)	Gamma	0							
	K-40	0	-	N/A	N/A	N/A	N/A	N/A	0
	Cs-134	0	150	N/A	N/A	N/A	N/A	N/A	0
	Cs-137	0	180	N/A	N/A	N/A	N/A	N/A	0
	Ra-226	0	-	N/A	N/A	N/A	N/A	N/A	0
	Th-228	0	-	N/A	N/A	N/A	N/A	N/A	0
	Th-232	0		N/A	N/A	N/A	N/A	N/A	0
	Sr-89	0	-	N/A	N/A	N/A	N/A	N/A	0
	Sr-90	0	-	N/A	N/A	N/A	N/A	N/A	0
Precipitation	Monthly								
(pCi/liter)	Gross Beta	12	4	4.02(6/12) (2.42-7.73)	01A	0.64 mi. SE	4.02(6/12) (2.42-7.73)	N/A	0
	H-3	2	2000	(0/2)	N/A	N/A	N/A	N/A	0
	Semiannual Gamma	2							
	Be-7	2	-	(0/2)	N/A	N/A	N/A	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

* Soil Samples required triennially. Last samples were taken 2010. Not required in 2012.

Table 3-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

North Anna Nuclear Power Station, Louisa County, Virginia – 2012

Docket No. 50-338/339 Page 3 of 9

Medium or Pathway Sampled (Unit)	Analysis		LLD (pCi/unit)	All Indicator Locations	Indicator Location with Highest Mean			Control Location	Non-routine
	Type	Total No.		Mean Range	Name	Distance Direction	Mean Range	Mean Range	Reported Measure-ments
Precipitation (pCi/liter)	Co-60	2	15	(0/2)	N/A	N/A	N/A	N/A	0
	*Zn-65	2	30	3.76(1/2) (3.76)	01A	0.64 mi. SE	3.76(1/2) (3.76)	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		(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		(0/2)	N/A	N/A	N/A	N/A	0
	La-140	2		(0/2)	N/A	N/A	N/A	N/A	0
	Th-228	2		(0/2)	N/A	N/A	N/A	N/A	0

* Activity listed is due to forced activity calculation. Nuclide was not identified during analysis. False positive.

Table 3-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

North Anna Nuclear Power Station, Louisa County, Virginia – 2012

Docket No. 50-338/339 Page 4 of 9

Medium or Pathway Sampled (Unit)	Analysis Type	Analysis Total No.	LLD (pCi/unit)	All Indicator Locations Mean Range	Indicator Location with Highest Mean Name	Indicator Location with Highest Mean Distance Direction	Indicator Location with Highest Mean Mean Range	Control Location Mean Range	Non-routine Reported Measure-ments
Milk (pCi/liter)	Gamma	12							
	K-40	12	-	1350(12/12) (1240-1480)	12A	7.50 mi. NW	1350(12/12) (1240-1480)	N/A	0
	I-131	12	1	(0/12)	12A	N/A.	N/A	N/A	0
	Cs-137	12	18	(0/12)	N/A	N/A	N/A	N/A	0
	Ba-140	12	60	(0/12)	N/A	N/A	N/A	N/A	0
	La-140	12	15	(0/12)	N/A	N/A	N/A	N/A	0
	Sr-89 (Quarterly)	4	-	(0/4)	N/A	N/A	N/A	N/A	0
	Sr-90 (Quarterly)	4	-	(0/4)	N/A	N/A	N/A	N/A	0

Table 3-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

North Anna Nuclear Power Station, Louisa County, Virginia – 2012

Docket No. 50-338/339 Page 5 of 9

Medium or Pathway Sampled (Unit)	Analysis Type	Analysis Total No.	LLD (pCi/unit)	All Indicator Locations Mean Range	Indicator Location with Highest Mean Name	Indicator Location with Highest Mean Distance Direction	Indicator Location with Highest Mean Mean Range	Control Location Mean Range	Non-routine Reported Measurements
Food Vegetation	Gamma	35							
(pCi/kg) (wet)	Be-7	35	-	1520(28/28) (460-4550)	26	1.15 S	1970(7/7) (1220-3330)	969(7/7) (268-2200)	0
	K-40	35	-	6280(28/28) (3650-9050)	15	1.37 SE	6980(7/7) (6000-8580)	4910(7/7) (3020-8600)	0
	I-131	35	60	(0/28)	N/A	N/A	N/A	(0/7)	0
	Cs-134	35	60	(0/28)	N/A	N/A	N/A	(0/7)	0
	Cs-137**	35	80	33.8(1/28) (33.8)	23	0.93 SSE	33.8(1/28) (33.8)	(0/7)	0
Ground Well Water	Tritium	4	2000	(0/4)	N/A	N/A	N/A	N/A	0
(pCi/liter)	Gamma	*3							
	Mn-54	3	15	(0/3)	N/A	N/A	N/A	N/A	0
	Fe-59	3	30	(0/3)	N/A	N/A	N/A	N/A	0
	Co-58	3	15	(0/3)	N/A	N/A	N/A	N/A	0
	Co-60	3	15	(0/3)	N/A	N/A	N/A	N/A	0
	Zn-65	3	30	(0/3)	N/A	N/A	N/A	N/A	0
	Zr-95	3	30	(0/3)	N/A	N/A	N/A	N/A	0
	Nb-95	3	15	(0/3)	N/A	N/A	N/A	N/A	0
	I-131	4	10	(0/4)	N/A	N/A	N/A	N/A	0

*Missed gamma analysis on 2nd Quarter 2012 Ground water well

** Activity listed is due to forced activity calculation. Nuclide was not identified during analysis. False positive

Table 3-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

North Anna Nuclear Power Station, Louisa County, Virginia – 2012

Docket No. 50-338/339 Page 6 of 9

Medium or Pathway Sampled (Unit)	Analysis Type	Total No.	LLD (pCi/unit)	All Indicator Locations Mean Range	Indicator Location with Highest Mean Name	Distance Direction	Mean Range	Control Location Mean Range	Non-routine Reported Measurements
Ground Well Water (pCi/liter)	Cs-134	3	15	(0/3)	N/A	N/A	N/A	N/A	0
	Cs-137	3	18	(0/3)	N/A	N/A	N/A	N/A	0
	Ba-140	3	60	(0/3)	N/A	N/A	N/A	N/A	0
	La-140	3	15	(0/3)	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
River Water (pCi/liter)	Tritium	4	2000	3050(4/4) (2040-4340)	11	5.80 mi. SE	3050(4/4) (2040-4340)	(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
	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

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

Table 3-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

North Anna Nuclear Power Station, Louisa County, Virginia – 2012

Docket No. 50-338/339 Page 7 of 9

Medium or Pathway Sampled (Unit)	Analysis Type	Analysis Total No.	LLD (pCi/unit)	All Indicator Locations Mean Range	Indicator Location with Highest Mean Name	Indicator Location with Highest Mean Distance Direction	Indicator Location with Highest Mean Mean Range	Control Location Mean Range	Non-routine Reported Measure-ments
River Water (pCi/liter)	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
Surface Water (pCi/L)	Tritium	8	2000	2600(4/4) (2260-2790)	08	3.37 mi. SSE	2600(4/4) (2260-2790)	(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	30	(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
	La-140	24	15	(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

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

North Anna Nuclear Power Station, Louisa County, Virginia – 2012

Docket No. 50-338/339 Page 8 of 9

Medium or Pathway Sampled (Unit)	Analysis Type	Analysis Total No.	LLD (pCi/unit)	All Indicator Locations Mean Range	Indicator Location with Highest Mean Name	Indicator Location with Highest Mean Distance Direction	Indicator Location with Highest Mean Mean Range	Control Location Mean Range	Non-routine Reported Measurements
Surface Water (pCi/liter)	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)	Gamma	6							
	K-40	6	-	16500 (4/4) (12400-22100)	08	3.37 mi. SSE	17300(2/2) (12400 - 22100)	12700(2/2) (12500-12800)	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	(176) 112(1/2) (112)	0
	Ra-226	6	-	3020(4/4) (2390-4130)	08	3.37 mi. SSE	3260(2/2) (2390-4130)	1680(2/2) (1300-2060)	0
	Th-228	6	-	1860(4/4) (1260-2400)	08	3.37 mi. SSE	2040 (2/2) (1680-2400)	683(2/2) (623-743)	0
	Th-232	6	-	1700 (4/4) (1160-2130)	08	3.37 mi. SSE	1835(2/2) (1540-2130)	699(2/2) (584-813)	0
	(Annually) Sr-89	3	-	(0/2)	N/A	N/A	N/A	(0/1)	0
	Sr-90	3	-	(0/2)	N/A	N/A	N/A	(0/1)	0
Shoreline Soil (pCi/kg) (dry)	Gamma	2							
	K-40	2	-	2280(2/2) (2000-2550)	08	3.37 mi. SSE	2280(2/2) (2000-2550)	N/A	0
	Cs-134	2	150	(0/2)	N/A	N/A	(0/2)	N/A	0
	Cs-137	2	180	157(1/2)	08	3.37 mi. SSE	157(1/2) (157)	N/A	0
	Ra-226	2	-	1210(1/2) (1210)	08	3.37 mi. SSE	1210(1/2) (1210)	N/A	0

Table 3-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

North Anna Nuclear Power Station, Louisa County, Virginia – 2012

Docket No. 50-338/339 Page 9 of 9

Medium or Pathway Sampled (Unit)	Analysis Type	Analysis Total No.	LLD (pCi/unit)	All Indicator Locations Mean Range	Indicator Location with Highest Mean Name	Indicator Location with Highest Mean Distance Direction	Indicator Location with Highest Mean Mean Range	Control Location Mean Range	Non-routine Reported Measure-ments
Shoreline Soil (pCi/kg) (dry)									
	Th-228	2	-	574(2/2) (439-708)	08	3.37 mi. SSE	574(2/2) (439-708)	N/A	0
	Th-232	2	-	533(2/2) (399-666)	08	3.37 mi. SSE	533(2/2) (399-666)	N/A	0
	(Annually) 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
Fish (pCi/kg) (wet)	Gamma	8							
	K-40	8	-	2320(4/4) (1930-3030)	08	3.37 mi. SSE	2320(4/4) (1930-3030)	1740(4/4) (1190-2560)	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
	Cs-137	8	150	(0/4)	N/A	N/A	N/A	(0/4)	0

3.2 Analytical Results of 2012 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 (2σ) of the net activity. Unless otherwise noted, the overall error (counting, sample size, chemistry, errors, etc.) is estimated to be 2 to 5 times that listed. Results are considered true positives when the measured value exceeds both the MDC and the 2σ error.

Because of counting statistics, negative values, zeros and numbers below the Minimum Detectable Level (MDL) are statistically valid pieces of data[1]. For clarity of this report only detectable results are presented. TBE'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

[1] 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 MEASURMENTS - SECTOR QUARTERLY TLD RESULTS

mR/Std. Month (30.4 days) ± 2 Sigma

Station	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Quarterly* Average +/- 2 s.d.
N-1	4.7	3.8	3.6	5.6	4.5 +/- 1.7
N-33	4.8	3.7	4.2	5.7	
N-2	3.8	2.4	2.9	4.0	3.1 +/- 1.5
N-34	3.7	1.9	2.9	3.5	
NNE-3	6.7	5.2	6.5	8.6	6.7 +/- 2.6
NNE-35	6.4	5.0	6.8	8.5	
NNE-4	4.7	3.1	4.4	5.0	4.3 +/- 1.9
NNE 36	5.0	2.6	4.2	5.3	
NE-5	4.2	3.7	4.6	5.8	4.6 +/- 1.4
NE-37	4.3	4.1	4.6	5.4	
NE-6	3.0	2.2	2.9	3.8	3.2 +/- 1.4
NE-38	3.7	2.6	3.1	4.3	
ENE-7	4.9	4.0	5.0	5.2	4.9 +/- 1.4
ENE-39	5.4	3.8	4.9	6.0	
ENE-8	3.9	2.3	3.0	3.2	3.1 +/- 1.0
ENE-40	3.3	2.8	2.7	3.3	
E-9	4.3	3.3	4.7	6.1	4.6 +/- 2.1
E-41	5.8	3.2	4.9	4.8	
E-10	3.8	4.6	4.3	4.9	4.3 +/- 1.5
E-42	3.9	2.9	4.4	5.3	
ESE-11	4.1	3.2	4.0	4.7	4.0 +/- 1.3
ESE-43	3.9	3.0	3.9	4.9	
ESE-12	3.6	3.1	5.0	5.3	4.2 +/- 1.9
ESE-44	4.2	2.9	4.4	5.2	
SE-13	4.0	3.0	4.1	5.0	4.1 +/- 1.7
SE-45	4.7	2.8	4.2	5.1	
SE-14	7.1	6.4	6.4	7.7	6.7 +/- 1.7
SE-46	6.1	5.1	6.8	7.6	
SSE-15	3.8	3.9	4.4	5.3	4.5 +/- 1.4
SSE-47	4.8	3.5	5.0	5.1	
SSE-16	2.2	2.0	2.9	3.5	2.7 +/- 1.3
SSE-48	2.9	1.8	2.7	3.4	

*Average of collocated TLDs.

TABLE 3-2

DIRECT RADIATION MEASURMENTS - SECTOR QUARTERLY TLD RESULTS

mR/Std. Month (30.4 days) ± 2 Sigma

Station	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Quarterly* Average +/- 2 s.d.
S-17	5.0	3.9	4.6	6.4	4.7 +/- 1.9
S-49	5.2	3.7	5.2	3.7	
S-18	2.6	1.5	3.0	2.4	2.3 +/- 1.2
S-50	2.1	1.4	2.3	2.8	
SSW-19	5.7	5.3	6.8	6.9	6.5 +/- 1.5
SSW-51	6.4	6.9	6.0	7.7	
SSW-20	2.3	1.6	2.4	3.0	2.3 +/- 1.1
SSW-52	2.2	1.5	2.2	2.9	
SW-21	4.3	3.8	3.9	5.2	5.0 +/- 2.4
SW-53	4.9	5.5	4.5	7.6	
SW-22	4.8	3.7	4.4	5.1	4.3 +/- 1.2
SW-54	4.2	3.2	4.3	4.6	
WSW-23	5.2	4.0	5.1	5.8	4.9 +/- 1.8
WSW-55	5.6	3.8	3.8	5.9	
WSW-24	3.6	3.0	4.3	4.3	3.8 +/- 1.4
WSW-56	3.5	2.7	4.2	4.6	
W-25	6.8	5.5	6.9	7.8	6.8 +/- 1.4
W-57	6.8	6.6	6.5	7.6	
W-26	2.5	2.9	3.0	4.3	3.2 +/- 1.5
W-58	4.2	2.3	2.9	3.2	
WNW-27	2.3	2.4	3.0	3.7	3.0 +/- 1.5
WNW-59	4.0	2.0	3.1	3.6	
WNW-28	2.7	2.0	2.0	3.7	2.6 +/- 1.3
WNW-60	2.4	2.2	2.1	3.4	
NW-29	6.7	5.3	7.1	8.2	7.0 +/- 2.5
NW-61	8.5	5.4	6.5	8.3	
NW-30	1.7	1.8	1.9	2.6	1.9 +/- 1.1
NW-62	1.7	1.4	1.4	3.0	
NNW-31	3.4	2.2	2.7	3.9	3.2 +/- 1.5
NNW-63	3.7	2.4	3.1	4.4	
NNW-32	3.2	2.7	3.9	4.4	3.4 +/- 1.4
NNW-64	3.3	2.6	4.1	2.7	
Mean					4.2 +/- 1.6

*Average of collocated TLDs.

TABLE 3-2

DIRECT RADIATION MEASURMENTS - SECTOR QUARTERLY TLD RESULTS

mR/Std. Month (30.4 days) ± 2 Sigma

Station	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Quarterly* Average +/- 2 s.d.
C-1	3.4	2.0	3.0	3.7	3.0 +/- 1.1
C-2	2.9	3.1	2.5	3.6	
C-3**	3.1	2.2	2.8	3.7	3.0 +/- 1.1
C-4**	2.9	2.5	3.2	3.7	
C-5	2.0	1.1	2.0	2.4	2.0 +/- 1.2
C-6	2.0	1.2	2.6	2.6	
C-7**	3.3	2.6	3.6	4.1	3.5 +/- 0.9
C-8**	3.7	3.1	3.6	3.8	
				Mean Indicator	2.5 +/- 1.5
				Control**	3.2 +/- 1.1
EPSA-01***	4.6	3.6	4.5	5.2	4.5 +/- 1.7
EPSA-02***	4.5	3.4	4.1	6.1	
EPSF-03***	4.6	3.3	3.8	4.5	4.4 +/- 1.6
EPSF-04***	5.5	3.6	4.4	5.4	
EPSR-05***	4.3	3.5	4.4	4.9	4.3 +/- 1.2
EPSR-06***	4.5	3.6	4.1	5.3	
EPSJ-07***	3.8	2.9	3.5	5.6	4.1 +/- 1.7
EPSJ-08***	4.5	3.8	3.6	4.9	
EPSP-09***	8.2	6.1	6.7	8.2	7.2 +/- 1.9
EPSP-10***	7.3	5.9	6.8	8.3	
Mean					4.9 +/- 2.8

*Average of collocated TLDs.
** Control Station
*** Emergency Plan TLDs.

TABLE 3-2
DIRECT RADIATION MEASURMENTS - SECTOR QUARTERLY TLD RESULTS
mR/Std. Month (30.4 days) ± 2 Sigma

Station	First Quarter 12/282011 3/28/2012	Second Quarter 3/28/2012 6/26/2012	Third Quarter 6/26/2012 9/25/2012	Fourth Quarter 9/25/2012 12/26/2012	Quarterly Average +/- 2 s.d.	Annual TLD
STA-01	4.5	3.4	3.8	5.6	4.3 +/- 1.9	6.1
STA-02	2.1	1.4	2.2	3.0	2.2 +/- 1.3	3.2
STA-03	2.2	1.5	1.9	2.7	2.1 +/- 1.0	3.3
STA-04	2.4	1.2	1.9	3.2	2.2 +/- 1.7	3.1
STA-05	3.8	2.6	3.2	3.8	3.4 +/- 1.1	3.0
STA-05A	2.9	2.6	3.4	3.0	3.0 +/- 0.7	3.5
STA-06	4.6	3.6	4.7	4.9	4.5 +/- 1.2	4.8
STA-07	3.0	2.5	3.3	3.5	3.1 +/- 0.9	3.9
STA-21	3.4	2.1	3.2	3.1	3.0 +/- 1.2	3.8
STA-22	3.6	2.5	3.2	6.1	3.9 +/- 3.1	4.4
STA-23	4.0	3.1	4.4	4.9	4.1 +/- 1.5	6.0
STA-24*	2.9	2.1	3.1	3.8	3.0 +/- 0.7	3.4
			Mean - Indicator Locations		3.2 +/- 1.1	4.1 +/- 2.2

*Control

Table 3-3
Air Particulate
Gross Beta Radioactivity
[10^{-3} pCi/m^3]

Period Ending	Station 01			Station 02			Station 03			Station 04			Station 05			Station 06			Station 07		
01/03/12	1.53E+01	+/-	3.20E+00	1.60E+01	+/-	3.26E+00	1.85E+01	+/-	3.41E+00	1.87E+01	+/-	3.44E+00	2.10E+01	+/-	3.51E+00	1.24E+01	+/-	3.05E+00	1.95E+01	+/-	3.43E+00
01/10/12	1.26E+01	+/-	3.14E+00	1.61E+01	+/-	3.31E+00	1.19E+01	+/-	3.11E+00	1.40E+01	+/-	3.21E+00	1.31E+01	+/-	3.17E+00	1.28E+01	+/-	3.16E+00	1.05E+01	+/-	3.05E+00
01/17/12	1.14E+01	+/-	2.76E+00	1.29E+01	+/-	2.83E+00	1.14E+01	+/-	2.75E+00	1.24E+01	+/-	2.81E+00	1.69E+01	+/-	3.04E+00	1.06E+01	+/-	2.71E+00	9.51E+00	+/-	2.65E+00
01/24/12	1.11E+01	+/-	2.62E+00	1.27E+01	+/-	2.72E+00	1.09E+01	+/-	2.63E+00	7.45E+00	+/-	2.41E+00	1.51E+01	+/-	2.85E+00	1.58E+01	+/-	2.88E+00	1.24E+01	+/-	2.70E+00
01/31/12	1.27E+01	+/-	2.49E+00	2.07E+01	+/-	2.92E+00	1.89E+01	+/-	2.83E+00	1.78E+01	+/-	2.77E+00	2.30E+01	+/-	3.03E+00	1.89E+01	+/-	2.83E+00	2.16E+01	+/-	2.97E+00
02/07/12	1.34E+01	+/-	2.79E+00	1.84E+01	+/-	3.04E+00	1.31E+01	+/-	2.78E+00	1.26E+01	+/-	2.74E+00	1.93E+01	+/-	3.09E+00	1.28E+01	+/-	2.76E+00	1.06E+01	+/-	2.92E+00
02/14/12	1.17E+01	+/-	2.51E+00	1.47E+01	+/-	2.67E+00	1.03E+01	+/-	2.46E+00	1.41E+01	+/-	2.67E+00	1.73E+01	+/-	2.82E+00	1.44E+01	+/-	2.67E+00	1.39E+01	+/-	2.64E+00
02/21/12	1.42E+01	+/-	2.92E+00	1.72E+01	+/-	3.07E+00	1.79E+01	+/-	3.06E+00	1.58E+01	+/-	2.98E+00	1.72E+01	+/-	3.07E+00	1.94E+01	+/-	3.17E+00	1.46E+01	+/-	2.94E+00
02/28/12	1.53E+01	+/-	2.80E+00	1.46E+01	+/-	2.78E+00	1.48E+01	+/-	2.76E+00	1.54E+01	+/-	2.80E+00	1.86E+01	+/-	2.97E+00	1.49E+01	+/-	2.78E+00	1.32E+01	+/-	2.69E+00
03/06/12	1.66E+01	+/-	3.00E+00	1.93E+01	+/-	3.13E+00	1.55E+01	+/-	2.97E+00	1.79E+01	+/-	3.06E+00	1.82E+01	+/-	3.08E+00	1.59E+01	+/-	2.96E+00	4.24E+00	+/-	1.64E+00
03/13/12	1.50E+01	+/-	2.69E+00	1.57E+01	+/-	2.72E+00	1.29E+01	+/-	2.60E+00	1.86E+01	+/-	2.90E+00	1.61E+01	+/-	2.75E+00	1.65E+01	+/-	2.77E+00	1.53E+01	+/-	2.76E+00
03/20/12	2.13E+01	+/-	3.04E+00	1.49E+01	+/-	2.72E+00	1.74E+01	+/-	2.86E+00	2.08E+01	+/-	3.02E+00	2.18E+01	+/-	3.07E+00	*			2.03E+01	+/-	3.00E+00
03/28/12	8.92E+00	+/-	2.21E+00	1.04E+01	+/-	2.29E+00	8.08E+00	+/-	2.12E+00	1.08E+01	+/-	2.29E+00	9.98E+00	+/-	2.26E+00	1.04E+01	+/-	2.29E+00	1.11E+01	+/-	2.33E+00
04/04/12	9.37E+00	+/-	2.39E+00	1.12E+01	+/-	2.51E+00	8.95E+00	+/-	2.42E+00	9.08E+00	+/-	2.41E+00	1.15E+01	+/-	2.54E+00	1.00E+01	+/-	2.45E+00	1.16E+01	+/-	2.54E+00
04/10/12	1.52E+01	+/-	3.08E+00	1.34E+01	+/-	2.97E+00	1.18E+01	+/-	2.88E+00	1.36E+01	+/-	2.98E+00	1.38E+01	+/-	3.13E+00	1.99E+01	+/-	3.49E+00	1.52E+01	+/-	3.07E+00
04/17/12	1.34E+01	+/-	2.70E+00	1.18E+01	+/-	2.62E+00	1.24E+01	+/-	2.65E+00	1.15E+01	+/-	2.60E+00	1.69E+01	+/-	3.07E+00	1.57E+01	+/-	2.83E+00	1.05E+01	+/-	2.54E+00
04/24/12	1.38E+01	+/-	2.62E+00	1.39E+01	+/-	2.62E+00	1.03E+01	+/-	2.42E+00	1.44E+01	+/-	2.65E+00	1.31E+01	+/-	2.58E+00	1.30E+01	+/-	2.58E+00	1.14E+01	+/-	2.48E+00
05/01/12	1.41E+01	+/-	3.13E+00	1.69E+01	+/-	3.26E+00	1.28E+01	+/-	3.07E+00	1.79E+01	+/-	3.31E+00	1.70E+01	+/-	3.26E+00	1.72E+01	+/-	3.27E+00	1.46E+01	+/-	3.15E+00
05/08/12	9.96E+00	+/-	2.60E+00	1.12E+01	+/-	2.67E+00	1.01E+01	+/-	2.56E+00	1.10E+01	+/-	2.63E+00	1.31E+01	+/-	2.76E+00	1.15E+01	+/-	2.68E+00	1.11E+01	+/-	2.66E+00
05/15/12	1.34E+01	+/-	2.73E+00	1.46E+01	+/-	2.81E+00	1.25E+01	+/-	2.68E+00	1.36E+01	+/-	2.75E+00	1.29E+01	+/-	2.71E+00	1.60E+01	+/-	2.88E+00	1.50E+01	+/-	2.83E+00
05/22/12	5.70E+00	+/-	2.40E+00	9.76E+00	+/-	2.64E+00	7.79E+00	+/-	2.53E+00	7.63E+00	+/-	2.52E+00	8.88E+00	+/-	2.59E+00	8.96E+00	+/-	2.59E+00	4.89E+00	+/-	2.35E+00
05/29/12	7.77E+00	+/-	2.29E+00	8.81E+00	+/-	2.36E+00	8.20E+00	+/-	2.32E+00	3.43E+00	+/-	1.99E+00	9.32E+00	+/-	2.39E+00	9.32E+00	+/-	2.39E+00	7.90E+00	+/-	2.30E+00
06/06/12	1.06E+01	+/-	2.27E+00	1.26E+01	+/-	2.38E+00	1.12E+01	+/-	2.31E+00	1.21E+01	+/-	2.36E+00	1.32E+01	+/-	2.42E+00	1.27E+01	+/-	2.39E+00	1.11E+01	+/-	2.30E+00
06/12/12	1.06E+01	+/-	2.91E+00	1.51E+01	+/-	3.16E+00	8.51E+00	+/-	2.76E+00	1.21E+01	+/-	2.99E+00	1.24E+01	+/-	3.00E+00	1.42E+01	+/-	3.11E+00	7.61E+00	+/-	2.71E+00
06/19/12	1.02E+01	+/-	2.43E+00	1.01E+01	+/-	2.42E+00	9.40E+00	+/-	2.39E+00	1.21E+01	+/-	2.54E+00	1.05E+01	+/-	2.45E+00	1.10E+01	+/-	2.48E+00	7.53E+00	+/-	2.26E+00
06/26/12	1.14E+01	+/-	2.81E+00	1.93E+01	+/-	3.18E+00	1.64E+01	+/-	3.04E+00	1.78E+01	+/-	3.11E+00	1.93E+01	+/-	3.19E+00	2.21E+01	+/-	3.33E+00	1.45E+01	+/-	2.96E+00

* Sample not obtained due to sampler not operating

Table 3-3
Air Particulate
Gross Beta Radioactivity
[10^{-3} pCi/m^3]

Period Ending	Station 21			Station 22			Station 23			Station 24*			Station 01A			Station 05A		
01/03/12	1.29E+01	+/-	3.09E+00	1.43E+01	+/-	3.17E+00	1.60E+01	+/-	3.26E+00	1.99E+01	+/-	3.47E+00	1.56E+01	+/-	3.22E+00	1.71E+01	+/-	3.31E+00
01/10/12	1.48E+01	+/-	3.25E+00	1.12E+01	+/-	3.08E+00	1.71E+01	+/-	3.35E+00	1.16E+01	+/-	3.10E+00	1.24E+01	+/-	3.13E+00	1.13E+01	+/-	3.08E+00
01/17/12	1.20E+01	+/-	2.78E+00	1.03E+01	+/-	2.70E+00	1.03E+01	+/-	2.70E+00	1.07E+01	+/-	2.71E+00	1.35E+01	+/-	2.87E+00	1.25E+01	+/-	2.81E+00
01/24/12	1.13E+01	+/-	2.64E+00	1.21E+01	+/-	2.68E+00	1.66E+01	+/-	2.92E+00	1.42E+01	+/-	2.80E+00	1.27E+01	+/-	2.72E+00	1.16E+01	+/-	2.66E+00
01/31/12	1.82E+01	+/-	2.80E+00	1.87E+01	+/-	2.82E+00	2.01E+01	+/-	2.90E+00	1.52E+01	+/-	2.63E+00	1.87E+01	+/-	2.82E+00	1.60E+01	+/-	2.68E+00
02/07/12	1.69E+01	+/-	2.97E+00	1.74E+01	+/-	3.00E+00	1.70E+01	+/-	2.97E+00	1.24E+01	+/-	2.73E+00	1.58E+01	+/-	2.91E+00	1.43E+01	+/-	2.84E+00
02/14/12	1.45E+01	+/-	2.66E+00	1.39E+01	+/-	2.64E+00	1.71E+01	+/-	2.81E+00	1.36E+01	+/-	2.62E+00	1.34E+01	+/-	2.61E+00	1.35E+01	+/-	2.61E+00
02/21/12	1.66E+01	+/-	3.04E+00	1.96E+01	+/-	3.18E+00	1.86E+01	+/-	3.13E+00	1.64E+01	+/-	3.03E+00	1.77E+01	+/-	3.09E+00	1.45E+01	+/-	2.94E+00
02/28/12	1.48E+01	+/-	2.77E+00	1.67E+01	+/-	2.87E+00	1.47E+01	+/-	2.76E+00	1.47E+01	+/-	2.77E+00	1.51E+01	+/-	2.79E+00	1.29E+01	+/-	2.67E+00
03/06/12	1.73E+01	+/-	3.04E+00		<	2.37E+00	1.57E+01	+/-	2.96E+00	1.59E+01	+/-	2.97E+00	1.37E+01	+/-	2.86E+00	1.25E+01	+/-	2.79E+00
03/13/12	1.81E+01	+/-	2.86E+00	1.55E+01	+/-	2.72E+00	1.66E+01	+/-	2.78E+00	1.51E+01	+/-	2.69E+00	1.61E+01	+/-	3.23E+00	1.52E+01	+/-	2.70E+00
03/20/12	1.99E+01	+/-	2.97E+00	2.03E+01	+/-	2.99E+00	2.05E+01	+/-	3.01E+00	1.99E+01	+/-	2.97E+00	1.35E+01	+/-	2.64E+00	1.83E+01	+/-	2.90E+00
03/28/12	1.01E+01	+/-	2.27E+00	9.19E+00	+/-	2.21E+00	1.11E+01	+/-	2.32E+00	9.81E+00	+/-	2.26E+00	8.97E+00	+/-	2.21E+00	1.18E+01	+/-	2.36E+00
04/04/12	9.86E+00	+/-	2.43E+00	1.15E+01	+/-	2.53E+00	1.32E+01	+/-	2.86E+00	1.24E+01	+/-	2.59E+00	9.70E+00	+/-	2.42E+00	1.15E+01	+/-	2.54E+00
04/10/12	1.33E+01	+/-	2.97E+00	1.36E+01	+/-	2.99E+00	1.43E+01	+/-	3.03E+00	1.16E+01	+/-	2.85E+00	1.42E+01	+/-	3.03E+00	1.27E+01	+/-	2.93E+00
04/17/12	1.21E+01	+/-	2.63E+00	1.31E+01	+/-	2.69E+00	1.36E+01	+/-	2.72E+00	1.28E+01	+/-	2.68E+00	1.05E+01	+/-	2.54E+00	1.14E+01	+/-	2.60E+00
04/24/12	1.33E+01	+/-	2.59E+00	1.21E+01	+/-	2.53E+00	1.49E+01	+/-	2.68E+00	1.06E+01	+/-	2.44E+00	1.12E+01	+/-	2.47E+00	1.15E+01	+/-	2.49E+00
05/01/12	1.21E+01	+/-	3.03E+00	1.44E+01	+/-	3.15E+00	1.60E+01	+/-	3.22E+00	1.46E+01	+/-	3.15E+00	1.35E+01	+/-	3.10E+00	1.72E+01	+/-	3.27E+00
05/08/12	1.22E+01	+/-	2.73E+00	1.25E+01	+/-	2.73E+00	1.26E+01	+/-	2.74E+00	1.00E+01	+/-	2.59E+00	8.94E+00	+/-	2.54E+00	3.03E+00	+/-	1.09E+00
05/15/12	1.19E+01	+/-	2.65E+00	1.12E+01	+/-	2.61E+00	1.59E+01	+/-	2.87E+00	1.16E+01	+/-	2.64E+00	9.73E+00	+/-	2.52E+00	1.26E+01	+/-	2.70E+00
05/22/12	7.32E+00	+/-	2.50E+00	7.02E+00	+/-	2.48E+00	6.13E+00	+/-	2.42E+00	6.89E+00	+/-	2.47E+00	6.07E+00	+/-	2.42E+00	4.89E+00	+/-	2.35E+00
05/29/12	8.59E+00	+/-	2.35E+00	1.07E+01	+/-	2.48E+00	7.62E+00	+/-	2.29E+00	8.65E+00	+/-	2.35E+00	8.66E+00	+/-	2.35E+00	9.39E+00	+/-	2.40E+00
06/06/12	1.02E+01	+/-	2.25E+00	1.29E+01	+/-	2.40E+00	1.18E+01	+/-	2.34E+00	7.54E+00	+/-	2.09E+00	1.13E+01	+/-	2.31E+00	1.01E+01	+/-	2.24E+00
06/12/12	1.05E+01	+/-	2.90E+00	1.26E+01	+/-	3.02E+00	1.48E+01	+/-	3.14E+00	1.33E+01	+/-	3.06E+00	8.50E+00	+/-	2.78E+00	1.19E+01	+/-	2.97E+00
06/19/12	1.08E+01	+/-	2.46E+00	8.40E+00	+/-	2.32E+00	9.21E+00	+/-	2.37E+00	9.88E+00	+/-	2.41E+00	9.21E+00	+/-	2.37E+00	1.28E+01	+/-	2.58E+00
06/26/12	1.56E+01	+/-	3.00E+00	1.91E+01	+/-	3.17E+00	1.74E+01	+/-	3.09E+00	1.60E+01	+/-	3.03E+00	1.33E+01	+/-	2.90E+00	1.62E+01	+/-	3.04E+00

* Control Station

Table 3-3
Air Particulate
Gross Beta Radioactivity
[10^{-3} pCi/m^3]

Period Ending	Station 01			Station 02			Station 03			Station 04			Station 05			Station 06			Station 07		
07/03/12	1.60E+01	+/-	2.83E+00	1.84E+01	+/-	2.96E+00	1.78E+01	+/-	4.58E+00	2.01E+01	+/-	3.08E+00	2.02E+01	+/-	4.27E+00	2.36E+01	+/-	3.33E+00	1.59E+01	+/-	2.83E+00
07/11/12	2.34E+01	+/-	2.93E+00	2.23E+01	+/-	2.88E+00	2.24E+01	+/-	2.85E+00	2.41E+01	+/-	2.94E+00	2.70E+01	+/-	3.08E+00	2.92E+01	+/-	3.18E+00	2.13E+01	+/-	2.84E+00
07/17/12	1.38E+01	+/-	2.99E+00	1.44E+01	+/-	3.03E+00	8.92E+00	+/-	2.70E+00	1.15E+01	+/-	2.86E+00	1.47E+01	+/-	3.04E+00	1.46E+01	+/-	3.04E+00	1.20E+01	+/-	2.89E+00
07/24/12	1.12E+01	+/-	2.69E+00	1.26E+01	+/-	2.77E+00	1.06E+01	+/-	2.70E+00	1.16E+01	+/-	2.69E+00	6.65E+00	+/-	2.40E+00	1.64E+01	+/-	2.92E+00	1.06E+01	+/-	2.67E+00
07/31/12	1.61E+01	+/-	2.76E+00	1.59E+01	+/-	2.74E+00	1.41E+01	+/-	2.65E+00	1.13E+01	+/-	2.54E+00	1.76E+01	+/-	2.87E+00	1.22E+01	+/-	2.59E+00	1.50E+01	+/-	2.70E+00
08/07/12	1.85E+01	+/-	2.97E+00	1.88E+01	+/-	3.04E+00	1.65E+01	+/-	2.92E+00	1.73E+01	+/-	2.95E+00	2.01E+01	+/-	3.08E+00	1.92E+01	+/-	3.03E+00	1.25E+01	+/-	2.71E+00
08/14/12	1.41E+01	+/-	3.02E+00	1.77E+01	+/-	3.13E+00	1.65E+01	+/-	3.03E+00	1.51E+01	+/-	2.98E+00	2.06E+01	+/-	3.26E+00	2.03E+01	+/-	3.26E+00	1.40E+01	+/-	2.93E+00
08/21/12	1.84E+01	+/-	3.03E+00	1.95E+01	+/-	3.09E+00	8.89E+00	+/-	2.53E+00	1.87E+01	+/-	3.05E+00	2.42E+01	+/-	3.32E+00	2.29E+01	+/-	3.26E+00	1.08E+01	+/-	2.64E+00
08/28/12	2.22E+01	+/-	3.26E+00	1.81E+01	+/-	3.06E+00	1.49E+01	+/-	2.91E+00	8.88E+00	+/-	2.58E+00	2.25E+01	+/-	3.27E+00	1.85E+01	+/-	3.08E+00	1.53E+01	+/-	2.92E+00
09/04/12	1.61E+01	+/-	2.97E+00	1.43E+01	+/-	2.89E+00	1.16E+01	+/-	2.74E+00	1.13E+01	+/-	2.73E+00	2.30E+01	+/-	3.31E+00	1.93E+01	+/-	3.13E+00	1.34E+01	+/-	2.84E+00
09/12/12	1.51E+01	+/-	2.49E+00	1.06E+01	+/-	2.23E+00	1.38E+01	+/-	2.40E+00	1.65E+01	+/-	2.55E+00	1.77E+01	+/-	2.61E+00	1.80E+01	+/-	2.63E+00	1.23E+01	+/-	2.33E+00
09/19/12	1.85E+01	+/-	3.01E+00	1.02E+01	+/-	2.57E+00	1.35E+01	+/-	2.81E+00	1.17E+01	+/-	2.68E+00	1.66E+01	+/-	2.93E+00	1.83E+01	+/-	3.01E+00	1.34E+01	+/-	2.75E+00
09/25/12	1.72E+01	+/-	3.19E+00	1.76E+01	+/-	3.21E+00	1.63E+01	+/-	3.08E+00	1.74E+01	+/-	3.16E+00	1.73E+01	+/-	3.18E+00	2.07E+01	+/-	3.36E+00	1.76E+01	+/-	3.20E+00
10/02/12	2.63E+01	+/-	3.25E+00	2.66E+01	+/-	3.29E+00	2.44E+01	+/-	3.19E+00	2.56E+01	+/-	3.25E+00	2.60E+01	+/-	3.26E+00	2.77E+01	+/-	3.33E+00	2.47E+01	+/-	3.20E+00
10/10/12	1.88E+01	+/-	2.86E+00	2.22E+01	+/-	3.01E+00	2.10E+01	+/-	2.96E+00	2.10E+01	+/-	2.96E+00	2.14E+01	+/-	2.98E+00	2.23E+01	+/-	3.02E+00	1.80E+01	+/-	2.83E+00
10/16/12	1.96E+01	+/-	3.49E+00	1.97E+01	+/-	3.51E+00	2.12E+01	+/-	3.57E+00	2.07E+01	+/-	3.56E+00	2.20E+01	+/-	3.62E+00	2.55E+01	+/-	3.78E+00	1.68E+01	+/-	3.35E+00
10/24/12	2.01E+01	+/-	2.76E+00	2.18E+01	+/-	2.84E+00	1.55E+01	+/-	2.53E+00	2.06E+01	+/-	2.78E+00	2.57E+01	+/-	3.01E+00	2.40E+01	+/-	2.94E+00	1.87E+01	+/-	2.69E+00
10/31/12	1.90E+01	+/-	3.20E+00	1.66E+01	+/-	3.09E+00	1.14E+01	+/-	2.83E+00	2.09E+01	+/-	3.29E+00	1.58E+01	+/-	3.06E+00	1.92E+01	+/-	3.22E+00	1.48E+01	+/-	3.00E+00
11/07/12	7.95E+00	+/-	2.35E+00	9.61E+00	+/-	2.45E+00	5.60E+00	+/-	2.19E+00	5.32E+00	+/-	2.17E+00	8.96E+00	+/-	2.41E+00	1.08E+01	+/-	2.51E+00	9.47E+00	+/-	2.44E+00
11/13/12	2.34E+01	+/-	3.57E+00	2.52E+01	+/-	3.66E+00	2.51E+01	+/-	3.66E+00	2.74E+01	+/-	3.76E+00	2.82E+01	+/-	3.79E+00	2.89E+01	+/-	3.83E+00	2.34E+01	+/-	3.57E+00
11/21/12	2.20E+01	+/-	2.99E+00	2.55E+01	+/-	3.14E+00	1.68E+01	+/-	2.76E+00	2.17E+01	+/-	2.98E+00	2.32E+01	+/-	3.04E+00	2.54E+01	+/-	3.14E+00	1.79E+01	+/-	2.81E+00
11/27/12	2.46E+01	+/-	3.54E+00	2.27E+01	+/-	3.43E+00	2.44E+01	+/-	3.57E+00	2.88E+01	+/-	3.75E+00	3.19E+01	+/-	3.87E+00	2.21E+01	+/-	3.40E+00	2.28E+01	+/-	3.44E+00
12/04/12	2.68E+01	+/-	3.40E+00	2.84E+01	+/-	3.48E+00	3.00E+01	+/-	3.50E+00	2.72E+01	+/-	3.41E+00	3.68E+01	+/-	3.82E+00	3.27E+01	+/-	3.65E+00	2.07E+01	+/-	3.14E+00
12/11/12	1.23E+01	+/-	2.67E+00	1.13E+01	+/-	2.62E+00	1.36E+01	+/-	2.74E+00	1.60E+01	+/-	2.87E+00	1.75E+01	+/-	2.94E+00	1.43E+01	+/-	2.78E+00	1.49E+01	+/-	2.81E+00
12/18/12	1.99E+01	+/-	3.02E+00	2.53E+01	+/-	3.28E+00	2.07E+01	+/-	3.07E+00	2.44E+01	+/-	3.24E+00	2.60E+01	+/-	3.31E+00	2.50E+01	+/-	3.27E+00	2.29E+01	+/-	3.17E+00
12/26/12	1.86E+01	+/-	2.84E+00	1.61E+01	+/-	2.72E+00	1.88E+01	+/-	2.83E+00	2.29E+01	+/-	3.02E+00	2.39E+01	+/-	3.06E+00	2.49E+01	+/-	3.11E+00	2.01E+01	+/-	2.90E+00
MEAN	1.546E+01	+/-	2.86E+00	1.64E+01	+/-	2.91E+00	1.45E+01	+/-	2.84E+00	1.60E+01	+/-	2.88E+00	1.84E+01	+/-	3.03E+00	1.79E+01	+/-	2.99E+00	1.44E+01	+/-	2.80E+00

Table 3-3
Air Particulate
Gross Beta Radioactivity
[10^{-3} pCi/m^3]

Period Ending	Station 21			Station 22			Station 23			Station 24*			Station 01A			Station 05A		
07/03/12	1.54E+01	+/-	2.80E+00	2.01E+01	+/-	3.05E+00	1.65E+01	+/-	3.40E+00	1.77E+01	+/-	2.93E+00	1.59E+01	+/-	2.83E+00	1.54E+01	+/-	2.81E+00
07/11/12	2.01E+01	+/-	2.79E+00	2.46E+01	+/-	2.98E+00	2.47E+01	+/-	2.99E+00	2.29E+01	+/-	2.91E+00	2.57E+01	+/-	3.03E+00	2.39E+01	+/-	2.95E+00
07/17/12	1.25E+01	+/-	2.92E+00	1.44E+01	+/-	3.03E+00	9.07E+00	+/-	2.70E+00	1.24E+01	+/-	2.91E+00	1.53E+01	+/-	3.08E+00	1.28E+01	+/-	2.93E+00
07/24/12	1.14E+01	+/-	2.72E+00	1.43E+01	+/-	2.86E+00	1.28E+01	+/-	2.79E+00	1.13E+01	+/-	2.70E+00	1.39E+01	+/-	2.83E+00	1.24E+01	+/-	2.73E+00
07/31/12	1.72E+01	+/-	2.81E+00	1.70E+01	+/-	2.80E+00	1.77E+01	+/-	2.84E+00	1.08E+01	+/-	2.47E+00	1.89E+01	+/-	2.90E+00	1.30E+01	+/-	2.63E+00
08/07/12	1.71E+01	+/-	2.95E+00	1.69E+01	+/-	2.94E+00	1.83E+01	+/-	3.01E+00	1.86E+01	+/-	3.03E+00	1.57E+01	+/-	2.83E+00	1.84E+01	+/-	3.00E+00
08/14/12	1.67E+01	+/-	3.09E+00	1.68E+01	+/-	3.09E+00	1.56E+01	+/-	3.03E+00	1.37E+01	+/-	2.91E+00	9.43E+00	+/-	2.87E+00	1.59E+01	+/-	3.04E+00
08/21/12	1.71E+01	+/-	2.96E+00	2.16E+01	+/-	3.18E+00	1.41E+01	+/-	2.81E+00	1.57E+01	+/-	2.90E+00	1.88E+01	+/-	3.05E+00	1.93E+01	+/-	3.09E+00
08/28/12	1.36E+01	+/-	2.85E+00	1.94E+01	+/-	3.16E+00	1.58E+01	+/-	2.96E+00	1.54E+01	+/-	2.94E+00	1.85E+01	+/-	3.09E+00	1.62E+01	+/-	2.97E+00
09/04/12	1.29E+01	+/-	2.81E+00	1.69E+01	+/-	3.12E+00	1.01E+01	+/-	2.66E+00	1.58E+01	+/-	2.96E+00	1.43E+01	+/-	2.88E+00	1.63E+01	+/-	2.99E+00
09/12/12	1.62E+01	+/-	2.54E+00	1.70E+01	+/-	2.58E+00	1.51E+01	+/-	2.48E+00	1.52E+01	+/-	2.48E+00	1.49E+01	+/-	2.47E+00	8.10E+00	+/-	2.08E+00
09/19/12	1.29E+01	+/-	2.72E+00	1.49E+01	+/-	2.83E+00	1.60E+01	+/-	2.90E+00	1.39E+01	+/-	2.78E+00	1.49E+01	+/-	2.83E+00	1.42E+01	+/-	2.80E+00
09/25/12	1.74E+01	+/-	3.20E+00	1.88E+01	+/-	3.27E+00	1.82E+01	+/-	3.23E+00	1.85E+01	+/-	3.25E+00	1.57E+01	+/-	3.11E+00	1.52E+01	+/-	3.07E+00
10/02/12	2.53E+01	+/-	3.22E+00	2.83E+01	+/-	3.36E+00	2.77E+01	+/-	3.33E+00	2.36E+01	+/-	3.15E+00	2.57E+01	+/-	3.23E+00	2.29E+01	+/-	3.11E+00
10/10/12	2.31E+01	+/-	3.05E+00	2.32E+01	+/-	3.06E+00	2.11E+01	+/-	2.97E+00	2.01E+01	+/-	2.92E+00	2.34E+01	+/-	3.07E+00	1.70E+01	+/-	2.78E+00
10/16/12	2.08E+01	+/-	3.55E+01	2.10E+01	+/-	3.56E+00	2.07E+01	+/-	3.55E+00	1.73E+01	+/-	3.38E+00	1.48E+01	+/-	3.25E+00	1.80E+01	+/-	3.42E+00
10/24/12	2.20E+01	+/-	2.85E+00	1.96E+01	+/-	2.74E+00	2.11E+01	+/-	2.81E+00	1.93E+01	+/-	2.73E+00	1.82E+01	+/-	2.67E+00	2.24E+01	+/-	2.86E+00
10/31/12	1.42E+01	+/-	2.97E+00	1.93E+01	+/-	3.21E+00	1.49E+01	+/-	3.01E+00	1.63E+01	+/-	3.08E+00	2.00E+01	+/-	3.25E+00	1.80E+01	+/-	3.16E+00
11/07/12	1.05E+01	+/-	2.50E+00	9.19E+00	+/-	2.42E+00		<	7.45E+00	1.00E+01	+/-	2.46E+00	8.10E+00	+/-	2.36E+00	7.72E+00	+/-	2.33E+00
11/13/12	2.39E+01	+/-	3.59E+00	2.89E+01	+/-	3.83E+00	2.68E+01	+/-	3.73E+00	2.56E+01	+/-	3.68E+00	2.32E+01	+/-	3.56E+00	2.45E+01	+/-	3.62E+00
11/21/12	2.33E+01	+/-	3.05E+00	1.43E+01	+/-	2.63E+00	2.12E+01	+/-	2.96E+00	2.23E+01	+/-	3.00E+00	2.27E+01	+/-	3.02E+00	2.31E+01	+/-	3.04E+00
11/27/12	2.09E+01	+/-	3.35E+00	2.05E+01	+/-	3.34E+00	2.39E+01	+/-	3.51E+00	2.32E+01	+/-	3.47E+00	2.02E+01	+/-	3.32E+00	2.15E+01	+/-	3.37E+00
12/04/12	3.21E+01	+/-	3.63E+00	2.80E+01	+/-	3.46E+00	3.05E+01	+/-	3.56E+00	3.19E+01	+/-	3.62E+00	2.79E+01	+/-	3.45E+00	2.58E+01	+/-	3.37E+00
12/11/12	1.42E+01	+/-	2.78E+00	1.75E+01	+/-	2.95E+00	1.59E+01	+/-	2.87E+00	1.23E+01	+/-	2.67E+00	1.53E+01	+/-	2.84E+00	1.37E+01	+/-	2.75E+00
12/18/12	2.78E+01	+/-	3.39E+00	2.52E+01	+/-	3.28E+00	2.14E+01	+/-	3.10E+00	2.48E+01	+/-	3.26E+00	2.49E+01	+/-	3.26E+00	2.46E+01	+/-	3.25E+00
12/26/12	1.70E+01	+/-	2.76E+00	2.18E+01	+/-	2.98E+00	2.44E+01	+/-	3.09E+00	2.06E+01	+/-	2.92E+00	1.90E+01	+/-	2.86E+00	2.05E+01	+/-	2.91E+00
MEAN	1.58E+01	+/-	3.49E+00	1.66E+01	+/-	2.91E+00	1.67E+01	+/-	3.03E+00	1.55E+01	+/-	2.86E+00	1.53E+01	+/-	2.86E+00	1.51E+01	+/-	2.82E+00
													Mean - All Indicator Locations			1.61E+01	+/-	2.95E+00

* Control Station

Table 3-4
Airborne Iodine
I-131
[10^{-3} pCi/m^3]

Period Ending	Station 01	Station 02	Station 03	Station 04	Station 05	Station 06	Station 07
01/03/12	< 2.96E+01	< 2.97E+01	< 3.00E+01	< 3.02E+01	< 1.26E+01	< 4.27E+01	< 4.27E+01
01/10/12	< 4.03E+01	< 4.04E+01	< 4.02E+01	< 4.04E+01	< 1.84E+01	< 1.84E+01	< 1.84E+01
01/17/12	< 1.72E+01	< 3.13E+01	< 3.12E+01	< 3.13E+01	< 3.13E+01	< 4.00E+01	< 4.00E+01
01/24/12	< 3.52E+01	< 3.52E+01	< 3.54E+01	< 5.03E+01	< 3.15E+01	< 3.15E+01	< 3.15E+01
01/31/12	< 2.04E+01	< 5.25E+01	< 5.24E+01	< 5.24E+01	< 5.24E+01	< 2.85E+01	< 2.85E+01
02/07/12	< 1.80E+01	< 1.80E+01	< 1.81E+01	< 1.80E+01	< 1.61E+01	< 1.61E+01	< 1.61E+01
02/14/12	< 2.06E+01	< 5.27E+01	< 5.39E+01	< 5.35E+01	< 5.29E+01	< 3.74E+01	< 3.74E+01
02/21/12	< 2.73E+01	< 2.74E+01	< 2.68E+01	< 2.71E+01	< 1.59E+01	< 1.59E+01	< 1.59E+01
02/28/12	< 6.40E+00	< 1.75E+01	< 1.72E+01	< 1.74E+01	< 1.74E+01	< 2.91E+01	< 2.91E+01
03/06/12	< 9.37E+00	< 2.41E+01	< 2.44E+01	< 2.41E+01	< 2.41E+01	< 1.40E+01	< 1.40E+01
03/13/12	< 7.80E+00	< 2.10E+01	< 2.15E+01	< 2.14E+01	< 2.11E+01	< 2.29E+01	< 2.37E+01
03/20/12	< 2.42E+01	< 9.39E+00	< 2.43E+01	< 2.42E+01	< 2.42E+01	* <	< 2.51E+01
03/28/12	< 1.46E+01	< 3.75E+01	< 3.68E+01	< 3.71E+01	< 3.75E+01	< 2.64E+01	< 2.64E+01
04/04/12	< 2.70E+01	< 2.71E+01	< 1.08E+01	< 2.75E+01	< 2.72E+01	< 1.70E+01	< 1.69E+01
04/10/12	< 1.38E+01	< 3.54E+01	< 3.54E+01	< 3.54E+01	< 3.75E+01	< 3.46E+01	< 3.23E+01
04/17/12	< 2.33E+01	< 2.33E+01	< 2.33E+01	< 9.04E+00	< 2.54E+01	< 1.66E+01	< 1.66E+01
04/24/12	< 1.09E+01	< 2.95E+01	< 2.95E+01	< 2.95E+01	< 2.95E+01	< 2.89E+01	< 2.89E+01
05/01/12	< 2.44E+01	< 2.44E+01	< 2.44E+01	< 2.44E+01	< 8.99E+00	< 2.53E+01	< 2.53E+01
05/08/12	< 1.17E+01	< 3.02E+01	< 2.96E+01	< 2.98E+01	< 3.01E+01	< 2.18E+01	< 2.18E+01
05/15/12	< 2.07E+01	< 5.37E+01	< 5.35E+01	< 5.36E+01	< 5.36E+01	< 2.20E+01	< 5.23E+01
05/22/12	< 4.00E+01	< 3.99E+01	< 4.00E+01	< 4.00E+01	< 3.49E+01	< 3.49E+01	< 3.49E+01
05/29/12	< 4.64E+01	< 4.64E+01	< 4.64E+01	< 4.64E+01	< 4.01E+01	< 4.01E+01	< 4.01E+01
06/06/12	< 1.55E+01	< 4.20E+01	< 4.20E+01	< 4.20E+01	< 4.20E+01	< 3.10E+01	< 3.10E+01
06/12/12	< 3.18E+01	< 3.16E+01	< 3.15E+01	< 3.16E+01	< 3.75E+01	< 3.76E+01	< 3.76E+01
06/19/12	< 1.37E+01	< 3.52E+01	< 3.54E+01	< 3.52E+01	< 3.52E+01	< 2.70E+01	< 2.70E+01
06/26/12	< 5.65E+01	< 5.61E+01	< 5.61E+01	< 5.62E+01	< 3.51E+01	< 3.52E+01	< 3.51E+01

* Sample not obtained due to sampler not operating

Table 3-4
Airborne Iodine
I-131
[10^{-3} pCi/m^3]

Period Ending	Station 21	Station 22	Station 23	Station 24*	Station 01A	Station 05A
01/03/12	< 4.29E+01	< 4.29E+01	< 3.42E+01	< 3.44E+01	< 3.41E+01	< 3.41E+01
01/10/12	< 1.84E+01	< 2.19E+01	< 9.34E+00	< 2.19E+01	< 2.19E+01	< 2.19E+01
01/17/12	< 4.00E+01	< 4.00E+01	< 3.52E+01	< 3.52E+01	< 3.52E+01	< 3.52E+01
01/24/12	< 3.15E+01	< 4.14E+01	< 4.14E+01	< 1.74E+01	< 4.14E+01	< 4.15E+01
01/31/12	< 2.86E+01	< 2.86E+01	< 3.34E+01	< 3.33E+01	< 3.34E+01	< 3.33E+01
02/07/12	< 1.61E+01	< 2.16E+01	< 2.16E+01	< 2.16E+01	< 8.39E+00	< 2.16E+01
02/14/12	< 3.73E+01	< 3.74E+01	< 3.33E+01	< 3.32E+01	< 3.32E+01	< 3.32E+01
02/21/12	< 1.59E+01	< 2.79E+01	< 2.79E+01	< 2.79E+01	< 2.79E+01	< 1.08E+01
02/28/12	< 2.91E+01	< 2.91E+01	< 3.58E+01	< 3.58E+01	< 3.58E+01	< 3.58E+01
03/06/12	< 1.40E+01	< 1.40E+01	< 1.88E+01	< 1.88E+01	< 1.88E+01	< 1.88E+01
03/13/12	< 2.29E+01	< 2.29E+01	< 2.33E+01	< 2.33E+01	< 2.94E+01	< 2.33E+01
03/20/12	< 2.51E+01	< 2.51E+01	< 2.51E+01	< 1.87E+01	< 1.88E+01	< 1.88E+01
03/28/12	< 2.64E+01	< 2.63E+01	< 2.03E+01	< 2.04E+01	< 2.04E+01	< 2.04E+01
04/04/12	< 1.69E+01	< 1.70E+01	< 2.17E+01	< 2.17E+01	< 2.16E+01	< 2.17E+01
04/10/12	< 3.24E+01	< 3.24E+01	< 2.66E+01	< 2.64E+01	< 2.66E+01	< 2.65E+01
04/17/12	< 1.66E+01	< 1.66E+01	< 1.72E+01	< 1.73E+01	< 1.72E+01	< 1.73E+01
04/24/12	< 2.89E+01	< 2.89E+01	< 1.95E+01	< 1.95E+01	< 1.95E+01	< 1.95E+01
05/01/12	< 2.54E+01	< 2.54E+01	< 2.68E+01	< 2.67E+01	< 2.68E+01	< 2.67E+01
05/08/12	< 2.20E+01	< 2.18E+01	< 1.82E+01	< 1.81E+01	< 1.82E+01	< 1.81E+01
05/15/12	< 5.21E+01	< 5.21E+01	< 5.22E+01	< 3.32E+01	< 3.31E+01	< 3.32E+01
05/22/12	< 3.48E+01	< 1.71E+01	< 3.16E+01	< 3.16E+01	< 3.16E+01	< 3.16E+01
05/29/12	< 4.02E+01	< 4.02E+01	< 2.36E+01	< 2.35E+01	< 2.36E+01	< 2.35E+01
06/06/12	< 3.09E+01	< 3.09E+01	< 3.25E+01	< 3.24E+01	< 3.24E+01	< 3.25E+01
06/12/12	< 1.58E+01	< 3.76E+01	< 2.51E+01	< 2.50E+01	< 2.51E+01	< 2.50E+01
06/19/12	< 2.70E+01	< 2.70E+01	< 2.21E+01	< 2.22E+01	< 2.21E+01	< 2.22E+01
06/26/12	< 3.49E+01	< 1.98E+01	< 4.71E+01	< 4.72E+01	< 4.73E+01	< 4.72E+01

* Control Station

Table 3-4
Airborne Iodine
I-131
[10^{-3} pCi/m^3]

Period Ending	Station 01	Station 02	Station 03	Station 04	Station 05	Station 06	Station 07
07/03/12	< 1.73E+01	< 2.92E+01	< 5.38E+01	< 2.96E+01	< 4.71E+01	< 4.07E+01	< 3.86E+01
07/11/12	< 5.73E+01	< 5.73E+01	< 5.62E+01	< 5.67E+01	< 6.28E+01	< 6.30E+01	< 6.30E+01
07/17/12	< 9.02E+00	< 2.33E+01	< 2.33E+01	< 2.32E+01	< 2.32E+01	< 3.15E+01	< 3.15E+01
07/24/12	< 7.96E+00	< 2.05E+01	< 2.09E+01	< 2.03E+01	< 2.02E+01	< 2.32E+01	< 2.38E+01
07/31/12	< 1.88E+01	< 4.84E+01	< 4.85E+01	< 4.96E+01	< 4.94E+01	< 5.10E+01	< 4.97E+01
08/07/12	< 2.02E+01	< 2.07E+01	< 2.06E+01	< 2.06E+01	< 1.29E+01	< 1.29E+01	< 1.31E+01
08/14/12	< 1.18E+01	< 2.95E+01	< 2.89E+01	< 2.92E+01	< 2.95E+01	< 2.90E+01	< 2.86E+01
08/21/12	< 2.60E+01	< 2.62E+01	< 2.62E+01	< 2.62E+01	< 2.16E+01	< 2.15E+01	< 2.15E+01
08/28/12	< 1.69E+01	< 4.35E+01	< 4.36E+01	< 4.35E+01	< 4.35E+01	< 4.08E+01	< 4.08E+01
09/04/12	< 2.05E+01	< 2.06E+01	< 2.05E+01	< 2.06E+01	< 3.17E+01	< 3.17E+01	< 3.17E+01
09/12/12	< 8.94E+00	< 1.62E+01	< 1.61E+01	< 1.61E+01	< 1.61E+01	< 2.18E+01	< 2.18E+01
09/19/12	< 1.31E+01	< 3.55E+01	< 3.64E+01	< 3.60E+01	< 3.57E+01	< 2.82E+01	< 2.82E+01
09/25/12	< 1.66E+01	< 4.25E+01	< 4.13E+01	< 4.18E+01	< 4.23E+01	< 5.05E+01	< 5.05E+01
10/02/12	< 3.65E+01	< 1.43E+01	< 3.68E+01	< 3.69E+01	< 3.68E+01	< 4.82E+01	< 4.82E+01
10/10/12	< 9.27E+01	< 2.39E+01	< 2.39E+01	< 2.38E+01	< 2.38E+01	< 2.37E+01	< 2.37E+01
10/16/12	< 3.07E+01	< 3.08E+01	< 1.19E+01	< 3.08E+01	< 3.08E+01	< 2.57E+01	< 2.57E+01
10/24/12	< 1.08E+01	< 1.97E+01	< 1.97E+01	< 1.96E+01	< 1.96E+01	< 2.25E+01	< 2.25E+01
10/31/12	< 2.64E+01	< 2.64E+01	< 2.64E+01	< 1.03E+01	< 2.64E+01	< 1.33E+01	< 3.17E+01
11/07/12	< 9.88E+00	< 2.67E+01	< 2.67E+01	< 2.67E+01	< 2.67E+01	< 2.89E+01	< 2.89E+01
11/13/12	< 4.67E+01	< 4.67E+01	< 4.68E+01	< 4.67E+01	< 2.07E+01	< 3.77E+01	< 3.77E+01
11/21/12	< 1.08E+01	< 2.77E+01	< 2.79E+01	< 2.78E+01	< 2.78E+01	< 2.71E+01	< 2.71E+01
11/27/12	< 4.28E+01	< 4.25E+01	< 4.34E+01	< 4.29E+01	< 4.48E+01	< 1.88E+01	< 4.48E+01
12/04/12	< 9.04E+00	< 2.34E+01	< 2.30E+01	< 2.32E+01	< 2.34E+01	< 1.80E+01	< 1.80E+01
12/11/12	< 2.22E+01	< 2.22E+01	< 2.22E+01	< 2.22E+01	< 2.00E+01	< 2.00E+01	< 8.39E+00
12/18/12	< 1.55E+01	< 1.55E+01	< 1.55E+01	< 1.55E+01	< 1.67E+01	< 1.67E+01	< 1.67E+01
12/26/12	< 1.20E+01	< 3.06E+01	< 3.05E+01	< 3.06E+01	< 3.06E+01	< 3.03E+01	< 3.03E+01

Table 3-4
Airborne Iodine
I-131
[10^{-3} pCi/m^3]

Period Ending	Station 21	Station 22	Station 23	Station 24*	Station 01A	Station 05A
07/03/12	< 3.85E+01	< 3.86E+01	< 2.56E+01	< 2.02E+01	< 2.01E+01	< 2.02E+01
07/11/12	< 6.31E+01	< 6.89E+01	< 2.89E+01	< 6.88E+01	< 6.89E+01	< 6.87E+01
07/17/12	< 3.15E+01	< 3.15E+01	< 2.88E+01	< 2.88E+01	< 2.88E+01	< 2.88E+01
07/24/12	< 2.39E+01	< 2.37E+01	< 2.17E+01	< 2.15E+01	< 2.15E+01	< 2.13E+01
07/31/12	< 4.97E+01	< 4.97E+01	< 3.06E+01	< 3.07E+01	< 3.05E+01	< 3.11E+01
08/07/12	< 1.31E+01	< 1.78E+01	< 1.77E+01	< 6.92E+00	< 1.73E+01	< 1.77E+01
08/14/12	< 2.89E+01	< 2.89E+01	< 2.21E+01	< 2.18E+01	< 2.37E+01	< 2.20E+01
08/21/12	< 2.14E+01	< 2.54E+01	< 2.54E+01	< 2.56E+01	< 1.06E+01	< 2.56E+01
08/28/12	< 4.10E+01	< 4.14E+01	< 3.12E+01	< 3.12E+01	< 3.11E+01	< 3.10E+01
09/04/12	< 3.16E+01	< 3.76E+01	< 3.60E+01	< 3.59E+01	< 3.59E+01	< 1.40E+01
09/12/12	< 2.18E+01	< 2.18E+01	< 1.96E+01	< 1.95E+01	< 1.96E+01	< 1.95E+01
09/19/12	< 2.81E+01	< 2.82E+01	< 3.78E+01	< 3.77E+01	< 3.76E+01	< 3.77E+01
09/25/12	< 5.06E+01	< 5.05E+01	< 3.57E+01	< 3.57E+01	< 3.60E+01	< 3.57E+01
10/02/12	< 4.81E+01	< 4.80E+01	< 2.53E+01	< 2.54E+01	< 2.52E+01	< 2.54E+01
10/10/12	< 2.37E+01	< 2.37E+01	< 2.10E+01	< 2.10E+01	< 2.10E+01	< 2.10E+01
10/16/12	< 2.56E+01	< 2.56E+01	< 2.19E+01	< 2.19E+01	< 2.18E+01	< 2.19E+01
10/24/12	< 2.25E+01	< 2.25E+01	< 3.22E+01	< 3.22E+01	< 3.22E+01	< 3.21E+01
10/31/12	< 3.17E+01	< 3.17E+01	< 3.17E+01	< 2.35E+01	< 2.35E+01	< 2.35E+01
11/07/12	< 2.90E+01	< 2.90E+01	< 4.58E+01	< 2.95E+01	< 2.96E+01	< 2.96E+01
11/13/12	< 3.77E+01	< 3.77E+01	< 5.99E+01	< 6.02E+01	< 5.99E+01	< 5.99E+01
11/21/12	< 2.70E+01	< 2.70E+01	< 1.96E+01	< 1.96E+01	< 1.96E+01	< 1.96E+01
11/27/12	< 4.48E+01	< 4.50E+01	< 3.06E+01	< 3.04E+01	< 3.06E+01	< 3.04E+01
12/04/12	< 1.80E+01	< 1.80E+01	< 2.29E+01	< 2.30E+01	< 2.29E+01	< 2.30E+01
12/11/12	< 2.00E+01	< 2.00E+01	< 2.02E+01	< 2.01E+01	< 2.02E+01	< 2.01E+01
12/18/12	< 1.67E+01	< 1.05E+01	< 1.90E+01	< 1.90E+01	< 1.90E+01	< 1.90E+01
12/26/12	< 3.04E+01	< 3.04E+01	< 2.58E+01	< 2.58E+01	< 2.59E+01	< 2.58E+01

* Control Station

Table 3-5
Airborne Particulate Gamma Spectra
[10^{-3} pCi/m^3]

Quarter 1

Sampling Location	Be-7	Cs-134*	Cs-137*		
01	1.16E+02 +/- 2.16E+01	< 9.66E-01	< 9.19E-01		
01A	1.17E+02 +/- 2.55E+01	< 1.23E+00	< 1.11E+00		
02	1.53E+02 +/- 2.84E+01	< 1.45E+00	< 9.01E-01		
03	1.25E+02 +/- 2.77E+01	< 1.41E+00	< 1.16E+00		
04	1.15E+02 +/- 2.40E+01	< 1.19E+00	< 1.02E+00		
05	1.37E+02 +/- 3.41E+01	< 1.40E+00	< 1.18E+00		
05A	9.95E+01 +/- 2.04E+01	< 1.25E+00	< 1.10E+00		
06	1.50E+02 +/- 3.59E+01	< 2.06E+00	< 1.79E+00		
07	1.16E+02 +/- 2.14E+01	< 1.13E+00	< 8.50E-01		
21	1.57E+02 +/- 3.45E+01	< 1.33E+00	< 1.39E+00		
22	1.60E+02 +/- 2.74E+01	< 1.60E+00	< 1.43E+00		
23	1.59E+02 +/- 2.87E+01	< 1.40E+00	< 1.48E+00		
24**	1.13E+02 +/- 2.82E+01	< 1.79E+00	< 1.51E+00		

Quarter 2

Sampling Location	Be-7	Cs-134*	Cs-137*	Sr-89	Sr-90
01	1.14E+02 +/- 1.97E+01	< 1.00E+00	< 9.19E-01	< 3.69E+00	< 7.39E-01
01A	1.45E+02 +/- 2.77E+01	< 8.92E-01	< 1.08E+00	< 3.83E+00	< 1.13E+00
02	1.49E+02 +/- 2.24E+01	< 1.19E+00	< 1.05E+00	< 3.83E+00	< 7.65E-01
03	1.42E+02 +/- 2.09E+01	< 8.53E-01	< 1.01E+00	< 3.97E+00	< 8.61E-01
04	1.64E+02 +/- 3.23E+01	< 1.41E+00	< 1.45E+00	< 4.00E+00	< 8.68E-01
05	1.60E+02 +/- 3.65E+01	< 1.26E+00	< 1.26E+00	< 3.84E+00	< 8.93E-01
05A	1.45E+02 +/- 2.92E+01	< 1.46E+00	< 9.13E-01	< 3.73E+00	< 8.08E-01
06	1.84E+02 +/- 2.92E+01	< 1.27E+00	< 1.02E+00	< 4.05E+00	< 1.10E+00
07	1.41E+02 +/- 2.89E+01	< 1.19E+00	< 1.23E+00	< 3.87E+00	< 1.17E+00
21	1.45E+02 +/- 2.80E+01	< 1.77E+00	< 1.36E+00	< 4.00E+00	< 1.11E+00
22	1.61E+02 +/- 2.79E+01	< 1.10E+00	< 9.24E-01	< 4.91E+00	< 1.22E+00
23	1.76E+02 +/- 2.76E+01	< 1.22E+00	< 1.11E+00	< 4.51E+00	< 9.02E-01
24**	1.19E+02 +/- 2.61E+01	< 1.22E+00	< 1.14E+00	< 4.37E+00	< 1.18E+00

* LLD identified in the ODCM

** Control Station

Table 3-5
Airborne Particulate Gamma Spectra
[10^{-3} pCi/m^3]

Quarter 3

Sampling Location	Be-7			Cs-134*		Cs-137*	
01	1.44E+02	+/-	3.35E+01	<	1.05E+00	<	1.01E+00
01A	1.18E+02	+/-	4.51E+01	<	1.24E+00	<	1.07E+00
02	1.49E+02	+/-	3.52E+01	<	1.90E+00	<	1.40E+00
03	1.33E+02	+/-	4.00E+01	<	1.11E+00	<	9.39E-01
04	1.37E+02	+/-	3.80E+01	<	1.71E+00	<	1.20E+00
05	1.64E+02	+/-	3.28E+01	<	1.63E+00	<	1.40E+00
05A	1.50E+02	+/-	3.55E+01	<	1.81E+00	<	1.39E+00
06	1.40E+02	+/-	4.58E+01	<	2.26E+01	<	1.60E+00
07	1.27E+02	+/-	3.27E+01	<	1.50E+00	<	1.09E+00
21	4.30E+02	+/-	1.04E+02	<	3.88E+00	<	3.26E+00
22	1.41E+02	+/-	2.62E+01	<	1.38E+00	<	1.20E+00
23	8.07E+01	+/-	2.38E+01	<	1.46E+00	<	9.15E-01
24**	1.47E+02	+/-	3.90E+01	<	1.95E+00	<	1.46E+00
MEAN							

Quarter 4

Sampling Location	Be-7			Cs-134*		Cs-137*		MEAN Be-7		
01	8.94E+01	+/-	2.47E+01	<	1.59E+00	<	1.24E+00	1.16E+02	+/-	2.49E+01
01A	9.06E+01	+/-	2.29E+01	<	1.40E+00	<	1.18E+00	1.18E+02	+/-	3.03E+01
02	9.72E+01	+/-	2.58E+01	<	1.55E+00	<	1.34E+00	1.37E+02	+/-	2.80E+01
03	8.64E+01	+/-	2.14E+01	<	1.50E+00	<	1.20E+00	1.22E+02	+/-	2.75E+01
04	8.90E+01	+/-	2.32E+01	<	1.70E+00	<	1.23E+00	1.26E+02	+/-	2.94E+01
05	1.21E+02	+/-	3.04E+01	<	1.64E+00	<	1.37E+00	1.46E+02	+/-	3.35E+01
05A	1.07E+02	+/-	2.15E+01	<	1.31E+00	<	9.85E-01	1.25E+02	+/-	2.67E+01
06	1.21E+02	+/-	2.59E+01	<	1.46E+00	<	1.49E+00	1.49E+02	+/-	3.42E+01
07	1.03E+02	+/-	2.38E+01	<	1.76E+00	<	1.39E+00	1.22E+02	+/-	2.67E+01
21	9.84E+01	+/-	2.67E+01	<	1.75E+00	<	1.33E+00	2.08E+02	+/-	4.83E+01
22	1.04E+02	+/-	2.77E+01	<	1.54E+00	<	1.14E+00	1.42E+02	+/-	2.73E+01
23	1.04E+02	+/-	2.88E+01	<	1.88E+00	<	1.64E+00	1.30E+02	+/-	2.72E+01
24**	1.05E+02	+/-	2.12E+01	<	1.23E+00	<	8.29E-01	1.21E+02	+/-	2.86E+01
						Mean of All Indicator Location:		1.37E+02	+/-	3.03E+01

* LLD Identified in ODCM

** Control Station

Table 3-6
Soil
[pCi/kg]

Soil sampled on triennial basis. Last taken 2010. Not required in 2012

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

Sampling Date	Gross Beta			H-3			Rainfall (inches)
01/31/12	5.20E+00	+/-	1.39E+00				1.85
02/28/12	3.48E+00	+/-	1.55E+00				2.11
03/28/12		<	2.27E+00				3.42
04/24/12		<	2.20E+00				1.21
05/29/12		<	2.21E+00				4.71
06/26/12		<	2.13E+00				3.53
07/31/12		<	2.10E+00				4.97
08/28/12	2.69E+00	+/-	1.47E+00				3.06
09/25/12		<	2.04E+00				2.75
10/31/12	2.61E+00	+/-	1.50E+00				4.56
11/27/12	7.73E+00	+/-	1.98E+00	<	8.62E+02		0.62
12/26/12	2.42E+00	+/-	1.49E+00	<	7.00E+02		1.77
Mean	4.02E+00	+/-	1.56E+00			Total	34.56

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

Sampling Location	Be-7			Mn-54		Fe-59		Co-58		Co-60	
01A											
06/26/12		<	4.55E+01	<	1.49E+00	<	1.24E+01	<	3.14E+00	<	1.05E+00
12/26/12		<	5.97E+01	<	2.05E+00	<	1.83E+01	<	4.48E+00	<	1.67E+00
	Zn-65			Zr-95		Nb-95		Cs-134		Cs-137	
01A											
06/26/12	3.76E+00*	+/-	1.73E+00	<	6.42E+00	<	3.63E+00	<	1.14E+00	<	1.19E+00
12/26/12		<	4.60E+00	<	9.32E+00	<	5.64E+00	<	1.82E+00	<	1.81E+00
	Ba-140			La-140		I-131		Th-228			
01A											
06/26/12		<	2.72E+03	<	7.38E+02	<	3.89E+04	<	2.29E+00		
12/26/12		<	2.43E+03	<	8.54E+02	<	2.69E+04	<	3.53E+00		

* Activity listed is due to forced activity calculation. Nuclide was not identified during analysis. False positive.

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

Station 12A

Sampling Date	K-40			Sr-89		Sr-90		I-131*	Cs-134*	Cs-137*	Ba-140*	La-140*
01/17/12	1.29E+03	+/-	1.70E+02	[a]		[a]		< 5.12E-01	< 4.59E+00	< 5.48E+00	< 2.74E+01	< 6.78E+00
02/21/12	1.27E+03	+/-	1.07E+02	[a]		[a]		< 4.88E-01	< 3.99E+00	< 4.83E+00	< 1.99E+01	< 5.98E+00
03/20/12	1.48E+03	+/-	1.41E+02	<	1.75E+00	<	6.53E-01	< 5.67E-01	< 5.04E+00	< 5.33E+00	< 2.61E+01	< 9.20E+00
04/17/12	1.30E+03	+/-	1.68E+02	[a]		[a]		< 5.32E-01	< 5.02E+00	< 6.05E+00	< 3.01E+01	< 8.76E+00
05/16/12	1.36E+03	+/-	1.16E+02	[a]		[a]		< 7.31E-01	< 4.68E+00	< 4.86E+00	< 2.67E+01	< 6.25E+00
06/19/12	1.24E+03	+/-	1.28E+02	<	2.36E+00	<	7.90E-01	< 6.60E-01	< 5.22E+00	< 5.75E+00	< 2.47E+01	< 7.65E+00
07/17/12	1.27E+03	+/-	1.48E+02	[a]		[a]		< 5.29E-01	< 6.55E+00	< 6.51E+00	< 3.63E+01	< 9.98E+00
08/21/12	1.39E+03	+/-	1.01E+02	[a]		[a]		< 6.73E-01	< 3.46E+00	< 3.93E+00	< 2.45E+01	< 6.17E+00
09/19/12	1.40E+03	+/-	1.78E+02	<	3.08E+00	<	1.74E+00	< 7.16E-01	< 7.77E+00	< 7.51E+00	< 4.02E+01	< 9.60E+00
10/16/12	1.35E+03	+/-	1.96E+02	[a]		[a]		< 6.42E-01	< 7.99E+00	< 9.43E+00	< 4.90E+01	< 1.15E+01
11/21/12	1.42E+03	+/-	1.37E+02	[a]		[a]		< 8.51E-01	< 6.05E+00	< 5.49E+00	< 3.93E+01	< 1.22E+01
12/18/12	1.45E+03	+/-	9.80E+01	<	1.93E+00	<	9.68E-01	< 8.42E-01	< 3.72E+00	< 4.39E+00	< 3.22E+01	< 9.09E+00
Sta. Mean	1.35E+03	+/-	1.41E+02									

* LLD identified in ODCM

[a] Sr-89/90 analyses performed on the last monthly sample of each quarter.

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

Sampling Location	Sampling Date	Be-7	K-40	I-131*	Cs-134*	Cs-137*
	04/10/12	4.55E+03 +/- 6.30E+02	7.99E+03 +/- 1.10E+03	< 1.71E+01	< 3.32E+01	< 3.70E+01
14B	05/08/12	5.98E+02 +/- 2.20E+02	5.33E+03 +/- 5.37E+02	< 3.03E+01	< 2.45E+01	< 2.29E+01
	06/12/12	7.86E+02 +/- 2.62E+02	6.69E+03 +/- 7.15E+02	< 2.86E+01	< 2.87E+01	< 3.34E+01
	07/11/12	1.37E+03 +/- 1.29E+02	9.05E+03 +/- 3.18E+02	< 3.40E+01	< 1.09E+01	< 1.31E+01
	08/14/12	1.16E+03 +/- 2.11E+02	7.78E+03 +/- 4.85E+02	< 5.76E+01	< 1.80E+01	< 1.82E+01
	09/12/12	1.22E+03 +/- 1.59E+02	5.56E+03 +/- 3.77E+02	< 3.11E+01	< 1.57E+01	< 1.69E+01
	10/12/12	1.50E+03 +/- 2.09E+02	6.13E+03 +/- 4.70E+02	< 3.69E+01	< 2.13E+01	< 2.18E+01
	Mean	1.60E+03 +/- 2.60E+02	6.93E+03 +/- 5.72E+02			

Sampling Location	Sampling Date	Be-7	K-40	I-131*	Cs-134*	Cs-137*
15	04/10/12	1.31E+03 +/- 2.15E+02	7.63E+03 +/- 5.02E+02	< 1.88E+01	< 2.01E+01	< 2.31E+01
	05/08/12	8.49E+02 +/- 2.33E+02	6.53E+03 +/- 5.84E+02	< 2.37E+01	< 2.52E+01	< 2.78E+01
	06/12/12	4.60E+02 +/- 2.64E+02	6.00E+03 +/- 8.81E+02	< 3.89E+01	< 2.74E+01	< 2.97E+01
	07/11/12	1.12E+03 +/- 1.28E+02	7.04E+03 +/- 3.46E+02	< 3.56E+01	< 1.08E+01	< 1.17E+01
	08/14/12	8.26E+02 +/- 1.92E+02	7.00E+03 +/- 5.07E+02	< 5.60E+01	< 1.89E+01	< 1.79E+01
	09/12/12	2.00E+03 +/- 3.02E+02	6.10E+03 +/- 5.77E+02	< 3.48E+01	< 1.60E+01	< 1.95E+01
	10/12/12	1.03E+03 +/- 2.22E+02	8.58E+03 +/- 5.24E+02	< 3.29E+01	< 1.93E+01	< 1.90E+01
	Mean	1.09E+03 +/- 2.22E+02	6.98E+03 +/- 5.60E+02			

Sampling Location	Sampling Date	Be-7	K-40	I-131*	Cs-134*	Cs-137*
16**	04/10/12	7.96E+02 +/- 2.38E+02	8.60E+03 +/- 6.39E+02	< 1.74E+01	< 2.38E+01	< 2.82E+01
	05/08/12	2.68E+02 +/- 1.84E+02	5.14E+03 +/- 5.44E+02	< 2.30E+01	< 2.01E+01	< 2.32E+01
	06/12/12	4.76E+02 +/- 2.23E+02	3.77E+03 +/- 5.50E+02	< 3.46E+01	< 2.35E+01	< 2.32E+01
	07/11/12	5.26E+02 +/- 9.44E+01	3.69E+03 +/- 1.92E+02	< 3.33E+01	< 1.03E+01	< 1.12E+01
	08/14/12	1.32E+03 +/- 2.12E+02	3.86E+03 +/- 3.89E+02	< 4.74E+01	< 1.86E+01	< 1.93E+01
	09/12/12	1.20E+03 +/- 1.76E+02	3.02E+03 +/- 3.57E+02	< 3.07E+01	< 1.62E+01	< 1.77E+01
	10/12/12	2.20E+03 +/- 2.67E+02	6.30E+03 +/- 5.91E+02	< 2.99E+01	< 1.77E+01	< 1.80E+01
	Mean	9.69E+02 +/- 1.99E+02	4.91E+03 +/- 4.66E+02			

* LLD identified in ODCM

** Control Station

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

Sampling Location	Sampling Date	Be-7			K-40			I-131*			Cs-134*			Cs-137*		
23	04/10/12	1.17E+03	+/-	3.83E+02	6.70E+03	+/-	6.55E+02	<	1.67E+01		<	2.21E+01		<	2.76E+01
	05/08/12	1.08E+03	+/-	3.55E+02	5.02E+03	+/-	9.16E+02	<	2.31E+01		<	2.86E+01		<	2.86E+01
	06/12/12	8.00E+02	+/-	3.42E+02	5.46E+03	+/-	8.45E+02	<	3.46E+01		<	3.12E+01		<	4.04E+01
	07/11/12	1.39E+03	+/-	1.47E+02	8.69E+03	+/-	3.20E+02	<	4.63E+01		<	1.22E+01		<	1.38E+01
	08/14/12	2.16E+03	+/-	4.18E+02	3.86E+03	+/-	5.89E+02	<	5.83E+01		<	2.58E+01	3.38E+1**	+/-	2.62E+01
	09/12/12	1.95E+03	+/-	2.30E+02	5.79E+03	+/-	5.11E+02	<	2.87E+01		<	1.99E+01		<	2.28E+01
	10/12/12	1.48E+03	+/-	3.77E+02	8.14E+03	+/-	7.37E+02	<	2.90E+01		<	2.75E+01		<	2.96E+01
	Mean	1.43E+03	+/-	3.22E+02	6.24E+03	+/-	6.53E+02	+/-			+/-			+/-	
Sampling Location	Sampling Date	Be-7			K-40			I-131*			Cs-134*			Cs-137*		
26	04/10/12	1.88E+03	+/-	3.64E+02	6.32E+03	+/-	7.61E+02	<	2.17E+01		<	3.21E+01		<	3.63E+01
	05/08/12	1.22E+03	+/-	2.75E+02	5.90E+03	+/-	7.14E+02	<	2.25E+01		<	2.78E+01		<	3.04E+01
	06/12/12	1.56E+03	+/-	6.51E+02	5.20E+03	+/-	1.29E+03	<	2.74E+01		<	4.18E+01		<	4.31E+01
	07/11/12	1.87E+03	+/-	2.11E+02	6.15E+03	+/-	3.66E+02	<	3.89E+01		<	1.54E+01		<	1.66E+01
	08/14/12	1.81E+03	+/-	2.98E+02	3.86E+03	+/-	5.38E+02	<	5.04E+01		<	2.98E+01		<	3.27E+01
	09/12/12	2.15E+03	+/-	2.74E+02	3.65E+03	+/-	4.17E+02	<	4.12E+01		<	2.08E+01		<	2.41E+01
	10/12/12	3.33E+03	+/-	3.52E+02	3.72E+03	+/-	4.64E+02	<	2.63E+01		<	2.52E+01		<	2.86E+01
	Mean	1.97E+03	+/-	3.46E+02	4.97E+03	+/-	6.50E+02	+/-			+/-			+/-	
Indicator locations		1.52E+03	+/-	2.88E+02	6.28E+03	+/-	6.09E+02	+/-			+/-			+/-	

* LLD identified in ODCM

**Activity listed is due to forced activity calculation. Nuclide was not identified during analysis. False positive.

Table 3-10

Well Water

Gamma Spectra, Strontium, and Tritium

[pCi/L]

Station 01A

Sampling Date	H-3	Sr-89	Sr-90	Mn-54	Fe-59	Co-58	Co-60	Zn-65
03/28/12	< 7.24E+02	[a]	[a]	< 4.16E+00	< 9.69E+00	< 3.60E+00	< 4.39E+00	< 8.04E+00
06/28/12	< 7.52E+02	< 2.70E+00	< 8.09E-01	*	*	*	*	*
09/25/12	< 8.02E+02	[a]	[a]	< 4.00E+00	< 1.04E+01	< 4.50E+00	< 4.75E+00	< 8.07E+00
12/26/12	< 7.07E+02	[a]	[a]	< 2.99E+00	< 6.83E+00	< 3.92E+00	< 2.80E+00	< 6.92E+00
Mean								

Sampling Date	Zr-95	Nb-95	I-131	Cs-134	Cs-137	Ba-140	La-140
03/28/12	< 6.76E+00	< 4.35E+00	< 3.45E-01	< 3.82E+00	< 4.04E+00	< 2.21E+01	< 8.04E+00
06/28/12	*	*	< 8.70E-01	*	*	*	*
09/25/12	< 7.60E+00	< 4.69E+00	< 8.22E-01	< 3.83E+00	< 4.20E+00	< 3.07E+01	< 1.13E+01
12/26/12	< 5.70E+00	< 4.26E+00	< 7.40E-01	< 3.13E+00	< 3.40E+00	< 2.47E+01	< 8.82E+00
Mean							

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

* Missed gamma analysis on 2nd Quarter 2012 Ground water well

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

Station 11

Sampling Date	H-3	Sr-89	Sr-90	Mn-54*	Fe-59*	Co-58*	Co-60*	Zn-65*
01/12/12	[a]	[b]	[b]	< 5.06E+00	< 1.00E+01	< 6.29E+00	< 6.12E+00	< 1.25E+01
02/13/12	[a]	[b]	[b]	< 3.48E+00	< 7.42E+00	< 3.80E+00	< 2.78E+00	< 5.71E+00
03/12/12	3.23E+03 +/- 6.20E+02	[b]	[b]	< 5.59E+00	< 1.01E+01	< 4.14E+00	< 5.99E+00	< 9.98E+00
04/16/12	[a]	[b]	[b]	< 3.61E+00	< 1.13E+01	< 5.04E+00	< 4.33E+00	< 8.55E+00
05/14/12	[a]	[b]	[b]	< 3.55E+00	< 7.75E+00	< 4.19E+00	< 3.52E+00	< 7.47E+00
06/11/12	2.57E+03 +/- 6.00E+02	< 3.41E+00	< 7.38E-01	< 5.63E+00	< 1.15E+01	< 6.14E+00	< 4.87E+00	< 8.44E+00
07/16/12	[a]	[b]	[b]	< 3.34E+00	< 7.69E+00	< 3.40E+00	< 2.96E+00	< 7.50E+00
08/14/12	[a]	[b]	[b]	< 2.56E+00	< 5.40E+00	< 2.65E+00	< 2.93E+00	< 5.67E+00
09/10/12	2.04E+03 +/- 6.06E+02	[b]	[b]	< 1.78E+00	< 4.15E+00	< 1.97E+00	< 1.95E+00	< 3.87E+00
10/15/12	[a]	[b]	[b]	< 1.61E+00	< 3.80E+00	< 1.63E+00	< 1.71E+00	< 3.19E+00
11/14/12	[a]	[b]	[b]	< 3.08E+00	< 6.26E+00	< 2.87E+00	< 3.33E+00	< 6.65E+00
12/12/12	4.34E+03 +/- 8.00E+02	[b]	[b]	< 5.20E+00	< 9.86E+00	< 5.12E+00	< 5.22E+00	< 9.19E+00
MEAN	3.05E+03 +/- 6.57E+02							

Sampling Date	Nb-95*	Zr-95*	I-131*	Cs-134*	Cs-137*	Ba-140*	La-140*
01/12/12	< 7.49E+00	< 9.85E+00	< 4.23E-01	< 6.24E+00	< 5.56E+00	< 3.75E+01	< 1.37E+01
02/13/12	< 3.46E+00	< 6.62E+00	< 4.52E-01	< 2.93E+00	< 3.77E+00	< 1.86E+01	< 6.07E+00
03/12/12	< 4.49E+00	< 7.21E+00	< 5.36E-01	< 4.30E+00	< 4.55E+00	< 2.14E+01	< 7.50E+00
04/16/12	< 4.81E+00	< 8.25E+00	< 5.75E-01	< 4.56E+00	< 5.37E+00	< 2.45E+01	< 6.05E+00
05/14/12	< 3.66E+00	< 7.23E+00	< 3.57E-01	< 3.46E+00	< 3.81E+00	< 3.31E+01	< 8.68E+00
06/11/12	< 5.52E+00	< 9.35E+00	< 8.94E-01	< 5.36E+00	< 5.65E+00	< 2.37E+01	< 7.39E+00
07/16/12	< 3.96E+00	< 6.54E+00	< 5.78E-01	< 3.22E+00	< 3.70E+00	< 1.95E+01	< 5.81E+00
08/14/12	< 3.10E+00	< 5.29E+00	< 6.44E-01	< 2.64E+00	< 3.04E+00	< 1.19E+01	< 3.31E+00
09/10/12	< 2.17E+00	< 3.46E+00	< 5.75E-01	< 1.76E+00	< 1.92E+00	< 1.42E+01	< 4.65E+00
10/15/12	< 1.68E+00	< 2.83E+00	< 5.65E-01	< 1.39E+00	< 1.68E+00	< 9.40E+00	< 3.23E+00
11/14/12	< 3.11E+00	< 5.27E+00	< 6.26E-01	< 2.73E+00	< 3.20E+00	< 1.33E+01	< 4.55E+00
12/12/12	< 5.69E+00	< 9.59E+00	< 5.19E-01	< 4.82E+00	< 5.59E+00	< 2.67E+01	< 7.28E+00

* LLD identified in ODCM

[a] Tritium analyses on quarterly composite.

[b] Sr-89/90 performed annually on 2nd quarter composite sample.

Table 3-12
Surface Water
Gamma Spectra, Strontium, Tritium
[pCi/L]

Station 08

Sampling Date	H-3*	Sr-89	Sr-90	Mn-54*	Fe-59*	Co-58*	Co-60*	Zn-65*
01/12/12	[a]	[b]	[b]	< 6.92E+00	< 1.13E+01	< 6.24E+00	< 5.68E+00	< 9.77E+00
02/13/12	[a]	[b]	[b]	< 3.73E+00	< 9.67E+00	< 3.83E+00	< 4.77E+00	< 8.43E+00
03/12/12	2.73E+03 +/- 5.98E+02	[b]	[b]	< 4.49E+00	< 9.98E+00	< 3.68E+00	< 4.82E+00	< 1.08E+01
04/16/12	[a]	[b]	[b]	< 6.03E+00	< 1.54E+01	< 6.33E+00	< 6.14E+00	< 1.24E+01
05/14/12		[b]	[b]	< 3.12E+00	< 8.21E+00	< 3.11E+00	< 3.14E+00	< 6.38E+00
06/11/12	2.79E+03 +/- 6.13E+02	< 3.78E+00	< 8.29E-01	< 5.84E+00	< 1.26E+01	< 5.36E+00	< 4.79E+00	< 1.35E+01
07/16/12	[a]	[b]	[b]	< 3.63E+00	< 8.27E+00	< 4.89E+00	< 4.02E+00	< 8.08E+00
08/14/12	[a]	[b]	[b]	< 3.21E+00	< 6.51E+00	< 2.59E+00	< 3.64E+00	< 5.93E+00
09/10/12	2.63E+03 +/- 6.35E+02	[b]	[b]	< 1.91E+00	< 4.63E+00	< 2.06E+00	< 1.76E+00	< 3.59E+00
10/15/12	[a]	[b]	[b]	< 1.55E+00	< 3.16E+00	< 1.53E+00	< 1.67E+00	< 3.03E+00
11/14/12	[a]	[b]	[b]	< 2.60E+00	< 5.46E+00	< 2.33E+00	< 2.56E+00	< 5.54E+00
12/12/12	2.26E+03 +/- 7.01E+02	[b]	[b]	< 4.31E+00	< 9.86E+00	< 4.34E+00	< 5.48E+00	< 8.07E+00
Mean	2.60E+03 +/- 6.37E+02							

Sampling Date	Zr-95*	Nb-95*	I-131*	Cs-134*	Cs-137*	Ba-140*	La-140*
01/12/12	< 9.57E+00	< 5.20E+00	< 3.46E-01	< 5.09E+00	< 6.35E+00	< 2.96E+01	< 1.27E+01
02/13/12	< 7.56E+00	< 4.82E+00	< 4.05E-01	< 3.66E+00	< 4.02E+00	< 2.27E+01	< 8.12E+00
03/12/12	< 8.77E+00	< 5.13E+00	< 6.06E-01	< 4.37E+00	< 5.06E+00	< 2.60E+01	< 8.47E+00
04/16/12	< 9.81E+00	< 6.74E+00	< 5.43E-01	< 5.71E+00	< 5.63E+00	< 2.83E+01	< 1.22E+01
05/14/12	< 6.26E+00	< 2.97E+00	< 3.81E-01	< 2.99E+00	< 2.82E+00	< 2.68E+01	< 9.15E+00
06/11/12	< 8.67E+00	< 5.82E+00	< 7.23E-01	< 4.97E+00	< 5.88E+00	< 2.51E+01	< 5.94E+00
07/16/12	< 7.36E+00	< 4.19E+00	< 6.07E-01	< 3.95E+00	< 4.53E+00	< 2.09E+01	< 8.72E+00
08/14/12	< 5.55E+00	< 3.34E+00	< 6.20E-01	< 2.71E+00	< 3.45E+00	< 1.21E+01	< 3.95E+00
09/10/12	< 3.56E+00	< 2.21E+00	< 4.95E-01	< 1.72E+00	< 1.98E+00	< 1.41E+01	< 4.28E+00
10/15/12	< 2.86E+00	< 1.57E+00	< 4.73E-01	< 1.45E+00	< 1.66E+00	< 8.71E+00	< 3.07E+00
11/14/12	< 3.91E+00	< 2.77E+00	< 6.45E-01	< 2.55E+00	< 2.65E+00	< 1.10E+01	< 4.43E+00
12/12/12	< 8.69E+00	< 4.80E+00	< 4.03E-01	< 4.51E+00	< 5.42E+00	< 2.44E+01	< 9.84E+00

* LLD identified in ODCM

[a] Tritium analyses on quarterly composite.

[b] Sr-89/90 performed annually on 2nd quarter composite sample.

Table 3-12

Surface Water

Gamma Spectra, Strontium, Tritium

[pCi/L]

Station 09A

Sampling Date	H-3*	Sr-89	Sr-90	Mn-54*	Fe-59*	Co-58*	Co-60*	Zn-65*
01/12/12	[a]	[b]	[b]	< 5.16E+00	< 1.26E+01	< 5.33E+00	< 5.85E+00	< 1.20E+01
02/13/12	[a]	[b]	[b]	< 2.93E+00	< 6.25E+00	< 3.18E+00	< 3.28E+00	< 6.62E+00
03/12/12	< 6.93E+02	[b]	[b]	< 4.91E+00	< 1.13E+01	< 4.07E+00	< 5.16E+00	< 8.43E+00
04/16/12	[a]	[b]	[b]	< 4.69E+00	< 1.12E+01	< 4.61E+00	< 4.83E+00	< 1.09E+01
05/14/12	[a]	[b]	[b]	< 3.82E+00	< 1.05E+01	< 4.85E+00	< 3.95E+00	< 7.44E+00
06/11/12	< 6.91E+02	< 3.87E+00	< 9.02E-01	< 5.73E+00	< 1.38E+01	< 5.48E+00	< 5.18E+00	< 1.19E+01
07/16/12	[a]	[b]	[b]	< 3.96E+00	< 9.12E+00	< 5.09E+00	< 4.48E+00	< 9.74E+00
08/14/12	[a]	[b]	[b]	< 3.39E+00	< 6.41E+00	< 2.91E+00	< 3.35E+00	< 5.67E+00
09/10/12	< 7.51E+02	[b]	[b]	< 1.46E+00	< 3.44E+00	< 1.65E+00	< 1.40E+00	< 2.91E+00
10/15/12	[a]	[b]	[b]	< 1.41E+00	< 3.03E+00	< 1.56E+00	< 1.41E+00	< 2.79E+00
11/14/12	[a]	[b]	[b]	< 3.18E+00	< 5.89E+00	< 3.09E+00	< 3.27E+00	< 6.20E+00
12/12/12	< 9.15E+02	[b]	[b]	< 5.46E+00	< 1.01E+01	< 4.99E+00	< 5.83E+00	< 1.03E+01

Sampling Date	Zr-95*	Nb-95*	I-131*	Cs-134*	Cs-137*	Ba-140*	La-140*
01/12/12	< 8.75E+00	< 6.44E+00	< 5.61E-01	< 3.85E+00	< 5.48E+00	< 3.61E+01	< 1.27E+01
02/13/12	< 5.37E+00	< 3.72E+00	< 3.83E-01	< 3.10E+00	< 3.55E+00	< 1.87E+01	< 6.05E+00
03/12/12	< 8.63E+00	< 5.49E+00	< 6.14E-01	< 4.45E+00	< 5.30E+00	< 2.43E+01	< 8.45E+00
04/16/12	< 9.30E+00	< 5.15E+00	< 5.48E-01	< 5.24E+00	< 5.54E+00	< 2.37E+01	< 8.71E+00
05/14/12	< 8.19E+00	< 4.76E+00	< 3.54E-01	< 3.92E+00	< 3.96E+00	< 3.36E+01	< 8.35E+00
06/11/12	< 1.18E+01	< 5.26E+00	< 7.65E-01	< 5.15E+00	< 4.56E+00	< 3.34E+01	< 7.77E+00
07/16/12	< 7.51E+00	< 4.02E+00	< 5.97E-01	< 4.01E+00	< 4.44E+00	< 2.16E+01	< 6.72E+00
08/14/12	< 6.07E+00	< 3.58E+00	< 7.06E-01	< 3.47E+00	< 3.62E+00	< 1.49E+01	< 4.00E+00
09/10/12	< 2.98E+00	< 1.78E+00	< 5.69E-01	< 1.41E+00	< 1.58E+00	< 1.25E+01	< 3.55E+00
10/15/12	< 2.60E+00	< 1.55E+00	< 5.76E-01	< 1.46E+00	< 1.58E+00	< 8.62E+00	< 2.55E+00
11/14/12	< 5.55E+00	< 3.60E+00	< 6.26E-01	< 3.07E+00	< 3.31E+00	< 1.32E+01	< 4.19E+00
12/12/12	< 9.12E+00	< 6.00E+00	< 4.78E-01	< 5.03E+00	< 5.72E+00	< 2.34E+01	< 9.20E+00

* LLD identified in ODCM

[a] Tritium analyses on quarterly composite.

[b] Sr-89/90 performed annually on 2nd quarter composite sample.

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

Sample Date	Sr-89	Sr-90	K-40	Cs-134*	Cs-137*
4/9/2012					
Station 08	[a]	[a]	2.21E+04 +/- 1.71E+03	< 6.67E+01	< 7.65E+01
Station 09A**	[a]	[a]	1.25E+04 +/- 1.22E+03	< 5.80E+01	< 7.29E+01
Station 11	[a]	[a]	1.69E+04 +/- 1.34E+03	< 6.20E+01	< 6.98E+01

	Ra-226	Th-228	Th-232
4/9/2012			
Station 08	4.13E+03 +/- 1.51E+03	2.40E+03 +/- 1.26E+02	2.13E+03 +/- 2.03E+02
Station 09A**	2.06E+03 +/- 1.20E+03	6.23E+02 +/- 9.17E+01	5.84E+02 +/- 1.59E+02
Station 11	2.92E+03 +/- 1.40E+03	1.26E+03 +/- 1.05E+02	1.16E+03 +/- 1.64E+02

Sample Date	Sr-89	Sr-90	K-40	Cs-134*	Cs-137*
10/23/2012					
Station 08	< 2.15E+02	< 3.96E+01	1.24E+04 +/- 1.34E+03	< 5.77E+01	< 7.26E+01
Station 09A**	< 1.97E+02	< 3.85E+01	1.28E+04 +/- 1.37E+03	< 6.19E+01	1.12E+02 +/- 8.64E+01
Station 11	< 1.85E+02	< 4.22E+01	1.44E+04 +/- 1.39E+03	< 7.32E+01	< 7.96E+01

	Ra-226	Th-228	Th-232
10/23/2012			
Station 08	2.39E+03 +/- 1.34E+03	1.68E+03 +/- 1.16E+02	1.54E+03 +/- 1.82E+02
Station 09A**	1.30E+03 +/- 1.18E+03	7.43E+02 +/- 1.04E+02	8.13E+02 +/- 1.55E+02
Station 11	2.65E+03 +/- 1.44E+03	2.08E+03 +/- 1.42E+02	1.97E+03 +/- 2.07E+02

MEAN

	Sr-89	Sr-90	K-40	Cs-134*	Cs-137*
Indicator			1.65E+04 +/- 1.45E+03		
Control			1.27E+04 +/- 1.30E+03		

	Ra-226	Th-228	Th-232
Indicator	3.02E+03 +/- 1.39E+03	1.86E+03 +/- 1.22E+02	1.70E+03 +/- 1.89E+02
Control	1.68E+03 +/- 1.20E+03	6.83E+02 +/- 9.79E+01	6.99E+02 +/- 1.57E+02

* LLD identified in ODCM

** Control Station

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

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

Sample Date	Sr-89	Sr-90	K-40	Cs-134*	Cs-137*
4/9/2012 Station 08	[a]	[a]	2.00E+03 +/- 8.74E+02	< 5.64E+01	< 6.64E+01

Ra-226	Th-228	Th-232
< 1.18E+03	7.08E+02 +/- 1.32E+02	6.66E+02 +/- 2.26E+02

Sample Date	Sr-89	Sr-90	K-40	Cs-134*	Cs-137*
10/23/2012 Station 08	< 1.65E+02	< 4.58E+01	2.55E+03 +/- 5.76E+02	< 3.36E+01	1.57E+02 +/- 3.83E+01

Ra-226	Th-228	Th-232
1.21E+03 +/- 6.73E+02	4.39E+02 +/- 6.56E+01	3.99E+02 +/- 8.88E+01

MEAN

Sr-89	Sr-90	K-40	Cs-134*	Cs-137*
		2.28E+03 +/- 7.25E+02		

Ra-226	Th-228	Th-232
1.21E+03 +/- 1.18E+03	5.74E+02 +/- 9.88E+01	5.33E+02 +/- 1.57E+02

* LLD identified in ODCM

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

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

Fish [a]

Sampling Date	K-40	Mn-54*	Fe-59*	Co-58*	Co-60*	Zn-65*	Cs-134*	**Station 08** Cs-137*
04/11/12	1.99E+03 +/- 9.45E+02	< 7.72E+01	< 2.01E+02	< 8.00E+01	< 8.40E+01	< 1.65E+02	< 7.68E+01	< 8.11E+01
10/24/12	2.31E+03 +/- 7.08E+02	< 5.72E+01	< 1.45E+02	< 6.00E+01	< 5.80E+01	< 1.34E+02	< 5.10E+01	< 5.53E+01

Sampling Date	K-40	Mn-54*	Fe-59*	Co-58*	Co-60*	Zn-65*	Cs-134*	**Station 25**** Cs-137*
04/10/12	1.47E+03 +/- 1.18E+03	< 7.27E+01	< 1.89E+02	< 8.29E+01	< 9.52E+01	< 1.38E+02	< 6.75E+01	< 8.14E+01
10/26/12	1.19E+03 +/- 7.58E+02	< 6.55E+01	< 1.54E+02	< 6.45E+01	< 7.82E+01	< 1.28E+02	< 5.38E+01	< 6.67E+01

catfish [b]

Sampling Date	K-40	Mn-54*	Fe-59*	Co-58*	Co-60*	Zn-65*	Cs-134*	**Station 08** Cs-137*
04/11/12	1.93E+03 +/- 4.35E+02	< 2.83E+01	< 8.17E+01	< 2.92E+01	< 2.67E+01	< 5.37E+01	< 3.12E+01	< 3.35E+01
10/25/12	3.03E+03 +/- 7.67E+02	< 5.17E+01	< 1.23E+02	< 4.84E+01	< 5.19E+01	< 1.12E+02	< 4.91E+01	< 5.01E+01

Sampling Date	K-40	Mn-54*	Fe-59*	Co-58*	Co-60*	Zn-65*	Cs-134*	**Station 25**** Cs-137*
04/10/12	1.73E+03 +/- 5.26E+02	< 3.44E+01	< 9.42E+01	< 3.05E+01	< 3.83E+01	< 6.70E+01	< 3.11E+01	< 3.75E+01
10/24/12	2.56E+03 +/- 7.87E+02	< 5.12E+01	< 1.30E+02	< 5.59E+01	< 5.60E+01	< 1.24E+02	< 5.34E+01	< 6.03E+01

Mean	2.32E+03 +/- 7.63E+02
Indicator	2.32E+03 +/- 7.14E+02
Control	1.74E+03 +/- 8.13E+02

* LLD identified in ODCM

** Control Station

[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 2012 and tabulated in Section 3, are discussed below. Except for TLDs, TBE analyzed all samples throughout the year. The procedures and specifications followed for these analyses are as required in the TBE 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 2012 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, Th-228 and Th-232 were detected in numerous samples. Th-228 & Th-232 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 2012 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 CaSO4: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.

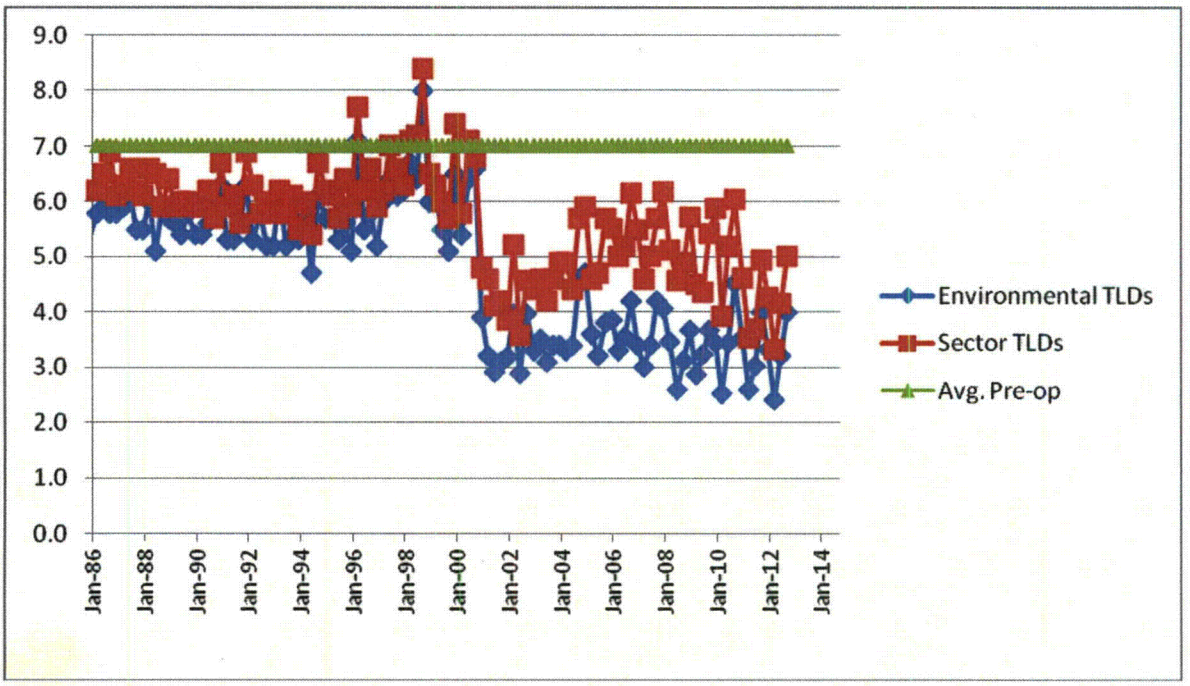


Figure 4-1 TLD (mrem/Standard Month)

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 4.2 mR/standard month with a range of 1.4 to 8.6 mR/standard month. The highest quarterly average reading for any single location was obtained at location NW-29/61. This value was 7.0 mR/standard month. This location is on site on the north gate of the construction side laydown area. Quarterly and annual TLDs are also located at twelve environmental air sampling stations. For the eleven indicator locations within 10 miles of the station the average quarterly reading was 3.2 mR/standard month with a range of 2.1 to 4.5 mR/standard month. The average annual reading for these locations was 4.0 mR/standard month with a range from 3.0 to 6.1 mR/standard month. The control location showed a quarterly average of 4.5 mR/standard month with a range of 3.6 to 4.9 mR/standard month. Its annual reading was 6.1 mR/standard month. 10 emergency sector TLDs, which are all located onsite had a quarterly average of 4.9 mR/standard month with EPSP-9/10 having the highest quarterly average of 7.2 mR/standard month. Eight other TLDs, designated C-1 thru C-8, which were pre-operational controls, were collected quarterly from four locations. Stations C-3/4 and C-7/8 are designated controls. These had a quarterly average of 3.2, while Station C-1/2 and C-5/6 had a quarterly average of 3.0 mR/standard month with a range of 2.0 to 3.7 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. The drop indicated in 2009 may be a function of a return to the vendor used from 1988 until 2001. This will be monitored in the future to see if this in fact the case. 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^3 to a high of 0.75 pCi/m^3.

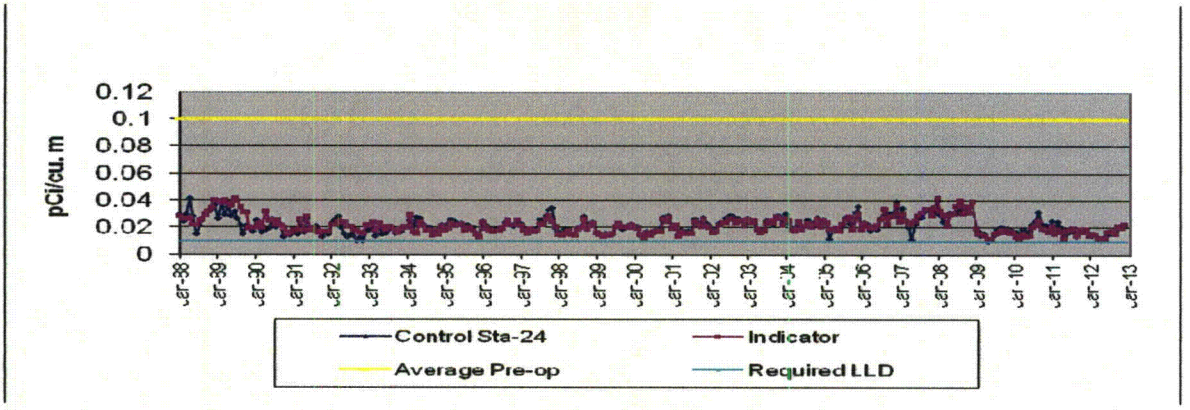


Figure 4-2 Historical Gross Beta in Air Particulates

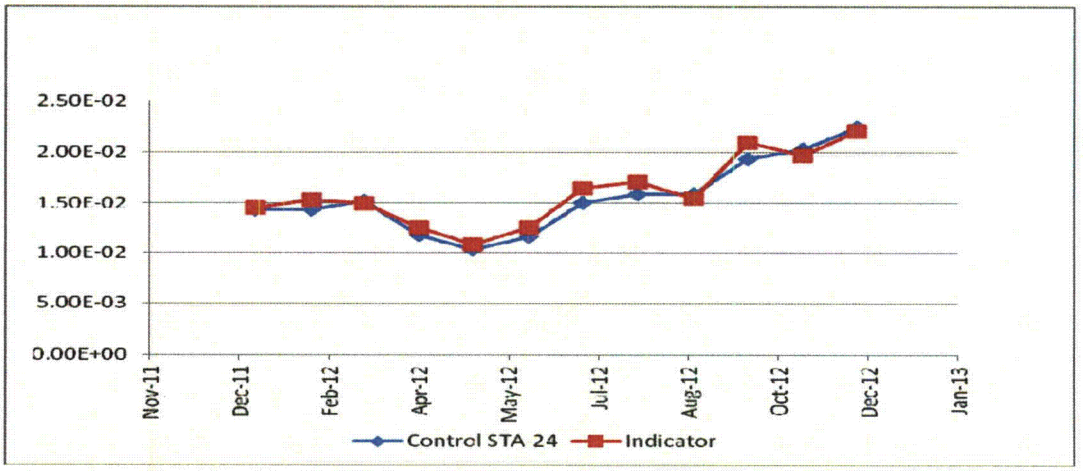


Figure 4-3 2012 Gross Beta in Air Particulates (pCi/m^3)

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. These results are similar to pre-operational data and the results of samples taken prior to and after the 1986 accident in the Soviet Union at Chernobyl and the effect of the Fukushima Daiichi event.

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. The results of these analyses indicate the lack of station effects on the environment.

4.5 Air Particulate Strontium

Strontium-89 and 90 analyses are performed on the second quarter composites of air particulate filters from all monitoring stations. There has been no detection of these fission products at any of the indicator or control stations in recent years.

4.6 Soil

Soil samples, which are collected every three years from twelve stations, were collected in 2010 and thus were not collected in 2012.

4.7 Precipitation

A sample of rain water was collected monthly at on-site station 01A and analyzed for gross beta activity. In November they were also analyzed for H-3. The results are presented in Table 3-7. 12 precipitation samples were obtained in 2012. Semi-annual composites are prepared and analyzed for gamma emitting isotopes in accordance with program requirements. Zn-65 was reported in one precipitation water sample at the indicator location. However, the peak was not identified, but forced activity concentration calculation exceeded MDC and the 2 sigma error. This is considered a false positive. Naturally occurring gamma emitting radioisotopes were detected. No positive H-3 results were reported. 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 cannot be made to the 2012 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 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. No samples indicated positive results. Results of gamma ray spectroscopy did not detect the presence of any isotopes related to the operation of North Anna. In years past, Cs-137 has been detected sporadically. The occurrences were attributed to residual global fallout from past atmospheric weapons testing. Naturally occurring K-40 was detected in all samples.

Once each quarter a sample from the collection station 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. Low levels of Cs-137, attributable to fallout, have been seen periodically in vegetation samples. As expected, naturally occurring potassium-40 and, cosmogenic beryllium-7 were detected in most samples, and thorium-228 and other natural products, including Bi-214, were detected in some samples. Cs-137 was reported in one sample at the indicator location. However, the peak was not identified, but forced activity concentration calculation exceeded MDC and the 2 sigma error. This is considered a false positive.

4.10 Well Water

Water was sampled quarterly from the onsite well at the metrology laboratory. These samples were analyzed for gamma radiation and for tritium. During the second quarter we requested that the vendor analyze for Sr-89, Sr-90, H-3, I-131, and gamma emitters. The second quarter sample was analyzed for Sr-89, Sr-90, H-3, and Iodine-131; however, it was not analyzed for gamma emitters. This analysis was missed. There was a duplicate analysis run on Sr-89 and Sr-90 so there was no sample remaining for further analysis once we confirmed that the gamma isotopic analysis was missed. The results of these analyses are presented in Table 3-10. No plant related isotopes were 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. Additionally, the second quarter samples are analyzed for strontium-89 and strontium-90 in accordance with program requirements. There has been no detection of these fission products at any of the indicator or control stations in recent years.

No gamma emitting radioisotopes were positively identified 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 3050 pCi/liter and a range of 2040 to 4340 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.

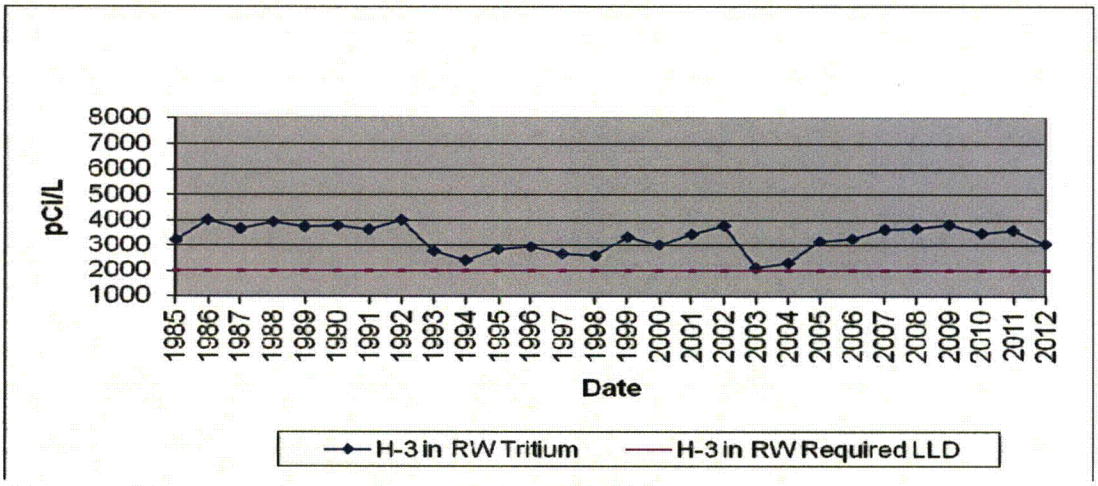


Figure 4-4Tritium in River water

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. Additionally, the second quarter samples are analyzed for strontium-89 and strontium-90. There has been no positive indication of these fission products at any of the indicator or control stations in recent years. The results are presented in Table 3-12.

No non-naturally occurring gamma emitting radioisotopes, including iodine were detected in any of the other samples. No tritium was detected at the control location. The average level of tritium activity at the indicator station was 2600 pCi/liter with a range of 2260 to 2790 pCi/liter. Levels of tritium have increased 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.

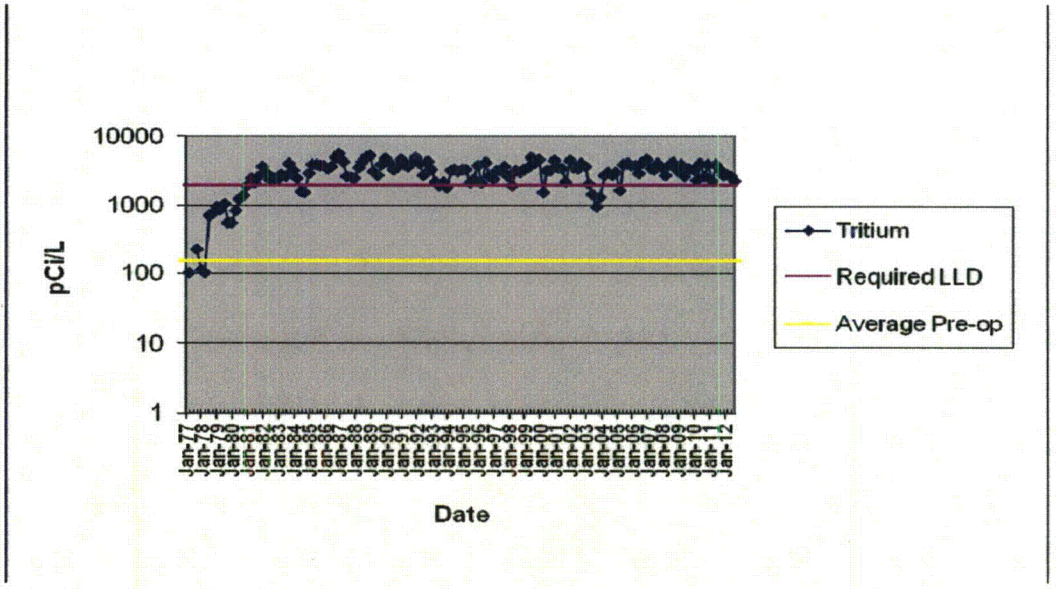


Figure 4.5Tritium in Surface Water

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 plant related isotopes were detected in 2012. 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 also analyzed by gamma ray spectroscopy.

Neither Strontium-89 nor Strontium-90 was detected any samples of aquatic sediment/silt in 2012. Strontium-90 has been detected occasionally in the past at both the indicator and control locations and is attributable to fallout from past bomb tests. A number of naturally occurring radioisotopes were detected in these samples at background levels.

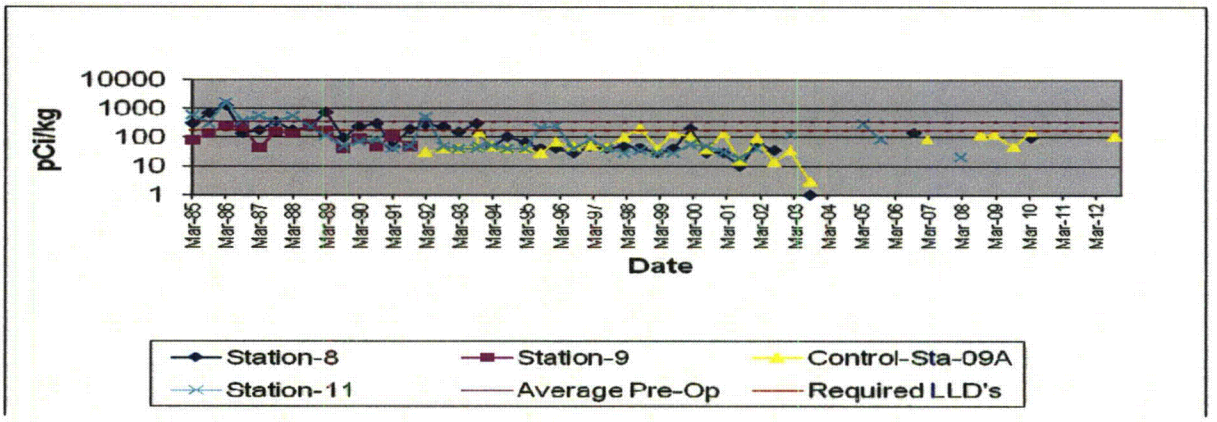


Figure 4-6 Cs-137 in Sediment/Silt

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 April 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. Cs-137 was identified in the control station during October. No plant related isotopes were detected in the two indicator samples analyzed. 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 2012 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. Naturally occurring K-40 was detected in all samples. No plant related isotopes were detected. Cs-137 was measured in pre-operational environmental fish samples.

5. PROGRAM EXCEPTIONS

REMP Exceptions for Scheduled Sampling and Analysis during 2012 – North Anna

Location	Description	Date of Sampling	Reason(s) for Loss/Exception
14B,15,16,23, 26	Vegetation	01/10/12	Seasonal unavailability
14B,15,16,23, 26	Vegetation	02/14/12	Seasonal unavailability
14B,15,16,23, 26	Vegetation	03/13/12	Seasonal unavailability
STA 6	AP/Char	03/20/12	Sampler not running/ replaced. No sample for this week.
STA 3,5	AP/Char	07//31/12	Power lost to samplers due to storm/power outage. Minimum volume not met per procedure. However, vendor met LLD.
STA 23	AP/Char	03/20/12	Sampler not running/ replaced. Minimum volume met.
14B,15,16,2 3, 26	Vegetation	11/13/12	Seasonal unavailability
14B,15,16,2 3, 26	Vegetation	12/11/12	Seasonal unavailability
STA 01A	Well Water	06/26/12	Sample not analyzed by vendor for gamma isotopic

REFERENCES

References

Dominion, North Anna Power Station Technical Specifications, Units 1 and 2.

Dominion, North Anna Power Station Independent Spent Fuel Storage Installation Technical Specifications.

Dominion, Station Administrative Procedure, VPAP-2103N, "Offsite Dose Calculation Manual".

Virginia Electric and Power Company, North Anna Technical Procedure, HP-3051.010, "Radiological Environmental Monitoring Program".

Title 10 Code of Federal Regulation, Part 50 (10CFR50), "Domestic Licensing of Production and Utilization Facilities".

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

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

USNRC Branch Technical Position, "Acceptable Radiological Environmental Monitoring Program", Rev. 1, November 1979.

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

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

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 2012

LAND USE CENSUS

North Anna Power Station

Louisa County, Virginia

January 1 to December 31, 2012

Direction	*Distance (miles)*					
	Nearest Site Boundary	*Nearest Resident*	*Nearest Garden (> 50m²)*	*Nearest Meat Animal*	*Nearest Milch Cow*	*Nearest Milch Goat*
N	0.9	1.3	1.7	2.9	*NONE*	*NONE*
NNE	0.9	0.9	1.2	3.1	*NONE*	*NONE*
NE	0.8	0.9	1.6	1.6	*NONE*	*NONE*
ENE	0.8	2.37	2.4	2.7	*NONE*	*NONE*
E	0.8	1.3	2.0	3.5	*NONE*	*NONE*
ESE	0.9	1.7	1.7	NONE	*NONE*	*NONE*
SE	0.9	1.4	1.5	1.4	*NONE*	*NONE*
SSE	0.9	1.0	1.0	1.6	*NONE*	*NONE*
S	0.9	1.0	1.0	2.0	*NONE*	*NONE*
SSW	1	1.3	2.34	2.0	*NONE*	*NONE*
SW	1.1	1.65	1.65	NONE	*NONE*	*NONE*
WSW	1.1	1.6	2.4	1.6	*NONE*	*NONE*
W	1.1	1.5	1.9	4.4	*NONE*	*NONE*
WNW	1	1.1	2.6	5.0	*NONE*	*NONE*
NW	1	1.0	2.0	NONE	*NONE*	*NONE*
NNW	0.9	1.0	1.2	2.3	*NONE*	*NONE*

2011 to 2012 Land Use Census Changes			
Nearest	Direction	2011 Distance	2012 Distance
Site Boundary	NONE		
Resident	ENE	2.2	2.37
	SW	1.7	1.65
Garden	SSW	3.1	2.34
	SW	2.6	1.65
Meat Animal	ESE	4.9	NONE
Milch Cow	NONE		
Milch Goat	NONE		

APPENDIX B: SUMMARY OF INTERLABORATORY COMPARISONS

YEAR 2012

INTRODUCTION

This appendix covers the Intercomparison Program of the Teledyne Brown Engineering – Environmental Services as required by technical specifications for the Radiological Environmental Monitoring Program (REMP). TBE uses QA/QC samples provided by Eckert & Zeigler Analytics, Inc, DOE's Mixed Analyte Performance Evaluation Program (MAPEP) and Environmental Resource Associates, (ERA) to monitor the quality of analytical processing associated with the REMP. The suite of samples is designed to be comparable with the pre-1996 US EPA Interlaboratory Cross-Check Program in terms of sample number, matrices, and nuclides. This includes:

E & Z Analytics:
Milk for gamma emitters, Iodine-131, Fe-55, Sr-89 and Sr-90 analyses once per quarter.
Air particulate for gamma emitters once per quarter
Charcoal for I-131 once per quarter

ERA
Water for tritium, gamma, Iodine-131, Sr-89, Sr-90, gross alpha and beta during the 2nd and 4th quarters.
Water for natural uranium during the 2nd quarter

DOE
Water and soil for gamma, Iodine-131, U-233/234, U-238, transuranics, tritium, Fe-55, Ni-63, Sr-90 and Tc-99 analyses during the 1st quarter.
Water for gross alpha and beta during the 1st and 3rd quarters.
Air particulates and vegetation for gamma, Iodine-131, U-233/234, U-238, transuranics, Sr-90 analyses during the 1st and 3rd quarters.
Air filter for gross alpha and beta analyses during the 1st and 3rd quarters.

RESULTS

Interlaboratory comparison program results are evaluated using TBE's criterion. Any sample analysis result that does not pass the criteria is investigated by TBE. For the primary laboratory, 14 out of 18 analytes met the specified acceptance criteria. Four analytes (one sample each of Co-60, Sr-89, Sr-90 and Gross Alpha) did not meet the specified acceptance criteria. Nonconformance Reports were generated and corrective actions taken as a result of this program.

NCR-12-05: ERA Rad89 Gross alpha is slightly biased high for Th-230 on Detector G1.

NCR 12-08: No cause was found for the failed high soil Co-60 sensitivity test or the high

Zn-65 in AP, which TBE considers anomaly.

NCR 12-11: Sr-90 in water high due to incorrect aliquot entered in LIMS.

NCR 12-13 The Sr-89 found to known ratio was 1.19, which TBE considers acceptable. It appears the aliquot was entered incorrectly.

A summary of TBE's results is provided in the tables on the following pages for the required sample matrix types and isotopic distribution. Delineated in the table for each of the media/analysis combinations, are: the specific radionuclide; its result; analytical date; the known values supplied by the providers; pass or fail criteria.

ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES 2012

Table F-1

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
March 2012	E10066	Milk	Sr-89	pCi/L	101	94.8	1.07	A
			Sr-90	pCi/L	11.7	13.5	0.87	A
	E10067	Milk	I-131	pCi/L	87.5	92.5	0.95	A
			Ce-141	pCi/L	247	260	0.95	A
			Cr-51	pCi/L	435	436	1.00	A
			Cs-134	pCi/L	133	149	0.89	A
			Cs-137	pCi/L	156	159	0.98	A
			Co-58	pCi/L	127	132	0.96	A
			Mn-54	pCi/L	190	195	0.97	A
			Fe-59	pCi/L	179	168	1.07	A
			Zn-65	pCi/L	327	333	0.98	A
			Co-60	pCi/L	274	279	0.98	A
	E10069	AP	Ce-141	pCi	167	164	1.02	A
			Cr-51	pCi	310	276	1.12	A
			Cs-134	pCi	107	94.5	1.13	A
			Cs-137	pCi	109	101	1.08	A
			Co-58	pCi	87.6	83.5	1.05	A
			Mn-54	pCi	133	123	1.08	A
			Fe-59	pCi	113	106	1.07	A
			Zn-65	pCi	226	210	1.08	A
			Co-60	pCi	185	176	1.05	A
	E10068	Charcoal	I-131	pCi	92.8	94.2	0.99	A
	E10070	Water	Fe-55	pCi/L	1800	1570	1.15	A
June 2012	E10198	Milk	Sr-89	pCi/L	86.1	99.8	0.86	A
			Sr-90	pCi/L	9.2	12.7	0.72	W
	E10199	Milk	I-131	pCi/L	88.9	99.7	0.89	A
			Ce-141	pCi/L	72.8	82.2	0.89	A
			Cr-51	pCi/L	394	402	0.98	A
			Cs-134	pCi/L	159	174	0.91	A
			Cs-137	pCi/L	206	212	0.97	A
			Co-58	pCi/L	89.5	92.3	0.97	A
			Mn-54	pCi/L	129	132	0.98	A
			Fe-59	pCi/L	129	128	1.01	A
			Zn-65	pCi/L	193	199	0.97	A
			Co-60	pCi/L	342	355	0.96	A
	E10201	AP	Ce-141	pCi	73.2	75.1	0.97	A
			Cr-51	pCi	367	366	1.00	A
			Cs-134	pCi	165	159	1.04	A
			Cs-137	pCi	205	193	1.06	A
			Co-58	pCi	84.7	84.2	1.01	A
			Mn-54	pCi	118	121	0.98	A
			Fe-59	pCi	125	117	1.07	A
			Zn-65	pCi	181	182	0.99	A
			Co-60	pCi	338	324	1.04	A
	E10200	Charcoal	I-131	pCi	101	96.6	1.05	A

ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES 2012

Table F-1

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
June 2012	E10202	Water	Fe-55	pCi/L	1890	1580	1.20	A
September 2012	E10296	Milk	Sr-89	pCi/L	106	99.6	1.06	A
			Sr-90	pCi/L	13.6	16.0	0.85	A
	E10297	Milk	I-131	pCi/L	89.8	99.6	0.90	A
			Ce-141	pCi/L	160	164	0.98	A
			Cr-51	pCi/L	230	248	0.93	A
			Cs-134	pCi/L	101	108	0.94	A
			Cs-137	pCi/L	174	174	1.00	A
			Co-58	pCi/L	97.2	100	0.97	A
			Mn-54	pCi/L	188	196	0.96	A
			Fe-59	pCi/L	159	152	1.05	A
			Zn-65	pCi/L	195	192	1.02	A
			Co-60	pCi/L	155	152	1.02	A
	E10299	AP	Ce-141	pCi	145	135	1.07	A
			Cr-51	pCi	219	205	1.07	A
			Cs-134	pCi	94.1	89.4	1.05	A
			Cs-137	pCi	140	144	0.97	A
			Co-58	pCi	88.3	83.0	1.06	A
			Mn-54	pCi	173	162	1.07	A
			Fe-59	pCi	136	125	1.09	A
			Zn-65	pCi	165	159	1.04	A
			Co-60	pCi	133	125	1.06	A
	E10298	Charcoal	I-131	pCi	95.5	97.2	0.98	A
	E10300	Water	Fe-55	pCi/L	1630	1900	0.86	A
December 2012	E10334	Milk	Sr-89	pCi/L	101	96.6	1.05	A
			Sr-90	pCi/L	11.3	13.8	0.82	A
	E10335	Milk	I-131	pCi/L	93.1	90.0	1.03	A
			Ce-141	pCi/L	52.5	51.0	1.03	A
			Cr-51	pCi/L	373	348	1.07	A
			Cs-134	pCi/L	157	165	0.95	A
			Cs-137	pCi/L	113	117	0.97	A
			Co-58	pCi/L	94.1	98.5	0.96	A
			Mn-54	pCi/L	116	116	1.00	A
			Fe-59	pCi/L	124	116	1.07	A
			Zn-65	pCi/L	190	186	1.02	A
			Co-60	pCi/L	172	170	1.01	A
	E10337A	AP	Ce-141	pCi	51.8	49.6	1.04	A
			Cr-51	pCi	372	338	1.10	A
			Cs-134	pCi	165	161	1.02	A
			Cs-137	pCi	113	114	0.99	A
			Co-58	pCi	96.5	95.8	1.01	A
			Mn-54	pCi	118	112	1.05	A
			Fe-59	pCi	105	112	0.94	A
			Zn-65	pCi	166	181	0.92	A
			Co-60	pCi	179	165	1.08	A

ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES 2012

Table F-1

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
December 2012	E10336	Charcoal	I-131	pCi	73.1	72.7	1.01	A
	E10333	Water	Fe-55	pCi/L	1550	1750	0.89	A

(a) Teledyne Brown Engineering reported result.

(b) The Analytics known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation.

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

(d) Analytics evaluation based on TBE internal QC limits: A= Acceptable. Reported result falls within ratio limits of 0.80-1.20. W-Acceptable with warning. Reported result falls within 0.70-0.80 or 1.20-1.30. N = Not Acceptable. Reported result falls outside the ratio limits of < 0.70 and > 1.30.

ERA ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES 2012

Table F-2

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Limits	Evaluation (c)
May 2012	RAD-89	Water	Sr-89	pCi/L	63.4	58.5	46.9 - 66.3	A
			Sr-90	pCi/L	33.5	37.4	27.4 - 43.1	A
			Ba-133	pCi/L	89.2	82.3	69.1 - 90.5	A
			Cs-134	pCi/L	66.5	74.2	60.6 - 81.6	A
			Cs-137	pCi/L	152	155	140 - 172	A
			Co-60	pCi/L	73.3	72.9	65.6 - 82.6	A
			Zn-65	pCi/L	109	105	94.5 - 125	A
			Gr-A	pCi/L	82.4	62.9	33.0 - 78.0	N (1)
			Gr-B	pCi/L	43.6	44.2	29.6 - 51.5	A
			I-131	pCi/L	25.9	27.1	22.5 - 31.9	A
			H-3	pCi/L	15433	15800	13800 - 17400	A
	MRAD-16	Filter	Gr-A	pCi/filter	39.5	77.8	26.1 - 121	A
November, 2012	RAD-91	Water	Sr-89	pCi/L	46.5	39.1	29.7 - 46.1	N (2)
			Sr-90	pCi/L	16.6	20.1	14.4 - 23.8	A
			Ba-133	pCi/L	85.2	84.8	71.3 - 93.3	A
			Cs-134	pCi/L	76.9	76.6	62.6 - 84.3	A
			Cs-137	pCi/L	177	183	165 - 203	A
			Co-60	pCi/L	77.4	78.3	70.5 - 88.5	A
			Zn-65	pCi/L	209	204	184 - 240	A
			Gr-A	pCi/L	50.6	58.6	30.6 - 72.9	A
			Gr-B	pCi/L	59.3	39.2	26.0 - 46.7	N (2)
			I-131	pCi/L	22.9	24.8	20.6 - 29.4	A
			H-3	pCi/L	5020	4890	4190 - 5380	A
	MRAD-17	Filter	Gr-A	pCi/filter	59.6	87.5	29.3 - 136	A

(1) Detector G1 is slightly biased high for Th-230 based measurements used only for ERA Gross Alpha samples. NCR 12-05

(2) The Sr-89 found to known ratio was 1.19, which TBE considers acceptable. It appears the aliquot was entered incorrectly for the Gross Beta NCR 12-13

(a) Teledyne Brown Engineering reported result.

(b) The ERA known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation.

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

DOE's MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES 2012

Table F-3

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Range	Evaluation (c)
March 2012	12-MaW26	Water	Cs-134	Bq/L	-0.0045		(1)	A
			Cs-137	Bq/L	37.5	39.9	27.9 - 51.9	A
			Co-57	Bq/L	30.8	32.9	23.0 - 42.8	A
			Co-60	Bq/L	22.4	23.72	16.60 - 30.84	A
			H-3	Bq/L	456	437	306 - 568	A
			Mn-54	Bq/L	31.0	31.8	22.3 - 41.3	A
			K-40	Bq/L	144	142	99 - 185	A
			Sr-90	Bq/L	-0.0084		(1)	A
			Zn-65	Bq/L	-0.369		(1)	A
	12-GrW26	Water	Gr-A	Bq/L	2.06	2.14	0.64 - 3.64	A
			Gr-B	Bq/L	7.48	6.36	3.18 - 9.54	A
	12-MaS26	Soil	Cs-134	Bq/kg	831	828	580 - 1076	A
			Cs-137	Bq/kg	0.145		(1)	A
			Co-57	Bq/kg	1270	1179	825 - 1533	A
			Co-60	Bq/kg	7.61	1.56	(2)	N (3)
			Mn-54	Bq/kg	634	558	391 - 725	A
			K-40	Bq/kg	1690	1491	1044 - 1938	A
			Sr-90	Bq/kg	328	392	274 - 540	A
			Zn-65	Bq/kg	753	642	449 - 835	A
	12-RdF26	AP	Cs-134	Bq/sample	2.31	2.38	1.67 - 3.09	A
			Cs-137	Bq/sample	2.15	1.79	1.25 - 2.33	W
			Co-57	Bq/sample	-0.0701		(1)	A
			Co-60	Bq/sample	2.62	2.182	1.527 - 2.837	W
			Mn-54	Bq/sample	4.13	3.24	2.27 - 4.21	W
			Sr-90	Bq/sample	0.0185		(1)	A
			Zn-65	Bq/sample	4.19	2.99	2.09 - 3.89	N (3)
	12-GrF26	AP	Gr-A	Bq/sample	0.365	1.2	0.4 - 2.0	A
			Gr-B	Bq/sample	2.31	2.4	1.2 - 3.6	A
	12-RdV26	Vegetation	Cs-134	Bq/sample	8.72	8.43	5.90 - 10.96	A
			Cs-137	Bq/sample	0.0424		(1)	A
			Co-57	Bq/sample	15.5	12.0	8.4 - 15.6	W
			Co-60	Bq/sample	6.80	6.05	4.24 - 7.87	A
			Mn-54	Bq/sample	0.0057		(1)	A
			Sr-90	Bq/sample	2.24	2.11	1.48 - 2.74	A
			Zn-65	Bq/sample	10.5	8.90	6.23 - 11.57	A
September 2012	12-MaW27	Water	Cs-134	Bq/L	21.4	23.2	16.2 - 30.2	A
			Cs-137	Bq/L	17.0	16.7	11.7 - 21.7	A
			Co-57	Bq/L	28.7	29.3	20.5 - 38.1	A
			Co-60	Bq/L	0.179		(1)	A
			H-3	Bq/L	387	334	234 - 434	A
			Mn-54	Bq/L	18.1	17.8	12.5 - 23.1	A
			K-40	Bq/L	139	134	94 - 174	A
			Sr-90	Bq/L	19.6	12.2	8.5 - 15.9	N (4)
			Zn-65	Bq/L	27.2	25.9	18.1 - 33.7	A
	12-GrW27	Water	Gr-A	Bq/L	0.966	1.79	0.54 - 3.04	A
			Gr-B	Bq/L	10.0	9.1	4.6 - 13.7	A

DOE's MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)
TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES 2012

Table F-3

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Range	Evaluation (c)
September 2012	12-MaS27	Soil	Cs-134	Bq/kg	880	939	657 - 1221	A
			Cs-137	Bq/kg	1220	1150	805 - 1495	A
			Co-57	Bq/kg	1330	1316	921 - 1711	A
			Co-60	Bq/kg	552	531	372 - 690	A
			Mn-54	Bq/kg	1000	920	644 - 1196	A
			K-40	Bq/kg	674	632	442 - 822	A
			Sr-90	Bq/kg	528	508	356 - 660	A
			Zn-65	Bq/kg	665	606	424 - 788	A
	12-RdF27	AP	Cs-134	Bq/sample	2.760	2.74	1.92 - 3.56	A
			Cs-137	Bq/sample	0.0415		(1)	A
			Co-57	Bq/sample	2.00	191.00	1.34 - 2.48	A
			Co-60	Bq/sample	1.78	1.728	1.210 - 2.246	A
			Mn-54	Bq/sample	2.40	2.36	1.65 - 3.07	A
			Sr-90	Bq/sample	0.931	1.03	0.72 - 1.34	A
			Zn-65	Bq/sample	-0.688		(1)	A
	12-GrF27	AP	Gr-A	Bq/sample	0.434	0.97	0.29 - 1.65	A
			Gr-B	Bq/sample	1.927	1.92	0.96 - 2.88	A
	12-RdV27	Vegetation	Cs-134	Bq/sample	6.28	6.51	4.56 - 8.46	A
			Cs-137	Bq/sample	4.62	4.38	3.07 - 5.69	A
			Co-57	Bq/sample	6.51	5.66	3.96 - 7.36	A
			Co-60	Bq/sample	5.32	5.12	3.58 - 6.66	A
			Mn-54	Bq/sample	3.59	3.27	2.29 - 4.25	A
			Sr-90	Bq/sample	0.0012		(1)	A
			Zn-65	Bq/sample	-0.046		(1)	A

(1) False positive test.

(2) Sensitivity evaluation

(3) No cause was found for the failed high soil Co-60 sensitivity test or the high Zn-65 in AP, which TBE considers an anomaly. NCR 12-08

(4) Sr-90 in water high due to incorrect aliquot entered in LIMS. 12-11

(a) Teledyne Brown Engineering reported result.

(b) The MAPEP known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation.

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