



---

# **ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT**

---

**DUKE ENERGY CORPORATION  
CATAWBA NUCLEAR STATION  
Units 1 and 2**

**2014**



---

# TABLE OF CONTENTS

---

<b>1.0 Executive Summary</b>	1-1
<b>2.0 Introduction</b>	2-1
2.1 Site Description and Sample Locations	2-1
2.2 Scope and Requirements of the REMP	2-1
2.3 Statistical and Calculational Methodology	2-2
2.3.1 Estimation of the Mean Value	2-2
2.3.2 Lower Level of Detection and Minimum Detectable Activity	2-3
2.3.3 Trend Identification	2-3
<b>3.0 Interpretation of Results</b>	3-1
3.1 Airborne Radioiodine and Particulates	3-2
3.2 Drinking Water	3-5
3.3 Surface Water	3-7
3.4 Ground Water	3-10
3.5 Milk	3-11
3.6 Broadleaf Vegetation	3-13
3.7 Food Products	3-15
3.8 Fish	3-16
3.9 Shoreline Sediment	3-19
3.10 Direct Gamma Radiation	3-23
3.10.1 Environmental TLD	3-23
3.10.2 ISFSI	3-24
3.11 Land Use Census	3-28
<b>4.0 Evaluation of Dose</b>	4-1
4.1 Dose from Environmental Measurements	4-1
4.2 Estimated Dose from Releases	4-1
4.3 Comparison of Doses	4-2
<b>5.0 Quality Assurance</b>	5-1
5.1 Sample Collection	5-1
5.2 Sample Analysis	5-1
5.3 Dosimetry Analysis	5-1
5.4 Laboratory Equipment Quality Assurance	5-1
5.4.1 Daily Quality Control	5-1
5.4.2 Calibration Verification	5-1
5.4.3 Batch Processing	5-1
5.5 Duke Energy Interlaboratory Comparison Program	5-1
5.5.1 Duke Energy Intercomparison Program	5-2
5.5.2 Eckert & Ziegler Analytics Cross Check Program	5-2
5.5.3 ERA Proficiency Testing	5-2
5.6 Duke Energy Audits	5-3
5.7 U.S. Nuclear Regulatory Commission Inspections	5-3
5.8 Intercomparison Program	5-3
5.9 TLD Intercomparison Program	5-3
5.9.1 Nuclear Technology Services Intercomparison Program	5-3
5.9.2 Internal Crosscheck (Duke Energy)	5-3

## Appendices

Appendix A: Environmental Sampling and Analysis Procedures	A-1
--	-----

I.	Change of Sampling Procedures . . . . .	A-2
II.	Description of Analysis Procedures . . . . .	A-2
III.	Change of Analysis Procedures . . . . .	A-3
IV.	Sampling and Analysis Procedures . . . . .	A-3
	A.1 Airborne Particulate and Radioiodine . . . . .	A-3
	A.2 Drinking Water . . . . .	A-4
	A.3 Surface Water . . . . .	A-4
	A.4 Ground Water . . . . .	A-4
	A.5 Milk . . . . .	A-4
	A.6 Broadleaf Vegetation . . . . .	A-5
	A.7 Food Products . . . . .	A-5
	A.8 Fish . . . . .	A-5
	A.9 Shoreline Sediment . . . . .	A-5
	A.10 Direct Gamma Radiation (TLD) . . . . .	A-6
	A.11 Annual Land Use Census . . . . .	A-6
V.	Global Positioning System (GPS) Analysis. . . . .	A-6
Appendix B:	Radiological Env. Monitoring Program - Summary of Results . . . . .	B-1
	Air Particulate . . . . .	B-2
	Air Radioiodine. . . . .	B-2
	Drinking Water . . . . .	B-2
	Surface Water . . . . .	B-2
	Ground Water . . . . .	B-3
	Milk . . . . .	B-3
	Broadleaf Vegetation . . . . .	B-3
	Food Products . . . . .	B-3
	Fish . . . . .	B-3
	Shoreline Sediment . . . . .	B-3
	Direct Gamma Radiation (TLD) . . . . .	B-4
Appendix C:	Catawba Nuclear Station Sampling Deviations and Unavailable Analyses . . . . .	C-1
	C.1 Sampling Deviations . . . . .	C-2
	C.2 Unavailable Analyses . . . . .	C-2
Appendix D:	Catawba Nuclear Station Analytical Deviations . . . . .	D-1
Appendix E:	Radiological Environmental Monitoring Program Results . . . . .	E-1
Appendix F:	Errata to Previous Reports . . . . .	F-1

## LIST OF FIGURES

2.1-1	Sampling Locations Map (One Mile Radius) . . . . .	2-4
2.1-2	Sampling Locations Map (Ten Mile Radius) . . . . .	2-5
3.1	Concentration of Gross Beta in Air Particulate . . . . .	3-2
3.2	Concentration of Tritium in Drinking Water . . . . .	3-5
3.3	Concentration of Tritium in Surface Water . . . . .	3-8
3.6	Concentration of Cs-137 in Broadleaf Vegetation . . . . .	3-13
3.8-1	Concentration of Co-58 in Fish . . . . .	3-16
3.8-2	Concentration of Co-60 in Fish . . . . .	3-17
3.8-3	Concentration of Cs-137 in Fish. . . . .	3-17
3.9-1	Concentration of Co-58 in Shoreline Sediment . . . . .	3-20
3.9-2	Concentration of Co-60 in Shoreline Sediment . . . . .	3-20
3.9-3	Concentration of Cs-137 in Shoreline Sediment . . . . .	3-21
3.10	Direct Gamma Radiation (TLD) Results . . . . .	3-24
3.11	2014 Land Use Census Map . . . . .	3-29

## LIST OF TABLES

2.1-A	Radiological Monitoring Program Sampling Locations . . . . .	2-6
2.1-B	Radiological Monitoring Program Sampling Locations (TLD Sites) . . . . .	2-7
2.2-A	Reporting Levels for Radioactivity Concentrations in Environmental Samples . . . . .	2-8
2.2-B	REMP Analysis Frequency . . . . .	2-8
2.2-C	Maximum Values for the Lower Limits of Detection . . . . .	2-9
3.1-A	Mean Concentration of Gross Beta in Air Particulate . . . . .	3-3
3.1-B	Mean Concentration of Air Radioiodine (I-131) . . . . .	3-4
3.2	Mean Concentrations of Radionuclides in Drinking Water . . . . .	3-6
3.3	Mean Concentrations of Radionuclides in Surface Water . . . . .	3-9
3.5	Mean Concentration of Radionuclides in Milk . . . . .	3-12
3.6	Mean Concentration of Radionuclides in Broadleaf Vegetation . . . . .	3-14
3.7	Mean Concentration of Radionuclides in Food Products . . . . .	3-15
3.8	Mean Concentrations of Radionuclides in Fish . . . . .	3-18
3.9	Mean Concentrations of Radionuclides in Shoreline Sediment . . . . .	3-22
3.10-A	Direct Gamma Radiation (TLD) Results . . . . .	3-25
3.10-B	Direct Gamma Radiation (TLD) Catawba 2014 Investigation Level . . . . .	3-26
3.11	Land Use Census Results . . . . .	3-28
4.1-A	Catawba Nuclear Station 2014 Environmental and Effluent Dose Comparison . . . . .	4-3
4.1-B	Maximum Individual Dose for 2014 based on Environmental Measurements (mrem) for Catawba Nuclear Station . . . . .	4-5
5.0-A	Duke Energy Interlaboratory Comparison Program . . . . .	5-5
5.0-B	Eckert & Ziegler Analytics Cross Check Program . . . . .	5-7
5.0-C	Environmental Resource Associates (ERA) Proficiency Testing . . . . .	5-9
5.0-D	2014 Environmental Dosimeter Cross-Check Results . . . . .	5-10

## LIST OF ACRONYMS USED IN THIS TEXT *(in alphabetical order)*

BW	BiWeekly
C	Control
CNS	Catawba Nuclear Station
ERA	Environmental Resource Associates
GI-LLI	Gastrointestinal – Lower Large Intestine
GPS	Global Positioning System
ISFSI	Independent Spent Fuel Storage Installation
LLD	Lower Limit of Detection
M	Monthly
MDA	Minimum Detectable Activity
mrem	Millirem
NIST	National Institute of Standards and Technology
NRC	Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
pCi/kg	picocurie per kilogram
pCi/l	picocurie per liter
pCi/m <sup>3</sup>	picocurie per cubic meter
PIP	Problem Investigation Program
Q	Quarterly
REMP	Radiological Environmental Monitoring Program
SA	Semiannually
SLCs	Selected Licensee Commitments
SM	Semimonthly
TECH SPECS	Technical Specifications
TLD	Thermoluminescent Dosimeter
μCi/ml	microcurie per milliliter
UFSAR	Updated Final Safety Analysis Report
W	Weekly

---

# 1.0 EXECUTIVE SUMMARY

---

This Annual Radiological Environmental Operating Report describes the Catawba Nuclear Station Radiological Environmental Monitoring Program (REMP), and the program results for the calendar year 2014.

Included are the identification of sampling locations, descriptions of environmental sampling and analysis procedures, comparisons of present environmental radioactivity levels and pre-operational environmental data, comparisons of doses calculated from environmental measurements and effluent data, analysis of trends in environmental radiological data as potentially affected by station operations, and a summary of environmental radiological sampling results. Quality assurance practices, sampling deviations, unavailable samples, and program changes are also discussed.

Sampling activities were conducted as prescribed by Selected Licensee Commitments (SLCs). One-thousand forty-two samples were analyzed comprising 1,068 test results in order to compile data for the 2014 report. Based on the annual land use census, the current number of sampling sites for Catawba Nuclear Station is sufficient.

Concentrations observed in the environment in 2014 for station related radionuclides were generally within the ranges of concentrations observed in the past. Inspection of data showed that radioactivity concentrations in drinking water, surface water, broadleaf vegetation, fish, and shoreline sediment are higher than the activities reported for samples collected prior to the operation of the station. Measured concentrations were not higher than expected and all positively identified measurements attributable to station operation were within limits as specified in SLCs.

Additionally, environmental radiological monitoring data is consistent with effluents introduced into the environment by plant operations. The total body dose estimated to the maximum exposed member of the public as calculated by environmental sampling data, excluding TLD results, was 6.24E-2 mrem for 2014. Background radiation dose in the United States is approximately 620 mrem per year (approximately half from naturally occurring sources such as radon and half from man-made sources such as medical processes).<sup>1</sup> It is therefore concluded that station operations has had no significant radiological impact on the health and safety of the public or the environment.

<sup>1</sup>NCRP (2009). National Council on Radiation Protection and Measurements. *Ionizing Radiation Exposure of the Population of the United States*, NCRP Report No. 160 (National Council on Radiation Protection and Measurements, Bethesda, Maryland).

---

## **2.0 INTRODUCTION**

---

### **2.1 SITE DESCRIPTION AND SAMPLE LOCATIONS**

Duke Energy Corporation's Catawba Nuclear Station is a two-unit facility located on the shore of Lake Wylie in York County, South Carolina. Each of the two essentially identical units employs a pressurized water reactor nuclear steam supply system furnished by Westinghouse Electric Corporation. Each generating unit is designed to produce a net electrical output of approximately 1145 MWe. Units 1 and 2 achieved initial criticality on January 7, 1985, and May 8, 1986, respectively.

Condenser cooling is accomplished utilizing a closed system incorporating cooling towers, instead of using lake water directly. Liquid effluents are released into Lake Wylie via the station discharge canal and are not accompanied by the large additional dilution water flow associated with "once-through" condenser cooling. This design results in greater radionuclide concentrations in the discharge canal given comparable liquid effluent source terms.

Figures 2.1-1 and 2.1-2 are maps depicting the Thermoluminescent Dosimeter (TLD) monitoring locations and the sampling locations. The location numbers shown on these maps correspond to those listed in Tables 2.1-A and 2.1-B. Figure 2.1-1 comprises all sample locations within a one mile radius of CNS. Figure 2.1-2 comprises all sample locations within a 10 mile radius of CNS.

### **2.2 SCOPE AND REQUIREMENTS OF THE REMP**

An environmental monitoring program has been in effect at Catawba Nuclear Station since 1981, four years prior to operation of Unit 1 in 1985. The preoperational program provides data on the existing environmental radioactivity levels for the site and vicinity which may be used to determine whether increases in environmental levels are attributable to the station. The operational program provides surveillance and backup support of detailed effluent monitoring which is necessary to evaluate the significance, if any, of the contributions to the existing environmental radioactivity levels that result from station operation.

This monitoring program is based on NRC guidance as reflected in the Selected Licensee Commitments Manual, with regard to sample media, sampling locations, sampling frequency and analytical sensitivity requirements. Indicator and control locations were established for comparison purposes to distinguish radioactivity of station origin from natural or other "man-made" environmental radioactivity. The environmental monitoring program also verifies projected and anticipated radionuclide concentrations in the environment and related exposures from releases of radionuclides from Catawba Nuclear Station. This program satisfies the requirements of Section IV.B.2 of Appendix I to 10CFR50 and provides surveillance of all appropriate critical exposure pathways to man and protects vital interests of the company, public and state and federal agencies concerned with the environment. Reporting levels for activity found in environmental samples are listed in Table 2.2-A. Table 2.2-B lists the REMP analysis and frequency schedule.

The Annual Land Use Census, required by Selected Licensee Commitments, is performed to ensure that changes in the use of areas at or beyond the site boundary are identified and that modifications to the REMP are made if required by changes in land use. This census satisfies the requirements of Section IV.B.3 of Appendix I to 10CFR50. Results are shown in Table 3.11.

Participation in an interlaboratory comparison program as required by Selected Licensee Commitments provides for independent checks on the precision and accuracy of measurements of radioactive material in REMP sample matrices. Such checks are performed as part of the quality assurance program for environmental monitoring in order to demonstrate that the results are valid for the purposes of Section IV.B.2 of Appendix I to 10CFR50. A summary of the results obtained as part of this comparison program are in Section 5 of this annual report.

## **2.3 STATISTICAL AND CALCULATIONAL METHODOLOGY**

### **2.3.1 ESTIMATION OF THE MEAN VALUE**

There was one (1) basic statistical calculation performed on the raw data resulting from the environmental sample analysis program. The calculation involved the determination of the mean value for the indicator and the control samples for each sample medium. The mean is a widely used statistic. This value was used in the reduction of the data generated by the sampling and analysis of the various media in the Radiological Environmental Monitoring Program. "Net activity (or concentration)" is the activity (or concentration) determined to be present in the sample. No "Minimum Detectable Activity", "Lower Limit of Detection", "Less Than Level", or negative activities or concentrations are included in the calculation of the mean. The following equation was used to estimate the mean:

$$\bar{x} = \frac{\sum_{i=1}^N x_i}{N}$$

Where:

$\bar{x}$  = estimate of the mean,

i = individual sample,

N = total number of samples with a net activity (or concentration),

$x_i$  = net activity (or concentration) for sample i.

### **2.3.2 LOWER LEVEL OF DETECTION AND MINIMUM DETECTABLE ACTIVITY**

The Lower Level of Detection (LLD), and Minimum Detectable Activity (MDA) are used throughout the REMP.

**LLD** - The LLD, as defined in the Selected Licensee Commitments Manual is the smallest concentration of radioactive material in a sample that will yield a net count, above the system background, that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal. The LLD is an *a priori* lower limit of detection. The actual LLD is dependent upon the standard deviation of the background counting rate, the counting efficiency, the sample size (mass or volume), the radiochemical yield and the radioactive decay of the sample between sample collection and counting. The "required" LLDs for each sample medium and selected radionuclides are given in the Selected Licensee Commitments and are listed in Table 2.2-C.

**MDA** - The MDA is the net counting rate (sample after subtraction of background) that must be surpassed before a sample is considered to contain a scientifically measurable amount of a radioactive material exceeding background amounts. The MDA is calculated using a sample background and may be thought of as an "actual" LLD for a particular sample measurement. Certain gross counting measurements display a calculated negative value, indicating background is greater than sample activity.

### **2.3.3 TREND IDENTIFICATION**

One of the purposes of an environmental monitoring program is to determine if there is a buildup of radionuclides in the environment due to the operation of the nuclear station. Visual inspection of tabular or graphical presentations of data (including preoperational) is used to determine if a trend exists. A decrease in a particular radionuclide's concentration in an environmental medium does not indicate that reactor operations are removing radioactivity from the environment but that reactor operations are not adding that radionuclide to the environment in quantities exceeding the preoperational level and that the normal removal processes (radioactive decay, deposition, resuspension, etc.) are influencing the concentration.

Substantial increases or decreases in the amount of a particular radionuclide's release from the nuclear plant will greatly affect the resulting environmental levels; therefore, a knowledge of the release of a radionuclide from the nuclear plant is necessary to completely interpret the trends, or lack of trends, determined from the environmental data. Factors that may affect environmental levels of radionuclides include prevailing weather conditions (periods of drought, solar cycles or heavier than normal precipitation), construction in or around either the nuclear plant or the sampling location, and addition or deletion of other sources of radioactive materials (such as the Chernobyl accident). Some of these factors may be obvious while others are sometimes unknown. Therefore, how trends are identified will include some judgment by plant personnel.



Figure 2.1-1

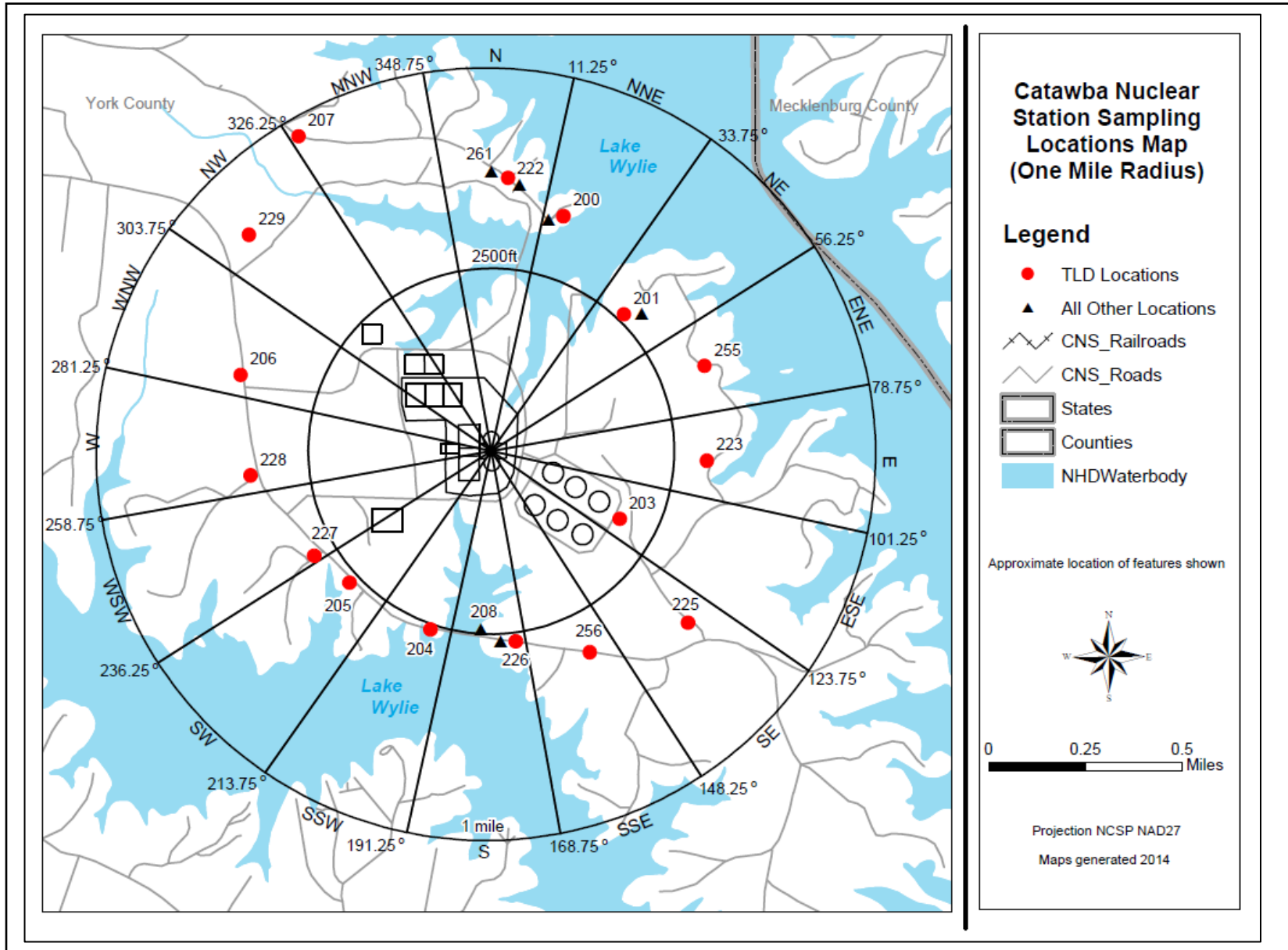
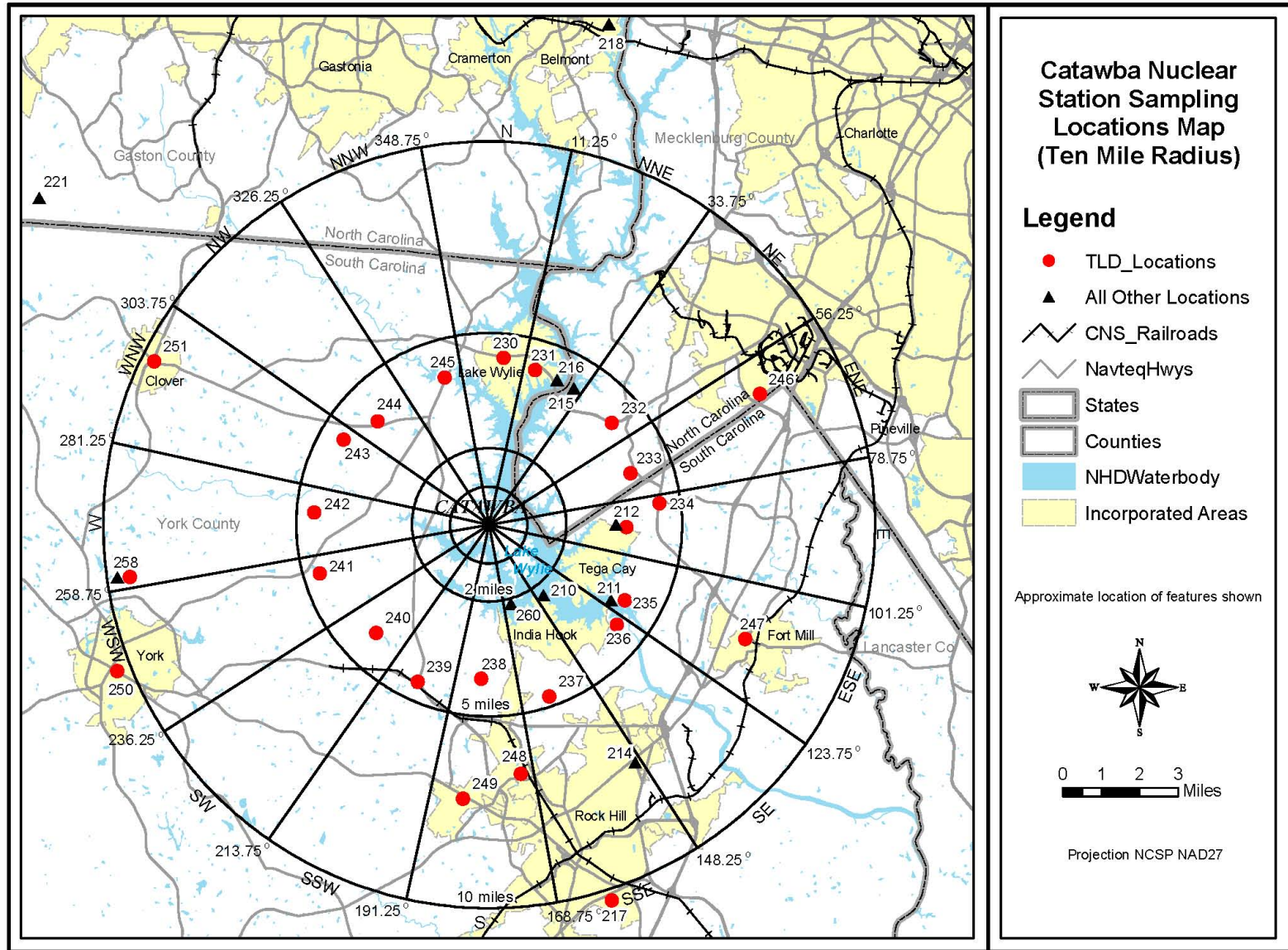


Figure 2.1-2



**TABLE 2.1-A**

**CATAWBA RADIOLOGICAL MONITORING PROGRAM  
SAMPLING LOCATIONS**

Table 2.1-A Codes			
W	Weekly	SM	Semimonthly
BW	BiWeekly	Q	Quarterly
M	Monthly	SA	Semiannually
C	Control	I	Indicator

Site #	Measure Type	Location Description*	Air Rad. & Part.	Surface Water	Drinking Water	Shoreline Sediment	Food Products (a)	Fish	Milk	Broad Leaf Veg. (b)	Ground Water
200	I	Site Boundary (0.63 mi NNE)	W							M	
201	I	Site Boundary (0.53 mi NE)	W							M	
208	I	Discharge Canal (0.45 mi S)	W	M		SA		SA			
210	I	Ebenezer Access (2.31 mi SE)				SA					
211	I	Wylie Dam (4.06 mi ESE)		M							
212	I	Tega Cay (3.32 mi E)	W								
214	I	Rock Hill Water Supply (7.30 mi SSE)			M						
215	C	River Pointe - Hwy 49 (4.21 mi NNE)		M		SA					
216	C	Hwy 49 Bridge (4.19 mi NNE)						SA			
218	C	Belmont Water Supply (13.5 mi NNE)			M						
221	C	Dairy (14.5 mi NW)							SM		
222	I	Site Boundary (0.70 mi N)								M	
226	I	Site Boundary (0.48 mi S)								M	
254	I	Residence (0.82 mi N)									Q
258	C	Fairhope Road (9.84 mi W)	W							M	
260	I	Irrigated Gardens (2.00 mi SSE)					M(a)				
261	I	Firing Range-Site Boundary (0.72 mi N)	W								

(a) During Harvest Season

(b) When Available

\* GPS data reflect approximate accuracy to within 2-5 meters. GPS field measurements were taken as close as possible to the item of interest.

**TABLE 2.1-B**

**CATAWBA RADIOLOGICAL MONITORING PROGRAM  
SAMPLING LOCATIONS (TLD SITES)**

Table 2.1-B Codes			
IR	Inner Ring	OR	Outer Ring
C	Control	SI	Special Interest

Site #	Measure Type	Location*	Distance (miles)	Sector	Site #	Measure Type	Location*	Distance (miles)	Sector
200	IR	SITE BOUNDARY	0.63	NNE	234	OR	WELLS FARGO BANK	4.50	E
201	IR	SITE BOUNDARY	0.53	NE	235	OR	LAKE WYLIE DAM	4.07	ESE
203	IR	SITE BOUNDARY	0.38	ESE	236	OR	SC WILDLIFE FEDERATION OFFICE	4.25	SE
204	IR	SITE BOUNDARY	0.48	SSW	237	OR	TWIN LAKES ROAD AND HOMESTEAD ROAD	4.75	SSE
205	IR	SITE BOUNDARY	0.25	SW	238	OR	PENNINGTON ROAD AND WEST OAK ROAD	4.02	S
206	IR	SITE BOUNDARY	0.67	WNW	239	OR	CARTER LUMBER COMPANY	4.49	SSW
207	IR	SITE BOUNDARY	0.95	NNW	240	OR	PARAHAM ROAD	4.07	SW
212	SI	TEGA CAY AIR SITE	3.32	E	241	OR	CAMPBELL ROAD	4.58	WSW
217	C	BLACKMON ROAD	10.3	SSE	242	OR	TRANSMISSION TOWER ON PARAHAM ROAD	4.56	W
222	IR	SITE BOUNDARY	0.71	N	243	OR	KINGSBURRY ROAD	4.39	WNW
223	IR	SITE BOUNDARY	0.57	E	244	OR	BETHEL ELEMENTARY SCHOOL	4.02	NW
225	IR	SITE BOUNDARY	0.68	SE	245	OR	CROWDERS CREEK BOAT LANDING	4.01	NNW
226	IR	SITE BOUNDARY	0.48	S	246	SI	CAROWINDS GUARD HOUSE	7.87	ENE
227	IR	SITE BOUNDARY	0.52	WSW	247	C	FORT MILL	7.33	ESE
228	IR	SITE BOUNDARY	0.61	W	248	SI	PIEDMONT MEDICAL CENTER	6.54	S
229	IR	SITE BOUNDARY	0.84	NW	249	SI	YORK COUNTY OPERATIONS CENTER	7.17	S
230	OR	RIVER HILLS CHURCH	4.37	N	250	SI	YORK DUKE ENERGY OFFICE	10.4	WSW
231	OR	RIVER HILLS FRONT ENTRANCE	4.21	NNE	251	C	CLOVER	9.72	WNW
232	OR	PLEASANT HILL ROAD	4.18	NE	255	IR	SITE BOUNDARY	0.61	ENE
233	OR	ZOAR ROAD AND THOMAS DRIVE	3.95	ENE	256	IR	SITE BOUNDARY	0.58	SSE
					258	SI	FAIRHOPE ROAD	9.84	W

\* GPS data reflect approximate accuracy to within 2-5 meters. GPS field measurements were taken as close as possible to the item of interest.

**TABLE 2.2-A**

**REPORTING LEVELS FOR RADIOACTIVITY  
CONCENTRATIONS IN ENVIRONMENTAL SAMPLES**

Analysis	Water (pCi/liter)	Air Particulates or Gases (pCi/m <sup>3</sup> )	Fish (pCi/kg-wet)	Milk (pCi/liter)	Food Products (pCi/kg-wet)
H-3	20,000 <sup>(a),(b)</sup>	---	---	---	---
Mn-54	1,000	---	30,000	---	---
Fe-59	400	---	10,000	---	---
Co-58	1,000	---	30,000	---	---
Co-60	300	---	10,000	---	---
Zn-65	300	---	20,000	---	---
Zr-Nb-95	400	---	---	---	---
I-131	2	0.9	---	3	100
Cs-134	30	10	1,000	60	1,000
Cs-137	50	20	2,000	70	2,000
Ba-La-140	200	---	---	300	---

- (a) If no drinking water pathway exists, a value of 30,000 pCi/liter may be used.  
 (b) H-3 Reporting level not applicable to surface water

**TABLE 2.2-B**

**REMP ANALYSIS FREQUENCY**

Sample Medium	Analysis Schedule	Gamma Isotopic	Tritium	Low Level I-131	Gross Beta	TLD
Air Radioiodine	Weekly	X	---	---	---	---
Air Particulate	Weekly	X	---	---	X	---
	Quarterly Composite	X	---	---	---	---
Direct Radiation	Quarterly	---	---	---	---	X
Surface Water	Monthly Composite	X	---	---	---	---
	Quarterly Composite	---	X	---	---	---
Drinking Water	Monthly Composite	X	---	(a)	X	---
	Quarterly Composite	---	X	---	---	---
Ground Water	Quarterly	X	X	---	---	---
Shoreline Sediment	Semiannually	X	---	---	---	---
Milk	Semimonthly	X	---	X	---	---
Fish	Semiannually	X	---	---	---	---
Broadleaf Vegetation	Monthly <sup>(b)</sup>	X	---	---	---	---
Food Products	Monthly <sup>(b)</sup>	X	---	---	---	---

- (a) Low-level I-131 analysis will be performed if the dose calculated for the consumption of drinking water is > 1 mrem per year. An LLD of 1 pCi/liter will be required for this analysis.  
 (b) When Available

**TABLE 2.2-C****MAXIMUM VALUES FOR THE LOWER LIMIT OF DETECTION**

Analysis	Water (pCi/liter)	Air Particulates or Gases (pCi/m <sup>3</sup> )	Fish (pCi/kg-wet)	Milk (pCi/liter)	Food Products (pCi/kg-wet)	Sediment (pCi/kg-dry)
Gross Beta	4	0.01	---	---	---	---
H-3	2000 <sup>(a)</sup>	---	---	---	---	---
Mn-54	15	---	130	---	---	---
Fe-59	30	---	260	---	---	---
Co-58, 60	15	---	130	---	---	---
Zn-65	30	---	260	---	---	---
Zr-Nb-95	15	---	---	---	---	---
I-131	1 <sup>(b)</sup>	0.07	---	1	60	---
Cs-134	15	0.05	130	15	60	150
Cs-137	18	0.06	150	18	80	180
Ba-La-140	15	---	---	15	---	---

(a) If no drinking water pathway exists, a value of 3,000 pCi/liter may be used.

(b) If no drinking water pathway exists, the LLD of gamma isotopic analysis may be used.

---

## 3.0 INTERPRETATION OF RESULTS

---

Review of all 2014 REMP analysis results was performed to identify changes in environmental levels as a result of station operations. The following section depicts and explains the review of these results. Sample data for 2014 was compared to preoperational and historical data. Over the years of operation, analysis and collection changes have taken place that do not allow direct comparisons for some data collected from 1984 (preoperational) through 2014. Summary tables containing 2014 information required by Technical Specification Administrative Control 5.6.2 are located in Appendix B. REMP results for 2014 are located in Appendix E.

Evaluation for significant trends was performed for radionuclides that are listed as required within Selected Licensee Commitments 16.11-13. The radionuclides include: H-3, Mn-54, Fe-59, Co-58, Co-60, Zn-65, Zr-95, Nb-95, I-131, Cs-134, Cs-137, Ba-140 and La-140. Gross beta analysis results were trended for drinking water and gross beta trending for air particulates was initiated in 1996. Other radionuclides detected that are the result of plant operation, but not required for reporting, are trended.

A comparison of annual mean concentrations of effluent-based detected radionuclides to historical results provided trending bases. Frequency of detection and concentrations related to SLC reporting levels (Table 2.2-A) were used as criteria for trending conclusions. All 2014 maximum percentages of reporting levels attributed to CNS operation were well below the 100% action level.

Selected Licensee Commitment section 16.11-13 addresses actions to be taken if radionuclides other than those required are detected in samples collected. The occurrences of these radionuclides are the result of CNS liquid effluents which contained the radionuclides.

During 1984-1986, all net activity results (sample minus background), both positive and negative were included in calculation of sample mean. A change in the EnRad gamma spectroscopy system on September 1, 1987, decreased the number of measurements yielding detectable low-level activity for indicator and control location samples. It was thought that the method used by the previous system was vulnerable to false-positive results.

All 2014 sample analysis results were reviewed to detect and identify any significant trends. Tables and graphs are used throughout this section to display data from effluent-based radionuclides identified since the system change in late 1987. All negative concentration values were replaced with zero for calculation purposes. Any zero concentrations used in tables or graphs represent activity measurements less than detectable levels.

Review of all 2014 data presented in this section supports the conclusion that there were no significant changes in environmental sample radionuclide concentrations of samples collected and analyzed from CNS site and surrounding areas that were attributable to plant operations.

### 3.1 AIRBORNE RADIOIODINE AND PARTICULATES

In 2014, 312 radioiodine and particulate samples were analyzed, 260 from five indicator locations and 52 at the control location. Particulate samples were analyzed weekly for gross beta. A quarterly gamma analysis was performed on the quarterly filter composite (by location). Radioiodine samples received a weekly gamma analysis.

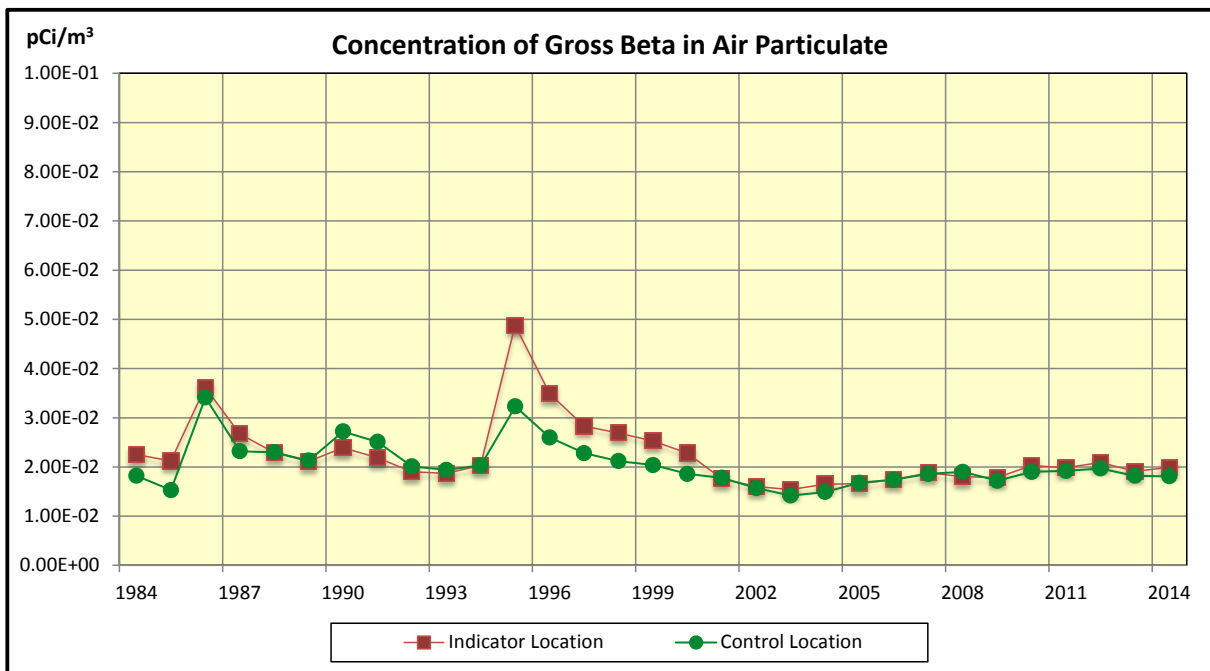
Figure 3.1 shows individual sample gross beta results for the indicator location with highest annual mean and the control location samples during 2014. The two sample locations' results are similar in concentration and have varied negligibly since preoperational periods.

There were no detectable gamma emitters identified for particulate filters analyzed during 2014. Table 3.1-A shows the highest indicator annual mean and control location annual mean for gross beta in air particulate.

There was no detectable I-131 in air radioiodine samples analyzed in 2014. Table 3.1-B shows the highest indicator annual mean and control location annual mean for I-131 since 1984 (preoperational period). The table shows similar concentrations for both the indicator and control locations and the activities decreasing from early in the operational history of the plant. No I-131 activity due to CNS plant operations has been detected since 1987.

K-40 and Be-7 that occur naturally were routinely detected in charcoal cartridges collected during the year.

**Figure 3.1**



*There is no reporting level for gross beta in air particulate*



**Table 3.1-A Mean Concentration of Gross Beta in Air Particulate**

<b>Year</b>	<b>Indicator Location (pCi/m<sup>3</sup>)</b>	<b>Control Location (pCi/m<sup>3</sup>)</b>
1984	2.25E-2	1.82E-2
1985	2.12E-2	1.53E-2
1986	3.62E-2	3.41E-2
1987	2.67E-2	2.32E-2
1988	2.29E-2	2.30E-2
1989	2.11E-2	2.13E-2
1990	2.39E-2	2.72E-2
1991	2.19E-2	2.51E-2
1992	1.90E-2	2.01E-2
1993	1.87E-2	1.94E-2
1994	2.03E-2	2.03E-2
1995	4.88E-2	3.23E-2
1996	3.49E-2	2.60E-2
1997	2.83E-2	2.28E-2
1998	2.69E-2	2.12E-2
1999	2.53E-2	2.04E-2
2000	2.28E-2	1.86E-2
2001	1.76E-2	1.78E-2
2002	1.60E-2	1.57E-2
2003	1.54E-2	1.42E-2
2004	1.65E-2	1.49E-2
2005	1.66E-2	1.68E-2
2006	1.74E-2	1.74E-2
2007	1.88E-2	1.86E-2
2008	1.80E-2	1.90E-2
2009	1.78E-2	1.72E-2
2010	2.03E-2	1.90E-2
2011	1.98E-2	1.92E-2
2012	2.09E-2	1.97E-2
2013	1.92E-2	1.82E-2
<b>Average (2004 - 2013)</b>	<b>1.82E-2</b>	<b>1.76E-2</b>
2014	1.99E-2	1.81E-2

**Table 3.1-B Mean Concentration of Air Radioiodine (I-131)**

Year	Indicator Location (pCi/m <sup>3</sup> )	Control Location (pCi/m <sup>3</sup> )
1984	1.30E-3	1.46E-2
1985	4.75E-3	2.38E-2
1986	1.43E-2	1.02E-2
1987	1.38E-2	0.00E0
1988	0.00E0	0.00E0
1989	0.00E0	0.00E0
1990	0.00E0	0.00E0
1991	0.00E0	0.00E0
1992	0.00E0	0.00E0
1993	0.00E0	0.00E0
1994	0.00E0	0.00E0
1995	0.00E0	0.00E0
1996	0.00E0	0.00E0
1997	0.00E0	0.00E0
1998	0.00E0	0.00E0
1999	0.00E0	0.00E0
2000	0.00E0	0.00E0
2001	0.00E0	0.00E0
2002	0.00E0	0.00E0
2003	0.00E0	0.00E0
2004	0.00E0	0.00E0
2005	0.00E0	0.00E0
2006	0.00E0	0.00E0
2007	0.00E0	0.00E0
2008	0.00E0	0.00E0
2009	0.00E0	0.00E0
2010	0.00E0	0.00E0
2011 <sup>(1)</sup>	5.53E-2	5.65E-2
2012	0.00E0	0.00E0
2013	0.00E0	0.00E0
2014	0.00E0	0.00E0

0.00E0 indicates no detectable measurements

(1) 2011 concentration affected by Fukushima Daiichi

### 3.2 DRINKING WATER

Gross beta and gamma spectroscopy were performed on 26 drinking water samples. The samples were composited to create 8 quarterly samples that were analyzed for tritium. One indicator location was sampled, along with one control location.

No gamma emitting radionuclides attributable to plant operations were identified in 2014 drinking water samples. There have been no gamma emitting radionuclides identified in drinking water samples since 1988.

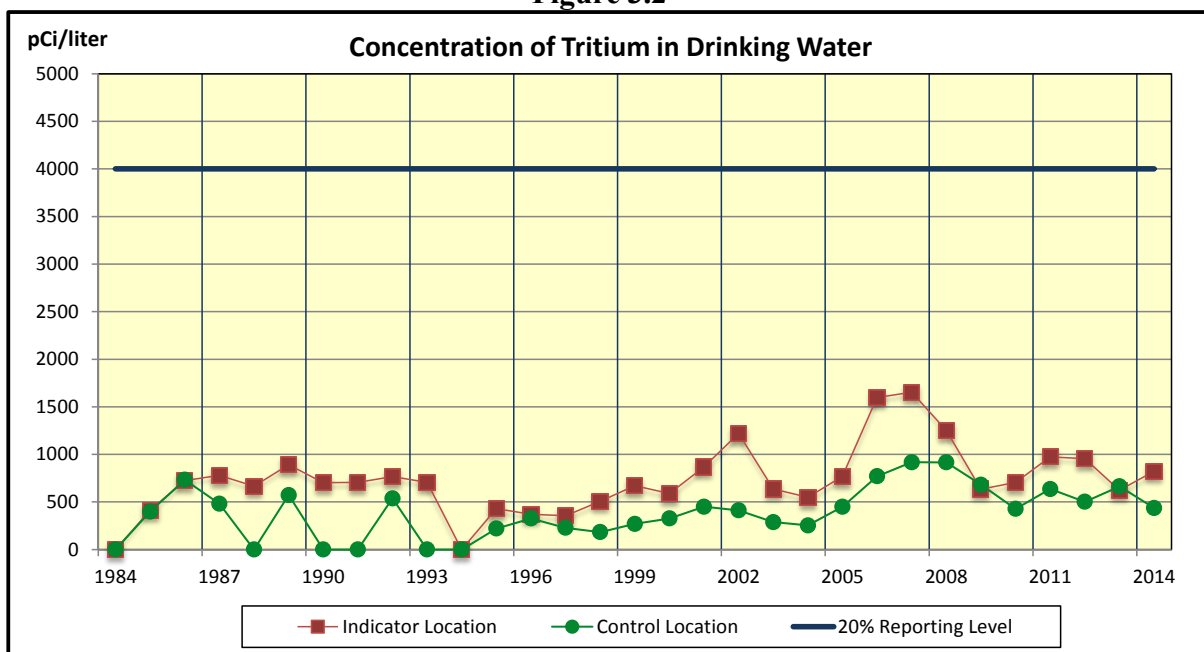
Table 3.2 shows highest annual mean gross beta concentrations for the indicator location and control location since preoperation. The indicator location (downstream of the plant effluent release point) average concentration was 1.96 pCi/l in 2014 and the control location concentration was 1.79 pCi/l. The table shows that current gross beta levels are not statistically different from preoperational concentrations.

Tritium was detected in the four indicator samples and in the four control samples during 2014. The mean indicator tritium concentration for 2014 was 821 pCi/l, 4.11% of reporting level. The mean control tritium concentration for 2014 was 437 pCi/l, 2.19% of reporting level. Figure 3.2 and Table 3.2 display the highest indicator and control location annual mean concentrations for tritium since 1984.

The concentration of tritium in drinking water is affected by releases from the Catawba plant and the McGuire Nuclear Station, located approximately 40 miles upstream of the Catawba plant on the Catawba River.

The dose for consumption of water was less than one mrem per year, historically and for 2014; therefore low-level iodine analysis is not required.

Figure 3.2



**Table 3.2 Mean Concentration of Radionuclides in Drinking Water**

YEAR	Gross Beta (pCi/l)		Tritium (pCi/l)	
	Indicator Location	Control Location	Indicator Location	Control Location
1984	4.72	1.83	3.10E-2	3.10E-2
1985	2.70	2.24	4.13E2	4.00E2
1986	3.11	2.26	7.23E2	7.33E2
1987	3.10	2.40	7.80E2	4.80E2
1988	3.60	2.60	6.64E2	0.00E0
1989	3.60	2.90	8.91E2	5.72E2
1990	4.50	3.20	7.03E2	0.00E0
1991	3.70	2.20	7.04E2	0.00E0
1992	3.20	2.40	7.65E2	5.38E2
1993	3.50	2.50	7.06E2	0.00E0
1994	3.30	2.70	0.00E0	0.00E0
1995	4.80	4.50	4.28E2	2.21E2
1996	3.08	3.14	3.71E2	3.27E2
1997	3.74	3.15	3.54E2	2.28E2
1998	2.51	2.44	5.07E2	1.83E2
1999	3.55	2.48	6.71E2	2.70E2
2000	3.04	2.27	5.87E2	3.26E2
2001	3.49	2.30	8.66E2	4.50E2
2002	3.44	2.36	1.22E3	4.11E2
2003	2.27	2.02	6.36E2	2.88E2
2004	1.88	1.69	5.47E2	2.54E2
2005	2.05	1.84	7.69E2	4.50E2
2006	2.30	2.17	1.59E3	7.70E2
2007	2.34	2.21	1.65E3	9.18E2
2008	2.81	2.16	1.25E3	9.16E2
2009	2.07	1.99	6.34E2	6.81E2
2010	1.84	1.80	7.05E2	4.27E2
2011	2.01	1.71	9.73E2	6.36E2
2012	1.89	1.84	9.54E2	5.02E2
2013	1.79	1.59	6.22E2	6.64E2
2014	1.96	1.79	8.21E2	4.37E2

0.00E0 indicates detectable measurements  
 1984 - 1986 mean based on all net activity

### **3.3 SURFACE WATER**

A total of 39 monthly surface water samples were analyzed for gamma emitting radionuclides. The samples were composited to create 12 quarterly samples for tritium analysis. Two indicator locations and one control location were sampled. One indicator location (208) is located near the liquid effluent discharge point.

All 2014 indicator location samples contained tritium with an average concentration of 4,220 pCi/l. Indicator Location 208 (Discharge Canal) showed a range of activities from 3,430 to 16,100 pCi/l which had the highest mean concentration of 7,785 pCi/l. Tritium was detected in three of the four control samples during 2014 with an average concentration of 418 pCi/l.

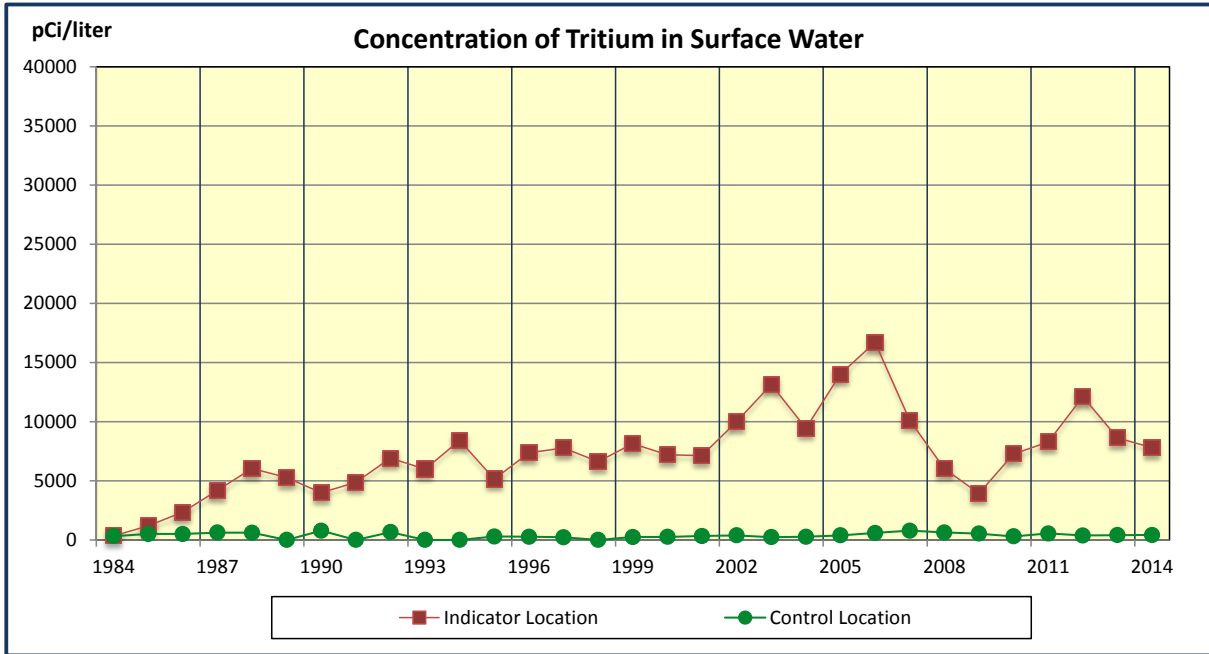
Gamma spectroscopy analysis detected Co-58 and Co-60 in two indicator samples during 2014 (PIP G-14-02220, PIP G-14-02408). Co-58 was detected at location 208 with a mean concentration of 7.23 pCi/l which represents 0.72% of the reporting level and Co-60 was detected at location 208 with a mean concentration of 4.69 pCi/l which represents 1.56% of the reporting level. Table 3.3 summarizes the indicator annual means of radionuclides detected since 1984. Visual inspection of the tabular data did not reveal any increasing trends.

During the third quarter of 2014, Catawba experienced higher than normal levels of mixed fission and activation products in the liquid radioactive waste processing system due to process influent stream chemical changes and larger than normal volumes of non-contaminated water introduced into the system. As system tanks reached storage capacity, liquid radioactive waste was discharged with higher than normal concentrations of mixed fission and activation products. Other radionuclides, such as tritium, were not impacted by this operational occurrence. Concentrations observed did not challenge the effluent concentration limits described in 10CFR20 or Selected Licensee Commitments (SLCs). Resulting dose to a member of the public from additional mixed fission and activation products discharged in liquid effluents also did not challenge limits described in 10CFR20, 10CFR50, 40CFR190, or SLCs. (PIP C-14-06334)

Figure 3.3 displays the highest indicator and control annual means for tritium since 1984. Table 3.3 lists the highest indicator annual means.

The concentration of tritium in surface water is affected by releases from the Catawba plant and the McGuire Nuclear Station, located approximately 40 miles upstream of the Catawba plant on the Catawba River.

Figure 3.3



*There is no reporting level for tritium in surface water, however, if no drinking water pathway exists, a value of 30,000 pCi/l may be used. A drinking water pathway exists for Catawba Nuclear Station, so this limit does not apply for surface water. See section 3.2 for drinking water results.*

**Table 3.3 Mean Concentrations of Radionuclides in Surface Water (pCi/l)**

YEAR	Co-58	Co-60	Nb-95	Cs-137	H-3 Indicator	H-3 Control
1984	4.59E-1	5.71E-1	6.48E-1	9.08E-1	3.35E2	3.18E2
1985	3.46E0	4.83E-2	2.70E0	8.19E-1	1.19E3	5.05E2
1986	3.10E-1	-4.12E-2	2.05E0	4.85E-1	2.34E3	5.05E2
1987 <sup>(1)</sup>	0.00E0	3.10E0	4.30E0	9.90E0	4.17E3	6.20E2
1988	9.20E0	0.00E0	0.00E0	0.00E0	6.03E3	6.07E2
1989	0.00E0	0.00E0	0.00E0	0.00E0	5.27E3	0.00E0
1990	6.50E0	0.00E0	0.00E0	0.00E0	3.98E3	7.73E2
1991	0.00E0	0.00E0	0.00E0	0.00E0	4.87E3	0.00E0
1992	0.00E0	0.00E0	0.00E0	0.00E0	6.91E3	6.64E2
1993	4.70E0	1.80E0	0.00E0	0.00E0	5.98E3	0.00E0
1994	0.00E0	0.00E0	0.00E0	0.00E0	8.42E3	0.00E0
1995	0.00E0	0.00E0	0.00E0	0.00E0	5.13E3	2.89E2
1996	0.00E0	0.00E0	0.00E0	0.00E0	7.36E3	2.61E2
1997	0.00E0	0.00E0	0.00E0	0.00E0	7.77E3	2.20E2
1998	0.00E0	0.00E0	0.00E0	0.00E0	6.61E3	0.00E0
1999	0.00E0	0.00E0	0.00E0	0.00E0	8.13E3	2.41E2
2000	0.00E0	0.00E0	0.00E0	0.00E0	7.19E3	2.56E2
2001	0.00E0	0.00E0	0.00E0	0.00E0	7.13E3	3.28E2
2002	0.00E0	0.00E0	0.00E0	0.00E0	1.00E4	3.80E2
2003	0.00E0	0.00E0	0.00E0	0.00E0	1.31E4	2.37E2
2004	0.00E0	0.00E0	0.00E0	0.00E0	9.43E3	2.60E2
2005	0.00E0	0.00E0	0.00E0	0.00E0	1.40E4	3.78E2
2006	0.00E0	0.00E0	0.00E0	0.00E0	1.67E4	5.83E2
2007	0.00E0	0.00E0	0.00E0	0.00E0	1.01E4	7.82E2
2008	6.80E0	1.16E1	0.00E0	0.00E0	6.02E3	6.31E2
2009	9.40E0	1.06E1	0.00E0	0.00E0	3.93E3	5.29E2
2010	0.00E0	0.00E0	0.00E0	0.00E0	7.26E3	2.94E2
2011	8.75E0	1.96E1	0.00E0	0.00E0	8.29E3	5.41E2
2012	0.00E0	0.00E0	0.00E0	0.00E0	1.21E4	3.71E2
2013	0.00E0	0.00E0	0.00E0	0.00E0	8.62E3	4.02E2
2014 <sup>(2)</sup>	7.23E0	4.69E0	0.00E0	0.00E0	7.79E3	4.18E2

0.00E0 indicates no detectable measurements  
 1984 - 1986 mean based on all net activity  
 (1) 1987 – Gamma spectroscopy system change  
 (2) 2014 – Gamma spectroscopy system change

### **3.4 GROUND WATER**

A total of two ground water samples was collected and analyzed for gamma emitters and tritium. There is one indicator location and no control location.

Naturally occurring K-40 was the only radionuclide identified during 2014. There have been no radionuclides identified in ground water samples since 1988.



### **3.5 MILK**

A total of 26 milk samples was analyzed by gamma spectroscopy and low level iodine during 2014. There was one control location sampled. No indicator dairies were identified by the 2014 land use census.

There were no gamma emitting radionuclides attributable to plant operations identified in milk samples in 2014. Cs-137 is the only radionuclide, other than naturally occurring, reported in milk samples since 1996. Cs-137 in milk is not unusual. It is a constituent of nuclear weapons test fallout and nuclear plant accidents and has been observed periodically in samples from indicator and control locations since the preoperational period. Airborne Cs-137 has not been released from the plant since 1992.

Table 3.5 lists highest indicator location annual mean and control location annual mean for Cs-137 since the preoperational period. K-40 is a naturally occurring radionuclide observed in milk samples in 2014.

**Table 3.5 Mean Concentration of Radionuclides in Milk**

<b>YEAR</b>	<b>Cs-137 Indicator (pCi/l)</b>	<b>Cs-137 Control (pCi/l)</b>
1984	2.95E0	2.98E0
1985	2.11E0	2.12E0
1986	3.76E0	4.54E0
1987 <sup>(1)</sup>	5.00E0	5.50E0
1988	3.20E0	3.80E0
1989	0.00E0	0.00E0
1990	8.00E0	6.70E0
1991	0.00E0	0.00E0
1992	3.40E0	5.00E0
1993	5.00E0	0.00E0
1994	2.80E0	0.00E0
1995	8.60E0	0.00E0
1996	6.05E0	0.00E0
1997	0.00E0	0.00E0
1998	0.00E0	0.00E0
1999	0.00E0	0.00E0
2000	0.00E0	0.00E0
2001	0.00E0	0.00E0
2002	0.00E0	0.00E0
2003	0.00E0	0.00E0
2004	No Indicator Location	0.00E0
2005	No Indicator Location	0.00E0
2006	No Indicator Location	0.00E0
2007	No Indicator Location	0.00E0
2008	No Indicator Location	0.00E0
2009	No Indicator Location	0.00E0
2010	No Indicator Location	0.00E0
2011	No Indicator Location	0.00E0
2012	No Indicator Location	0.00E0
2013	No Indicator Location	0.00E0
2014 <sup>(2)</sup>	No Indicator Location	0.00E0

0.00E0 indicates no detectable measurements

1984 - 1986 mean based on all net activity

(1) 1987 – Gamma spectroscopy system change

(2) 2014 – Gamma spectroscopy system change

### 3.6 BROADLEAF VEGETATION

Gamma spectroscopy was performed on 60 broadleaf vegetation samples during 2014. Four indicator locations and one control location were sampled.

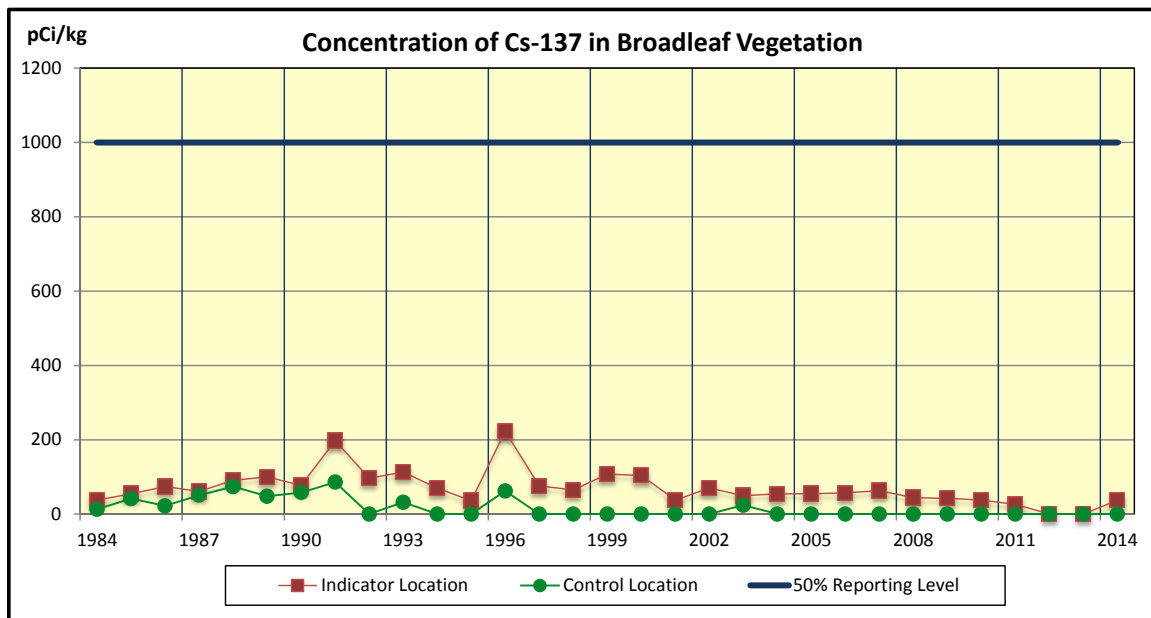
Six of the forty-eight samples collected at indicator locations contained detectable Cs-137 activity. Cs-137 was detected in six of the twelve samples collected at location 201. The highest Cs-137 concentration detected at location 201 was 58.6 pCi/kg which is 2.93% of the reporting level. Cs-137 was not detected in the control location samples.

Cs-137 is the only gamma emitting radionuclide, other than naturally occurring, reported in vegetation samples. It is not unusual for Cs-137 to be present in vegetation. It is a constituent of nuclear weapons test fallout and nuclear plant accidents and has been observed in samples from indicator and control locations since the preoperational period. Table 3.6 lists the highest indicator location annual mean and control location annual mean for Cs-137 since early in the station's operational history. Visual inspection of the tabular data did not reveal any increasing trends.

Figure 3.6 shows indicator and control annual means for Cs-137 in vegetation since 1984. Values shown from 1984 to 2014 show a stable trend for Cs-137 in vegetation. No airborne Cs-137 has been released from the plant since 1992.

K-40 and Be-7 are naturally occurring radionuclides that were observed in broadleaf vegetation samples in 2014.

**Figure 3.6**



**Table 3.6 Mean Concentration of Radionuclides in Broadleaf Vegetation**

YEAR	Cs-137 Indicator (pCi/kg)	Cs-137 Control (pCi/kg)
1984	3.76E1	1.30E1
1985	5.48E1	4.16E1
1986	7.42E1	2.22E1
1987 <sup>(1)</sup>	6.10E1	5.10E1
1988	9.10E1	7.40E1
1989	1.00E2	4.80E1
1990	7.70E1	5.80E1
1991	1.98E2	8.60E1
1992	9.70E1	0.00E0
1993	1.13E2	3.20E1
1994	7.00E1	0.00E0
1995	3.60E1	0.00E0
1996	2.23E2	6.22E1
1997	7.57E1	0.00E0
1998	6.53E1	0.00E0
1999	1.08E2	0.00E0
2000	1.04E2	0.00E0
2001	3.76E1	0.00E0
2002	7.02E1	0.00E0
2003	4.96E1	2.40E1
2004	5.45E1	0.00E0
2005	5.48E1	0.00E0
2006	5.79E1	0.00E0
2007	6.31E1	0.00E0
2008	4.44E1	0.00E0
2009	4.25E1	0.00E0
2010	3.77E1	0.00E0
2011	2.62E1	0.00E0
2012	0.00E0	0.00E0
2013	0.00E0	0.00E0
2014 <sup>(2)</sup>	3.72E1	0.00E0

0.00E0 indicates no detectable measurements

1984 - 1986 mean based on all net activity

2011 concentration affected by Fukushima Daiichi

(1) 1987 – Gamma spectroscopy system change

(2) 2014 – Gamma spectroscopy system change

### 3.7 FOOD PRODUCTS

Collection of food product samples (crops) from an irrigated garden began in 1989. The irrigated garden is located on Lake Wylie downstream from CNS, Location 260. During the 2014 growing season twelve samples were collected and analyzed for gamma radionuclides. There were no gamma emitting radionuclides attributable to plant operations identified in food product samples in 2014. There is no control location for this media type.

Table 3.7 shows Cs-137 indicator location highest annual mean concentrations since 1989.

K-40 and Be-7 are naturally occurring radionuclides that were observed in food product samples in 2014.

**Table 3.7 Mean Concentration of Radionuclides in Food Products**

YEAR	Cs-137 Indicator (pCi/kg)
1989	0.00E0
1990	0.00E0
1991	0.00E0
1992	0.00E0
1993	2.50E1
1994	0.00E0
1995	0.00E0
1996	0.00E0
1997	0.00E0
1998	0.00E0
1999	0.00E0
2000	0.00E0
2001	0.00E0
2002	0.00E0
2003	0.00E0
2004	0.00E0
2005	0.00E0
2006	0.00E0
2007	0.00E0
2008	0.00E0
2009	0.00E0
2010	0.00E0
2011	0.00E0
2012	0.00E0
2013	0.00E0
2014 <sup>(1)</sup>	0.00E0

0.00E0 indicates no detectable measurements

There is no control location for Food Products.

(1) 2014 – Gamma spectroscopy system change

### 3.8 FISH

Gamma spectroscopy was performed on 12 fish samples collected during 2014. One downstream indicator location and one control location were sampled.

Co-58, Co-60, and Cs-137 are normally the predominant radionuclides identified in fish samples. Cs-137 was detected in one indicator sample in 2014 at a concentration of 11.0 pCi/kg, which is 0.55% of the reporting level. Cs-137 was not detected in any of the control location samples.

Figures 3.8-1, 3.8-2, and 3.8-3 are graphs displaying annual mean concentrations for Co-58, Co-60, and Cs-137. Table 3.8 depicts the highest indicator location annual mean for radionuclides detected. In addition, radionuclides identified in fish samples since 1988 have been included in the table. Overall, radionuclides have not shown a significant trend or accumulation.

K-40 was observed in some fish samples collected during 2014.

Figure 3.8-1

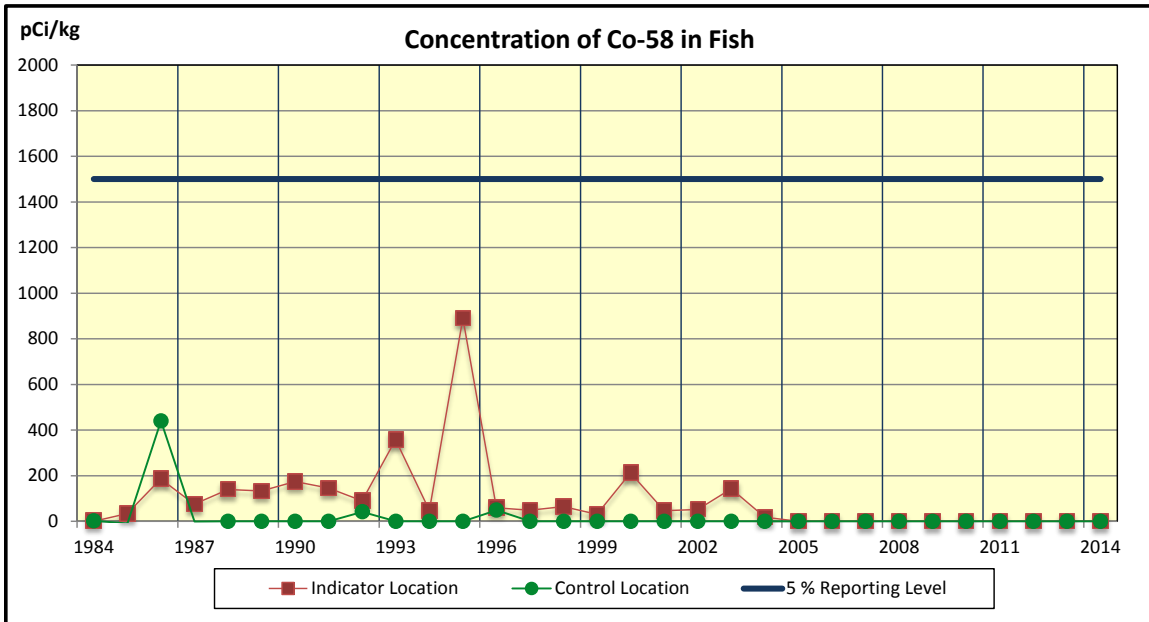


Figure 3.8-2

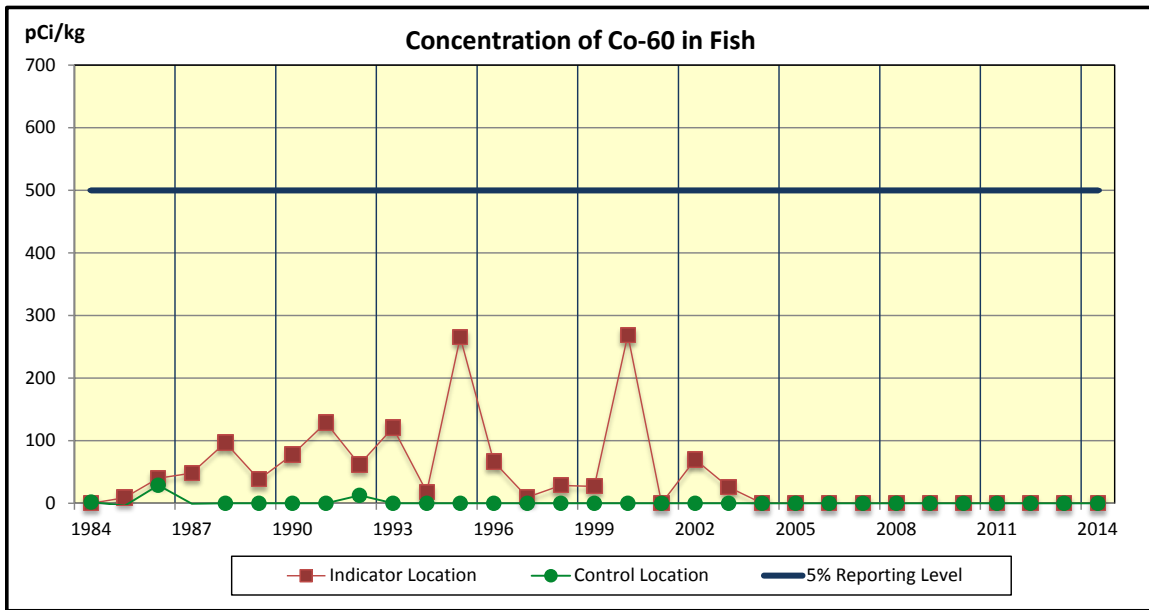
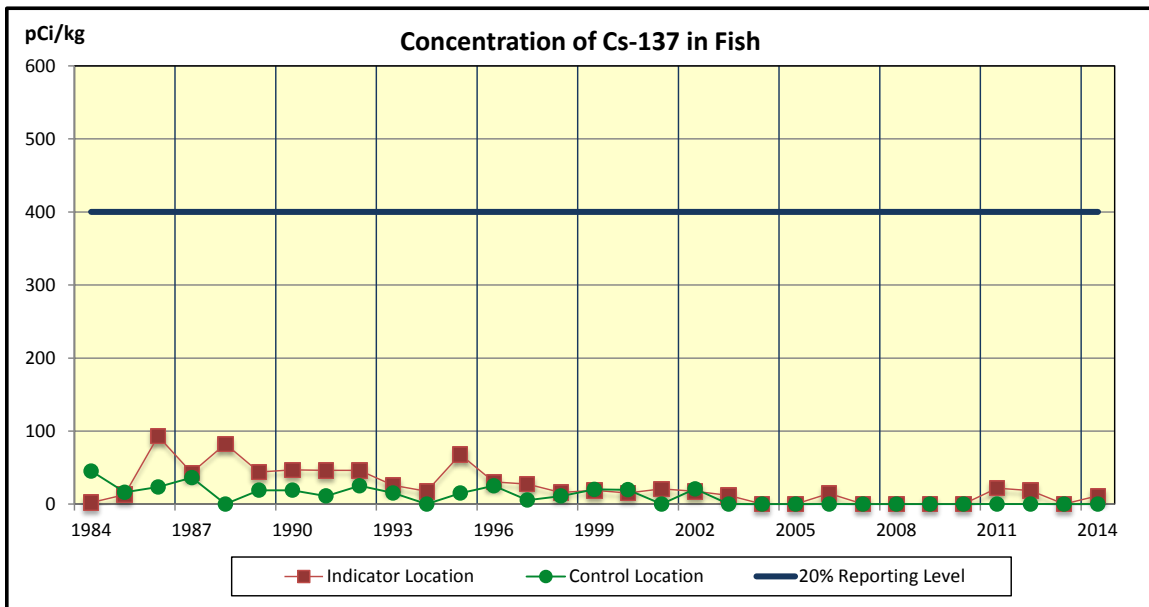


Figure 3.8-3



**Table 3.8 Mean Concentrations of Radionuclides in Fish (pCi/kg)**

Year	Mn-54	Co-58	Co-60	Cs-134	Cs-137	Nb-95	Fe-59	Sb-122	Sb-125
1984	3.07E0	3.00E0	6.11E-1	-5.32E0	1.83E0	0.00E0	0.00E0	0.00E0	0.00E0
1985	7.68E-1	3.40E1	9.11E0	3.22E0	1.28E1	5.07E0	0.00E0	0.00E0	0.00E0
1986	2.01E1	1.86E2	4.01E1	3.51E1	9.29E1	0.00E0	7.30E0	0.00E0	0.00E0
1987 <sup>(1)</sup>	7.24E0	7.57E1	4.81E1	3.83E0	4.27E1	5.40E0	0.00E0	0.00E0	0.00E0
1988	2.85E1	1.40E2	9.70E1	1.67E1	8.24E1	0.00E0	0.00E0	0.00E0	0.00E0
1989	8.28E0	1.33E2	3.83E1	1.47E1	4.37E1	8.58E-1	0.00E0	0.00E0	0.00E0
1990	2.51E1	1.75E2	7.77E1	1.32E1	4.66E1	3.33E0	0.00E0	7.00E0	9.25E0
1991	3.15E1	1.46E2	1.29E2	1.03E1	4.60E1	7.90E-1	2.30E0	0.00E0	7.45E0
1992	1.34E1	9.02E1	6.20E1	1.27E1	4.61E1	0.00E0	0.00E0	0.00E0	0.00E0
1993	2.14E1	3.58E2	1.21E2	2.73E0	2.56E1	0.00E0	0.00E0	0.00E0	0.00E0
1994	1.91E0	4.75E1	1.81E1	0.00E0	1.75E1	0.00E0	0.00E0	0.00E0	1.45E1
1995	5.65E1	8.90E2	2.66E2	0.00E0	6.77E1	1.38E1	0.00E0	0.00E0	0.00E0
1996	0.00E0	5.95E1	6.68E1	0.00E0	3.02E1	0.00E0	0.00E0	0.00E0	0.00E0
1997	0.00E0	4.93E1	9.88E0	0.00E0	2.74E1	0.00E0	0.00E0	0.00E0	0.00E0
1998	0.00E0	6.44E1	2.86E1	0.00E0	1.58E1	0.00E0	0.00E0	0.00E0	0.00E0
1999	0.00E0	3.12E1	2.71E1	0.00E0	1.87E1	0.00E0	0.00E0	0.00E0	0.00E0
2000	0.00E0	2.13E2	2.69E2	0.00E0	1.52E1	0.00E0	0.00E0	0.00E0	0.00E0
2001	0.00E0	4.66E1	0.00E0	0.00E0	2.08E1	0.00E0	0.00E0	0.00E0	0.00E0
2002	0.00E0	5.23E1	7.00E1	0.00E0	1.73E1	0.00E0	0.00E0	0.00E0	0.00E0
2003	0.00E0	1.43E2	2.61E1	0.00E0	1.19E1	0.00E0	0.00E0	0.00E0	0.00E0
2004	4.92E1	1.81E1	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0
2005	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0
2006	0.00E0	0.00E0	0.00E0	0.00E0	1.44E1	0.00E0	0.00E0	0.00E0	0.00E0
2007	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0
2008	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0
2009	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0
2010	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0
2011	0.00E0	0.00E0	0.00E0	0.00E0	2.16E1	0.00E0	0.00E0	0.00E0	0.00E0
2012	0.00E0	0.00E0	0.00E0	0.00E0	1.84E1	0.00E0	0.00E0	0.00E0	0.00E0
2013	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0
2014 <sup>(2)</sup>	0.00E0	0.00E0	0.00E0	0.00E0	1.10E1	0.00E0	0.00E0	0.00E0	0.00E0

0.00E0 indicates no detectable measurements

1984 - 1986 mean based on all net activity

(1) 1987 – Gamma spectroscopy system change

(2) 2014 – Gamma spectroscopy system change



### **3.9 SHORELINE SEDIMENT**

During 2014, a total of 6 shoreline sediment samples was analyzed, four from two indicator locations and two from the control location.

Co-58, Co-60, and Cs-137 are normally the predominant radionuclides identified in shoreline sediment samples. Mn-54, Co-58, Co-60, and Cs-137 were identified in one of the two indicator samples collected from location 208 (Discharge Canal), which is the closest location to the plant's liquid effluent release point (PIP G-14-02572). Mn-54 identified with an annual mean concentration of 68.4 pCi/kg, Co-58 identified with an annual mean concentration of 887 pCi/kg, Co-60 identified with an annual mean concentration of 790 pCi/kg, and Cs-137 identified with an annual mean concentration of 24.6 pCi/kg. There were no gamma emitting radionuclides attributable to plant operations identified in samples from the other indicator location (210) or the control location.

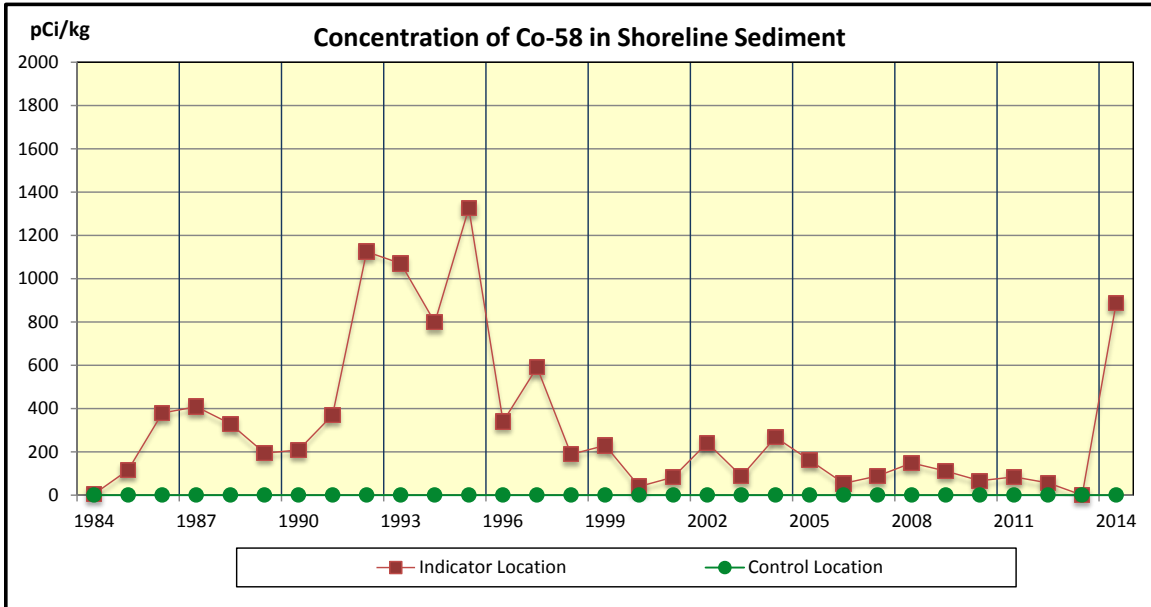
During the third quarter of 2014, Catawba experienced higher than normal levels of mixed fission and activation products in the liquid radioactive waste processing system due to process influent stream chemical changes and larger than normal volumes of non-contaminated water introduced into the system. As system tanks reached storage capacity, liquid radioactive waste was discharged with higher than normal concentrations of mixed fission and activation products. Concentrations observed did not challenge the effluent concentration limits described in 10CFR20 or Selected Licensee Commitments (SLCs). Resulting dose to a member of the public from additional mixed fission and activation products discharged in liquid effluents also did not challenge limits described in 10CFR20, 10CFR50, 40CFR190, or SLCs. (PIP C-14-06334)

Table 3.9 lists highest indicator location annual mean since 1984. Included in the table are radionuclides that have been identified in shoreline sediment samples since 1988.

Figures 3.9-1, 3.9-2, and 3.9-3 are graphs displaying annual mean concentrations for Co-58, Co-60, and Cs-137.

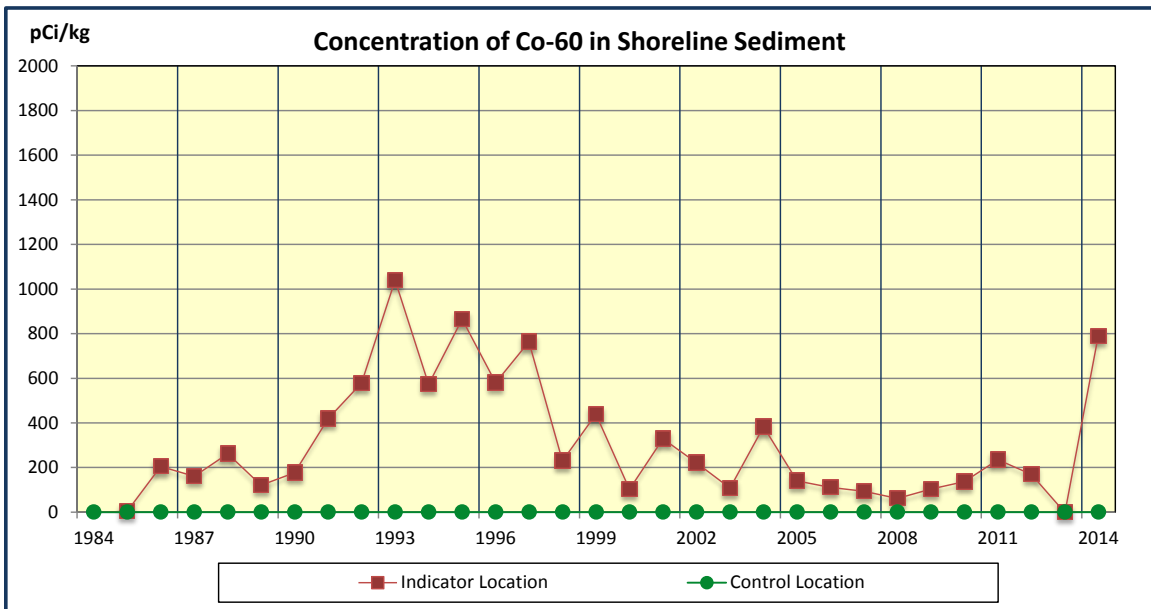
Naturally occurring K-40 was observed in some shoreline sediment samples collected during 2014.

Figure 3.9-1



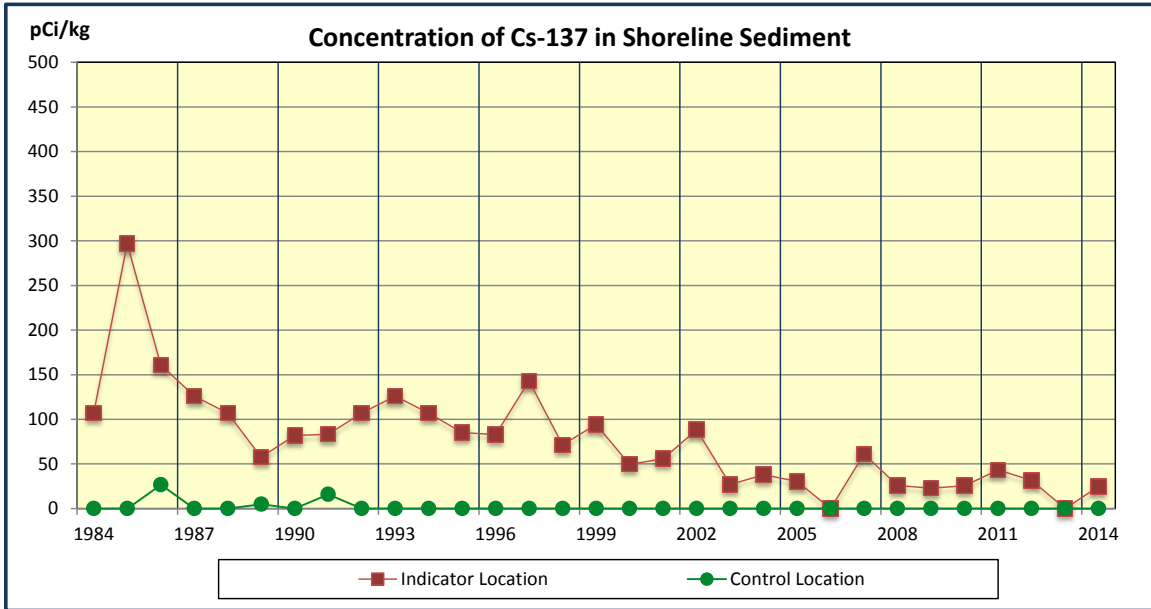
*There is no reporting level for Co-58 in Shoreline Sediment*

Figure 3.9-2



*There is no reporting level for Co-60 in Shoreline Sediment*

Figure 3.9-3



*There is no reporting level for Cs-137 in Shoreline Sediment*

**Table 3.9 Mean Concentrations of Radionuclides in Shoreline Sediment (pCi/kg)**

Year	Mn-54	Co-58	Co-60	Nb-95	Zr-95	Cs-134	Cs-137	Co-57	Sb-125
1984	1.03E0	4.40E0	-2.34E0	0.00E0	0.00E0	3.19E1	1.07E2	0.00E0	0.00E0
1985	-3.12E0	1.16E2	5.18E0	0.00E0	0.00E0	2.11E2	2.97E2	0.00E0	0.00E0
1986	1.09E2	3.79E2	2.05E2	0.00E0	3.96E1	6.50E1	1.61E2	0.00E0	0.00E0
1987 <sup>(1)</sup>	8.83E1	4.08E2	1.61E2	4.22E1	0.00E0	6.08E1	1.26E2	0.00E0	0.00E0
1988	1.07E2	3.29E2	2.63E2	2.28E1	7.54E0	2.59E1	1.07E2	7.65E-1	3.68E0
1989	4.58E1	1.94E2	1.21E2	5.02E0	0.00E0	1.65E1	5.77E1	0.00E0	1.57E1
1990	5.39E1	2.08E2	1.77E2	0.00E0	0.00E0	1.66E1	8.18E1	0.00E0	7.15E0
1991	8.50E1	3.70E2	4.19E2	5.30E0	0.00E0	1.82E1	8.33E1	1.20E0	1.50E1
1992	1.17E2	1.13E3	5.80E2	3.50E0	0.00E0	1.69E1	1.07E2	3.00E0	2.70E1
1993	1.33E2	1.07E3	1.04E3	0.00E0	0.00E0	2.80E1	1.26E2	2.47E1	2.16E2
1994	4.93E1	7.98E2	5.73E2	0.00E0	0.00E0	5.67E0	1.07E2	4.38E0	4.60E1
1995	1.02E2	1.33E3	8.65E2	1.13E2	0.00E0	0.00E0	8.50E1	3.69E1	1.49E2
1996	8.73E1	3.39E2	5.81E2	0.00E0	0.00E0	0.00E0	8.30E1	0.00E0	1.96E2
1997	6.96E1	5.90E2	7.64E2	0.00E0	0.00E0	0.00E0	1.43E2	0.00E0	1.76E2
1998	3.07E1	1.88E2	2.30E2	0.00E0	0.00E0	0.00E0	7.11E1	0.00E0	0.00E0
1999	7.28E1	2.29E2	4.39E2	0.00E0	0.00E0	0.00E0	9.42E1	0.00E0	1.40E2
2000	0.00E0	3.90E1	1.03E2	0.00E0	0.00E0	0.00E0	4.96E1	0.00E0	0.00E0
2001	3.86E1	8.27E1	3.29E2	0.00E0	0.00E0	0.00E0	5.58E1	0.00E0	0.00E0
2002	3.51E1	2.41E2	2.22E2	0.00E0	0.00E0	0.00E0	8.83E1	0.00E0	0.00E0
2003	2.17E1	8.75E1	1.08E2	0.00E0	0.00E0	0.00E0	2.69E1	0.00E0	0.00E0
2004	6.60E1	2.67E2	3.83E2	0.00E0	0.00E0	0.00E0	3.79E1	0.00E0	0.00E0
2005	0.00E0	1.61E2	1.41E2	0.00E0	0.00E0	0.00E0	3.04E1	0.00E0	0.00E0
2006	0.00E0	5.40E1	1.11E2	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0
2007	0.00E0	8.77E1	9.46E1	0.00E0	0.00E0	0.00E0	6.13E1	0.00E0	0.00E0
2008	0.00E0	1.48E2	6.24E1	0.00E0	0.00E0	0.00E0	2.57E1	0.00E0	0.00E0
2009	0.00E0	1.10E2	1.04E2	0.00E0	0.00E0	0.00E0	2.27E1	0.00E0	0.00E0
2010	0.00E0	6.56E1	1.37E2	0.00E0	0.00E0	0.00E0	2.56E1	0.00E0	0.00E0
2011	0.00E0	8.36E1	2.36E2	0.00E0	0.00E0	3.62E1	4.33E1	1.05E1	0.00E0
2012	0.00E0	5.59E1	1.70E2	0.00E0	0.00E0	0.00E0	3.15E1	0.00E0	0.00E0
2013	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0	0.00E0
2014 <sup>(2)</sup>	6.84E1	8.87E2	7.90E2	0.00E0	0.00E0	0.00E0	2.46E1	0.00E0	0.00E0

0.00E0 indicates no detectable measurements

1984 - 1986 mean based on all net activity

(1) 1987 – Gamma spectroscopy system change

(2) 2014 – Gamma spectroscopy system change

## **3.10 DIRECT GAMMA RADIATION**

### **3.10.1 ENVIRONMENTAL TLD**

Catawba is licensed with an exclusion area boundary defined by UFSAR Section 2.1.1.2 as a 2500 foot radius from station center. This is the same boundary established for determining radioactive effluent release limits. No permanent public access is permitted within the exclusion area. TLD locations designated as "inner ring" are within a 1 mile radius from station center and all are used as indicators. TLD locations designated as "outer ring" are outside the 1 mile "inner ring" but within a 5 mile radius of station center. All outer ring TLD locations are used as indicators. A subset of TLD locations within a 7 to 11 mile radius from station center are designated as "special interest." The three "control" locations are greater than 7 miles from station center. These locations were chosen to reduce the probability of influence from Catawba operation on data. The control locations are not used as background subtraction in the TLD analysis. Their purpose is to provide a comparison to indicator locations.

In 2014, 163 total TLDs were analyzed, 151 at indicator locations and 12 at control locations. TLDs are collected and analyzed quarterly. Transit and laboratory background dose is determined and subtracted from gross field readings as required by ANSI N545-1975. The highest annual total dose was 85.4 mrem at indicator location 237, 4.75 miles SSE of station center. Figure 3.10 and Table 3.10-A show TLD inner ring, outer ring, and control location annual averages in mrem per year. Data is provided from 1984 when TLD locations were added and arranged in an inner ring and outer ring configuration. Preoperational data is also provided in the table. As shown in the graph, doses measured by environmental TLDs show little or no change since the current TLD system was implemented. Comparing data from the 2014 Catawba Annual Radiological Effluent Release Report (ARERR), dose to a member of the public resulting from gaseous effluent releases at Catawba is a small fraction of measured TLD dose. Therefore, it can be concluded that gaseous effluents from Catawba had negligible impact on measured TLD values.

Starting in 2014, enhanced analytical methods were implemented. Quarterly and annual baseline dose was determined using appropriate statistical methods considering data from 2000 through 2012. Quarterly and annual dose for 2014 was compared to baseline values to determine if an Investigation Level had been exceeded for evaluation of potential dose to a member of the public. No TLD location exceeded the Quarterly or Annual Investigation Level in 2014, therefore no evaluation of dose to a member of the public from direct or scattered radiation was performed. Table 3.10-B summarizes the data.

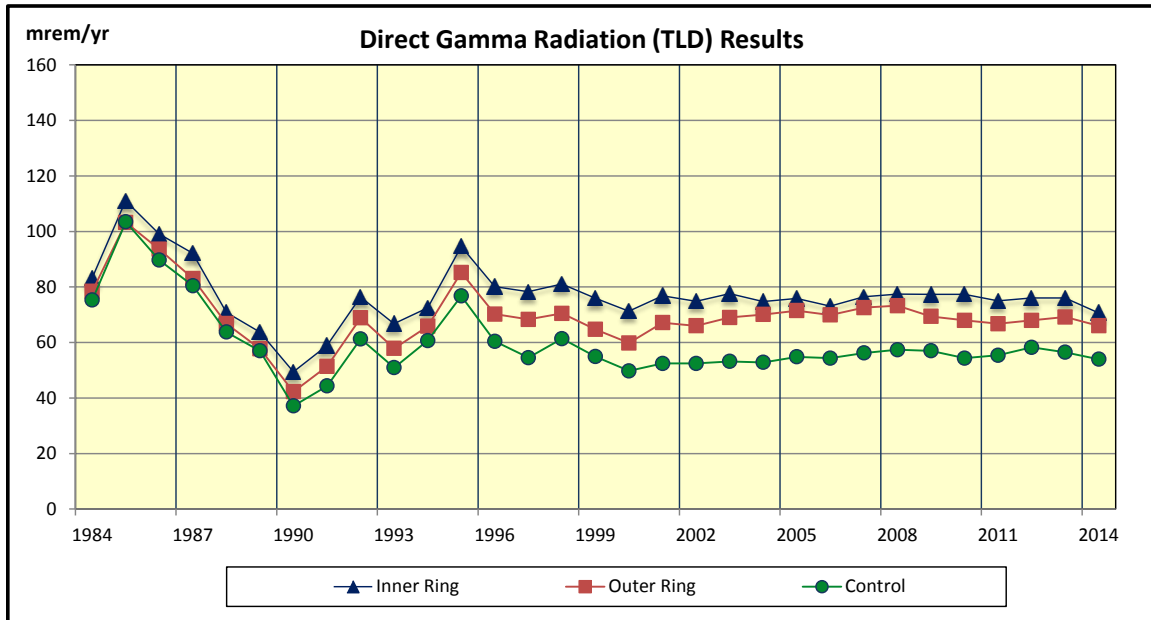
A TLD intercomparison program is conducted as part of the quality assurance program. Results of this program are included in section 5.9.

### 3.10.2 ISFSI

The Catawba ISFSI began operation in 2007. It is located approximately 0.2 miles north of station center in a secured area specifically constructed to provide dry storage for spent nuclear fuel. The ISFSI employs the NAC-UMS® and MAGNASTOR® vertical storage designs. Irradiated fuel assemblies are confined, protected, and shielded by a reinforced concrete modules. Both systems are completely passive and designed to provide radiation shielding and safe confinement for a range of accident conditions and natural events. Both systems use a passive natural circulation ventilation system to remove decay heat from the modules. No radiological liquid or gaseous effluents are expected from the passive storage provided by the ISFSI. Therefore any dose to offsite locations would be from direct and scattered gamma radiation.

Environmental TLD results described in 3.10.1 above are reviewed quarterly to identify trends and demonstrate compliance with dose and dose rate limits at the 2500 foot exclusion area boundary. Additional TLD locations not associated with REMP are presently located on the Catawba protected area fence near the ISFSI and on the ISFSI boundary. These are used to demonstrate compliance with occupational exposure controls and augment REMP TLD results. Doses measured by environmental TLDs show little or no change since the ISFSI began operation.

Figure 3.10



*There is no reporting level for Direct Radiation (TLD)*

*AREOR 2014, results converted from mR/year to mrem/yr (n \* 0.95)*

**Table 3.10-A Direct Gamma Radiation (TLD) Results<sup>(1)</sup>**

Year	Inner Ring Average (mrem/yr)	Outer Ring Average (mrem/yr)	Control Average (mrem/yr)
1984*	8.31E1	7.85E1	7.53E1
1985	1.11E2	1.03E2	1.03E2
1986	9.91E1	9.36E1	8.97E1
1987	9.22E1	8.30E1	8.05E1
1988	7.09E1	6.68E1	6.37E1
1989	6.37E1	5.78E1	5.70E1
1990	4.94E1	4.23E1	3.71E1
1991	5.89E1	5.14E1	4.44E1
1992	7.64E1	6.89E1	6.13E1
1993	6.68E1	5.79E1	5.09E1
1994	7.25E1	6.58E1	6.07E1
1995	9.46E1	8.52E1	7.68E1
1996	8.01E1	7.02E1	6.04E1
1997	7.83E1	6.83E1	5.45E1
1998	8.10E1	7.05E1	6.14E1
1999	7.60E1	6.47E1	5.49E1
2000	7.13E1	5.98E1	4.98E1
2001	7.69E1	6.72E1	5.24E1
2002	7.49E1	6.60E1	5.24E1
2003	7.76E1	6.90E1	5.32E1
2004	7.47E1	7.01E1	5.28E1
2005	7.58E1	7.15E1	5.48E1
2006	7.31E1	6.99E1	5.43E1
2007	7.65E1	7.26E1	5.62E1
2008	7.74E1	7.32E1	5.74E1
2009	7.73E1	6.94E1	5.70E1
2010	7.74E1	6.80E1	5.43E1
2011	7.50E1	6.67E1	5.54E1
2012	7.61E1	6.80E1	5.83E1
2013	7.60E1	6.92E1	5.65E1
2014	7.07E1	6.60E1	5.40E1

\* Preoperational Data

(1) 2014 AREOR, tabular results converted from mR/yr to mrem/yr (n \* 0.95)

**Table 3.10-B Direct Gamma Radiation (TLD) Catawba 2014 Investigation Level**

Catawba 2014 MDD <sub>Q</sub> : 6	Catawba 2014 MDD <sub>A</sub> : 11
-----------------------------------	------------------------------------

Location	Quarterly (mrem)									Annual(mrem)		
	B <sub>Q</sub>	M <sub>Q</sub> Q1	M <sub>Q</sub> Q2	M <sub>Q</sub> Q3	M <sub>Q</sub> Q4	L <sub>Q</sub> Q1	L <sub>Q</sub> Q2	L <sub>Q</sub> Q3	L <sub>Q</sub> Q4	B <sub>A</sub>	M <sub>A</sub> *	L <sub>A</sub>
200	17.1	18.6	15.3	16.2	15.7	ND	ND	ND	ND	69.6	65.8	ND
201	17.2	18.7	14.3	14.5	18.8	ND	ND	ND	ND	69.0	66.4	ND
203	20.1	19.5	14.5	15.8	18.3	ND	ND	ND	ND	78.7	68.1	ND
204-P	17.0	18.1	12.2	13.8	16.0	ND	ND	ND	ND	70.3	60.0	ND
204-S	19.2	19.1	14.3	14.4	15.9	ND	ND	ND	ND	76.8	63.7	ND
205-P	20.4	18.8	14.9	16.0	16.0	ND	ND	ND	ND	81.4	65.6	ND
205-S	14.0	16.2	11.4	13.7	14.1	ND	ND	ND	ND	55.4	55.4	ND**
206	21.1	22.6	19.8	17.7	18.4	ND	ND	ND	ND	85.2	78.5	ND
207	20.9	22.7	19.9	17.6	18.8	ND	ND	ND	ND	84.7	78.9	ND
212	15.9	17.9	14.4	13.9	14.9	ND	ND	ND	ND	64.0	61.1	ND
217	11.3	15.7	10.9	10.0	11.2	ND	ND	ND	ND	46.1	47.8	ND
222	16.8	20.0	14.5	14.7	15.6	ND	ND	ND	ND	67.3	64.8	ND
223	19.6	20.5	18.1	17.9	17.9	ND	ND	ND	ND	78.6	74.3	ND
225-P	18.7	20.8	16.4	16.7	17.4	ND	ND	ND	ND	74.8	71.3	ND
225-S	17.8	20.1	16.3	16.7	18.7	ND	ND	ND	ND	71.8	71.9	ND
226	17.0	18.6	13.4	15.2	15.1	ND	ND	ND	ND	70.6	62.3	ND
227	17.9	19.8	15.1	15.1	14.6	ND	ND	ND	ND	72.2	64.6	ND
228	17.5	19.8	15.0	16.2	15.3	ND	ND	ND	ND	70.0	66.2	ND
229	22.0	26.5	18.0	20.0	20.5	ND	ND	ND	ND	88.6	84.9	ND
230	12.4	14.3	10.6	11.8	12.2	ND	ND	ND	ND	50.5	48.9	ND
231-P	19.3	19.9	15.0	16.3	16.8	ND	ND	ND	ND	77.1	68.0	ND
231-S	20.3	21.2	17.7	19.4	19.4	ND	ND	ND	ND	81.7	77.6	ND
232-P	21.3	23.8	17.4	---	22.2	ND	ND	ND	ND	86.2	84.6	ND
232-S	20.1	---	16.0	18.6	20.0	ND	ND	ND	ND	80.5	72.8	ND
233	14.5	15.3	12.3	12.9	13.3	ND	ND	ND	ND	58.3	53.8	ND
234-P	17.0	18.6	---	15.9	17.8	ND	ND	ND	ND	67.9	69.7	ND
234-S	18.3	19.4	15.5	15.8	17.9	ND	ND	ND	ND	73.1	68.5	ND
235	16.2	18.6	12.8	14.2	17.0	ND	ND	ND	ND	64.8	62.6	ND
236	21.2	22.9	17.9	18.7	19.7	ND	ND	ND	ND	85.5	79.1	ND
237	21.0	26.4	16.9	20.0	22.1	ND	ND	ND	ND	90.1	85.4	ND
238-P	16.2	18.4	15.7	16.0	15.6	ND	ND	ND	ND	64.5	65.6	ND
238-S	18.3	20.9	15.9	16.4	17.5	ND	ND	ND	ND	73.7	70.7	ND
239	17.9	19.9	18.5	---	23.5	ND	ND	ND	ND	72.2	82.5	ND
240-P	12.3	13.4	10.3	11.9	12.1	ND	ND	ND	ND	50.1	47.6	ND
240-S	12.3	14.4	10.1	11.7	12.2	ND	ND	ND	ND	50.1	48.4	ND
241-P	13.1	13.9	10.6	12.2	13.2	ND	ND	ND	ND	52.6	49.9	ND
241-S	13.1	12.7	10.9	12.1	11.4	ND	ND	ND	ND	53.3	47.1	ND
242	16.2	17.8	13.9	15.2	15.0	ND	ND	ND	ND	65.0	61.8	ND
243	16.2	19.6	14.2	14.7	16.0	ND	ND	ND	ND	65.1	64.4	ND
244-P	16.7	21.8	16.9	17.7	19.2	ND	ND	ND	ND	68.9	75.5	ND
244-S	15.5	17.5	14.1	13.4	15.1	ND	ND	ND	ND	62.2	60.0	ND
245	16.3	20.6	13.6	14.4	17.2	ND	ND	ND	ND	66.4	65.8	ND
246-P	14.6	16.6	12.5	12.7	15.0	ND	ND	ND	ND	59.4	56.9	ND
246-S	14.0	15.6	11.5	13.0	14.9	ND	ND	ND	ND	57.8	55.0	ND
247	12.9	14.3	10.7	13.1	12.2	ND	ND	ND	ND	51.9	50.3	ND
248	14.2	16.2	12.5	13.4	12.8	ND	ND	ND	ND	56.9	55.0	ND
249	17.1	21.5	15.1	15.2	16.3	ND	ND	ND	ND	68.2	68.1	ND
250	16.2	17.3	14.0	15.7	15.5	ND	ND	ND	ND	65.0	62.4	ND
251	16.6	18.2	14.3	16.0	15.3	ND	ND	ND	ND	66.0	63.7	ND
255	20.0	22.1	17.3	19.2	20.7	ND	ND	ND	ND	80.1	79.3	ND
256	19.9	21.9	17.2	19.3	20.3	ND	ND	ND	ND	79.7	78.7	ND
258	18.9	21.6	16.6	17.1	21.3	ND	ND	ND	ND	76.9	76.6	ND

\* M<sub>A</sub> determined by normalizing available quarterly data to 4 full quarters



**Table 3.10-B definition of terms**

- $MDD_Q$  = minimum differential dose, quarterly, 3 times 90<sup>th</sup> percentile  $s_Q$  determined from analysis in mrem
- $MDD_A$  = minimum differential dose, annual, 3 times 90<sup>th</sup> percentile  $s_A$  determined from analysis in mrem
- $B_Q$  = Quarterly baseline (mrem)
- $M_Q$  = location's 91 day standard quarter normalized dose (mrem per standard quarter)
- $L_Q$  = quarterly investigation level dose (mrem)
- $B_A$  = baseline background dose (mrem) (annual)
- $M_A$  = annual monitoring data -  $M_a$  determined by normalizing available quarterly data to 4 full quarters
- $L_A$  = annual investigation level dose (mrem)
- ND = not detected

### 3.11 LAND USE CENSUS

The 2014 Annual Land Use Census was conducted July 9, and July 10, 2014 as required by SLC 16.11-14. Table 3.11 summarizes census results. A map indicating identified locations is shown in Figure 3.11.

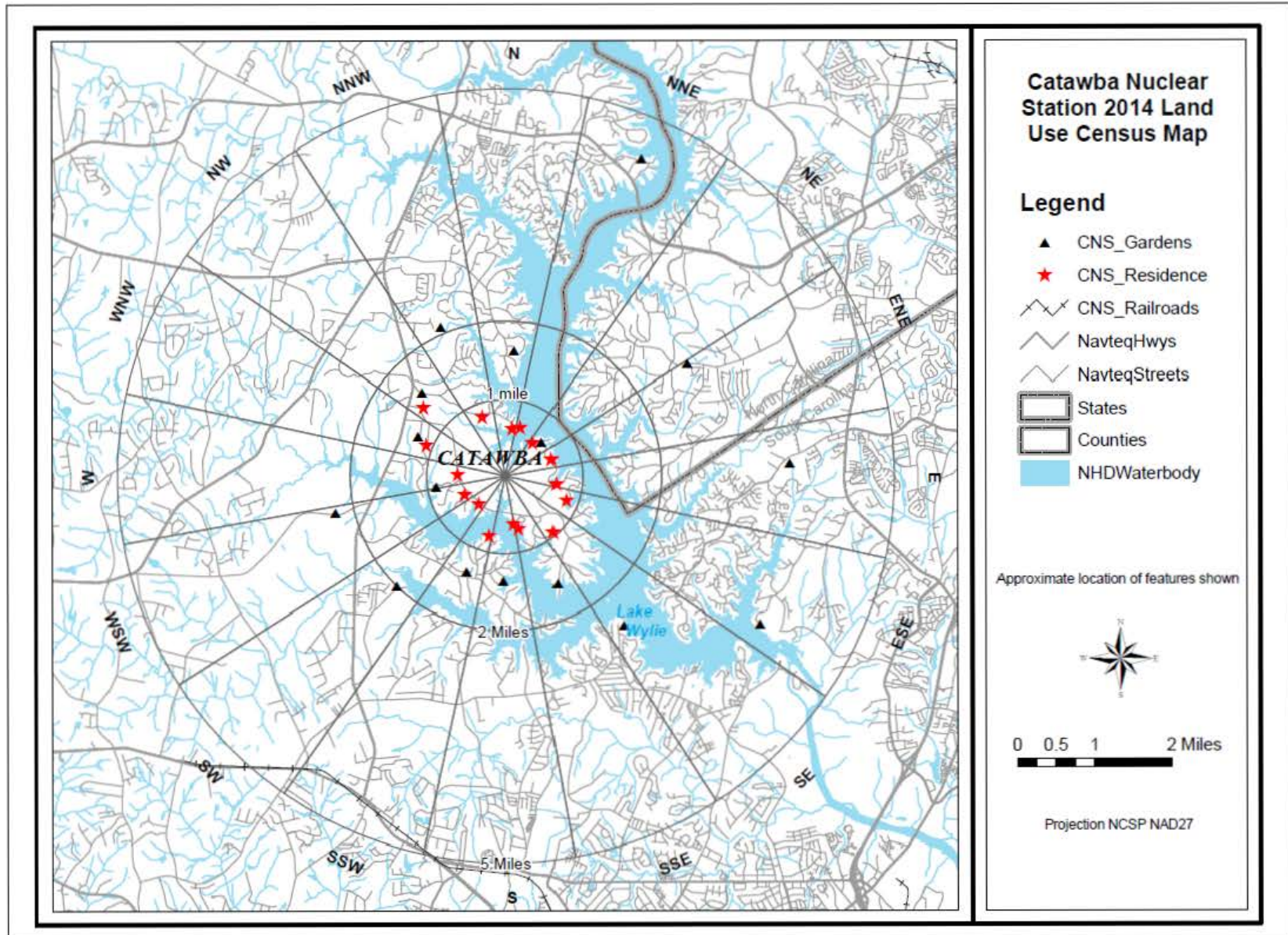
During the 2014 census no irrigated gardens (superior to existing gardens) or milk locations were identified. The nearest residence is located in the NE sector at 0.56 miles. No environmental program changes were required as a result of the 2014 land use census.

**Table 3.11 Catawba 2014 Land Use Census Results**

<b>Sector</b>		<b>Distance (Miles)</b>	<b>Sector</b>		<b>Distance (Miles)</b>
<b>N</b>	Nearest Residence	0.63	<b>S</b>	Nearest Residence	0.63
	Nearest Garden (irrigated)	1.55		Nearest Garden	1.25
	Nearest Milk Animal	-		Nearest Milk Animal	-
<b>NNE</b>	Nearest Residence	0.66	<b>SSW</b>	Nearest Residence	0.81
	Nearest Garden	4.47		Nearest Garden	1.34
	Nearest Milk Animal	-		Nearest Milk Animal	-
<b>NE</b>	Nearest Residence	0.56	<b>SW</b>	Nearest Residence	0.63
	Nearest Garden	0.68		Nearest Garden	2.02
	Nearest Milk Animal	-		Nearest Milk Animal	-
<b>ENE</b>	Nearest Residence	0.61	<b>WSW</b>	Nearest Residence	0.57
	Nearest Garden	2.73		Nearest Garden	2.03
	Nearest Milk Animal	-		Nearest Milk Animal	-
<b>E</b>	Nearest Residence	0.65	<b>W</b>	Nearest Residence	0.68
	Nearest Garden	3.52		Nearest Garden	0.96
	Nearest Milk Animal	-		Nearest Milk Animal	-
<b>ESE</b>	Nearest Residence	0.84	<b>WNW</b>	Nearest Residence	1.10
	Nearest Garden	3.70		Nearest Garden	1.18
	Nearest Milk Animal	-		Nearest Milk Animal	-
<b>SE</b>	Nearest Residence	0.97	<b>NW</b>	Nearest Residence	1.39
	Nearest Garden (irrigated)	2.55		Nearest Garden	1.54
	Nearest Milk Animal	-		Nearest Milk Animal	-
<b>SSE</b>	Nearest Residence	0.74	<b>NNW</b>	Nearest Residence	0.86
	Nearest Garden	1.64		Nearest Garden	2.13
	Nearest Milk Animal	-		Nearest Milk Animal	-

“-“ indicates no occurrences within the 5 mile radius

Figure 3.11



---

## 4.0 EVALUATION OF DOSE

---

### 4.1 DOSE FROM ENVIRONMENTAL MEASUREMENTS

Annual doses to maximum exposed individuals were estimated based on measured concentrations of radionuclides in 2014 CNS REMP samples. The primary purpose of estimating doses based on sample results is to allow comparison to effluent program dose estimates.

Doses based on sample results were calculated using the methodology and data presented in NRC Regulatory Guide 1.109. Measured radionuclide concentrations, averaged over the entire year for a specific radionuclide, indicator location and sample type, were used to calculate REMP-based doses. Where applicable, average background concentration at the corresponding control location was subtracted. Regulatory Guide 1.109 consumption rates for the maximum exposed individual were used in the calculations. When the guide listed “NO DATA” as the dose factor for a given radionuclide and organ, a dose factor of zero was assumed.

Maximum dose estimates (Highest Annual Mean Concentration) based on fish sample results are reported in Table 4.1-A. The individual critical population and pathway dose calculations are reported in Table 4.1-B.

REMP-based dose estimates are not reported for airborne radioiodine, airborne particulate, milk, or ground water sample types because no radionuclides attributable to CNS operations were detected. Naturally occurring K-40 and Be-7 were detected in some samples but were not included in any REMP-based dose estimates. Dose estimates are not reported for surface water because sampled surface water is not considered to be a potable drinking water source although surface water tritium concentrations are used in calculating doses from fish. Exposure estimates based upon REMP TLD results are discussed in Section 3.10.

The maximum environmental organ dose estimate for any single sample type (excluding TLD results) collected during 2014 was 1.70E-1 mrem to the adult total body from consuming vegetation.

### 4.2 ESTIMATED DOSE FROM RELEASES

Throughout the year, dose estimates were calculated based on actual 2014 liquid and gaseous effluent release data. Effluent-based dose estimates were calculated using the RETDAS computer program which employs methodology and data presented in NRC Regulatory Guide 1.109. These doses are shown in Table 4.1-A along with the corresponding REMP-based dose estimates. Summaries of RETDAS dose calculations are reported in the Annual Radioactive Effluent Release Report.

The effluent-based liquid release doses are summations of the dose contributions from the drinking water, fish, and shoreline pathways. For iodine, particulate, and tritium exposure the effluent-based gaseous release doses are summations of the dose contributors from ground/plane, inhalation, milk and vegetation pathways.

### **4.3 COMPARISON OF DOSES**

The environmental and effluent dose estimates given in Table 4.1-A agree reasonably well. The similarity of the doses indicate that the radioactivity levels in the environment do not differ significantly from those expected based on effluent measurements and modeling of the environmental exposure pathways. This indicates that effluent program dose estimates are both valid and reasonably conservative.

There are some differences in how effluent and environmental doses are calculated that affect the comparison. Doses calculated from environmental data are conservative because they are based on a mean that includes only samples with a net positive activity versus a mean that includes all sample results (i.e. zero results are not included in the mean). Also, airborne tritium is not measured in environmental samples but is used to calculate effluent doses.

Additionally, in 2010 Catawba began reporting estimated dose from effluent Carbon 14 (C-14). This change came about with the issuing of Regulatory Guide 1.21, Revision 2, Measuring, Evaluating and Reporting Radioactive Material in Liquid and Gaseous Effluents and Solid Waste. A description of this change is found in the 2010 Annual Radiological Effluent Release Report. C-14 is not easily measured in the environment and therefore, environmental and effluent doses from C-14 cannot be compared directly.

In calculations based on liquid release pathways, shoreline sediment, drinking water, and fish were the predominant dose pathways based on environmental and effluent data. The maximum total organ dose based on 2014 environmental sample results was 7.28E-2 mrem to the child liver. The maximum total organ dose of 1.54E-1 mrem for liquid effluent-based estimates was to the child bone.

In calculations based on gaseous release pathways, vegetation was the predominant dose pathway based on environmental and effluent data. The maximum total organ dose based on 2014 environmental sample results was 1.70E-1 mrem to the adult total body. The maximum total organ dose for gaseous effluent estimates was 4.71E0 mrem to the child bone.

The doses calculated do not exceed 40CFR190 or 10CFR50 dose commitment limits for members of the public. Doses to members of the public attributable to the operation of CNS are being maintained well within regulatory limits.

**TABLE 4.1-A**

**CATAWBA NUCLEAR STATION  
2014 ENVIRONMENTAL AND EFFLUENT DOSE COMPARISON**

**LIQUID RELEASE PATHWAY**

<b>Organ</b>	<b>Environmental or Effluent Data</b>	<b>Critical Age <sup>(1)</sup></b>	<b>Critical Pathway <sup>(2)</sup></b>	<b>Location</b>	<b>Maximum Dose <sup>(3)</sup> (mrem)</b>
Skin	Environmental	Teen	Shoreline Sediment	208 (0.45 mi S)	1.27E-02
Skin	Effluent	Teen	Shoreline Sediment	Discharge Pt.	9.72E-03
Bone	Environmental	Child	Fresh Water Fish	208 (0.45 mi S)	2.48E-02
Bone	Effluent	Child	Fresh Water Fish	Discharge Pt.	1.54E-01
Liver	Environmental	Child	Drinking Water	214 (7.30 mi SSE)	7.28E-02
Liver	Effluent	Child	Drinking Water	7.30 mi SSE	9.89E-02
T. Body	Environmental	Adult	Fresh Water Fish	208 (0.45 mi S)	6.24E-02
T. Body	Effluent	Child	Drinking Water	7.30 mi SSE	9.45E-02
Thyroid	Environmental	Child	Drinking Water	214 (7.30 mi SSE)	4.91E-02
Thyroid	Effluent	Child	Drinking Water	7.30 mi SSE	8.73E-02
Kidney	Environmental	Child	Drinking Water	214 (7.30 mi SSE)	5.68E-02
Kidney	Effluent	Child	Drinking Water	7.30 mi SSE	8.82E-02
Lung	Environmental	Child	Drinking Water	214 (7.30 mi SSE)	5.19E-02
Lung	Effluent	Child	Drinking Water	7.30 mi SSE	8.79E-02
GI-LLI	Environmental	Child	Drinking Water	214 (7.30 mi SSE)	4.92E-02
GI-LLI	Effluent	Child	Drinking Water	7.30 mi SSE	9.10E-02

- (1) Critical Age is the highest total dose (all pathways) to an age group.
- (2) Critical Pathway is the highest individual dose within the identified Critical Age group.
- (3) Maximum dose is a summation of the fish, drinking water and shoreline sediment pathways.

GASEOUS RELEASE PATHWAY**IODINE, PARTICULATE, and TRITIUM**

<b>Organ</b>	<b>Environmental or Effluent Data</b>	<b>Critical Age <sup>(1)</sup></b>	<b>Critical Pathway <sup>(2)</sup></b>	<b>Location</b>	<b>Maximum Dose <sup>(3)</sup> (mrem)</b>
Skin	Environmental	-	-	-	0.00E+00
Skin	Effluent	-	-	-	0.00E+00
Bone	Environmental	Child	Vegetation	201 (0.53 mi NE)	3.16E-01
Bone	Effluent	Child	Vegetation	0.5 mi NE	4.71E+00
Liver	Environmental	Child	Vegetation	201 (0.53 mi NE)	3.03E-01
Liver	Effluent	Child	Vegetation	0.5 mi NE	2.03E+00
T. Body	Environmental	Adult	Vegetation	201 (0.53 mi NE)	1.70E-01
T. Body	Effluent	Child	Vegetation	0.5 mi NE	2.03E+00
Thyroid	Environmental	-	-	-	0.00E+00
Thyroid	Effluent	Child	Vegetation	0.5 mi NE	2.03E+00
Kidney	Environmental	Child	Vegetation	201 (0.53 mi NE)	9.87E-02
Kidney	Effluent	Child	Vegetation	0.5 mi NE	2.03E+00
Lung	Environmental	Child	Vegetation	201 (0.53 mi NE)	3.55E-02
Lung	Effluent	Child	Vegetation	0.5 mi NE	2.03E+00
GI-LLI	Environmental	Adult	Vegetation	201 (0.53 mi NE)	5.02E-03
GI-LLI	Effluent	Child	Vegetation	0.5 mi NE	2.03E+00

(1) Critical Age is the highest total dose (all pathways) to an age group.

(2) Critical Pathway is the highest individual dose within the identified Critical Age group.

(3) Maximum dose is a summation of the ground/plane, inhalation, milk and vegetation pathways.

**TABLE 4.1-B***Maximum Individual Dose for 2014 based on Environmental Measurements (mrem) for Catawba Nuclear Station*

Age	Sample Medium	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI	Skin
<b>Infant</b>	Airborne	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Drinking Water	0.00E+00	3.90E-02	3.90E-02	3.90E-02	3.90E-02	3.90E-02	3.90E-02	0.00E+00
	Milk	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	<u>TOTAL</u>	0.00E+00	3.90E-02	3.90E-02	3.90E-02	3.90E-02	3.90E-02	3.90E-02	0.00E+00
<b>Child</b>	Airborne	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Drinking Water	0.00E+00	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02	0.00E+00
	Milk	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Broadleaf Vegetation	3.16E-01	3.03E-01	4.47E-02	0.00E+00	9.87E-02	3.55E-02	1.90E-03	0.00E+00
	Fish	2.48E-02	3.30E-02	1.28E-02	9.29E-03	1.70E-02	1.21E-02	9.44E-03	0.00E+00
	Shoreline Sediment	0.00E+00	0.00E+00	2.26E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.65E-03
	<u>TOTAL</u>	3.41E-01	3.76E-01	9.96E-02	4.91E-02	1.56E-01	8.74E-02	5.11E-02	2.65E-03
<b>Teen</b>	Airborne	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Drinking Water	0.00E+00	2.08E-02	2.08E-02	2.08E-02	2.08E-02	2.08E-02	2.08E-02	0.00E+00
	Milk	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Broadleaf Vegetation	1.75E-01	2.33E-01	8.11E-02	0.00E+00	7.92E-02	3.08E-02	3.31E-03	0.00E+00
	Fish	1.97E-02	3.75E-02	2.04E-02	1.12E-02	2.02E-02	1.47E-02	1.16E-02	0.00E+00
	Shoreline Sediment	0.00E+00	0.00E+00	1.08E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.27E-02
	<u>TOTAL</u>	1.95E-01	2.91E-01	1.33E-01	3.20E-02	1.20E-01	6.63E-02	3.57E-02	1.27E-02
<b>Adult</b>	Airborne	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Drinking Water	0.00E+00	2.94E-02	2.94E-02	2.94E-02	2.94E-02	2.94E-02	2.94E-02	0.00E+00
	Milk	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Broadleaf Vegetation	1.90E-01	2.60E-01	1.70E-01	0.00E+00	8.81E-02	2.93E-02	5.02E-03	0.00E+00
	Fish	1.84E-02	3.98E-02	3.11E-02	1.46E-02	2.32E-02	1.75E-02	1.51E-02	0.00E+00
	Shoreline Sediment	0.00E+00	0.00E+00	1.93E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.27E-03
	<u>TOTAL</u>	2.08E-01	3.29E-01	2.32E-01	4.40E-02	1.41E-01	7.62E-02	4.95E-02	2.27E-03

Note: Dose tables are provided for sample media displaying positive nuclide occurrence.



**Catawba Nuclear Station**  
**Dose from Drinking Water Pathway for 2014 Data**  
**Maximum Exposed Infant**

**Infant Dose from Drinking Water Pathway (mrem) = Usage (l) x Dose Factor (mrem/pCi ingested) x Concentration (pCi/l)**

**Usage (intake in one year) = 330 l**

Radionuclide	<u>Ingestion Dose Factor</u>							<u>Highest Annual Net Mean Concentration</u>		<u>Dose (mrem)</u>						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI	Indicator Location	Water (pCi/l)	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Mn-54	NO DATA	1.99E-05	4.51E-06	NO DATA	4.41E-06	NO DATA	7.31E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-58	NO DATA	3.60E-06	8.98E-06	NO DATA	NO DATA	NO DATA	8.97E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fe-59	3.08E-05	5.38E-05	2.12E-05	NO DATA	NO DATA	1.59E-05	2.57E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-60	NO DATA	1.08E-05	2.55E-05	NO DATA	NO DATA	NO DATA	2.57E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zn-65	1.84E-05	6.31E-05	2.91E-05	NO DATA	3.06E-05	NO DATA	5.33E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nb-95	4.20E-08	1.73E-08	1.00E-08	NO DATA	1.24E-08	NO DATA	1.46E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zr-95	2.06E-07	5.02E-08	3.56E-08	NO DATA	5.41E-08	NO DATA	2.50E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
I-131	3.59E-05	4.23E-05	1.86E-05	1.39E-02	4.94E-05	NO DATA	1.51E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cs-134	3.77E-04	7.03E-04	7.10E-05	NO DATA	1.81E-04	7.42E-05	1.91E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cs-137	5.22E-04	6.11E-04	4.33E-05	NO DATA	1.64E-04	6.64E-05	1.91E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BaLa-140	1.71E-04	1.71E-07	8.81E-06	NO DATA	4.06E-08	1.05E-07	4.20E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	NO DATA	3.08E-07	3.08E-07	3.08E-07	3.08E-07	3.08E-07	3.08E-07	214	384	0.00E+00	3.90E-02	3.90E-02	3.90E-02	3.90E-02	3.90E-02	3.90E-02
<b>Dose Commitment (mrem) =</b>										<b>0.00E+00</b>	<b>3.90E-02</b>	<b>3.90E-02</b>	<b>3.90E-02</b>	<b>3.90E-02</b>	<b>3.90E-02</b>	<b>3.90E-02</b>

***Catawba Nuclear Station  
Dose from Drinking Water Pathway for 2014 Data  
Maximum Exposed Child***

Child Dose from Drinking Water Pathway (mrem) = Usage (l) x Dose Factor (mrem/pCi ingested) x Concentration (pCi/l)

Usage (intake in one year) = 510 l

Radionuclide	<u>Ingestion Dose Factor</u>							<u>Highest Annual Net Mean Concentration</u>		<u>Dose (mrem)</u>						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI	Indicator Location	Water (pCi/l)	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Mn-54	NO DATA	1.07E-05	2.85E-06	NO DATA	3.00E-06	NO DATA	8.98E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-58	NO DATA	1.80E-06	5.51E-06	NO DATA	NO DATA	NO DATA	1.05E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fe-59	1.65E-05	2.67E-05	1.33E-05	NO DATA	NO DATA	7.74E-06	2.78E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C0-60	NO DATA	5.29E-06	1.56E-05	NO DATA	NO DATA	NO DATA	2.93E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zn-65	1.37E-05	3.65E-05	2.27E-05	NO DATA	2.30E-05	NO DATA	6.41E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nb-95	2.25E-08	8.76E-09	6.26E-09	NO DATA	8.23E-09	NO DATA	1.62E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zr-95	1.16E-07	2.55E-08	2.27E-08	NO DATA	3.65E-08	NO DATA	2.66E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
I-131	1.72E-05	1.73E-05	9.83E-06	5.72E-03	2.84E-05	NO DATA	1.54E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cs-134	2.34E-04	3.84E-04	8.10E-05	NO DATA	1.19E-04	4.27E-05	2.07E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cs-137	3.27E-04	3.13E-04	4.62E-05	NO DATA	1.02E-04	3.67E-05	1.96E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BaLa-140	8.31E-05	7.28E-08	4.85E-06	NO DATA	2.37E-08	4.34E-08	4.21E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	NO DATA	2.03E-07	2.03E-07	2.03E-07	2.03E-07	2.03E-07	2.03E-07	214	384	0.00E+00	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02
Dose Commitment (mrem) =										0.00E+00	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02	3.98E-02

***Catawba Nuclear Station  
Dose from Broadleaf Vegetation Pathway for 2014 Data  
Maximum Exposed Child***

**Child Dose from Vegetation Pathway (mrem) = Usage (kg) x Dose Factor (mrem/pCi ingested) x Concentration (pCi/kg)**

**Usage (intake in one year) = 26 kg**

Radionuclide	<u>Ingestion Dose Factor</u>							<u>Highest Annual Net Mean Concentration</u>		<u>Dose (mrem)</u>						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI	Indicator Location	Food (pCi/kg)	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
I-131	1.72E-05	1.73E-05	9.83E-06	5.72E-03	2.84E-05	NO DATA	1.54E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cs-134	2.34E-04	3.84E-04	8.10E-05	NO DATA	1.19E-04	4.27E-05	2.07E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cs-137	3.27E-04	3.13E-04	4.62E-05	NO DATA	1.02E-04	3.67E-05	1.96E-06	201	37.2	3.16E-01	3.03E-01	4.47E-02	0.00E+00	9.87E-02	3.55E-02	1.90E-03
<b>Dose Commitment (mrem) =</b>										<b>3.16E-01</b>	<b>3.03E-01</b>	<b>4.47E-02</b>	<b>0.00E+00</b>	<b>9.87E-02</b>	<b>3.55E-02</b>	<b>1.90E-03</b>

**Catawba Nuclear Station**  
**Dose from Fish Pathway for 2014 Data**  
**Maximum Exposed Child**

Child Dose from Fish Pathway (mrem) = Usage (kg) x Dose Factor (mrem/pCi ingested) x Concentration (pCi/kg)

H-3 Concentration in Fish = Surface Water pCi/l x Bioaccumulation Factor 0.9 pCi/kg per pCi/l = 7367 pCi/l x 0.9 = 6630 pCi/kg

Usage (intake in one year) = 6.9 kg

Radionuclide	<u>Ingestion Dose Factor</u>							<u>Highest Annual Net Mean Concentration</u>		<u>Dose (mrem)</u>						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI	Indicator Location	Fish (pCi/kg)	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Mn-54	NO DATA	1.07E-05	2.85E-06	NO DATA	3.00E-06	NO DATA	8.98E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-58	NO DATA	1.80E-06	5.51E-06	NO DATA	NO DATA	NO DATA	1.05E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fe-59	1.65E-05	2.67E-05	1.33E-05	NO DATA	NO DATA	7.74E-06	2.78E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C0-60	NO DATA	5.29E-06	1.56E-05	NO DATA	NO DATA	NO DATA	2.93E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zn-65	1.37E-05	3.65E-05	2.27E-05	NO DATA	2.30E-05	NO DATA	6.41E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cs-134	2.34E-04	3.84E-04	8.10E-05	NO DATA	1.19E-04	4.27E-05	2.07E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cs-137	3.27E-04	3.13E-04	4.62E-05	NO DATA	1.02E-04	3.67E-05	1.96E-06	208	11.0	2.48E-02	2.38E-02	3.51E-03	0.00E+00	7.74E-03	2.79E-03	1.49E-04
H-3	NO DATA	2.03E-07	2.03E-07	2.03E-07	2.03E-07	2.03E-07	2.03E-07	208	6630	0.00E+00	9.29E-03	9.29E-03	9.29E-03	9.29E-03	9.29E-03	9.29E-03
Dose Commitment (mrem) =										2.48E-02	3.30E-02	1.28E-02	9.29E-03	1.70E-02	1.21E-02	9.44E-03

***Catawba Nuclear Station***  
***Dose from Shoreline Sediment Pathway for 2014 Data***  
***Maximum Exposed Child***

Shoreline Recreation = 14 hr (in one year)  
 Shore Width Factor = 0.2  
 Sediment Surface Mass = 40 kg/m<sup>2</sup>

Child Dose from Shoreline Sediment Pathway (mrem) = Shoreline Recreation (hr) x External Dose Factor (mrem/hr per pCi/m<sup>2</sup>) x Shore Width Factor x Sediment Surface Mass (kg/m<sup>2</sup>) x Sediment Concentration (pCi/kg)

Radionuclide	External Dose Factor Standing on Contaminated Ground		Indicator Location	Sediment (pCi/kg)	Highest Annual Net Mean Concentration		Dose	
	(mrem/hr per pCi/m <sup>2</sup> )				(mrem)			
	T. Body	Skin			T. Body	Skin		
Mn-54	5.80E-09	6.80E-09	208	68.4	4.44E-05	5.21E-05		
Co-58	7.00E-09	8.20E-09	208	887	6.95E-04	8.15E-04		
Co-60	1.70E-08	2.00E-08	208	790	1.50E-03	1.77E-03		
Cs-134	1.20E-08	1.40E-08	ALL	0.00	0.00E+00	0.00E+00		
Cs-137	4.20E-09	4.90E-09	208	24.6	1.16E-05	1.35E-05		
Dose Commitment (mrem) =					2.26E-03	2.65E-03		

**Catawba Nuclear Station**  
**Dose from Drinking Water Pathway for 2014 Data**  
**Maximum Exposed Teen**

Teen Dose from Drinking Water Pathway (mrem) = Usage (l) x Dose Factor (mrem/pCi ingested) x Concentration (pCi/l)

Usage (intake in one year) = 510 l

Radionuclide	<u>Ingestion Dose Factor</u>							<u>Highest Annual Net Mean Concentration</u>		<u>Dose (mrem)</u>						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI	Indicator Location	Water (pCi/l)	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Mn-54	NO DATA	5.90E-06	1.17E-06	NO DATA	1.76E-06	NO DATA	1.21E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-58	NO DATA	9.72E-07	2.24E-06	NO DATA	NO DATA	NO DATA	1.34E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fe-59	5.87E-06	1.37E-05	5.29E-06	NO DATA	NO DATA	4.32E-06	3.24E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-60	NO DATA	2.81E-06	6.33E-06	NO DATA	NO DATA	NO DATA	3.66E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zn-65	5.76E-06	2.00E-05	9.33E-06	NO DATA	1.28E-05	NO DATA	8.47E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nb-95	8.22E-09	4.56E-09	2.51E-09	NO DATA	4.42E-09	NO DATA	1.95E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zr-95	4.12E-08	1.30E-08	8.94E-09	NO DATA	1.91E-08	NO DATA	3.00E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
I-131	5.85E-06	8.19E-06	4.40E-06	2.39E-03	1.41E-05	NO DATA	1.62E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cs-134	8.37E-05	1.97E-04	9.14E-05	NO DATA	6.26E-05	2.39E-05	2.45E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cs-137	1.12E-04	1.49E-04	5.19E-05	NO DATA	5.07E-05	1.97E-05	2.12E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BaLa-140	2.84E-05	3.48E-08	1.83E-06	NO DATA	1.18E-08	2.34E-08	4.38E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	NO DATA	1.06E-07	1.06E-07	1.06E-07	1.06E-07	1.06E-07	1.06E-07	214	384	0.00E+00	2.08E-02	2.08E-02	2.08E-02	2.08E-02	2.08E-02	2.08E-02
Dose Commitment (mrem)=										0.00E+00	2.08E-02	2.08E-02	2.08E-02	2.08E-02	2.08E-02	2.08E-02

***Catawba Nuclear Station  
Dose from Broadleaf Vegetation Pathway for 2014 Data  
Maximum Exposed Teen***

Teen Dose from Vegetation Pathway (mrem) = Usage (kg) x Dose Factor (mrem/pCi ingested) x Concentration (pCi/kg)

Usage (intake in one year) = 42 kg

Radionuclide	<u>Ingestion Dose Factor</u>							<u>Highest Annual Net Mean Concentration</u>		<u>Dose (mrem)</u>						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI	Indicator Location	Food (pCi/kg)	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
I-131	5.85E-06	8.19E-06	4.40E-06	2.39E-03	1.41E-05	NO DATA	1.62E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cs-134	8.37E-05	1.97E-04	9.14E-05	NO DATA	6.26E-05	2.39E-05	2.45E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cs-137	1.12E-04	1.49E-04	5.19E-05	NO DATA	5.07E-05	1.97E-05	2.12E-06	201	37.2	1.75E-01	2.33E-01	8.11E-02	0.00E+00	7.92E-02	3.08E-02	3.31E-03
Dose Commitment (mrem) =										1.75E-01	2.33E-01	8.11E-02	0.00E+00	7.92E-02	3.08E-02	3.31E-03

***Catawba Nuclear Station  
Dose from Fish Pathway for 2014 Data  
Maximum Exposed Teen***

Teen Dose from Fish Pathway (mrem) = Usage (kg) x Dose Factor (mrem/pCi ingested) x Concentration (pCi/kg)

H-3 Concentration in Fish = Surface Water pCi/l x Bioaccumulation Factor 0.9 pCi/kg per pCi/l = 7367 pCi/l x 0.9 = 6630 pCi/kg

Usage (intake in one year) = 16 kg

Radionuclide	<u>Ingestion Dose Factor</u>							<u>Highest Annual Net Mean Concentration</u>		<u>Dose (mrem)</u>						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI	Location	(pCi/kg)	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Mn-54	NO DATA	5.90E-06	1.17E-06	NO DATA	1.76E-06	NO DATA	1.21E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-58	NO DATA	9.72E-07	2.24E-06	NO DATA	NO DATA	NO DATA	1.34E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fe-59	5.87E-06	1.37E-05	5.29E-06	NO DATA	NO DATA	4.32E-06	3.24E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-60	NO DATA	2.81E-06	6.33E-06	NO DATA	NO DATA	NO DATA	3.66E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zn-65	5.76E-06	2.00E-05	9.33E-06	NO DATA	1.28E-05	NO DATA	8.47E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cs-134	8.37E-05	1.97E-04	9.14E-05	NO DATA	6.26E-05	2.39E-05	2.45E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cs-137	1.12E-04	1.49E-04	5.19E-05	NO DATA	5.07E-05	1.97E-05	2.12E-06	208	11.0	1.97E-02	2.62E-02	9.13E-03	0.00E+00	8.92E-03	3.47E-03	3.73E-04
H-3	NO DATA	1.06E-07	1.06E-07	1.06E-07	1.06E-07	1.06E-07	1.06E-07	208	6630	0.00E+00	1.12E-02	1.12E-02	1.12E-02	1.12E-02	1.12E-02	1.12E-02
Dose Commitment (mrem) =										1.97E-02	3.75E-02	2.04E-02	1.12E-02	2.02E-02	1.47E-02	1.16E-02



***Catawba Nuclear Station***  
***Dose from Shoreline Sediment Pathway for 2014 Data***  
***Maximum Exposed Teen***

Shoreline Recreation = 67 hr (in one year)  
 Shore Width Factor = 0.2  
 Sediment Surface Mass = 40 kg/m<sup>2</sup>

Teen Dose from Shoreline Sediment Pathway (mrem) = Shoreline Recreation (hr) x External Dose Factor (mrem/hr per pCi/m<sup>2</sup>) x Shore Width Factor x Sediment Surface Mass (kg/m<sup>2</sup>) x Sediment Concentration (pCi/kg)

Radionuclide	External Dose Factor Standing <u>on Contaminated Ground</u>		Indicator Location	Sediment (pCi/kg)	<u>Dose</u>	
	(mrem/hr per pCi/m <sup>2</sup> )				(mrem)	
	T. Body	Skin			T. Body	Skin
Mn-54	5.80E-09	6.80E-09	208	68.4	2.13E-04	2.49E-04
Co-58	7.00E-09	8.20E-09	208	887	3.33E-03	3.90E-03
Co-60	1.70E-08	2.00E-08	208	790	7.20E-03	8.47E-03
Cs-134	1.20E-08	1.40E-08	ALL	0.00	0.00E+00	0.00E+00
Cs-137	4.20E-09	4.90E-09	208	24.6	5.54E-05	6.46E-05
Dose Commitment (mrem) =					1.08E-02	1.27E-02

**Catawba Nuclear Station**  
**Dose from Drinking Water Pathway for 2014 Data**  
**Maximum Exposed Adult**

Adult Dose from Drinking Water Pathway (mrem) = Usage (l) x Dose Factor (mrem/pCi ingested) x Concentration (pCi/l)

Usage (intake in one year) = 730 l

Radionuclide	<u>Ingestion Dose Factor</u>							<u>Highest Annual Net Mean Concentration</u>		<u>Dose (mrem)</u>						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI	Indicator Location	Water (pCi/l)	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Mn-54	NO DATA	4.57E-06	8.72E-07	NO DATA	1.36E-06	NO DATA	1.40E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-58	NO DATA	7.45E-07	1.67E-06	NO DATA	NO DATA	NO DATA	1.51E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fe-59	4.34E-06	1.02E-05	3.91E-06	NO DATA	NO DATA	2.85E-06	3.40E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-60	NO DATA	2.14E-06	4.72E-06	NO DATA	NO DATA	NO DATA	4.02E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zn-65	4.84E-06	1.54E-05	6.96E-06	NO DATA	1.03E-05	NO DATA	9.70E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nb-95	6.22E-09	3.46E-09	1.86E-09	NO DATA	3.42E-09	NO DATA	2.10E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zr-95	3.04E-08	9.75E-09	6.60E-09	NO DATA	1.53E-08	NO DATA	3.09E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
I-131	4.16E-06	5.95E-06	3.41E-06	1.95E-03	1.02E-05	NO DATA	1.57E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cs-134	6.22E-05	1.48E-04	1.21E-04	NO DATA	4.79E-05	1.59E-05	2.59E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cs-137	7.97E-05	1.09E-04	7.14E-05	NO DATA	3.70E-05	1.23E-05	2.11E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BaLa-140	2.03E-05	2.55E-08	1.33E-06	NO DATA	8.67E-09	1.46E-08	4.18E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	NO DATA	1.05E-07	1.05E-07	1.05E-07	1.05E-07	1.05E-07	1.05E-07	214	384	0.00E+00	2.94E-02	2.94E-02	2.94E-02	2.94E-02	2.94E-02	2.94E-02
<b>Dose Commitment (mrem) =</b>										<b>0.00E+00</b>	<b>2.94E-02</b>	<b>2.94E-02</b>	<b>2.94E-02</b>	<b>2.94E-02</b>	<b>2.94E-02</b>	<b>2.94E-02</b>

**Catawba Nuclear Station**  
**Dose from Broadleaf Vegetation Pathway for 2014 Data**  
**Maximum Exposed Adult**

Adult Dose from Vegetation (mrem) = Usage (kg) x Dose Factor (mrem/pCi ingested) x Concentration (pCi/kg)

Usage (intake in one year) = 64 kg

Radionuclide	<u>Ingestion Dose Factor</u>							<u>Highest Annual Net Mean Concentration</u>		<u>Dose (mrem)</u>						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI	Indicator Location	Food (pCi/kg)	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
I-131	4.16E-06	5.95E-06	3.41E-06	1.95E-03	1.02E-05	NO DATA	1.57E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cs-134	6.22E-05	1.48E-04	1.21E-04	NO DATA	4.79E-05	1.59E-05	2.59E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cs-137	7.97E-05	1.09E-04	7.14E-05	NO DATA	3.70E-05	1.23E-05	2.11E-06	201	37.2	1.90E-01	2.60E-01	1.70E-01	0.00E+00	8.81E-02	2.93E-02	5.02E-03
Dose Commitment (mrem) =										1.90E-01	2.60E-01	1.70E-01	0.00E+00	8.81E-02	2.93E-02	5.02E-03

**Catawba Nuclear Station**  
**Dose from Fish Pathway for 2014 Data**  
**Maximum Exposed Adult**

Adult Dose from Fish Pathway (mrem) = Usage (kg) x Dose Factor (mrem/pCi ingested) x Concentration (pCi/kg)

H-3 Concentration in Fish = Surface Water pCi/l x Bioaccumulation Factor 0.9 pCi/kg per pCi/l = 7367 pCi/l x 0.9 = 6630 pCi/kg

Usage (intake in one year) = 21 kg

Radionuclide	<u>Ingestion Dose Factor</u>							<u>Highest Annual Net Mean Concentration</u>		<u>Dose (mrem)</u>						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI	Location	(pCi/kg)	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
Mn-54	NO DATA	4.57E-06	8.72E-07	NO DATA	1.36E-06	NO DATA	1.40E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-58	NO DATA	7.45E-07	1.67E-06	NO DATA	NO DATA	NO DATA	1.51E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fe-59	4.34E-06	1.02E-05	3.91E-06	NO DATA	NO DATA	2.85E-06	3.40E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-60	NO DATA	2.14E-06	4.72E-06	NO DATA	NO DATA	NO DATA	4.02E-05	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zn-65	4.84E-06	1.54E-05	6.96E-06	NO DATA	1.03E-05	NO DATA	9.70E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cs-134	6.22E-05	1.48E-04	1.21E-04	NO DATA	4.79E-05	1.59E-05	2.59E-06	ALL	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cs-137	7.97E-05	1.09E-04	7.14E-05	NO DATA	3.70E-05	1.23E-05	2.11E-06	208	11.0	1.84E-02	2.52E-02	1.65E-02	0.00E+00	8.55E-03	2.84E-03	4.87E-04
H-3	NO DATA	1.05E-07	1.05E-07	1.05E-07	1.05E-07	1.05E-07	1.05E-07	208	6630	0.00E+00	1.46E-02	1.46E-02	1.46E-02	1.46E-02	1.46E-02	1.46E-02
Dose Commitment (mrem) =										1.84E-02	3.98E-02	3.11E-02	1.46E-02	2.32E-02	1.75E-02	1.51E-02

***Catawba Nuclear Station***  
***Dose from Shoreline Sediment Pathway for 2014 Data***  
***Maximum Exposed Adult***

Shoreline Recreation = 12 hr (in one year)  
 Shore Width Factor = 0.2  
 Sediment Surface Mass = 40 kg/m<sup>2</sup>

Adult Dose from Shoreline Sediment Pathway (mrem) = Shoreline Recreation (hr) x External Dose Factor (mrem/hr per pCi/m<sup>2</sup>) x Shore Width Factor x Sediment Surface Mass (kg/m<sup>2</sup>) x Sediment Concentration (pCi/kg)

Radionuclide	External Dose Factor Standing <u>on Contaminated Ground</u> (mrem/hr per pCi/m <sup>2</sup> )		Indicator Location	Highest Annual Net <u>Mean Concentration</u> Sediment (pCi/kg)	<u>Dose</u> (mrem)	
	T. Body	Skin			T. Body	Skin
Mn-54	5.80E-09	6.80E-09	208	68.4	3.81E-05	4.47E-05
Co-58	7.00E-09	8.20E-09	208	887	5.96E-04	6.98E-04
Co-60	1.70E-08	2.00E-08	208	790	1.29E-03	1.52E-03
Cs-134	1.20E-08	1.40E-08	ALL	0.00	0.00E+00	0.00E+00
Cs-137	4.20E-09	4.90E-09	208	24.6	9.92E-06	1.16E-05
Dose Commitment (mrem) =					1.93E-03	2.27E-03

---

## **5.0 QUALITY ASSURANCE**

---

### **5.1 SAMPLE COLLECTION**

EnRad Laboratories, Fisheries, and Aquatic Ecology performed the environmental sample collections as specified by approved sample collection procedures.

### **5.2 SAMPLE ANALYSIS**

EnRad Laboratories performed the environmental sample analyses as specified by approved analysis procedures. EnRad Laboratories is located in Huntersville, North Carolina, at Duke Energy's Environmental Center.

### **5.3 DOSIMETRY ANALYSIS**

The Radiation Dosimetry and Records group performed environmental dosimetry measurements as specified by approved dosimetry analysis procedures.

### **5.4 LABORATORY EQUIPMENT QUALITY ASSURANCE**

#### **5.4.1 DAILY QUALITY CONTROL**

EnRad Laboratories has an internal quality assurance program which monitors each type of instrumentation for reliability and accuracy. Daily quality control checks ensure that instruments are in proper working order and these checks are used to monitor instrument performance.

#### **5.4.2 CALIBRATION VERIFICATION**

National Institute of Standards and Technology (NIST) standards that represent counting geometries are analyzed as unknowns at various frequencies ranging from weekly to annually to verify that efficiency calibrations are valid. The frequency is dependent upon instrument use and performance. Investigations are performed and documented should calibration verification data fall outside of the acceptable limits.

#### **5.4.3 BATCH PROCESSING**

Method quality control samples are analyzed with sample analyses that are processed in batches. These include gross beta in drinking water and tritium analyses.

### **5.5 DUKE ENERGY INTERLABORATORY COMPARISON PROGRAM**

In 2014 Duke Energy Environmental Laboratory (EnRad) participated in interlaboratory programs to satisfy Radiological Environmental Monitoring Program

requirements in Duke Energy nuclear plant Offsite Dose Calculation Manuals and Selected Licensee Commitments Manuals, as applicable. In addition, EnRad Laboratory participated in the Environmental Resource Associates (ERA) RadChem™ Proficiency Testing program to satisfy the North Carolina state drinking water radiochemistry certification requirements.

EnRad Laboratory participated in three interlaboratory programs: Eckert & Ziegler Analytics (EZA), ERA, and Fleet Scientific Services (FSS). EZA results were evaluated against NRC Inspection Procedure (IP) 84750 acceptance criteria. ERA reported results were evaluated based on National Environmental Laboratory Accreditation Conference (NELAC) Field of Proficiency Testing criteria. FSS results were evaluated as prescribed in the Duke Energy Nuclear Generation Procedure SRPMP 9-2.

A low-level Iodine-131 in water cross check was not performed during 2014, but was performed during 2013. A low-level Iodine-131 in milk cross check was performed during 2014. The preparation and analysis of both media (milk and water) for the low-level Iodine-131 analysis is accomplished using the EnRad procedure 54, Preparation of Samples for low-level I-131 Analysis. Low-level Iodine-131 sample preparation and testing for both media is a similar process. A low-level Iodine-131 cross check in water is scheduled for the second quarter 2015 cross check program. Low-level Iodine-131 analysis of water was not required during 2014 since the dose calculated for the consumption of the water was not greater than 1 mrem per year in any supported program (PIP G-15-00781 or CR # 744148).

### **5.5.1 DUKE ENERGY INTERCOMPARISON PROGRAM**

EnRad Laboratories participated in the Duke Energy Fleet Scientific Services (FSS) Intercomparison Program during 2014. Interlaboratory cross-check samples, including gamma in water (Marinelli beakers), low-level I-131 in milk, and tritium in water samples were analyzed during 2014. A summary of the EnRad Laboratory program results for 2014 is documented in Table 5.0-A.

### **5.5.2 ECKERT & ZIEGLER ANALYTICS CROSS CHECK PROGRAM**

EnRad Laboratories participated in the Eckert & Ziegler Analytics Cross Check Program during 2014. Cross-check samples including air filters, air cartridges, gross beta in water, various gamma samples in Marinelli beakers (soil, vegetation, and milk), and Iodine in milk samples were analyzed at various times of the year. A summary of the EnRad Laboratory program results for 2014 is documented in Table 5.0-B.

### **5.5.3 ERA PROFICIENCY TESTING**

EnRad Laboratories performed method proficiency testing through a program administered by Environmental Resource Associates (ERA) of Arvada, CO.

ERA supplied requested method proficiency samples for analysis and nuclide concentration determination. ERA reported proficiency test results to the North Carolina Department of Health and Human Services, North Carolina Public Health Drinking Water Laboratory Certification Program. A summary of these proficiency test data for 2014 is documented in Table 5.0-C.

## **5.6 DUKE ENERGY AUDITS**

The Catawba Nuclear Station Radiological Environmental Monitoring Program was audited by the Quality Assurance Group in 2014. No environmental monitoring issues were identified.

## **5.7 U.S. NUCLEAR REGULATORY COMMISSION INSPECTIONS**

The Catawba Nuclear Station Radiological Environmental Monitoring Program was not audited by the NRC in 2014, but was audited by the NRC in 2013. No findings were noted in the 2013 audit report.

## **5.8 INTERCOMPARISON PROGRAM**

Catawba Nuclear Station routinely participates in an environmental sample intercomparison program. Program elements include sampling frequency and analysis parameters for drinking water, surface water, milk, fish, broadleaf vegetation, and shoreline sediment samples that have been collected. Samples are routinely split with a vendor laboratory for intercomparison analysis.

## **5.9 TLD INTERCOMPARISON PROGRAM**

### **5.9.1 NUCLEAR TECHNOLOGY SERVICES INTERCOMPARISON PROGRAM**

Radiation Dosimetry and Records participates in a quarterly TLD intercomparison program administered by Nuclear Technology Services, Inc. of Roswell, GA. Nuclear Technology Services irradiates environmental dosimeters quarterly and sends them to the Radiation Dosimetry and Records group for analysis of the unknown estimated delivered exposure. A summary of the 2014 Nuclear Technology Services Intercomparison Report is documented in Table 5.0-D. The individual measurements were evaluated and results falling outside the acceptable ratio criteria had an evaluation performed to identify any recommended remedial actions and to reduce anomalous errors. Complete documentation of any evaluation will be available and provided to the NRC upon request.

### **5.9.2 INTERNAL CROSSCHECK (DUKE ENERGY)**

Radiation Dosimetry and Records participates in a quarterly TLD intracomparison program administered internally by the Dosimetry Lab. The



Dosimetry Lab Staff irradiates environmental dosimeters quarterly and submits them for analysis of the unknown estimated delivered exposure. A summary of the 2014 Internal Cross Check (Duke Energy) Result is documented in Table 5.0-D.

# TABLE 5.0-A

## DUKE ENERGY

### INTERLABORATORY COMPARISON PROGRAM

#### 2014 EnRad Fleet Scientific Services Cross Check Performance Summary

Cross check samples were distributed by Fleet Scientific Services (FSS) in accordance with Duke Energy Nuclear Generation Procedure SRPMP 9-2. Seven water samples were analyzed for tritium and gamma emitters, while three milk samples were analyzed for low-level I-131. The below table lists results for specific analyses. Fifty-eight results were evaluated as prescribed in procedure SRPMP 9-2. The acceptance criteria for the program was based on the NRC Inspection Manual Procedure 84750 (IP 84750). These results passed the acceptance criteria for the program.

Sample	Sample ID	Nuclide	Quarter	Units	EnRad Value	FSS Value	EnRad/FSS Ratio	Evaluation
Milk LLI-131	Q143LIM1	I-131	3	pCi/L	3.04E+03	2.96E+03	1.03	Agreement
			3	pCi/L	3.06E+03	2.96E+03	1.03	Agreement
			3	pCi/L	3.07E+03	2.96E+03	1.04	Agreement
	Q143LIM2	I-131	3	pCi/L	1.25E+03	1.27E+03	0.98	Agreement
			3	pCi/L	1.25E+03	1.27E+03	0.98	Agreement
			3	pCi/L	1.24E+03	1.27E+03	0.97	Agreement
	Q143LIM3	I-131	3	pCi/L	4.64E+02	4.58E+02	1.01	Agreement
			3	pCi/L	4.70E+02	4.58E+02	1.03	Agreement
	Tritium in Water	Q143TWR1	H-3	3	pCi/L	1.77E+03	1.85E+03	0.96
3				pCi/L	1.79E+03	1.85E+03	0.97	Agreement
3				pCi/L	1.78E+03	1.85E+03	0.96	Agreement
Q143TWR2		H-3	3	pCi/L	1.76E+05	1.81E+05	0.97	Agreement
			3	pCi/L	1.75E+05	1.81E+05	0.96	Agreement
Tritium in Water	Q141TWR1	H-3	1	pCi/L	1.10E+03	1.05E+03	1.05	Agreement
					1.14E+03	1.05E+03	1.09	Agreement
					1.11E+03	1.05E+03	1.06	Agreement
	Q141TWR2	H-3	1	pCi/L	7.04E+03	7.46E+03	0.94	Agreement
					7.03E+03	7.46E+03	0.94	Agreement
					7.16E+03	7.46E+03	0.96	Agreement
	Q141TWR3	H-3	1	pCi/L	3.13E+03	3.21E+03	0.98	Agreement
					3.11E+03	3.21E+03	0.97	Agreement
					3.13E+03	3.21E+03	0.98	Agreement

## TABLE 5.0-A (Cont.)

Sample	Sample ID	Nuclide	Quarter	Units	EnRad Value	FSS Value	EnRad/FSS Ratio	Evaluation
Gamma in Water	Q143GWSL-1.0 L	Cr-51	3	pCi/L	1.71E+05	1.80E+05	0.95	Agreement
			3	pCi/L	1.70E+05	1.80E+05	0.95	Agreement
		Mn-54	3	pCi/L	6.34E+04	5.99E+04	1.06	Agreement
			3	pCi/L	6.35E+04	5.99E+04	1.06	Agreement
		Co-58	3	pCi/L	6.80E+04	6.89E+04	0.99	Agreement
			3	pCi/L	6.81E+04	6.89E+04	0.99	Agreement
		Fe-59	3	pCi/L	8.72E+04	8.38E+04	1.04	Agreement
			3	pCi/L	8.75E+04	8.38E+04	1.04	Agreement
		Co-60	3	pCi/L	1.27E+05	1.22E+05	1.04	Agreement
			3	pCi/L	1.26E+05	1.22E+05	1.03	Agreement
		Zn-65	3	pCi/L	3.52E+04	3.12E+04	1.13	Agreement
			3	pCi/L	3.53E+04	3.12E+04	1.13	Agreement
		Cs-134	3	pCi/L	5.97E+04	6.35E+04	0.91	Agreement
			3	pCi/L	5.95E+04	6.53E+04	0.91	Agreement
		Cs-137	3	pCi/L	8.01E+04	7.87E+04	1.02	Agreement
			3	pCi/L	7.98E+04	7.87E+04	1.01	Agreement
		Ce-141	3	pCi/L	7.13E+04	7.65E+04	0.93	Agreement
			3	pCi/L	7.24E+04	7.65E+04	0.95	Agreement
	Q143GWSL-3.5 L	Cr-51	3	pCi/L	1.76E+05	1.80E+05	0.98	Agreement
			3	pCi/L	1.73E+05	1.80E+05	0.96	Agreement
		Mn-54	3	pCi/L	6.32E+04	5.99E+04	1.06	Agreement
			3	pCi/L	6.31E+04	5.99E+04	1.05	Agreement
		Co-58	3	pCi/L	6.89E+04	6.89E+04	1.00	Agreement
			3	pCi/L	6.84E+04	6.89E+04	0.99	Agreement
		Fe-59	3	pCi/L	8.54E+04	8.38E+04	1.02	Agreement
			3	pCi/L	8.69E+04	8.38E+04	1.04	Agreement
		Co-60	3	pCi/L	1.28E+05	1.22E+05	1.05	Agreement
			3	pCi/L	1.27E+05	1.22E+05	1.04	Agreement
Zn-65		3	pCi/L	3.42E+04	3.12E+04	1.10	Agreement	
		3	pCi/L	3.45E+04	3.12E+04	1.11	Agreement	
Cs-134		3	pCi/L	6.39E+04	6.53E+04	0.98	Agreement	
		3	pCi/L	6.17E+04	6.53E+04	0.95	Agreement	
Cs-137		3	pCi/L	8.11E+04	7.87E+04	1.03	Agreement	
		3	pCi/L	8.08E+04	7.87E+04	1.03	Agreement	
Ce-141		3	pCi/L	7.39E+04	7.65E+04	0.97	Agreement	
		3	pCi/L	7.36E+04	7.65E+04	0.96	Agreement	

# TABLE 5.0-B

## ECKERT & ZIEGLER ANALYTICS

### CROSS CHECK PROGRAM

#### 2014 Cross Check Results for EnRad Laboratories

Cross check samples are received, prepared, and analyzed in all four quarters of 2014. Results are reported directly to Eckert & Ziegler Analytics. Environmental cross check samples were analyzed in replicate, and the result closest to the mean is reported to Eckert & Ziegler Analytics. The acceptance criteria for the program was based on the NRC Inspection Manual Procedure 84750 (IP 84750). Fifty environmental results were reported, of which 49 (98%) met the acceptance criteria based on IP 84750.

Sample	Sample ID	Nuclide	Quarter	Units	EnRad Value	EZA Value	EnRad/EZA Ratio	Evaluation
Beta Filter in Planchet	E10901	Gross Beta	2	pCi	201	199	1.01	Agreement
Gamma in Soil	E10904	Ce-141	2	pCi/g	0.23	0.24	0.96	Agreement
		Cr-51	2	pCi/g	0.48	0.49	0.98	Agreement
		Cs-134	2	pCi/g	0.24	0.32	0.76	Non-Agreement*
		Cs-137	2	pCi/g	0.27	0.31	0.86	Agreement
		Co-58	2	pCi/g	0.18	0.22	0.83	Agreement
		Mn-54	2	pCi/g	0.29	0.3	0.96	Agreement
		Fe-59	2	pCi/g	0.2	0.2	1.01	Agreement
		Zn-65	2	pCi/g	0.49	0.49	1.00	Agreement
		Co-60	2	pCi/g	0.41	0.44	0.94	Agreement
I-131 in Milk	E10801	I-131	1	pCi/L	93.8	99.8	0.94	Agreement
Gross Beta in Water	E10905	Gross Beta	2	pCi/L	265	249	1.06	Agreement
I-131 Charcoal Cartridge	E10802	I-131	1	pCi	76.1	75.1	1.01	Agreement
Gamma in Vegetation (Coffee Grounds)	E10902	Ce-141	2	pCi/g	0.22	0.24	0.91	Agreement
		Cr-51	2	pCi/g	0.42	0.5	0.85	Agreement
		Cs-134	2	pCi/g	0.28	0.32	0.88	Agreement
		Cs-137	2	pCi/g	0.22	0.24	0.94	Agreement
		Co-58	2	pCi/g	0.21	0.22	0.96	Agreement
		Mn-54	2	pCi/g	0.28	0.3	0.92	Agreement
		Fe-59	2	pCi/g	0.19	0.2	0.95	Agreement
		Zn-65	2	pCi/g	0.44	0.49	0.89	Agreement
Co-60	2	pCi/g	0.38	0.44	0.87	Agreement		

\* See PIP G-14-01710

## TABLE 5.0-B (Cont.)

Sample	Sample ID	Nuclide	Quarter	Units	EnRad Value	EZA Value	EnRad/EZA Ratio	Evaluation
Gamma in Composite Filter	E10987	Ce-141	3	pCi	64.1	62.6	1.02	Agreement
		Cr-51	3	pCi	135	143	0.94	Agreement
		Cs-134	3	pCi	74.6	78.3	0.95	Agreement
		Cs-137	3	pCi	97.8	95.9	1.02	Agreement
		Co-58	3	pCi	71.7	71	1.01	Agreement
		Mn-54	3	pCi	69.5	70.4	0.99	Agreement
		Fe-59	3	pCi	86.8	78.4	1.11	Agreement
		Zn-65	3	pCi	37	36.2	1.02	Agreement
		Co-60	3	pCi	161	148	1.09	Agreement
Gamma in Milk	E10800	I-131	1	pCi/L	97.3	98.5	0.99	Agreement
		Ce-141	1	pCi/L	120	119	1.01	Agreement
		Cr-51	1	pCi/L	505	491	1.03	Agreement
		Cs-134	1	pCi/L	192	210	0.92	Agreement
		Cs-137	1	pCi/L	255	253	1.01	Agreement
		Co-58	1	pCi/L	274	268	1.02	Agreement
		Mn-54	1	pCi/L	314	297	1.06	Agreement
		Fe-59	1	pCi/L	232	219	1.06	Agreement
		Zn-65	1	pCi/L	318	323	0.99	Agreement
Gamma in Soil	E11051	Co-60	1	pCi/L	335	337	0.99	Agreement
		Ce-141	4	pCi/g	0.31	0.35	0.89	Agreement
		Cr-51	4	pCi/g	0.61	0.648	0.94	Agreement
		Cs-134	4	pCi/g	0.25	0.263	0.95	Agreement
		Cs-137	4	pCi/g	0.36	0.396	0.91	Agreement
		Co-58	4	pCi/g	0.19	0.208	0.91	Agreement
		Mn-54	4	pCi/g	0.35	0.36	0.97	Agreement
		Fe-59	4	pCi/g	0.27	0.279	0.97	Agreement
		Zn-65	4	pCi/g	0.46	0.474	0.97	Agreement
Co-60	4	pCi/g	0.34	0.375	0.91	Agreement		

# TABLE 5.0-C

## ENVIRONMENTAL RESOURCE ASSOCIATES (ERA) PROFICIENCY TESTING

### 2014 Proficiency Test Results for EnRad Laboratories

North Carolina Department of Health and Human Services Laboratory Certification  
EnRad Laboratories

Proficiency test samples are received, prepared, and analyzed in second and fourth quarters of 2014. Results are reported directly to Environmental Resource Associates as described in the instruction package within the study period. Proficiency test data are reported to ERA for evaluation. The acceptance criteria for the program was based on the National Environmental Laboratory Accreditation Conference (NELAC) Field of Proficiency Testing criteria. Fourteen results were reported of which 14 (100 %) met the acceptance criteria. ERA reports proficiency test results to the North Carolina Department of Health and Human Services, North Carolina Public Drinking Water Laboratory Certification Program. This testing is to satisfy the North Carolina state drinking water radiochemistry certification requirements.

Sample	Sample ID	Nuclide	Quarter	Units	EnRad Value	ERA Value	Acceptance Limits	Evaluation
Gamma Emitters in Water	RAD-97	Ba-133	2	pCi/L	87.51	87.9	74.0 - 96.7	Agreement
		Cs-134	2	pCi/L	41.01	44.3	35.5 - 48.7	Agreement
		Cs-137	2	pCi/L	85.47	89.1	80.2 - 101	Agreement
		Co-60	2	pCi/L	62.75	64.2	57.8 - 73.1	Agreement
		Zn-65	2	pCi/L	249.8	235	212 - 275	Agreement
Gamma Emitters in Water	RAD-99	Ba-133	4	pCi/L	46.9	49.1	40.3 - 54.5	Agreement
		Cs-134	4	pCi/L	81.7	89.8	73.7 - 98.8	Agreement
		Cs-137	4	pCi/L	96.9	98.8	88.9 - 111	Agreement
		Co-60	4	pCi/L	91	92.1	82.9 - 104	Agreement
		Zn-65	4	pCi/L	335	310	279 - 362	Agreement
Tritium in Water	RAD-97	H-3	2	pCi/L	8680	8770	7610 - 9650	Agreement
	RAD-99	H-3	4	pCi/L	6290	6880	5940 - 7570	Agreement
Iodine-131 in Water	RAD-97	I-131	2	pCi/L	25.9	25.7	21.3 - 30.3	Agreement
	RAD-99	I-131	4	pCi/L	20.4	20.3	16.8 - 24.4	Agreement

# TABLE 5.0-D

## 2014 ENVIRONMENTAL DOSIMETER CROSS-CHECK RESULTS

### Nuclear Technology Services

Radiation Dosimetry and Records participates in a quarterly TLD intercomparison program administered by Nuclear Technology Services, Inc. of Roswell, GA. Nuclear Technology Services irradiates environmental dosimeters quarterly and sends them to the Radiation Dosimetry and Records group for analysis of the unknown estimated delivered exposure. The individual measurements were evaluated and results falling outside the acceptable ratio criteria had an evaluation performed to identify any recommended remedial actions and to reduce anomalous errors. Complete documentation of any evaluation will be available and provided to the NRC upon request.

1st Quarter 2014						2nd Quarter 2014					
TLD Number	Reported (mR)	Delivered (mR)	Bias (% diff)	Pass/Fail Criteria	Pass/Fail	TLD Number	Reported (mR)	Delivered (mR)	Bias (% diff)	Pass/Fail Criteria	Pass/Fail
102403	93.2	90.40	3.12	<+/-15%	Pass	102196	18.07	18.66	-3.16	<+/-15%	Pass
103045	99.3	90.40	9.87	<+/-15%	Pass	102193	19.44	18.66	4.18	<+/-15%	Pass
103009	101.0	90.40	11.76	<+/-15%	Pass	102192	17.28	18.66	-7.40	<+/-15%	Pass
102243	90.3	90.40	-0.09	<+/-15%	Pass	102176	17.70	18.66	-5.14	<+/-15%	Pass
102858	97.9	90.40	8.33	<+/-15%	Pass	102175	18.66	18.66	0.00	<+/-15%	Pass
Average Bias (B)			6.60			Average Bias (B)			-2.30		
Standard Deviation (S)			4.93			Standard Deviation (S)			4.53		
Measure Performance  B +S			11.53	<15%	Pass	Measure Performance  B +S			6.83	<15%	Pass
3rd Quarter 2014						4th Quarter 2014					
TLD Number	Reported (mR)	Delivered (mR)	Bias (% diff)	Pass/Fail Criteria	Pass/Fail	TLD Number	Reported (mR)	Delivered (mR)	Bias (% diff)	Pass/Fail Criteria	Pass/Fail
103705	70.04	69.7	0.49	<+/-15%	Pass	101241	84.63	77.7	8.92	<+/-15%	Pass
103704	69.36	69.7	-0.49	<+/-15%	Pass	103494	87.46	77.7	12.56	<+/-15%	Pass
103686	71.90	69.7	3.16	<+/-15%	Pass	103229	88.45	77.7	13.84	<+/-15%	Pass
103685	72.82	69.7	4.48	<+/-15%	Pass	103493	89.19	77.7	14.79	<+/-15%	Pass
103517	73.71	69.7	5.75	<+/-15%	Pass	103044	91.02	77.7	17.14	<+/-15%	**Fail
Average Bias (B)			2.68			Average Bias (B)			13.45		
Standard Deviation (S)			2.63			Standard Deviation (S)			3.04		
Measure Performance  B +S			5.31	<15%	Pass	Measure Performance  B +S			16.49	<15%	**Fail

\*\*Refer to PIP G-15-00554

# TABLE 5.0-D (Cont.)

## Internal Crosscheck (Duke Energy)

Radiation Dosimetry and Records participates in a quarterly TLD intracomparison program administered internally by the Dosimetry Lab. The Dosimetry Lab Staff irradiates environmental dosimeters quarterly and submits them for analysis of the unknown estimated delivered exposure.

1st Quarter 2014						2nd Quarter 2014					
TLD Number	Reported (mR)	Delivered (mR)	Bias (% diff)	Pass/Fail Criteria	Pass/Fail	TLD Number	Reported (mR)	Delivered (mR)	Bias (% diff)	Pass/Fail Criteria	Pass/Fail
101221	30.14	32.7	-7.83	<+/-15%	Pass	103635	22.36	21.8	2.57	<+/-15%	Pass
102801	32.82	32.7	0.37	<+/-15%	Pass	102777	22.93	21.8	5.18	<+/-15%	Pass
100019	30.32	32.7	-7.28	<+/-15%	Pass	103181	22.78	21.8	4.50	<+/-15%	Pass
103173	32.14	32.7	-1.71	<+/-15%	Pass	103218	22.82	21.8	4.68	<+/-15%	Pass
100085	30.90	32.7	-5.50	<+/-15%	Pass	103657	22.29	21.8	2.25	<+/-15%	Pass
101024	30.92	32.7	-5.44	<+/-15%	Pass	102927	21.90	21.8	0.46	<+/-15%	Pass
100350	30.73	32.7	-6.02	<+/-15%	Pass	103396	21.54	21.8	-1.19	<+/-15%	Pass
102359	30.71	32.7	-6.09	<+/-15%	Pass	102723	22.84	21.8	4.77	<+/-15%	Pass
103174	30.26	32.7	-7.46	<+/-15%	Pass	103394	22.47	21.8	3.07	<+/-15%	Pass
101376	31.49	32.7	-3.70	<+/-15%	Pass	103058	22.36	21.8	2.57	<+/-15%	Pass
Average Bias (B)			-5.07			Average Bias (B)			2.89		
Standard Deviation (S)			2.65			Standard Deviation (S)			2.05		
Measure Performance  B +S			7.72	<15%	Pass	Measure Performance  B +S			4.93	<15%	Pass
3rd Quarter 2014						4th Quarter 2014					
TLD Number	Reported (mR)	Delivered (mR)	Bias (% diff)	Pass/Fail Criteria	Pass/Fail	TLD Number	Reported (mR)	Delivered (mR)	Bias (% diff)	Pass/Fail Criteria	Pass/Fail
102737	47.05	43.6	7.91	<+/-15%	Pass	102768	57.48	54.5	5.47	<+/-15%	Pass
102750	46.06	43.6	5.64	<+/-15%	Pass	103263	55.38	54.5	1.61	<+/-15%	Pass
102773	48.32	43.6	10.83	<+/-15%	Pass	103453	56.30	54.5	3.30	<+/-15%	Pass
102824	45.81	43.6	5.07	<+/-15%	Pass	102746	54.25	54.5	-0.46	<+/-15%	Pass
102397	44.38	43.6	1.79	<+/-15%	Pass	103656	56.09	54.5	2.92	<+/-15%	Pass
102832	46.37	43.6	6.35	<+/-15%	Pass	102482	53.50	54.5	-1.83	<+/-15%	Pass
102725	47.00	43.6	7.80	<+/-15%	Pass	103446	54.71	54.5	0.39	<+/-15%	Pass
102481	45.21	43.6	3.69	<+/-15%	Pass	103339	53.55	54.5	-1.74	<+/-15%	Pass
102758	45.97	43.6	5.44	<+/-15%	Pass	103582	53.97	54.5	-0.97	<+/-15%	Pass
103120	46.87	43.6	7.50	<+/-15%	Pass	103288	55.43	54.5	1.71	<+/-15%	Pass
Average Bias (B)			6.20			Average Bias (B)			1.04		
Standard Deviation (S)			2.51			Standard Deviation (S)			2.40		
Measure Performance  B +S			8.71	<15%	Pass	Measure Performance  B +S			3.44	<15%	Pass



**APPENDIX A**

**ENVIRONMENTAL SAMPLING**  
**&**  
**ANALYSIS PROCEDURES**

---

# APPENDIX A

---

## ENVIRONMENTAL SAMPLING AND ANALYSIS PROCEDURES

Adherence to established procedures for sampling and analysis of all environmental media at Catawba Nuclear Station was required to ensure compliance with Station Selected Licensee Commitments. Analytical procedures were employed to ensure that Selected Licensee Commitments detection capabilities were achieved.

Environmental sampling and analyses were performed by EnRad Laboratories, Dosimetry and Records, Fisheries and Aquatic Ecology.

This appendix describes the environmental sampling frequencies and analysis procedures by media type.

### I. CHANGE OF SAMPLING PROCEDURES

Indicator location 208 (AP/AR) and indicator location 261 (AP/AR) added to the program as replacement locations for indicator location 205 (AP/AR), which was removed from the program (PIP C-12-08826, PIP G-14-02551).

Indicator location 205 (TLD) was relocated (PIP G-14-02551).

Indicator location 254 (Ground Water) removed from the program (PIP G-14-02551).

### II. DESCRIPTION OF ANALYSIS PROCEDURES

Gamma spectroscopy analyses are performed using high purity germanium gamma detectors and Canberra analytical software. Designated sample volumes are transferred to appropriate counting geometries and analyzed by gamma spectroscopy. Perishable samples such as fish and broadleaf vegetation are ground to achieve a homogeneous mixture. Soils and sediments are dried, sifted to remove foreign objects (rocks, clams, glass, etc.) then transferred to appropriate counting geometry.

Low-level iodine analyses are performed by passing a designated sample aliquot through a pre-weighed amount of ion exchange resin to remove and concentrate any iodine in the aqueous sample (milk). The resin is then dried, mixed thoroughly, and a net resin weight determined before being transferred to appropriate counting geometry and analyzed by gamma spectroscopy.

Tritium analyses are performed quarterly by using low-level environmental liquid scintillation analysis technique on a Packard 2550 liquid scintillation system or Perkin-

Elmer 2900TR liquid scintillation system. Tritium samples are distilled and batch processed with a laboratory fortified blank, matrix spike, matrix spike duplicate, and blank to verify instrument performance and sample preparation technique are acceptable.

Gross beta analysis is performed by concentrating a designated aliquot of sample precipitate and analyzing by Tennelec XLB Series 5 gas-flow proportional counters. Samples are batch processed with a blank to ensure sample contamination has not occurred.

### **III. CHANGE OF ANALYSIS PROCEDURES**

REMP analytical results reporting with 2 Sigma error was initiated during 2014, replacing the 1 Sigma error reporting (PIP G-14-01981).

Low-level Iodine-131 (LLI-131) test components were modified to include only the LLI-131 component; all other components such as Beryllium-7 and Potassium-40 were removed (PIP G-14-02526).

Gamma spectroscopy milk Iodine-131 MDA requirement was removed from the "GAMMAMILK" analysis as the required low-level Iodine-131 (LLI-131) requirement is satisfied by the "GAMMALLI" LLI-131 preparation and testing procedure and gamma spectroscopy analysis (PIP G-14-02692).

The gamma spectroscopy system was replaced during 2014 (10JUL2014). Gamma spectroscopy system hardware, detector cooling apparatus, software, electronics, nuclide identification libraries, and analytical test matrix components for test matrices were modified (PIP G-15-000625).

### **IV. SAMPLING AND ANALYSIS PROCEDURES**

#### **A.1 AIRBORNE PARTICULATE AND RADIOIODINE**

Airborne particulate and radioiodine samples at each of six locations were composited continuously by means of continuous air samplers. Air particulates were collected on a particulate filter and radioiodines were collected in a charcoal cartridge positioned behind the filter in the sampler. The samplers are designed to operate at a constant flow rate (in order to compensate for any filter loading) and are set to sample approximately 2 cubic feet per minute. Filters and cartridges were collected weekly. A separate weekly gamma analysis was performed on each charcoal cartridge. A weekly gross beta analysis was performed on each filter. A quarterly gamma analysis was performed on the quarterly filter composite (by location). The continuous composite samples were collected from the locations listed below.

Location 200 = Site Boundary (0.63 mi. NNE)

Location 201 = Site Boundary (0.53 mi. NE)  
Location 208 = Discharge Canal (0.45 mi. S)  
Location 212 = Tega Cay (3.32 mi. E)  
Location 258 = Fairhope Road (9.84 mi. W)(Control)  
Location 261 = Site Boundary (0.72 mi. N)

## **A.2 DRINKING WATER**

Monthly composite drinking water samples were collected at each of two locations. A gross beta and gamma analysis was performed on monthly composites. Tritium analysis was performed on the quarterly composites. The composites were collected monthly from the locations listed below.

Location 214 = Rock Hill Water Supply (7.30 mi. SSE)  
Location 218 = Belmont Water Supply (13.5 mi. NNE)(Control)

## **A.3 SURFACE WATER**

Monthly composite samples were collected at each of three locations. A gamma analysis was performed on the monthly composites. Tritium analysis was performed on the quarterly composites. The composites were collected monthly from the locations listed below.

Location 208 = Discharge Canal (0.45 mi. S)  
Location 211 = Wylie Dam (4.06 mi. ESE)  
Location 215 = River Pointe - Hwy 49 (4.21 mi. NNE)(Control)

## **A.4 GROUND WATER**

Grab samples were collected quarterly from a residential well at one location. A gamma analysis and tritium analysis were performed on each sample. The samples were collected from the location listed below.

Location 254 = Residence (0.82 mi. N)

## **A.5 MILK**

Biweekly grab samples were collected at one location. A gamma and low-level Iodine-131 analysis was performed on each sample. The biweekly grab samples were collected from the location listed below.

Location 221 = Dairy (14.5 mi. NW)(Control)

## **A.6 BROADLEAF VEGETATION**

Monthly samples were collected at each of five locations. A gamma analysis was performed on each sample. The samples were collected from the locations listed below.

Location 200 = Site Boundary (0.63 mi. NNE)  
Location 201 = Site Boundary (0.53 mi. NE)  
Location 222 = Site Boundary (0.70 mi. N)  
Location 226 = Site Boundary (0.48 mi. S)  
Location 258 = Fairhope Road (9.84 mi. W)(Control)

## **A.7 FOOD PRODUCTS**

Monthly samples were collected when available during the harvest season at one location. A gamma analysis was performed on each sample. The samples were collected from the location listed below.

Location 260 = Irrigated Gardens (2.00 mi. SSE)

## **A.8 FISH**

Semiannual samples were collected at each of two locations. A gamma analysis was performed on the edible portions of each sample. Boney fish (i.e. Sunfish) were prepared whole minus the head and tail portions. The samples were collected from the locations listed below.

Location 208 = Discharge Canal (0.45 mi. S)  
Location 216 = Hwy 49 Bridge (4.19 mi. NNE)(Control)

## **A.9 SHORELINE SEDIMENT**

Semiannual samples were collected at each of three locations. A gamma analysis was performed on each sample following the drying and removal of rocks and clams. The samples were collected from the locations listed below.

Location 208 = Discharge Canal (0.45 mi. S)  
Location 210 = Ebenezer Access (2.31 mi. SE)  
Location 215 = River Pointe - Hwy 49 (4.21 mi. NNE)(Control)

#### **A.10 DIRECT GAMMA RADIATION (TLD)**

Thermoluminescent dosimeters (TLD) were collected quarterly at forty-one locations. A gamma exposure rate was determined for each TLD. TLD locations are listed in Table 2.1-B. The TLDs were placed as indicated below.

- \* An inner ring of 16 TLDs, one in each meteorological sector in the general area of the site boundary.
- \* An outer ring of 16 TLDs, one in each meteorological sector in the 6 to 8 kilometer range.
- \* The remaining TLDs were placed in special interest areas such as population centers, residential areas, schools, and at three control locations.

#### **A.11 ANNUAL LAND USE CENSUS**

An Annual Land Use Census was conducted to identify within a distance of 8 kilometers (5.0 miles) from the station, the nearest location from the site boundary in each of the sixteen meteorological sectors, the following:

- \* The Nearest Residence
- \* The Nearest Garden greater than 50 square meters or 500 square feet
- \* The Nearest Milk-giving Animal (cow, goat, etc.)

The census was conducted during the growing season from 7/9 – 7/10/2014. Results are shown in Table 3.11. No changes were made to the sampling procedures during 2014 as a result of the 2014 census.

### **V. GLOBAL POSITIONING SYSTEM (GPS) ANALYSIS**

The Catawba site centerline used for GPS measurements was referenced from the Catawba Nuclear Station Updated Final Safety Analysis Report (UFSAR), section 2.1.1.1, Specification of Location. Waypoint coordinates used for CNS GPS measurements were latitude 35°-3'-5"N and longitude 81°-4'-10"W. Maps and tables were generated using North American Datum (NAD) 27. Data normally reflect accuracy to within 2 to 5 meters from point of measurement. All GPS field measurements were taken as close as possible to the item of interest. Distances for the locations are displayed using three significant figures.

**APPENDIX B**

**RADIOLOGICAL  
ENVIRONMENTAL MONITORING  
PROGRAM**

**SUMMARY OF RESULTS**

**2014**

**CATAWBA NUCLEAR STATION  
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM DATA SUMMARY**

Catawba Nuclear Station  
York County, South Carolina

Docket Numbers 50-413, 414  
Calendar Year 2014

Medium or Pathway Sampled or Measured (Unit of Measurement)	Type and Total No. of Measurements Performed	Lower Limit of Detection (LLD) <sup>(1)</sup>	All Indicator Locations <sup>(2) (3)</sup> Mean Range	Location w/Highest Annual Mean		Control Locations Mean Range <sup>(2) (3)</sup>	No. of Non-Routine Report Meas.
				Name, Distance, and Direction	Mean Range <sup>(2) (3)</sup>		
Air Particulate (pCi/m <sup>3</sup> )	Gross Beta 312	See Table 2.2-C	1.95E-2 (260/260) 8.29E-3 – 2.95E-2	208 (0.45 mi S)	1.99E-2 (52/52) 1.05E-2 – 2.88E-2	258 (9.84 mi W) 1.81E-2 (52/52) 6.09E-3 – 2.73E-2	0
	Gamma 24	See Table 2.2-C	All less than LLD	-----	-----	All less than LLD	0
Air Radioiodine (pCi/m <sup>3</sup> )	Gamma 312	See Table 2.2-C	All less than LLD	-----	-----	All less than LLD	0
Drinking Water (pCi/l)	Gross Beta 26	4	1.96 (13/13) 0.95 – 2.81	214 (7.30 mi SSE)	1.96 (13/13) 0.95 – 2.81	218 (13.5 mi NNE) 1.79 (13/13) 0.88 – 2.68	0
	Gamma 26	See Table 2.2-C	All less than LLD	-----	-----	All less than LLD	0
	Tritium 8	2000	821 (4/4) 497 - 1130	214 (7.30 mi SSE)	821 (4/4) 497 - 1130	218 (13.5 mi NNE) 437 (4/4) 380 – 518	0
Surface Water (pCi/l)	Gamma 39 Co-58	See Table 2.2-C	7.23 (2/26) 6.53 – 7.93	208 (0.45 mi S)	7.23 (2/13) 6.53 – 7.93	All less than LLD	0
	Co-60	See Table 2.2-C	4.69 (2/26) 3.24 – 6.14	208 (0.45 mi S)	4.69 (2/13) 3.24 – 6.14	All less than LLD	0
	Tritium 12	2000	4220 (8/8) 404 - 16100	208 (0.45 mi S)	7785 (4/4) 3430 - 16100	215 (4.21 mi NNE) 418 (3/4) 360 – 448	0



**CATAWBA NUCLEAR STATION  
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM DATA SUMMARY**

Catawba Nuclear Station  
York County, South Carolina

Docket Numbers 50-413, 414  
Calendar Year 2014

Medium or Pathway Sampled or Measured (Unit of Measurement)	Type and Total No. of Measurements Performed	Lower Limit of Detection (LLD) <sup>(1)</sup>	All Indicator Locations <sup>(2) (3)</sup> Mean Range	Location w/Highest Annual Mean		Control Locations Mean Range <sup>(2) (3)</sup>	No. of Non-Routine Report Meas.
				Name, Distance, and Direction	Mean Range <sup>(2) (3)</sup>		
Ground Water (pCi/l)	Gamma 2 <sup>(4)</sup>	See Table 2.2-C	All less than LLD	----	----	No Control Location	0
	Tritium 2 <sup>(4)</sup>	2000	All less than LLD	----	----	No Control Location	0
Milk (pCi/l)	Gamma 26	See Table 2.2-C	No Indicator Location	----	----	All less than LLD	0
	I-131 26	See Table 2.2-C	No Indicator Location	----	----	All less than LLD	0
Broadleaf Vegetation (pCi/kg, wet)	Gamma 60 Cs-137	See Table 2.2-C	37.2 (6/48) 17.2 – 58.6	201 (0.53 mi NE)	37.2 (6/12) 17.2 – 58.6	All less than LLD	0
Food Products (pCi/kg, wet)	Gamma 12	See Table 2.2-C	All less than LLD	----	----	No Control Location	0
Fish (pCi/kg, wet)	Gamma 12 Cs-137	See Table 2.2-C	11.0 (1/6) 11.0 – 11.0	208 (0.45 mi S)	11.0 (1/6) 11.0 – 11.0	All less than LLD	0
Sediments--Shoreline (pCi/kg, dry)	Gamma 6 Mn-54	See Table 2.2-C	68.4 (1/4) 68.4 – 68.4	208 (0.45 mi S)	68.4 (1/2) 68.4 – 68.4	All less than LLD	0
	Co-58	See Table 2.2-C	887 (1/4) 887 – 887	208 (0.45 mi S)	887 (1/2) 887 – 887	All less than LLD	0

*Shoreline Sediment  
continued on next page*

**CATAWBA NUCLEAR STATION  
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM DATA SUMMARY**

Catawba Nuclear Station  
York County, South Carolina

Docket Numbers 50-413, 414  
Calendar Year 2014

Medium or Pathway Sampled or Measured (Unit of Measurement)	Type and Total No. of Measurements Performed	Lower Limit of Detection (LLD) <sup>(1)</sup>	All Indicator Locations <sup>(2) (3)</sup> Mean Range	Location w/Highest Annual Mean		Control Locations Mean Range <sup>(2) (3)</sup>	No. of Non-Routine Report Meas.
				Name, Distance, and Direction	Mean Range <sup>(2) (3)</sup>		
Sediments--Shoreline (pCi/kg, dry)	Gamma 6 Co-60	See Table 2.2-C	790 (1/4) 790 – 790	208 (0.45 mi S)	790 (1/2) 790 - 790	All less than LLD	0
	Cs-137	See Table 2.2-C	24.6 (1/4) 24.6 – 24.6	208 (0.45 mi S)	24.6 (1/2) 24.6 – 24.6	All less than LLD	0
TLD (mR per quarter) <sup>(5)</sup>	TLD Readout 163 <sup>(4)</sup>	-----	17.8 (151/151) 10.8 – 27.9	237 (4.75 mi SSE)	22.5 (4/4) 17.8 – 27.8	217 (10.3 mi SSE) 247 (7.33 mi ESE) 251 (9.72 mi WNW)  14.2 (12/12) 10.6 – 19.2	0

## Footnotes to Appendix B

1. The Lower Limit of Detection (LLD) is the smallest concentration of radioactive material in a sample that will yield a net count above system background which will be detected with 95 percent probability and with only 5 percent probability of falsely concluding that a blank observation represents a "real" signal. Due to counting statistics and varying volumes, occasionally lower LLDs are achieved. Refer to Section 2.3.2 for an explanation of how LLD values were derived.
2. Mean and range are based on detectable measurements only.
3. The fractions of all samples with detectable activities at specific locations are indicated in parentheses.
4. Missing samples or surveillances are discussed in Appendix C or Appendix D.
5. TLD exposure is reported in milliroentgen (mR) per standard quarter (91 days). TLD data indicated in section 3.10 (Direct Gamma Radiation) are reported in mrem /yr ( $n * 0.95$ ).

**APPENDIX C**

**SAMPLING DEVIATIONS  
&  
UNAVAILABLE ANALYSES**

# APPENDIX C

## CATAWBA NUCLEAR STATION SAMPLING DEVIATIONS & UNAVAILABLE ANALYSES

DEVIATION & UNAVAILABLE REASON CODES			
BF	Blown Fuse	PO	Power Outage
FZ	Sample Frozen	PS	Pump out of service / Undergoing Repair
IW	Inclement Weather	SL	Sample Loss/Lost due to Lab Accident
LC	Line Clog to Sampler	SM	Motor / Rotor Seized
OT	Other	TF	Torn Filter
PI	Power Interrupt	VN	Vandalism
PM	Preventive Maintenance	CN	Construction

### C.1 SAMPLING DEVIATIONS

#### Air Particulate and Air Radioiodine

Location	Scheduled Collection Dates	Actual Collection Dates	Code	Description & Action to Prevent Recurrence	Corrective Action Identity
208	7/29 – 8/5/2014 8/5 – 8/12/2014	7/29 – 8/1/2014 8/6 – 8/12/2014	PO	Power interrupted for about 129 hours to sampling equipment due to fallen tree. CNS maintenance removed fallen tree and restored power to sampling equipment.	G-14-01749 G-14-01807

#### Drinking Water

Location	Scheduled Collection Dates	Actual Collection Dates	Code	Description & Action to Prevent Recurrence	Corrective Action Identity
218	9/16 – 10/14/2014	9/16 – 10/14/2014	OT	Sample pump tubing failed causing downtime of about 2.32 hours. Tubing replaced, sampler returned to operation.	G-14-02392

### C.2 UNAVAILABLE ANALYSES

#### Ground Water

Location	Scheduled Collection Dates	Code	Description & Action to Prevent Recurrence	Corrective Action Identity
254	9/16/2014 12/9/2014	OT	Location no longer available due to residential owner actions. All existing structures, including well house cleared from property.	G-14-01973

## TLD

Location	Scheduled Collection Dates	Code	Description & Action to Prevent Recurrence	Corrective Action Identity
239	6/9 – 9/18/2014	VN	TLD missing at time of collection.	G-15-00230

**APPENDIX D**

**ANALYTICAL DEVIATIONS**

No Analytical deviations were incurred for the  
2014 Radiological Environmental Monitoring Program

**APPENDIX E**

**RADIOLOGICAL  
ENVIRONMENTAL MONITORING  
PROGRAM RESULTS**

**2014**

This appendix includes sample analysis report summaries and supportive data generated from each sample medium for 2014.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR PARTICULATE Concentration (Activity): pCi/m3

Sample Point 200 [ INDICATOR - NNE @ 0.63 miles ]

Sample ID	Sample Dates	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
280737	12/31/2013 - 1/7/2014	Beta	1.60E-02	1.35E-03	3.03E-03
280920	1/7/2014 - 1/14/2014	Beta	1.72E-02	1.40E-03	3.11E-03
281300	1/14/2014 - 1/21/2014	Beta	1.69E-02	1.34E-03	2.91E-03
281659	1/21/2014 - 1/28/2014	Beta	1.58E-02	1.35E-03	3.19E-03
282227	1/28/2014 - 2/4/2014	Beta	2.03E-02	1.40E-03	2.82E-03
283089	2/4/2014 - 2/10/2014	Beta	1.78E-02	1.51E-03	3.38E-03
283471	2/10/2014 - 2/18/2014	Beta	2.22E-02	1.37E-03	2.60E-03
284658	2/18/2014 - 2/25/2014	Beta	1.60E-02	1.29E-03	2.78E-03
285220	2/25/2014 - 3/4/2014	Beta	2.42E-02	1.52E-03	2.90E-03
285827	3/4/2014 - 3/11/2014	Beta	1.86E-02	1.38E-03	2.79E-03
286342	3/11/2014 - 3/18/2014	Beta	1.50E-02	1.29E-03	2.88E-03
287190	3/18/2014 - 3/25/2014	Beta	1.42E-02	1.26E-03	2.83E-03
288447	3/25/2014 - 4/1/2014	Beta	1.49E-02	1.37E-03	3.31E-03
289023	12/31/2013 - 4/1/2014	Cs-134	<3.41E-04	0.00E+00	3.41E-04
		Cs-137	<3.62E-04	0.00E+00	3.62E-04
		Be-7	1.34E-01	6.29E-03	5.69E-03
		K-40	7.60E-03	3.28E-03	5.82E-03
289181	4/1/2014 - 4/8/2014	Beta	1.77E-02	1.38E-03	2.95E-03
289567	4/8/2014 - 4/15/2014	Beta	1.64E-02	1.30E-03	2.73E-03
290049	4/15/2014 - 4/22/2014	Beta	1.92E-02	1.46E-03	3.19E-03
292130	4/22/2014 - 4/29/2014	Beta	2.05E-02	1.48E-03	3.16E-03
292860	4/29/2014 - 5/6/2014	Beta	1.79E-02	1.44E-03	3.25E-03
293131	5/6/2014 - 5/13/2014	Beta	2.87E-02	1.61E-03	2.86E-03
294773	5/13/2014 - 5/20/2014	Beta	2.02E-02	1.43E-03	2.94E-03
295299	5/20/2014 - 5/28/2014	Beta	2.31E-02	1.42E-03	2.87E-03

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR PARTICULATE Concentration (Activity): pCi/m3

Sample Point 200 [ INDICATOR - NNE @ 0.63 miles ]

Sample ID	Sample Dates	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
295623	5/28/2014 - 6/3/2014	Beta	1.77E-02	1.61E-03	3.84E-03
296025	6/3/2014 - 6/10/2014	Beta	1.43E-02	1.31E-03	3.07E-03
296290	6/10/2014 - 6/17/2014	Beta	2.08E-02	1.42E-03	2.76E-03
296820	6/17/2014 - 6/24/2014	Beta	2.24E-02	1.46E-03	2.82E-03
297095	6/24/2014 - 7/1/2014	Beta	1.65E-02	1.35E-03	3.03E-03
297287	4/1/2014 - 7/1/2014	Cs-134	<6.67E-04	0.00E+00	6.67E-04
		Cs-137	<9.80E-04	0.00E+00	9.80E-04
		Be-7	1.47E-01	4.87E-02	1.09E-02
		K-40	<1.44E-02	0.00E+00	1.44E-02
297450	7/1/2014 - 7/8/2014	Beta	1.83E-02	2.81E-03	3.14E-03
297705	7/8/2014 - 7/15/2014	Beta	2.19E-02	2.93E-03	3.09E-03
350510	7/15/2014 - 7/22/2014	Beta	1.31E-02	2.50E-03	3.06E-03
350511	7/22/2014 - 7/29/2014	Beta	1.86E-02	2.78E-03	3.05E-03
350955	7/29/2014 - 8/5/2014	Beta	1.67E-02	2.70E-03	3.09E-03
351202	8/5/2014 - 8/12/2014	Beta	2.34E-02	3.01E-03	3.13E-03
351508	8/12/2014 - 8/19/2014	Beta	2.02E-02	2.96E-03	3.38E-03
353370	8/19/2014 - 8/26/2014	Beta	1.98E-02	2.78E-03	2.87E-03
353940	8/26/2014 - 9/3/2014	Beta	1.77E-02	2.50E-03	2.69E-03
354385	9/3/2014 - 9/9/2014	Beta	8.67E-03	2.69E-03	3.83E-03
354701	9/9/2014 - 9/16/2014	Beta	1.36E-02	2.43E-03	2.85E-03
355030	9/16/2014 - 9/23/2014	Beta	2.85E-02	3.27E-03	3.27E-03
355560	9/23/2014 - 9/30/2014	Beta	1.62E-02	2.56E-03	2.79E-03
355566	7/1/2014 - 9/30/2014	Cs-134	<7.10E-04	0.00E+00	7.10E-04
		Cs-137	<7.34E-04	0.00E+00	7.34E-04
		Be-7	1.07E-01	2.86E-02	3.56E-02
		K-40	9.90E-03	7.31E-03	9.22E-03
356387	9/30/2014 - 10/7/2014	Beta	2.70E-02	3.09E-03	2.94E-03

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR PARTICULATE Concentration (Activity): pCi/m3

Sample Point 200 [ INDICATOR - NNE @ 0.63 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
356971	10/7/2014 - 10/14/2014	Beta	2.23E-02	2.85E-03	2.79E-03
357977	10/14/2014 - 10/21/2014	Beta	1.40E-02	2.53E-03	3.00E-03
358600	10/21/2014 - 10/28/2014	Beta	1.97E-02	2.86E-03	3.16E-03
359204	10/28/2014 - 11/4/2014	Beta	2.43E-02	2.99E-03	2.96E-03
359959	11/4/2014 - 11/11/2014	Beta	2.33E-02	2.88E-03	2.76E-03
360650	11/11/2014 - 11/18/2014	Beta	1.90E-02	2.89E-03	3.30E-03
361518	11/18/2014 - 11/25/2014	Beta	2.36E-02	3.14E-03	3.45E-03
361903	11/25/2014 - 12/2/2014	Beta	1.73E-02	2.65E-03	2.92E-03
362712	12/2/2014 - 12/9/2014	Beta	1.94E-02	2.84E-03	3.12E-03
363461	12/9/2014 - 12/16/2014	Beta	2.24E-02	2.92E-03	2.92E-03
363913	12/16/2014 - 12/23/2014	Beta	2.23E-02	2.94E-03	3.00E-03
364428	12/23/2014 - 12/30/2014	Beta	1.32E-02	2.39E-03	2.76E-03
364434	9/30/2014 - 12/30/2014	Cs-134	<9.50E-04	0.00E+00	9.50E-04
		Cs-137	<1.01E-03	0.00E+00	1.01E-03
		Be-7	1.09E-01	2.23E-02	1.83E-02
		K-40	1.56E-02	7.70E-03	2.49E-03

## Sample Point 201 [ INDICATOR - NE @ 0.53 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
280712	12/31/2013 - 1/7/2014	Beta	1.59E-02	1.34E-03	3.01E-03
280895	1/7/2014 - 1/14/2014	Beta	1.84E-02	1.42E-03	3.09E-03
281275	1/14/2014 - 1/21/2014	Beta	1.35E-02	1.25E-03	2.91E-03
281634	1/21/2014 - 1/28/2014	Beta	1.87E-02	1.47E-03	3.38E-03
282202	1/28/2014 - 2/4/2014	Beta	1.91E-02	1.38E-03	2.83E-03
283064	2/4/2014 - 2/10/2014	Beta	1.70E-02	1.49E-03	3.39E-03
283446	2/10/2014 - 2/18/2014	Beta	2.26E-02	1.38E-03	2.60E-03
284633	2/18/2014 - 2/25/2014	Beta	1.78E-02	1.35E-03	2.81E-03
285195	2/25/2014 - 3/4/2014	Beta	2.47E-02	1.52E-03	2.89E-03

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR PARTICULATE Concentration (Activity): pCi/m3

Sample Point 201 [ INDICATOR - NE @ 0.53 miles ]

Sample ID	Sample Dates	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
285802	3/4/2014 - 3/11/2014	Beta	1.79E-02	1.35E-03	2.76E-03
286317	3/11/2014 - 3/18/2014	Beta	1.36E-02	1.26E-03	2.88E-03
287165	3/18/2014 - 3/25/2014	Beta	1.55E-02	1.30E-03	2.85E-03
288422	3/25/2014 - 4/1/2014	Beta	1.28E-02	1.32E-03	3.30E-03
289024	12/31/2013 - 4/1/2014	Cs-134	<2.68E-04	0.00E+00	2.68E-04
		Cs-137	<2.84E-04	0.00E+00	2.84E-04
		Be-7	1.29E-01	4.68E-03	4.37E-03
		K-40	2.43E-02	2.17E-03	3.16E-03
289156	4/1/2014 - 4/8/2014	Beta	1.54E-02	1.32E-03	2.96E-03
289542	4/8/2014 - 4/15/2014	Beta	1.55E-02	1.28E-03	2.74E-03
290024	4/15/2014 - 4/22/2014	Beta	1.89E-02	1.45E-03	3.21E-03
292105	4/22/2014 - 4/29/2014	Beta	1.96E-02	1.46E-03	3.16E-03
292835	4/29/2014 - 5/6/2014	Beta	1.84E-02	1.45E-03	3.25E-03
293106	5/6/2014 - 5/13/2014	Beta	2.57E-02	1.54E-03	2.85E-03
294748	5/13/2014 - 5/20/2014	Beta	2.43E-02	1.53E-03	2.94E-03
295274	5/20/2014 - 5/28/2014	Beta	2.26E-02	1.41E-03	2.87E-03
295598	5/28/2014 - 6/3/2014	Beta	1.88E-02	1.64E-03	3.84E-03
296000	6/3/2014 - 6/10/2014	Beta	1.27E-02	1.27E-03	3.08E-03
296265	6/10/2014 - 6/17/2014	Beta	1.93E-02	1.38E-03	2.75E-03
296795	6/17/2014 - 6/24/2014	Beta	2.01E-02	1.41E-03	2.83E-03
297070	6/24/2014 - 7/1/2014	Beta	1.72E-02	1.39E-03	3.10E-03
297288	4/1/2014 - 7/1/2014	Cs-134	<5.84E-04	0.00E+00	5.84E-04
		Cs-137	<1.23E-03	0.00E+00	1.23E-03
		Be-7	1.09E-01	3.30E-02	3.49E-02
		K-40	1.67E-02	1.06E-02	4.52E-03
297425	7/1/2014 - 7/8/2014	Beta	1.49E-02	2.64E-03	3.14E-03
297680	7/8/2014 - 7/15/2014	Beta	2.08E-02	2.88E-03	3.08E-03

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR PARTICULATE Concentration (Activity): pCi/m3

Sample Point 201 [ INDICATOR - NE @ 0.53 miles ]

Sample ID	Sample Dates	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
350512	7/15/2014 - 7/22/2014	Beta	1.62E-02	2.65E-03	3.05E-03
350513	7/22/2014 - 7/29/2014	Beta	1.71E-02	2.71E-03	3.04E-03
350956	7/29/2014 - 8/5/2014	Beta	1.40E-02	2.57E-03	3.09E-03
351203	8/5/2014 - 8/12/2014	Beta	2.66E-02	3.15E-03	3.13E-03
351509	8/12/2014 - 8/19/2014	Beta	2.06E-02	2.99E-03	3.39E-03
353371	8/19/2014 - 8/26/2014	Beta	2.22E-02	2.88E-03	2.86E-03
353941	8/26/2014 - 9/3/2014	Beta	1.90E-02	2.56E-03	2.69E-03
354386	9/3/2014 - 9/9/2014	Beta	8.29E-03	2.67E-03	3.83E-03
354702	9/9/2014 - 9/16/2014	Beta	1.28E-02	2.43E-03	2.93E-03
355031	9/16/2014 - 9/23/2014	Beta	2.76E-02	3.23E-03	3.26E-03
355561	9/23/2014 - 9/30/2014	Beta	1.44E-02	2.48E-03	2.79E-03
355567	7/1/2014 - 9/30/2014	Cs-134	<8.12E-04	0.00E+00	8.12E-04
		Cs-137	<9.31E-04	0.00E+00	9.31E-04
		Be-7	1.23E-01	2.35E-02	1.50E-02
		K-40	<1.84E-02	0.00E+00	1.84E-02
356388	9/30/2014 - 10/7/2014	Beta	2.86E-02	3.17E-03	2.96E-03
356972	10/7/2014 - 10/14/2014	Beta	2.52E-02	2.97E-03	2.77E-03
357978	10/14/2014 - 10/21/2014	Beta	1.56E-02	2.61E-03	3.00E-03
358601	10/21/2014 - 10/28/2014	Beta	1.98E-02	2.86E-03	3.15E-03
359205	10/28/2014 - 11/4/2014	Beta	2.58E-02	3.05E-03	2.96E-03
359960	11/4/2014 - 11/11/2014	Beta	2.39E-02	2.92E-03	2.78E-03
360651	11/11/2014 - 11/18/2014	Beta	2.21E-02	3.01E-03	3.28E-03
361519	11/18/2014 - 11/25/2014	Beta	2.49E-02	3.19E-03	3.45E-03
361904	11/25/2014 - 12/2/2014	Beta	1.82E-02	2.70E-03	2.92E-03
362713	12/2/2014 - 12/9/2014	Beta	2.30E-02	3.00E-03	3.13E-03

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR PARTICULATE Concentration (Activity): pCi/m3

Sample Point 201 [ INDICATOR - NE @ 0.53 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
363462	12/9/2014 - 12/16/2014	Beta	2.58E-02	3.02E-03	2.84E-03
363914	12/16/2014 - 12/23/2014	Beta	2.24E-02	2.90E-03	2.93E-03
364429	12/23/2014 - 12/30/2014	Beta	1.58E-02	2.53E-03	2.76E-03
364435	9/30/2014 - 12/30/2014	Cs-134	<1.06E-03	0.00E+00	1.06E-03
		Cs-137	<7.53E-04	0.00E+00	7.53E-04
		Be-7	1.14E-01	2.19E-02	1.48E-02
		K-40	7.04E-03	7.93E-03	1.25E-02

Sample Point 208 [ INDICATOR - S @ 0.45 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
280733	12/31/2013 - 1/7/2014	Beta	1.74E-02	1.38E-03	3.00E-03
280916	1/7/2014 - 1/14/2014	Beta	1.63E-02	1.37E-03	3.09E-03
281296	1/14/2014 - 1/21/2014	Beta	1.61E-02	1.32E-03	2.91E-03
281655	1/21/2014 - 1/28/2014	Beta	1.75E-02	1.44E-03	3.38E-03
282223	1/28/2014 - 2/4/2014	Beta	1.98E-02	1.39E-03	2.83E-03
283085	2/4/2014 - 2/10/2014	Beta	1.66E-02	1.46E-03	3.31E-03
283467	2/10/2014 - 2/18/2014	Beta	2.62E-02	1.45E-03	2.60E-03
284654	2/18/2014 - 2/25/2014	Beta	1.52E-02	1.28E-03	2.80E-03
285216	2/25/2014 - 3/4/2014	Beta	2.54E-02	1.55E-03	2.90E-03
285823	3/4/2014 - 3/11/2014	Beta	1.89E-02	1.37E-03	2.77E-03
286338	3/11/2014 - 3/18/2014	Beta	1.60E-02	1.32E-03	2.88E-03
287186	3/18/2014 - 3/25/2014	Beta	1.48E-02	1.29E-03	2.85E-03
288443	3/25/2014 - 4/1/2014	Beta	1.57E-02	1.39E-03	3.30E-03
289026	12/31/2013 - 4/1/2014	Cs-134	<2.74E-04	0.00E+00	2.74E-04
		Cs-137	<3.68E-04	0.00E+00	3.68E-04
		Be-7	1.42E-01	5.06E-03	4.33E-03
		K-40	9.94E-03	2.38E-03	3.49E-03
289177	4/1/2014 - 4/8/2014	Beta	1.79E-02	1.38E-03	2.95E-03
289563	4/8/2014 - 4/15/2014	Beta	1.85E-02	1.36E-03	2.75E-03
290045	4/15/2014 - 4/22/2014	Beta	2.48E-02	1.58E-03	3.20E-03

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR PARTICULATE Concentration (Activity): pCi/m3

Sample Point 208 [ INDICATOR - S @ 0.45 miles ]

Sample ID	Sample Dates	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
292126	4/22/2014 - 4/29/2014	Beta	1.92E-02	1.45E-03	3.16E-03
292856	4/29/2014 - 5/6/2014	Beta	1.93E-02	1.47E-03	3.24E-03
293127	5/6/2014 - 5/13/2014	Beta	2.84E-02	1.60E-03	2.87E-03
294769	5/13/2014 - 5/20/2014	Beta	2.39E-02	1.52E-03	2.94E-03
295295	5/20/2014 - 5/28/2014	Beta	2.57E-02	1.48E-03	2.87E-03
295619	5/28/2014 - 6/3/2014	Beta	1.88E-02	1.64E-03	3.84E-03
296021	6/3/2014 - 6/10/2014	Beta	1.57E-02	1.35E-03	3.08E-03
296286	6/10/2014 - 6/17/2014	Beta	1.77E-02	1.34E-03	2.75E-03
296816	6/17/2014 - 6/24/2014	Beta	1.99E-02	1.40E-03	2.83E-03
297091	6/24/2014 - 7/1/2014	Beta	1.80E-02	1.41E-03	3.10E-03
297290	4/1/2014 - 7/1/2014	Cs-134	<7.60E-04	0.00E+00	7.60E-04
		Cs-137	<8.03E-04	0.00E+00	8.03E-04
		Be-7	1.40E-01	6.00E-02	1.60E-02
		K-40	<1.72E-02	0.00E+00	1.72E-02
297446	7/1/2014 - 7/8/2014	Beta	1.82E-02	2.79E-03	3.12E-03
297701	7/8/2014 - 7/15/2014	Beta	2.11E-02	2.90E-03	3.09E-03
350514	7/15/2014 - 7/22/2014	Beta	1.67E-02	2.68E-03	3.05E-03
350515	7/22/2014 - 7/29/2014	Beta	1.55E-02	2.63E-03	3.04E-03
350957	7/29/2014 - 8/1/2014	Beta	1.67E-02	5.60E-03	8.02E-03
351204	8/6/2014 - 8/12/2014	Beta	2.29E-02	3.34E-03	3.67E-03
351510	8/12/2014 - 8/19/2014	Beta	2.09E-02	2.99E-03	3.39E-03
353372	8/19/2014 - 8/26/2014	Beta	1.99E-02	2.78E-03	2.86E-03
353942	8/26/2014 - 9/3/2014	Beta	1.81E-02	2.47E-03	2.62E-03
354387	9/3/2014 - 9/9/2014	Beta	1.05E-02	2.73E-03	3.74E-03
354703	9/9/2014 - 9/16/2014	Beta	1.28E-02	2.44E-03	2.93E-03

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR PARTICULATE Concentration (Activity): pCi/m<sup>3</sup>

Sample Point 208 [ INDICATOR - S @ 0.45 miles ]

Sample ID	Sample Dates	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
355033	9/16/2014 - 9/23/2014	Beta	2.84E-02	3.26E-03	3.26E-03
355562	9/23/2014 - 9/30/2014	Beta	1.53E-02	2.52E-03	2.79E-03
355568	7/1/2014 - 9/30/2014	Cs-134	<6.50E-04	0.00E+00	6.49E-04
		Cs-137	<7.24E-04	0.00E+00	7.24E-04
		Be-7	1.30E-01	2.48E-02	1.69E-02
		K-40	1.53E-02	7.79E-03	2.60E-03
356389	9/30/2014 - 10/7/2014	Beta	2.88E-02	3.17E-03	2.96E-03
356973	10/7/2014 - 10/14/2014	Beta	2.45E-02	2.94E-03	2.77E-03
357979	10/14/2014 - 10/21/2014	Beta	1.64E-02	2.65E-03	3.00E-03
358602	10/21/2014 - 10/28/2014	Beta	2.12E-02	2.92E-03	3.15E-03
359206	10/28/2014 - 11/4/2014	Beta	2.55E-02	3.04E-03	2.96E-03
359961	11/4/2014 - 11/11/2014	Beta	2.49E-02	2.96E-03	2.78E-03
360652	11/11/2014 - 11/18/2014	Beta	2.27E-02	2.99E-03	3.20E-03
361520	11/18/2014 - 11/25/2014	Beta	2.34E-02	3.12E-03	3.45E-03
361905	11/25/2014 - 12/2/2014	Beta	1.91E-02	2.74E-03	2.92E-03
362714	12/2/2014 - 12/9/2014	Beta	2.11E-02	2.92E-03	3.13E-03
363463	12/9/2014 - 12/16/2014	Beta	2.45E-02	2.96E-03	2.84E-03
363915	12/16/2014 - 12/23/2014	Beta	2.52E-02	3.02E-03	2.93E-03
364430	12/23/2014 - 12/30/2014	Beta	1.78E-02	2.63E-03	2.76E-03
364436	9/30/2014 - 12/30/2014	Cs-134	<7.87E-04	0.00E+00	7.87E-04
		Cs-137	<1.01E-03	0.00E+00	1.01E-03
		Be-7	9.32E-02	1.97E-02	1.54E-02
		K-40	7.15E-03	7.44E-03	1.13E-02

## Sample Point 212 [ INDICATOR - E @ 3.32 miles ]

Sample ID	Sample Dates	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
280705	12/31/2013 - 1/7/2014	Beta	1.89E-02	1.42E-03	3.01E-03
280888	1/7/2014 - 1/14/2014	Beta	1.49E-02	1.35E-03	3.14E-03
281268	1/14/2014 - 1/21/2014	Beta	1.59E-02	1.31E-03	2.91E-03
281627	1/21/2014 - 1/28/2014	Beta	1.69E-02	1.42E-03	3.35E-03

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.





# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR PARTICULATE Concentration (Activity): pCi/m3

Sample Point 212 [ INDICATOR - E @ 3.32 miles ]

Sample ID	Sample Dates	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
282195	1/28/2014 - 2/4/2014	Beta	1.88E-02	1.36E-03	2.81E-03
283057	2/4/2014 - 2/10/2014	Beta	1.73E-02	1.53E-03	3.48E-03
283439	2/10/2014 - 2/18/2014	Beta	2.61E-02	1.45E-03	2.60E-03
284627	2/18/2014 - 2/25/2014	Beta	1.66E-02	1.30E-03	2.77E-03
285189	2/25/2014 - 3/4/2014	Beta	2.49E-02	1.53E-03	2.89E-03
285796	3/4/2014 - 3/11/2014	Beta	1.65E-02	1.33E-03	2.83E-03
286311	3/11/2014 - 3/18/2014	Beta	1.70E-02	1.34E-03	2.88E-03
287159	3/18/2014 - 3/25/2014	Beta	1.42E-02	1.26E-03	2.83E-03
288416	3/25/2014 - 4/1/2014	Beta	1.47E-02	1.37E-03	3.30E-03
289027	12/31/2013 - 4/1/2014	Cs-134	<3.10E-04	0.00E+00	3.10E-04
		Cs-137	<3.14E-04	0.00E+00	3.14E-04
		Be-7	1.40E-01	6.65E-03	5.81E-03
		K-40	1.99E-02	2.74E-03	2.78E-03
289150	4/1/2014 - 4/8/2014	Beta	1.44E-02	1.30E-03	2.98E-03
289536	4/8/2014 - 4/15/2014	Beta	1.92E-02	1.37E-03	2.74E-03
290018	4/15/2014 - 4/22/2014	Beta	2.13E-02	1.51E-03	3.20E-03
292099	4/22/2014 - 4/29/2014	Beta	1.88E-02	1.44E-03	3.16E-03
292829	4/29/2014 - 5/6/2014	Beta	1.67E-02	1.42E-03	3.26E-03
293100	5/6/2014 - 5/13/2014	Beta	2.73E-02	1.55E-03	2.79E-03
294742	5/13/2014 - 5/20/2014	Beta	2.30E-02	1.50E-03	2.94E-03
295268	5/20/2014 - 5/28/2014	Beta	2.34E-02	1.43E-03	2.85E-03
295592	5/28/2014 - 6/3/2014	Beta	1.40E-02	1.52E-03	3.86E-03
295994	6/3/2014 - 6/10/2014	Beta	1.45E-02	1.32E-03	3.08E-03
296259	6/10/2014 - 6/17/2014	Beta	1.98E-02	1.40E-03	2.76E-03
296789	6/17/2014 - 6/24/2014	Beta	1.97E-02	1.39E-03	2.81E-03

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR PARTICULATE Concentration (Activity): pCi/m<sup>3</sup>

Sample Point 212 [ INDICATOR - E @ 3.32 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
297064	6/24/2014 - 7/1/2014	Beta	1.87E-02	1.45E-03	3.20E-03
297291	4/1/2014 - 7/1/2014	Cs-134	<6.77E-04	0.00E+00	6.77E-04
		Cs-137	<7.18E-04	0.00E+00	7.18E-04
		Be-7	1.43E-01	2.89E-02	1.69E-02
		K-40	8.61E-03	6.55E-03	3.33E-03
297419	7/1/2014 - 7/8/2014	Beta	1.82E-02	2.84E-03	3.21E-03
297674	7/8/2014 - 7/15/2014	Beta	2.03E-02	2.92E-03	3.17E-03
350516	7/15/2014 - 7/22/2014	Beta	1.78E-02	2.71E-03	3.02E-03
350517	7/22/2014 - 7/29/2014	Beta	1.91E-02	2.82E-03	3.07E-03
350958	7/29/2014 - 8/5/2014	Beta	1.65E-02	2.68E-03	3.09E-03
351205	8/5/2014 - 8/12/2014	Beta	2.51E-02	3.09E-03	3.14E-03
351511	8/12/2014 - 8/19/2014	Beta	1.82E-02	2.87E-03	3.37E-03
353373	8/19/2014 - 8/26/2014	Beta	2.12E-02	2.85E-03	2.88E-03
353943	8/26/2014 - 9/3/2014	Beta	1.85E-02	2.52E-03	2.68E-03
354388	9/3/2014 - 9/9/2014	Beta	9.11E-03	2.72E-03	3.84E-03
354704	9/9/2014 - 9/16/2014	Beta	1.51E-02	2.53E-03	2.89E-03
355035	9/16/2014 - 9/23/2014	Beta	2.83E-02	3.30E-03	3.31E-03
355563	9/23/2014 - 9/30/2014	Beta	1.61E-02	2.56E-03	2.79E-03
355569	7/1/2014 - 9/30/2014	Cs-134	<8.15E-04	0.00E+00	8.15E-04
		Cs-137	<8.06E-04	0.00E+00	8.06E-04
		Be-7	1.25E-01	2.46E-02	1.85E-02
		K-40	1.16E-02	9.82E-03	1.45E-02
356390	9/30/2014 - 10/7/2014	Beta	2.95E-02	3.17E-03	2.92E-03
356974	10/7/2014 - 10/14/2014	Beta	2.26E-02	2.87E-03	2.80E-03
357980	10/14/2014 - 10/21/2014	Beta	1.41E-02	2.50E-03	2.95E-03
358603	10/21/2014 - 10/28/2014	Beta	2.13E-02	2.93E-03	3.16E-03
359207	10/28/2014 - 11/4/2014	Beta	2.78E-02	3.13E-03	2.95E-03

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR PARTICULATE Concentration (Activity): pCi/m3

Sample Point 212 [ INDICATOR - E @ 3.32 miles ]

Sample ID	Sample Dates	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
359962	11/4/2014 - 11/11/2014	Beta	2.19E-02	2.81E-03	2.75E-03
360653	11/11/2014 - 11/18/2014	Beta	2.24E-02	3.04E-03	3.32E-03
361521	11/18/2014 - 11/25/2014	Beta	2.06E-02	3.01E-03	3.45E-03
361906	11/25/2014 - 12/2/2014	Beta	2.01E-02	2.77E-03	2.90E-03
362715	12/2/2014 - 12/9/2014	Beta	1.54E-02	2.65E-03	3.13E-03
363464	12/9/2014 - 12/16/2014	Beta	2.67E-02	3.17E-03	3.00E-03
363916	12/16/2014 - 12/23/2014	Beta	2.37E-02	2.95E-03	2.93E-03
364431	12/23/2014 - 12/30/2014	Beta	1.60E-02	2.54E-03	2.76E-03
364437	9/30/2014 - 12/30/2014	Cs-134	<9.49E-04	0.00E+00	9.49E-04
		Cs-137	<6.43E-04	0.00E+00	6.43E-04
		Be-7	1.33E-01	2.36E-02	1.35E-02
		K-40	1.83E-02	8.37E-03	2.48E-03

Sample Point 258 [ CONTROL - W @ 9.84 miles ]

Sample ID	Sample Dates	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
280706	12/31/2013 - 1/7/2014	Beta	1.32E-02	1.27E-03	3.02E-03
280889	1/7/2014 - 1/14/2014	Beta	1.55E-02	1.34E-03	3.08E-03
281269	1/14/2014 - 1/21/2014	Beta	1.50E-02	1.29E-03	2.91E-03
281628	1/21/2014 - 1/28/2014	Beta	1.74E-02	1.44E-03	3.38E-03
282196	1/28/2014 - 2/4/2014	Beta	1.90E-02	1.38E-03	2.84E-03
283058	2/4/2014 - 2/10/2014	Beta	1.59E-02	1.47E-03	3.40E-03
283440	2/10/2014 - 2/18/2014	Beta	2.25E-02	1.38E-03	2.59E-03
284628	2/18/2014 - 2/25/2014	Beta	1.75E-02	1.34E-03	2.81E-03
285190	2/25/2014 - 3/4/2014	Beta	2.43E-02	1.53E-03	2.90E-03
285797	3/4/2014 - 3/11/2014	Beta	1.71E-02	1.32E-03	2.75E-03
286312	3/11/2014 - 3/18/2014	Beta	1.40E-02	1.26E-03	2.88E-03
287160	3/18/2014 - 3/25/2014	Beta	1.39E-02	1.27E-03	2.85E-03
288417	3/25/2014 - 4/1/2014	Beta	1.37E-02	1.35E-03	3.31E-03

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR PARTICULATE Concentration (Activity): pCi/m3

Sample Point 258 [ CONTROL - W @ 9.84 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
289028	12/31/2013 - 4/1/2014	Cs-134	<2.75E-04	0.00E+00	2.75E-04
		Cs-137	<3.61E-04	0.00E+00	3.61E-04
		Be-7	1.33E-01	5.63E-03	4.00E-03
		K-40	5.81E-03	1.89E-03	3.66E-03
289151	4/1/2014 - 4/8/2014	Beta	1.56E-02	1.32E-03	2.94E-03
289537	4/8/2014 - 4/15/2014	Beta	1.77E-02	1.32E-03	2.69E-03
290019	4/15/2014 - 4/22/2014	Beta	1.76E-02	1.41E-03	3.18E-03
292100	4/22/2014 - 4/29/2014	Beta	1.85E-02	1.43E-03	3.16E-03
292830	4/29/2014 - 5/6/2014	Beta	1.67E-02	1.41E-03	3.25E-03
293101	5/6/2014 - 5/13/2014	Beta	2.73E-02	1.58E-03	2.86E-03
294743	5/13/2014 - 5/20/2014	Beta	2.07E-02	1.42E-03	2.85E-03
295269	5/20/2014 - 5/28/2014	Beta	2.15E-02	1.39E-03	2.87E-03
295593	5/28/2014 - 6/3/2014	Beta	1.98E-02	1.63E-03	3.75E-03
295995	6/3/2014 - 6/10/2014	Beta	1.46E-02	1.30E-03	3.00E-03
296260	6/10/2014 - 6/17/2014	Beta	1.79E-02	1.34E-03	2.75E-03
296790	6/17/2014 - 6/24/2014	Beta	1.82E-02	1.39E-03	2.91E-03
297065	6/24/2014 - 7/1/2014	Beta	1.56E-02	1.36E-03	3.11E-03
297292	4/1/2014 - 7/1/2014	Cs-134	<5.82E-04	0.00E+00	5.82E-04
		Cs-137	<6.80E-04	0.00E+00	6.80E-04
		Be-7	1.58E-01	2.89E-02	1.76E-02
		K-40	1.20E-02	8.99E-03	1.24E-02
297420	7/1/2014 - 7/8/2014	Beta	1.65E-02	2.71E-03	3.11E-03
297675	7/8/2014 - 7/15/2014	Beta	1.97E-02	2.83E-03	3.08E-03
350518	7/15/2014 - 7/22/2014	Beta	1.67E-02	2.68E-03	3.05E-03
350519	7/22/2014 - 7/29/2014	Beta	1.50E-02	2.60E-03	3.04E-03
350959	7/29/2014 - 8/5/2014	Beta	1.35E-02	2.55E-03	3.10E-03
351206	8/5/2014 - 8/12/2014	Beta	2.27E-02	2.97E-03	3.12E-03

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR PARTICULATE Concentration (Activity): pCi/m3

Sample Point 258 [ CONTROL - W @ 9.84 miles ]

Sample ID	Sample Dates	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
351512	8/12/2014 - 8/19/2014	Beta	1.82E-02	2.88E-03	3.39E-03
353374	8/19/2014 - 8/26/2014	Beta	2.16E-02	2.85E-03	2.86E-03
353944	8/26/2014 - 9/3/2014	Beta	1.77E-02	2.50E-03	2.70E-03
354389	9/3/2014 - 9/9/2014	Beta	6.09E-03	2.53E-03	3.81E-03
354705	9/9/2014 - 9/16/2014	Beta	1.33E-02	2.47E-03	2.94E-03
355038	9/16/2014 - 9/23/2014	Beta	2.46E-02	3.10E-03	3.25E-03
355564	9/23/2014 - 9/30/2014	Beta	1.36E-02	2.43E-03	2.79E-03
355570	7/1/2014 - 9/30/2014	Cs-134	<8.86E-04	0.00E+00	8.86E-04
		Cs-137	<7.01E-04	0.00E+00	7.01E-04
		Be-7	8.71E-02	2.05E-02	1.83E-02
		K-40	1.81E-02	1.08E-02	1.38E-02
356391	9/30/2014 - 10/7/2014	Beta	2.61E-02	3.06E-03	2.96E-03
356975	10/7/2014 - 10/14/2014	Beta	2.43E-02	2.93E-03	2.77E-03
357981	10/14/2014 - 10/21/2014	Beta	1.31E-02	2.50E-03	3.01E-03
358604	10/21/2014 - 10/28/2014	Beta	2.08E-02	2.85E-03	3.06E-03
359208	10/28/2014 - 11/4/2014	Beta	2.23E-02	2.96E-03	3.05E-03
359963	11/4/2014 - 11/11/2014	Beta	2.31E-02	2.88E-03	2.78E-03
360654	11/11/2014 - 11/18/2014	Beta	1.87E-02	2.80E-03	3.18E-03
361522	11/18/2014 - 11/25/2014	Beta	2.26E-02	3.09E-03	3.45E-03
361907	11/25/2014 - 12/2/2014	Beta	1.86E-02	2.73E-03	2.93E-03
362716	12/2/2014 - 12/9/2014	Beta	1.66E-02	2.70E-03	3.12E-03
363465	12/9/2014 - 12/16/2014	Beta	2.38E-02	2.93E-03	2.83E-03
363917	12/16/2014 - 12/23/2014	Beta	2.05E-02	2.81E-03	2.93E-03
364432	12/23/2014 - 12/30/2014	Beta	1.25E-02	2.35E-03	2.76E-03
364438	9/30/2014 - 12/30/2014	Cs-134	<9.84E-04	0.00E+00	9.84E-04
		Cs-137	<5.60E-04	0.00E+00	5.60E-04
		Be-7	1.11E-01	2.17E-02	1.62E-02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR PARTICULATE Concentration (Activity): pCi/m3

Sample Point 258 [ CONTROL - W @ 9.84 miles ]

Sample ID	Sample Dates	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
364438	9/30/2014 - 12/30/2014	K-40	9.94E-03	7.86E-03	1.07E-02
<b>Sample Point 261 [ INDICATOR - N @ 0.72 miles ]</b>					
280734	12/31/2013 - 1/7/2014	Beta	1.86E-02	1.41E-03	3.03E-03
280917	1/7/2014 - 1/14/2014	Beta	1.64E-02	1.38E-03	3.12E-03
281297	1/14/2014 - 1/21/2014	Beta	1.63E-02	1.32E-03	2.91E-03
281656	1/21/2014 - 1/28/2014	Beta	1.84E-02	1.45E-03	3.34E-03
282224	1/28/2014 - 2/4/2014	Beta	1.96E-02	1.38E-03	2.82E-03
283086	2/4/2014 - 2/10/2014	Beta	1.73E-02	1.53E-03	3.48E-03
283468	2/10/2014 - 2/18/2014	Beta	2.46E-02	1.42E-03	2.59E-03
284655	2/18/2014 - 2/25/2014	Beta	1.69E-02	1.32E-03	2.79E-03
285217	2/25/2014 - 3/4/2014	Beta	2.59E-02	1.55E-03	2.90E-03
285824	3/4/2014 - 3/11/2014	Beta	1.92E-02	1.39E-03	2.79E-03
286339	3/11/2014 - 3/18/2014	Beta	1.47E-02	1.28E-03	2.85E-03
287187	3/18/2014 - 3/25/2014	Beta	1.60E-02	1.32E-03	2.86E-03
288444	3/25/2014 - 4/1/2014	Beta	1.52E-02	1.38E-03	3.31E-03
289029	12/31/2013 - 4/1/2014	Cs-134	<2.96E-04	0.00E+00	2.96E-04
		Cs-137	<3.30E-04	0.00E+00	3.30E-04
		Be-7	1.29E-01	6.29E-03	5.22E-03
		K-40	8.70E-03	1.71E-03	3.27E-03
289178	4/1/2014 - 4/8/2014	Beta	1.45E-02	1.30E-03	2.95E-03
289564	4/8/2014 - 4/15/2014	Beta	1.91E-02	1.37E-03	2.74E-03
290046	4/15/2014 - 4/22/2014	Beta	1.98E-02	1.47E-03	3.19E-03
292127	4/22/2014 - 4/29/2014	Beta	1.99E-02	1.47E-03	3.16E-03
292857	4/29/2014 - 5/6/2014	Beta	1.64E-02	1.40E-03	3.25E-03
293128	5/6/2014 - 5/13/2014	Beta	2.30E-02	1.48E-03	2.85E-03
294770	5/13/2014 - 5/20/2014	Beta	1.94E-02	1.42E-03	2.93E-03

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR PARTICULATE Concentration (Activity): pCi/m3

Sample Point 261 [ INDICATOR - N @ 0.72 miles ]

Sample ID	Sample Dates	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
295296	5/20/2014 - 5/28/2014	Beta	2.18E-02	1.39E-03	2.86E-03
295620	5/28/2014 - 6/3/2014	Beta	1.88E-02	1.64E-03	3.84E-03
296022	6/3/2014 - 6/10/2014	Beta	1.49E-02	1.33E-03	3.07E-03
296287	6/10/2014 - 6/17/2014	Beta	1.88E-02	1.37E-03	2.76E-03
296817	6/17/2014 - 6/24/2014	Beta	2.18E-02	1.45E-03	2.83E-03
297092	6/24/2014 - 7/1/2014	Beta	1.75E-02	1.40E-03	3.10E-03
297293	4/1/2014 - 7/1/2014	Cs-134	<4.56E-04	0.00E+00	4.56E-04
		Cs-137	<4.89E-04	0.00E+00	4.89E-04
		Be-7	1.64E-01	2.69E-02	1.08E-02
		K-40	9.04E-03	5.78E-03	6.26E-03
297447	7/1/2014 - 7/8/2014	Beta	1.91E-02	2.84E-03	3.13E-03
297702	7/8/2014 - 7/15/2014	Beta	1.72E-02	2.71E-03	3.08E-03
350520	7/15/2014 - 7/22/2014	Beta	2.01E-02	2.83E-03	3.05E-03
350521	7/22/2014 - 7/29/2014	Beta	1.90E-02	2.80E-03	3.05E-03
350960	7/29/2014 - 8/5/2014	Beta	1.74E-02	2.73E-03	3.09E-03
351207	8/5/2014 - 8/12/2014	Beta	2.65E-02	3.15E-03	3.14E-03
351513	8/12/2014 - 8/19/2014	Beta	1.77E-02	2.85E-03	3.38E-03
353375	8/19/2014 - 8/26/2014	Beta	2.14E-02	2.85E-03	2.87E-03
353945	8/26/2014 - 9/3/2014	Beta	2.05E-02	2.62E-03	2.69E-03
354390	9/3/2014 - 9/9/2014	Beta	1.10E-02	2.82E-03	3.83E-03
354706	9/9/2014 - 9/16/2014	Beta	1.59E-02	2.59E-03	2.92E-03
355041	9/16/2014 - 9/23/2014	Beta	2.81E-02	3.26E-03	3.27E-03
355565	9/23/2014 - 9/30/2014	Beta	1.54E-02	2.53E-03	2.79E-03
355571	7/1/2014 - 9/30/2014	Cs-134	<9.32E-04	0.00E+00	9.32E-04
		Cs-137	<6.84E-04	0.00E+00	6.84E-04
		Be-7	1.11E-01	2.44E-02	2.38E-02
		K-40	7.97E-03	7.98E-03	1.21E-02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR PARTICULATE Concentration (Activity): pCi/m3

Sample Point 261 [ INDICATOR - N @ 0.72 miles ]

Sample ID	Sample Dates	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
356392	9/30/2014 - 10/7/2014	Beta	2.80E-02	3.14E-03	2.96E-03
356976	10/7/2014 - 10/14/2014	Beta	2.37E-02	2.91E-03	2.77E-03
357982	10/14/2014 - 10/21/2014	Beta	1.54E-02	2.60E-03	3.00E-03
358605	10/21/2014 - 10/28/2014	Beta	1.98E-02	2.87E-03	3.16E-03
359209	10/28/2014 - 11/4/2014	Beta	2.58E-02	3.05E-03	2.96E-03
359964	11/4/2014 - 11/11/2014	Beta	2.35E-02	2.89E-03	2.77E-03
360655	11/11/2014 - 11/18/2014	Beta	2.53E-02	3.15E-03	3.30E-03
361523	11/18/2014 - 11/25/2014	Beta	2.39E-02	3.15E-03	3.45E-03
361908	11/25/2014 - 12/2/2014	Beta	1.95E-02	2.76E-03	2.92E-03
362717	12/2/2014 - 12/9/2014	Beta	2.06E-02	2.89E-03	3.12E-03
363466	12/9/2014 - 12/16/2014	Beta	2.67E-02	3.06E-03	2.85E-03
363918	12/16/2014 - 12/23/2014	Beta	2.52E-02	3.02E-03	2.93E-03
364433	12/23/2014 - 12/30/2014	Beta	1.52E-02	2.49E-03	2.76E-03
364439	9/30/2014 - 12/30/2014	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
		Cs-134	<7.23E-04	0.00E+00	7.23E-04
		Cs-137	<4.96E-04	0.00E+00	4.96E-04
		Be-7	1.24E-01	2.24E-02	1.23E-02
		K-40	1.53E-02	8.27E-03	7.79E-03

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 200 [ INDICATOR - NNE @ 0.63 miles ]

Sample ID	Sample Dates	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
280707	12/31/2013 - 1/7/2014	I-131	<2.15E-02	0.00E+00	2.15E-02
		Cs-134	<1.44E-02	0.00E+00	1.44E-02
		Cs-137	<1.71E-02	0.00E+00	1.71E-02
		Be-7	<1.78E-01	0.00E+00	1.78E-01
		K-40	<6.30E-01	0.00E+00	6.30E-01
280890	1/7/2014 - 1/14/2014	I-131	<1.97E-02	0.00E+00	1.97E-02
		Cs-134	<1.62E-02	0.00E+00	1.62E-02
		Cs-137	<1.94E-02	0.00E+00	1.94E-02
		Be-7	<1.68E-01	0.00E+00	1.68E-01
		K-40	6.08E-01	1.33E-01	7.82E-02
281270	1/14/2014 - 1/21/2014	I-131	<2.43E-02	0.00E+00	2.43E-02
		Cs-134	<2.18E-02	0.00E+00	2.18E-02
		Cs-137	<1.55E-02	0.00E+00	1.55E-02
		Be-7	<1.35E-01	0.00E+00	1.35E-01
		K-40	5.69E-01	1.27E-01	2.15E-01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.





# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 200 [ INDICATOR - NNE @ 0.63 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
281629	1/21/2014 - 1/28/2014	I-131	<1.20E-02	0.00E+00	1.20E-02
		Cs-134	<1.19E-02	0.00E+00	1.19E-02
		Cs-137	<1.13E-02	0.00E+00	1.13E-02
		Be-7	<1.33E-01	0.00E+00	1.33E-01
		K-40	3.61E-01	9.01E-02	6.09E-02
282197	1/28/2014 - 2/4/2014	I-131	<2.48E-02	0.00E+00	2.48E-02
		Cs-134	<1.75E-02	0.00E+00	1.75E-02
		Cs-137	<2.06E-02	0.00E+00	2.06E-02
		Be-7	<1.41E-01	0.00E+00	1.41E-01
		K-40	4.23E-01	1.33E-01	3.80E-01
283059	2/4/2014 - 2/10/2014	I-131	<1.82E-02	0.00E+00	1.82E-02
		Cs-134	<1.10E-02	0.00E+00	1.10E-02
		Cs-137	<3.57E-03	0.00E+00	3.57E-03
		Be-7	<8.60E-02	0.00E+00	8.60E-02
		K-40	3.90E-01	1.30E-01	1.81E-01
283441	2/10/2014 - 2/18/2014	I-131	<1.09E-02	0.00E+00	1.09E-02
		Cs-134	<1.15E-02	0.00E+00	1.15E-02
		Cs-137	<1.17E-02	0.00E+00	1.17E-02
		Be-7	<7.58E-02	0.00E+00	7.58E-02
		K-40	2.83E-01	9.08E-02	1.77E-01
284629	2/18/2014 - 2/25/2014	I-131	<1.23E-02	0.00E+00	1.23E-02
		Cs-134	<1.23E-02	0.00E+00	1.23E-02
		Cs-137	<1.61E-02	0.00E+00	1.61E-02
		Be-7	<1.26E-01	0.00E+00	1.26E-01
		K-40	2.52E-01	1.16E-01	2.24E-01
285191	2/25/2014 - 3/4/2014	I-131	<2.32E-02	0.00E+00	2.32E-02
		Cs-134	<1.33E-02	0.00E+00	1.33E-02
		Cs-137	<1.87E-02	0.00E+00	1.87E-02
		Be-7	<1.13E-01	0.00E+00	1.13E-01
		K-40	5.36E-01	1.46E-01	7.74E-02
285798	3/4/2014 - 3/11/2014	I-131	<1.70E-02	0.00E+00	1.70E-02
		Cs-134	<1.71E-02	0.00E+00	1.71E-02
		Cs-137	<2.01E-02	0.00E+00	2.01E-02
		Be-7	<1.64E-01	0.00E+00	1.64E-01
		K-40	6.66E-01	1.39E-01	2.09E-01
286313	3/11/2014 - 3/18/2014	I-131	<2.10E-02	0.00E+00	2.10E-02
		Cs-134	<2.20E-02	0.00E+00	2.20E-02
		Cs-137	<1.53E-02	0.00E+00	1.53E-02
		Be-7	<1.59E-01	0.00E+00	1.59E-01
		K-40	<6.37E-01	0.00E+00	6.37E-01
287161	3/18/2014 - 3/25/2014	I-131	<2.19E-02	0.00E+00	2.19E-02
		Cs-134	<2.10E-02	0.00E+00	2.10E-02
		Cs-137	<2.09E-02	0.00E+00	2.09E-02
		Be-7	<1.42E-01	0.00E+00	1.42E-01
		K-40	3.20E-01	1.28E-01	3.34E-01
288418	3/25/2014 - 4/1/2014	I-131	<9.56E-03	0.00E+00	9.56E-03
		Cs-134	<9.69E-03	0.00E+00	9.69E-03
		Cs-137	<8.28E-03	0.00E+00	8.28E-03
		Be-7	<6.07E-02	0.00E+00	6.07E-02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 200 [ INDICATOR - NNE @ 0.63 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
288418	3/25/2014 - 4/1/2014	K-40	5.32E-01	8.96E-02	1.07E-01
289152	4/1/2014 - 4/8/2014	I-131	<2.53E-02	0.00E+00	2.53E-02
		Cs-134	<1.89E-02	0.00E+00	1.89E-02
		Cs-137	<1.80E-02	0.00E+00	1.80E-02
		Be-7	<1.25E-01	0.00E+00	1.25E-01
		K-40	<5.40E-01	0.00E+00	5.40E-01
289538	4/8/2014 - 4/15/2014	I-131	<1.50E-02	0.00E+00	1.50E-02
		Cs-134	<1.72E-02	0.00E+00	1.72E-02
		Cs-137	<2.16E-02	0.00E+00	2.16E-02
		Be-7	<1.70E-01	0.00E+00	1.70E-01
		K-40	<5.60E-01	0.00E+00	5.60E-01
290020	4/15/2014 - 4/22/2014	I-131	<1.74E-02	0.00E+00	1.74E-02
		Cs-134	<1.25E-02	0.00E+00	1.25E-02
		Cs-137	<9.36E-03	0.00E+00	9.36E-03
		Be-7	<7.14E-02	0.00E+00	7.14E-02
		K-40	3.52E-01	9.09E-02	6.34E-02
292101	4/22/2014 - 4/29/2014	I-131	<2.59E-02	0.00E+00	2.59E-02
		Cs-134	<1.73E-02	0.00E+00	1.73E-02
		Cs-137	<2.78E-02	0.00E+00	2.78E-02
		Be-7	<1.73E-01	0.00E+00	1.73E-01
		K-40	<6.68E-01	0.00E+00	6.68E-01
292831	4/29/2014 - 5/6/2014	I-131	<1.19E-02	0.00E+00	1.19E-02
		Cs-134	<1.04E-02	0.00E+00	1.04E-02
		Cs-137	<1.19E-02	0.00E+00	1.19E-02
		Be-7	<6.59E-02	0.00E+00	6.59E-02
		K-40	<3.68E-01	0.00E+00	3.68E-01
293102	5/6/2014 - 5/13/2014	I-131	<1.31E-02	0.00E+00	1.31E-02
		Cs-134	<8.07E-03	0.00E+00	8.07E-03
		Cs-137	<1.04E-02	0.00E+00	1.04E-02
		Be-7	<9.27E-02	0.00E+00	9.27E-02
		K-40	5.95E-01	8.42E-02	1.07E-01
294744	5/13/2014 - 5/20/2014	I-131	<9.07E-03	0.00E+00	9.07E-03
		Cs-134	<9.68E-03	0.00E+00	9.68E-03
		Cs-137	<1.67E-02	0.00E+00	1.67E-02
		Be-7	<8.16E-02	0.00E+00	8.16E-02
		K-40	2.93E-01	7.57E-02	1.46E-01
295270	5/20/2014 - 5/28/2014	I-131	<2.74E-02	0.00E+00	2.74E-02
		Cs-134	<1.03E-02	0.00E+00	1.03E-02
		Cs-137	<1.28E-02	0.00E+00	1.28E-02
		Be-7	<1.01E-01	0.00E+00	1.01E-01
		K-40	4.59E-01	9.79E-02	1.91E-01
295594	5/28/2014 - 6/3/2014	I-131	<2.57E-02	0.00E+00	2.57E-02
		Cs-134	<2.02E-02	0.00E+00	2.02E-02
		Cs-137	<2.74E-02	0.00E+00	2.74E-02
		Be-7	<1.06E-01	0.00E+00	1.06E-01
		K-40	3.22E-01	1.60E-01	4.93E-01
295996	6/3/2014 - 6/10/2014	I-131	<1.72E-02	0.00E+00	1.72E-02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 200 [ INDICATOR - NNE @ 0.63 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
295996	6/3/2014 - 6/10/2014	Cs-134	<1.49E-02	0.00E+00	1.49E-02
		Cs-137	<1.68E-02	0.00E+00	1.68E-02
		Be-7	<1.17E-01	0.00E+00	1.17E-01
		K-40	3.05E-01	8.46E-02	1.67E-01
296261	6/10/2014 - 6/17/2014	I-131	<1.02E-02	0.00E+00	1.02E-02
		Cs-134	<1.26E-02	0.00E+00	1.26E-02
		Cs-137	<1.15E-02	0.00E+00	1.15E-02
		Be-7	<1.05E-01	0.00E+00	1.05E-01
		K-40	2.83E-01	9.45E-02	1.64E-01
296791	6/17/2014 - 6/24/2014	I-131	<1.56E-02	0.00E+00	1.56E-02
		Cs-134	<1.34E-02	0.00E+00	1.34E-02
		Cs-137	<1.22E-02	0.00E+00	1.22E-02
		Be-7	<8.84E-02	0.00E+00	8.84E-02
		K-40	2.78E-01	9.90E-02	2.17E-01
297066	6/24/2014 - 7/1/2014	I-131	<2.04E-02	0.00E+00	2.04E-02
		Cs-134	<2.15E-02	0.00E+00	2.15E-02
		Cs-137	<1.61E-02	0.00E+00	1.61E-02
		Be-7	<1.31E-01	0.00E+00	1.31E-01
		K-40	4.17E-01	1.08E-01	7.52E-02
297421	7/1/2014 - 7/8/2014	I-131	<1.82E-02	0.00E+00	1.82E-02
		Cs-134	<1.38E-02	0.00E+00	1.38E-02
		Cs-137	<1.23E-02	0.00E+00	1.23E-02
		Be-7	<1.01E-01	0.00E+00	1.01E-01
		K-40	4.27E-01	1.01E-01	6.41E-02
297676	7/8/2014 - 7/15/2014	I-131	<3.03E-02	0.00E+00	3.03E-02
		Cs-134	<1.33E-02	0.00E+00	1.33E-02
		Cs-137	<1.65E-02	0.00E+00	1.65E-02
		Be-7	<1.41E-01	0.00E+00	1.41E-01
		K-40	3.87E-01	1.96E-01	6.55E-02
350522	7/15/2014 - 7/22/2014	I-131	<2.85E-02	0.00E+00	2.85E-02
		Cs-134	<1.03E-02	0.00E+00	1.03E-02
		Cs-137	<1.28E-02	0.00E+00	1.28E-02
		Be-7	<1.09E-01	0.00E+00	1.09E-01
		K-40	3.53E-01	2.62E-01	3.46E-01
350523	7/22/2014 - 7/29/2014	I-131	<1.19E-02	0.00E+00	1.19E-02
		Cs-134	<3.87E-03	0.00E+00	3.87E-03
		Cs-137	<1.92E-02	0.00E+00	1.92E-02
		Be-7	<1.05E-01	0.00E+00	1.05E-01
		K-40	4.91E-01	3.14E-01	4.02E-01
350961	7/29/2014 - 8/5/2014	I-131	<2.16E-02	0.00E+00	2.16E-02
		Cs-134	<1.52E-02	0.00E+00	1.52E-02
		Cs-137	<1.30E-02	0.00E+00	1.30E-02
		Be-7	<1.64E-01	0.00E+00	1.64E-01
		K-40	<5.79E-01	0.00E+00	5.79E-01
351208	8/5/2014 - 8/12/2014	I-131	<2.18E-02	0.00E+00	2.18E-02
		Cs-134	<1.85E-02	0.00E+00	1.85E-02
		Cs-137	<1.30E-02	0.00E+00	1.30E-02
		Be-7	<1.66E-01	0.00E+00	1.66E-01
		K-40	<7.30E-01	0.00E+00	7.30E-01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 200 [ INDICATOR - NNE @ 0.63 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
351514	8/12/2014 - 8/19/2014	I-131	<1.58E-02	0.00E+00	1.58E-02
		Cs-134	<5.66E-03	0.00E+00	5.66E-03
		Cs-137	<2.10E-02	0.00E+00	2.10E-02
		Be-7	<1.54E-01	0.00E+00	1.54E-01
		K-40	4.55E-01	2.64E-01	2.77E-01
353376	8/19/2014 - 8/26/2014	I-131	<1.95E-02	0.00E+00	1.95E-02
		Cs-134	<2.78E-02	0.00E+00	2.78E-02
		Cs-137	<2.33E-02	0.00E+00	2.33E-02
		Be-7	<1.33E-01	0.00E+00	1.33E-01
		K-40	3.29E-01	2.19E-01	2.24E-01
353946	8/26/2014 - 9/3/2014	I-131	<1.92E-02	0.00E+00	1.92E-02
		Cs-134	<1.71E-02	0.00E+00	1.71E-02
		Cs-137	<1.43E-02	0.00E+00	1.43E-02
		Be-7	<1.03E-01	0.00E+00	1.03E-01
		K-40	6.22E-01	2.60E-01	7.03E-02
354391	9/3/2014 - 9/9/2014	I-131	<2.33E-02	0.00E+00	2.33E-02
		Cs-134	<2.28E-02	0.00E+00	2.28E-02
		Cs-137	<1.91E-02	0.00E+00	1.91E-02
		Be-7	<1.53E-01	0.00E+00	1.53E-01
		K-40	5.85E-01	3.10E-01	2.77E-01
354707	9/9/2014 - 9/16/2014	I-131	<1.34E-02	0.00E+00	1.34E-02
		Cs-134	<2.20E-02	0.00E+00	2.20E-02
		Cs-137	<2.05E-02	0.00E+00	2.05E-02
		Be-7	<9.90E-02	0.00E+00	9.90E-02
		K-40	<6.47E-01	0.00E+00	6.47E-01
355044	9/16/2014 - 9/23/2014	I-131	<2.12E-02	0.00E+00	2.12E-02
		Cs-134	<3.84E-03	0.00E+00	3.84E-03
		Cs-137	<1.65E-02	0.00E+00	1.65E-02
		Be-7	<1.45E-01	0.00E+00	1.45E-01
		K-40	3.72E-01	2.81E-01	3.82E-01
355572	9/23/2014 - 9/30/2014	I-131	<2.10E-02	0.00E+00	2.10E-02
		Cs-134	<1.86E-02	0.00E+00	1.86E-02
		Cs-137	<1.64E-02	0.00E+00	1.64E-02
		Be-7	<1.44E-01	0.00E+00	1.44E-01
		K-40	5.37E-01	2.57E-01	8.09E-02
356393	9/30/2014 - 10/7/2014	I-131	<2.16E-02	0.00E+00	2.16E-02
		Cs-134	<1.50E-02	0.00E+00	1.50E-02
		Cs-137	<1.62E-02	0.00E+00	1.62E-02
		Be-7	<1.33E-01	0.00E+00	1.33E-01
		K-40	5.29E-01	2.53E-01	7.96E-02
356977	10/7/2014 - 10/14/2014	I-131	<2.41E-02	0.00E+00	2.41E-02
		Cs-134	<3.83E-03	0.00E+00	3.83E-03
		Cs-137	<1.90E-02	0.00E+00	1.90E-02
		Be-7	<1.03E-01	0.00E+00	1.03E-01
		K-40	<6.54E-01	0.00E+00	6.54E-01
357983	10/14/2014 - 10/21/2014	I-131	<2.08E-02	0.00E+00	2.08E-02
		Cs-134	<1.31E-02	0.00E+00	1.31E-02
		Cs-137	<2.31E-02	0.00E+00	2.31E-02
		Be-7	<1.02E-01	0.00E+00	1.02E-01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 200 [ INDICATOR - NNE @ 0.63 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
357983	10/14/2014 - 10/21/2014	K-40	1.98E-01	2.35E-01	3.73E-01
358606	10/21/2014 - 10/28/2014	I-131	<1.95E-02	0.00E+00	1.95E-02
		Cs-134	<1.85E-02	0.00E+00	1.85E-02
		Cs-137	<2.12E-02	0.00E+00	2.12E-02
		Be-7	<1.55E-01	0.00E+00	1.55E-01
		K-40	2.43E-01	2.57E-01	3.95E-01
359210	10/28/2014 - 11/4/2014	I-131	<1.39E-02	0.00E+00	1.39E-02
		Cs-134	<8.05E-03	0.00E+00	8.05E-03
		Cs-137	<1.48E-02	0.00E+00	1.48E-02
		Be-7	<1.10E-01	0.00E+00	1.10E-01
		K-40	<4.21E-01	0.00E+00	4.21E-01
359965	11/4/2014 - 11/11/2014	I-131	<1.37E-02	0.00E+00	1.37E-02
		Cs-134	<8.96E-03	0.00E+00	8.96E-03
		Cs-137	<1.28E-02	0.00E+00	1.28E-02
		Be-7	<9.13E-02	0.00E+00	9.13E-02
		K-40	4.28E-01	1.76E-01	1.61E-01
360656	11/11/2014 - 11/18/2014	I-131	<2.38E-02	0.00E+00	2.38E-02
		Cs-134	<1.05E-02	0.00E+00	1.05E-02
		Cs-137	<2.33E-02	0.00E+00	2.33E-02
		Be-7	<1.20E-01	0.00E+00	1.20E-01
		K-40	<6.23E-01	0.00E+00	6.23E-01
361524	11/18/2014 - 11/25/2014	I-131	<1.84E-02	0.00E+00	1.84E-02
		Cs-134	<1.04E-02	0.00E+00	1.04E-02
		Cs-137	<1.90E-02	0.00E+00	1.90E-02
		Be-7	<1.18E-01	0.00E+00	1.18E-01
		K-40	<6.00E-01	0.00E+00	6.00E-01
361909	11/25/2014 - 12/2/2014	I-131	<2.83E-02	0.00E+00	2.83E-02
		Cs-134	<1.96E-02	0.00E+00	1.96E-02
		Cs-137	<1.43E-02	0.00E+00	1.43E-02
		Be-7	<1.35E-01	0.00E+00	1.35E-01
		K-40	5.16E-01	2.62E-01	2.53E-01
362718	12/2/2014 - 12/9/2014	I-131	<1.26E-02	0.00E+00	1.26E-02
		Cs-134	<1.57E-02	0.00E+00	1.57E-02
		Cs-137	<1.50E-02	0.00E+00	1.50E-02
		Be-7	<1.39E-01	0.00E+00	1.39E-01
		K-40	<5.36E-01	0.00E+00	5.36E-01
363467	12/9/2014 - 12/16/2014	I-131	<1.31E-02	0.00E+00	1.31E-02
		Cs-134	<1.00E-02	0.00E+00	1.00E-02
		Cs-137	<1.60E-02	0.00E+00	1.60E-02
		Be-7	<8.92E-02	0.00E+00	8.92E-02
		K-40	5.57E-01	1.87E-01	3.97E-02
363919	12/16/2014 - 12/23/2014	I-131	<1.89E-02	0.00E+00	1.89E-02
		Cs-134	<1.51E-02	0.00E+00	1.51E-02
		Cs-137	<1.58E-02	0.00E+00	1.58E-02
		Be-7	<1.26E-01	0.00E+00	1.26E-01
		K-40	5.92E-01	2.56E-01	2.82E-01
364440	12/23/2014 - 12/30/2014	I-131	<1.72E-02	0.00E+00	1.72E-02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 200 [ INDICATOR - NNE @ 0.63 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
364440	12/23/2014 - 12/30/2014	Cs-134	<1.48E-02	0.00E+00	1.48E-02
		Cs-137	<1.02E-02	0.00E+00	1.02E-02
		Be-7	<9.31E-02	0.00E+00	9.31E-02
		K-40	5.78E-01	2.64E-01	3.15E-01

Sample Point 201 [ INDICATOR - NE @ 0.53 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
280708	12/31/2013 - 1/7/2014	I-131	<2.69E-02	0.00E+00	2.69E-02
		Cs-134	<2.09E-02	0.00E+00	2.09E-02
		Cs-137	<2.21E-02	0.00E+00	2.21E-02
		Be-7	<1.34E-01	0.00E+00	1.34E-01
		K-40	<5.91E-01	0.00E+00	5.91E-01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
280891	1/7/2014 - 1/14/2014	I-131	<1.10E-02	0.00E+00	1.10E-02
		Cs-134	<2.12E-02	0.00E+00	2.12E-02
		Cs-137	<1.90E-02	0.00E+00	1.90E-02
		Be-7	<1.46E-01	0.00E+00	1.46E-01
		K-40	2.88E-01	9.09E-02	3.02E-01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
281271	1/14/2014 - 1/21/2014	I-131	<2.27E-02	0.00E+00	2.27E-02
		Cs-134	<1.99E-02	0.00E+00	1.99E-02
		Cs-137	<1.76E-02	0.00E+00	1.76E-02
		Be-7	<1.28E-01	0.00E+00	1.28E-01
		K-40	3.56E-01	1.56E-01	2.15E-01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
281630	1/21/2014 - 1/28/2014	I-131	<1.53E-02	0.00E+00	1.53E-02
		Cs-134	<1.38E-02	0.00E+00	1.38E-02
		Cs-137	<1.25E-02	0.00E+00	1.25E-02
		Be-7	<8.04E-02	0.00E+00	8.04E-02
		K-40	4.10E-01	9.40E-02	5.83E-02

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
282198	1/28/2014 - 2/4/2014	I-131	<2.65E-02	0.00E+00	2.65E-02
		Cs-134	<1.73E-02	0.00E+00	1.73E-02
		Cs-137	<1.88E-02	0.00E+00	1.88E-02
		Be-7	<1.40E-01	0.00E+00	1.40E-01
		K-40	5.13E-01	1.21E-01	7.70E-02

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
283060	2/4/2014 - 2/10/2014	I-131	<2.55E-02	0.00E+00	2.55E-02
		Cs-134	<2.17E-02	0.00E+00	2.17E-02
		Cs-137	<2.94E-02	0.00E+00	2.94E-02
		Be-7	<1.84E-01	0.00E+00	1.84E-01
		K-40	3.57E-01	1.08E-01	8.78E-02

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
283442	2/10/2014 - 2/18/2014	I-131	<1.88E-02	0.00E+00	1.88E-02
		Cs-134	<1.71E-02	0.00E+00	1.71E-02
		Cs-137	<1.37E-02	0.00E+00	1.37E-02
		Be-7	<1.22E-01	0.00E+00	1.22E-01
		K-40	<4.99E-01	0.00E+00	4.99E-01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
284630	2/18/2014 - 2/25/2014	I-131	<2.86E-02	0.00E+00	2.86E-02
		Cs-134	<2.10E-02	0.00E+00	2.10E-02
		Cs-137	<1.21E-02	0.00E+00	1.21E-02
		Be-7	<1.59E-01	0.00E+00	1.59E-01
		K-40	4.12E-01	1.33E-01	2.69E-01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
285192	2/25/2014 - 3/4/2014	I-131	<2.36E-02	0.00E+00	2.36E-02
		Cs-134	<2.09E-02	0.00E+00	2.09E-02
		Cs-137	<1.78E-02	0.00E+00	1.78E-02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 201 [ INDICATOR - NE @ 0.53 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
285192	2/25/2014 - 3/4/2014	Be-7	<1.37E-01	0.00E+00	1.37E-01
		K-40	5.71E-01	1.28E-01	2.14E-01
285799	3/4/2014 - 3/11/2014	I-131	<2.22E-02	0.00E+00	2.22E-02
		Cs-134	<2.22E-02	0.00E+00	2.22E-02
		Cs-137	<2.19E-02	0.00E+00	2.19E-02
		Be-7	<1.34E-01	0.00E+00	1.34E-01
		K-40	4.30E-01	1.11E-01	2.07E-01
286314	3/11/2014 - 3/18/2014	I-131	<2.75E-02	0.00E+00	2.75E-02
		Cs-134	<1.60E-02	0.00E+00	1.60E-02
		Cs-137	<2.48E-02	0.00E+00	2.48E-02
		Be-7	<1.30E-01	0.00E+00	1.30E-01
		K-40	2.83E-01	8.96E-02	2.11E-01
287162	3/18/2014 - 3/25/2014	I-131	<1.12E-02	0.00E+00	1.12E-02
		Cs-134	<9.31E-03	0.00E+00	9.31E-03
		Cs-137	<1.06E-02	0.00E+00	1.06E-02
		Be-7	<7.69E-02	0.00E+00	7.69E-02
		K-40	3.84E-01	6.78E-02	1.02E-01
288419	3/25/2014 - 4/1/2014	I-131	<2.21E-02	0.00E+00	2.21E-02
		Cs-134	<1.54E-02	0.00E+00	1.54E-02
		Cs-137	<2.18E-02	0.00E+00	2.18E-02
		Be-7	<1.03E-01	0.00E+00	1.03E-01
		K-40	5.71E-01	1.28E-01	2.12E-01
289153	4/1/2014 - 4/8/2014	I-131	<1.85E-02	0.00E+00	1.85E-02
		Cs-134	<1.60E-02	0.00E+00	1.60E-02
		Cs-137	<1.82E-02	0.00E+00	1.82E-02
		Be-7	<1.46E-01	0.00E+00	1.46E-01
		K-40	3.17E-01	1.22E-01	7.73E-02
289539	4/8/2014 - 4/15/2014	I-131	<9.73E-03	0.00E+00	9.73E-03
		Cs-134	<7.54E-03	0.00E+00	7.54E-03
		Cs-137	<1.00E-02	0.00E+00	1.00E-02
		Be-7	<8.54E-02	0.00E+00	8.54E-02
		K-40	4.52E-01	9.14E-02	1.08E-01
290021	4/15/2014 - 4/22/2014	I-131	<2.64E-02	0.00E+00	2.64E-02
		Cs-134	<2.04E-02	0.00E+00	2.04E-02
		Cs-137	<1.79E-02	0.00E+00	1.79E-02
		Be-7	<1.62E-01	0.00E+00	1.62E-01
		K-40	3.65E-01	1.24E-01	2.05E-01
292102	4/22/2014 - 4/29/2014	I-131	<2.17E-02	0.00E+00	2.17E-02
		Cs-134	<2.00E-02	0.00E+00	2.00E-02
		Cs-137	<2.19E-02	0.00E+00	2.19E-02
		Be-7	<1.65E-01	0.00E+00	1.65E-01
		K-40	4.99E-01	1.50E-01	2.55E-01
292832	4/29/2014 - 5/6/2014	I-131	<2.56E-02	0.00E+00	2.56E-02
		Cs-134	<1.35E-02	0.00E+00	1.35E-02
		Cs-137	<2.18E-02	0.00E+00	2.18E-02
		Be-7	<1.63E-01	0.00E+00	1.63E-01
		K-40	4.28E-01	1.11E-01	2.05E-01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 201 [ INDICATOR - NE @ 0.53 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
293103	5/6/2014 - 5/13/2014	I-131	<2.22E-02	0.00E+00	2.22E-02
		Cs-134	<1.60E-02	0.00E+00	1.60E-02
		Cs-137	<2.39E-02	0.00E+00	2.39E-02
		Be-7	<1.65E-01	0.00E+00	1.65E-01
		K-40	<5.00E-01	0.00E+00	5.00E-01
294745	5/13/2014 - 5/20/2014	I-131	<1.13E-02	0.00E+00	1.13E-02
		Cs-134	<7.93E-03	0.00E+00	7.93E-03
		Cs-137	<1.49E-02	0.00E+00	1.49E-02
		Be-7	<6.76E-02	0.00E+00	6.76E-02
		K-40	2.78E-01	8.44E-02	1.54E-01
295271	5/20/2014 - 5/28/2014	I-131	<1.46E-02	0.00E+00	1.46E-02
		Cs-134	<6.94E-03	0.00E+00	6.94E-03
		Cs-137	<8.47E-03	0.00E+00	8.47E-03
		Be-7	<4.71E-02	0.00E+00	4.71E-02
		K-40	2.20E-01	7.31E-02	1.42E-01
295595	5/28/2014 - 6/3/2014	I-131	<2.69E-02	0.00E+00	2.69E-02
		Cs-134	<1.67E-02	0.00E+00	1.67E-02
		Cs-137	<2.74E-02	0.00E+00	2.74E-02
		Be-7	<1.37E-01	0.00E+00	1.37E-01
		K-40	3.99E-01	1.15E-01	8.99E-02
295997	6/3/2014 - 6/10/2014	I-131	<1.24E-02	0.00E+00	1.24E-02
		Cs-134	<5.66E-03	0.00E+00	5.66E-03
		Cs-137	<1.04E-02	0.00E+00	1.04E-02
		Be-7	<8.18E-02	0.00E+00	8.18E-02
		K-40	5.86E-01	8.36E-02	3.23E-02
296262	6/10/2014 - 6/17/2014	I-131	<1.46E-02	0.00E+00	1.46E-02
		Cs-134	<1.14E-02	0.00E+00	1.14E-02
		Cs-137	<1.48E-02	0.00E+00	1.48E-02
		Be-7	<1.24E-01	0.00E+00	1.24E-01
		K-40	5.41E-01	1.13E-01	6.35E-02
296792	6/17/2014 - 6/24/2014	I-131	<2.43E-02	0.00E+00	2.43E-02
		Cs-134	<1.95E-02	0.00E+00	1.95E-02
		Cs-137	<1.54E-02	0.00E+00	1.54E-02
		Be-7	<7.61E-02	0.00E+00	7.61E-02
		K-40	<7.14E-01	0.00E+00	7.14E-01
297067	6/24/2014 - 7/1/2014	I-131	<1.63E-02	0.00E+00	1.63E-02
		Cs-134	<2.35E-02	0.00E+00	2.35E-02
		Cs-137	<1.88E-02	0.00E+00	1.88E-02
		Be-7	<1.24E-01	0.00E+00	1.24E-01
		K-40	4.56E-01	1.14E-01	2.07E-01
297422	7/1/2014 - 7/8/2014	I-131	<2.14E-02	0.00E+00	2.14E-02
		Cs-134	<2.01E-02	0.00E+00	2.01E-02
		Cs-137	<1.23E-02	0.00E+00	1.23E-02
		Be-7	<1.40E-01	0.00E+00	1.40E-01
		K-40	6.31E-01	1.35E-01	3.28E-01
297677	7/8/2014 - 7/15/2014	I-131	<3.02E-02	0.00E+00	3.02E-02
		Cs-134	<1.20E-02	0.00E+00	1.20E-02
		Cs-137	<1.28E-02	0.00E+00	1.28E-02
		Be-7	<9.09E-02	0.00E+00	9.09E-02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.





# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 201 [ INDICATOR - NE @ 0.53 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
297677	7/8/2014 - 7/15/2014	K-40	4.82E-01	1.71E-01	3.84E-02
350525	7/15/2014 - 7/22/2014	I-131	<3.99E-02	0.00E+00	3.99E-02
		Cs-134	<1.31E-02	0.00E+00	1.31E-02
		Cs-137	<1.63E-02	0.00E+00	1.63E-02
		Be-7	<3.18E-02	0.00E+00	3.18E-02
		K-40	<4.92E-01	0.00E+00	4.92E-01
350524	7/22/2014 - 7/29/2014	I-131	<2.94E-02	0.00E+00	2.94E-02
		Cs-134	<1.05E-02	0.00E+00	1.05E-02
		Cs-137	<1.92E-02	0.00E+00	1.92E-02
		Be-7	<1.04E-01	0.00E+00	1.04E-01
		K-40	3.48E-01	2.34E-01	2.62E-01
350962	7/29/2014 - 8/5/2014	I-131	<1.35E-02	0.00E+00	1.35E-02
		Cs-134	<1.85E-02	0.00E+00	1.85E-02
		Cs-137	<1.30E-02	0.00E+00	1.30E-02
		Be-7	<1.32E-01	0.00E+00	1.32E-01
		K-40	4.33E-01	2.98E-01	3.93E-01
351209	8/5/2014 - 8/12/2014	I-131	<2.03E-02	0.00E+00	2.03E-02
		Cs-134	<1.52E-02	0.00E+00	1.52E-02
		Cs-137	<1.90E-02	0.00E+00	1.90E-02
		Be-7	<1.33E-01	0.00E+00	1.33E-01
		K-40	<5.79E-01	0.00E+00	5.79E-01
351515	8/12/2014 - 8/19/2014	I-131	<2.35E-02	0.00E+00	2.35E-02
		Cs-134	<2.26E-02	0.00E+00	2.26E-02
		Cs-137	<2.47E-02	0.00E+00	2.47E-02
		Be-7	<1.64E-01	0.00E+00	1.64E-01
		K-40	2.96E-01	2.97E-01	4.59E-01
353377	8/19/2014 - 8/26/2014	I-131	<1.61E-02	0.00E+00	1.61E-02
		Cs-134	<1.56E-02	0.00E+00	1.56E-02
		Cs-137	<1.30E-02	0.00E+00	1.30E-02
		Be-7	<1.03E-01	0.00E+00	1.03E-01
		K-40	4.57E-01	2.80E-01	3.28E-01
353947	8/26/2014 - 9/3/2014	I-131	<1.54E-02	0.00E+00	1.54E-02
		Cs-134	<2.77E-02	0.00E+00	2.77E-02
		Cs-137	<1.85E-02	0.00E+00	1.85E-02
		Be-7	<2.60E-02	0.00E+00	2.60E-02
		K-40	3.07E-01	2.00E-01	2.11E-01
354392	9/3/2014 - 9/9/2014	I-131	<2.17E-02	0.00E+00	2.17E-02
		Cs-134	<2.64E-02	0.00E+00	2.64E-02
		Cs-137	<2.89E-02	0.00E+00	2.89E-02
		Be-7	<2.12E-01	0.00E+00	2.12E-01
		K-40	<7.58E-01	0.00E+00	7.58E-01
354708	9/9/2014 - 9/16/2014	I-131	<1.10E-02	0.00E+00	1.10E-02
		Cs-134	<1.95E-02	0.00E+00	1.95E-02
		Cs-137	<1.89E-02	0.00E+00	1.89E-02
		Be-7	<1.18E-01	0.00E+00	1.18E-01
		K-40	7.41E-01	3.03E-01	8.04E-02
355045	9/16/2014 - 9/23/2014	I-131	<1.40E-02	0.00E+00	1.40E-02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 201 [ INDICATOR - NE @ 0.53 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
355045	9/16/2014 - 9/23/2014	Cs-134	<1.52E-02	0.00E+00	1.52E-02
		Cs-137	<4.78E-03	0.00E+00	4.78E-03
		Be-7	<1.19E-01	0.00E+00	1.19E-01
		K-40	5.66E-01	2.64E-01	8.07E-02
355573	9/23/2014 - 9/30/2014	I-131	<1.99E-02	0.00E+00	1.99E-02
		Cs-134	<1.32E-02	0.00E+00	1.32E-02
		Cs-137	<1.91E-02	0.00E+00	1.91E-02
		Be-7	<1.02E-01	0.00E+00	1.02E-01
		K-40	5.68E-01	2.65E-01	8.10E-02
356394	9/30/2014 - 10/7/2014	I-131	<2.51E-02	0.00E+00	2.51E-02
		Cs-134	<1.69E-02	0.00E+00	1.69E-02
		Cs-137	<1.63E-02	0.00E+00	1.63E-02
		Be-7	<1.20E-01	0.00E+00	1.20E-01
		K-40	4.79E-01	3.22E-01	4.30E-01
356978	10/7/2014 - 10/14/2014	I-131	<1.12E-02	0.00E+00	1.12E-02
		Cs-134	<1.69E-02	0.00E+00	1.69E-02
		Cs-137	<1.89E-02	0.00E+00	1.89E-02
		Be-7	<1.02E-01	0.00E+00	1.02E-01
		K-40	4.52E-01	2.70E-01	3.01E-01
357984	10/14/2014 - 10/21/2014	I-131	<2.47E-02	0.00E+00	2.47E-02
		Cs-134	<1.52E-02	0.00E+00	1.52E-02
		Cs-137	<1.30E-02	0.00E+00	1.30E-02
		Be-7	<1.65E-01	0.00E+00	1.65E-01
		K-40	<5.19E-01	0.00E+00	5.19E-01
358607	10/21/2014 - 10/28/2014	I-131	<1.79E-02	0.00E+00	1.79E-02
		Cs-134	<1.04E-02	0.00E+00	1.04E-02
		Cs-137	<2.12E-02	0.00E+00	2.12E-02
		Be-7	<1.02E-01	0.00E+00	1.02E-01
		K-40	8.63E-01	3.29E-01	8.06E-02
359211	10/28/2014 - 11/4/2014	I-131	<1.24E-02	0.00E+00	1.24E-02
		Cs-134	<9.66E-03	0.00E+00	9.66E-03
		Cs-137	<1.42E-02	0.00E+00	1.42E-02
		Be-7	<7.59E-02	0.00E+00	7.59E-02
		K-40	4.39E-01	1.77E-01	1.55E-01
359966	11/4/2014 - 11/11/2014	I-131	<1.00E-02	0.00E+00	1.00E-02
		Cs-134	<1.15E-02	0.00E+00	1.15E-02
		Cs-137	<1.21E-02	0.00E+00	1.21E-02
		Be-7	<9.20E-02	0.00E+00	9.20E-02
		K-40	4.54E-01	1.65E-01	3.85E-02
360657	11/11/2014 - 11/18/2014	I-131	<1.80E-02	0.00E+00	1.80E-02
		Cs-134	<2.12E-02	0.00E+00	2.12E-02
		Cs-137	<1.64E-02	0.00E+00	1.64E-02
		Be-7	<1.66E-01	0.00E+00	1.66E-01
		K-40	4.47E-01	2.34E-01	8.07E-02
361525	11/18/2014 - 11/25/2014	I-131	<1.70E-02	0.00E+00	1.70E-02
		Cs-134	<1.31E-02	0.00E+00	1.31E-02
		Cs-137	<1.90E-02	0.00E+00	1.90E-02
		Be-7	<1.82E-01	0.00E+00	1.82E-01
		K-40	4.76E-01	2.42E-01	8.07E-02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 201 [ INDICATOR - NE @ 0.53 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
361910	11/25/2014 - 12/2/2014	I-131	<1.77E-02	0.00E+00	1.77E-02
		Cs-134	<8.05E-03	0.00E+00	8.05E-03
		Cs-137	<1.47E-02	0.00E+00	1.47E-02
		Be-7	<1.36E-01	0.00E+00	1.36E-01
		K-40	5.28E-01	2.29E-01	6.50E-02

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
362719	12/2/2014 - 12/9/2014	I-131	<1.27E-02	0.00E+00	1.27E-02
		Cs-134	<8.19E-03	0.00E+00	8.19E-03
		Cs-137	<1.67E-02	0.00E+00	1.67E-02
		Be-7	<8.16E-02	0.00E+00	8.16E-02
		K-40	3.67E-01	1.92E-01	6.64E-02

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
363468	12/9/2014 - 12/16/2014	I-131	<1.16E-02	0.00E+00	1.16E-02
		Cs-134	<8.28E-03	0.00E+00	8.28E-03
		Cs-137	<1.12E-02	0.00E+00	1.12E-02
		Be-7	<7.72E-02	0.00E+00	7.72E-02
		K-40	4.75E-01	1.94E-01	1.94E-01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
363920	12/16/2014 - 12/23/2014	I-131	<1.72E-02	0.00E+00	1.72E-02
		Cs-134	<1.47E-02	0.00E+00	1.47E-02
		Cs-137	<1.91E-02	0.00E+00	1.91E-02
		Be-7	<1.18E-01	0.00E+00	1.18E-01
		K-40	5.67E-01	2.42E-01	2.59E-01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
364441	12/23/2014 - 12/30/2014	I-131	<8.31E-03	0.00E+00	8.31E-03
		Cs-134	<7.35E-03	0.00E+00	7.35E-03
		Cs-137	<8.08E-03	0.00E+00	8.08E-03
		Be-7	<6.42E-02	0.00E+00	6.42E-02
		K-40	3.26E-01	1.19E-01	1.24E-01

## Sample Point 208 [ INDICATOR - S @ 0.45 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
280735	12/31/2013 - 1/7/2014	I-131	<2.02E-02	0.00E+00	2.02E-02
		Cs-134	<1.79E-02	0.00E+00	1.79E-02
		Cs-137	<1.96E-02	0.00E+00	1.96E-02
		Be-7	<1.26E-01	0.00E+00	1.26E-01
		K-40	3.55E-01	1.40E-01	3.28E-01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
280918	1/7/2014 - 1/14/2014	I-131	<1.86E-02	0.00E+00	1.86E-02
		Cs-134	<1.24E-02	0.00E+00	1.24E-02
		Cs-137	<1.70E-02	0.00E+00	1.70E-02
		Be-7	<1.49E-01	0.00E+00	1.49E-01
		K-40	6.32E-01	1.35E-01	2.07E-01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
281298	1/14/2014 - 1/21/2014	I-131	<2.07E-02	0.00E+00	2.07E-02
		Cs-134	<1.45E-02	0.00E+00	1.45E-02
		Cs-137	<1.72E-02	0.00E+00	1.72E-02
		Be-7	<1.25E-01	0.00E+00	1.25E-01
		K-40	5.72E-01	1.17E-01	6.44E-02

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
281657	1/21/2014 - 1/28/2014	I-131	<1.17E-02	0.00E+00	1.17E-02
		Cs-134	<6.93E-03	0.00E+00	6.93E-03
		Cs-137	<1.05E-02	0.00E+00	1.05E-02
		Be-7	<7.56E-02	0.00E+00	7.56E-02
		K-40	4.65E-01	7.45E-02	1.27E-01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
282225	1/28/2014 - 2/4/2014	I-131	<2.18E-02	0.00E+00	2.18E-02
		Cs-134	<1.74E-02	0.00E+00	1.74E-02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 208 [ INDICATOR - S @ 0.45 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
282225	1/28/2014 - 2/4/2014	Cs-137	<1.75E-02	0.00E+00	1.75E-02
		Be-7	<1.61E-01	0.00E+00	1.61E-01
		K-40	4.84E-01	1.18E-01	7.70E-02
283087	2/4/2014 - 2/10/2014	I-131	<1.10E-02	0.00E+00	1.10E-02
		Cs-134	<1.09E-02	0.00E+00	1.09E-02
		Cs-137	<1.14E-02	0.00E+00	1.14E-02
		Be-7	<6.28E-02	0.00E+00	6.28E-02
		K-40	5.03E-01	8.17E-02	1.24E-01
283469	2/10/2014 - 2/18/2014	I-131	<7.12E-03	0.00E+00	7.12E-03
		Cs-134	<1.73E-02	0.00E+00	1.73E-02
		Cs-137	<1.23E-02	0.00E+00	1.23E-02
		Be-7	<9.34E-02	0.00E+00	9.34E-02
		K-40	4.22E-01	9.44E-02	1.92E-01
284656	2/18/2014 - 2/25/2014	I-131	<1.21E-02	0.00E+00	1.21E-02
		Cs-134	<7.50E-03	0.00E+00	7.50E-03
		Cs-137	<9.61E-03	0.00E+00	9.61E-03
		Be-7	<6.60E-02	0.00E+00	6.60E-02
		K-40	4.58E-01	8.43E-02	8.53E-02
285218	2/25/2014 - 3/4/2014	I-131	<2.12E-02	0.00E+00	2.12E-02
		Cs-134	<1.75E-02	0.00E+00	1.75E-02
		Cs-137	<2.25E-02	0.00E+00	2.25E-02
		Be-7	<1.12E-01	0.00E+00	1.12E-01
		K-40	<5.39E-01	0.00E+00	5.39E-01
285825	3/4/2014 - 3/11/2014	I-131	<2.23E-02	0.00E+00	2.23E-02
		Cs-134	<1.44E-02	0.00E+00	1.44E-02
		Cs-137	<1.60E-02	0.00E+00	1.60E-02
		Be-7	<1.91E-01	0.00E+00	1.91E-01
		K-40	<6.05E-01	0.00E+00	6.05E-01
286340	3/11/2014 - 3/18/2014	I-131	<2.28E-02	0.00E+00	2.28E-02
		Cs-134	<1.73E-02	0.00E+00	1.73E-02
		Cs-137	<1.99E-02	0.00E+00	1.99E-02
		Be-7	<1.75E-01	0.00E+00	1.75E-01
		K-40	6.24E-01	1.33E-01	3.76E-01
287188	3/18/2014 - 3/25/2014	I-131	<1.35E-02	0.00E+00	1.35E-02
		Cs-134	<1.13E-02	0.00E+00	1.13E-02
		Cs-137	<8.92E-03	0.00E+00	8.92E-03
		Be-7	<7.73E-02	0.00E+00	7.73E-02
		K-40	3.52E-01	8.29E-02	1.88E-01
288445	3/25/2014 - 4/1/2014	I-131	<9.23E-03	0.00E+00	9.23E-03
		Cs-134	<1.11E-02	0.00E+00	1.11E-02
		Cs-137	<8.47E-03	0.00E+00	8.47E-03
		Be-7	<6.21E-02	0.00E+00	6.21E-02
		K-40	6.70E-01	9.84E-02	1.06E-01
289179	4/1/2014 - 4/8/2014	I-131	<2.04E-02	0.00E+00	2.04E-02
		Cs-134	<2.25E-02	0.00E+00	2.25E-02
		Cs-137	<1.44E-02	0.00E+00	1.44E-02
		Be-7	<9.66E-02	0.00E+00	9.66E-02
		K-40	4.30E-01	1.11E-01	2.72E-01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 208 [ INDICATOR - S @ 0.45 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
289565	4/8/2014 - 4/15/2014	I-131	<1.07E-02	0.00E+00	1.07E-02
		Cs-134	<1.15E-02	0.00E+00	1.15E-02
		Cs-137	<1.02E-02	0.00E+00	1.02E-02
		Be-7	<6.22E-02	0.00E+00	6.22E-02
		K-40	3.23E-01	9.50E-02	1.38E-01
290047	4/15/2014 - 4/22/2014	I-131	<7.56E-03	0.00E+00	7.56E-03
		Cs-134	<7.75E-03	0.00E+00	7.75E-03
		Cs-137	<9.72E-03	0.00E+00	9.72E-03
		Be-7	<6.83E-02	0.00E+00	6.83E-02
		K-40	5.90E-01	9.51E-02	8.60E-02
292128	4/22/2014 - 4/29/2014	I-131	<9.54E-03	0.00E+00	9.54E-03
		Cs-134	<8.75E-03	0.00E+00	8.75E-03
		Cs-137	<1.15E-02	0.00E+00	1.15E-02
		Be-7	<7.41E-02	0.00E+00	7.41E-02
		K-40	5.98E-01	8.46E-02	8.59E-02
292858	4/29/2014 - 5/6/2014	I-131	<1.24E-02	0.00E+00	1.24E-02
		Cs-134	<7.14E-03	0.00E+00	7.14E-03
		Cs-137	<1.23E-02	0.00E+00	1.23E-02
		Be-7	<7.09E-02	0.00E+00	7.09E-02
		K-40	3.95E-01	9.16E-02	1.67E-01
293129	5/6/2014 - 5/13/2014	I-131	<1.22E-02	0.00E+00	1.22E-02
		Cs-134	<8.86E-03	0.00E+00	8.86E-03
		Cs-137	<2.22E-02	0.00E+00	2.22E-02
		Be-7	<1.15E-01	0.00E+00	1.15E-01
		K-40	3.54E-01	1.41E-01	1.98E-01
294771	5/13/2014 - 5/20/2014	I-131	<1.19E-02	0.00E+00	1.19E-02
		Cs-134	<1.04E-02	0.00E+00	1.04E-02
		Cs-137	<1.43E-02	0.00E+00	1.43E-02
		Be-7	<6.04E-02	0.00E+00	6.04E-02
		K-40	3.47E-01	6.94E-02	1.01E-01
295297	5/20/2014 - 5/28/2014	I-131	<2.56E-02	0.00E+00	2.56E-02
		Cs-134	<1.24E-02	0.00E+00	1.24E-02
		Cs-137	<1.90E-02	0.00E+00	1.90E-02
		Be-7	<1.01E-01	0.00E+00	1.01E-01
		K-40	<5.32E-01	0.00E+00	5.32E-01
295621	5/28/2014 - 6/3/2014	I-131	<2.79E-02	0.00E+00	2.79E-02
		Cs-134	<2.34E-02	0.00E+00	2.34E-02
		Cs-137	<2.95E-02	0.00E+00	2.95E-02
		Be-7	<1.88E-01	0.00E+00	1.88E-01
		K-40	5.32E-01	1.33E-01	3.11E-01
296023	6/3/2014 - 6/10/2014	I-131	<9.34E-03	0.00E+00	9.34E-03
		Cs-134	<9.14E-03	0.00E+00	9.14E-03
		Cs-137	<1.41E-02	0.00E+00	1.41E-02
		Be-7	<9.60E-02	0.00E+00	9.60E-02
		K-40	5.19E-01	1.06E-01	1.98E-01
296288	6/10/2014 - 6/17/2014	I-131	<9.65E-03	0.00E+00	9.65E-03
		Cs-134	<1.11E-02	0.00E+00	1.11E-02
		Cs-137	<1.77E-02	0.00E+00	1.77E-02
		Be-7	<8.78E-02	0.00E+00	8.78E-02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 208 [ INDICATOR - S @ 0.45 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
296288	6/10/2014 - 6/17/2014	K-40	4.64E-01	9.53E-02	1.24E-01
296818	6/17/2014 - 6/24/2014	I-131	<1.86E-02	0.00E+00	1.86E-02
		Cs-134	<1.96E-02	0.00E+00	1.96E-02
		Cs-137	<1.54E-02	0.00E+00	1.54E-02
		Be-7	<1.40E-01	0.00E+00	1.40E-01
		K-40	<5.70E-01	0.00E+00	5.70E-01
297093	6/24/2014 - 7/1/2014	I-131	<1.20E-02	0.00E+00	1.20E-02
		Cs-134	<1.28E-02	0.00E+00	1.28E-02
		Cs-137	<1.24E-02	0.00E+00	1.24E-02
		Be-7	<7.05E-02	0.00E+00	7.05E-02
		K-40	3.21E-01	1.10E-01	1.76E-01
297448	7/1/2014 - 7/8/2014	I-131	<2.06E-02	0.00E+00	2.06E-02
		Cs-134	<1.73E-02	0.00E+00	1.73E-02
		Cs-137	<2.19E-02	0.00E+00	2.19E-02
		Be-7	<1.48E-01	0.00E+00	1.48E-01
		K-40	3.84E-01	1.44E-01	3.28E-01
297703	7/8/2014 - 7/15/2014	I-131	<3.04E-02	0.00E+00	3.04E-02
		Cs-134	<8.13E-03	0.00E+00	8.13E-03
		Cs-137	<1.28E-02	0.00E+00	1.28E-02
		Be-7	<8.75E-02	0.00E+00	8.75E-02
		K-40	5.31E-01	2.62E-01	2.68E-01
350527	7/15/2014 - 7/22/2014	I-131	<2.58E-02	0.00E+00	2.58E-02
		Cs-134	<2.35E-02	0.00E+00	2.35E-02
		Cs-137	<1.29E-02	0.00E+00	1.29E-02
		Be-7	<1.41E-01	0.00E+00	1.41E-01
		K-40	3.83E-01	2.70E-01	3.48E-01
350526	7/22/2014 - 7/29/2014	I-131	<1.75E-02	0.00E+00	1.75E-02
		Cs-134	<1.53E-02	0.00E+00	1.53E-02
		Cs-137	<2.51E-02	0.00E+00	2.51E-02
		Be-7	<1.47E-01	0.00E+00	1.47E-01
		K-40	5.81E-01	2.97E-01	2.89E-01
350963	7/29/2014 - 8/1/2014	I-131	<5.43E-02	0.00E+00	5.43E-02
		Cs-134	<2.96E-02	0.00E+00	2.96E-02
		Cs-137	<2.92E-02	0.00E+00	2.92E-02
		Be-7	<3.04E-01	0.00E+00	3.04E-01
		K-40	1.07E+00	6.65E-01	8.11E-01
351210	8/6/2014 - 8/12/2014	I-131	<2.77E-02	0.00E+00	2.77E-02
		Cs-134	<1.78E-02	0.00E+00	1.78E-02
		Cs-137	<2.49E-02	0.00E+00	2.49E-02
		Be-7	<1.55E-01	0.00E+00	1.55E-01
		K-40	5.02E-01	3.06E-01	3.38E-01
351516	8/12/2014 - 8/19/2014	I-131	<1.60E-02	0.00E+00	1.60E-02
		Cs-134	<2.26E-02	0.00E+00	2.26E-02
		Cs-137	<1.29E-02	0.00E+00	1.29E-02
		Be-7	<1.02E-01	0.00E+00	1.02E-01
		K-40	6.57E-01	3.14E-01	3.00E-01
353378	8/19/2014 - 8/26/2014	I-131	<1.61E-02	0.00E+00	1.61E-02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 208 [ INDICATOR - S @ 0.45 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
353378	8/19/2014 - 8/26/2014	Cs-134	<1.56E-02	0.00E+00	1.56E-02
		Cs-137	<1.91E-02	0.00E+00	1.91E-02
		Be-7	<1.19E-01	0.00E+00	1.19E-01
		K-40	4.90E-01	2.74E-01	2.83E-01
353948	8/26/2014 - 9/3/2014	I-131	<2.09E-02	0.00E+00	2.09E-02
		Cs-134	<1.32E-02	0.00E+00	1.32E-02
		Cs-137	<1.39E-02	0.00E+00	1.39E-02
		Be-7	<1.40E-01	0.00E+00	1.40E-01
		K-40	3.80E-01	1.99E-01	6.86E-02
354393	9/3/2014 - 9/9/2014	I-131	<1.19E-02	0.00E+00	1.19E-02
		Cs-134	<2.23E-02	0.00E+00	2.23E-02
		Cs-137	<1.47E-02	0.00E+00	1.47E-02
		Be-7	<1.63E-01	0.00E+00	1.63E-01
		K-40	3.04E-01	2.04E-01	9.15E-02
354709	9/9/2014 - 9/16/2014	I-131	<1.80E-02	0.00E+00	1.80E-02
		Cs-134	<1.55E-02	0.00E+00	1.55E-02
		Cs-137	<1.63E-02	0.00E+00	1.63E-02
		Be-7	<1.44E-01	0.00E+00	1.44E-01
		K-40	<5.97E-01	0.00E+00	5.97E-01
355047	9/16/2014 - 9/23/2014	I-131	<1.62E-02	0.00E+00	1.62E-02
		Cs-134	<1.70E-02	0.00E+00	1.70E-02
		Cs-137	<1.90E-02	0.00E+00	1.90E-02
		Be-7	<1.03E-01	0.00E+00	1.03E-01
		K-40	<5.81E-01	0.00E+00	5.81E-01
355574	9/23/2014 - 9/30/2014	I-131	<2.45E-02	0.00E+00	2.45E-02
		Cs-134	<1.70E-02	0.00E+00	1.70E-02
		Cs-137	<1.91E-02	0.00E+00	1.91E-02
		Be-7	<1.44E-01	0.00E+00	1.44E-01
		K-40	<6.37E-01	0.00E+00	6.37E-01
356395	9/30/2014 - 10/7/2014	I-131	<2.78E-02	0.00E+00	2.78E-02
		Cs-134	<1.31E-02	0.00E+00	1.31E-02
		Cs-137	<1.29E-02	0.00E+00	1.29E-02
		Be-7	<1.20E-01	0.00E+00	1.20E-01
		K-40	<5.17E-01	0.00E+00	5.17E-01
356979	10/7/2014 - 10/14/2014	I-131	<2.42E-02	0.00E+00	2.42E-02
		Cs-134	<1.04E-02	0.00E+00	1.04E-02
		Cs-137	<1.29E-02	0.00E+00	1.29E-02
		Be-7	<1.56E-01	0.00E+00	1.56E-01
		K-40	4.65E-01	2.61E-01	2.56E-01
357985	10/14/2014 - 10/21/2014	I-131	<1.60E-02	0.00E+00	1.60E-02
		Cs-134	<1.31E-02	0.00E+00	1.31E-02
		Cs-137	<2.12E-02	0.00E+00	2.12E-02
		Be-7	<1.44E-01	0.00E+00	1.44E-01
		K-40	5.65E-01	2.63E-01	8.05E-02
358608	10/21/2014 - 10/28/2014	I-131	<1.60E-02	0.00E+00	1.60E-02
		Cs-134	<1.70E-02	0.00E+00	1.70E-02
		Cs-137	<1.64E-02	0.00E+00	1.64E-02
		Be-7	<1.02E-01	0.00E+00	1.02E-01
		K-40	<5.61E-01	0.00E+00	5.61E-01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 208 [ INDICATOR - S @ 0.45 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
359212	10/28/2014 - 11/4/2014	I-131	<1.31E-02	0.00E+00	1.31E-02
		Cs-134	<1.48E-02	0.00E+00	1.48E-02
		Cs-137	<1.14E-02	0.00E+00	1.14E-02
		Be-7	<1.24E-01	0.00E+00	1.24E-01
		K-40	4.65E-01	3.22E-01	4.49E-01
359967	11/4/2014 - 11/11/2014	I-131	<1.25E-02	0.00E+00	1.25E-02
		Cs-134	<9.69E-03	0.00E+00	9.69E-03
		Cs-137	<1.42E-02	0.00E+00	1.42E-02
		Be-7	<8.29E-02	0.00E+00	8.29E-02
		K-40	3.60E-01	1.58E-01	1.38E-01
360658	11/11/2014 - 11/18/2014	I-131	<1.92E-02	0.00E+00	1.92E-02
		Cs-134	<1.81E-02	0.00E+00	1.81E-02
		Cs-137	<2.59E-02	0.00E+00	2.59E-02
		Be-7	<1.52E-01	0.00E+00	1.52E-01
		K-40	3.78E-01	2.12E-01	7.88E-02
361526	11/18/2014 - 11/25/2014	I-131	<1.85E-02	0.00E+00	1.85E-02
		Cs-134	<1.99E-02	0.00E+00	1.99E-02
		Cs-137	<2.49E-02	0.00E+00	2.49E-02
		Be-7	<8.05E-02	0.00E+00	8.05E-02
		K-40	2.98E-01	2.51E-01	3.51E-01
361911	11/25/2014 - 12/2/2014	I-131	<3.06E-02	0.00E+00	3.06E-02
		Cs-134	<9.08E-03	0.00E+00	9.08E-03
		Cs-137	<1.66E-02	0.00E+00	1.66E-02
		Be-7	<1.45E-01	0.00E+00	1.45E-01
		K-40	4.14E-01	2.36E-01	2.40E-01
362720	12/2/2014 - 12/9/2014	I-131	<1.59E-02	0.00E+00	1.59E-02
		Cs-134	<7.49E-03	0.00E+00	7.49E-03
		Cs-137	<1.44E-02	0.00E+00	1.44E-02
		Be-7	<9.84E-02	0.00E+00	9.84E-02
		K-40	3.29E-01	1.77E-01	2.15E-01
363469	12/9/2014 - 12/16/2014	I-131	<1.22E-02	0.00E+00	1.22E-02
		Cs-134	<7.42E-03	0.00E+00	7.42E-03
		Cs-137	<1.21E-02	0.00E+00	1.21E-02
		Be-7	<9.53E-02	0.00E+00	9.53E-02
		K-40	4.55E-01	1.95E-01	2.06E-01
363921	12/16/2014 - 12/23/2014	I-131	<1.43E-02	0.00E+00	1.43E-02
		Cs-134	<8.22E-03	0.00E+00	8.22E-03
		Cs-137	<1.54E-02	0.00E+00	1.54E-02
		Be-7	<1.23E-01	0.00E+00	1.23E-01
		K-40	5.13E-01	1.95E-01	4.79E-02
364442	12/23/2014 - 12/30/2014	I-131	<1.43E-02	0.00E+00	1.43E-02
		Cs-134	<1.48E-02	0.00E+00	1.48E-02
		Cs-137	<1.55E-02	0.00E+00	1.55E-02
		Be-7	<1.00E-01	0.00E+00	1.00E-01
		K-40	4.67E-01	2.03E-01	1.79E-01

Sample Point 212 [ INDICATOR - E @ 3.32 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
280710	12/31/2013 - 1/7/2014	I-131	<1.82E-02	0.00E+00	1.82E-02
		Cs-134	<2.19E-02	0.00E+00	2.19E-02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.





# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 212 [ INDICATOR - E @ 3.32 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
280710	12/31/2013 - 1/7/2014	Cs-137	<1.32E-02	0.00E+00	1.32E-02
		Be-7	<1.31E-01	0.00E+00	1.31E-01
		K-40	6.00E-01	1.31E-01	2.15E-01
280893	1/7/2014 - 1/14/2014	I-131	<2.64E-02	0.00E+00	2.64E-02
		Cs-134	<2.09E-02	0.00E+00	2.09E-02
		Cs-137	<1.84E-02	0.00E+00	1.84E-02
		Be-7	<1.34E-01	0.00E+00	1.34E-01
		K-40	4.38E-01	1.13E-01	2.10E-01
281273	1/14/2014 - 1/21/2014	I-131	<1.53E-02	0.00E+00	1.53E-02
		Cs-134	<8.16E-03	0.00E+00	8.16E-03
		Cs-137	<1.34E-02	0.00E+00	1.34E-02
		Be-7	<1.10E-01	0.00E+00	1.10E-01
		K-40	<4.48E-01	0.00E+00	4.48E-01
281632	1/21/2014 - 1/28/2014	I-131	<1.66E-02	0.00E+00	1.66E-02
		Cs-134	<1.47E-02	0.00E+00	1.47E-02
		Cs-137	<1.35E-02	0.00E+00	1.35E-02
		Be-7	<9.63E-02	0.00E+00	9.63E-02
		K-40	4.89E-01	1.07E-01	1.65E-01
282200	1/28/2014 - 2/4/2014	I-131	<1.96E-02	0.00E+00	1.96E-02
		Cs-134	<2.27E-02	0.00E+00	2.27E-02
		Cs-137	<2.24E-02	0.00E+00	2.24E-02
		Be-7	<1.60E-01	0.00E+00	1.60E-01
		K-40	<5.31E-01	0.00E+00	5.31E-01
283062	2/4/2014 - 2/10/2014	I-131	<1.24E-02	0.00E+00	1.24E-02
		Cs-134	<8.16E-03	0.00E+00	8.16E-03
		Cs-137	<1.09E-02	0.00E+00	1.09E-02
		Be-7	<1.03E-01	0.00E+00	1.03E-01
		K-40	4.67E-01	1.13E-01	7.42E-02
283444	2/10/2014 - 2/18/2014	I-131	<1.05E-02	0.00E+00	1.05E-02
		Cs-134	<7.88E-03	0.00E+00	7.88E-03
		Cs-137	<6.78E-03	0.00E+00	6.78E-03
		Be-7	<6.42E-02	0.00E+00	6.42E-02
		K-40	4.75E-01	8.00E-02	1.16E-01
284631	2/18/2014 - 2/25/2014	I-131	<9.67E-03	0.00E+00	9.67E-03
		Cs-134	<9.64E-03	0.00E+00	9.64E-03
		Cs-137	<9.46E-03	0.00E+00	9.46E-03
		Be-7	<7.57E-02	0.00E+00	7.57E-02
		K-40	2.72E-01	9.17E-02	1.69E-01
285193	2/25/2014 - 3/4/2014	I-131	<2.68E-02	0.00E+00	2.68E-02
		Cs-134	<2.12E-02	0.00E+00	2.12E-02
		Cs-137	<2.27E-02	0.00E+00	2.27E-02
		Be-7	<1.55E-01	0.00E+00	1.55E-01
		K-40	8.25E-01	1.53E-01	2.70E-01
285800	3/4/2014 - 3/11/2014	I-131	<1.66E-02	0.00E+00	1.66E-02
		Cs-134	<1.33E-02	0.00E+00	1.33E-02
		Cs-137	<1.60E-02	0.00E+00	1.60E-02
		Be-7	<1.18E-01	0.00E+00	1.18E-01
		K-40	3.14E-01	8.70E-02	6.53E-02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 212 [ INDICATOR - E @ 3.32 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
286315	3/11/2014 - 3/18/2014	I-131	<2.40E-02	0.00E+00	2.40E-02
		Cs-134	<1.60E-02	0.00E+00	1.60E-02
		Cs-137	<2.48E-02	0.00E+00	2.48E-02
		Be-7	<1.55E-01	0.00E+00	1.55E-01
		K-40	6.80E-01	1.39E-01	2.66E-01
287163	3/18/2014 - 3/25/2014	I-131	<1.16E-02	0.00E+00	1.16E-02
		Cs-134	<1.00E-02	0.00E+00	1.00E-02
		Cs-137	<3.32E-03	0.00E+00	3.32E-03
		Be-7	<1.11E-01	0.00E+00	1.11E-01
		K-40	2.06E-01	8.90E-02	1.92E-01
288420	3/25/2014 - 4/1/2014	I-131	<2.48E-02	0.00E+00	2.48E-02
		Cs-134	<1.83E-02	0.00E+00	1.83E-02
		Cs-137	<1.54E-02	0.00E+00	1.54E-02
		Be-7	<1.01E-01	0.00E+00	1.01E-01
		K-40	6.00E-01	1.31E-01	2.12E-01
289154	4/1/2014 - 4/8/2014	I-131	<2.01E-02	0.00E+00	2.01E-02
		Cs-134	<2.44E-02	0.00E+00	2.44E-02
		Cs-137	<2.08E-02	0.00E+00	2.08E-02
		Be-7	<1.74E-01	0.00E+00	1.74E-01
		K-40	5.47E-01	1.47E-01	3.87E-01
289540	4/8/2014 - 4/15/2014	I-131	<1.42E-02	0.00E+00	1.42E-02
		Cs-134	<1.15E-02	0.00E+00	1.15E-02
		Cs-137	<1.57E-02	0.00E+00	1.57E-02
		Be-7	<9.24E-02	0.00E+00	9.24E-02
		K-40	3.02E-01	6.43E-02	1.01E-01
290022	4/15/2014 - 4/22/2014	I-131	<1.25E-02	0.00E+00	1.25E-02
		Cs-134	<9.35E-03	0.00E+00	9.35E-03
		Cs-137	<1.39E-02	0.00E+00	1.39E-02
		Be-7	<8.85E-02	0.00E+00	8.85E-02
		K-40	2.89E-01	1.07E-01	2.34E-01
292103	4/22/2014 - 4/29/2014	I-131	<1.09E-02	0.00E+00	1.09E-02
		Cs-134	<8.74E-03	0.00E+00	8.74E-03
		Cs-137	<1.21E-02	0.00E+00	1.21E-02
		Be-7	<6.53E-02	0.00E+00	6.53E-02
		K-40	6.23E-01	9.45E-02	8.58E-02
292833	4/29/2014 - 5/6/2014	I-131	<1.24E-02	0.00E+00	1.24E-02
		Cs-134	<7.20E-03	0.00E+00	7.20E-03
		Cs-137	<1.27E-02	0.00E+00	1.27E-02
		Be-7	<1.15E-01	0.00E+00	1.15E-01
		K-40	4.55E-01	9.92E-02	5.85E-02
293104	5/6/2014 - 5/13/2014	I-131	<1.02E-02	0.00E+00	1.02E-02
		Cs-134	<9.81E-03	0.00E+00	9.81E-03
		Cs-137	<1.12E-02	0.00E+00	1.12E-02
		Be-7	<7.54E-02	0.00E+00	7.54E-02
		K-40	4.80E-01	8.36E-02	1.21E-01
294746	5/13/2014 - 5/20/2014	I-131	<9.13E-03	0.00E+00	9.13E-03
		Cs-134	<7.55E-03	0.00E+00	7.55E-03
		Cs-137	<9.16E-03	0.00E+00	9.16E-03
		Be-7	<5.69E-02	0.00E+00	5.69E-02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 212 [ INDICATOR - E @ 3.32 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
294746	5/13/2014 - 5/20/2014	K-40	6.72E-01	8.97E-02	3.24E-02
295272	5/20/2014 - 5/28/2014	I-131	<2.74E-02	0.00E+00	2.74E-02
		Cs-134	<7.42E-03	0.00E+00	7.42E-03
		Cs-137	<9.14E-03	0.00E+00	9.14E-03
		Be-7	<7.11E-02	0.00E+00	7.11E-02
		K-40	1.87E-01	9.53E-02	1.90E-01
295596	5/28/2014 - 6/3/2014	I-131	<3.37E-02	0.00E+00	3.37E-02
		Cs-134	<2.92E-02	0.00E+00	2.92E-02
		Cs-137	<2.34E-02	0.00E+00	2.34E-02
		Be-7	<1.98E-01	0.00E+00	1.98E-01
		K-40	5.69E-01	1.38E-01	9.05E-02
295998	6/3/2014 - 6/10/2014	I-131	<1.45E-02	0.00E+00	1.45E-02
		Cs-134	<1.22E-02	0.00E+00	1.22E-02
		Cs-137	<1.74E-02	0.00E+00	1.74E-02
		Be-7	<1.16E-01	0.00E+00	1.16E-01
		K-40	1.56E-01	9.60E-02	2.18E-01
296263	6/10/2014 - 6/17/2014	I-131	<7.84E-03	0.00E+00	7.84E-03
		Cs-134	<1.38E-02	0.00E+00	1.38E-02
		Cs-137	<8.15E-03	0.00E+00	8.15E-03
		Be-7	<8.01E-02	0.00E+00	8.01E-02
		K-40	2.93E-01	7.57E-02	1.46E-01
296793	6/17/2014 - 6/24/2014	I-131	<2.42E-02	0.00E+00	2.42E-02
		Cs-134	<1.72E-02	0.00E+00	1.72E-02
		Cs-137	<2.32E-02	0.00E+00	2.32E-02
		Be-7	<1.56E-01	0.00E+00	1.56E-01
		K-40	<5.11E-01	0.00E+00	5.11E-01
297068	6/24/2014 - 7/1/2014	I-131	<1.88E-02	0.00E+00	1.88E-02
		Cs-134	<7.77E-03	0.00E+00	7.77E-03
		Cs-137	<2.05E-02	0.00E+00	2.05E-02
		Be-7	<2.13E-01	0.00E+00	2.13E-01
		K-40	5.87E-01	1.31E-01	7.94E-02
297423	7/1/2014 - 7/8/2014	I-131	<2.26E-02	0.00E+00	2.26E-02
		Cs-134	<1.65E-02	0.00E+00	1.65E-02
		Cs-137	<2.86E-02	0.00E+00	2.86E-02
		Be-7	<9.63E-02	0.00E+00	9.63E-02
		K-40	<5.94E-01	0.00E+00	5.94E-01
297678	7/8/2014 - 7/15/2014	I-131	<2.38E-02	0.00E+00	2.38E-02
		Cs-134	<6.99E-03	0.00E+00	6.99E-03
		Cs-137	<1.10E-02	0.00E+00	1.10E-02
		Be-7	<9.70E-02	0.00E+00	9.70E-02
		K-40	5.22E-01	2.13E-01	5.66E-02
350529	7/15/2014 - 7/22/2014	I-131	<3.33E-02	0.00E+00	3.33E-02
		Cs-134	<1.67E-02	0.00E+00	1.67E-02
		Cs-137	<2.08E-02	0.00E+00	2.08E-02
		Be-7	<1.52E-01	0.00E+00	1.52E-01
		K-40	4.97E-01	2.45E-01	7.91E-02
350528	7/22/2014 - 7/29/2014	I-131	<1.96E-02	0.00E+00	1.96E-02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 212 [ INDICATOR - E @ 3.32 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
350528	7/22/2014 - 7/29/2014	Cs-134	<1.73E-02	0.00E+00	1.73E-02
		Cs-137	<2.36E-02	0.00E+00	2.36E-02
		Be-7	<1.70E-01	0.00E+00	1.70E-01
		K-40	4.14E-01	2.52E-01	2.62E-01
350964	7/29/2014 - 8/5/2014	I-131	<1.73E-02	0.00E+00	1.73E-02
		Cs-134	<1.52E-02	0.00E+00	1.52E-02
		Cs-137	<1.29E-02	0.00E+00	1.29E-02
		Be-7	<8.05E-02	0.00E+00	8.05E-02
		K-40	<5.79E-01	0.00E+00	5.79E-01
351211	8/5/2014 - 8/12/2014	I-131	<2.19E-02	0.00E+00	2.19E-02
		Cs-134	<1.70E-02	0.00E+00	1.70E-02
		Cs-137	<1.30E-02	0.00E+00	1.30E-02
		Be-7	<1.45E-01	0.00E+00	1.45E-01
		K-40	4.91E-01	2.72E-01	2.74E-01
351517	8/12/2014 - 8/19/2014	I-131	<1.92E-02	0.00E+00	1.92E-02
		Cs-134	<5.64E-03	0.00E+00	5.64E-03
		Cs-137	<1.62E-02	0.00E+00	1.62E-02
		Be-7	<1.72E-01	0.00E+00	1.72E-01
		K-40	2.59E-01	2.01E-01	2.39E-01
353379	8/19/2014 - 8/26/2014	I-131	<2.50E-02	0.00E+00	2.50E-02
		Cs-134	<1.98E-02	0.00E+00	1.98E-02
		Cs-137	<1.31E-02	0.00E+00	1.31E-02
		Be-7	<1.33E-01	0.00E+00	1.33E-01
		K-40	4.50E-01	2.36E-01	8.13E-02
353950	8/26/2014 - 9/3/2014	I-131	<9.41E-03	0.00E+00	9.41E-03
		Cs-134	<1.35E-02	0.00E+00	1.35E-02
		Cs-137	<4.15E-03	0.00E+00	4.15E-03
		Be-7	<1.25E-01	0.00E+00	1.25E-01
		K-40	4.14E-01	2.10E-01	7.02E-02
354394	9/3/2014 - 9/9/2014	I-131	<2.63E-02	0.00E+00	2.63E-02
		Cs-134	<6.66E-03	0.00E+00	6.66E-03
		Cs-137	<1.91E-02	0.00E+00	1.91E-02
		Be-7	<1.80E-01	0.00E+00	1.80E-01
		K-40	<7.20E-01	0.00E+00	7.20E-01
354710	9/9/2014 - 9/16/2014	I-131	<2.33E-02	0.00E+00	2.33E-02
		Cs-134	<2.49E-02	0.00E+00	2.49E-02
		Cs-137	<2.08E-02	0.00E+00	2.08E-02
		Be-7	<1.30E-01	0.00E+00	1.30E-01
		K-40	<6.72E-01	0.00E+00	6.72E-01
355049	9/16/2014 - 9/23/2014	I-131	<1.82E-02	0.00E+00	1.82E-02
		Cs-134	<1.55E-02	0.00E+00	1.55E-02
		Cs-137	<1.93E-02	0.00E+00	1.93E-02
		Be-7	<1.04E-01	0.00E+00	1.04E-01
		K-40	5.95E-01	3.27E-01	3.79E-01
355575	9/23/2014 - 9/30/2014	I-131	<2.23E-02	0.00E+00	2.23E-02
		Cs-134	<1.53E-02	0.00E+00	1.53E-02
		Cs-137	<1.91E-02	0.00E+00	1.91E-02
		Be-7	<1.32E-01	0.00E+00	1.32E-01
		K-40	4.78E-01	2.42E-01	8.09E-02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 212 [ INDICATOR - E @ 3.32 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
356396	9/30/2014 - 10/7/2014	I-131	<2.30E-02	0.00E+00	2.30E-02
		Cs-134	<1.66E-02	0.00E+00	1.66E-02
		Cs-137	<1.60E-02	0.00E+00	1.60E-02
		Be-7	<8.07E-02	0.00E+00	8.07E-02
		K-40	<4.63E-01	0.00E+00	4.63E-01
356980	10/7/2014 - 10/14/2014	I-131	<2.14E-02	0.00E+00	2.14E-02
		Cs-134	<1.53E-02	0.00E+00	1.53E-02
		Cs-137	<2.13E-02	0.00E+00	2.13E-02
		Be-7	<1.56E-01	0.00E+00	1.56E-01
		K-40	3.03E-01	2.66E-01	3.85E-01
357986	10/14/2014 - 10/21/2014	I-131	<2.42E-02	0.00E+00	2.42E-02
		Cs-134	<1.67E-02	0.00E+00	1.67E-02
		Cs-137	<1.28E-02	0.00E+00	1.28E-02
		Be-7	<1.30E-01	0.00E+00	1.30E-01
		K-40	7.30E-01	2.99E-01	7.92E-02
358609	10/21/2014 - 10/28/2014	I-131	<2.59E-02	0.00E+00	2.59E-02
		Cs-134	<1.85E-02	0.00E+00	1.85E-02
		Cs-137	<2.32E-02	0.00E+00	2.32E-02
		Be-7	<1.19E-01	0.00E+00	1.19E-01
		K-40	5.73E-01	2.98E-01	3.02E-01
359213	10/28/2014 - 11/4/2014	I-131	<1.36E-02	0.00E+00	1.36E-02
		Cs-134	<1.33E-02	0.00E+00	1.33E-02
		Cs-137	<1.14E-02	0.00E+00	1.14E-02
		Be-7	<1.25E-01	0.00E+00	1.25E-01
		K-40	6.69E-01	2.73E-01	7.25E-02
359968	11/4/2014 - 11/11/2014	I-131	<1.43E-02	0.00E+00	1.43E-02
		Cs-134	<1.13E-02	0.00E+00	1.13E-02
		Cs-137	<1.34E-02	0.00E+00	1.34E-02
		Be-7	<7.69E-02	0.00E+00	7.69E-02
		K-40	<3.24E-01	0.00E+00	3.24E-01
360659	11/11/2014 - 11/18/2014	I-131	<1.63E-02	0.00E+00	1.63E-02
		Cs-134	<2.16E-02	0.00E+00	2.16E-02
		Cs-137	<4.85E-03	0.00E+00	4.85E-03
		Be-7	<1.47E-01	0.00E+00	1.47E-01
		K-40	3.63E-01	2.12E-01	8.19E-02
361527	11/18/2014 - 11/25/2014	I-131	<1.04E-02	0.00E+00	1.04E-02
		Cs-134	<1.85E-02	0.00E+00	1.85E-02
		Cs-137	<2.12E-02	0.00E+00	2.12E-02
		Be-7	<1.43E-01	0.00E+00	1.43E-01
		K-40	<6.69E-01	0.00E+00	6.69E-01
361912	11/25/2014 - 12/2/2014	I-131	<2.48E-02	0.00E+00	2.48E-02
		Cs-134	<1.43E-02	0.00E+00	1.43E-02
		Cs-137	<1.46E-02	0.00E+00	1.46E-02
		Be-7	<1.18E-01	0.00E+00	1.18E-01
		K-40	<4.65E-01	0.00E+00	4.65E-01
362721	12/2/2014 - 12/9/2014	I-131	<2.01E-02	0.00E+00	2.01E-02
		Cs-134	<1.51E-02	0.00E+00	1.51E-02
		Cs-137	<1.16E-02	0.00E+00	1.16E-02
		Be-7	<1.07E-01	0.00E+00	1.07E-01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 212 [ INDICATOR - E @ 3.32 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
362721	12/2/2014 - 12/9/2014	K-40	5.83E-01	2.80E-01	2.57E-01
363470	12/9/2014 - 12/16/2014	I-131	<1.42E-02	0.00E+00	1.42E-02
		Cs-134	<1.10E-02	0.00E+00	1.10E-02
		Cs-137	<1.44E-02	0.00E+00	1.44E-02
		Be-7	<8.69E-02	0.00E+00	8.69E-02
		K-40	3.39E-01	1.58E-01	1.41E-01
363922	12/16/2014 - 12/23/2014	I-131	<1.42E-02	0.00E+00	1.42E-02
		Cs-134	<1.06E-02	0.00E+00	1.06E-02
		Cs-137	<1.18E-02	0.00E+00	1.18E-02
		Be-7	<1.12E-01	0.00E+00	1.12E-01
		K-40	7.07E-01	2.31E-01	4.79E-02
364443	12/23/2014 - 12/30/2014	I-131	<1.59E-02	0.00E+00	1.59E-02
		Cs-134	<9.58E-03	0.00E+00	9.58E-03
		Cs-137	<1.19E-02	0.00E+00	1.19E-02
		Be-7	<1.07E-01	0.00E+00	1.07E-01
		K-40	5.38E-01	2.16E-01	1.80E-01
<b>Sample Point 258 [ CONTROL - W @ 9.84 miles ]</b>					
280711	12/31/2013 - 1/7/2014	I-131	<2.24E-02	0.00E+00	2.24E-02
		Cs-134	<1.78E-02	0.00E+00	1.78E-02
		Cs-137	<1.98E-02	0.00E+00	1.98E-02
		Be-7	<1.12E-01	0.00E+00	1.12E-01
		K-40	<5.59E-01	0.00E+00	5.59E-01
280894	1/7/2014 - 1/14/2014	I-131	<2.39E-02	0.00E+00	2.39E-02
		Cs-134	<1.94E-02	0.00E+00	1.94E-02
		Cs-137	<1.60E-02	0.00E+00	1.60E-02
		Be-7	<1.24E-01	0.00E+00	1.24E-01
		K-40	6.30E-01	1.34E-01	3.01E-01
281274	1/14/2014 - 1/21/2014	I-131	<1.86E-02	0.00E+00	1.86E-02
		Cs-134	<1.49E-02	0.00E+00	1.49E-02
		Cs-137	<1.99E-02	0.00E+00	1.99E-02
		Be-7	<1.54E-01	0.00E+00	1.54E-01
		K-40	3.49E-01	1.29E-01	2.31E-01
281633	1/21/2014 - 1/28/2014	I-131	<1.75E-02	0.00E+00	1.75E-02
		Cs-134	<7.23E-03	0.00E+00	7.23E-03
		Cs-137	<8.56E-03	0.00E+00	8.56E-03
		Be-7	<7.11E-02	0.00E+00	7.11E-02
		K-40	4.53E-01	9.88E-02	5.83E-02
282201	1/28/2014 - 2/4/2014	I-131	<2.24E-02	0.00E+00	2.24E-02
		Cs-134	<2.24E-02	0.00E+00	2.24E-02
		Cs-137	<2.12E-02	0.00E+00	2.12E-02
		Be-7	<1.12E-01	0.00E+00	1.12E-01
		K-40	3.97E-01	1.31E-01	2.14E-01
283063	2/4/2014 - 2/10/2014	I-131	<9.95E-03	0.00E+00	9.95E-03
		Cs-134	<9.65E-03	0.00E+00	9.65E-03
		Cs-137	<1.28E-02	0.00E+00	1.28E-02
		Be-7	<9.25E-02	0.00E+00	9.25E-02
		K-40	5.10E-01	1.06E-01	5.99E-02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 258 [ CONTROL - W @ 9.84 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
283445	2/10/2014 - 2/18/2014	I-131	<6.82E-03	0.00E+00	6.82E-03
		Cs-134	<1.03E-02	0.00E+00	1.03E-02
		Cs-137	<1.16E-02	0.00E+00	1.16E-02
		Be-7	<4.88E-02	0.00E+00	4.88E-02
		K-40	<3.54E-01	0.00E+00	3.54E-01
284632	2/18/2014 - 2/25/2014	I-131	<1.41E-02	0.00E+00	1.41E-02
		Cs-134	<9.26E-03	0.00E+00	9.26E-03
		Cs-137	<9.33E-03	0.00E+00	9.33E-03
		Be-7	<8.47E-02	0.00E+00	8.47E-02
		K-40	4.38E-01	7.75E-02	9.80E-02
285194	2/25/2014 - 3/4/2014	I-131	<1.91E-02	0.00E+00	1.91E-02
		Cs-134	<1.28E-02	0.00E+00	1.28E-02
		Cs-137	<1.70E-02	0.00E+00	1.70E-02
		Be-7	<1.57E-01	0.00E+00	1.57E-01
		K-40	4.59E-01	1.15E-01	7.76E-02
285801	3/4/2014 - 3/11/2014	I-131	<2.13E-02	0.00E+00	2.13E-02
		Cs-134	<1.68E-02	0.00E+00	1.68E-02
		Cs-137	<2.06E-02	0.00E+00	2.06E-02
		Be-7	<1.32E-01	0.00E+00	1.32E-01
		K-40	7.42E-01	1.46E-01	2.06E-01
286316	3/11/2014 - 3/18/2014	I-131	<2.32E-02	0.00E+00	2.32E-02
		Cs-134	<1.98E-02	0.00E+00	1.98E-02
		Cs-137	<1.79E-02	0.00E+00	1.79E-02
		Be-7	<8.80E-02	0.00E+00	8.80E-02
		K-40	3.92E-01	1.34E-01	7.66E-02
287164	3/18/2014 - 3/25/2014	I-131	<9.58E-03	0.00E+00	9.58E-03
		Cs-134	<8.34E-03	0.00E+00	8.34E-03
		Cs-137	<8.97E-03	0.00E+00	8.97E-03
		Be-7	<7.35E-02	0.00E+00	7.35E-02
		K-40	3.22E-01	8.40E-02	1.01E-01
288421	3/25/2014 - 4/1/2014	I-131	<1.39E-02	0.00E+00	1.39E-02
		Cs-134	<6.47E-03	0.00E+00	6.47E-03
		Cs-137	<6.13E-03	0.00E+00	6.13E-03
		Be-7	<7.72E-02	0.00E+00	7.72E-02
		K-40	<3.80E-01	0.00E+00	3.80E-01
289155	4/1/2014 - 4/8/2014	I-131	<2.19E-02	0.00E+00	2.19E-02
		Cs-134	<2.14E-02	0.00E+00	2.14E-02
		Cs-137	<1.65E-02	0.00E+00	1.65E-02
		Be-7	<1.34E-01	0.00E+00	1.34E-01
		K-40	2.28E-01	1.34E-01	2.14E-01
289541	4/8/2014 - 4/15/2014	I-131	<1.16E-02	0.00E+00	1.16E-02
		Cs-134	<1.03E-02	0.00E+00	1.03E-02
		Cs-137	<1.11E-02	0.00E+00	1.11E-02
		Be-7	<7.97E-02	0.00E+00	7.97E-02
		K-40	<4.61E-01	0.00E+00	4.61E-01
290023	4/15/2014 - 4/22/2014	I-131	<1.52E-02	0.00E+00	1.52E-02
		Cs-134	<1.55E-02	0.00E+00	1.55E-02
		Cs-137	<9.64E-03	0.00E+00	9.64E-03
		Be-7	<1.11E-01	0.00E+00	1.11E-01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 258 [ CONTROL - W @ 9.84 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
290023	4/15/2014 - 4/22/2014	K-40	4.92E-01	1.07E-01	6.33E-02
292104	4/22/2014 - 4/29/2014	I-131	<1.31E-02	0.00E+00	1.31E-02
		Cs-134	<1.03E-02	0.00E+00	1.03E-02
		Cs-137	<1.08E-02	0.00E+00	1.08E-02
		Be-7	<6.38E-02	0.00E+00	6.38E-02
		K-40	3.59E-01	8.54E-02	9.94E-02
292834	4/29/2014 - 5/6/2014	I-131	<1.73E-02	0.00E+00	1.73E-02
		Cs-134	<1.86E-02	0.00E+00	1.86E-02
		Cs-137	<2.34E-02	0.00E+00	2.34E-02
		Be-7	<1.11E-01	0.00E+00	1.11E-01
		K-40	6.06E-01	1.61E-01	2.05E-01
293105	5/6/2014 - 5/13/2014	I-131	<8.17E-03	0.00E+00	8.17E-03
		Cs-134	<8.93E-03	0.00E+00	8.93E-03
		Cs-137	<1.01E-02	0.00E+00	1.01E-02
		Be-7	<9.68E-02	0.00E+00	9.68E-02
		K-40	3.11E-01	7.78E-02	5.26E-02
294747	5/13/2014 - 5/20/2014	I-131	<1.84E-02	0.00E+00	1.84E-02
		Cs-134	<8.36E-03	0.00E+00	8.36E-03
		Cs-137	<1.47E-02	0.00E+00	1.47E-02
		Be-7	<1.24E-01	0.00E+00	1.24E-01
		K-40	5.49E-01	1.43E-01	2.14E-01
295273	5/20/2014 - 5/28/2014	I-131	<1.60E-02	0.00E+00	1.60E-02
		Cs-134	<1.24E-02	0.00E+00	1.24E-02
		Cs-137	<2.92E-03	0.00E+00	2.92E-03
		Be-7	<7.96E-02	0.00E+00	7.96E-02
		K-40	2.27E-01	6.54E-02	5.11E-02
295597	5/28/2014 - 6/3/2014	I-131	<2.58E-02	0.00E+00	2.58E-02
		Cs-134	<2.14E-02	0.00E+00	2.14E-02
		Cs-137	<2.49E-02	0.00E+00	2.49E-02
		Be-7	<1.10E-01	0.00E+00	1.10E-01
		K-40	<5.80E-01	0.00E+00	5.80E-01
295999	6/3/2014 - 6/10/2014	I-131	<2.10E-02	0.00E+00	2.10E-02
		Cs-134	<1.69E-02	0.00E+00	1.69E-02
		Cs-137	<1.85E-02	0.00E+00	1.85E-02
		Be-7	<1.68E-01	0.00E+00	1.68E-01
		K-40	3.89E-01	1.04E-01	7.52E-02
296264	6/10/2014 - 6/17/2014	I-131	<1.77E-02	0.00E+00	1.77E-02
		Cs-134	<8.53E-03	0.00E+00	8.53E-03
		Cs-137	<1.27E-02	0.00E+00	1.27E-02
		Be-7	<1.09E-01	0.00E+00	1.09E-01
		K-40	2.38E-01	7.17E-02	5.84E-02
296794	6/17/2014 - 6/24/2014	I-131	<2.66E-02	0.00E+00	2.66E-02
		Cs-134	<1.46E-02	0.00E+00	1.46E-02
		Cs-137	<2.00E-02	0.00E+00	2.00E-02
		Be-7	<1.47E-01	0.00E+00	1.47E-01
		K-40	5.08E-01	1.50E-01	2.19E-01
297069	6/24/2014 - 7/1/2014	I-131	<1.78E-02	0.00E+00	1.78E-02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.





# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 258 [ CONTROL - W @ 9.84 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
297069	6/24/2014 - 7/1/2014	Cs-134	<1.69E-02	0.00E+00	1.69E-02
		Cs-137	<1.47E-02	0.00E+00	1.47E-02
		Be-7	<9.24E-02	0.00E+00	9.24E-02
		K-40	<5.11E-01	0.00E+00	5.11E-01
297424	7/1/2014 - 7/8/2014	I-131	<1.81E-02	0.00E+00	1.81E-02
		Cs-134	<1.24E-02	0.00E+00	1.24E-02
		Cs-137	<1.82E-02	0.00E+00	1.82E-02
		Be-7	<2.01E-01	0.00E+00	2.01E-01
		K-40	7.16E-01	1.43E-01	2.12E-01
297679	7/8/2014 - 7/15/2014	I-131	<1.85E-02	0.00E+00	1.85E-02
		Cs-134	<3.95E-03	0.00E+00	3.95E-03
		Cs-137	<8.69E-03	0.00E+00	8.69E-03
		Be-7	<4.40E-02	0.00E+00	4.40E-02
		K-40	4.46E-01	1.46E-01	3.02E-02
350531	7/15/2014 - 7/22/2014	I-131	<3.82E-02	0.00E+00	3.82E-02
		Cs-134	<1.52E-02	0.00E+00	1.52E-02
		Cs-137	<1.63E-02	0.00E+00	1.63E-02
		Be-7	<3.18E-02	0.00E+00	3.18E-02
		K-40	<6.79E-01	0.00E+00	6.79E-01
350530	7/22/2014 - 7/29/2014	I-131	<2.14E-02	0.00E+00	2.14E-02
		Cs-134	<1.53E-02	0.00E+00	1.53E-02
		Cs-137	<2.33E-02	0.00E+00	2.33E-02
		Be-7	<1.69E-01	0.00E+00	1.69E-01
		K-40	<5.45E-01	0.00E+00	5.45E-01
350965	7/29/2014 - 8/5/2014	I-131	<2.07E-02	0.00E+00	2.07E-02
		Cs-134	<1.52E-02	0.00E+00	1.52E-02
		Cs-137	<1.90E-02	0.00E+00	1.90E-02
		Be-7	<1.32E-01	0.00E+00	1.32E-01
		K-40	2.68E-01	1.80E-01	8.08E-02
351212	8/5/2014 - 8/12/2014	I-131	<2.04E-02	0.00E+00	2.04E-02
		Cs-134	<1.31E-02	0.00E+00	1.31E-02
		Cs-137	<2.11E-02	0.00E+00	2.11E-02
		Be-7	<8.13E-02	0.00E+00	8.13E-02
		K-40	3.45E-01	2.83E-01	4.03E-01
351518	8/12/2014 - 8/19/2014	I-131	<1.61E-02	0.00E+00	1.61E-02
		Cs-134	<3.15E-02	0.00E+00	3.15E-02
		Cs-137	<2.30E-02	0.00E+00	2.30E-02
		Be-7	<1.18E-01	0.00E+00	1.18E-01
		K-40	6.21E-01	2.76E-01	8.01E-02
353380	8/19/2014 - 8/26/2014	I-131	<1.81E-02	0.00E+00	1.81E-02
		Cs-134	<2.28E-02	0.00E+00	2.28E-02
		Cs-137	<1.30E-02	0.00E+00	1.30E-02
		Be-7	<1.33E-01	0.00E+00	1.33E-01
		K-40	<5.20E-01	0.00E+00	5.21E-01
353951	8/26/2014 - 9/3/2014	I-131	<1.56E-02	0.00E+00	1.56E-02
		Cs-134	<5.00E-03	0.00E+00	5.00E-03
		Cs-137	<1.43E-02	0.00E+00	1.43E-02
		Be-7	<1.45E-01	0.00E+00	1.45E-01
		K-40	3.41E-01	2.61E-01	3.64E-01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 258 [ CONTROL - W @ 9.84 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
354395	9/3/2014 - 9/9/2014	I-131	<3.24E-02	0.00E+00	3.24E-02
		Cs-134	<2.63E-02	0.00E+00	2.63E-02
		Cs-137	<2.20E-02	0.00E+00	2.20E-02
		Be-7	<1.52E-01	0.00E+00	1.52E-01
		K-40	7.57E-01	3.29E-01	9.33E-02
354711	9/9/2014 - 9/16/2014	I-131	<1.99E-02	0.00E+00	1.99E-02
		Cs-134	<2.27E-02	0.00E+00	2.27E-02
		Cs-137	<1.90E-02	0.00E+00	1.90E-02
		Be-7	<1.56E-01	0.00E+00	1.56E-01
		K-40	<5.60E-01	0.00E+00	5.60E-01
355052	9/16/2014 - 9/23/2014	I-131	<2.40E-02	0.00E+00	2.40E-02
		Cs-134	<1.85E-02	0.00E+00	1.85E-02
		Cs-137	<1.64E-02	0.00E+00	1.64E-02
		Be-7	<1.02E-01	0.00E+00	1.02E-01
		K-40	7.16E-01	3.29E-01	3.12E-01
355576	9/23/2014 - 9/30/2014	I-131	<2.37E-02	0.00E+00	2.37E-02
		Cs-134	<1.32E-02	0.00E+00	1.32E-02
		Cs-137	<2.50E-02	0.00E+00	2.50E-02
		Be-7	<1.44E-01	0.00E+00	1.44E-01
		K-40	<5.43E-01	0.00E+00	5.43E-01
356398	9/30/2014 - 10/7/2014	I-131	<2.81E-02	0.00E+00	2.81E-02
		Cs-134	<1.85E-02	0.00E+00	1.85E-02
		Cs-137	<2.11E-02	0.00E+00	2.11E-02
		Be-7	<1.04E-01	0.00E+00	1.04E-01
		K-40	<6.32E-01	0.00E+00	6.32E-01
356981	10/7/2014 - 10/14/2014	I-131	<2.55E-02	0.00E+00	2.55E-02
		Cs-134	<2.11E-02	0.00E+00	2.11E-02
		Cs-137	<1.89E-02	0.00E+00	1.89E-02
		Be-7	<1.02E-01	0.00E+00	1.02E-01
		K-40	2.67E-01	1.79E-01	8.03E-02
357987	10/14/2014 - 10/21/2014	I-131	<1.62E-02	0.00E+00	1.62E-02
		Cs-134	<1.53E-02	0.00E+00	1.53E-02
		Cs-137	<2.32E-02	0.00E+00	2.32E-02
		Be-7	<1.19E-01	0.00E+00	1.19E-01
		K-40	<5.63E-01	0.00E+00	5.63E-01
358610	10/21/2014 - 10/28/2014	I-131	<1.47E-02	0.00E+00	1.47E-02
		Cs-134	<1.28E-02	0.00E+00	1.28E-02
		Cs-137	<1.44E-02	0.00E+00	1.44E-02
		Be-7	<9.91E-02	0.00E+00	9.91E-02
		K-40	<4.28E-01	0.00E+00	4.28E-01
359214	10/28/2014 - 11/4/2014	I-131	<1.75E-02	0.00E+00	1.75E-02
		Cs-134	<8.30E-03	0.00E+00	8.30E-03
		Cs-137	<1.52E-02	0.00E+00	1.52E-02
		Be-7	<8.07E-02	0.00E+00	8.07E-02
		K-40	4.89E-01	2.69E-01	3.12E-01
359969	11/4/2014 - 11/11/2014	I-131	<1.10E-02	0.00E+00	1.10E-02
		Cs-134	<9.02E-03	0.00E+00	9.02E-03
		Cs-137	<1.28E-02	0.00E+00	1.28E-02
		Be-7	<8.31E-02	0.00E+00	8.31E-02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 258 [ CONTROL - W @ 9.84 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
359969	11/4/2014 - 11/11/2014	K-40	3.85E-01	1.82E-01	2.03E-01
360660	11/11/2014 - 11/18/2014	I-131	<1.77E-02	0.00E+00	1.77E-02
		Cs-134	<1.28E-02	0.00E+00	1.28E-02
		Cs-137	<1.26E-02	0.00E+00	1.26E-02
		Be-7	<1.41E-01	0.00E+00	1.41E-01
		K-40	2.89E-01	1.85E-01	7.84E-02
361528	11/18/2014 - 11/25/2014	I-131	<2.14E-02	0.00E+00	2.14E-02
		Cs-134	<1.31E-02	0.00E+00	1.31E-02
		Cs-137	<1.30E-02	0.00E+00	1.30E-02
		Be-7	<1.32E-01	0.00E+00	1.32E-01
		K-40	<6.53E-01	0.00E+00	6.53E-01
361913	11/25/2014 - 12/2/2014	I-131	<2.88E-02	0.00E+00	2.88E-02
		Cs-134	<1.63E-02	0.00E+00	1.63E-02
		Cs-137	<1.66E-02	0.00E+00	1.66E-02
		Be-7	<1.24E-01	0.00E+00	1.24E-01
		K-40	1.93E-01	1.88E-01	2.70E-01
362722	12/2/2014 - 12/9/2014	I-131	<2.05E-02	0.00E+00	2.05E-02
		Cs-134	<1.76E-02	0.00E+00	1.76E-02
		Cs-137	<1.50E-02	0.00E+00	1.50E-02
		Be-7	<9.44E-02	0.00E+00	9.44E-02
		K-40	4.06E-01	2.21E-01	2.14E-01
363471	12/9/2014 - 12/16/2014	I-131	<1.35E-02	0.00E+00	1.35E-02
		Cs-134	<1.09E-02	0.00E+00	1.09E-02
		Cs-137	<9.22E-03	0.00E+00	9.22E-03
		Be-7	<9.93E-02	0.00E+00	9.93E-02
		K-40	3.92E-01	1.78E-01	1.88E-01
363923	12/16/2014 - 12/23/2014	I-131	<1.73E-02	0.00E+00	1.73E-02
		Cs-134	<1.54E-02	0.00E+00	1.54E-02
		Cs-137	<2.27E-02	0.00E+00	2.27E-02
		Be-7	<1.12E-01	0.00E+00	1.12E-01
		K-40	5.27E-01	2.19E-01	2.02E-01
364444	12/23/2014 - 12/30/2014	I-131	<1.16E-02	0.00E+00	1.16E-02
		Cs-134	<1.07E-02	0.00E+00	1.07E-02
		Cs-137	<1.19E-02	0.00E+00	1.19E-02
		Be-7	<9.32E-02	0.00E+00	9.32E-02
		K-40	5.40E-01	2.14E-01	1.71E-01

## Sample Point 261 [ INDICATOR - N @ 0.72 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
280736	12/31/2013 - 1/7/2014	I-131	<2.16E-02	0.00E+00	2.16E-02
		Cs-134	<2.01E-02	0.00E+00	2.01E-02
		Cs-137	<2.07E-02	0.00E+00	2.07E-02
		Be-7	<8.00E-02	0.00E+00	8.00E-02
		K-40	4.32E-01	1.12E-01	7.78E-02
280919	1/7/2014 - 1/14/2014	I-131	<1.31E-02	0.00E+00	1.31E-02
		Cs-134	<5.70E-03	0.00E+00	5.70E-03
		Cs-137	<5.62E-03	0.00E+00	5.62E-03
		Be-7	<5.64E-02	0.00E+00	5.64E-02
		K-40	5.27E-01	4.88E-02	8.85E-02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 261 [ INDICATOR - N @ 0.72 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
281299	1/14/2014 - 1/21/2014	I-131	<2.46E-02	0.00E+00	2.46E-02
		Cs-134	<1.78E-02	0.00E+00	1.78E-02
		Cs-137	<2.35E-02	0.00E+00	2.35E-02
		Be-7	<1.43E-01	0.00E+00	1.43E-01
		K-40	4.69E-01	1.47E-01	3.52E-01
281658	1/21/2014 - 1/28/2014	I-131	<9.57E-03	0.00E+00	9.57E-03
		Cs-134	<1.11E-02	0.00E+00	1.11E-02
		Cs-137	<1.30E-02	0.00E+00	1.30E-02
		Be-7	<9.62E-02	0.00E+00	9.62E-02
		K-40	3.27E-01	7.93E-02	1.41E-01
282226	1/28/2014 - 2/4/2014	I-131	<1.53E-02	0.00E+00	1.53E-02
		Cs-134	<1.56E-02	0.00E+00	1.56E-02
		Cs-137	<1.93E-02	0.00E+00	1.93E-02
		Be-7	<1.90E-01	0.00E+00	1.90E-01
		K-40	<4.25E-01	0.00E+00	4.25E-01
283088	2/4/2014 - 2/10/2014	I-131	<2.18E-02	0.00E+00	2.18E-02
		Cs-134	<1.89E-02	0.00E+00	1.89E-02
		Cs-137	<1.62E-02	0.00E+00	1.62E-02
		Be-7	<1.26E-01	0.00E+00	1.26E-01
		K-40	4.94E-01	1.61E-01	2.58E-01
283470	2/10/2014 - 2/18/2014	I-131	<1.19E-02	0.00E+00	1.19E-02
		Cs-134	<8.79E-03	0.00E+00	8.79E-03
		Cs-137	<1.05E-02	0.00E+00	1.05E-02
		Be-7	<6.90E-02	0.00E+00	6.90E-02
		K-40	<3.02E-01	0.00E+00	3.02E-01
284657	2/18/2014 - 2/25/2014	I-131	<8.83E-03	0.00E+00	8.83E-03
		Cs-134	<1.26E-02	0.00E+00	1.26E-02
		Cs-137	<1.42E-02	0.00E+00	1.42E-02
		Be-7	<1.02E-01	0.00E+00	1.02E-01
		K-40	<4.51E-01	0.00E+00	4.51E-01
285219	2/25/2014 - 3/4/2014	I-131	<1.85E-02	0.00E+00	1.85E-02
		Cs-134	<1.60E-02	0.00E+00	1.60E-02
		Cs-137	<1.55E-02	0.00E+00	1.55E-02
		Be-7	<9.07E-02	0.00E+00	9.07E-02
		K-40	<6.31E-01	0.00E+00	6.31E-01
285826	3/4/2014 - 3/11/2014	I-131	<9.75E-03	0.00E+00	9.75E-03
		Cs-134	<9.40E-03	0.00E+00	9.40E-03
		Cs-137	<1.55E-02	0.00E+00	1.55E-02
		Be-7	<1.24E-01	0.00E+00	1.24E-01
		K-40	3.58E-01	9.24E-02	6.44E-02
286341	3/11/2014 - 3/18/2014	I-131	<2.38E-02	0.00E+00	2.38E-02
		Cs-134	<1.72E-02	0.00E+00	1.72E-02
		Cs-137	<1.52E-02	0.00E+00	1.52E-02
		Be-7	<1.60E-01	0.00E+00	1.60E-01
		K-40	<6.42E-01	0.00E+00	6.42E-01
287189	3/18/2014 - 3/25/2014	I-131	<1.49E-02	0.00E+00	1.49E-02
		Cs-134	<1.62E-02	0.00E+00	1.62E-02
		Cs-137	<1.95E-02	0.00E+00	1.95E-02
		Be-7	<9.03E-02	0.00E+00	9.03E-02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 261 [ INDICATOR - N @ 0.72 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
287189	3/18/2014 - 3/25/2014	K-40	4.01E-01	1.45E-01	3.17E-01
288446	3/25/2014 - 4/1/2014	I-131	<1.45E-02	0.00E+00	1.45E-02
		Cs-134	<1.01E-02	0.00E+00	1.01E-02
		Cs-137	<1.88E-02	0.00E+00	1.88E-02
		Be-7	<9.89E-02	0.00E+00	9.89E-02
		K-40	5.52E-01	1.15E-01	1.76E-01
289180	4/1/2014 - 4/8/2014	I-131	<9.68E-03	0.00E+00	9.68E-03
		Cs-134	<1.06E-02	0.00E+00	1.06E-02
		Cs-137	<7.08E-03	0.00E+00	7.08E-03
		Be-7	<9.37E-02	0.00E+00	9.37E-02
		K-40	5.04E-01	7.77E-02	3.24E-02
289566	4/8/2014 - 4/15/2014	I-131	<2.09E-02	0.00E+00	2.09E-02
		Cs-134	<1.74E-02	0.00E+00	1.74E-02
		Cs-137	<1.78E-02	0.00E+00	1.78E-02
		Be-7	<1.22E-01	0.00E+00	1.22E-01
		K-40	4.71E-01	1.39E-01	7.68E-02
290048	4/15/2014 - 4/22/2014	I-131	<2.09E-02	0.00E+00	2.09E-02
		Cs-134	<2.12E-02	0.00E+00	2.12E-02
		Cs-137	<1.83E-02	0.00E+00	1.83E-02
		Be-7	<1.44E-01	0.00E+00	1.44E-01
		K-40	<5.16E-01	0.00E+00	5.16E-01
292129	4/22/2014 - 4/29/2014	I-131	<2.32E-02	0.00E+00	2.32E-02
		Cs-134	<1.74E-02	0.00E+00	1.74E-02
		Cs-137	<1.55E-02	0.00E+00	1.55E-02
		Be-7	<1.72E-01	0.00E+00	1.72E-01
		K-40	<4.91E-01	0.00E+00	4.91E-01
292859	4/29/2014 - 5/6/2014	I-131	<2.21E-02	0.00E+00	2.21E-02
		Cs-134	<1.89E-02	0.00E+00	1.89E-02
		Cs-137	<2.50E-02	0.00E+00	2.50E-02
		Be-7	<1.55E-01	0.00E+00	1.55E-01
		K-40	3.72E-01	1.03E-01	3.33E-01
293130	5/6/2014 - 5/13/2014	I-131	<1.32E-02	0.00E+00	1.32E-02
		Cs-134	<1.20E-02	0.00E+00	1.20E-02
		Cs-137	<1.50E-02	0.00E+00	1.50E-02
		Be-7	<9.16E-02	0.00E+00	9.16E-02
		K-40	7.33E-02	9.64E-02	1.01E-01
294772	5/13/2014 - 5/20/2014	I-131	<1.41E-02	0.00E+00	1.41E-02
		Cs-134	<7.26E-03	0.00E+00	7.26E-03
		Cs-137	<1.67E-02	0.00E+00	1.67E-02
		Be-7	4.52E-02	2.53E-02	9.07E-02
		K-40	3.69E-01	8.94E-02	5.86E-02
295298	5/20/2014 - 5/28/2014	I-131	<2.54E-02	0.00E+00	2.54E-02
		Cs-134	<1.53E-02	0.00E+00	1.53E-02
		Cs-137	<2.02E-02	0.00E+00	2.02E-02
		Be-7	<1.21E-01	0.00E+00	1.21E-01
		K-40	3.99E-01	9.97E-02	1.88E-01
295622	5/28/2014 - 6/3/2014	I-131	<2.97E-02	0.00E+00	2.97E-02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 261 [ INDICATOR - N @ 0.72 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
295622	5/28/2014 - 6/3/2014	Cs-134	<1.73E-02	0.00E+00	1.73E-02
		Cs-137	<2.57E-02	0.00E+00	2.57E-02
		Be-7	<1.30E-01	0.00E+00	1.30E-01
		K-40	<6.03E-01	0.00E+00	6.03E-01
296024	6/3/2014 - 6/10/2014	I-131	<1.14E-02	0.00E+00	1.14E-02
		Cs-134	<1.28E-02	0.00E+00	1.28E-02
		Cs-137	<1.61E-02	0.00E+00	1.61E-02
		Be-7	<6.07E-02	0.00E+00	6.07E-02
		K-40	3.47E-01	1.13E-01	2.10E-01
296289	6/10/2014 - 6/17/2014	I-131	<1.98E-02	0.00E+00	1.98E-02
		Cs-134	<1.35E-02	0.00E+00	1.35E-02
		Cs-137	<1.80E-02	0.00E+00	1.80E-02
		Be-7	<1.12E-01	0.00E+00	1.12E-01
		K-40	5.53E-01	1.15E-01	6.50E-02
296819	6/17/2014 - 6/24/2014	I-131	<1.58E-02	0.00E+00	1.58E-02
		Cs-134	<1.61E-02	0.00E+00	1.61E-02
		Cs-137	<2.27E-02	0.00E+00	2.27E-02
		Be-7	<1.46E-01	0.00E+00	1.46E-01
		K-40	5.41E-01	1.58E-01	7.69E-02
297094	6/24/2014 - 7/1/2014	I-131	<1.56E-02	0.00E+00	1.56E-02
		Cs-134	<1.37E-02	0.00E+00	1.37E-02
		Cs-137	<9.85E-03	0.00E+00	9.85E-03
		Be-7	<7.65E-02	0.00E+00	7.65E-02
		K-40	4.44E-01	1.20E-01	1.76E-01
297449	7/1/2014 - 7/8/2014	I-131	<1.97E-02	0.00E+00	1.97E-02
		Cs-134	<1.84E-02	0.00E+00	1.84E-02
		Cs-137	<1.28E-02	0.00E+00	1.28E-02
		Be-7	<1.60E-01	0.00E+00	1.60E-01
		K-40	<5.96E-01	0.00E+00	5.96E-01
297704	7/8/2014 - 7/15/2014	I-131	<3.98E-02	0.00E+00	3.98E-02
		Cs-134	<1.53E-02	0.00E+00	1.53E-02
		Cs-137	<1.89E-02	0.00E+00	1.89E-02
		Be-7	<1.14E-01	0.00E+00	1.14E-01
		K-40	3.80E-01	2.35E-01	2.39E-01
350533	7/15/2014 - 7/22/2014	I-131	<3.61E-02	0.00E+00	3.61E-02
		Cs-134	<1.31E-02	0.00E+00	1.31E-02
		Cs-137	<1.88E-02	0.00E+00	1.88E-02
		Be-7	<1.55E-01	0.00E+00	1.55E-01
		K-40	<5.55E-01	0.00E+00	5.55E-01
350532	7/22/2014 - 7/29/2014	I-131	<2.31E-02	0.00E+00	2.31E-02
		Cs-134	<1.33E-02	0.00E+00	1.33E-02
		Cs-137	<1.66E-02	0.00E+00	1.66E-02
		Be-7	<1.21E-01	0.00E+00	1.21E-01
		K-40	<6.76E-01	0.00E+00	6.76E-01
350966	7/29/2014 - 8/5/2014	I-131	<2.05E-02	0.00E+00	2.05E-02
		Cs-134	<2.53E-02	0.00E+00	2.53E-02
		Cs-137	<2.31E-02	0.00E+00	2.31E-02
		Be-7	<1.74E-01	0.00E+00	1.74E-01
		K-40	4.65E-01	2.97E-01	3.73E-01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 261 [ INDICATOR - N @ 0.72 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
351213	8/5/2014 - 8/12/2014	I-131	<2.94E-02	0.00E+00	2.94E-02
		Cs-134	<3.82E-03	0.00E+00	3.82E-03
		Cs-137	<1.64E-02	0.00E+00	1.64E-02
		Be-7	<1.45E-01	0.00E+00	1.45E-01
		K-40	<4.20E-01	0.00E+00	4.20E-01
351519	8/12/2014 - 8/19/2014	I-131	<2.23E-02	0.00E+00	2.23E-02
		Cs-134	<1.94E-02	0.00E+00	1.94E-02
		Cs-137	<1.88E-02	0.00E+00	1.88E-02
		Be-7	<1.18E-01	0.00E+00	1.18E-01
		K-40	5.97E-01	3.00E-01	2.97E-01
353381	8/19/2014 - 8/26/2014	I-131	<2.26E-02	0.00E+00	2.26E-02
		Cs-134	<1.56E-02	0.00E+00	1.56E-02
		Cs-137	<2.13E-02	0.00E+00	2.13E-02
		Be-7	<8.16E-02	0.00E+00	8.16E-02
		K-40	4.49E-01	2.35E-01	8.11E-02
353953	8/26/2014 - 9/3/2014	I-131	<1.69E-02	0.00E+00	1.69E-02
		Cs-134	<1.35E-02	0.00E+00	1.35E-02
		Cs-137	<2.02E-02	0.00E+00	2.02E-02
		Be-7	<1.03E-01	0.00E+00	1.03E-01
		K-40	<5.83E-01	0.00E+00	5.83E-01
354396	9/3/2014 - 9/9/2014	I-131	<2.35E-02	0.00E+00	2.35E-02
		Cs-134	<3.69E-02	0.00E+00	3.69E-02
		Cs-137	<5.56E-03	0.00E+00	5.56E-03
		Be-7	<1.18E-01	0.00E+00	1.18E-01
		K-40	4.31E-01	3.30E-01	4.54E-01
354712	9/9/2014 - 9/16/2014	I-131	<2.25E-02	0.00E+00	2.25E-02
		Cs-134	<2.75E-02	0.00E+00	2.75E-02
		Cs-137	<2.63E-02	0.00E+00	2.63E-02
		Be-7	<1.18E-01	0.00E+00	1.18E-01
		K-40	5.37E-01	2.89E-01	3.02E-01
355054	9/16/2014 - 9/23/2014	I-131	<1.63E-02	0.00E+00	1.63E-02
		Cs-134	<1.71E-02	0.00E+00	1.71E-02
		Cs-137	<1.91E-02	0.00E+00	1.91E-02
		Be-7	<1.03E-01	0.00E+00	1.03E-01
		K-40	3.97E-01	2.58E-01	3.01E-01
355577	9/23/2014 - 9/30/2014	I-131	<2.00E-02	0.00E+00	2.00E-02
		Cs-134	<1.70E-02	0.00E+00	1.70E-02
		Cs-137	<2.50E-02	0.00E+00	2.50E-02
		Be-7	<1.83E-01	0.00E+00	1.83E-01
		K-40	5.37E-01	3.07E-01	3.55E-01
356427	9/30/2014 - 10/7/2014	I-131	<2.20E-02	0.00E+00	2.20E-02
		Cs-134	<1.84E-02	0.00E+00	1.84E-02
		Cs-137	<1.29E-02	0.00E+00	1.29E-02
		Be-7	<1.34E-01	0.00E+00	1.34E-01
		K-40	5.50E-01	2.83E-01	2.66E-01
356982	10/7/2014 - 10/14/2014	I-131	<2.42E-02	0.00E+00	2.42E-02
		Cs-134	<1.04E-02	0.00E+00	1.04E-02
		Cs-137	<1.63E-02	0.00E+00	1.63E-02
		Be-7	<1.45E-01	0.00E+00	1.45E-01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 261 [ INDICATOR - N @ 0.72 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
356982	10/7/2014 - 10/14/2014	K-40	5.93E-01	2.70E-01	8.03E-02
357988	10/14/2014 - 10/21/2014	I-131	<2.37E-02	0.00E+00	2.37E-02
		Cs-134	<1.70E-02	0.00E+00	1.70E-02
		Cs-137	<1.30E-02	0.00E+00	1.30E-02
		Be-7	<1.65E-01	0.00E+00	1.65E-01
		K-40	4.76E-01	2.41E-01	8.06E-02
358611	10/21/2014 - 10/28/2014	I-131	<4.07E-03	0.00E+00	4.07E-03
		Cs-134	<1.31E-02	0.00E+00	1.31E-02
		Cs-137	<2.12E-02	0.00E+00	2.12E-02
		Be-7	<1.45E-01	0.00E+00	1.45E-01
		K-40	5.36E-01	2.57E-01	8.07E-02
359215	10/28/2014 - 11/4/2014	I-131	<1.04E-02	0.00E+00	1.04E-02
		Cs-134	<9.01E-03	0.00E+00	9.01E-03
		Cs-137	<8.51E-03	0.00E+00	8.51E-03
		Be-7	<7.81E-02	0.00E+00	7.81E-02
		K-40	6.77E-01	2.09E-01	1.70E-01
359970	11/4/2014 - 11/11/2014	I-131	<1.51E-02	0.00E+00	1.51E-02
		Cs-134	<6.36E-03	0.00E+00	6.36E-03
		Cs-137	<1.48E-02	0.00E+00	1.48E-02
		Be-7	<9.17E-02	0.00E+00	9.17E-02
		K-40	4.76E-01	2.01E-01	2.16E-01
360661	11/11/2014 - 11/18/2014	I-131	<1.99E-02	0.00E+00	1.99E-02
		Cs-134	<1.05E-02	0.00E+00	1.05E-02
		Cs-137	<1.65E-02	0.00E+00	1.65E-02
		Be-7	<8.17E-02	0.00E+00	8.17E-02
		K-40	<6.03E-01	0.00E+00	6.03E-01
361529	11/18/2014 - 11/25/2014	I-131	<2.00E-02	0.00E+00	2.00E-02
		Cs-134	<1.99E-02	0.00E+00	1.99E-02
		Cs-137	<1.90E-02	0.00E+00	1.90E-02
		Be-7	<1.43E-01	0.00E+00	1.43E-01
		K-40	<5.81E-01	0.00E+00	5.81E-01
361914	11/25/2014 - 12/2/2014	I-131	<2.85E-02	0.00E+00	2.85E-02
		Cs-134	<1.33E-02	0.00E+00	1.33E-02
		Cs-137	<1.85E-02	0.00E+00	1.85E-02
		Be-7	<1.35E-01	0.00E+00	1.35E-01
		K-40	5.29E-01	2.97E-01	3.56E-01
362723	12/2/2014 - 12/9/2014	I-131	<1.44E-02	0.00E+00	1.44E-02
		Cs-134	<1.26E-02	0.00E+00	1.26E-02
		Cs-137	<1.50E-02	0.00E+00	1.50E-02
		Be-7	<9.39E-02	0.00E+00	9.39E-02
		K-40	3.73E-01	1.65E-01	1.55E-01
363472	12/9/2014 - 12/16/2014	I-131	<8.36E-03	0.00E+00	8.36E-03
		Cs-134	<9.75E-03	0.00E+00	9.75E-03
		Cs-137	<1.43E-02	0.00E+00	1.43E-02
		Be-7	<8.72E-02	0.00E+00	8.72E-02
		K-40	5.58E-01	1.85E-01	3.88E-02
363924	12/16/2014 - 12/23/2014	I-131	<1.51E-02	0.00E+00	1.51E-02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.





# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: AIR RADIOIODINE Concentration (Activity): pCi/m3

Sample Point 261 [ INDICATOR - N @ 0.72 miles ]

Sample ID:	Sample Dates:		Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
363924	12/16/2014 - 12/23/2014		Cs-134	<1.47E-02	0.00E+00	1.47E-02
			Cs-137	<1.44E-02	0.00E+00	1.44E-02
			Be-7	<8.49E-02	0.00E+00	8.49E-02
			K-40	4.42E-01	1.80E-01	4.79E-02

Sample ID:	Sample Dates:		Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
364445	12/23/2014 - 12/30/2014		I-131	<1.44E-02	0.00E+00	1.44E-02
			Cs-134	<1.34E-02	0.00E+00	1.34E-02
			Cs-137	<1.92E-02	0.00E+00	1.92E-02
			Be-7	<7.65E-02	0.00E+00	7.65E-02
			K-40	5.13E-01	2.29E-01	2.43E-01

Media Type: CROPS Concentration (Activity): pCi/kg

Sample Point 260 [ INDICATOR - SSE @ 2 miles ]

Sample ID:	Sample Dates:	MIXEDCROPS	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
279908	1/7/2014 - 1/7/2014		I-131	<1.52E+01	0.00E+00	1.52E+01
			Cs-134	<1.28E+01	0.00E+00	1.28E+01
			Cs-137	<1.56E+01	0.00E+00	1.56E+01
			Be-7	6.37E+02	1.02E+02	1.21E+02
			K-40	4.15E+03	2.27E+02	1.43E+02

Sample ID:	Sample Dates:	MIXEDCROPS	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
281474	2/4/2014 - 2/4/2014		I-131	<2.58E+01	0.00E+00	2.58E+01
			Cs-134	<3.40E+01	0.00E+00	3.40E+01
			Cs-137	<4.29E+01	0.00E+00	4.29E+01
			Be-7	1.48E+02	1.57E+02	4.01E+02
			K-40	5.81E+03	4.76E+02	3.62E+02

Sample ID:	Sample Dates:	MIXEDCROPS	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
284589	3/4/2014 - 3/4/2014		I-131	<1.98E+01	0.00E+00	1.98E+01
			Cs-134	<2.12E+01	0.00E+00	2.12E+01
			Cs-137	<2.65E+01	0.00E+00	2.65E+01
			Be-7	<2.17E+02	0.00E+00	2.17E+02
			K-40	3.58E+03	2.92E+02	2.22E+02

Sample ID:	Sample Dates:	MIXEDCROPS	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
287393	4/1/2014 - 4/1/2014		I-131	<2.48E+01	0.00E+00	2.48E+01
			Cs-134	<2.34E+01	0.00E+00	2.34E+01
			Cs-137	<2.99E+01	0.00E+00	2.99E+01
			Be-7	<2.37E+02	0.00E+00	2.37E+02
			K-40	5.30E+03	3.38E+02	3.26E+02

Sample ID:	Sample Dates:	MIXEDCROPS	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
290923	5/6/2014 - 5/6/2014		I-131	<3.28E+01	0.00E+00	3.28E+01
			Cs-134	<4.13E+01	0.00E+00	4.13E+01
			Cs-137	<4.63E+01	0.00E+00	4.63E+01
			Be-7	<3.17E+02	0.00E+00	3.17E+02
			K-40	4.45E+03	4.30E+02	4.06E+02

Sample ID:	Sample Dates:	MIXEDCROPS	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
295151	6/3/2014 - 6/3/2014		I-131	<1.22E+01	0.00E+00	1.22E+01
			Cs-134	<1.22E+01	0.00E+00	1.22E+01
			Cs-137	<1.77E+01	0.00E+00	1.77E+01
			Be-7	<1.30E+02	0.00E+00	1.30E+02
			K-40	2.59E+03	2.08E+02	4.50E+01

Sample ID:	Sample Dates:	MIXEDCROPS	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
296837	7/1/2014 - 7/1/2014		I-131	<9.01E+00	0.00E+00	9.01E+00
			Cs-134	<1.21E+01	0.00E+00	1.21E+01
			Cs-137	<2.01E+01	0.00E+00	2.01E+01
			Be-7	<9.28E+01	0.00E+00	9.28E+01
			K-40	2.08E+03	1.82E+02	2.04E+02

Sample ID:	Sample Dates:	MIXEDCROPS	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
298373	8/5/2014 - 8/5/2014		I-131	<1.41E+01	0.00E+00	1.41E+01
			Cs-134	<1.45E+01	0.00E+00	1.45E+01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: CROPS Concentration (Activity): pCi/kg

Sample Point 260 [ INDICATOR - SSE @ 2 miles ]

Sample ID:	Sample Dates:	MIXEDCROPS	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
298373	8/5/2014 - 8/5/2014	MIXEDCROPS	Cs-137	<1.61E+01	0.00E+00	1.61E+01
			Be-7	<1.21E+02	0.00E+00	1.21E+02
			K-40	1.76E+03	3.86E+02	3.05E+02
354402	9/3/2014 - 9/3/2014	MIXEDCROPS	I-131	<1.63E+01	0.00E+00	1.63E+01
			Cs-134	<2.21E+01	0.00E+00	2.21E+01
			Cs-137	<1.68E+01	0.00E+00	1.68E+01
			Be-7	<1.16E+02	0.00E+00	1.16E+02
			K-40	2.72E+03	5.13E+02	2.20E+02
356988	10/7/2014 - 10/7/2014	MIXEDCROPS	I-131	<8.26E+00	0.00E+00	8.26E+00
			Cs-134	<1.00E+01	0.00E+00	1.00E+01
			Cs-137	<1.36E+01	0.00E+00	1.36E+01
			Be-7	<9.27E+01	0.00E+00	9.27E+01
			K-40	2.77E+03	3.78E+02	1.50E+02
359976	11/4/2014 - 11/4/2014	MIXEDCROPS	I-131	<2.21E+01	0.00E+00	2.21E+01
			Cs-134	<3.92E+01	0.00E+00	3.92E+01
			Cs-137	<1.94E+01	0.00E+00	1.94E+01
			Be-7	<2.34E+02	0.00E+00	2.34E+02
			K-40	3.53E+03	6.94E+02	4.13E+02
362729	12/2/2014 - 12/2/2014	MIXEDCROPS	I-131	<1.65E+01	0.00E+00	1.65E+01
			Cs-134	<1.80E+01	0.00E+00	1.80E+01
			Cs-137	<1.94E+01	0.00E+00	1.94E+01
			Be-7	2.92E+02	1.15E+02	1.42E+02
			K-40	3.67E+03	5.43E+02	2.56E+02

Media Type: DRINKING WATER Concentration (Activity): pCi/l

Sample Point 214 [ INDICATOR - SSE @ 7.3 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD		
280927	12/10/2013 - 1/7/2014	Beta	1.67E+00	4.09E-01	1.26E+00		
		Mn-54	<3.22E+00	0.00E+00	3.22E+00		
		Co-58	<4.54E+00	0.00E+00	4.54E+00		
		Fe-59	<9.71E+00	0.00E+00	9.71E+00		
		Co-60	<4.44E+00	0.00E+00	4.44E+00		
		Zn-65	<7.76E+00	0.00E+00	7.76E+00		
		Zr-95	<7.78E+00	0.00E+00	7.78E+00		
		Nb-95	<5.03E+00	0.00E+00	5.03E+00		
		I-131	<1.20E+01	0.00E+00	1.20E+01		
		Cs-134	<3.40E+00	0.00E+00	3.40E+00		
		Cs-137	<3.37E+00	0.00E+00	3.37E+00		
		BaLa-140	<8.24E+00	0.00E+00	8.24E+00		
		Be-7	<3.70E+01	0.00E+00	3.70E+01		
		K-40	1.16E+02	1.69E+01	2.99E+01		
		283104	1/7/2014 - 2/4/2014	Beta	2.81E+00	3.87E-01	1.08E+00
				Mn-54	<3.25E+00	0.00E+00	3.25E+00
Co-58	<3.77E+00			0.00E+00	3.77E+00		
Fe-59	<9.40E+00			0.00E+00	9.40E+00		
Co-60	<4.61E+00			0.00E+00	4.61E+00		
Zn-65	<7.81E+00			0.00E+00	7.81E+00		
Zr-95	<6.46E+00			0.00E+00	6.46E+00		
Nb-95	<4.09E+00			0.00E+00	4.09E+00		
I-131	<1.14E+01			0.00E+00	1.14E+01		
Cs-134	<3.13E+00			0.00E+00	3.13E+00		
Cs-137	<4.28E+00			0.00E+00	4.28E+00		
BaLa-140	<9.32E+00			0.00E+00	9.32E+00		
Be-7	<3.62E+01			0.00E+00	3.62E+01		
K-40	4.78E+01			2.25E+01	3.98E+01		

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: DRINKING WATER Concentration (Activity): pCi/l

Sample Point 214 [ INDICATOR - SSE @ 7.3 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
284775	12/10/2013 - 3/4/2014	H3DW	4.97E+02	6.57E+01	1.91E+02
285952	2/4/2014 - 3/4/2014	Beta	2.06E+00	3.87E-01	1.15E+00
		Mn-54	<3.24E+00	0.00E+00	3.24E+00
		Co-58	<3.51E+00	0.00E+00	3.51E+00
		Fe-59	<8.08E+00	0.00E+00	8.08E+00
		Co-60	<4.21E+00	0.00E+00	4.21E+00
		Zn-65	<8.11E+00	0.00E+00	8.11E+00
		Zr-95	<6.55E+00	0.00E+00	6.55E+00
		Nb-95	<4.97E+00	0.00E+00	4.97E+00
		I-131	<1.25E+01	0.00E+00	1.25E+01
		Cs-134	<2.73E+00	0.00E+00	2.73E+00
		Cs-137	<3.21E+00	0.00E+00	3.21E+00
		BaLa-140	<9.64E+00	0.00E+00	9.64E+00
		Be-7	<3.17E+01	0.00E+00	3.17E+01
		K-40	4.60E+01	1.57E+01	3.33E+01
289218	3/4/2014 - 4/1/2014	Beta	1.94E+00	4.28E-01	1.34E+00
		Mn-54	<3.87E+00	0.00E+00	3.87E+00
		Co-58	<3.84E+00	0.00E+00	3.84E+00
		Fe-59	<7.77E+00	0.00E+00	7.77E+00
		Co-60	<5.17E+00	0.00E+00	5.17E+00
		Zn-65	<7.32E+00	0.00E+00	7.32E+00
		Zr-95	<6.68E+00	0.00E+00	6.68E+00
		Nb-95	<4.64E+00	0.00E+00	4.64E+00
		I-131	<1.40E+01	0.00E+00	1.40E+01
		Cs-134	<3.87E+00	0.00E+00	3.87E+00
		Cs-137	<4.41E+00	0.00E+00	4.41E+00
		BaLa-140	<7.88E+00	0.00E+00	7.88E+00
		Be-7	<3.58E+01	0.00E+00	3.58E+01
		K-40	1.92E+02	2.87E+01	3.70E+01
292880	4/1/2014 - 4/29/2014	Beta	9.50E-01	4.51E-01	1.47E+00
		Mn-54	<3.83E+00	0.00E+00	3.83E+00
		Co-58	<4.07E+00	0.00E+00	4.07E+00
		Fe-59	<9.81E+00	0.00E+00	9.81E+00
		Co-60	<4.14E+00	0.00E+00	4.14E+00
		Zn-65	<7.58E+00	0.00E+00	7.58E+00
		Zr-95	<6.69E+00	0.00E+00	6.69E+00
		Nb-95	<4.80E+00	0.00E+00	4.80E+00
		I-131	<1.10E+01	0.00E+00	1.10E+01
		Cs-134	<2.95E+00	0.00E+00	2.95E+00
		Cs-137	<3.74E+00	0.00E+00	3.74E+00
		BaLa-140	<1.07E+01	0.00E+00	1.07E+01
		Be-7	<3.58E+01	0.00E+00	3.58E+01
		K-40	5.38E+01	1.78E+01	3.18E+01
295308	3/4/2014 - 5/28/2014	H3DW	1.01E+03	7.27E+01	1.88E+02
295633	4/29/2014 - 5/28/2014	Beta	2.43E+00	4.44E-01	1.36E+00
		Mn-54	<3.29E+00	0.00E+00	3.29E+00
		Co-58	<3.53E+00	0.00E+00	3.53E+00
		Fe-59	<5.95E+00	0.00E+00	5.95E+00
		Co-60	<3.44E+00	0.00E+00	3.44E+00
		Zn-65	<5.97E+00	0.00E+00	5.97E+00
		Zr-95	<4.70E+00	0.00E+00	4.70E+00
		Nb-95	<3.93E+00	0.00E+00	3.93E+00
		I-131	<1.44E+01	0.00E+00	1.44E+01
		Cs-134	<2.52E+00	0.00E+00	2.52E+00
		Cs-137	<2.83E+00	0.00E+00	2.83E+00
		BaLa-140	<1.24E+01	0.00E+00	1.24E+01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: DRINKING WATER Concentration (Activity): pCi/l

Sample Point 214 [ INDICATOR - SSE @ 7.3 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
295633	4/29/2014 - 5/28/2014	Be-7	<2.86E+01	0.00E+00	2.86E+01
		K-40	8.30E+01	1.16E+01	2.06E+01
297114	5/28/2014 - 6/24/2014	Beta	9.60E-01	8.30E-01	1.37E+00
		Mn-54	<3.70E+00	0.00E+00	3.70E+00
		Co-58	<3.81E+00	0.00E+00	3.81E+00
		Fe-59	<6.67E+00	0.00E+00	6.67E+00
		Co-60	<4.43E+00	0.00E+00	4.43E+00
		Zn-65	<6.86E+00	0.00E+00	6.86E+00
		Zr-95	<4.41E+00	0.00E+00	4.41E+00
		Nb-95	<4.05E+00	0.00E+00	4.05E+00
		I-131	<1.40E+01	0.00E+00	1.40E+01
		Cs-134	<3.30E+00	0.00E+00	3.30E+00
		Cs-137	<3.95E+00	0.00E+00	3.95E+00
		BaLa-140	<7.26E+00	0.00E+00	7.26E+00
		Be-7	<3.56E+01	0.00E+00	3.56E+01
		K-40	1.74E+02	1.99E+01	2.92E+01
350534	6/24/2014 - 7/22/2014	Beta	1.84E+00	9.07E-01	1.44E+00
		Mn-54	<3.30E+00	0.00E+00	3.30E+00
		Co-58	<3.14E+00	0.00E+00	3.14E+00
		Fe-59	<5.90E+00	0.00E+00	5.90E+00
		Co-60	<3.32E+00	0.00E+00	3.32E+00
		Zn-65	<4.59E+00	0.00E+00	4.59E+00
		Zr-95	<5.58E+00	0.00E+00	5.58E+00
		Nb-95	<3.94E+00	0.00E+00	3.94E+00
		I-131	<1.09E+01	0.00E+00	1.09E+01
		Cs-134	<1.99E+00	0.00E+00	1.99E+00
		Cs-137	<2.78E+00	0.00E+00	2.78E+00
		BaLa-140	<8.66E+00	0.00E+00	8.66E+00
		Be-7	<2.38E+01	0.00E+00	2.38E+01
		K-40	4.88E+01	2.80E+01	3.88E+01
351520	7/22/2014 - 8/19/2014	Beta	1.77E+00	8.47E-01	1.35E+00
		Mn-54	<3.33E+00	0.00E+00	3.33E+00
		Co-58	<2.97E+00	0.00E+00	2.97E+00
		Fe-59	<8.03E+00	0.00E+00	8.03E+00
		Co-60	<2.70E+00	0.00E+00	2.70E+00
		Zn-65	<6.67E+00	0.00E+00	6.67E+00
		Zr-95	<5.85E+00	0.00E+00	5.85E+00
		Nb-95	<3.88E+00	0.00E+00	3.88E+00
		I-131	<1.08E+01	0.00E+00	1.08E+01
		Cs-134	<3.64E+00	0.00E+00	3.64E+00
		Cs-137	<3.21E+00	0.00E+00	3.21E+00
		BaLa-140	<7.17E+00	0.00E+00	7.17E+00
		Be-7	<3.02E+01	0.00E+00	3.02E+01
		K-40	1.64E+02	4.24E+01	4.38E+01
354215	5/28/2014 - 8/19/2014	H3DW	1.13E+03	1.45E+02	1.91E+02
354583	8/19/2014 - 9/16/2014	Beta	2.42E+00	8.17E-01	1.23E+00
		Mn-54	<2.43E+00	0.00E+00	2.43E+00
		Co-58	<2.79E+00	0.00E+00	2.79E+00
		Fe-59	<6.45E+00	0.00E+00	6.45E+00
		Co-60	<2.25E+00	0.00E+00	2.25E+00
		Zn-65	<5.27E+00	0.00E+00	5.27E+00
		Zr-95	<5.69E+00	0.00E+00	5.69E+00
		Nb-95	<3.92E+00	0.00E+00	3.92E+00
		I-131	<1.20E+01	0.00E+00	1.20E+01
		Cs-134	<2.87E+00	0.00E+00	2.87E+00
		Cs-137	<2.24E+00	0.00E+00	2.24E+00

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: DRINKING WATER Concentration (Activity): pCi/l

Sample Point 214 [ INDICATOR - SSE @ 7.3 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
354583	8/19/2014 - 9/16/2014	BaLa-140	<7.32E+00	0.00E+00	7.32E+00
		Be-7	<2.45E+01	0.00E+00	2.45E+01
		K-40	1.46E+02	3.50E+01	4.02E+01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
356854	9/16/2014 - 10/14/2014	Beta	2.60E+00	8.40E-01	1.26E+00
		Mn-54	<2.32E+00	0.00E+00	2.32E+00
		Co-58	<2.51E+00	0.00E+00	2.51E+00
		Fe-59	<5.89E+00	0.00E+00	5.89E+00
		Co-60	<2.04E+00	0.00E+00	2.04E+00
		Zn-65	<3.26E+00	0.00E+00	3.26E+00
		Zr-95	<4.65E+00	0.00E+00	4.65E+00
		Nb-95	<3.31E+00	0.00E+00	3.31E+00
		I-131	<1.20E+01	0.00E+00	1.20E+01
		Cs-134	<2.42E+00	0.00E+00	2.42E+00
		Cs-137	<2.45E+00	0.00E+00	2.45E+00
		BaLa-140	<6.71E+00	0.00E+00	6.71E+00
		Be-7	<2.16E+01	0.00E+00	2.16E+01
		K-40	4.47E+01	2.37E+01	3.36E+01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
359745	10/14/2014 - 11/11/2014	Beta	1.37E+00	8.03E-01	1.29E+00
		Mn-54	<1.50E+00	0.00E+00	1.50E+00
		Co-58	<1.85E+00	0.00E+00	1.85E+00
		Fe-59	<4.11E+00	0.00E+00	4.11E+00
		Co-60	<1.44E+00	0.00E+00	1.44E+00
		Zn-65	<3.34E+00	0.00E+00	3.34E+00
		Zr-95	<3.42E+00	0.00E+00	3.42E+00
		Nb-95	<2.56E+00	0.00E+00	2.56E+00
		I-131	<1.20E+01	0.00E+00	1.20E+01
		Cs-134	<1.97E+00	0.00E+00	1.97E+00
		Cs-137	<1.56E+00	0.00E+00	1.56E+00
		BaLa-140	<4.79E+00	0.00E+00	4.79E+00
		Be-7	<1.59E+01	0.00E+00	1.59E+01
		K-40	4.72E+01	1.66E+01	2.10E+01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
362142	11/11/2014 - 12/9/2014	Beta	2.61E+00	8.14E-01	1.21E+00
		Mn-54	<1.17E+00	0.00E+00	1.17E+00
		Co-58	<1.31E+00	0.00E+00	1.31E+00
		Fe-59	<2.72E+00	0.00E+00	2.72E+00
		Co-60	<1.02E+00	0.00E+00	1.02E+00
		Zn-65	<2.09E+00	0.00E+00	2.09E+00
		Zr-95	<2.25E+00	0.00E+00	2.25E+00
		Nb-95	<1.69E+00	0.00E+00	1.69E+00
		I-131	<1.10E+01	0.00E+00	1.10E+01
		Cs-134	<1.11E+00	0.00E+00	1.11E+00
		Cs-137	<1.00E+00	0.00E+00	1.00E+00
		BaLa-140	<4.74E+00	0.00E+00	4.74E+00
		Be-7	<1.07E+01	0.00E+00	1.07E+01
		K-40	4.21E+01	1.24E+01	1.58E+01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
364859	8/19/2014 - 12/9/2014	H3DW	6.47E+02	1.32E+02	1.92E+02

Sample Point 218 [ CONTROL - NNE @ 13.5 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
280922	12/10/2013 - 1/7/2014	Beta	1.18E+00	3.96E-01	1.26E+00
		Mn-54	<3.63E+00	0.00E+00	3.63E+00
		Co-58	<3.96E+00	0.00E+00	3.96E+00
		Fe-59	<8.75E+00	0.00E+00	8.75E+00
		Co-60	<3.46E+00	0.00E+00	3.46E+00
		Zn-65	<6.79E+00	0.00E+00	6.79E+00
		Zr-95	<6.90E+00	0.00E+00	6.90E+00
		Nb-95	<4.82E+00	0.00E+00	4.82E+00
		I-131	<1.29E+01	0.00E+00	1.29E+01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: DRINKING WATER Concentration (Activity): pCi/l

Sample Point 218 [ CONTROL - NNE @ 13.5 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
280922	12/10/2013 - 1/7/2014	Cs-134	<3.30E+00	0.00E+00	3.30E+00
		Cs-137	<2.98E+00	0.00E+00	2.98E+00
		BaLa-140	<7.87E+00	0.00E+00	7.87E+00
		Be-7	<3.35E+01	0.00E+00	3.35E+01
		K-40	2.41E+02	2.24E+01	3.13E+01
283099	1/7/2014 - 2/4/2014	Beta	2.68E+00	3.84E-01	1.08E+00
		Mn-54	<4.75E+00	0.00E+00	4.75E+00
		Co-58	<3.41E+00	0.00E+00	3.41E+00
		Fe-59	<1.42E+01	0.00E+00	1.42E+01
		Co-60	<5.39E+00	0.00E+00	5.39E+00
		Zn-65	<9.18E+00	0.00E+00	9.18E+00
		Zr-95	<7.69E+00	0.00E+00	7.69E+00
		Nb-95	<6.56E+00	0.00E+00	6.56E+00
		I-131	<1.38E+01	0.00E+00	1.38E+01
		Cs-134	<4.46E+00	0.00E+00	4.46E+00
		Cs-137	<4.93E+00	0.00E+00	4.93E+00
		BaLa-140	<1.35E+01	0.00E+00	1.35E+01
		Be-7	<4.76E+01	0.00E+00	4.76E+01
		K-40	3.22E+01	1.64E+01	5.25E+01
284774	12/10/2013 - 3/4/2014	H3DW	3.80E+02	6.37E+01	1.90E+02
285947	2/4/2014 - 3/4/2014	Beta	2.18E+00	3.90E-01	1.15E+00
		Mn-54	<3.34E+00	0.00E+00	3.34E+00
		Co-58	<3.58E+00	0.00E+00	3.58E+00
		Fe-59	<7.19E+00	0.00E+00	7.19E+00
		Co-60	<3.41E+00	0.00E+00	3.41E+00
		Zn-65	<6.87E+00	0.00E+00	6.87E+00
		Zr-95	<5.76E+00	0.00E+00	5.76E+00
		Nb-95	<3.97E+00	0.00E+00	3.97E+00
		I-131	<1.21E+01	0.00E+00	1.21E+01
		Cs-134	<2.62E+00	0.00E+00	2.62E+00
		Cs-137	<3.34E+00	0.00E+00	3.34E+00
		BaLa-140	<8.30E+00	0.00E+00	8.30E+00
		Be-7	<2.92E+01	0.00E+00	2.92E+01
		K-40	7.38E+01	2.02E+01	2.67E+01
289190	3/4/2014 - 4/1/2014	Beta	2.51E+00	4.40E-01	1.33E+00
		Mn-54	<3.42E+00	0.00E+00	3.42E+00
		Co-58	<3.14E+00	0.00E+00	3.14E+00
		Fe-59	<8.46E+00	0.00E+00	8.46E+00
		Co-60	<5.63E+00	0.00E+00	5.63E+00
		Zn-65	<7.56E+00	0.00E+00	7.56E+00
		Zr-95	<6.95E+00	0.00E+00	6.95E+00
		Nb-95	<4.36E+00	0.00E+00	4.36E+00
		I-131	<1.14E+01	0.00E+00	1.14E+01
		Cs-134	<3.70E+00	0.00E+00	3.70E+00
		Cs-137	<4.09E+00	0.00E+00	4.09E+00
		BaLa-140	<1.04E+01	0.00E+00	1.04E+01
		Be-7	<3.02E+01	0.00E+00	3.02E+01
		K-40	5.43E+01	2.30E+01	4.56E+01
292875	4/1/2014 - 4/29/2014	Beta	2.28E+00	4.77E-01	1.46E+00
		Mn-54	<5.22E+00	0.00E+00	5.22E+00
		Co-58	<4.48E+00	0.00E+00	4.48E+00
		Fe-59	<1.00E+01	0.00E+00	1.00E+01
		Co-60	<5.49E+00	0.00E+00	5.49E+00
		Zn-65	<1.06E+01	0.00E+00	1.06E+01
		Zr-95	<8.42E+00	0.00E+00	8.42E+00
		Nb-95	<5.52E+00	0.00E+00	5.52E+00

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: DRINKING WATER Concentration (Activity): pCi/l

Sample Point 218 [ CONTROL - NNE @ 13.5 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
292875	4/1/2014 - 4/29/2014	I-131	<1.45E+01	0.00E+00	1.45E+01
		Cs-134	<4.38E+00	0.00E+00	4.38E+00
		Cs-137	<4.88E+00	0.00E+00	4.88E+00
		BaLa-140	<1.04E+01	0.00E+00	1.04E+01
		Be-7	<4.20E+01	0.00E+00	4.20E+01
		K-40	2.63E+02	3.13E+01	4.92E+01
295307	3/4/2014 - 5/28/2014	H3DW	4.31E+02	6.37E+01	1.86E+02
295627	4/29/2014 - 5/28/2014	Beta	1.89E+00	4.29E-01	1.35E+00
		Mn-54	<2.78E+00	0.00E+00	2.78E+00
		Co-58	<2.84E+00	0.00E+00	2.84E+00
		Fe-59	<6.07E+00	0.00E+00	6.07E+00
		Co-60	<2.90E+00	0.00E+00	2.90E+00
		Zn-65	<5.52E+00	0.00E+00	5.52E+00
		Zr-95	<5.61E+00	0.00E+00	5.61E+00
		Nb-95	<3.58E+00	0.00E+00	3.58E+00
		I-131	<1.45E+01	0.00E+00	1.45E+01
		Cs-134	<2.43E+00	0.00E+00	2.43E+00
		Cs-137	<3.28E+00	0.00E+00	3.28E+00
		BaLa-140	<7.51E+00	0.00E+00	7.51E+00
		Be-7	<2.91E+01	0.00E+00	2.91E+01
		K-40	1.34E+02	1.82E+01	2.52E+01
297109	5/28/2014 - 6/24/2014	Beta	9.14E-01	8.23E-01	1.36E+00
		Mn-54	<4.44E+00	0.00E+00	4.44E+00
		Co-58	<5.41E+00	0.00E+00	5.41E+00
		Fe-59	<1.18E+01	0.00E+00	1.18E+01
		Co-60	<4.68E+00	0.00E+00	4.68E+00
		Zn-65	<1.11E+01	0.00E+00	1.11E+01
		Zr-95	<1.02E+01	0.00E+00	1.02E+01
		Nb-95	<5.90E+00	0.00E+00	5.90E+00
		I-131	<1.45E+01	0.00E+00	1.45E+01
		Cs-134	<4.05E+00	0.00E+00	4.05E+00
		Cs-137	<4.82E+00	0.00E+00	4.82E+00
		BaLa-140	<8.96E+00	0.00E+00	8.96E+00
		Be-7	<4.41E+01	0.00E+00	4.41E+01
		K-40	<9.09E+01	0.00E+00	9.09E+01
350535	6/24/2014 - 7/22/2014	Beta	1.41E+00	8.76E-01	1.42E+00
		Mn-54	<3.03E+00	0.00E+00	3.03E+00
		Co-58	<2.86E+00	0.00E+00	2.86E+00
		Fe-59	<7.94E+00	0.00E+00	7.94E+00
		Co-60	<1.82E+00	0.00E+00	1.82E+00
		Zn-65	<7.27E+00	0.00E+00	7.27E+00
		Zr-95	<6.22E+00	0.00E+00	6.22E+00
		Nb-95	<4.50E+00	0.00E+00	4.50E+00
		I-131	<1.19E+01	0.00E+00	1.19E+01
		Cs-134	<1.96E+00	0.00E+00	1.96E+00
		Cs-137	<2.84E+00	0.00E+00	2.84E+00
		BaLa-140	<8.84E+00	0.00E+00	8.84E+00
		Be-7	<2.53E+01	0.00E+00	2.53E+01
		K-40	5.25E+01	2.30E+01	2.86E+01
351521	7/22/2014 - 8/19/2014	Beta	2.08E+00	8.54E-01	1.34E+00
		Mn-54	<2.89E+00	0.00E+00	2.89E+00
		Co-58	<2.75E+00	0.00E+00	2.75E+00
		Fe-59	<7.90E+00	0.00E+00	7.90E+00
		Co-60	<2.92E+00	0.00E+00	2.92E+00
		Zn-65	<5.37E+00	0.00E+00	5.37E+00
		Zr-95	<6.54E+00	0.00E+00	6.54E+00

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: DRINKING WATER Concentration (Activity): pCi/l

Sample Point 218 [ CONTROL - NNE @ 13.5 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
351521	7/22/2014 - 8/19/2014	Nb-95	<3.85E+00	0.00E+00	3.85E+00
		I-131	<1.10E+01	0.00E+00	1.10E+01
		Cs-134	<3.46E+00	0.00E+00	3.46E+00
		Cs-137	<3.42E+00	0.00E+00	3.42E+00
		BaLa-140	<8.47E+00	0.00E+00	8.47E+00
		Be-7	<2.58E+01	0.00E+00	2.58E+01
		K-40	4.73E+01	3.22E+01	4.65E+01
354216	5/28/2014 - 8/19/2014	H3DW	4.19E+02	1.23E+02	1.89E+02
354584	8/19/2014 - 9/16/2014	Beta	8.82E-01	7.43E-01	1.22E+00
		Mn-54	<1.69E+00	0.00E+00	1.69E+00
		Co-58	<2.43E+00	0.00E+00	2.43E+00
		Fe-59	<5.93E+00	0.00E+00	5.93E+00
		Co-60	<2.56E+00	0.00E+00	2.56E+00
		Zn-65	<4.75E+00	0.00E+00	4.75E+00
		Zr-95	<4.13E+00	0.00E+00	4.13E+00
		Nb-95	<3.56E+00	0.00E+00	3.56E+00
		I-131	<1.11E+01	0.00E+00	1.11E+01
		Cs-134	<2.84E+00	0.00E+00	2.84E+00
		Cs-137	<2.28E+00	0.00E+00	2.28E+00
		BaLa-140	<6.30E+00	0.00E+00	6.30E+00
		Be-7	<1.83E+01	0.00E+00	1.83E+01
		K-40	3.31E+01	2.44E+01	3.75E+01
		356855	9/16/2014 - 10/14/2014	Beta	1.53E+00
Mn-54	<2.07E+00			0.00E+00	2.07E+00
Co-58	<2.02E+00			0.00E+00	2.02E+00
Fe-59	<4.85E+00			0.00E+00	4.85E+00
Co-60	<1.99E+00			0.00E+00	1.99E+00
Zn-65	<3.57E+00			0.00E+00	3.57E+00
Zr-95	<3.74E+00			0.00E+00	3.74E+00
Nb-95	<2.92E+00			0.00E+00	2.92E+00
I-131	<1.16E+01			0.00E+00	1.16E+01
Cs-134	<2.13E+00			0.00E+00	2.13E+00
Cs-137	<1.78E+00			0.00E+00	1.78E+00
BaLa-140	<5.41E+00			0.00E+00	5.41E+00
Be-7	<1.92E+01			0.00E+00	1.92E+01
K-40	1.83E+02			3.42E+01	3.99E+01
359746	10/14/2014 - 11/11/2014			Beta	1.97E+00
		Mn-54	<1.94E+00	0.00E+00	1.94E+00
		Co-58	<1.94E+00	0.00E+00	1.94E+00
		Fe-59	<4.52E+00	0.00E+00	4.52E+00
		Co-60	<2.01E+00	0.00E+00	2.01E+00
		Zn-65	<3.87E+00	0.00E+00	3.87E+00
		Zr-95	<3.92E+00	0.00E+00	3.92E+00
		Nb-95	<2.85E+00	0.00E+00	2.85E+00
		I-131	<1.19E+01	0.00E+00	1.19E+01
		Cs-134	<2.13E+00	0.00E+00	2.13E+00
		Cs-137	<1.80E+00	0.00E+00	1.80E+00
		BaLa-140	<4.92E+00	0.00E+00	4.92E+00
		Be-7	<1.73E+01	0.00E+00	1.73E+01
		K-40	1.23E+02	2.43E+01	2.62E+01
		362143	11/11/2014 - 12/9/2014	Beta	1.77E+00
Mn-54	<7.62E-01			0.00E+00	7.62E-01
Co-58	<8.87E-01			0.00E+00	8.87E-01
Fe-59	<1.99E+00			0.00E+00	1.99E+00
Co-60	<6.43E-01			0.00E+00	6.43E-01
Zn-65	<1.42E+00			0.00E+00	1.42E+00

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.





# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: DRINKING WATER Concentration (Activity): pCi/l

Sample Point 218 [ CONTROL - NNE @ 13.5 miles ]

Sample ID:	Sample Dates:		Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
362143	11/11/2014 - 12/9/2014		Zr-95	<1.32E+00	0.00E+00	1.32E+00
			Nb-95	<1.14E+00	0.00E+00	1.14E+00
			I-131	<1.19E+01	0.00E+00	1.19E+01
			Cs-134	<8.43E-01	0.00E+00	8.43E-01
			Cs-137	<6.53E-01	0.00E+00	6.53E-01
			BaLa-140	<3.71E+00	0.00E+00	3.71E+00
			Be-7	<8.27E+00	0.00E+00	8.27E+00
			K-40	2.89E+01	7.36E+00	9.73E+00

Sample ID:	Sample Dates:		Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
364860	8/19/2014 - 12/9/2014		H3DW	5.18E+02	1.28E+02	1.92E+02

Media Type: FISH Concentration (Activity): Unknown

Sample Point 208 [ INDICATOR - S @ 0.45 miles ]

Sample ID:	Sample Dates:		Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
287047	4/8/2014 - 4/8/2014	BOTMFEEDER	Mn-54	<1.34E+01	0.00E+00	1.34E+01
			Co-58	<1.51E+01	0.00E+00	1.51E+01
			Fe-59	<3.88E+01	0.00E+00	3.88E+01
			Co-60	<1.90E+01	0.00E+00	1.90E+01
			Zn-65	<3.91E+01	0.00E+00	3.91E+01
			Nb-95	<1.49E+01	0.00E+00	1.49E+01
			I-131	<1.42E+01	0.00E+00	1.42E+01
			Cs-134	<1.33E+01	0.00E+00	1.33E+01
			Cs-137	<1.15E+01	0.00E+00	1.15E+01
			Be-7	<9.34E+01	0.00E+00	9.34E+01
			K-40	2.55E+03	2.03E+02	1.92E+02
			Ag-110M	<9.50E+00	0.00E+00	9.50E+00
			Sb-122	<2.09E+01	0.00E+00	2.09E+01
			Sb-125	<2.87E+01	0.00E+00	2.87E+01

Sample ID:	Sample Dates:		Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
287049	4/8/2014 - 4/8/2014	FORAGER	Mn-54	<2.19E+01	0.00E+00	2.19E+01
			Co-58	<2.63E+01	0.00E+00	2.63E+01
			Fe-59	<3.91E+01	0.00E+00	3.91E+01
			Co-60	<2.88E+01	0.00E+00	2.88E+01
			Zn-65	<5.33E+01	0.00E+00	5.33E+01
			Nb-95	<2.58E+01	0.00E+00	2.58E+01
			I-131	<2.24E+01	0.00E+00	2.24E+01
			Cs-134	<2.27E+01	0.00E+00	2.27E+01
			Cs-137	<2.06E+01	0.00E+00	2.06E+01
			Be-7	<2.04E+02	0.00E+00	2.04E+02
			K-40	3.26E+03	2.81E+02	2.63E+02
			Ag-110M	<2.66E+01	0.00E+00	2.66E+01
			Sb-122	<2.63E+01	0.00E+00	2.63E+01
			Sb-125	<6.08E+01	0.00E+00	6.08E+01

Sample ID:	Sample Dates:		Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
287051	4/8/2014 - 4/8/2014	FREESWIM	Mn-54	<1.05E+01	0.00E+00	1.05E+01
			Co-58	<8.69E+00	0.00E+00	8.69E+00
			Fe-59	<2.20E+01	0.00E+00	2.20E+01
			Co-60	<1.14E+01	0.00E+00	1.14E+01
			Zn-65	<2.83E+01	0.00E+00	2.83E+01
			Nb-95	<9.57E+00	0.00E+00	9.57E+00
			I-131	<9.45E+00	0.00E+00	9.45E+00
			Cs-134	<9.03E+00	0.00E+00	9.03E+00
			Cs-137	1.10E+01	3.37E+00	9.65E+00
			Be-7	5.16E+01	2.38E+01	6.92E+01
			K-40	3.29E+03	1.54E+02	9.10E+01
			Ag-110M	<9.54E+00	0.00E+00	9.54E+00
			Sb-122	<1.40E+01	0.00E+00	1.40E+01
			Sb-125	<2.24E+01	0.00E+00	2.24E+01

Sample ID:	Sample Dates:		Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
356989	10/6/2014 - 10/6/2014	FREESWIM	Mn-54	<1.83E+01	0.00E+00	1.83E+01
			Co-58	<2.19E+01	0.00E+00	2.19E+01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: FISH Concentration (Activity): Unknown

Sample Point 208 [ INDICATOR - S @ 0.45 miles ]

Sample ID:	356989	Sample Dates:	10/6/2014 - 10/6/2014	FREESWIM	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
					Fe-59	<5.76E+01	0.00E+00	5.76E+01
					Co-60	<3.20E+01	0.00E+00	3.20E+01
					Zn-65	<5.35E+01	0.00E+00	5.35E+01
					Nb-95	<1.98E+01	0.00E+00	1.98E+01
					I-131	<3.60E+01	0.00E+00	3.60E+01
					Cs-134	<2.34E+01	0.00E+00	2.34E+01
					Cs-137	<2.13E+01	0.00E+00	2.13E+01
					Be-7	<1.49E+02	0.00E+00	1.49E+02
					K-40	3.07E+03	5.59E+02	5.47E+01
					Ag-110M	<3.28E+00	0.00E+00	3.28E+00
					Sb-122	<1.68E+02	0.00E+00	1.68E+02
					Sb-125	<4.82E+01	0.00E+00	4.82E+01

Sample ID:	356990	Sample Dates:	10/6/2014 - 10/6/2014	BOTMFEEDER	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
					Mn-54	<1.98E+01	0.00E+00	1.98E+01
					Co-58	<2.37E+01	0.00E+00	2.37E+01
					Fe-59	<4.89E+01	0.00E+00	4.89E+01
					Co-60	<1.60E+01	0.00E+00	1.60E+01
					Zn-65	<4.62E+01	0.00E+00	4.62E+01
					Nb-95	<1.51E+01	0.00E+00	1.51E+01
					I-131	<2.89E+01	0.00E+00	2.89E+01
					Cs-134	<3.05E+01	0.00E+00	3.05E+01
					Cs-137	<2.72E+01	0.00E+00	2.72E+01
					Be-7	<1.69E+02	0.00E+00	1.69E+02
					K-40	2.62E+03	5.35E+02	2.34E+02
					Ag-110M	<1.85E+01	0.00E+00	1.85E+01
					Sb-122	<1.79E+02	0.00E+00	1.79E+02
					Sb-125	<6.20E+01	0.00E+00	6.20E+01

Sample ID:	356991	Sample Dates:	10/6/2014 - 10/6/2014	FORAGER	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
					Mn-54	<2.99E+01	0.00E+00	2.99E+01
					Co-58	<3.12E+01	0.00E+00	3.12E+01
					Fe-59	<6.10E+01	0.00E+00	6.10E+01
					Co-60	<3.26E+01	0.00E+00	3.26E+01
					Zn-65	<9.94E+01	0.00E+00	9.94E+01
					Nb-95	<3.22E+01	0.00E+00	3.22E+01
					I-131	<4.37E+01	0.00E+00	4.37E+01
					Cs-134	<2.75E+01	0.00E+00	2.75E+01
					Cs-137	<3.63E+01	0.00E+00	3.63E+01
					Be-7	<2.30E+02	0.00E+00	2.30E+02
					K-40	2.68E+03	6.32E+02	4.71E+02
					Ag-110M	<2.14E+01	0.00E+00	2.14E+01
					Sb-122	<2.11E+02	0.00E+00	2.11E+02
					Sb-125	<7.26E+01	0.00E+00	7.26E+01

## Sample Point 216 [ CONTROL - NNE @ 4.19 miles ]

Sample ID:	287048	Sample Dates:	4/8/2014 - 4/8/2014	BOTMFEEDER	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
					Mn-54	<8.66E+00	0.00E+00	8.66E+00
					Co-58	<1.00E+01	0.00E+00	1.00E+01
					Fe-59	<2.08E+01	0.00E+00	2.08E+01
					Co-60	<9.01E+00	0.00E+00	9.01E+00
					Zn-65	<2.36E+01	0.00E+00	2.36E+01
					Nb-95	<8.54E+00	0.00E+00	8.54E+00
					I-131	<9.21E+00	0.00E+00	9.21E+00
					Cs-134	<7.21E+00	0.00E+00	7.21E+00
					Cs-137	<1.23E+01	0.00E+00	1.23E+01
					Be-7	<6.87E+01	0.00E+00	6.87E+01
					K-40	3.71E+03	1.58E+02	7.95E+01
					Ag-110M	<8.58E+00	0.00E+00	8.58E+00
					Sb-122	<1.64E+01	0.00E+00	1.64E+01
					Sb-125	<2.27E+01	0.00E+00	2.27E+01

Sample ID:	287050	Sample Dates:	4/8/2014 - 4/8/2014	FORAGER	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
					Mn-54	<1.15E+01	0.00E+00	1.15E+01
					Co-58	<1.30E+01	0.00E+00	1.30E+01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: FISH Concentration (Activity): Unknown

Sample Point 216 [ CONTROL - NNE @ 4.19 miles ]

Sample ID:	Sample Dates:	FORAGER	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
287050	4/8/2014 - 4/8/2014	FORAGER	Fe-59	<2.80E+01	0.00E+00	2.80E+01
			Co-60	<1.75E+01	0.00E+00	1.75E+01
			Zn-65	<2.91E+01	0.00E+00	2.91E+01
			Nb-95	<1.32E+01	0.00E+00	1.32E+01
			I-131	<9.99E+00	0.00E+00	9.99E+00
			Cs-134	<1.03E+01	0.00E+00	1.03E+01
			Cs-137	<1.35E+01	0.00E+00	1.35E+01
			Be-7	<8.54E+01	0.00E+00	8.54E+01
			K-40	3.03E+03	1.95E+02	1.26E+02
			Ag-110M	<8.99E+00	0.00E+00	8.99E+00
			Sb-122	<1.62E+01	0.00E+00	1.62E+01
			Sb-125	<2.89E+01	0.00E+00	2.89E+01
			287052	4/8/2014 - 4/8/2014	FREESWIM	Mn-54
Co-58	<1.37E+01	0.00E+00				1.37E+01
Fe-59	<3.72E+01	0.00E+00				3.72E+01
Co-60	<1.46E+01	0.00E+00				1.46E+01
Zn-65	<3.90E+01	0.00E+00				3.90E+01
Nb-95	<1.87E+01	0.00E+00				1.87E+01
I-131	<1.24E+01	0.00E+00				1.24E+01
Cs-134	<1.42E+01	0.00E+00				1.42E+01
Cs-137	<1.94E+01	0.00E+00				1.94E+01
Be-7	<9.89E+01	0.00E+00				9.89E+01
K-40	3.33E+03	2.43E+02				2.29E+02
Ag-110M	<1.72E+01	0.00E+00				1.72E+01
Sb-122	<2.62E+01	0.00E+00				2.62E+01
Sb-125	<3.87E+01	0.00E+00	3.87E+01			
356992	10/6/2014 - 10/6/2014	FREESWIM	Mn-54	<2.14E+01	0.00E+00	2.14E+01
			Co-58	<2.59E+01	0.00E+00	2.59E+01
			Fe-59	<5.30E+01	0.00E+00	5.30E+01
			Co-60	<9.04E+00	0.00E+00	9.04E+00
			Zn-65	<7.07E+01	0.00E+00	7.07E+01
			Nb-95	<3.49E+01	0.00E+00	3.49E+01
			I-131	<3.75E+01	0.00E+00	3.75E+01
			Cs-134	<3.61E+01	0.00E+00	3.61E+01
			Cs-137	<2.34E+01	0.00E+00	2.34E+01
			Be-7	<1.58E+02	0.00E+00	1.58E+02
			K-40	3.19E+03	7.30E+02	3.96E+02
			Ag-110M	<2.12E+01	0.00E+00	2.12E+01
			Sb-122	<2.34E+02	0.00E+00	2.34E+02
Sb-125	<4.57E+01	0.00E+00	4.57E+01			
356993	10/6/2014 - 10/6/2014	BOTMFEEDER	Mn-54	<2.06E+01	0.00E+00	2.06E+01
			Co-58	<2.78E+01	0.00E+00	2.78E+01
			Fe-59	<5.10E+01	0.00E+00	5.10E+01
			Co-60	<3.46E+01	0.00E+00	3.46E+01
			Zn-65	<7.99E+01	0.00E+00	7.99E+01
			Nb-95	<1.75E+01	0.00E+00	1.75E+01
			I-131	<4.64E+01	0.00E+00	4.64E+01
			Cs-134	<3.48E+01	0.00E+00	3.48E+01
			Cs-137	<2.52E+01	0.00E+00	2.52E+01
			Be-7	<1.32E+02	0.00E+00	1.32E+02
			K-40	3.06E+03	7.27E+02	5.15E+02
			Ag-110M	<2.04E+01	0.00E+00	2.04E+01
			Sb-122	<1.59E+02	0.00E+00	1.59E+02
Sb-125	<5.76E+01	0.00E+00	5.76E+01			
356994	10/6/2014 - 10/6/2014	FORAGER	Mn-54	<4.04E+01	0.00E+00	4.04E+01
			Co-58	<4.48E+01	0.00E+00	4.48E+01
			Fe-59	<9.99E+01	0.00E+00	9.99E+01
			Co-60	<1.12E+01	0.00E+00	1.12E+01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: FISH Concentration (Activity): Unknown

Sample Point 216 [ CONTROL - NNE @ 4.19 miles ]

Sample ID:	Sample Dates:	FORAGER	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
356994	10/6/2014 - 10/6/2014		Zn-65	<1.03E+02	0.00E+00	1.03E+02
			Nb-95	<5.57E+01	0.00E+00	5.57E+01
			I-131	<3.96E+01	0.00E+00	3.96E+01
			Cs-134	<8.61E+00	0.00E+00	8.61E+00
			Cs-137	<3.82E+01	0.00E+00	3.82E+01
			Be-7	<2.90E+02	0.00E+00	2.90E+02
			K-40	1.90E+03	7.31E+02	8.36E+02
			Ag-110M	<3.21E+01	0.00E+00	3.21E+01
			Sb-122	<2.88E+02	0.00E+00	2.88E+02
			Sb-125	<6.33E+01	0.00E+00	6.33E+01

Media Type: GROUND WATER Concentration (Activity): pCi/l

Sample Point 254 [ INDICATOR - N @ 0.82 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
285951	3/4/2014 - 3/4/2014	Mn-54	<7.15E+00	0.00E+00	7.15E+00
		Co-58	<5.68E+00	0.00E+00	5.68E+00
		Fe-59	<1.52E+01	0.00E+00	1.52E+01
		Co-60	<8.73E+00	0.00E+00	8.73E+00
		Zn-65	<1.41E+01	0.00E+00	1.41E+01
		Zr-95	<1.28E+01	0.00E+00	1.28E+01
		Nb-95	<6.24E+00	0.00E+00	6.24E+00
		I-131	<1.09E+01	0.00E+00	1.09E+01
		Cs-134	<7.06E+00	0.00E+00	7.06E+00
		Cs-137	<6.02E+00	0.00E+00	6.02E+00
		BaLa-140	<1.01E+01	0.00E+00	1.01E+01
		Be-7	<5.30E+01	0.00E+00	5.30E+01
		K-40	6.81E+01	2.05E+01	1.67E+01
		H3GW	<2.92E+01	0.00E+00	1.84E+02

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
295632	5/28/2014 - 5/28/2014	Mn-54	<5.56E+00	0.00E+00	5.56E+00
		Co-58	<6.30E+00	0.00E+00	6.30E+00
		Fe-59	<1.38E+01	0.00E+00	1.38E+01
		Co-60	<8.07E+00	0.00E+00	8.07E+00
		Zn-65	<1.22E+01	0.00E+00	1.22E+01
		Zr-95	<1.32E+01	0.00E+00	1.32E+01
		Nb-95	<6.36E+00	0.00E+00	6.36E+00
		I-131	<1.04E+01	0.00E+00	1.04E+01
		Cs-134	<6.67E+00	0.00E+00	6.67E+00
		Cs-137	<6.54E+00	0.00E+00	6.54E+00
		BaLa-140	<7.58E+00	0.00E+00	7.58E+00
		Be-7	<5.55E+01	0.00E+00	5.55E+01
		K-40	1.82E+02	4.80E+01	5.83E+01
		H3GW	<-1.7E+02	0.00E+00	1.89E+02

Media Type: MILK Concentration (Activity): pCi/l

Sample Point 221 [ CONTROL - NW @ 14.5 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
281236	1/14/2014 - 1/14/2014	Be-7	<4.31E+00	0.00E+00	4.31E+00
		K-40	4.69E+01	6.06E+00	6.85E+00
		LLI-131	<6.04E-01	0.00E+00	6.04E-01
		I-131	<8.61E+00	0.00E+00	8.61E+00
		Cs-134	<8.01E+00	0.00E+00	8.01E+00
		Cs-137	<9.78E+00	0.00E+00	9.78E+00
		BaLa-140	<1.15E+01	0.00E+00	1.15E+01
		Be-7	<6.90E+01	0.00E+00	6.90E+01
		K-40	1.14E+03	1.28E+02	1.20E+02

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
282167	1/28/2014 - 1/28/2014	Be-7	<3.64E+00	0.00E+00	3.64E+00
		K-40	4.40E+01	3.68E+00	4.60E+00
		LLI-131	<6.48E-01	0.00E+00	6.48E-01
		I-131	<9.73E+00	0.00E+00	9.73E+00
		Cs-134	<9.19E+00	0.00E+00	9.19E+00

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: MILK Concentration (Activity): pCi/l

Sample Point 221 [ CONTROL - NW @ 14.5 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
282167	1/28/2014 - 1/28/2014	Cs-137	<1.04E+01	0.00E+00	1.04E+01
		BaLa-140	<1.04E+01	0.00E+00	1.04E+01
		Be-7	<7.86E+01	0.00E+00	7.86E+01
		K-40	1.74E+03	1.33E+02	1.35E+02
283426	2/10/2014 - 2/10/2014	Be-7	<4.89E+00	0.00E+00	4.89E+00
		K-40	4.48E+01	4.53E+00	6.52E+00
		LLI-131	<6.29E-01	0.00E+00	6.29E-01
		I-131	<7.52E+00	0.00E+00	7.52E+00
		Cs-134	<8.56E+00	0.00E+00	8.56E+00
		Cs-137	<1.02E+01	0.00E+00	1.02E+01
		BaLa-140	<8.12E+00	0.00E+00	8.12E+00
		Be-7	<7.74E+01	0.00E+00	7.74E+01
		K-40	1.57E+03	1.22E+02	1.25E+02
285154	2/25/2014 - 2/25/2014	Be-7	<4.17E+00	0.00E+00	4.17E+00
		K-40	4.15E+01	4.39E+00	7.24E+00
		LLI-131	<5.22E-01	0.00E+00	5.22E-01
		I-131	<9.64E+00	0.00E+00	9.64E+00
		Cs-134	<9.18E+00	0.00E+00	9.18E+00
		Cs-137	<1.08E+01	0.00E+00	1.08E+01
		BaLa-140	<3.03E+00	0.00E+00	3.03E+00
		Be-7	<6.87E+01	0.00E+00	6.87E+01
		K-40	1.50E+03	1.15E+02	9.91E+01
286263	3/11/2014 - 3/11/2014	Be-7	<1.82E+00	0.00E+00	1.82E+00
		K-40	4.47E+01	2.11E+00	1.90E+00
		LLI-131	<4.51E-01	0.00E+00	4.51E-01
		I-131	<8.31E+00	0.00E+00	8.31E+00
		Cs-134	<8.87E+00	0.00E+00	8.87E+00
		Cs-137	<8.11E+00	0.00E+00	8.11E+00
		BaLa-140	<7.47E+00	0.00E+00	7.47E+00
		Be-7	<5.54E+01	0.00E+00	5.54E+01
		K-40	1.39E+03	1.24E+02	1.02E+02
288399	3/25/2014 - 3/25/2014	Be-7	<3.51E+00	0.00E+00	3.51E+00
		K-40	3.87E+01	4.89E+00	5.24E+00
		LLI-131	<6.47E-01	0.00E+00	6.47E-01
		I-131	<5.58E+00	0.00E+00	5.58E+00
		Cs-134	<5.83E+00	0.00E+00	5.83E+00
		Cs-137	<5.74E+00	0.00E+00	5.74E+00
		BaLa-140	<3.63E+00	0.00E+00	3.63E+00
		Be-7	<4.48E+01	0.00E+00	4.48E+01
		K-40	1.62E+03	8.39E+01	3.73E+01
289506	4/8/2014 - 4/8/2014	Be-7	<3.71E+00	0.00E+00	3.71E+00
		K-40	4.39E+01	5.01E+00	6.21E+00
		LLI-131	<5.91E-01	0.00E+00	5.91E-01
		I-131	<6.57E+00	0.00E+00	6.57E+00
		Cs-134	<9.94E+00	0.00E+00	9.94E+00
		Cs-137	<9.94E+00	0.00E+00	9.94E+00
		BaLa-140	<6.52E+00	0.00E+00	6.52E+00
		Be-7	<6.50E+01	0.00E+00	6.50E+01
		K-40	1.62E+03	1.19E+02	9.65E+01
291524	4/22/2014 - 4/22/2014	Be-7	<3.27E+00	0.00E+00	3.27E+00
		K-40	2.41E+01	2.86E+00	4.46E+00
		LLI-131	<5.61E-01	0.00E+00	5.61E-01
		I-131	<6.42E+00	0.00E+00	6.42E+00
		Cs-134	<5.38E+00	0.00E+00	5.38E+00
		Cs-137	<7.22E+00	0.00E+00	7.22E+00

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: MILK Concentration (Activity): pCi/l

Sample Point 221 [ CONTROL - NW @ 14.5 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
291524	4/22/2014 - 4/22/2014	BaLa-140	<6.46E+00	0.00E+00	6.46E+00
		Be-7	<3.98E+01	0.00E+00	3.98E+01
		K-40	1.06E+03	7.28E+01	5.59E+01
293077	5/6/2014 - 5/6/2014	Be-7	<3.73E+00	0.00E+00	3.73E+00
		K-40	<6.34E+00	0.00E+00	6.34E+00
		LLI-131	<6.09E-01	0.00E+00	6.09E-01
		I-131	<8.66E+00	0.00E+00	8.66E+00
		Cs-134	<8.00E+00	0.00E+00	8.00E+00
		Cs-137	<9.15E+00	0.00E+00	9.15E+00
		BaLa-140	<9.95E+00	0.00E+00	9.95E+00
		Be-7	<6.93E+01	0.00E+00	6.93E+01
		K-40	1.63E+03	1.20E+02	9.99E+01
295231	5/20/2014 - 5/20/2014	Be-7	<3.86E+00	0.00E+00	3.86E+00
		K-40	4.82E+01	3.76E+00	5.25E+00
		LLI-131	<4.97E-01	0.00E+00	4.97E-01
		I-131	<5.10E+00	0.00E+00	5.10E+00
		Cs-134	<6.26E+00	0.00E+00	6.26E+00
		Cs-137	<6.35E+00	0.00E+00	6.35E+00
		BaLa-140	<5.31E+00	0.00E+00	5.31E+00
		Be-7	<4.62E+01	0.00E+00	4.62E+01
		K-40	1.55E+03	8.10E+01	4.85E+01
295993	6/3/2014 - 6/3/2014	Be-7	<3.34E+00	0.00E+00	3.34E+00
		K-40	1.86E+01	3.93E+00	5.37E+00
		LLI-131	<6.46E-01	0.00E+00	6.46E-01
		I-131	<9.18E+00	0.00E+00	9.18E+00
		Cs-134	<6.37E+00	0.00E+00	6.37E+00
		Cs-137	<1.16E+01	0.00E+00	1.16E+01
		BaLa-140	<8.65E+00	0.00E+00	8.65E+00
		Be-7	<5.97E+01	0.00E+00	5.97E+01
		K-40	1.49E+03	1.14E+02	6.37E+01
296759	6/17/2014 - 6/17/2014	Be-7	<3.98E+00	0.00E+00	3.98E+00
		K-40	5.23E+01	5.09E+00	6.62E+00
		LLI-131	<5.98E-01	0.00E+00	5.98E-01
		I-131	<6.27E+00	0.00E+00	6.27E+00
		Cs-134	<5.22E+00	0.00E+00	5.22E+00
		Cs-137	<6.76E+00	0.00E+00	6.76E+00
		BaLa-140	<7.13E+00	0.00E+00	7.13E+00
		Be-7	<4.23E+01	0.00E+00	4.23E+01
		K-40	1.58E+03	8.80E+01	7.47E+01
297387	7/1/2014 - 7/1/2014	Be-7	<3.24E+00	0.00E+00	3.24E+00
		K-40	3.95E+01	4.90E+00	4.77E+00
		LLI-131	<6.47E-01	0.00E+00	6.47E-01
		I-131	<9.73E+00	0.00E+00	9.73E+00
		Cs-134	<5.91E+00	0.00E+00	5.91E+00
		Cs-137	<9.87E+00	0.00E+00	9.87E+00
		BaLa-140	<9.48E+00	0.00E+00	9.48E+00
		Be-7	<6.67E+01	0.00E+00	6.67E+01
		K-40	1.60E+03	1.22E+02	9.69E+01
298207	7/15/2014 - 7/15/2014	LLI-131	<6.26E-01	0.00E+00	6.26E-01
		I-131	<1.00E+01	0.00E+00	1.00E+01
		Cs-134	<4.91E+00	0.00E+00	4.91E+00
		Cs-137	<5.07E+00	0.00E+00	5.07E+00
		BaLa-140	<9.02E+00	0.00E+00	9.02E+00
		Be-7	<4.69E+01	0.00E+00	4.69E+01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: MILK Concentration (Activity): pCi/l

Sample Point 221 [ CONTROL - NW @ 14.5 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
298207	7/15/2014 - 7/15/2014	K-40	1.69E+03	2.07E+02	6.58E+01
350675	7/29/2014 - 7/29/2014	LLI-131	<6.32E-01	0.00E+00	6.32E-01
		I-131	<8.97E+00	0.00E+00	8.97E+00
		Cs-134	<7.47E+00	0.00E+00	7.47E+00
		Cs-137	<1.14E+01	0.00E+00	1.14E+01
		BaLa-140	<7.76E+00	0.00E+00	7.76E+00
		Be-7	<6.83E+01	0.00E+00	6.83E+01
		K-40	1.51E+03	2.54E+02	1.25E+02
351522	8/12/2014 - 8/12/2014	LLI-131	<6.26E-01	0.00E+00	6.26E-01
		I-131	<1.04E+01	0.00E+00	1.04E+01
		Cs-134	<5.90E+00	0.00E+00	5.90E+00
		Cs-137	<1.05E+01	0.00E+00	1.05E+01
		BaLa-140	<1.04E+01	0.00E+00	1.04E+01
		Be-7	<6.69E+01	0.00E+00	6.69E+01
		K-40	1.50E+03	2.74E+02	1.65E+02
353955	8/26/2014 - 8/26/2014	LLI-131	<6.39E-01	0.00E+00	6.39E-01
		I-131	<5.71E+00	0.00E+00	5.71E+00
		Cs-134	<7.20E+00	0.00E+00	7.20E+00
		Cs-137	<6.33E+00	0.00E+00	6.33E+00
		BaLa-140	<7.34E+00	0.00E+00	7.34E+00
		Be-7	<3.92E+01	0.00E+00	3.92E+01
		K-40	<1.02E+02	0.00E+00	1.02E+02
354713	9/9/2014 - 9/9/2014	LLI-131	<6.11E-01	0.00E+00	6.11E-01
		I-131	<1.00E+01	0.00E+00	1.00E+01
		Cs-134	<1.17E+01	0.00E+00	1.17E+01
		Cs-137	<1.15E+01	0.00E+00	1.15E+01
		BaLa-140	<1.05E+01	0.00E+00	1.05E+01
		Be-7	<8.04E+01	0.00E+00	8.04E+01
		K-40	1.58E+03	2.85E+02	1.73E+02
355578	9/23/2014 - 9/23/2014	LLI-131	<6.43E-01	0.00E+00	6.43E-01
		I-131	<1.13E+01	0.00E+00	1.13E+01
		Cs-134	<1.13E+01	0.00E+00	1.13E+01
		Cs-137	<9.43E+00	0.00E+00	9.43E+00
		BaLa-140	<7.68E+00	0.00E+00	7.68E+00
		Be-7	<6.19E+01	0.00E+00	6.19E+01
		K-40	1.60E+03	2.76E+02	1.54E+02
356995	10/7/2014 - 10/7/2014	LLI-131	<6.43E-01	0.00E+00	6.43E-01
		I-131	<5.42E+00	0.00E+00	5.42E+00
		Cs-134	<5.97E+00	0.00E+00	5.97E+00
		Cs-137	<1.15E+01	0.00E+00	1.15E+01
		BaLa-140	<9.21E+00	0.00E+00	9.21E+00
		Be-7	<3.92E+01	0.00E+00	3.92E+01
		K-40	1.57E+03	2.47E+02	8.87E+01
358612	10/21/2014 - 10/21/2014	LLI-131	<6.19E-01	0.00E+00	6.19E-01
		I-131	<1.17E+01	0.00E+00	1.17E+01
		Cs-134	<1.13E+01	0.00E+00	1.13E+01
		Cs-137	<1.04E+01	0.00E+00	1.04E+01
		BaLa-140	<2.80E+00	0.00E+00	2.80E+00
		Be-7	<7.06E+01	0.00E+00	7.06E+01
		K-40	1.67E+03	2.76E+02	1.07E+02
359977	11/4/2014 - 11/4/2014	LLI-131	<5.43E-01	0.00E+00	5.43E-01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: MILK Concentration (Activity): pCi/l

Sample Point 221 [ CONTROL - NW @ 14.5 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
359977	11/4/2014 - 11/4/2014	I-131	<5.95E+00	0.00E+00	5.95E+00
		Cs-134	<5.97E+00	0.00E+00	5.97E+00
		Cs-137	<9.23E+00	0.00E+00	9.23E+00
		BaLa-140	<6.20E+00	0.00E+00	6.20E+00
		Be-7	<4.88E+01	0.00E+00	4.88E+01
		K-40	1.52E+03	2.49E+02	1.40E+02

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
361530	11/18/2014 - 11/18/2014	LLI-131	<6.15E-01	0.00E+00	6.15E-01
		I-131	<1.31E+01	0.00E+00	1.31E+01
		Cs-134	<9.02E+00	0.00E+00	9.02E+00
		Cs-137	<1.40E+01	0.00E+00	1.40E+01
		BaLa-140	<5.38E+00	0.00E+00	5.38E+00
		Be-7	<1.08E+02	0.00E+00	1.08E+02
K-40	1.78E+03	3.63E+02	4.23E+01		

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
362730	12/2/2014 - 12/2/2014	LLI-131	<6.38E-01	0.00E+00	6.38E-01
		I-131	<1.02E+01	0.00E+00	1.02E+01
		Cs-134	<1.08E+01	0.00E+00	1.08E+01
		Cs-137	<7.74E+00	0.00E+00	7.74E+00
		BaLa-140	<8.18E+00	0.00E+00	8.18E+00
		Be-7	<6.82E+01	0.00E+00	6.82E+01
K-40	1.52E+03	2.80E+02	1.91E+02		

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
363926	12/16/2014 - 12/16/2014	LLI-131	<6.24E-01	0.00E+00	6.24E-01
		I-131	<8.63E+00	0.00E+00	8.63E+00
		Cs-134	<9.39E+00	0.00E+00	9.39E+00
		Cs-137	<7.18E+00	0.00E+00	7.18E+00
		BaLa-140	<9.22E+00	0.00E+00	9.22E+00
		Be-7	<6.29E+01	0.00E+00	6.29E+01
K-40	1.48E+03	2.30E+02	7.12E+01		

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
364898	12/30/2014 - 12/30/2014	LLI-131	<6.50E-01	0.00E+00	6.50E-01
		I-131	<6.89E+00	0.00E+00	6.89E+00
		Cs-134	<5.15E+00	0.00E+00	5.15E+00
		Cs-137	<6.43E+00	0.00E+00	6.43E+00
		BaLa-140	<5.98E+00	0.00E+00	5.98E+00
		Be-7	<5.61E+01	0.00E+00	5.61E+01
K-40	1.49E+03	2.39E+02	8.34E+01		

Media Type: SEDIMENT\_SHORE Concentration (Activity): pCi/kg

Sample Point 208 [ INDICATOR - S @ 0.45 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
287062	4/15/2014 - 4/15/2014	Mn-54	<2.58E+01	0.00E+00	2.58E+01
		Co-58	<2.35E+01	0.00E+00	2.35E+01
		Fe-59	<5.96E+01	0.00E+00	5.96E+01
		Co-60	<2.80E+01	0.00E+00	2.80E+01
		Zn-65	<6.17E+01	0.00E+00	6.17E+01
		Zr-95	<4.27E+01	0.00E+00	4.27E+01
		Nb-95	<2.67E+01	0.00E+00	2.67E+01
		I-131	<2.83E+01	0.00E+00	2.83E+01
		Cs-134	<1.71E+01	0.00E+00	1.71E+01
		Cs-137	<2.90E+01	0.00E+00	2.90E+01
		Be-7	<2.01E+02	0.00E+00	2.01E+02
		K-40	1.50E+04	4.65E+02	2.34E+02
		Co-57	<1.57E+01	0.00E+00	1.57E+01
		Mo-99	<7.62E+02	0.00E+00	7.62E+02
		Ag-110M	<2.16E+01	0.00E+00	2.16E+01
		Sb-122	<1.13E+02	0.00E+00	1.13E+02
Sb-125	<4.71E+01	0.00E+00	4.71E+01		

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.





# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: SEDIMENT\_SHORE Concentration (Activity): pCi/kg

Sample Point 208 [ INDICATOR - S @ 0.45 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
357306	10/7/2014 - 10/7/2014	Mn-54	6.84E+01	1.34E+01	1.77E+01
		Co-58	8.87E+02	8.67E+01	2.99E+01
		Fe-59	<3.81E+01	0.00E+00	3.81E+01
		Co-60	7.90E+02	7.10E+01	2.51E+01
		Zn-65	<3.86E+01	0.00E+00	3.86E+01
		Zr-95	<2.63E+01	0.00E+00	2.63E+01
		Nb-95	<1.74E+01	0.00E+00	1.74E+01
		I-131	<3.33E+01	0.00E+00	3.33E+01
		Cs-134	<1.97E+01	0.00E+00	1.97E+01
		Cs-137	2.46E+01	9.57E+00	1.44E+01
		Be-7	7.83E+02	3.27E+02	5.22E+02
		K-40	1.77E+04	1.52E+03	1.84E+02
		Co-57	<1.23E+01	0.00E+00	1.23E+01
		Mo-99	<2.84E+03	0.00E+00	2.84E+03
		Ag-110M	<1.26E+01	0.00E+00	1.26E+01
		Sb-122	<4.58E+02	0.00E+00	4.58E+02
		Sb-125	<3.64E+01	0.00E+00	3.64E+01

## Sample Point 210 [ INDICATOR - SE @ 2.31 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
287063	4/15/2014 - 4/15/2014	Mn-54	<1.21E+01	0.00E+00	1.21E+01
		Co-58	<1.14E+01	0.00E+00	1.14E+01
		Fe-59	<2.60E+01	0.00E+00	2.60E+01
		Co-60	<1.15E+01	0.00E+00	1.15E+01
		Zn-65	<2.99E+01	0.00E+00	2.99E+01
		Zr-95	<1.99E+01	0.00E+00	1.99E+01
		Nb-95	<1.38E+01	0.00E+00	1.38E+01
		I-131	<1.69E+01	0.00E+00	1.69E+01
		Cs-134	<9.95E+00	0.00E+00	9.95E+00
		Cs-137	<1.22E+01	0.00E+00	1.22E+01
		Be-7	1.20E+02	3.95E+01	8.60E+01
		K-40	7.16E+03	2.07E+02	9.02E+01
		Co-57	<9.19E+00	0.00E+00	9.19E+00
		Mo-99	<3.02E+02	0.00E+00	3.02E+02
		Ag-110M	<9.35E+00	0.00E+00	9.35E+00
		Sb-122	<6.22E+01	0.00E+00	6.22E+01
		Sb-125	<2.88E+01	0.00E+00	2.88E+01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
357307	10/7/2014 - 10/7/2014	Mn-54	<2.01E+01	0.00E+00	2.01E+01
		Co-58	<1.37E+01	0.00E+00	1.37E+01
		Fe-59	<3.69E+01	0.00E+00	3.69E+01
		Co-60	<2.10E+01	0.00E+00	2.10E+01
		Zn-65	<5.22E+01	0.00E+00	5.22E+01
		Zr-95	<3.38E+01	0.00E+00	3.38E+01
		Nb-95	<1.83E+01	0.00E+00	1.83E+01
		I-131	<2.02E+01	0.00E+00	2.02E+01
		Cs-134	<2.09E+01	0.00E+00	2.09E+01
		Cs-137	<1.80E+01	0.00E+00	1.80E+01
		Be-7	<1.52E+02	0.00E+00	1.52E+02
		K-40	6.64E+03	7.89E+02	3.28E+01
		Co-57	<1.25E+01	0.00E+00	1.25E+01
		Mo-99	<6.94E+02	0.00E+00	6.94E+02
		Ag-110M	<1.66E+01	0.00E+00	1.66E+01
		Sb-122	<1.11E+02	0.00E+00	1.11E+02
		Sb-125	<3.63E+01	0.00E+00	3.63E+01

## Sample Point 215 [ CONTROL - NNE @ 4.21 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
287064	4/15/2014 - 4/15/2014	Mn-54	<2.71E+01	0.00E+00	2.71E+01
		Co-58	<3.03E+01	0.00E+00	3.03E+01
		Fe-59	<7.19E+01	0.00E+00	7.19E+01
		Co-60	<3.31E+01	0.00E+00	3.31E+01
		Zn-65	<8.38E+01	0.00E+00	8.38E+01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: SEDIMENT\_SHORE Concentration (Activity): pCi/kg

Sample Point 215 [ CONTROL - NNE @ 4.21 miles ]

Sample ID:	287064	Sample Dates:	4/15/2014 - 4/15/2014	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
				Zr-95	<4.78E+01	0.00E+00	4.78E+01
				Nb-95	<3.42E+01	0.00E+00	3.42E+01
				I-131	<3.59E+01	0.00E+00	3.59E+01
				Cs-134	<2.33E+01	0.00E+00	2.33E+01
				Cs-137	<2.59E+01	0.00E+00	2.59E+01
				Be-7	2.15E+02	1.09E+02	2.03E+02
				K-40	2.01E+04	5.42E+02	2.77E+02
				Co-57	<1.64E+01	0.00E+00	1.64E+01
				Mo-99	<9.19E+02	0.00E+00	9.19E+02
				Ag-110M	<2.46E+01	0.00E+00	2.46E+01
				Sb-122	<1.47E+02	0.00E+00	1.47E+02
				Sb-125	<6.46E+01	0.00E+00	6.46E+01

Sample ID:	357308	Sample Dates:	10/7/2014 - 10/7/2014	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
				Mn-54	<2.29E+01	0.00E+00	2.29E+01
				Co-58	<1.60E+01	0.00E+00	1.60E+01
				Fe-59	<5.09E+01	0.00E+00	5.09E+01
				Co-60	<2.96E+01	0.00E+00	2.96E+01
				Zn-65	<6.30E+01	0.00E+00	6.30E+01
				Zr-95	<3.45E+01	0.00E+00	3.45E+01
				Nb-95	<2.16E+01	0.00E+00	2.16E+01
				I-131	<2.48E+01	0.00E+00	2.48E+01
				Cs-134	<2.60E+01	0.00E+00	2.60E+01
				Cs-137	<2.34E+01	0.00E+00	2.34E+01
				Be-7	<1.62E+02	0.00E+00	1.62E+02
				K-40	1.28E+04	1.35E+03	3.93E+02
				Co-57	<1.85E+01	0.00E+00	1.85E+01
				Mo-99	<9.45E+02	0.00E+00	9.45E+02
				Ag-110M	<1.74E+01	0.00E+00	1.74E+01
				Sb-122	<1.35E+02	0.00E+00	1.35E+02
				Sb-125	<5.17E+01	0.00E+00	5.17E+01

Media Type: SURFACE WATER Concentration (Activity): pCi/l

Sample Point 208 [ INDICATOR - S @ 0.45 miles ]

Sample ID:	280923	Sample Dates:	12/10/2013 - 1/7/2014	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
				Mn-54	<3.89E+00	0.00E+00	3.89E+00
				Co-58	<4.21E+00	0.00E+00	4.21E+00
				Fe-59	<1.01E+01	0.00E+00	1.01E+01
				Co-60	<5.70E+00	0.00E+00	5.70E+00
				Zn-65	<7.30E+00	0.00E+00	7.30E+00
				Zr-95	<7.63E+00	0.00E+00	7.63E+00
				Nb-95	<4.84E+00	0.00E+00	4.84E+00
				I-131	<1.43E+01	0.00E+00	1.43E+01
				Cs-134	<3.61E+00	0.00E+00	3.61E+00
				Cs-137	<4.31E+00	0.00E+00	4.31E+00
				BaLa-140	<8.22E+00	0.00E+00	8.22E+00
				Be-7	<4.09E+01	0.00E+00	4.09E+01
				K-40	1.42E+02	2.17E+01	2.99E+01

Sample ID:	283100	Sample Dates:	1/7/2014 - 2/4/2014	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
				Mn-54	<3.40E+00	0.00E+00	3.40E+00
				Co-58	<3.55E+00	0.00E+00	3.55E+00
				Fe-59	<7.66E+00	0.00E+00	7.66E+00
				Co-60	<3.40E+00	0.00E+00	3.40E+00
				Zn-65	<6.32E+00	0.00E+00	6.32E+00
				Zr-95	<7.50E+00	0.00E+00	7.50E+00
				Nb-95	<3.82E+00	0.00E+00	3.82E+00
				I-131	<1.25E+01	0.00E+00	1.25E+01
				Cs-134	<3.09E+00	0.00E+00	3.09E+00
				Cs-137	<3.52E+00	0.00E+00	3.52E+00
				BaLa-140	<9.98E+00	0.00E+00	9.98E+00
				Be-7	<3.31E+01	0.00E+00	3.31E+01
				K-40	2.05E+02	2.43E+01	3.02E+01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: SURFACE WATER Concentration (Activity): pCi/l

Sample Point 208 [ INDICATOR - S @ 0.45 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
284771	12/10/2013 - 3/4/2014	H3SW	5.65E+03	1.20E+02	1.91E+02
285948	2/4/2014 - 3/4/2014	Mn-54	<3.13E+00	0.00E+00	3.13E+00
		Co-58	<3.16E+00	0.00E+00	3.16E+00
		Fe-59	<8.60E+00	0.00E+00	8.60E+00
		Co-60	<3.83E+00	0.00E+00	3.83E+00
		Zn-65	<7.23E+00	0.00E+00	7.23E+00
		Zr-95	<5.74E+00	0.00E+00	5.74E+00
		Nb-95	<4.43E+00	0.00E+00	4.43E+00
		I-131	<1.14E+01	0.00E+00	1.14E+01
		Cs-134	<2.30E+00	0.00E+00	2.30E+00
		Cs-137	<3.38E+00	0.00E+00	3.38E+00
		BaLa-140	<8.03E+00	0.00E+00	8.03E+00
		Be-7	<3.30E+01	0.00E+00	3.30E+01
		K-40	5.41E+01	2.02E+01	2.68E+01
289191	3/4/2014 - 4/1/2014	Mn-54	<2.78E+00	0.00E+00	2.78E+00
		Co-58	<2.98E+00	0.00E+00	2.98E+00
		Fe-59	<6.68E+00	0.00E+00	6.68E+00
		Co-60	<3.09E+00	0.00E+00	3.09E+00
		Zn-65	<6.50E+00	0.00E+00	6.50E+00
		Zr-95	<5.65E+00	0.00E+00	5.65E+00
		Nb-95	<4.33E+00	0.00E+00	4.33E+00
		I-131	<1.13E+01	0.00E+00	1.13E+01
		Cs-134	<2.98E+00	0.00E+00	2.98E+00
		Cs-137	<3.13E+00	0.00E+00	3.13E+00
		BaLa-140	<6.60E+00	0.00E+00	6.60E+00
		Be-7	<3.09E+01	0.00E+00	3.09E+01
		K-40	1.75E+02	2.74E+01	2.57E+01
292876	4/1/2014 - 4/29/2014	Mn-54	<4.67E+00	0.00E+00	4.67E+00
		Co-58	<4.14E+00	0.00E+00	4.14E+00
		Fe-59	<1.36E+01	0.00E+00	1.36E+01
		Co-60	<6.53E+00	0.00E+00	6.53E+00
		Zn-65	<9.53E+00	0.00E+00	9.53E+00
		Zr-95	<9.46E+00	0.00E+00	9.46E+00
		Nb-95	<5.35E+00	0.00E+00	5.35E+00
		I-131	<1.45E+01	0.00E+00	1.45E+01
		Cs-134	<3.72E+00	0.00E+00	3.72E+00
		Cs-137	<5.48E+00	0.00E+00	5.48E+00
		BaLa-140	<1.28E+01	0.00E+00	1.28E+01
		Be-7	<4.19E+01	0.00E+00	4.19E+01
		K-40	6.45E+01	2.56E+01	5.59E+01
295304	3/4/2014 - 5/28/2014	H3SW	1.61E+04	1.88E+02	1.87E+02
295628	4/29/2014 - 5/28/2014	Mn-54	<2.13E+00	0.00E+00	2.13E+00
		Co-58	<2.88E+00	0.00E+00	2.88E+00
		Fe-59	<5.48E+00	0.00E+00	5.48E+00
		Co-60	<2.82E+00	0.00E+00	2.82E+00
		Zn-65	<5.48E+00	0.00E+00	5.48E+00
		Zr-95	<4.87E+00	0.00E+00	4.87E+00
		Nb-95	<3.05E+00	0.00E+00	3.05E+00
		I-131	<1.17E+01	0.00E+00	1.17E+01
		Cs-134	<2.21E+00	0.00E+00	2.21E+00
		Cs-137	<2.82E+00	0.00E+00	2.82E+00
		BaLa-140	<7.28E+00	0.00E+00	7.28E+00
		Be-7	<2.43E+01	0.00E+00	2.43E+01
		K-40	6.10E+01	1.22E+01	2.36E+01
297110	5/28/2014 - 6/24/2014	Mn-54	<4.52E+00	0.00E+00	4.52E+00

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: SURFACE WATER Concentration (Activity): pCi/l

Sample Point 208 [ INDICATOR - S @ 0.45 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
297110	5/28/2014 - 6/24/2014	Co-58	<4.56E+00	0.00E+00	4.56E+00
		Fe-59	<8.62E+00	0.00E+00	8.62E+00
		Co-60	<3.90E+00	0.00E+00	3.90E+00
		Zn-65	<1.12E+01	0.00E+00	1.12E+01
		Zr-95	<8.42E+00	0.00E+00	8.42E+00
		Nb-95	<5.83E+00	0.00E+00	5.83E+00
		I-131	<1.40E+01	0.00E+00	1.40E+01
		Cs-134	<3.89E+00	0.00E+00	3.89E+00
		Cs-137	<4.70E+00	0.00E+00	4.70E+00
		BaLa-140	<1.38E+01	0.00E+00	1.38E+01
		Be-7	<3.49E+01	0.00E+00	3.49E+01
		K-40	5.30E+01	2.27E+01	4.86E+01
		350536	6/24/2014 - 7/22/2014	Mn-54	<2.38E+00
Co-58	<3.02E+00			0.00E+00	3.02E+00
Fe-59	<5.94E+00			0.00E+00	5.94E+00
Co-60	<2.51E+00			0.00E+00	2.51E+00
Zn-65	<4.92E+00			0.00E+00	4.92E+00
Zr-95	<5.41E+00			0.00E+00	5.41E+00
Nb-95	<3.51E+00			0.00E+00	3.51E+00
I-131	<1.20E+01			0.00E+00	1.20E+01
Cs-134	<1.96E+00			0.00E+00	1.96E+00
Cs-137	<2.39E+00			0.00E+00	2.39E+00
BaLa-140	<6.51E+00			0.00E+00	6.51E+00
Be-7	<2.58E+01			0.00E+00	2.58E+01
K-40	1.61E+02			3.83E+01	4.42E+01
353382	7/22/2014 - 8/19/2014	Mn-54	<4.02E+00	0.00E+00	4.02E+00
		Co-58	<4.19E+00	0.00E+00	4.19E+00
		Fe-59	<6.15E+00	0.00E+00	6.15E+00
		Co-60	<2.50E+00	0.00E+00	2.50E+00
		Zn-65	<9.37E+00	0.00E+00	9.37E+00
		Zr-95	<1.03E+01	0.00E+00	1.03E+01
		Nb-95	<4.08E+00	0.00E+00	4.08E+00
		I-131	<1.14E+01	0.00E+00	1.14E+01
		Cs-134	<5.09E+00	0.00E+00	5.09E+00
		Cs-137	<4.62E+00	0.00E+00	4.62E+00
		BaLa-140	<9.73E+00	0.00E+00	9.73E+00
		Be-7	<3.54E+01	0.00E+00	3.54E+01
		K-40	<7.20E+01	0.00E+00	7.20E+01
354218	5/28/2014 - 8/19/2014	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
		H3SW	5.96E+03	2.41E+02	1.90E+02
355060	8/19/2014 - 9/16/2014	Mn-54	<4.01E+00	0.00E+00	4.01E+00
		Co-58	7.93E+00	3.78E+00	5.18E+00
		Fe-59	<7.46E+00	0.00E+00	7.46E+00
		Co-60	6.14E+00	3.22E+00	4.19E+00
		Zn-65	<5.69E+00	0.00E+00	5.69E+00
		Zr-95	<6.02E+00	0.00E+00	6.02E+00
		Nb-95	<4.29E+00	0.00E+00	4.29E+00
		I-131	<1.17E+01	0.00E+00	1.17E+01
		Cs-134	<3.76E+00	0.00E+00	3.76E+00
		Cs-137	<3.09E+00	0.00E+00	3.09E+00
		BaLa-140	<8.27E+00	0.00E+00	8.27E+00
		Be-7	<3.16E+01	0.00E+00	3.16E+01
		K-40	6.31E+01	3.23E+01	4.14E+01
357989	9/16/2014 - 10/14/2014	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
		Mn-54	<2.22E+00	0.00E+00	2.22E+00
		Co-58	6.53E+00	3.49E+00	5.49E+00
		Fe-59	<4.69E+00	0.00E+00	4.69E+00
		Co-60	3.24E+00	2.34E+00	3.70E+00

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: SURFACE WATER Concentration (Activity): pCi/l

Sample Point 208 [ INDICATOR - S @ 0.45 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
357989	9/16/2014 - 10/14/2014	Zn-65	<3.93E+00	0.00E+00	3.93E+00
		Zr-95	<4.25E+00	0.00E+00	4.25E+00
		Nb-95	<2.96E+00	0.00E+00	2.96E+00
		I-131	<1.11E+01	0.00E+00	1.11E+01
		Cs-134	<2.42E+00	0.00E+00	2.42E+00
		Cs-137	<1.90E+00	0.00E+00	1.90E+00
		BaLa-140	<6.41E+00	0.00E+00	6.41E+00
		Be-7	<1.97E+01	0.00E+00	1.97E+01
		K-40	1.02E+02	2.32E+01	2.61E+01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
360662	10/14/2014 - 11/11/2014	Mn-54	<3.09E+00	0.00E+00	3.09E+00
		Co-58	<3.23E+00	0.00E+00	3.23E+00
		Fe-59	<5.99E+00	0.00E+00	5.99E+00
		Co-60	<3.46E+00	0.00E+00	3.46E+00
		Zn-65	<5.59E+00	0.00E+00	5.59E+00
		Zr-95	<5.78E+00	0.00E+00	5.78E+00
		Nb-95	<3.75E+00	0.00E+00	3.75E+00
		I-131	<1.17E+01	0.00E+00	1.17E+01
		Cs-134	<3.32E+00	0.00E+00	3.32E+00
		Cs-137	<2.53E+00	0.00E+00	2.53E+00
		BaLa-140	<6.72E+00	0.00E+00	6.72E+00
		Be-7	<2.86E+01	0.00E+00	2.86E+01
		K-40	1.70E+02	3.78E+01	3.77E+01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
363473	11/11/2014 - 12/9/2014	Mn-54	<1.47E+00	0.00E+00	1.47E+00
		Co-58	<1.76E+00	0.00E+00	1.76E+00
		Fe-59	<4.06E+00	0.00E+00	4.06E+00
		Co-60	<1.54E+00	0.00E+00	1.54E+00
		Zn-65	<2.88E+00	0.00E+00	2.88E+00
		Zr-95	<3.35E+00	0.00E+00	3.35E+00
		Nb-95	<2.36E+00	0.00E+00	2.36E+00
		I-131	<1.18E+01	0.00E+00	1.18E+01
		Cs-134	<1.60E+00	0.00E+00	1.60E+00
		Cs-137	<1.39E+00	0.00E+00	1.39E+00
		BaLa-140	<5.71E+00	0.00E+00	5.71E+00
		Be-7	<1.48E+01	0.00E+00	1.48E+01
		K-40	1.29E+02	2.66E+01	3.49E+01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
364446	8/19/2014 - 12/9/2014	H3SW	3.43E+03	2.00E+02	1.92E+02

Sample Point 211 [ INDICATOR - ESE @ 4.06 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
280924	12/10/2013 - 1/7/2014	Mn-54	<3.32E+00	0.00E+00	3.32E+00
		Co-58	<3.58E+00	0.00E+00	3.58E+00
		Fe-59	<6.72E+00	0.00E+00	6.72E+00
		Co-60	<4.26E+00	0.00E+00	4.26E+00
		Zn-65	<7.41E+00	0.00E+00	7.41E+00
		Zr-95	<6.71E+00	0.00E+00	6.71E+00
		Nb-95	<4.36E+00	0.00E+00	4.36E+00
		I-131	<9.88E+00	0.00E+00	9.88E+00
		Cs-134	<2.91E+00	0.00E+00	2.91E+00
		Cs-137	<3.86E+00	0.00E+00	3.86E+00
		BaLa-140	<8.66E+00	0.00E+00	8.66E+00
		Be-7	<2.94E+01	0.00E+00	2.94E+01
		K-40	6.98E+01	1.76E+01	2.78E+01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
283101	1/7/2014 - 2/4/2014	Mn-54	<4.02E+00	0.00E+00	4.02E+00
		Co-58	<4.17E+00	0.00E+00	4.17E+00
		Fe-59	<8.61E+00	0.00E+00	8.61E+00
		Co-60	<5.70E+00	0.00E+00	5.70E+00
		Zn-65	<6.43E+00	0.00E+00	6.43E+00
		Zr-95	<8.10E+00	0.00E+00	8.10E+00

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: SURFACE WATER Concentration (Activity): pCi/l

Sample Point 211 [ INDICATOR - ESE @ 4.06 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
283101	1/7/2014 - 2/4/2014	Nb-95	<3.92E+00	0.00E+00	3.92E+00
		I-131	<1.42E+01	0.00E+00	1.42E+01
		Cs-134	<3.33E+00	0.00E+00	3.33E+00
		Cs-137	<4.12E+00	0.00E+00	4.12E+00
		BaLa-140	<1.15E+01	0.00E+00	1.15E+01
		Be-7	<3.84E+01	0.00E+00	3.84E+01
		K-40	1.02E+02	1.62E+01	3.86E+01
284772	12/10/2013 - 3/4/2014	H3SW	4.04E+02	6.46E+01	1.91E+02
285949	2/4/2014 - 3/4/2014	Mn-54	<3.39E+00	0.00E+00	3.39E+00
		Co-58	<3.35E+00	0.00E+00	3.35E+00
		Fe-59	<8.16E+00	0.00E+00	8.16E+00
		Co-60	<3.55E+00	0.00E+00	3.55E+00
		Zn-65	<6.67E+00	0.00E+00	6.67E+00
		Zr-95	<5.69E+00	0.00E+00	5.69E+00
		Nb-95	<4.70E+00	0.00E+00	4.70E+00
		I-131	<1.34E+01	0.00E+00	1.34E+01
		Cs-134	<3.31E+00	0.00E+00	3.31E+00
		Cs-137	<3.42E+00	0.00E+00	3.42E+00
		BaLa-140	<8.31E+00	0.00E+00	8.31E+00
		Be-7	<3.78E+01	0.00E+00	3.78E+01
		K-40	1.74E+02	2.03E+01	3.09E+01
		289192	3/4/2014 - 4/1/2014	Mn-54	<3.96E+00
Co-58	<4.68E+00			0.00E+00	4.68E+00
Fe-59	<1.02E+01			0.00E+00	1.02E+01
Co-60	<3.11E+00			0.00E+00	3.11E+00
Zn-65	<8.81E+00			0.00E+00	8.81E+00
Zr-95	<8.72E+00			0.00E+00	8.72E+00
Nb-95	<4.70E+00			0.00E+00	4.70E+00
I-131	<1.44E+01			0.00E+00	1.44E+01
Cs-134	<3.11E+00			0.00E+00	3.11E+00
Cs-137	<4.40E+00			0.00E+00	4.40E+00
BaLa-140	<8.99E+00			0.00E+00	8.99E+00
Be-7	<4.40E+01			0.00E+00	4.40E+01
K-40	1.49E+02			2.50E+01	4.65E+01
292877	4/1/2014 - 4/29/2014			Mn-54	<4.04E+00
		Co-58	<4.30E+00	0.00E+00	4.30E+00
		Fe-59	<9.02E+00	0.00E+00	9.02E+00
		Co-60	<3.04E+00	0.00E+00	3.04E+00
		Zn-65	<7.12E+00	0.00E+00	7.12E+00
		Zr-95	<7.15E+00	0.00E+00	7.15E+00
		Nb-95	<4.44E+00	0.00E+00	4.44E+00
		I-131	<1.44E+01	0.00E+00	1.44E+01
		Cs-134	<3.21E+00	0.00E+00	3.21E+00
		Cs-137	<3.79E+00	0.00E+00	3.79E+00
		BaLa-140	<7.17E+00	0.00E+00	7.17E+00
		Be-7	<3.90E+01	0.00E+00	3.90E+01
		K-40	<7.59E+01	0.00E+00	7.59E+01
		295305	3/4/2014 - 5/28/2014	H3SW	6.23E+02
295629	4/29/2014 - 5/28/2014	Mn-54	<2.78E+00	0.00E+00	2.78E+00
		Co-58	<3.67E+00	0.00E+00	3.67E+00
		Fe-59	<8.47E+00	0.00E+00	8.47E+00
		Co-60	<3.54E+00	0.00E+00	3.54E+00
		Zn-65	<7.01E+00	0.00E+00	7.01E+00
		Zr-95	<5.93E+00	0.00E+00	5.93E+00
		Nb-95	<4.47E+00	0.00E+00	4.47E+00

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: SURFACE WATER Concentration (Activity): pCi/l

Sample Point 211 [ INDICATOR - ESE @ 4.06 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
295629	4/29/2014 - 5/28/2014	I-131	<1.43E+01	0.00E+00	1.43E+01
		Cs-134	<2.69E+00	0.00E+00	2.69E+00
		Cs-137	<3.19E+00	0.00E+00	3.19E+00
		BaLa-140	<9.39E+00	0.00E+00	9.39E+00
		Be-7	<2.80E+01	0.00E+00	2.80E+01
		K-40	9.56E+01	1.57E+01	2.59E+01
297111	5/28/2014 - 6/24/2014	Mn-54	<4.53E+00	0.00E+00	4.53E+00
		Co-58	<4.43E+00	0.00E+00	4.43E+00
		Fe-59	<1.04E+01	0.00E+00	1.04E+01
		Co-60	<4.97E+00	0.00E+00	4.97E+00
		Zn-65	<8.22E+00	0.00E+00	8.22E+00
		Zr-95	<9.54E+00	0.00E+00	9.54E+00
		Nb-95	<4.98E+00	0.00E+00	4.98E+00
		I-131	<1.40E+01	0.00E+00	1.40E+01
		Cs-134	<4.18E+00	0.00E+00	4.18E+00
		Cs-137	<5.33E+00	0.00E+00	5.33E+00
		BaLa-140	<9.64E+00	0.00E+00	9.64E+00
		Be-7	<4.58E+01	0.00E+00	4.58E+01
		K-40	7.66E+01	3.06E+01	4.08E+01
350537	6/24/2014 - 7/22/2014	Mn-54	<2.47E+00	0.00E+00	2.47E+00
		Co-58	<2.53E+00	0.00E+00	2.53E+00
		Fe-59	<5.80E+00	0.00E+00	5.80E+00
		Co-60	<2.31E+00	0.00E+00	2.31E+00
		Zn-65	<5.05E+00	0.00E+00	5.05E+00
		Zr-95	<5.53E+00	0.00E+00	5.53E+00
		Nb-95	<3.09E+00	0.00E+00	3.09E+00
		I-131	<1.02E+01	0.00E+00	1.02E+01
		Cs-134	<1.88E+00	0.00E+00	1.88E+00
		Cs-137	<2.21E+00	0.00E+00	2.21E+00
		BaLa-140	<6.63E+00	0.00E+00	6.63E+00
		Be-7	<2.29E+01	0.00E+00	2.29E+01
		K-40	7.45E+01	2.89E+01	4.02E+01
353383	7/22/2014 - 8/19/2014	Mn-54	<3.57E+00	0.00E+00	3.57E+00
		Co-58	<4.19E+00	0.00E+00	4.19E+00
		Fe-59	<1.05E+01	0.00E+00	1.05E+01
		Co-60	<4.09E+00	0.00E+00	4.09E+00
		Zn-65	<9.90E+00	0.00E+00	9.90E+00
		Zr-95	<9.95E+00	0.00E+00	9.95E+00
		Nb-95	<6.05E+00	0.00E+00	6.05E+00
		I-131	<1.14E+01	0.00E+00	1.14E+01
		Cs-134	<3.96E+00	0.00E+00	3.96E+00
		Cs-137	<5.08E+00	0.00E+00	5.08E+00
		BaLa-140	<6.65E+00	0.00E+00	6.65E+00
		Be-7	<3.09E+01	0.00E+00	3.09E+01
		K-40	4.38E+01	3.08E+01	3.96E+01
354220	5/28/2014 - 8/19/2014	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
		H3SW	9.88E+02	1.40E+02	1.89E+02
355063	8/19/2014 - 9/16/2014	Mn-54	<2.34E+00	0.00E+00	2.34E+00
		Co-58	<2.62E+00	0.00E+00	2.62E+00
		Fe-59	<6.01E+00	0.00E+00	6.01E+00
		Co-60	<2.54E+00	0.00E+00	2.54E+00
		Zn-65	<4.78E+00	0.00E+00	4.78E+00
		Zr-95	<4.71E+00	0.00E+00	4.71E+00
		Nb-95	<3.26E+00	0.00E+00	3.26E+00
		I-131	<1.20E+01	0.00E+00	1.20E+01
		Cs-134	<2.57E+00	0.00E+00	2.57E+00
		Cs-137	<2.27E+00	0.00E+00	2.27E+00

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: SURFACE WATER Concentration (Activity): pCi/l

Sample Point 211 [ INDICATOR - ESE @ 4.06 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
355063	8/19/2014 - 9/16/2014	BaLa-140	<7.64E+00	0.00E+00	7.64E+00
		Be-7	<2.08E+01	0.00E+00	2.08E+01
		K-40	8.29E+01	2.79E+01	3.72E+01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
357990	9/16/2014 - 10/14/2014	Mn-54	<2.30E+00	0.00E+00	2.30E+00
		Co-58	<2.28E+00	0.00E+00	2.28E+00
		Fe-59	<4.15E+00	0.00E+00	4.15E+00
		Co-60	<2.08E+00	0.00E+00	2.08E+00
		Zn-65	<4.36E+00	0.00E+00	4.36E+00
		Zr-95	<4.77E+00	0.00E+00	4.77E+00
		Nb-95	<3.48E+00	0.00E+00	3.48E+00
		I-131	<1.19E+01	0.00E+00	1.19E+01
		Cs-134	<2.53E+00	0.00E+00	2.53E+00
		Cs-137	<2.68E+00	0.00E+00	2.68E+00
		BaLa-140	<6.10E+00	0.00E+00	6.10E+00
		Be-7	<2.66E+01	0.00E+00	2.66E+01
		K-40	4.17E+01	2.35E+01	3.36E+01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
360663	10/14/2014 - 11/11/2014	Mn-54	<2.02E+00	0.00E+00	2.02E+00
		Co-58	<2.44E+00	0.00E+00	2.44E+00
		Fe-59	<6.52E+00	0.00E+00	6.52E+00
		Co-60	<2.48E+00	0.00E+00	2.48E+00
		Zn-65	<4.79E+00	0.00E+00	4.79E+00
		Zr-95	<4.20E+00	0.00E+00	4.20E+00
		Nb-95	<2.80E+00	0.00E+00	2.80E+00
		I-131	<1.13E+01	0.00E+00	1.13E+01
		Cs-134	<2.67E+00	0.00E+00	2.67E+00
		Cs-137	<2.09E+00	0.00E+00	2.09E+00
		BaLa-140	<4.09E+00	0.00E+00	4.09E+00
		Be-7	<1.94E+01	0.00E+00	1.94E+01
		K-40	3.51E+01	2.35E+01	3.44E+01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
363474	11/11/2014 - 12/9/2014	Mn-54	<1.33E+00	0.00E+00	1.33E+00
		Co-58	<1.62E+00	0.00E+00	1.62E+00
		Fe-59	<3.92E+00	0.00E+00	3.92E+00
		Co-60	<1.42E+00	0.00E+00	1.42E+00
		Zn-65	<2.61E+00	0.00E+00	2.61E+00
		Zr-95	<2.67E+00	0.00E+00	2.67E+00
		Nb-95	<2.05E+00	0.00E+00	2.05E+00
		I-131	<1.09E+01	0.00E+00	1.09E+01
		Cs-134	<1.56E+00	0.00E+00	1.56E+00
		Cs-137	<1.34E+00	0.00E+00	1.34E+00
		BaLa-140	<5.32E+00	0.00E+00	5.32E+00
		Be-7	<1.48E+01	0.00E+00	1.48E+01
		K-40	3.12E+01	9.70E+00	1.20E+01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
364447	8/19/2014 - 12/9/2014	H3SW	6.06E+02	1.31E+02	1.92E+02

Sample Point 215 [ CONTROL - NNE @ 4.21 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
280926	12/10/2013 - 1/7/2014	Mn-54	<2.92E+00	0.00E+00	2.92E+00
		Co-58	<3.93E+00	0.00E+00	3.93E+00
		Fe-59	<8.19E+00	0.00E+00	8.19E+00
		Co-60	<3.67E+00	0.00E+00	3.67E+00
		Zn-65	<6.03E+00	0.00E+00	6.03E+00
		Zr-95	<6.38E+00	0.00E+00	6.38E+00
		Nb-95	<4.39E+00	0.00E+00	4.39E+00
		I-131	<1.37E+01	0.00E+00	1.37E+01
		Cs-134	<3.55E+00	0.00E+00	3.55E+00
		Cs-137	<3.36E+00	0.00E+00	3.36E+00
		BaLa-140	<7.15E+00	0.00E+00	7.15E+00
		Be-7	<3.50E+01	0.00E+00	3.50E+01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.





# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: SURFACE WATER Concentration (Activity): pCi/l

Sample Point 215 [ CONTROL - NNE @ 4.21 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
280926	12/10/2013 - 1/7/2014	K-40	1.45E+02	3.26E+01	3.08E+01
283103	1/7/2014 - 2/4/2014	Mn-54	<3.74E+00	0.00E+00	3.74E+00
		Co-58	<4.53E+00	0.00E+00	4.53E+00
		Fe-59	<9.90E+00	0.00E+00	9.90E+00
		Co-60	<3.97E+00	0.00E+00	3.97E+00
		Zn-65	<7.24E+00	0.00E+00	7.24E+00
		Zr-95	<7.67E+00	0.00E+00	7.67E+00
		Nb-95	<5.32E+00	0.00E+00	5.32E+00
		I-131	<1.36E+01	0.00E+00	1.36E+01
		Cs-134	<3.87E+00	0.00E+00	3.87E+00
		Cs-137	<3.29E+00	0.00E+00	3.29E+00
		BaLa-140	<9.22E+00	0.00E+00	9.22E+00
		Be-7	<3.98E+01	0.00E+00	3.98E+01
		K-40	2.09E+02	3.15E+01	3.81E+01
284773	12/10/2013 - 3/4/2014	H3SW	<1.45E+02	0.00E+00	1.89E+02
285950	2/4/2014 - 3/4/2014	Mn-54	<3.90E+00	0.00E+00	3.90E+00
		Co-58	<3.27E+00	0.00E+00	3.27E+00
		Fe-59	<8.69E+00	0.00E+00	8.69E+00
		Co-60	<5.53E+00	0.00E+00	5.53E+00
		Zn-65	<7.05E+00	0.00E+00	7.05E+00
		Zr-95	<8.20E+00	0.00E+00	8.20E+00
		Nb-95	<4.68E+00	0.00E+00	4.68E+00
		I-131	<1.29E+01	0.00E+00	1.29E+01
		Cs-134	<3.84E+00	0.00E+00	3.84E+00
		Cs-137	<4.10E+00	0.00E+00	4.10E+00
		BaLa-140	<1.23E+01	0.00E+00	1.23E+01
		Be-7	<4.02E+01	0.00E+00	4.02E+01
		K-40	3.42E+01	1.91E+01	4.00E+01
289200	3/4/2014 - 4/1/2014	Mn-54	<2.46E+00	0.00E+00	2.46E+00
		Co-58	<3.38E+00	0.00E+00	3.38E+00
		Fe-59	<7.98E+00	0.00E+00	7.98E+00
		Co-60	<4.07E+00	0.00E+00	4.07E+00
		Zn-65	<5.28E+00	0.00E+00	5.28E+00
		Zr-95	<5.86E+00	0.00E+00	5.86E+00
		Nb-95	<5.24E+00	0.00E+00	5.24E+00
		I-131	<1.26E+01	0.00E+00	1.26E+01
		Cs-134	<3.06E+00	0.00E+00	3.06E+00
		Cs-137	<3.91E+00	0.00E+00	3.91E+00
		BaLa-140	<8.49E+00	0.00E+00	8.49E+00
		Be-7	<3.19E+01	0.00E+00	3.19E+01
		K-40	<6.23E+01	0.00E+00	6.23E+01
292879	4/1/2014 - 4/29/2014	Mn-54	<4.86E+00	0.00E+00	4.86E+00
		Co-58	<4.11E+00	0.00E+00	4.11E+00
		Fe-59	<9.39E+00	0.00E+00	9.39E+00
		Co-60	<4.50E+00	0.00E+00	4.50E+00
		Zn-65	<9.17E+00	0.00E+00	9.17E+00
		Zr-95	<7.27E+00	0.00E+00	7.27E+00
		Nb-95	<4.77E+00	0.00E+00	4.77E+00
		I-131	<1.42E+01	0.00E+00	1.42E+01
		Cs-134	<4.12E+00	0.00E+00	4.12E+00
		Cs-137	<4.18E+00	0.00E+00	4.18E+00
		BaLa-140	<9.12E+00	0.00E+00	9.12E+00
		Be-7	<4.10E+01	0.00E+00	4.10E+01
		K-40	2.37E+02	2.75E+01	3.23E+01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: SURFACE WATER Concentration (Activity): pCi/l

Sample Point 215 [ CONTROL - NNE @ 4.21 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
295306	3/4/2014 - 5/28/2014	H3SW	3.60E+02	6.23E+01	1.85E+02
295630	4/29/2014 - 5/28/2014	Mn-54	<2.69E+00	0.00E+00	2.69E+00
		Co-58	<2.96E+00	0.00E+00	2.96E+00
		Fe-59	<7.22E+00	0.00E+00	7.22E+00
		Co-60	<3.34E+00	0.00E+00	3.34E+00
		Zn-65	<5.78E+00	0.00E+00	5.78E+00
		Zr-95	<5.56E+00	0.00E+00	5.56E+00
		Nb-95	<3.82E+00	0.00E+00	3.82E+00
		I-131	<1.44E+01	0.00E+00	1.44E+01
		Cs-134	<2.88E+00	0.00E+00	2.88E+00
		Cs-137	<3.71E+00	0.00E+00	3.71E+00
		BaLa-140	<8.14E+00	0.00E+00	8.14E+00
		Be-7	<2.81E+01	0.00E+00	2.81E+01
		K-40	1.13E+02	1.37E+01	2.86E+01
297113	5/28/2014 - 6/24/2014	Mn-54	<4.07E+00	0.00E+00	4.07E+00
		Co-58	<3.86E+00	0.00E+00	3.86E+00
		Fe-59	<9.73E+00	0.00E+00	9.73E+00
		Co-60	<4.70E+00	0.00E+00	4.70E+00
		Zn-65	<1.01E+01	0.00E+00	1.01E+01
		Zr-95	<6.78E+00	0.00E+00	6.78E+00
		Nb-95	<5.79E+00	0.00E+00	5.79E+00
		I-131	<1.17E+01	0.00E+00	1.17E+01
		Cs-134	<3.74E+00	0.00E+00	3.74E+00
		Cs-137	<3.30E+00	0.00E+00	3.30E+00
		BaLa-140	<1.02E+01	0.00E+00	1.02E+01
		Be-7	<3.73E+01	0.00E+00	3.73E+01
		K-40	8.60E+01	2.04E+01	4.03E+01
350538	6/24/2014 - 7/22/2014	Mn-54	<2.15E+00	0.00E+00	2.15E+00
		Co-58	<2.47E+00	0.00E+00	2.47E+00
		Fe-59	<5.26E+00	0.00E+00	5.26E+00
		Co-60	<2.22E+00	0.00E+00	2.22E+00
		Zn-65	<5.06E+00	0.00E+00	5.06E+00
		Zr-95	<4.62E+00	0.00E+00	4.62E+00
		Nb-95	<3.11E+00	0.00E+00	3.11E+00
		I-131	<1.17E+01	0.00E+00	1.17E+01
		Cs-134	<2.02E+00	0.00E+00	2.02E+00
		Cs-137	<2.51E+00	0.00E+00	2.51E+00
		BaLa-140	<5.96E+00	0.00E+00	5.96E+00
		Be-7	<2.34E+01	0.00E+00	2.34E+01
		K-40	4.48E+01	2.44E+01	3.46E+01
352240	7/22/2014 - 8/19/2014	Mn-54	<4.59E+00	0.00E+00	4.59E+00
		Co-58	<3.67E+00	0.00E+00	3.67E+00
		Fe-59	<6.15E+00	0.00E+00	6.15E+00
		Co-60	<3.66E+00	0.00E+00	3.66E+00
		Zn-65	<8.80E+00	0.00E+00	8.80E+00
		Zr-95	<8.24E+00	0.00E+00	8.24E+00
		Nb-95	<5.64E+00	0.00E+00	5.64E+00
		I-131	<1.10E+01	0.00E+00	1.10E+01
		Cs-134	<5.09E+00	0.00E+00	5.09E+00
		Cs-137	<4.09E+00	0.00E+00	4.09E+00
		BaLa-140	<9.73E+00	0.00E+00	9.73E+00
		Be-7	<2.10E+01	0.00E+00	2.10E+01
		K-40	4.05E+01	4.22E+01	6.67E+01
354221	5/28/2014 - 8/19/2014	H3SW	4.47E+02	1.25E+02	1.91E+02
355066	8/19/2014 - 9/16/2014	Mn-54	<4.12E+00	0.00E+00	4.12E+00

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: SURFACE WATER Concentration (Activity): pCi/l

Sample Point 215 [ CONTROL - NNE @ 4.21 miles ]

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
355066	8/19/2014 - 9/16/2014	Co-58	<4.13E+00	0.00E+00	4.13E+00
		Fe-59	<7.82E+00	0.00E+00	7.82E+00
		Co-60	<3.21E+00	0.00E+00	3.21E+00
		Zn-65	<6.43E+00	0.00E+00	6.43E+00
		Zr-95	<6.77E+00	0.00E+00	6.77E+00
		Nb-95	<5.21E+00	0.00E+00	5.21E+00
		I-131	<1.20E+01	0.00E+00	1.20E+01
		Cs-134	<3.68E+00	0.00E+00	3.68E+00
		Cs-137	<3.99E+00	0.00E+00	3.99E+00
		BaLa-140	<1.01E+01	0.00E+00	1.01E+01
		Be-7	<2.99E+01	0.00E+00	2.99E+01
		K-40	5.12E+01	3.25E+01	4.40E+01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
357991	9/16/2014 - 10/14/2014	Mn-54	<3.19E+00	0.00E+00	3.19E+00
		Co-58	<3.20E+00	0.00E+00	3.20E+00
		Fe-59	<7.01E+00	0.00E+00	7.01E+00
		Co-60	<2.79E+00	0.00E+00	2.79E+00
		Zn-65	<6.51E+00	0.00E+00	6.51E+00
		Zr-95	<4.10E+00	0.00E+00	4.10E+00
		Nb-95	<4.45E+00	0.00E+00	4.45E+00
		I-131	<1.17E+01	0.00E+00	1.17E+01
		Cs-134	<3.84E+00	0.00E+00	3.84E+00
		Cs-137	<2.88E+00	0.00E+00	2.88E+00
		BaLa-140	<8.46E+00	0.00E+00	8.46E+00
		Be-7	<2.90E+01	0.00E+00	2.90E+01
		K-40	5.33E+01	2.80E+01	3.50E+01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
360664	10/14/2014 - 11/11/2014	Mn-54	<2.62E+00	0.00E+00	2.62E+00
		Co-58	<3.05E+00	0.00E+00	3.05E+00
		Fe-59	<4.22E+00	0.00E+00	4.22E+00
		Co-60	<2.65E+00	0.00E+00	2.65E+00
		Zn-65	<4.33E+00	0.00E+00	4.33E+00
		Zr-95	<4.84E+00	0.00E+00	4.84E+00
		Nb-95	<3.34E+00	0.00E+00	3.34E+00
		I-131	<1.07E+01	0.00E+00	1.07E+01
		Cs-134	<2.94E+00	0.00E+00	2.94E+00
		Cs-137	<2.56E+00	0.00E+00	2.56E+00
		BaLa-140	<4.65E+00	0.00E+00	4.65E+00
		Be-7	<2.35E+01	0.00E+00	2.35E+01
		K-40	4.09E+01	2.25E+01	3.16E+01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
363475	11/11/2014 - 12/9/2014	Mn-54	<1.40E+00	0.00E+00	1.40E+00
		Co-58	<1.75E+00	0.00E+00	1.75E+00
		Fe-59	<4.21E+00	0.00E+00	4.21E+00
		Co-60	<1.33E+00	0.00E+00	1.33E+00
		Zn-65	<3.12E+00	0.00E+00	3.12E+00
		Zr-95	<3.25E+00	0.00E+00	3.25E+00
		Nb-95	<2.49E+00	0.00E+00	2.49E+00
		I-131	<1.10E+01	0.00E+00	1.10E+01
		Cs-134	<1.72E+00	0.00E+00	1.72E+00
		Cs-137	<1.62E+00	0.00E+00	1.62E+00
		BaLa-140	<5.60E+00	0.00E+00	5.60E+00
		Be-7	<1.63E+01	0.00E+00	1.63E+01
		K-40	3.68E+01	1.71E+01	2.45E+01

Sample ID:	Sample Dates:	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
364448	8/19/2014 - 12/9/2014	H3SW	4.48E+02	1.26E+02	1.92E+02

Media Type: TLD Concentration (Activity): mR/Standard Quarter

Sample Point 200 [ INDICATOR - NNE @ 0.63 miles ]

TLD RING TLD\_INNER

Sample ID:	Sample Dates:	Nuclide	Activity
286547	12/19/2013 - 3/20/2014	mR/Std Qtr	19.60

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: TLD Concentration (Activity): mR/Standard Quarter

Sample Point 200 [ INDICATOR - NNE @ 0.63 miles ]

TLD RING TLD\_INNER

Sample ID:	296495	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	16.15
Sample ID:	365504	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	17.08
Sample ID:	362416	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	16.50

Sample Point 201 [ INDICATOR - NE @ 0.53 miles ]

TLD RING TLD\_INNER

Sample ID:	286548	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	19.65
Sample ID:	296496	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	15.12
Sample ID:	365505	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	15.27
Sample ID:	362417	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	19.83

Sample Point 203 [ INDICATOR - ESE @ 0.38 miles ]

TLD RING TLD\_INNER

Sample ID:	286549	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	20.49
Sample ID:	296497	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	15.32
Sample ID:	365506	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	16.56
Sample ID:	362418	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	19.28

Sample Point 204 [ INDICATOR - SSW @ 0.48 miles ]

TLD RING TLD\_INNER

Sample ID:	286550	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	19.06
Sample ID:	296498	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	12.82
Sample ID:	365507	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	14.53
Sample ID:	362419	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	16.80

Sample Point 205 [ INDICATOR - SW @ 0.5 miles ]

TLD RING TLD\_INNER

Sample ID:	286551	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	19.79
Sample ID:	296499	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	15.65
Sample ID:	365508	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	16.85
Sample ID:	362420	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	16.80

Sample Point 206 [ INDICATOR - WNW @ 0.67 miles ]

TLD RING TLD\_INNER

Sample ID:	286552	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	23.83

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: TLD Concentration (Activity): mR/Standard Quarter

Sample Point 206 [ INDICATOR - WNW @ 0.67 miles ]

TLD RING TLD\_INNER

Sample ID:	296500	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	20.82
Sample ID:	365509	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	18.61
Sample ID:	362421	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	19.40

Sample Point 207 [ INDICATOR - NNW @ 0.95 miles ]

TLD RING TLD\_INNER

Sample ID:	286553	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	23.86
Sample ID:	296501	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	20.92
Sample ID:	365510	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	18.50
Sample ID:	362422	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	19.83

Sample Point 212 [ INDICATOR - E @ 3.32 miles ]

TLD RING TLD\_SPEC

Sample ID:	286554	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	18.78
Sample ID:	296502	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	15.19
Sample ID:	365511	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	14.61
Sample ID:	362423	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	15.75

Sample Point 217 [ CONTROL - SSE @ 10.3 miles ]

TLD RING TLD\_CTRL

Sample ID:	286555	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	16.49
Sample ID:	296503	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	11.55
Sample ID:	365512	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	10.55
Sample ID:	362424	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	11.80

Sample Point 222 [ INDICATOR - N @ 0.71 miles ]

TLD RING TLD\_INNER

Sample ID:	286532	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	21.03
Sample ID:	296480	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	15.30
Sample ID:	365513	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	15.47
Sample ID:	362425	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	16.40

Sample Point 223 [ INDICATOR - E @ 0.57 miles ]

TLD RING TLD\_INNER

Sample ID:	286533	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	21.61

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.

# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: TLD Concentration (Activity): mR/Standard Quarter

Sample Point 223 [ INDICATOR - E @ 0.57 miles ]

TLD RING TLD\_INNER

Sample ID:	296481	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	19.04
Sample ID:	365514	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	18.84
Sample ID:	362426	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	18.83

Sample Point 225 [ INDICATOR - SE @ 0.68 miles ]

TLD RING TLD\_INNER

Sample ID:	286534	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	21.86
Sample ID:	296482	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	17.32
Sample ID:	365515	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	17.63
Sample ID:	362427	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	18.30

Sample Point 226 [ INDICATOR - S @ 0.48 miles ]

TLD RING TLD\_INNER

Sample ID:	286556	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	19.63
Sample ID:	296504	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	14.06
Sample ID:	365516	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	16.02
Sample ID:	362428	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	15.88

Sample Point 227 [ INDICATOR - WSW @ 0.52 miles ]

TLD RING TLD\_INNER

Sample ID:	286535	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	20.78
Sample ID:	296483	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	15.86
Sample ID:	365517	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	15.94
Sample ID:	362429	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	15.44

Sample Point 228 [ INDICATOR - W @ 0.61 miles ]

TLD RING TLD\_INNER

Sample ID:	286536	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	20.84
Sample ID:	296484	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	15.83
Sample ID:	365518	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	16.97
Sample ID:	362430	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	16.10

Sample Point 229 [ INDICATOR - NW @ 0.84 miles ]

TLD RING TLD\_INNER

Sample ID:	286537	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	27.94

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: TLD Concentration (Activity): mR/Standard Quarter

Sample Point 229 [ INDICATOR - NW @ 0.84 miles ]

TLD RING TLD\_INNER

Sample ID:	296485	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	18.90
Sample ID:	365519	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	21.02
Sample ID:	362431	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	21.60

Sample Point 230 [ INDICATOR - N @ 4.37 miles ]

TLD RING TLD\_OUTER

Sample ID:	286538	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	15.14
Sample ID:	296486	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	11.21
Sample ID:	365520	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	12.39
Sample ID:	362432	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	12.76

Sample Point 231 [ INDICATOR - NNE @ 4.21 miles ]

TLD RING TLD\_OUTER

Sample ID:	286539	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	20.92
Sample ID:	296487	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	15.77
Sample ID:	365521	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	17.23
Sample ID:	362433	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	17.69

Sample Point 232 [ INDICATOR - NE @ 4.18 miles ]

TLD RING TLD\_OUTER

Sample ID:	286540	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	25.10
Sample ID:	296488	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	18.25
Sample ID:	365522	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	19.57
Sample ID:	362434	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	23.38

Sample Point 233 [ INDICATOR - ENE @ 3.95 miles ]

TLD RING TLD\_OUTER

Sample ID:	286541	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	16.13
Sample ID:	296489	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	12.87
Sample ID:	365523	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	13.55
Sample ID:	362435	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	13.98

Sample Point 234 [ INDICATOR - E @ 4.5 miles ]

TLD RING TLD\_OUTER

Sample ID:	286542	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	19.57

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: TLD Concentration (Activity): mR/Standard Quarter

Sample Point 234 [ INDICATOR - E @ 4.5 miles ]

TLD RING TLD\_OUTER

Sample ID:	296490	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	16.32
Sample ID:	365524	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	16.66
Sample ID:	362436	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	18.68

Sample Point 235 [ INDICATOR - ESE @ 4.07 miles ]

TLD RING TLD\_OUTER

Sample ID:	286543	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	19.58
Sample ID:	296491	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	13.50
Sample ID:	365525	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	14.93
Sample ID:	362437	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	17.90

Sample Point 236 [ INDICATOR - SE @ 4.25 miles ]

TLD RING TLD\_OUTER

Sample ID:	286544	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	24.15
Sample ID:	296492	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	18.78
Sample ID:	365526	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	19.72
Sample ID:	362438	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	20.67

Sample Point 237 [ INDICATOR - SSE @ 4.75 miles ]

TLD RING TLD\_OUTER

Sample ID:	286545	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	27.79
Sample ID:	296493	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	17.84
Sample ID:	365527	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	20.97
Sample ID:	362439	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	23.28

Sample Point 238 [ INDICATOR - S @ 4.02 miles ]

TLD RING TLD\_OUTER

Sample ID:	286546	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	19.40
Sample ID:	296494	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	16.47
Sample ID:	365528	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	16.83
Sample ID:	362440	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	16.39

Sample Point 239 [ INDICATOR - SSW @ 4.49 miles ]

TLD RING TLD\_OUTER

Sample ID:	286557	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	20.86

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.





# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: TLD Concentration (Activity): mR/Standard Quarter

Sample Point 239 [ INDICATOR - SSW @ 4.49 miles ]

TLD RING TLD\_OUTER

Sample ID:	296505	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	19.51
Sample ID:	362441	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	24.73

Sample Point 240 [ INDICATOR - SW @ 4.07 miles ]

TLD RING TLD\_OUTER

Sample ID:	286558	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	14.09
Sample ID:	296506	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	10.76
Sample ID:	365530	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	12.48
Sample ID:	362442	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	12.73

Sample Point 241 [ INDICATOR - WSW @ 4.58 miles ]

TLD RING TLD\_OUTER

Sample ID:	286559	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	14.63
Sample ID:	296507	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	11.20
Sample ID:	365531	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	12.81
Sample ID:	362443	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	13.86

Sample Point 242 [ INDICATOR - W @ 4.56 miles ]

TLD RING TLD\_OUTER

Sample ID:	286560	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	18.75
Sample ID:	296508	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	14.59
Sample ID:	365532	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	16.01
Sample ID:	362444	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	15.75

Sample Point 243 [ INDICATOR - WNW @ 4.39 miles ]

TLD RING TLD\_OUTER

Sample ID:	286561	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	20.61
Sample ID:	296509	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	14.87
Sample ID:	365533	Sample Dates:	6/19/2014 - 9/18/2014	Nuclide	Activity
				mR/Std Qtr	15.48
Sample ID:	362445	Sample Dates:	9/18/2014 - 12/18/2014	Nuclide	Activity
				mR/Std Qtr	16.78

Sample Point 244 [ INDICATOR - NW @ 4.02 miles ]

TLD RING TLD\_OUTER

Sample ID:	286562	Sample Dates:	12/19/2013 - 3/20/2014	Nuclide	Activity
				mR/Std Qtr	22.85
Sample ID:	296510	Sample Dates:	3/20/2014 - 6/19/2014	Nuclide	Activity
				mR/Std Qtr	17.76

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: TLD Concentration (Activity): mR/Standard Quarter

Sample Point 244 [ INDICATOR - NW @ 4.02 miles ]

TLD RING TLD\_OUTER

Sample ID:	Sample Dates:	Nuclide	Activity
365534	6/19/2014 - 9/18/2014	mR/Std Qtr	18.57
362446	9/18/2014 - 12/18/2014	mR/Std Qtr	20.22

Sample Point 245 [ INDICATOR - NNW @ 4.01 miles ]

TLD RING TLD\_OUTER

Sample ID:	Sample Dates:	Nuclide	Activity
286563	12/19/2013 - 3/20/2014	mR/Std Qtr	21.70
296511	3/20/2014 - 6/19/2014	mR/Std Qtr	14.28
365535	6/19/2014 - 9/18/2014	mR/Std Qtr	15.25
362447	9/18/2014 - 12/18/2014	mR/Std Qtr	18.12

Sample Point 246 [ INDICATOR - ENE @ 7.87 miles ]

TLD RING TLD\_SPEC

Sample ID:	Sample Dates:	Nuclide	Activity
286610	12/19/2013 - 3/20/2014	mR/Std Qtr	17.48
296558	3/20/2014 - 6/19/2014	mR/Std Qtr	13.18
365536	6/19/2014 - 9/18/2014	mR/Std Qtr	13.44
362448	9/18/2014 - 12/18/2014	mR/Std Qtr	15.82

Sample Point 247 [ CONTROL - ESE @ 7.33 miles ]

TLD RING TLD\_CTRL

Sample ID:	Sample Dates:	Nuclide	Activity
286447	12/19/2013 - 3/20/2014	mR/Std Qtr	15.04
296395	3/20/2014 - 6/19/2014	mR/Std Qtr	11.26
365537	6/19/2014 - 9/18/2014	mR/Std Qtr	13.77
362449	9/18/2014 - 12/18/2014	mR/Std Qtr	12.85

Sample Point 248 [ INDICATOR - S @ 6.54 miles ]

TLD RING TLD\_SPEC

Sample ID:	Sample Dates:	Nuclide	Activity
286446	12/19/2013 - 3/20/2014	mR/Std Qtr	17.09
296394	3/20/2014 - 6/19/2014	mR/Std Qtr	13.17
365538	6/19/2014 - 9/18/2014	mR/Std Qtr	14.07
362450	9/18/2014 - 12/18/2014	mR/Std Qtr	13.53

Sample Point 249 [ INDICATOR - S @ 7.17 miles ]

TLD RING TLD\_SPEC

Sample ID:	Sample Dates:	Nuclide	Activity
286448	12/19/2013 - 3/20/2014	mR/Std Qtr	22.65
296396	3/20/2014 - 6/19/2014	mR/Std Qtr	15.91

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: TLD Concentration (Activity): mR/Standard Quarter

Sample Point 249 [ INDICATOR - S @ 7.17 miles ]

TLD RING TLD\_SPEC

Sample ID: 365539	Sample Dates: 6/19/2014 - 9/18/2014	Nuclide	Activity
		mR/Std Qtr	15.97

Sample ID: 362451	Sample Dates: 9/18/2014 - 12/18/2014	Nuclide	Activity
		mR/Std Qtr	17.16

Sample Point 250 [ INDICATOR - WSW @ 10.4 miles ]

TLD RING TLD\_SPEC

Sample ID: 286451	Sample Dates: 12/19/2013 - 3/20/2014	Nuclide	Activity
		mR/Std Qtr	18.22

Sample ID: 296399	Sample Dates: 3/20/2014 - 6/19/2014	Nuclide	Activity
		mR/Std Qtr	14.73

Sample ID: 365540	Sample Dates: 6/19/2014 - 9/18/2014	Nuclide	Activity
		mR/Std Qtr	16.53

Sample ID: 362452	Sample Dates: 9/18/2014 - 12/18/2014	Nuclide	Activity
		mR/Std Qtr	16.35

Sample Point 251 [ CONTROL - WNW @ 9.72 miles ]

TLD RING TLD\_CTRL

Sample ID: 286449	Sample Dates: 12/19/2013 - 3/20/2014	Nuclide	Activity
		mR/Std Qtr	19.24

Sample ID: 296397	Sample Dates: 3/20/2014 - 6/19/2014	Nuclide	Activity
		mR/Std Qtr	14.96

Sample ID: 365541	Sample Dates: 6/19/2014 - 9/18/2014	Nuclide	Activity
		mR/Std Qtr	16.77

Sample ID: 362453	Sample Dates: 9/18/2014 - 12/18/2014	Nuclide	Activity
		mR/Std Qtr	16.10

Sample Point 255 [ INDICATOR - ENE @ 0.61 miles ]

TLD RING TLD\_INNER

Sample ID: 286450	Sample Dates: 12/19/2013 - 3/20/2014	Nuclide	Activity
		mR/Std Qtr	23.30

Sample ID: 296398	Sample Dates: 3/20/2014 - 6/19/2014	Nuclide	Activity
		mR/Std Qtr	18.24

Sample ID: 365542	Sample Dates: 6/19/2014 - 9/18/2014	Nuclide	Activity
		mR/Std Qtr	20.15

Sample ID: 362454	Sample Dates: 9/18/2014 - 12/18/2014	Nuclide	Activity
		mR/Std Qtr	21.76

Sample Point 256 [ INDICATOR - SSE @ 0.58 miles ]

TLD RING TLD\_INNER

Sample ID: 286459	Sample Dates: 12/19/2013 - 3/20/2014	Nuclide	Activity
		mR/Std Qtr	23.0

Sample ID: 296407	Sample Dates: 3/20/2014 - 6/19/2014	Nuclide	Activity
		mR/Std Qtr	18.11

Sample ID: 365543	Sample Dates: 6/19/2014 - 9/18/2014	Nuclide	Activity
		mR/Std Qtr	20.29

Sample ID: 362455	Sample Dates: 9/18/2014 - 12/18/2014	Nuclide	Activity
		mR/Std Qtr	21.42

Sample Point 258 [ CONTROL - W @ 9.84 miles ]

TLD RING TLD\_SPEC

Sample ID: 286452	Sample Dates: 12/19/2013 - 3/20/2014	Nuclide	Activity
		mR/Std Qtr	22.73

Sample ID: 296400	Sample Dates: 3/20/2014 - 6/19/2014	Nuclide	Activity
		mR/Std Qtr	17.52

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: TLD Concentration (Activity): mR/Standard Quarter

Sample Point 258 [ CONTROL - W @ 9.84 miles ]

TLD RING TLD\_SPEC

Sample ID:	Sample Dates:	Nuclide	Activity
365544	6/19/2014 - 9/18/2014	mR/Std Qtr	18.04
362456	9/18/2014 - 12/18/2014	mR/Std Qtr	22.37

Media Type: VEGETATION Concentration (Activity): pCi/kg

Sample Point 200 [ INDICATOR - NNE @ 0.63 miles ]

Sample ID:	Sample Dates:	MIXEDBLV	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
279588	1/7/2014 - 1/7/2014	MIXEDBLV	I-131	<2.80E+01	0.00E+00	2.80E+01
			Cs-134	<2.48E+01	0.00E+00	2.48E+01
			Cs-137	<2.04E+01	0.00E+00	2.04E+01
			Be-7	4.43E+02	1.94E+02	2.03E+02
			K-40	4.04E+03	3.01E+02	2.00E+02
281225	2/4/2014 - 2/4/2014	MIXEDBLV	I-131	<3.42E+01	0.00E+00	3.42E+01
			Cs-134	<3.51E+01	0.00E+00	3.51E+01
			Cs-137	<3.42E+01	0.00E+00	3.42E+01
			Be-7	8.90E+02	1.48E+02	2.79E+02
			K-40	3.60E+03	3.71E+02	1.04E+02
284406	3/4/2014 - 3/4/2014	MIXEDBLV	I-131	<3.41E+01	0.00E+00	3.41E+01
			Cs-134	<3.67E+01	0.00E+00	3.67E+01
			Cs-137	<4.17E+01	0.00E+00	4.17E+01
			Be-7	4.85E+02	1.38E+02	2.77E+02
			K-40	3.01E+03	3.70E+02	7.14E+02
287043	4/1/2014 - 4/1/2014	MIXEDBLV	I-131	<2.08E+01	0.00E+00	2.08E+01
			Cs-134	<2.26E+01	0.00E+00	2.26E+01
			Cs-137	<3.03E+01	0.00E+00	3.03E+01
			Be-7	3.72E+02	7.07E+01	1.73E+02
			K-40	2.63E+03	2.24E+02	1.39E+02
289844	5/6/2014 - 5/6/2014	MIXEDBLV	I-131	<2.96E+01	0.00E+00	2.96E+01
			Cs-134	<2.55E+01	0.00E+00	2.55E+01
			Cs-137	<3.49E+01	0.00E+00	3.49E+01
			Be-7	<2.89E+02	0.00E+00	2.89E+02
			K-40	3.54E+03	2.88E+02	3.34E+02
294848	6/3/2014 - 6/3/2014	MIXEDBLV	I-131	<1.73E+01	0.00E+00	1.73E+01
			Cs-134	<1.53E+01	0.00E+00	1.53E+01
			Cs-137	<2.96E+01	0.00E+00	2.96E+01
			Be-7	2.45E+02	8.50E+01	1.81E+02
			K-40	4.31E+03	3.47E+02	2.75E+02
296616	7/1/2014 - 7/1/2014	MIXEDBLV	I-131	<3.33E+01	0.00E+00	3.33E+01
			Cs-134	<3.62E+01	0.00E+00	3.62E+01
			Cs-137	<5.17E+01	0.00E+00	5.17E+01
			Be-7	6.74E+02	1.56E+02	2.74E+02
			K-40	4.14E+03	4.51E+02	5.26E+02
298135	8/5/2014 - 8/5/2014	MIXEDBLV	Mn-54	<1.44E+01	0.00E+00	1.44E+01
			Co-58	<1.47E+01	0.00E+00	1.47E+01
			Fe-59	<3.09E+01	0.00E+00	3.09E+01
			Co-60	<1.62E+01	0.00E+00	1.62E+01
			Zn-65	<2.63E+01	0.00E+00	2.63E+01
			Zr-95	<2.88E+01	0.00E+00	2.88E+01
			Nb-95	<1.51E+01	0.00E+00	1.51E+01
			I-131	<1.32E+01	0.00E+00	1.32E+01
			Cs-134	<1.04E+01	0.00E+00	1.04E+01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: VEGETATION Concentration (Activity): pCi/kg

Sample Point 200 [ INDICATOR - NNE @ 0.63 miles ]

Sample ID:	Sample Dates:	MIXEDBLV	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
298135	8/5/2014 - 8/5/2014		Cs-137	<1.68E+01	0.00E+00	1.68E+01
			BaLa-140	<1.34E+01	0.00E+00	1.34E+01
			Be-7	1.32E+03	2.10E+02	1.30E+02
			K-40	3.46E+03	5.00E+02	1.50E+02
354397	9/3/2014 - 9/3/2014		Mn-54	<3.38E+01	0.00E+00	3.38E+01
			Co-58	<2.95E+01	0.00E+00	2.95E+01
			Fe-59	<8.02E+01	0.00E+00	8.02E+01
			Co-60	<4.20E+01	0.00E+00	4.20E+01
			Zn-65	<8.70E+01	0.00E+00	8.70E+01
			Zr-95	<5.40E+01	0.00E+00	5.40E+01
			Nb-95	<3.99E+01	0.00E+00	3.99E+01
			I-131	<3.28E+01	0.00E+00	3.28E+01
			Cs-134	<3.98E+01	0.00E+00	3.98E+01
			Cs-137	<2.19E+01	0.00E+00	2.19E+01
			BaLa-140	<4.30E+01	0.00E+00	4.30E+01
			Be-7	3.97E+02	2.80E+02	4.29E+02
			K-40	3.36E+03	7.66E+02	5.34E+02
356983	10/7/2014 - 10/7/2014		Mn-54	<4.04E+01	0.00E+00	4.04E+01
			Co-58	<4.17E+01	0.00E+00	4.17E+01
			Fe-59	<7.24E+01	0.00E+00	7.24E+01
			Co-60	<2.67E+01	0.00E+00	2.67E+01
			Zn-65	<6.71E+01	0.00E+00	6.71E+01
			Zr-95	<5.82E+01	0.00E+00	5.82E+01
			Nb-95	<2.47E+01	0.00E+00	2.47E+01
			I-131	<3.10E+01	0.00E+00	3.10E+01
			Cs-134	<4.08E+01	0.00E+00	4.08E+01
			Cs-137	<3.67E+01	0.00E+00	3.67E+01
			BaLa-140	<5.10E+01	0.00E+00	5.10E+01
			Be-7	3.29E+02	3.12E+02	4.99E+02
			K-40	3.60E+03	8.34E+02	5.51E+02
359971	11/4/2014 - 11/4/2014		Mn-54	<9.13E+00	0.00E+00	9.13E+00
			Co-58	<7.35E+00	0.00E+00	7.35E+00
			Fe-59	<1.79E+01	0.00E+00	1.79E+01
			Co-60	<9.49E+00	0.00E+00	9.49E+00
			Zn-65	<2.29E+01	0.00E+00	2.29E+01
			Zr-95	<1.58E+01	0.00E+00	1.58E+01
			Nb-95	<8.30E+00	0.00E+00	8.30E+00
			I-131	<7.93E+00	0.00E+00	7.93E+00
			Cs-134	<1.22E+01	0.00E+00	1.22E+01
			Cs-137	<8.33E+00	0.00E+00	8.33E+00
			BaLa-140	<1.03E+01	0.00E+00	1.03E+01
			Be-7	5.88E+02	1.02E+02	1.04E+02
			K-40	3.46E+03	3.75E+02	1.44E+02
362724	12/2/2014 - 12/2/2014		Mn-54	<2.74E+01	0.00E+00	2.74E+01
			Co-58	<1.97E+01	0.00E+00	1.97E+01
			Fe-59	<7.78E+01	0.00E+00	7.78E+01
			Co-60	<3.59E+01	0.00E+00	3.59E+01
			Zn-65	<6.01E+01	0.00E+00	6.01E+01
			Zr-95	<5.91E+01	0.00E+00	5.91E+01
			Nb-95	<3.28E+01	0.00E+00	3.28E+01
			I-131	<4.61E+01	0.00E+00	4.61E+01
			Cs-134	<2.63E+01	0.00E+00	2.63E+01
			Cs-137	<3.30E+01	0.00E+00	3.30E+01
			BaLa-140	<4.97E+01	0.00E+00	4.97E+01
			Be-7	6.25E+02	2.74E+02	3.82E+02
			K-40	4.27E+03	7.15E+02	6.15E+01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: VEGETATION Concentration (Activity): pCi/kg

Sample Point 201 [ INDICATOR - NE @ 0.53 miles ]

Sample ID:	Sample Dates:	MIXEDBLV	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
279589	1/7/2014 - 1/7/2014	MIXEDBLV	I-131	<3.82E+01	0.00E+00	3.82E+01
			Cs-134	<3.68E+01	0.00E+00	3.68E+01
			Cs-137	<4.84E+01	0.00E+00	4.84E+01
			Be-7	2.02E+03	2.26E+02	3.43E+02
			K-40	4.00E+03	4.65E+02	5.60E+02
281226	2/4/2014 - 2/4/2014	MIXEDBLV	I-131	<3.24E+01	0.00E+00	3.24E+01
			Cs-134	<2.47E+01	0.00E+00	2.47E+01
			Cs-137	<4.24E+01	0.00E+00	4.24E+01
			Be-7	9.47E+02	1.39E+02	2.21E+02
			K-40	3.38E+03	3.19E+02	3.00E+02
284407	3/4/2014 - 3/4/2014	MIXEDBLV	I-131	<2.25E+01	0.00E+00	2.25E+01
			Cs-134	<2.36E+01	0.00E+00	2.36E+01
			Cs-137	<2.93E+01	0.00E+00	2.93E+01
			Be-7	8.04E+02	1.26E+02	1.70E+02
			K-40	3.66E+03	2.67E+02	2.50E+02
287044	4/1/2014 - 4/1/2014	MIXEDBLV	I-131	<4.93E+01	0.00E+00	4.93E+01
			Cs-134	<3.79E+01	0.00E+00	3.79E+01
			Cs-137	<6.82E+01	0.00E+00	6.82E+01
			Be-7	1.46E+03	2.44E+02	4.41E+02
			K-40	3.75E+03	5.00E+02	6.03E+02
289845	5/6/2014 - 5/6/2014	MIXEDBLV	I-131	<2.60E+01	0.00E+00	2.60E+01
			Cs-134	<2.33E+01	0.00E+00	2.33E+01
			Cs-137	<3.41E+01	0.00E+00	3.41E+01
			Be-7	3.80E+02	8.62E+01	2.02E+02
			K-40	2.78E+03	3.57E+02	5.11E+02
294849	6/3/2014 - 6/3/2014	MIXEDBLV	I-131	<2.25E+01	0.00E+00	2.25E+01
			Cs-134	<1.26E+01	0.00E+00	1.26E+01
			Cs-137	4.18E+01	7.52E+00	1.28E+01
			Be-7	6.10E+02	7.92E+01	1.19E+02
			K-40	3.47E+03	1.84E+02	1.51E+02
296617	7/1/2014 - 7/1/2014	MIXEDBLV	I-131	<3.13E+01	0.00E+00	3.13E+01
			Cs-134	<1.98E+01	0.00E+00	1.98E+01
			Cs-137	3.32E+01	1.92E+01	2.64E+01
			Be-7	5.31E+02	1.28E+02	2.05E+02
			K-40	3.18E+03	3.08E+02	2.92E+02
298136	8/5/2014 - 8/5/2014	MIXEDBLV	Mn-54	<2.65E+01	0.00E+00	2.65E+01
			Co-58	<1.97E+01	0.00E+00	1.97E+01
			Fe-59	<5.42E+01	0.00E+00	5.42E+01
			Co-60	<3.13E+01	0.00E+00	3.13E+01
			Zn-65	<6.72E+01	0.00E+00	6.72E+01
			Zr-95	<4.54E+01	0.00E+00	4.54E+01
			Nb-95	<2.91E+01	0.00E+00	2.91E+01
			I-131	<2.15E+01	0.00E+00	2.15E+01
			Cs-134	<2.49E+01	0.00E+00	2.49E+01
			Cs-137	5.27E+01	2.54E+01	3.30E+01
			BaLa-140	<3.02E+01	0.00E+00	3.02E+01
			Be-7	1.79E+03	3.54E+02	3.31E+02
			K-40	2.63E+03	5.31E+02	6.05E+01
354398	9/3/2014 - 9/3/2014	MIXEDBLV	Mn-54	<1.78E+01	0.00E+00	1.78E+01
			Co-58	<2.12E+01	0.00E+00	2.12E+01
			Fe-59	<5.48E+01	0.00E+00	5.48E+01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: VEGETATION Concentration (Activity): pCi/kg

Sample Point 201 [ INDICATOR - NE @ 0.53 miles ]

Sample ID:	Sample Dates:	MIXEDBLV	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
354398	9/3/2014 - 9/3/2014		Co-60	<3.15E+01	0.00E+00	3.15E+01
			Zn-65	<4.78E+01	0.00E+00	4.78E+01
			Zr-95	<3.52E+01	0.00E+00	3.52E+01
			Nb-95	<2.24E+01	0.00E+00	2.24E+01
			I-131	<2.41E+01	0.00E+00	2.41E+01
			Cs-134	<2.92E+01	0.00E+00	2.92E+01
			Cs-137	5.86E+01	3.10E+01	4.55E+01
			BaLa-140	<3.69E+01	0.00E+00	3.69E+01
			Be-7	1.73E+03	3.46E+02	3.75E+02
			K-40	2.69E+03	4.87E+02	4.73E+01

Sample ID:	Sample Dates:	MIXEDBLV	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
356984	10/7/2014 - 10/7/2014		Mn-54	<2.57E+01	0.00E+00	2.57E+01
			Co-58	<1.99E+01	0.00E+00	1.99E+01
			Fe-59	<3.85E+01	0.00E+00	3.85E+01
			Co-60	<2.66E+01	0.00E+00	2.66E+01
			Zn-65	<4.61E+01	0.00E+00	4.61E+01
			Zr-95	<4.96E+01	0.00E+00	4.96E+01
			Nb-95	<2.52E+01	0.00E+00	2.52E+01
			I-131	<2.28E+01	0.00E+00	2.28E+01
			Cs-134	<2.64E+01	0.00E+00	2.64E+01
			Cs-137	<2.80E+01	0.00E+00	2.80E+01
			BaLa-140	<2.74E+01	0.00E+00	2.74E+01
			Be-7	1.77E+03	3.22E+02	2.94E+02
			K-40	3.31E+03	5.94E+02	3.76E+02

Sample ID:	Sample Dates:	MIXEDBLV	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
359972	11/4/2014 - 11/4/2014		Mn-54	<9.50E+00	0.00E+00	9.50E+00
			Co-58	<8.31E+00	0.00E+00	8.31E+00
			Fe-59	<1.82E+01	0.00E+00	1.82E+01
			Co-60	<1.10E+01	0.00E+00	1.10E+01
			Zn-65	<2.12E+01	0.00E+00	2.12E+01
			Zr-95	<1.44E+01	0.00E+00	1.44E+01
			Nb-95	<8.82E+00	0.00E+00	8.82E+00
			I-131	<8.61E+00	0.00E+00	8.61E+00
			Cs-134	<1.39E+01	0.00E+00	1.39E+01
			Cs-137	1.72E+01	1.07E+01	1.65E+01
			BaLa-140	<1.25E+01	0.00E+00	1.25E+01
			Be-7	1.17E+03	1.61E+02	1.30E+02
			K-40	3.14E+03	3.73E+02	2.25E+02

Sample ID:	Sample Dates:	MIXEDBLV	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
362725	12/2/2014 - 12/2/2014		Mn-54	<1.01E+01	0.00E+00	1.01E+01
			Co-58	<1.04E+01	0.00E+00	1.04E+01
			Fe-59	<2.71E+01	0.00E+00	2.71E+01
			Co-60	<1.32E+01	0.00E+00	1.32E+01
			Zn-65	<2.35E+01	0.00E+00	2.35E+01
			Zr-95	<2.14E+01	0.00E+00	2.14E+01
			Nb-95	<1.49E+01	0.00E+00	1.49E+01
			I-131	<4.80E+01	0.00E+00	4.80E+01
			Cs-134	<1.36E+01	0.00E+00	1.36E+01
			Cs-137	1.94E+01	1.13E+01	1.78E+01
			BaLa-140	<3.16E+01	0.00E+00	3.16E+01
			Be-7	3.04E+03	3.16E+02	1.80E+02
			K-40	4.18E+03	4.21E+02	1.81E+02

## Sample Point 222 [ INDICATOR - N @ 0.71 miles ]

Sample ID:	Sample Dates:	MIXEDBLV	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
279590	1/7/2014 - 1/7/2014		I-131	<5.52E+01	0.00E+00	5.52E+01
			Cs-134	<4.34E+01	0.00E+00	4.34E+01
			Cs-137	<6.85E+01	0.00E+00	6.85E+01
			Be-7	1.21E+03	2.18E+02	3.94E+02
			K-40	2.69E+03	4.16E+02	1.73E+02

Sample ID:	Sample Dates:	MIXEDBLV	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
281227	2/4/2014 - 2/4/2014		I-131	<5.27E+01	0.00E+00	5.27E+01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: VEGETATION Concentration (Activity): pCi/kg

Sample Point 222 [ INDICATOR - N @ 0.71 miles ]

Sample ID:	Sample Dates:	MIXEDBLV	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
281227	2/4/2014 - 2/4/2014	MIXEDBLV	Cs-134	<1.87E+01	0.00E+00	1.87E+01
			Cs-137	<1.98E+01	0.00E+00	1.98E+01
			Be-7	7.66E+02	1.13E+02	1.75E+02
			K-40	2.61E+03	1.76E+02	2.00E+02
284408	3/4/2014 - 3/4/2014	MIXEDBLV	I-131	<5.20E+01	0.00E+00	5.20E+01
			Cs-134	<5.20E+01	0.00E+00	5.20E+01
			Cs-137	<5.24E+01	0.00E+00	5.24E+01
			Be-7	8.10E+02	1.75E+02	3.62E+02
			K-40	2.93E+03	3.64E+02	4.26E+02
287045	4/1/2014 - 4/1/2014	MIXEDBLV	I-131	<5.17E+01	0.00E+00	5.17E+01
			Cs-134	<4.42E+01	0.00E+00	4.42E+01
			Cs-137	<5.66E+01	0.00E+00	5.66E+01
			Be-7	5.72E+02	2.22E+02	3.76E+02
			K-40	4.40E+03	4.56E+02	5.42E+02
289846	5/6/2014 - 5/6/2014	MIXEDBLV	I-131	<3.07E+01	0.00E+00	3.07E+01
			Cs-134	<2.93E+01	0.00E+00	2.93E+01
			Cs-137	<3.15E+01	0.00E+00	3.15E+01
			Be-7	3.39E+02	1.22E+02	2.57E+02
			K-40	3.11E+03	3.61E+02	3.24E+02
294850	6/3/2014 - 6/3/2014	MIXEDBLV	I-131	<3.76E+01	0.00E+00	3.76E+01
			Cs-134	<3.21E+01	0.00E+00	3.21E+01
			Cs-137	<4.06E+01	0.00E+00	4.06E+01
			Be-7	2.51E+02	1.24E+02	2.74E+02
			K-40	3.86E+03	4.58E+02	4.60E+02
296618	7/1/2014 - 7/1/2014	MIXEDBLV	I-131	<3.62E+01	0.00E+00	3.62E+01
			Cs-134	<3.01E+01	0.00E+00	3.01E+01
			Cs-137	<3.62E+01	0.00E+00	3.62E+01
			Be-7	7.50E+02	1.23E+02	2.65E+02
			K-40	2.10E+03	3.72E+02	5.30E+02
298137	8/5/2014 - 8/5/2014	MIXEDBLV	Mn-54	<3.01E+01	0.00E+00	3.01E+01
			Co-58	<2.79E+01	0.00E+00	2.79E+01
			Fe-59	<5.47E+01	0.00E+00	5.47E+01
			Co-60	<4.51E+01	0.00E+00	4.51E+01
			Zn-65	<7.73E+01	0.00E+00	7.73E+01
			Zr-95	<4.80E+01	0.00E+00	4.80E+01
			Nb-95	<2.48E+01	0.00E+00	2.48E+01
			I-131	<2.29E+01	0.00E+00	2.29E+01
			Cs-134	<2.57E+01	0.00E+00	2.57E+01
			Cs-137	<3.33E+01	0.00E+00	3.33E+01
			BaLa-140	<2.85E+01	0.00E+00	2.85E+01
			Be-7	1.42E+03	3.32E+02	3.12E+02
			K-40	1.99E+03	5.71E+02	4.72E+02
			354399	9/3/2014 - 9/3/2014	MIXEDBLV	Mn-54
Co-58	<2.37E+01	0.00E+00				2.37E+01
Fe-59	<4.56E+01	0.00E+00				4.56E+01
Co-60	<3.54E+01	0.00E+00				3.54E+01
Zn-65	<6.93E+01	0.00E+00				6.93E+01
Zr-95	<4.39E+01	0.00E+00				4.39E+01
Nb-95	<2.58E+01	0.00E+00				2.58E+01
I-131	<2.34E+01	0.00E+00				2.34E+01
Cs-134	<3.66E+01	0.00E+00				3.66E+01
Cs-137	<2.24E+01	0.00E+00				2.24E+01
BaLa-140	<2.20E+01	0.00E+00				2.20E+01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.





# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: VEGETATION Concentration (Activity): pCi/kg

Sample Point 222 [ INDICATOR - N @ 0.71 miles ]

Sample ID:	Sample Dates:	MIXEDBLV	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
354399	9/3/2014 - 9/3/2014	MIXEDBLV	Be-7	8.09E+02	2.30E+02	2.69E+02
			K-40	2.77E+03	5.47E+02	3.61E+02
356985	10/7/2014 - 10/7/2014	MIXEDBLV	Mn-54	<2.97E+01	0.00E+00	2.97E+01
			Co-58	<2.67E+01	0.00E+00	2.67E+01
			Fe-59	<4.84E+01	0.00E+00	4.84E+01
			Co-60	<3.14E+01	0.00E+00	3.14E+01
			Zn-65	<5.76E+01	0.00E+00	5.76E+01
			Zr-95	<4.27E+01	0.00E+00	4.27E+01
			Nb-95	<2.47E+01	0.00E+00	2.47E+01
			I-131	<2.03E+01	0.00E+00	2.03E+01
			Cs-134	<3.03E+01	0.00E+00	3.03E+01
			Cs-137	<2.79E+01	0.00E+00	2.79E+01
			BaLa-140	<3.21E+01	0.00E+00	3.21E+01
			Be-7	7.35E+02	2.47E+02	3.12E+02
			K-40	2.12E+03	4.95E+02	3.72E+02
359973	11/4/2014 - 11/4/2014	MIXEDBLV	Mn-54	<1.78E+01	0.00E+00	1.78E+01
			Co-58	<1.63E+01	0.00E+00	1.63E+01
			Fe-59	<5.13E+01	0.00E+00	5.13E+01
			Co-60	<1.97E+01	0.00E+00	1.97E+01
			Zn-65	<5.32E+01	0.00E+00	5.32E+01
			Zr-95	<3.42E+01	0.00E+00	3.42E+01
			Nb-95	<1.80E+01	0.00E+00	1.80E+01
			I-131	<1.73E+01	0.00E+00	1.73E+01
			Cs-134	<2.47E+01	0.00E+00	2.47E+01
			Cs-137	<2.38E+01	0.00E+00	2.38E+01
			BaLa-140	<2.15E+01	0.00E+00	2.15E+01
			Be-7	5.68E+02	1.73E+02	1.82E+02
			K-40	2.41E+03	4.71E+02	1.86E+02
362726	12/2/2014 - 12/2/2014	MIXEDBLV	Mn-54	<2.65E+01	0.00E+00	2.65E+01
			Co-58	<3.12E+01	0.00E+00	3.12E+01
			Fe-59	<6.97E+01	0.00E+00	6.97E+01
			Co-60	<1.99E+01	0.00E+00	1.99E+01
			Zn-65	<6.42E+01	0.00E+00	6.42E+01
			Zr-95	<6.08E+01	0.00E+00	6.08E+01
			Nb-95	<3.03E+01	0.00E+00	3.03E+01
			I-131	<4.51E+01	0.00E+00	4.51E+01
			Cs-134	<2.74E+01	0.00E+00	2.74E+01
			Cs-137	<3.20E+01	0.00E+00	3.20E+01
			BaLa-140	<3.67E+01	0.00E+00	3.67E+01
			Be-7	3.59E+02	2.07E+02	3.11E+02
			K-40	2.45E+03	5.14E+02	4.52E+02
<b>Sample Point 226 [ INDICATOR - S @ 0.48 miles ]</b>						
279591	1/7/2014 - 1/7/2014	MIXEDBLV	I-131	<3.60E+01	0.00E+00	3.60E+01
			Cs-134	<3.04E+01	0.00E+00	3.04E+01
			Cs-137	<3.04E+01	0.00E+00	3.04E+01
			Be-7	1.58E+03	1.58E+02	2.34E+02
			K-40	4.15E+03	3.94E+02	2.73E+02
281228	2/4/2014 - 2/4/2014	MIXEDBLV	I-131	<4.61E+01	0.00E+00	4.61E+01
			Cs-134	<4.53E+01	0.00E+00	4.53E+01
			Cs-137	<4.58E+01	0.00E+00	4.58E+01
			Be-7	7.20E+02	1.80E+02	3.35E+02
			K-40	5.59E+03	5.35E+02	1.39E+02
284409	3/4/2014 - 3/4/2014	MIXEDBLV	I-131	<2.94E+01	0.00E+00	2.94E+01
			Cs-134	<3.22E+01	0.00E+00	3.22E+01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: VEGETATION Concentration (Activity): pCi/kg

Sample Point 226 [ INDICATOR - S @ 0.48 miles ]

Sample ID:	Sample Dates:	MIXEDBLV	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
284409	3/4/2014 - 3/4/2014	MIXEDBLV	Cs-137	<3.84E+01	0.00E+00	3.84E+01
			Be-7	7.27E+02	1.47E+02	2.55E+02
			K-40	3.67E+03	3.48E+02	3.41E+02
287046	4/1/2014 - 4/1/2014	MIXEDBLV	I-131	<3.32E+01	0.00E+00	3.32E+01
			Cs-134	<2.94E+01	0.00E+00	2.94E+01
			Cs-137	<3.52E+01	0.00E+00	3.52E+01
			Be-7	7.96E+02	1.38E+02	2.74E+02
			K-40	2.75E+03	3.96E+02	5.99E+02
289847	5/6/2014 - 5/6/2014	MIXEDBLV	I-131	<2.88E+01	0.00E+00	2.88E+01
			Cs-134	<2.93E+01	0.00E+00	2.93E+01
			Cs-137	<2.99E+01	0.00E+00	2.99E+01
			Be-7	3.95E+02	1.26E+02	2.01E+02
			K-40	3.67E+03	4.11E+02	2.90E+02
294851	6/3/2014 - 6/3/2014	MIXEDBLV	I-131	<3.63E+01	0.00E+00	3.63E+01
			Cs-134	<3.40E+01	0.00E+00	3.40E+01
			Cs-137	<3.06E+01	0.00E+00	3.06E+01
			Be-7	2.43E+02	1.18E+02	2.31E+02
			K-40	2.93E+03	3.58E+02	2.84E+02
296619	7/1/2014 - 7/1/2014	MIXEDBLV	I-131	<3.56E+01	0.00E+00	3.56E+01
			Cs-134	<3.56E+01	0.00E+00	3.56E+01
			Cs-137	<4.12E+01	0.00E+00	4.12E+01
			Be-7	5.93E+02	1.55E+02	3.20E+02
			K-40	3.41E+03	4.25E+02	4.41E+02
298138	8/5/2014 - 8/5/2014	MIXEDBLV	Mn-54	<2.54E+01	0.00E+00	2.54E+01
			Co-58	<2.40E+01	0.00E+00	2.40E+01
			Fe-59	<5.97E+01	0.00E+00	5.97E+01
			Co-60	<3.41E+01	0.00E+00	3.41E+01
			Zn-65	<5.24E+01	0.00E+00	5.24E+01
			Zr-95	<5.46E+01	0.00E+00	5.46E+01
			Nb-95	<3.03E+01	0.00E+00	3.03E+01
			I-131	<2.74E+01	0.00E+00	2.74E+01
			Cs-134	<2.69E+01	0.00E+00	2.69E+01
			Cs-137	<3.17E+01	0.00E+00	3.17E+01
			BaLa-140	<2.00E+01	0.00E+00	2.00E+01
			Be-7	1.33E+03	3.28E+02	3.81E+02
			K-40	4.96E+03	7.87E+02	2.77E+02
354400	9/3/2014 - 9/3/2014	MIXEDBLV	Mn-54	<1.75E+01	0.00E+00	1.75E+01
			Co-58	<2.02E+01	0.00E+00	2.02E+01
			Fe-59	<4.44E+01	0.00E+00	4.44E+01
			Co-60	<1.89E+01	0.00E+00	1.89E+01
			Zn-65	<4.46E+01	0.00E+00	4.46E+01
			Zr-95	<3.06E+01	0.00E+00	3.06E+01
			Nb-95	<2.45E+01	0.00E+00	2.45E+01
			I-131	<4.47E+01	0.00E+00	4.47E+01
			Cs-134	<2.05E+01	0.00E+00	2.05E+01
			Cs-137	<1.98E+01	0.00E+00	1.98E+01
			BaLa-140	<4.05E+01	0.00E+00	4.05E+01
			Be-7	8.69E+02	2.08E+02	2.56E+02
			K-40	4.66E+03	5.84E+02	2.77E+02
356986	10/7/2014 - 10/7/2014	MIXEDBLV	Mn-54	<3.89E+01	0.00E+00	3.89E+01
			Co-58	<4.33E+01	0.00E+00	4.33E+01
			Fe-59	<9.47E+01	0.00E+00	9.47E+01
			Co-60	<5.43E+01	0.00E+00	5.43E+01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: VEGETATION Concentration (Activity): pCi/kg

Sample Point 226 [ INDICATOR - S @ 0.48 miles ]

Sample ID:	Sample Dates:	MIXEDBLV	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
356986	10/7/2014 - 10/7/2014		Zn-65	<1.13E+02	0.00E+00	1.13E+02
			Zr-95	<5.06E+01	0.00E+00	5.06E+01
			Nb-95	<4.93E+01	0.00E+00	4.93E+01
			I-131	<3.46E+01	0.00E+00	3.46E+01
			Cs-134	<4.36E+01	0.00E+00	4.36E+01
			Cs-137	<3.17E+01	0.00E+00	3.17E+01
			BaLa-140	<6.53E+01	0.00E+00	6.53E+01
			Be-7	8.90E+02	3.71E+02	4.91E+02
			K-40	4.82E+03	1.01E+03	5.12E+02

Sample ID:	Sample Dates:	MIXEDBLV	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
359974	11/4/2014 - 11/4/2014		Mn-54	<2.62E+01	0.00E+00	2.62E+01
			Co-58	<1.73E+01	0.00E+00	1.73E+01
			Fe-59	<3.70E+01	0.00E+00	3.70E+01
			Co-60	<1.58E+01	0.00E+00	1.58E+01
			Zn-65	<5.36E+01	0.00E+00	5.36E+01
			Zr-95	<3.33E+01	0.00E+00	3.33E+01
			Nb-95	<1.76E+01	0.00E+00	1.76E+01
			I-131	<1.99E+01	0.00E+00	1.99E+01
			Cs-134	<2.47E+01	0.00E+00	2.47E+01
			Cs-137	<1.80E+01	0.00E+00	1.80E+01
			BaLa-140	<2.59E+01	0.00E+00	2.59E+01
			Be-7	7.14E+02	2.19E+02	2.70E+02
			K-40	4.86E+03	7.02E+02	2.09E+02

Sample ID:	Sample Dates:	MIXEDBLV	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
362727	12/2/2014 - 12/2/2014		Mn-54	<3.03E+01	0.00E+00	3.03E+01
			Co-58	<2.00E+01	0.00E+00	2.00E+01
			Fe-59	<5.72E+01	0.00E+00	5.72E+01
			Co-60	<4.24E+01	0.00E+00	4.24E+01
			Zn-65	<7.06E+01	0.00E+00	7.06E+01
			Zr-95	<5.23E+01	0.00E+00	5.23E+01
			Nb-95	<3.04E+01	0.00E+00	3.04E+01
			I-131	<2.31E+01	0.00E+00	2.31E+01
			Cs-134	<4.21E+01	0.00E+00	4.21E+01
			Cs-137	<3.89E+01	0.00E+00	3.89E+01
			BaLa-140	<2.41E+01	0.00E+00	2.41E+01
			Be-7	1.21E+03	3.29E+02	3.84E+02
			K-40	4.18E+03	7.59E+02	4.21E+02

## Sample Point 258 [ CONTROL - W @ 9.84 miles ]

Sample ID:	Sample Dates:	MIXEDBLV	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
279593	1/7/2014 - 1/7/2014		I-131	<3.02E+01	0.00E+00	3.02E+01
			Cs-134	<3.44E+01	0.00E+00	3.44E+01
			Cs-137	<4.86E+01	0.00E+00	4.86E+01
			Be-7	1.34E+03	1.64E+02	2.97E+02
			K-40	3.67E+03	4.26E+02	3.23E+02

Sample ID:	Sample Dates:	MIXEDBLV	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
281229	2/4/2014 - 2/4/2014		I-131	<3.30E+01	0.00E+00	3.30E+01
			Cs-134	<4.48E+01	0.00E+00	4.48E+01
			Cs-137	<4.49E+01	0.00E+00	4.49E+01
			Be-7	6.90E+02	2.17E+02	3.41E+02
			K-40	4.22E+03	4.88E+02	4.48E+02

Sample ID:	Sample Dates:	MIXEDBLV	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
284433	3/4/2014 - 3/4/2014		I-131	<3.49E+01	0.00E+00	3.49E+01
			Cs-134	<2.78E+01	0.00E+00	2.78E+01
			Cs-137	<2.90E+01	0.00E+00	2.90E+01
			Be-7	6.20E+02	1.63E+02	2.84E+02
			K-40	3.78E+03	3.41E+02	3.59E+02

Sample ID:	Sample Dates:	MIXEDBLV	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
287074	4/1/2014 - 4/1/2014		I-131	<4.45E+01	0.00E+00	4.45E+01
			Cs-134	<4.02E+01	0.00E+00	4.02E+01
			Cs-137	<4.74E+01	0.00E+00	4.74E+01

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: VEGETATION Concentration (Activity): pCi/kg

Sample Point 258 [ CONTROL - W @ 9.84 miles ]

Sample ID:	Sample Dates:	MIXEDBLV	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
287074	4/1/2014 - 4/1/2014	MIXEDBLV	Be-7	1.56E+03	2.37E+02	3.70E+02
			K-40	6.04E+03	5.75E+02	5.52E+02
289849	5/6/2014 - 5/6/2014	MIXEDBLV	I-131	<1.74E+01	0.00E+00	1.74E+01
			Cs-134	<1.42E+01	0.00E+00	1.42E+01
			Cs-137	<1.88E+01	0.00E+00	1.88E+01
			Be-7	3.87E+02	7.96E+01	1.26E+02
			K-40	3.93E+03	2.38E+02	1.44E+02
294853	6/3/2014 - 6/3/2014	MIXEDBLV	I-131	<2.63E+01	0.00E+00	2.63E+01
			Cs-134	<2.23E+01	0.00E+00	2.23E+01
			Cs-137	<2.58E+01	0.00E+00	2.58E+01
			Be-7	4.55E+02	1.14E+02	2.08E+02
			K-40	4.68E+03	3.68E+02	3.76E+02
296621	7/1/2014 - 7/1/2014	MIXEDBLV	I-131	<3.75E+01	0.00E+00	3.75E+01
			Cs-134	<2.94E+01	0.00E+00	2.94E+01
			Cs-137	<4.46E+01	0.00E+00	4.46E+01
			Be-7	1.40E+03	2.00E+02	2.88E+02
			K-40	3.10E+03	3.73E+02	4.02E+02
298140	8/5/2014 - 8/5/2014	MIXEDBLV	Mn-54	<2.44E+01	0.00E+00	2.44E+01
			Co-58	<1.93E+01	0.00E+00	1.93E+01
			Fe-59	<5.49E+01	0.00E+00	5.49E+01
			Co-60	<3.44E+01	0.00E+00	3.44E+01
			Zn-65	<4.32E+01	0.00E+00	4.32E+01
			Zr-95	<3.70E+01	0.00E+00	3.70E+01
			Nb-95	<1.96E+01	0.00E+00	1.96E+01
			I-131	<2.35E+01	0.00E+00	2.35E+01
			Cs-134	<2.18E+01	0.00E+00	2.18E+01
			Cs-137	<2.90E+01	0.00E+00	2.90E+01
			BaLa-140	<2.59E+01	0.00E+00	2.59E+01
			Be-7	1.84E+03	3.41E+02	3.16E+02
			K-40	2.62E+03	5.44E+02	4.17E+02
			354401	9/3/2014 - 9/3/2014	MIXEDBLV	Mn-54
Co-58	<3.05E+01	0.00E+00				3.05E+01
Fe-59	<6.71E+01	0.00E+00				6.71E+01
Co-60	<3.82E+01	0.00E+00				3.82E+01
Zn-65	<5.47E+01	0.00E+00				5.47E+01
Zr-95	<6.29E+01	0.00E+00				6.29E+01
Nb-95	<2.93E+01	0.00E+00				2.93E+01
I-131	<2.84E+01	0.00E+00				2.84E+01
Cs-134	<4.69E+01	0.00E+00				4.69E+01
Cs-137	<3.47E+01	0.00E+00				3.47E+01
BaLa-140	<2.85E+01	0.00E+00				2.85E+01
Be-7	8.65E+02	3.06E+02				4.07E+02
K-40	4.58E+03	8.46E+02				6.45E+02
356987	10/7/2014 - 10/7/2014	MIXEDBLV				Mn-54
			Co-58	<1.72E+01	0.00E+00	1.72E+01
			Fe-59	<3.91E+01	0.00E+00	3.91E+01
			Co-60	<2.31E+01	0.00E+00	2.31E+01
			Zn-65	<4.08E+01	0.00E+00	4.08E+01
			Zr-95	<3.54E+01	0.00E+00	3.54E+01
			Nb-95	<2.10E+01	0.00E+00	2.10E+01
			I-131	<2.77E+01	0.00E+00	2.77E+01
			Cs-134	<2.30E+01	0.00E+00	2.30E+01
			Cs-137	<2.01E+01	0.00E+00	2.01E+01
			BaLa-140	<2.51E+01	0.00E+00	2.51E+01
			Be-7	1.07E+03	2.13E+02	2.49E+02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



# CATAWBA Radiological Environmental Monitoring Analysis Report - 2014 (Appendix E)

Media Type: VEGETATION Concentration (Activity): pCi/kg

Sample Point 258 [ CONTROL - W @ 9.84 miles ]

Sample ID:	Sample Dates:	MIXEDBLV	Nuclide	Activity	Sigma Error <sup>1</sup>	LLD
356987	10/7/2014 - 10/7/2014		K-40	3.84E+03	5.01E+02	3.11E+02
359975	11/4/2014 - 11/4/2014		Mn-54	<1.40E+01	0.00E+00	1.40E+01
			Co-58	<1.24E+01	0.00E+00	1.24E+01
			Fe-59	<2.11E+01	0.00E+00	2.11E+01
			Co-60	<1.41E+01	0.00E+00	1.41E+01
			Zn-65	<2.71E+01	0.00E+00	2.71E+01
			Zr-95	<2.23E+01	0.00E+00	2.23E+01
			Nb-95	<1.22E+01	0.00E+00	1.22E+01
			I-131	<1.13E+01	0.00E+00	1.13E+01
			Cs-134	<2.17E+01	0.00E+00	2.17E+01
			Cs-137	<1.09E+01	0.00E+00	1.09E+01
			BaLa-140	<1.32E+01	0.00E+00	1.32E+01
			Be-7	1.04E+03	1.73E+02	2.00E+02
			K-40	3.95E+03	4.40E+02	1.71E+02
362728	12/2/2014 - 12/2/2014		Mn-54	<2.55E+01	0.00E+00	2.55E+01
			Co-58	<1.49E+01	0.00E+00	1.49E+01
			Fe-59	<8.03E+01	0.00E+00	8.03E+01
			Co-60	<3.31E+01	0.00E+00	3.31E+01
			Zn-65	<6.48E+01	0.00E+00	6.48E+01
			Zr-95	<3.92E+01	0.00E+00	3.92E+01
			Nb-95	<3.23E+01	0.00E+00	3.23E+01
			I-131	<3.05E+01	0.00E+00	3.05E+01
			Cs-134	<4.05E+01	0.00E+00	4.05E+01
			Cs-137	<3.41E+01	0.00E+00	3.41E+01
			BaLa-140	<3.39E+01	0.00E+00	3.39E+01
			Be-7	1.07E+03	2.87E+02	3.15E+02
			K-40	3.89E+03	7.61E+02	6.05E+02

(1) Effective 10JUL2014, analytical samples indicating detectable activity are reported with 2 Sigma error.



**APPENDIX F**

**ERRATA TO  
PREVIOUS REPORTS**

---

# APPENDIX F

---

## ERRATA TO THE 2014 AREOR

Catawba AREORs: 2009 and 2013

Report titled "Environmental TLD Dose Report" used by the Dosimetry Laboratory to communicate final TLD results was found to have an error in the calculation of dose per standard quarter. The error would have existed since the report's first use for 2nd quarter 2009 and only applies to quarters where date ranges were other than a standard quarter (not equal to 91 days). Catawba environmental TLD data were evaluated and it was determined the quarters affected were Catawba 3Q2009 and Catawba 1Q2013. Catawba environmental TLD results were updated during 2015 in the EnRad Sample Manager database to indicate the corrected dose per standard quarter values derived from the new Dosimetry Laboratory reporting mechanism. (PIP G-14-02451).

2009 Catawba AREOR entities affected:

- Section 3.10, Figure 3.10
- Section 3.10, Table 3.10
- 2009 inner ring average updated from 79.9 mR/yr to 81.4 mR/yr
- 2009 outer ring average updated from 71.9 mR/yr to 73.0 mR/yr
- 2009 control average updated from 58.0 mR/yr to 60.0 mR/yr

2009 Appendix B, Direct Radiation TLD section

### **2009 TLD Appendix B section as originally reported**

All Indicator Locations	Location with Highest Annual Mean		Control Location
Mean (Fraction) Range	Location Code	Mean (Fraction) Range	Mean (Fraction) Range
18.7 (150 / 150)	235	23.9 (3 / 3)	14.5 (12 / 12)
10.2 – 29.6	(4.07 mi ESE)	17.0 – 29.6	10.2 – 20.6

### **Updated 2009 TLD Appendix B section**

All Indicator Locations	Location with Highest Annual Mean		Control Location
Mean (Fraction) Range	Location Code	Mean (Fraction) Range	Mean (Fraction) Range
19.0 (150 / 150)	237	24.2 (4 / 4)	14.7 (12 / 12)
11.1 – 29.6	(4.75 mi SSE)	21.0 – 26.9	11.0 – 20.6

2013 Catawba AREOR

- Section 3.10, Figure 3.10
- Section 3.10, Table 3.10
- 2013 inner ring average updated from 78.2 mR/yr to 80.0 mR/yr
- 2013 outer ring average updated from 71.2 mR/yr to 72.8 mR/yr
- 2013 control average updated from 58.0 mR/yr to 59.5 mR/yr

2013 Appendix B, Direct Radiation TLD section

**2013 TLD Appendix B section as originally reported**

All Indicator Locations	Location with Highest Annual Mean		Control Location
Mean (Fraction) Range	Location Code	Mean (Fraction) Range	Mean (Fraction) Range
18.4 (152 / 152)	229	24.2 (4 / 4)	14.5 (12 / 12)
12.0 – 26.7	(0.84 mi NW)	22.0 – 26.7	11.0 – 19.3

**Updated 2013 TLD Appendix B section**

All Indicator Locations	Location with Highest Annual Mean		Control Location
Mean (Fraction) Range	Location Code	Mean (Fraction) Range	Mean (Fraction) Range
18.9 (152 / 152)	229	24.8 (4 / 4)	14.9 (12 / 12)
12.0 – 29.4	(0.84 mi NW)	22.0 – 29.4	11.0 – 21.3