

Duke Power Company  
McGuire Nuclear Generation Department  
12700 Hagers Ferry Road (MG01VP)  
Huntersville, NC 28078-8985

T. C. McMEEKIN  
Vice President  
(704)875-4800  
(704)875-4809 Fax



**DUKE POWER**

April 24, 1996

U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, D.C. 20555

Subject: McGuire Nuclear Station  
Docket Nos. 50-369 and 50-370  
Annual Radiological Environmental Operating Report

Please find attached the McGuire Nuclear Station Annual Radiological Environmental Operating Report for 1995 pursuant to McGuire Unit 1 and Unit 2 Technical Specification 6.9.1.6.

Questions or problems with respect to this report should be directed to Kay Crane, at (704) 875-4306.

Very truly yours,

T. C. McMeekin, Vice President  
McGuire Nuclear Station

Mr. Victor Nerses, Project Manager  
Office of Nuclear Reactor Regulation  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Mr. Dayne Brown  
Division of Radiation Protection  
P.O. Box 27687  
Raleigh, N.C. 27611-7687

Mr. S. D. Ebnetter  
U. S. Nuclear Regulatory Commission  
Region II  
101 Marietta Street, NW - Suite 2900  
Atlanta, Georgia 30323

ANI Library  
Town Center, Suite 300S  
29 South Main Street  
West Hartford, CT  
06107-2445

Mr. George Maxwell  
Senior Resident Inspector  
McGuire Nuclear Site

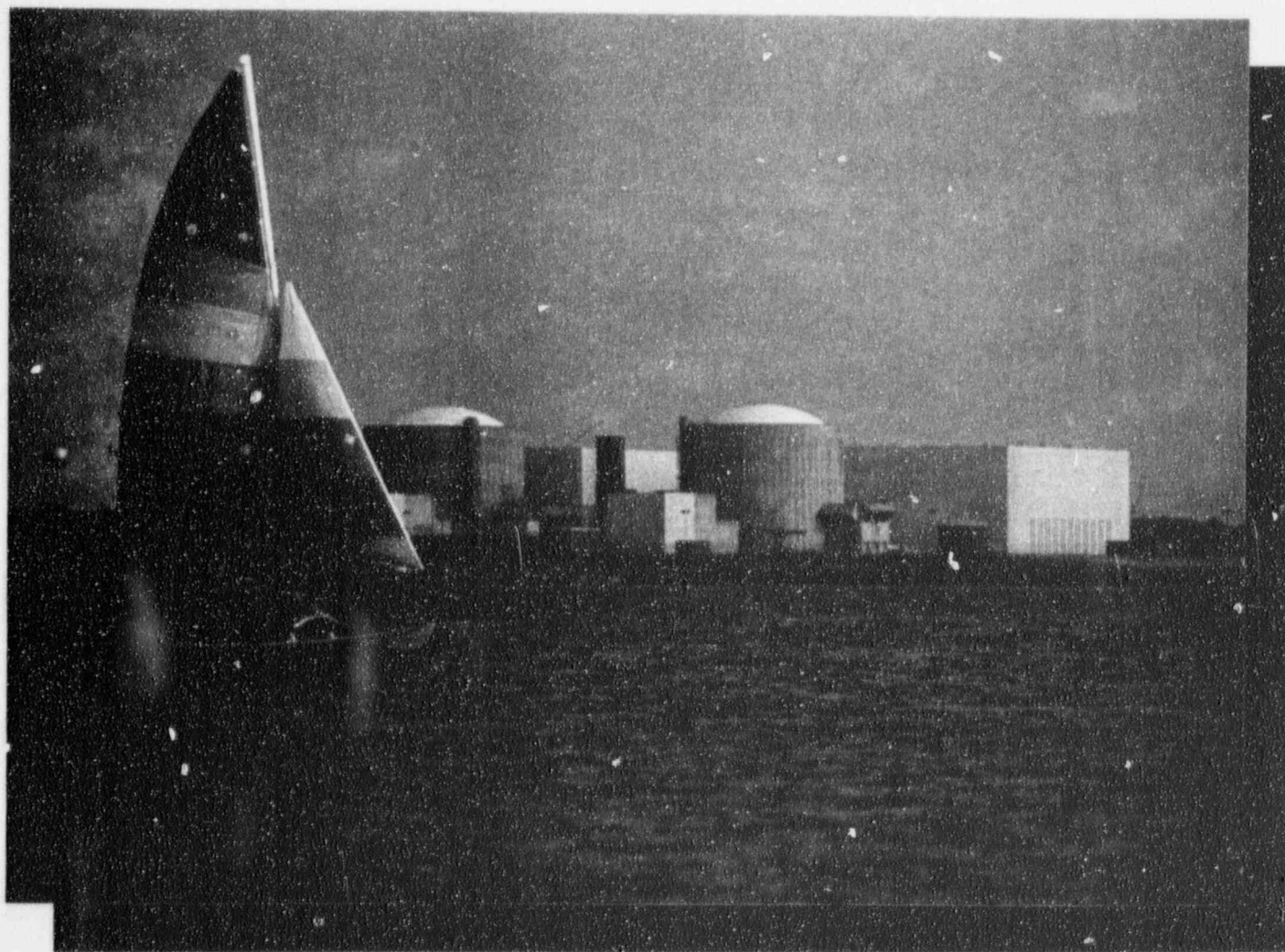
9604300135 951231  
PDR ADOCK 05000369  
R PDR

IE25  
1/1

# **DUKE POWER**

## **McGuire Nuclear Station**

### **Units 1 and 2**



**Annual  
Radiological Environmental  
Operating Report  
1995**

---

---

**ANNUAL RADIOLOGICAL  
ENVIRONMENTAL OPERATING REPORT**

---

---

for

**DUKE POWER COMPANY  
MCGUIRE NUCLEAR STATION  
Units 1 and 2**

**January 1 - December 31**

**1995**

---

# TABLE OF CONTENTS

---

<u>TITLE</u>	<u>PAGE</u>
List of Figures . . . . .	iv
List of Tables . . . . .	v
List of Acronyms . . . . .	vii
<b>1. Executive Summary . . . . .</b>	<b>1-1</b>
<b>2. Introduction . . . . .</b>	<b>2-1</b>
2.1 Site Description and Sample Locations . . . . .	2-1
2.2 Scope and Requirements of Environmental Monitoring Program . . . . .	2-1
2.3 Statistical and Computational Methodology . . . . .	2-2
2.3.1 Estimation of the Mean Value . . . . .	2-2
2.3.2 Lower Level of Detection, Minimum Detectable Activity, and Critical Level . . . . .	2-3
2.3.3 Trend Identification . . . . .	2-3
2.3.4 Test Statistic . . . . .	2-5
<b>3. Radiological Environmental Monitoring Program - Discussion, Interpretation, and Trending of Results . . . . .</b>	<b>3-1</b>
3.1 Airborne Radioiodines and Particulates . . . . .	3-2
3.1.1 Radioiodines . . . . .	3-2
3.1.2 Particulates . . . . .	3-4
3.2 Drinking Water . . . . .	3-6
3.3 Surface Water . . . . .	3-8
3.4 Milk . . . . .	3-10
3.5 Broadleaf Vegetation . . . . .	3-12

3.6	Shoreline Sediment . . . . .	3-14
3.7	Fish . . . . .	3-16
3.8	Direct Gamma Radiation . . . . .	3-18
3.9	Food Products . . . . .	3-21
3.10	Land Use Census . . . . .	3-23
<b>4.</b>	<b>Evaluation of Dose from Environmental Measurements Verses</b>	
	<b>Estimated Dose from Releases . . . . .</b>	<b>4-1</b>
4.1	Dose from Environmental Measurements . . . . .	4-1
4.2	Estimated Dose from Releases . . . . .	4-1
4.3	Comparison of Doses . . . . .	4-1
4.4	Pathway Dose Calculations . . . . .	4-2
<b>5.</b>	<b>Quality Assurance . . . . .</b>	<b>5-1</b>
5.1	Duke Power Company Environmental Laboratories . . . . .	5-1
5.2	Contractor Laboratories . . . . .	5-4
<b>6.</b>	<b>References . . . . .</b>	<b>6-1</b>
	<b>Appendix A: Environmental Sample and Analysis Procedures - Summary . . . . .</b>	<b>A-1</b>
I.	Change of Sampling Procedures . . . . .	A-1
II.	Description of Analysis Procedures . . . . .	A-2
III.	Change of Analysis Procedures . . . . .	A-2
IV.	Sampling and Analysis Procedures . . . . .	A-2
A.1	Airborne Particulate and Radioiodines . . . . .	A-2
A.2	Drinking Water . . . . .	A-3
A.3	Surface Water . . . . .	A-3
A.4	Milk . . . . .	A-3
A.5	Broadleaf Vegetation . . . . .	A-3
A.6	Shoreline Sediment . . . . .	A-4

A.7 Fish	A-4
A.8 Direct Gamma Radiation (TLD)	A-4
A.9 Food Products	A-5
A.10 Annual Land Use Census	A-5
V. Program Improvements	A-6

Appendix B: Radiological Environmental Monitoring Program - Results Summary

Air Particulate	B-1
Air Radioiodines	B-2
Broadleaf Vegetation	B-3
Food Products	B-4
Drinking Water	B-5
Fish	B-7
Milk	B-8
Shoreline Sediment	B-9
Surface Water	B-10
Direct Gamma Radiation (TLD)	B-11

Appendix C: Sampling Deviations and Unavailable Analyses

C.1 Sampling Deviations	C-1
C.2 Unavailable Analyses	C-4
C.3 Sample Deviation and Unavailable Reduction Plan	C-4

Appendix D: Analytical Deviations - Lower Limits of Detection

Appendix E: Radiological Environmental Monitoring Program Results	E-1
---	-----

---

# LIST OF FIGURES

---

<u>FIGURE</u>	<u>TITLE</u>	<u>PAGE</u>
2.1-1	Sampling Locations Map (Site Boundary)	2-9
2.1-2	Sampling Locations Map (Ten Mile Radius)	2-10
3.1.1	Concentration of Radionuclides in Airborne Radioiodines	3-2
3.1.2	Concentration of Radionuclides in Airborne Particulates	3-4
3.2	Concentration of Radionuclides in Drinking Water	3-6
3.3	Concentration of Radionuclides in Surface Water	3-8
3.4	Concentration of Radionuclides in Milk	3-10
3.5	Concentration of Radionuclides in Broadleaf Vegetation	3-12
3.6	Concentration of Radionuclides in Shoreline Sediment	3-14
3.7	Concentration of Radionuclides in Fish	3-16
3.8	TLD Exposure from Direct Radiation	3-18
3.9	Concentration of Radionuclides in Food Products	3-21
3.10	Land Use Census Map	3-26

---

# LIST OF TABLES

---

<u>TABLE</u>	<u>TITLE</u>	<u>PAGE</u>
2.1-A	Radiological Monitoring Program Sampling Locations . . . . .	2-7
2.1-B	Radiological Monitoring Program Sampling Locations (TLD) . . . . .	2-8
2.2-A	Reporting Levels for Radioactivity Concentrations in Environmental Samples . . . . .	2-11
2.2-B	REMP Analysis Frequency . . . . .	2-12
2.2-C	Lower Limit of Detection Capabilities for Environmental Sample Analysis . . . . .	2-13
3.1.1-A	Concentration of Radionuclides in Airborne Radioiodines . . . . .	3-3
3.1.1-B	Percentages of Reporting Levels for Radioiodines . . . . .	3-3
3.1.2	Percentages of Reporting Levels for Particulates . . . . .	3-5
3.2-A	Concentration of Radionuclides in Drinking Water . . . . .	3-7
3.2-B	Percentages of Reporting Levels for Drinking Water . . . . .	3-7
3.3-A	Concentration of Radionuclides in Surface Water . . . . .	3-9
3.3-B	Percentages of Reporting Levels for Surface Water . . . . .	3-9
3.4-A	Concentration of Radionuclides in Milk . . . . .	3-11
3.4-B	Percentages of Reporting Levels for Milk . . . . .	3-11
3.5-A	Concentration of Radionuclides in Broadleaf Vegetation . . . . .	3-13
3.5-B	Percentages of Reporting Levels for Broadleaf Vegetation . . . . .	3-13
3.6-A	Concentration of Radionuclides in Shoreline Sediment . . . . .	3-15
3.6-B	Comparison of Indicator and Control Means for Shoreline Sediment . . . . .	3-15
3.7-A	Concentration of Radionuclides in Fish . . . . .	3-17
3.7-B	Percentages of Reporting Levels for Fish . . . . .	3-17
3.8-A	TLD Exposure from Direct Radiation . . . . .	3-19
3.8-B	Comparison of Inner Ring/Outer Ring TLD Results . . . . .	3-20
3.9	Percentages of Reporting Levels for Food Products . . . . .	3-22



3.10	Land Use Census Results . . . . .	3-24
4.1-A	1995 Environmental and Effluent Dose Comparison for Liquid and Gaseous Waste Release Pathways . . . . .	4-3
4.1-B	Maximum Individual Dose Summary for 1995 . . . . .	4-5
5.0-A	Duke Power Company Interlaboratory Comparison Program . . . . .	5-5
5.0-B	U.S. Environmental Protection Agency Interlaboratory Comparison Program . . . . .	5-7
5.0-C	State of North Carolina DEHNR 1995 Environmental Dosimeter Cross-Check Results . . . . .	5-9
C.3-A	Deviation Reduction Plan Overview . . . . .	C-4
C.3-B	Deviation Reduction Plan Equipment Purchases . . . . .	C-5
C.3-C	Deviation Reduction Plan Air Site Upgrade Equipment Purchases . . . . .	C-6

# LIST OF ACRONYMS

Acronyms and their interpretations used in this report (displayed alphabetically)

ACRONYM	DEFINITION
BW	BiWeekly
C	Control
CL	Critical Level
DEHNR	Department of Environmental Health and Natural Resources
DHEC	Department of Health and Environmental Control
EPA	Environmental Protection Agency
FSAR	Final Safety Analysis Report
LLD	Lower Limit of Detection
M	Monthly
MDA	Minimum Detectable Activity
MNS	McGuire Nuclear Station
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
Q	Quarterly
REMP	Radiological Environmental Monitoring Program
SA	Semiannually
SLCs	Selected Licensee Commitments
SM	Semimonthly
TECH SPECS	Technical Specifications
TLD	Thermoluminescent Dosimeter
uCi/ml	microcurie per milliliter
W	Weekly

---

## 1.0 EXECUTIVE SUMMARY

---

This Annual Radiological Environmental Operating Report describes the McGuire Nuclear Station Radiological Environmental Monitoring Program (REMP), and the program results for the calendar year 1995.

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 (SLC's). Required analyses were performed and detection capabilities were met for all samples as required by SLC's. Supplemental analyses were performed for some media for additional information. Twelve-hundred samples were analyzed comprising 9000 test results in order to compile data for the 1995 report. Based on the annual land use census, the current number of sampling sites for McGuire Nuclear Station is sufficient.

Concentrations observed in the environment in 1995 for station related radionuclides were generally within the ranges of concentrations observed in the past. Inspection of data showed that radioactivity concentrations in surface water, drinking water, shoreline sediment and fish 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 were within limits as specified in SLC's. 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 6.86E-02 mrem for 1995. It is therefore concluded that station operations has had no significant radiological impact on the health and safety of the public or the environment.

---

## **2.0 INTRODUCTION**

---

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

McGuire Nuclear Station is located geographically near the center of the highly industrialized region on the Carolinas. The land is predominantly rural non-farm with a small amount of land being used to support beef cattle and farming. Recreation in the area is confined mostly to the lake and shores of Lake Norman and Mountain Island reservoir. The McGuire site is in northwestern Mecklenburg County, North Carolina, 17 miles north-northwest of Charlotte, North Carolina. The site is bounded to the west by the Catawba River channel and to the north by 32,510 acre Lake Norman. Lake Norman is impounded by Duke Power Company's Cowans Ford Dam Hydroelectric Station, which is located immediately west of the site and on the Catawba River channel. The tailwater of Cowans Ford Dam is the upper limit of Mountain Island Reservoir. Mountain Island Dam is located 15 miles downstream from the site. Lookout Shoals Hydroelectric Station is at the upper reaches of Lake Norman. Marshall Steam Station is located on the western shore of Lake Norman, approximately 16 miles upstream from the site (reference 6.3). The site exclusion radius is 2500 feet.

Tables 2.1-A and 2.1-B define the sampling and TLD locations for the McGuire Radiological Monitoring Program. Figures 2.1-1 and 2.1-2 illustrate these locations as compared to McGuire Nuclear Station.

### **2.2 SCOPE AND REQUIREMENTS OF ENVIRONMENTAL MONITORING PROGRAM**

An environmental monitoring program has been in effect at McGuire Nuclear Station since 1977, four years prior to operation of Unit 1 in 1988. 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 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 McGuire 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 radioactivity 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 Radiological Environmental Monitoring Program 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 3.10.

Participation in an approved 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 Environmental Monitoring Program. The following equation was used to estimate the mean (reference 6.8):

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

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  $i$ .

NOTE: "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.

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

The Lower Level of Detection (LLD), Minimum Detectable Activity (MDA), and Critical Level (CL) are used throughout the Environmental Monitoring Program.

**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" LLD's 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 may be thought of as an "actual" LLD for a particular sample measurement remembering that the MDA is calculated using a sample background instead of a system background.

**CL** - The CL is defined as the net count rate which must be exceeded before a sample is considered to contain any measurable activity above the background.

### **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. This is traditionally done by looking at historical data (including preoperational data) and determining if a trend exists. Trends, if they exist, may be either positive or negative. Since nuclear reactor operations do not remove radioactivity from the surrounding environment, a negative trend 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 concentration.

In many cases, visual inspection of tabular or graphical presentations of data may be sufficient to determine if a trend exists. In other cases, it may not be so obvious. Therefore, it is desirable to obtain a single numerical value from the data which will permit a meaningful interpretation of the relationship existing between the variations in the data. If it is assumed that a linear relationship exists between the time after startup of the reactor and the amount of radionuclides in a particular environmental medium, the least squares regression method may be used to define the linear relationship. To determine if the data actually correlate to the straight line assumption, the theoretical variance is compared to the actual variance. The numerical value that summarizes this comparison is known as the correlation coefficient.

This correlation coefficient, symbolized by "r", is a determination of how closely the data fit a straight line and may be calculated from the following equation (reference 6.8):

$$r = \frac{N\sum XY - \sum X \sum Y}{[(N\sum X^2 - (\sum X)^2)(N\sum Y^2 - (\sum Y)^2)]^{\frac{1}{2}}}$$

Where:

- r = correlation coefficient for the data set of X and Y,
- X = the year or point in time,
- Y = the radionuclide concentration associated with X,
- N = number of observations.

The range of values as calculated by the correlation coefficient lies between positive one (+1) and negative one (-1). Zero (0) represents no indication of either a positive or negative trend. A positive (+) correlation coefficient indicates an increasing trend, and conversely, a negative (-) correlation coefficient indicates a decreasing trend. The absolute value of the correlation coefficient indicates the strength of the relationship or probability of a trend.

Identifying a trend by using the correlation coefficient is only useful for the time periods where the discharge from the nuclear plant is relatively stable and no other sources of radioactivity are present. 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. Other factors that may affect environmental levels of radionuclides include prevailing weather conditions (periods of drought or heavier than normal precipitation), construction in or around either the nuclear plant or the sampling location, addition or deletion of other sources of radioactive materials (such as the Chernobyl accident), etc.. Some of these factors may be obvious while others are sometimes unknown to the plant personnel. Specific discussion of

correlation coefficient results are discussed in Section 3, "Radiological Environmental Monitoring Program - Discussion, Interpretation, and Trending of Results".

The change in the method of calculating the mean (using only net positive results incorporated in 1987) will also affect the apparent trends.

Because of the above considerations, how trends are identified will depend not only on the least squares regression method, but will include some judgment by plant personnel on the factors affecting environmental levels.

### 2.3.4 TEST STATISTIC

In some cases, we would not expect to observe a buildup of radionuclides in the environment, but instead would expect to see a measurable increase in levels over a short duration. This is the case for direct radiation measurements, where the radiation level is measured over a finite period and is dependent upon whether plant discharges were occurring at that time or not. In this case, the correlation coefficient is not a sufficient indicator of whether effluents are having an impact on the environment, since there is no bioaccumulation. Another test is needed to give us a meaningful interpretation of the data.

The statistic that compares the means from two sets of measurements to determine if there is a statistically significant difference is called the test statistic, or t-statistic, and is calculated as follows (reference 6.7):

$$t = \frac{\bar{X}_1 - \bar{X}_2}{S_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

Where:

$\bar{X}_1$  = the mean value of the first set of measurements

$\bar{X}_2$  = the mean value of the second set of measurements

$S_p$  = the common variance of the two sets of measurements

$$S_p = \sqrt{S_p^2}$$

Where:

$$S_p^2 = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}$$

$n_1$  = the number of measurements in the first data set



$n_2$  = the number of measurements in the second data set

$s_1$  = the sample variance of the first data set

$s_2$  = the sample variance of the second data set

The calculated value of the test statistic is then compared to expected values of the test statistic tabulated based on the number of measurements taken and the degree of confidence required for the results. The calculated value of the test statistic will be compared to the expected value at the 95% and 99% confidence levels. A positive value occurs (the two sets of data are significantly different) when the absolute value of the calculated test statistic exceeds the absolute value of the expected tabulated value.

Due to the existence of naturally occurring differences in background radiation levels over time (as a result of solar cycles and other meteorological phenomena) and systematic errors due to instrument variability, ratios of measurements can be used to calculate the t-statistic instead of individual measurements. By using ratios, biases associated with the measurement process are minimized and allow us to more accurately compare results from one year to the next. Specifically, in the case of TLD measurements, the inner ring of TLD results is ratioed with the outer ring of TLD measurements in a given year and the ratio for one year is compared to the ratio for another year.

As with other environmental samples, outside factors may affect the results observed and the resulting trends identified. Therefore, the significance of trends will be based in part on judgment of plant personnel familiar with the factors affecting environmental levels, as well as the statistical results.

TABLE 2.1-A

MCGUIRE RADIOLOGICAL MONITORING PROGRAM  
SAMPLING LOCATIONS

W	Weekly	SM	Semimonthly
BW	BiWeekly	Q	Quarterly
M	Monthly	SA	Semiannually
C	Control		

Site #	Location Description	Air Rad. & Part.	Surface Water	Drinking Water	Shoreline Sediment	Food Products	Fish	Milk	Broad Leaf Veg.
119	Mt. Holly Municipal Water Supply ( 7.4 mi SSW )			BW					
120	Site Boundary ( 0.5 mi NNE )	W							M ( b )
121	Site Boundary ( 0.5 mi NE )	W							
125	Site Boundary ( 0.4 mi SW )	W							M ( b )
128	Discharge Canal Bridge ( 0.4 mi ENE )		BW						
129	Discharge Canal Entrance to Lake Norman ( 0.5 mi ENE )				SA		SA		
130	Hwy 73 Bridge Downstream ( 0.5 mi SW )				SA				
131	Cowans Ford Dam ( 0.6 mi W )		BW						
132	Charlotte Municipal Water Supply ( 11.2 mi SSE )			BW					
133	Cornelius ( 6.2 mi NE )	W							
134 C	East Lincoln Jr High School ( 8.8 mi WNW )	W							M ( b )
135 C	Plant Marshall Intake Canal ( 11.9 mi N )		BW						
136 C	Mooresville Municipal Water Supply ( 12.7 mi NNE )			BW					
137 C	Pinnacle Access Area ( 12.0 mi N )				SA		SA		
138	Henry Cook Dairy ( 3.1 mi ESE )							SM	
139	William Cook Dairy ( 2.5 mi E )							SM	
140	Kidd Dairy-Cows ( 2.7 mi SSE )							SM	
141 C	Lynch Dairy-Cows ( 14.8 mi WNW )							SM	
188	5 mile radius Gardens ( 2.8 mi N )					M ( a )			
192	Peninsula ( 2.8 mi NNE )	W							
193	Site Boundary ( 0.2 mi N )								M ( b )
194	East Lincoln County Water Supply ( 6.7 mi NNW )			BW					
195	Fishing Access Road ( 0.2 mi N )	W							

(a) During Harvest Season

(b) When Available

TABLE 2.1-B

MCGUIRE RADIOLOGICAL MONITORING PROGRAM  
SAMPLING LOCATIONS

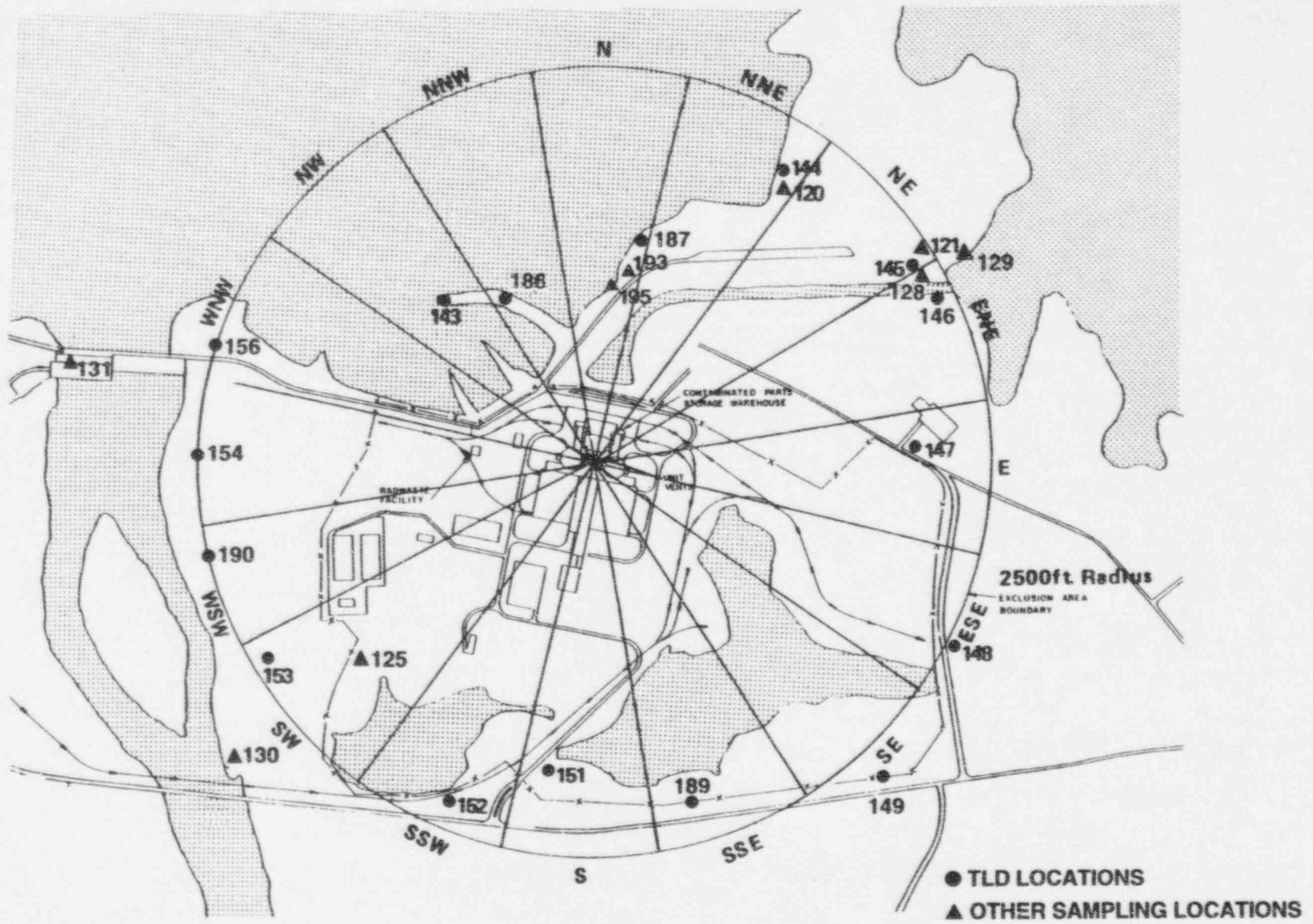
(TLD SITES)

Site #	Location Description		Site #	Location Description	
143	SITE BOUNDARY	0.3 miles NW	167	4-5 MILE RADIUS	4.9 miles SW
144	SITE BOUNDARY	0.5 miles NNE	168	4-5 MILE RADIUS	4.6 miles WSW
145	SITE BOUNDARY	0.5 miles NE	169	4-5 MILE RADIUS	4.0 miles W
146	SITE BOUNDARY	0.4 miles ENE	170	4-5 MILE RADIUS	4.3 miles WNW
147	SITE BOUNDARY	0.4 miles E	171	4-5 MILE RADIUS	4.0 miles NW
148	SITE BOUNDARY	0.5 miles ESE	172	4-5 MILE RADIUS	5.7 miles NNW
149	SITE BOUNDARY	0.5 miles SE	173	SPECIAL INTEREST	8.4 miles NNW
151	SITE BOUNDARY	0.4 miles S	174	SPECIAL INTEREST	8.8 miles WNW
152	SITE BOUNDARY	0.4 miles SSW	175	CONTROL	12.7 miles WNW
153	SITE BOUNDARY	0.5 miles SW	176	SPECIAL INTEREST	11.0 miles SW
154	SITE BOUNDARY	0.5 miles W	177	SPECIAL INTEREST	8.8 miles S
156	SITE BOUNDARY	0.5 miles WNW	178	SPECIAL INTEREST	9.3 miles SE
189	SITE BOUNDARY	0.4 miles SSE	179	SPECIAL INTEREST	10.6 miles ESE
190	SITE BOUNDARY	0.4 miles WSW	180	SPECIAL INTEREST	12.7 miles NNE
157	4-5 MILE RADIUS	4.7 miles N	181	SPECIAL INTEREST	7.0 miles NE
158	4-5 MILE RADIUS	4.3 miles NNE	182	SPECIAL INTEREST	6.2 miles NE
159	4-5 MILE RADIUS	5.0 miles NE	183	SPECIAL INTEREST	5.8 miles S
160	4-5 MILE RADIUS	4.9 miles ENE	186	SPECIAL INTEREST	0.2 miles NNW
161	4-5 MILE RADIUS	4.7 miles E	187	SPECIAL INTEREST	0.2 miles N
162	4-5 MILE RADIUS	4.5 miles ESE	191	SITE BOUNDARY	2.8 miles SSE
163	4-5 MILE RADIUS	4.9 miles SE	196	SPECIAL INTEREST	1.0 miles S
164	4-5 MILE RADIUS	4.6 miles SSE	197	SPECIAL INTEREST	1.1 miles S
165	4-5 MILE RADIUS	5.1 miles S	198	SPECIAL INTEREST	1.3 miles S
166	4-5 MILE RADIUS	5.3 miles SSW	199	SPECIAL INTEREST	1.5 miles S

\* All TLDs are collected quarterly

Figure 2.1-1

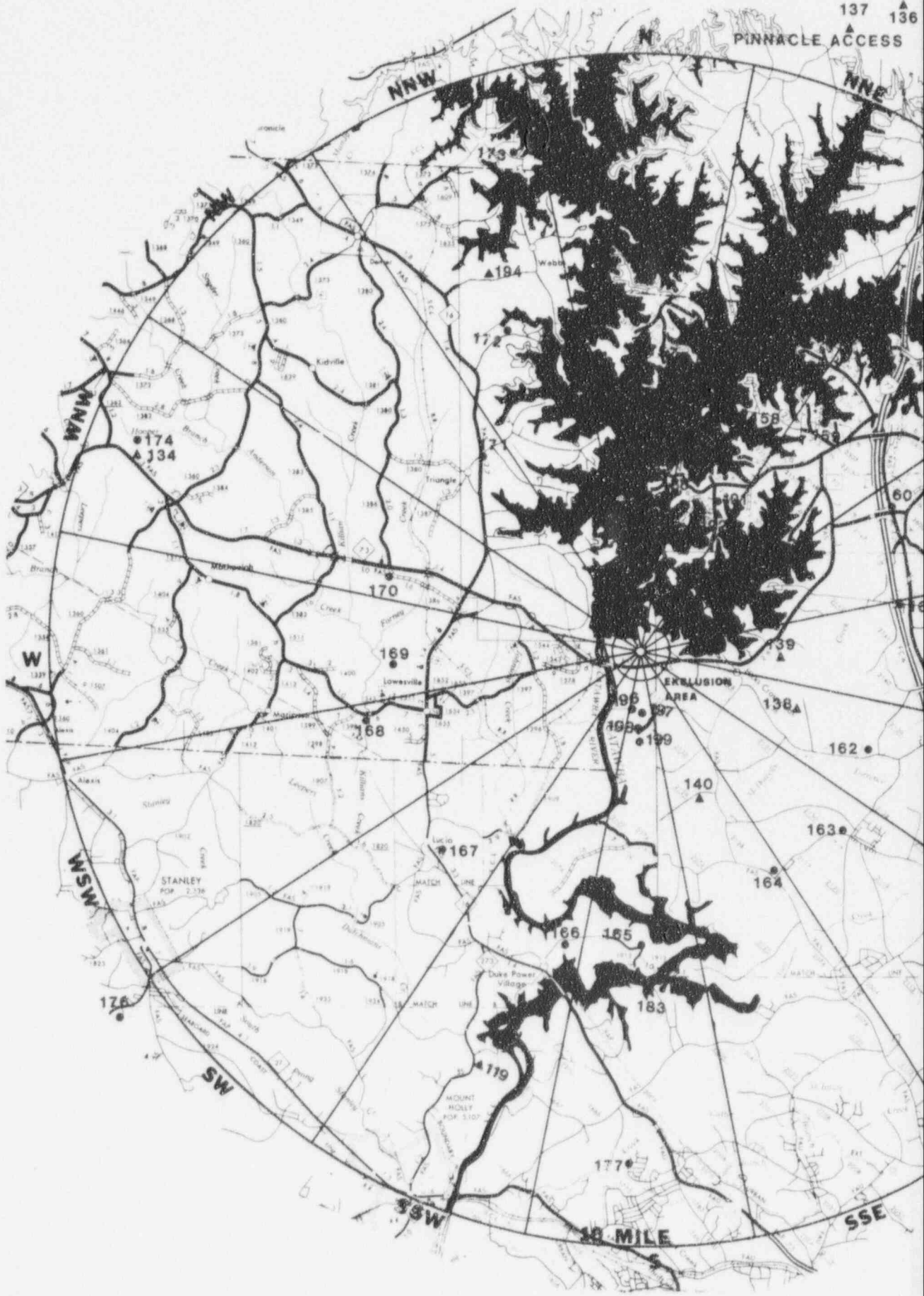
Sampling Locations Map (Site Boundary)



PINNACLE ACCESS

▲ 141

● 175



LORESVILLE WATER  
TREATMENT PLANT

• 180

N



- TLD LOCATIONS
- ▲ ALL OTHER SAMPLING LOCATIONS

LEGEND

- FINISHED OR UNIMPROVED ROAD
- GRADED AND DRAINED ROAD
- SOIL, GRAVEL OR STONE SURFACED ROAD
- SAND SURFACED ROAD
- 4 LANE UNDIVIDED HIGHWAY
- DIVIDED HIGHWAY
- HIGHWAY WITH FRONTAGE ROADS
- FULL CONTROL ACCESS
- FEDERAL AID INTERSTATE ROAD
- FEDERAL AID PRIMARY ROAD
- FEDERAL AID SECONDARY ROAD
- FEDERAL AID URBAN
- NON-SYSTEM ROAD
- PROJECTED LOCATION
- INTERSECTION DISTANCE
- TRAFFIC CIRCLE
- HIGHWAY INTERCHANGE
- DETAILED HIGHWAY INTERCHANGE
- INTERSTATE HIGHWAY
- U.S. NUMBERED HIGHWAY
- NC. NUMBERED HIGHWAY
- SECONDARY ROAD NUMBERS
- UNDERGROUND CABLE
- RAILROAD ANY NUMBER OF TRACES USED BY SINGLE OPERATING COMPANY
- RAILROAD ANY NUMBER OF TRACES USED BY MORE THAN ONE OPERATING COMPANY ON SAME OR ADJACENT RIGHTS-OF-WAY
- RAILROAD STATION
- GRADE CROSSING
- UNDERPASS
- OVERPASS
- RAILROAD TUNNEL
- ARMY, NAVY OR MARINE CORPS FIELD
- CIVIL OR MUNICIPAL AIRPORT
- MARKED AUXILIARY FIELD
- MARKER ON FIELD "B" IN SYMBOL
- DOCK, PIER OR LANDING
- FERRY OR TOLL FERRY
- LIGHT, NAUTICAL
- LIGHTHOUSE
- COAST GUARD STATION
- CANAL
- NARROW STREAM
- WIDE STREAM
- DAM WITH LOCK
- DAM
- RESERVOIR, POND OR LAKE
- PROMINENT PEAK NUMBERS INDICATE ELEVATION
- ROAD THROUGH MOUNTAIN PASS
- HIGHWAY BRIDGE OVER 20 FT
- DRAW SPAN ON BRIDGE
- HIGHWAY TUNNEL
- FORD
- STATE LINE
- COUNTY LINE
- CITY LIMITS
- RESERVATION OR PARK BOUNDARY
- INSET AREA
- DELIMITED AREA POPULATION EST.
- COUNTY SEAT
- OTHER TOWNS AND VILLAGES
- TRIANGULATION STATION
- INCORPORATED CITY OR VILLAGE (GENERALIZED)
- SCHOOL
- CHURCH
- CHURCH WITH CEMETERY
- CEMETERY
- HOSPITAL
- CORRECTIONAL OR PENAL INSTN.
- HIGHWAY GARAGE OR MAINT. YARD
- HIGHWAY DEV. OR DIST. OFFICE
- WEIGHT STATION
- PATROL STATION
- POST AREA
- MONUMENT - SMALL HISTORICAL SITE

LOTTE WATER WORKS

MCGUIRE NUCLEAR STATION

FIGURE 2.1-2  
SAMPLING LOCATIONS MAP  
(TEN MILE RADIUS)

9604300135 -01

**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)	BroadLeaf Vegetation (pCi/kg-wet)
H3	20,000 <sup>(a)</sup>				
Mn54	1,000		30,000		
Fe59	400		10,000		
Co58	1,000		30,000		
Co60	300		10,000		
Zn65	300		20,000		
Zr-Nb-95	400				
I131	2	1		3	100
Cs134	30	10	1,000	60	1,000
Cs137	50	20	2,000	70	2,000
Ba-La-140	200			300	

(a) NOTE: *If no drinking water pathway exists, a value of 30,000 pCi/liter may be used.*

TABLE 2.2-B

REMP ANALYSIS FREQUENCY

SAMPLE MEDIUM	ANALYSIS SCHEDULE	GAMMA ISOTOPIC	TRITIUM	LOW LEVEL I-131	GROSS BETA	TLD
Air Radioiodine and Particulates	Weekly	X			X	
Direct Radiation	Quarterly					X
Surface Water	Monthly Composite	X				
	Quarterly Composite		X			
Drinking Water	Biweekly			X		
	Monthly Composite	X			X	
	Quarterly Composite		X			
Shoreline Sediment	Semiannually	X				
Milk	Semimonthly	X		X		
Fish	Semiannually	X				
Broadleaf Vegetation	Monthly (when available)	X				
Food Products	Monthly (during harvest season)	X				



**TABLE 2.2-C**

**LOWER LIMIT OF DETECTION (LLD)  
CAPABILITIES FOR ENVIRONMENTAL SAMPLE ANALYSIS**

Analysis	Water (pCi/liter)	Air Particulates or Gases (pCi/m <sup>3</sup> )	Fish (pCi/kg-wet)	Milk (pCi/liter)	BroadLeaf Vegetation (pCi/kg-wet)	Sediment (pCi/kg-dry)
Gross Beta	4					
H3	2000 <sup>(a)</sup>					
Mn54	15		130			
Fe59	30		260			
Co58, 60	15		130			
Zn65	30		260			
Zr-Nb-95	15					
I131	1 <sup>(b)</sup>	0.07		1	60	
Cs134	15	0.05	130	15	60	150
Cs137	18	0.06	150	18	80	180
Ba-La-140	15			15		

(a) *If no drinking water pathway exists, a value of 3000 pCi/liter may be used.*

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

---

### **3.0 RADIOLGICAL ENVIRONMENTAL MONITORING PROGRAM - DISCUSSION, INTERPRETATION AND TRENDING OF RESULTS**

---

The radionuclides with Selected Licensee Commitments reporting levels in the environmental media samples that indicated detectable activity since the change of analysis techniques in 1988 have been historically trended over a seventeen-year period from 1979 - 1995. Fish media have been trended over a sixteen year period since indicator samples were not available in 1979. Analyses from 1977 - 1978 have been excluded since these results were much higher than the other preoperational years due to outside influence such as weapons testing. Including these results would have produced correlation coefficients and averages that were not representative. The preoperational analyses from 1981 were combined with the operational analyses from the latter part of 1981 and averaged to give one concentration for each radionuclide for that year. The highest annual mean concentration of applicable Selected Licensee Commitments radionuclides from the indicator locations for each media type was used for the estimation of the mean value and correlation coefficient.

Highest annual means were used to determine trends and occasionally the average concentrations reported were negative. Negative values were obtained using reported activities that were less than the assumed background. All negative values (concentrations) were replaced with a zero to properly represent environmental conditions. Any zero concentrations used in tables or graphs represent activity measurements less than detectable levels. Figures 3.1.1 through 3.9 provide a graphical presentation of the indicator highest means, control means, and reporting levels (if applicable) for each media type. Control means for food products were not graphed since there is no food products control location. In addition, the percentages of Selected Licensee Commitments reporting levels were calculated for each reportable radionuclide in each media type.

No Selected Licensee Commitments reporting levels were exceeded or approached in 1995 due to plant effluents.

Only the radionuclides with Selected Licensee Commitments reporting levels that have shown consistent activity since 1989 were historically trended and compared with the sixteen-year average. All other radionuclides demonstrated no detectable activity for the past seven years and have shown decreasing or no trends. It is important to note that while historical trends are helpful in determining radioactivity buildup, environmental radionuclide levels could be affected without exhibiting increasing or decreasing trends.

### 3.1 AIRBORNE RADIOIODINES AND PARTICULATES

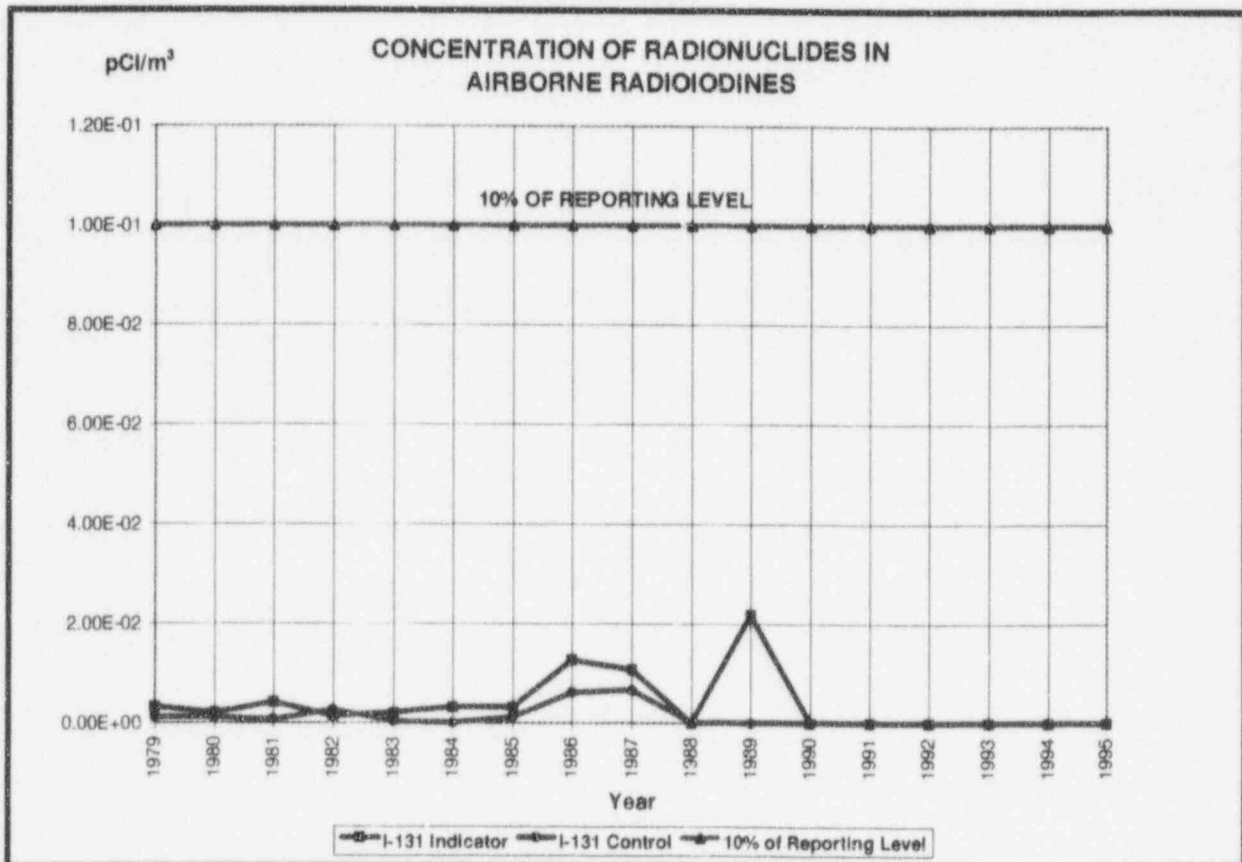
#### 3.1.1 RADIOIODINES

In 1995, 364 radioiodine samples were analyzed, 312 at six indicator locations and 52 at the control location.

No detectable I-131 activity in environmental air samples was found in 1995. Cs-137 was found in one indicator sample and two control samples. However, no Cs-137 was found on the corresponding particulate filters. An investigation performed in 1990 concluded that Cs-137 activity detected only on the cartridges was not attributed by station effluents but was an active constituent of the charcoal media (reference 6.5). Therefore, the Cs-137 activity was not used to calculate correlation coefficients or doses.

Figure 3.1.1 shows I-131 indicator and control location concentrations with comparisons to 10% of the reporting level. Table 3.1.1-A gives indicator location highest annual means since 1979 for I-131. Preoperational and sixteen year averages are also shown. The correlation coefficient indicated a decreasing trend for I-131. No I-131 activity has been detected since 1989. Table 3.1.1-B shows control location means and the percentages of environmental concentrations to the Selected Licensee Commitments reporting levels for the indicators at the locations with the highest annual mean for 1995. No activity was detected and therefore no reporting levels were approached.

FIGURE 3.1.1



**Table 3.1.1-A Concentration of Radionuclides in Airborne Radioiodines**

YEAR	I-131 Indicator (pCi/m <sup>3</sup> )
1979*	3.28E-3
1980*	2.01E-3
1981*	4.17E-3
1982*	1.42E-3
1983*	1.99E-3
1984	3.17E-3
1985	3.15E-3
1986	1.27E-2
1987	1.07E-2
1988	0.00E0
1989	2.18E-2
1990	0.00E0
1991	0.00E0
1992	0.00E0
1993	0.00E0
1994	0.00E0
16 Year Average	4.03E-3
1995	0.00E0
Correlation Coefficient	-0.14

\* Radioiodines and Particulates analyzed together.

**Table 3.1.1-B Percentages of Reporting Levels for Radioiodines**

Radionuclide	Indicator Highest Mean (pCi/m <sup>3</sup> )	Reporting Level (pCi/m <sup>3</sup> )	Percentage of Reporting Level	Control Mean (pCi/m <sup>3</sup> )
I-131	0.00E0	1.00E0	0.00%	0.00E0

### 3.1.2 PARTICULATES

In 1995, 364 particulate samples were analyzed, 312 at the six indicator locations and 52 at the control location.

Per Selected Licensee Commitments, if gross beta in air particulate samples is greater than ten times the yearly mean of control samples, gamma isotopic analysis shall be performed on individual samples. Although the location with the highest mean ( $3.02E-2$  pCi/m<sup>3</sup>) was less than ten times the yearly mean of the control location ( $5.17E-2$  pCi/m<sup>3</sup>), gamma isotopic analysis was performed on all particulate filters. No detectable gamma emitting particulate activity was found in environmental air samples in 1995. Figure 3.1.2 shows Cs-137 indicator and control location concentrations with comparisons to 1% of the reporting level. Since no activity has been detected since 1987, all radionuclides have indicated decreasing or no trends.

Table 3.1.2 shows control location means and the percentages of environmental concentrations to the Selected Licensee Commitments reporting levels for the indicator locations with the highest annual mean for 1995. No activity was detected and therefore no reporting levels were approached.

FIGURE 3.1.2

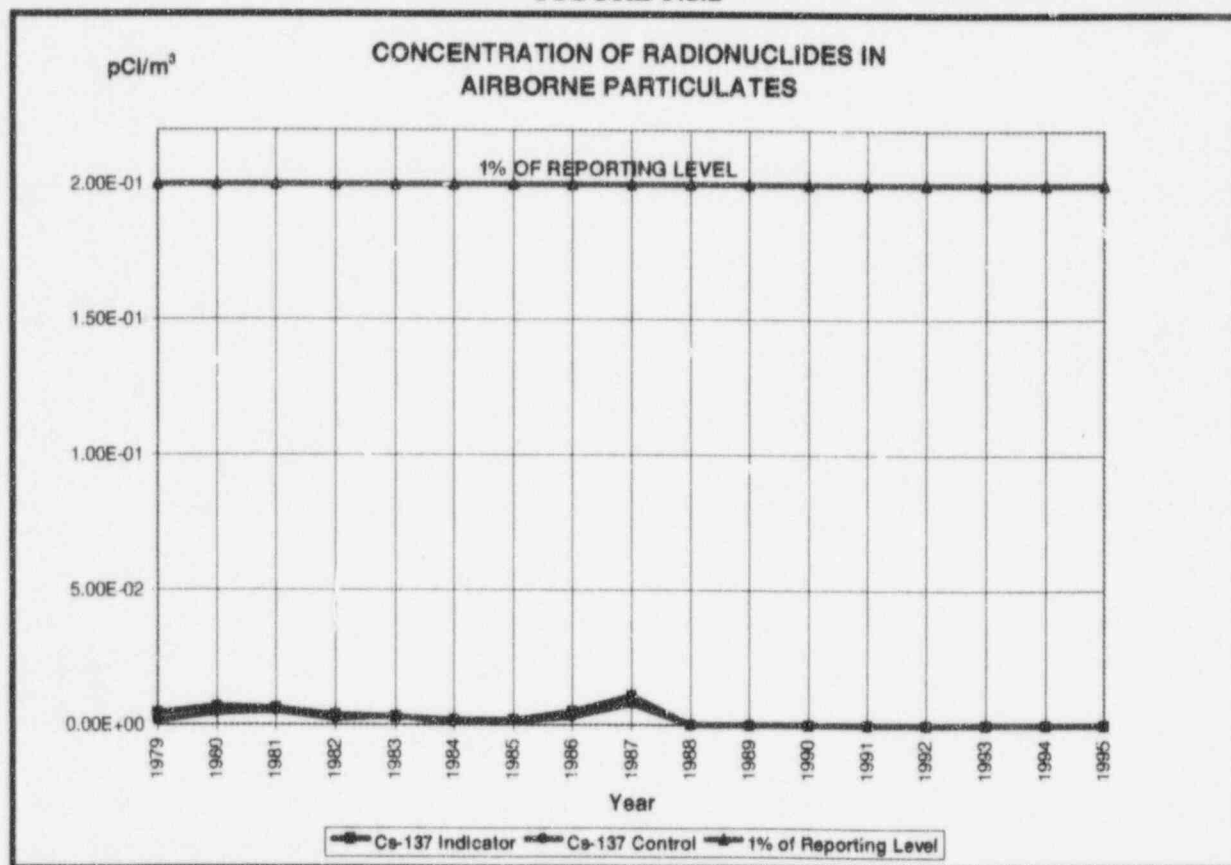


Table 3.1.2 Percentages of Reporting Levels for Particulates

Radionuclide	Indicator Highest Mean (pCi/m <sup>3</sup> )	Reporting Level (pCi/m <sup>3</sup> )	Percentage of Reporting Level	Control Mean (pCi/m <sup>3</sup> )
I-131	0.00E0	1.00E0	0.00%	0.00E0
Cs-134	0.00E0	1.00E1	0.00%	0.00E0
Cs-137	0.00E0	2.00E1	0.00%	0.00E0

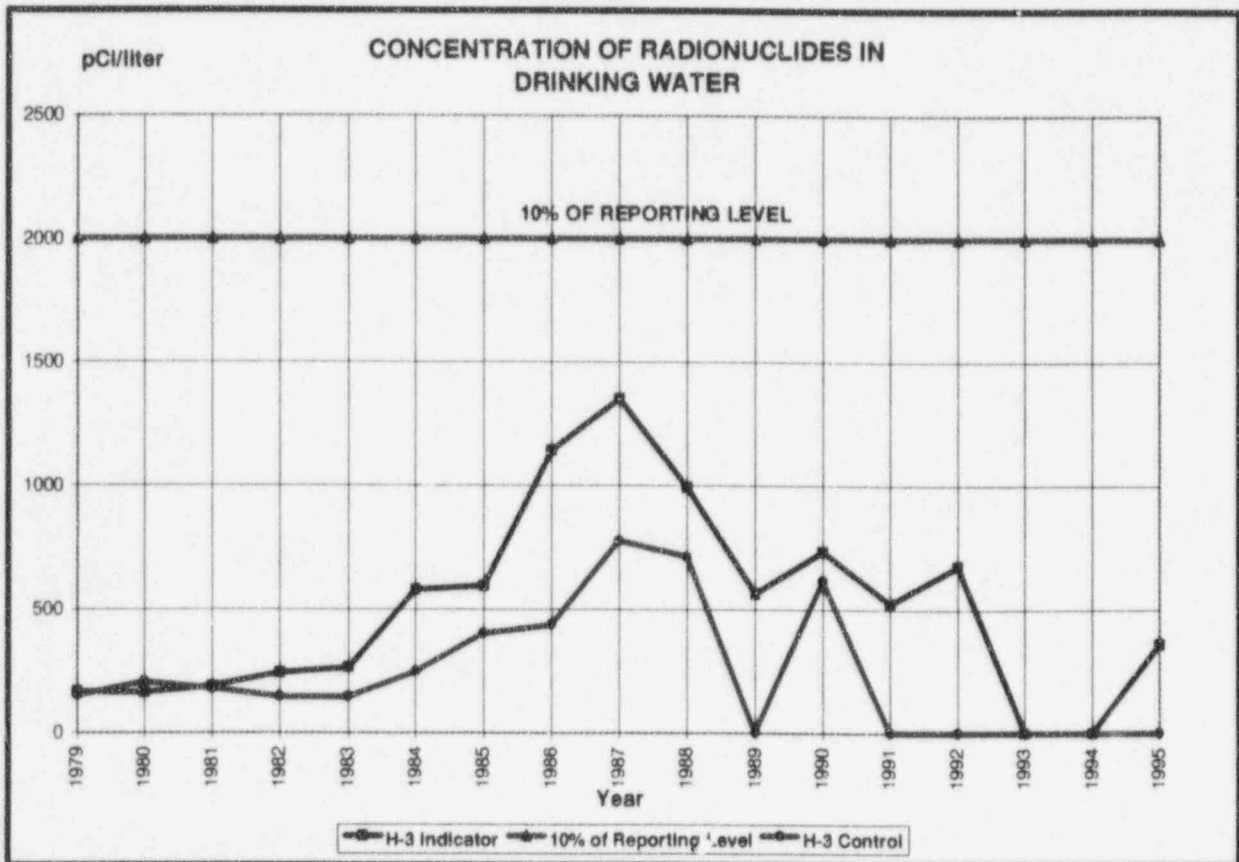
### 3.2 DRINKING WATER

In 1995, 52 drinking water samples were analyzed for beta, I-131/LL, and other gamma emitting radionuclides. Thirty-nine samples were from the three indicator locations and 13 from the control location. Tritium (H-3) analyses were performed on 16 composite samples, 12 at indicator locations and four at the control location.

No detectable gamma activity was found in drinking water samples in 1995 and has not been detected since 1987. Beta analyses indicated 4.2 pCi/l at the location with the highest annual mean and 3.3 pCi/l at the control location. Tritium was detected in one of the 12 indicator composite samples taken in 1995. Figure 3.2 shows tritium indicator and control location concentrations with comparisons to 10% of the reporting level. Table 3.2-A gives indicator location highest annual means since 1979 for H-3. Preoperational and sixteen year averages are also shown. The correlation coefficient, which was slightly above zero, indicated an increasing trend for H-3. All other radionuclides have decreasing or no trends.

Table 3.2-B shows control location means and the percentages of environmental concentrations to the Selected Licensee Commitments reporting levels for the indicators at the locations with the highest annual mean for 1995. The one 1995 sample that indicated tritium activity resulted in only 1.79% of the reporting level and was less than the sixteen year average.

FIGURE 3.2



**Table 3.2-A Concentration of Radionuclides in Drinking Water**

YEAR	H-3 Indicator (pCi/l)
1979	1.65E2
1980	1.63E2
1981	1.88E2
1982	2.43E2
1983	2.65E2
1984	5.77E2
1985	5.93E2
1986	1.14E3
1987	1.35E3
1988	9.92E2
1989	5.62E2
1990	7.32E2
1991	5.22E2
1992	6.73E2
1993	0.00E0
1994	0.00E0
16 Year Average	5.10E2
1995	3.58E2
Correlation Coefficient	0.09

**Table 3.2-B Percentages of Reporting Levels for Drinking Water**

Radionuclide	Indicator Highest Mean (pCi/l)	Reporting Level (pCi/l)	Percentage of Reporting Level	Control Mean (pCi/l)
H-3	3.58E2	2.00E4	1.79%	0.00E0
Mn-54	0.00E0	1.00E3	0.00%	0.00E0
Fe-59	0.00E0	4.00E2	0.00%	0.00E0
Co-58	0.00E0	1.00E3	0.00%	0.00E0
Co-60	0.00E0	3.00E2	0.00%	0.00E0
Zn-65	0.00E0	3.00E2	0.00%	0.00E0
Nb-95	0.00E0	4.00E2	0.00%	0.00E0
Zr-95	0.00E0	4.00E2	0.00%	0.00E0
I-131/LL	0.00E0	2.00E0	0.00%	0.00E0
Cs-134	0.00E0	3.00E1	0.00%	0.00E0
Cs-137	0.00E0	5.00E1	0.00%	0.00E0
Ba/La-140	0.00E0	2.00E2	0.00%	0.00E0



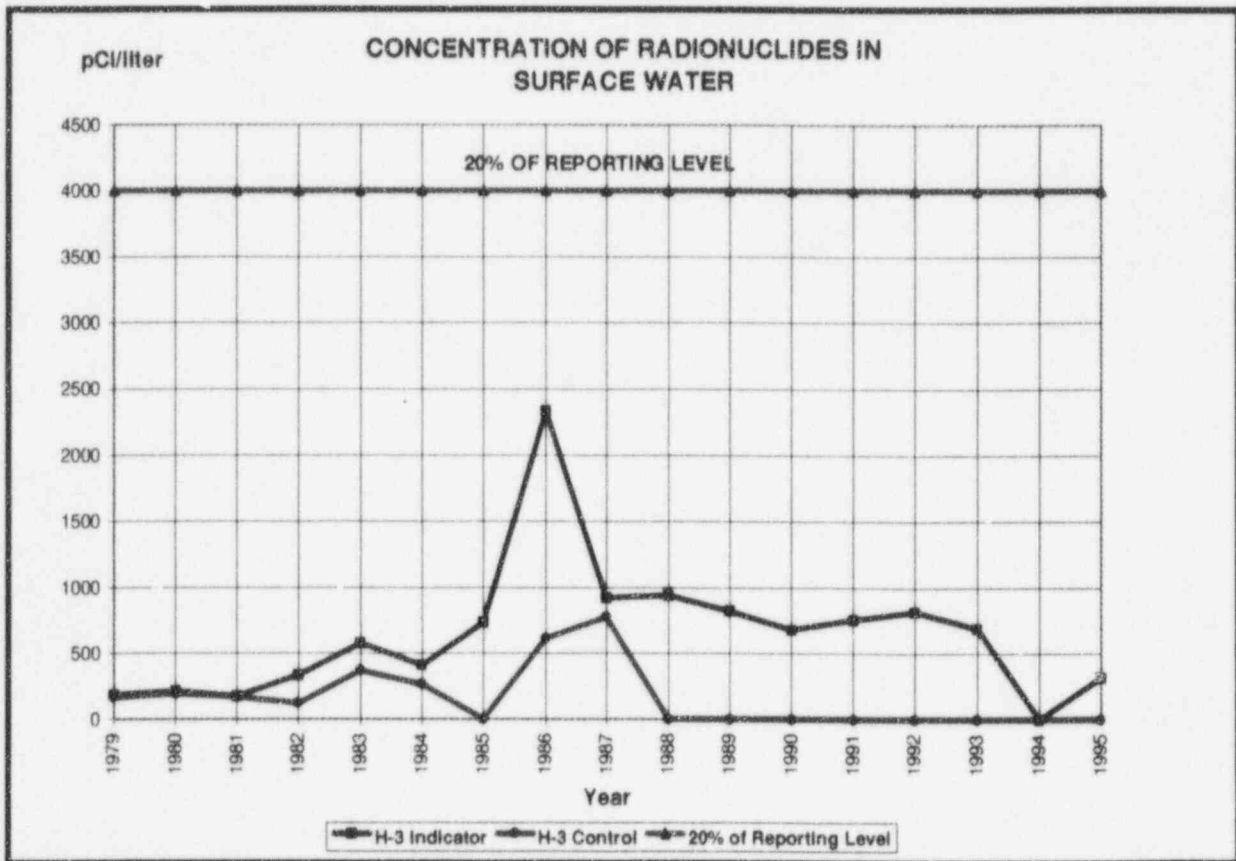
### 3.3 SURFACE WATER

In 1995, 39 surface water samples were analyzed for I-131/LL and other gamma emitting radionuclides, 26 at the two indicator locations and 13 at the control location. Analyses for H-3 were performed on 12 samples, eight at indicator locations and four at the control location.

No detectable gamma activity was found in surface water samples in 1995 and has not been detected since 1988. Tritium was detected in three of the eight indicator composite samples taken in 1995. Figure 3.3 shows tritium indicator and control location concentrations with comparisons to 20% of the reporting level. Table 3.3-A gives indicator location highest annual means since 1979 for H-3. Preoperational and sixteen year averages are also shown. The correlation coefficient indicated an increasing trend for H-3. All other radionuclides have decreasing or no trends.

Table 3.3-B shows control location means and the percentages of environmental concentrations to the Selected Licensee Commitments reporting levels for the indicators at the locations with the highest annual mean for 1995. The samples that indicated H-3 activity in 1995 resulted in only 1.58% of the reporting level and was less than the sixteen year average.

FIGURE 3.3



**Table 3.3-A Concentration of Radionuclides in Surface Water**

YEAR	H-3 Indicator (pCi/l)
1979	1.85E2
1980	2.13E2
1981	1.75E2
1982	3.30E2
1983	5.75E2
1984	4.10E2
1985	7.33E2
1986	2.33E3
1987	9.20E2
1988	9.40E2
1989	8.22E2
1990	6.77E2
1991	7.53E2
1992	8.13E2
1993	6.85E2
1994	0.00E0
16 Year Average	6.60E2
1995	3.15E2
Correlation Coefficient	0.13

**Table 3.3-B Percentages of Reporting Levels for Surface Water**

Radionuclide	Indicator Highest Mean (pCi/l)	Reporting Level (pCi/l)	Percentage of Reporting Level	Control Mean (pCi/l)
H-3	3.15E2	2.00E4	1.58%	0.00E0
Mn-54	0.00E0	1.00E3	0.00%	0.00E0
Fe-59	0.00E0	4.00E2	0.00%	0.00E0
Co-58	0.00E0	1.00E3	0.00%	0.00E0
Co-60	0.00E0	3.00E2	0.00%	0.00E0
Zn-65	0.00E0	3.00E2	0.00%	0.00E0
Nb-95	0.00E0	4.00E2	0.00%	0.00E0
Zr-95	0.00E0	4.00E2	0.00%	0.00E0
I-131/LL	0.00E0	2.00E0	0.00%	0.00E0
Cs-134	0.00E0	3.00E1	0.00%	0.00E0
Cs-137	0.00E0	5.00E1	0.00%	0.00E0
Ba/La-140	0.00E0	2.00E2	0.00%	0.00E0

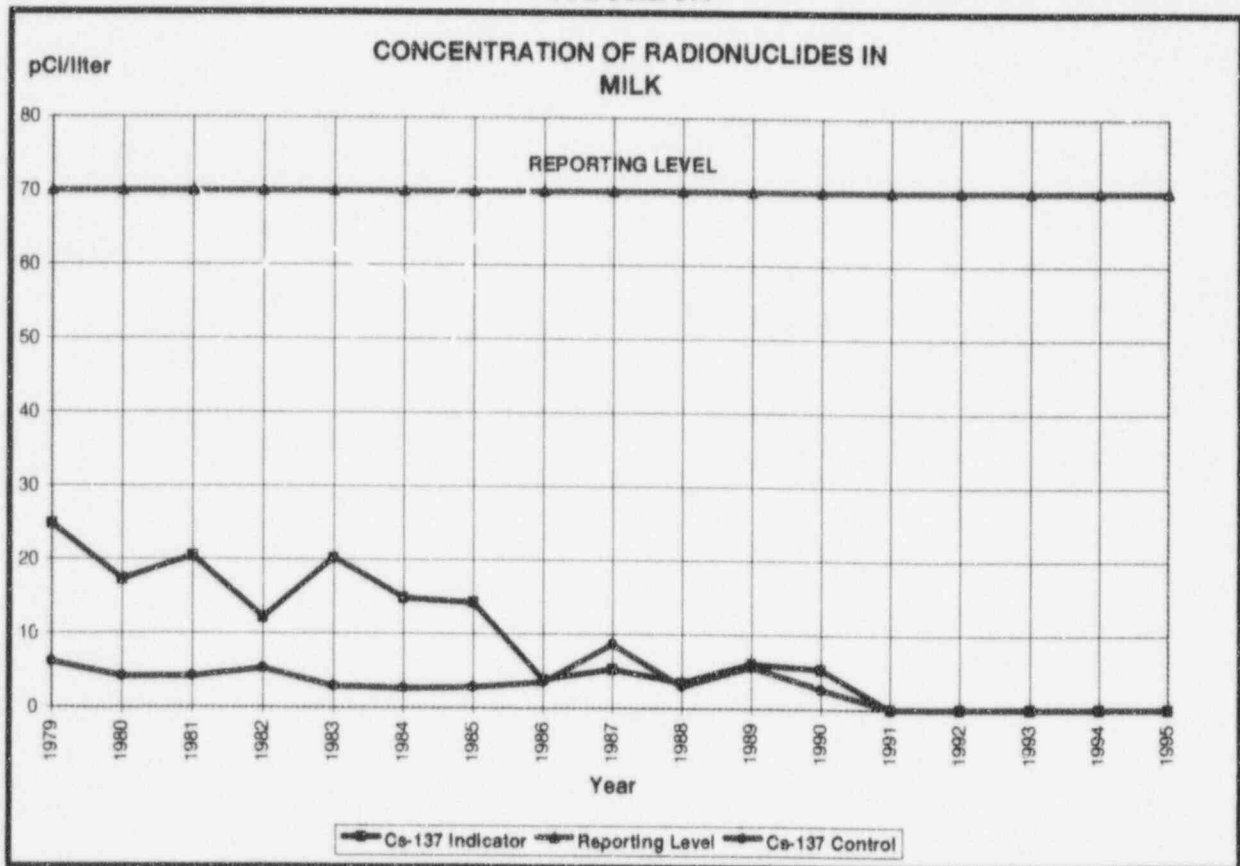
### 3.4 MILK

In 1995, 104 milk samples were analyzed for I-131/LL and other gamma emitting radionuclides, 78 at the three indicator locations and 26 at the control location.

No detectable activity was found in milk samples in 1995. Cs-137 has not been detected in milk samples since 1990 and all other radionuclides have not been detected since 1987. Figure 3.4 shows Cs-137 indicator and control location concentrations with comparisons to the reporting level. Table 3.4-A gives indicator location highest annual means since 1979 for Cs-137. Preoperational and sixteen year averages are also shown. The correlation coefficient indicated a decreasing trend for Cs-137. All other radionuclides have decreasing or no trends.

Table 3.4-B shows control location means and the percentages of environmental concentrations to the Selected Licensee Commitments reporting levels for the indicators at the locations with the highest annual means for 1995. No activity was detected and therefore no reporting levels were approached.

FIGURE 3.4



**Table 3.4-A Concentration of Radionuclides in Milk**

<b>YEAR</b>	<b>Cs-137 Indicator (pCi/l)</b>
1979	2.48E2
1980	1.72E1
1981	2.04E1
1982	1.21E1
1983	2.02E1
1984	1.48E1
1985	1.42E1
1986	3.74E0
1987	5.20E0
1988	3.40E0
1989	6.00E0
1990	5.30E0
1991	0.00E0
1992	0.00E0
1993	0.00E0
1994	0.00E0
16 Year Average	9.21E0
1995	0.00E0
Correlation Coefficient	-0.92

**Table 3.4-B Percentages of Reporting Levels for Milk**

<b>Radionuclide</b>	<b>Indicator Highest Mean (pCi/l)</b>	<b>Reporting Level (pCi/l)</b>	<b>Percentage of Reporting Level</b>	<b>Control Mean (pCi/l)</b>
I-131/LL	0.00E0	3.00E0	0.00%	0.00E0
Cs-134	0.00E0	6.00E1	0.00%	0.00E0
Cs-137	0.00E0	7.00E1	0.00%	0.00E0
Ba/La-140	0.00E0	3.00E2	0.00%	0.00E0

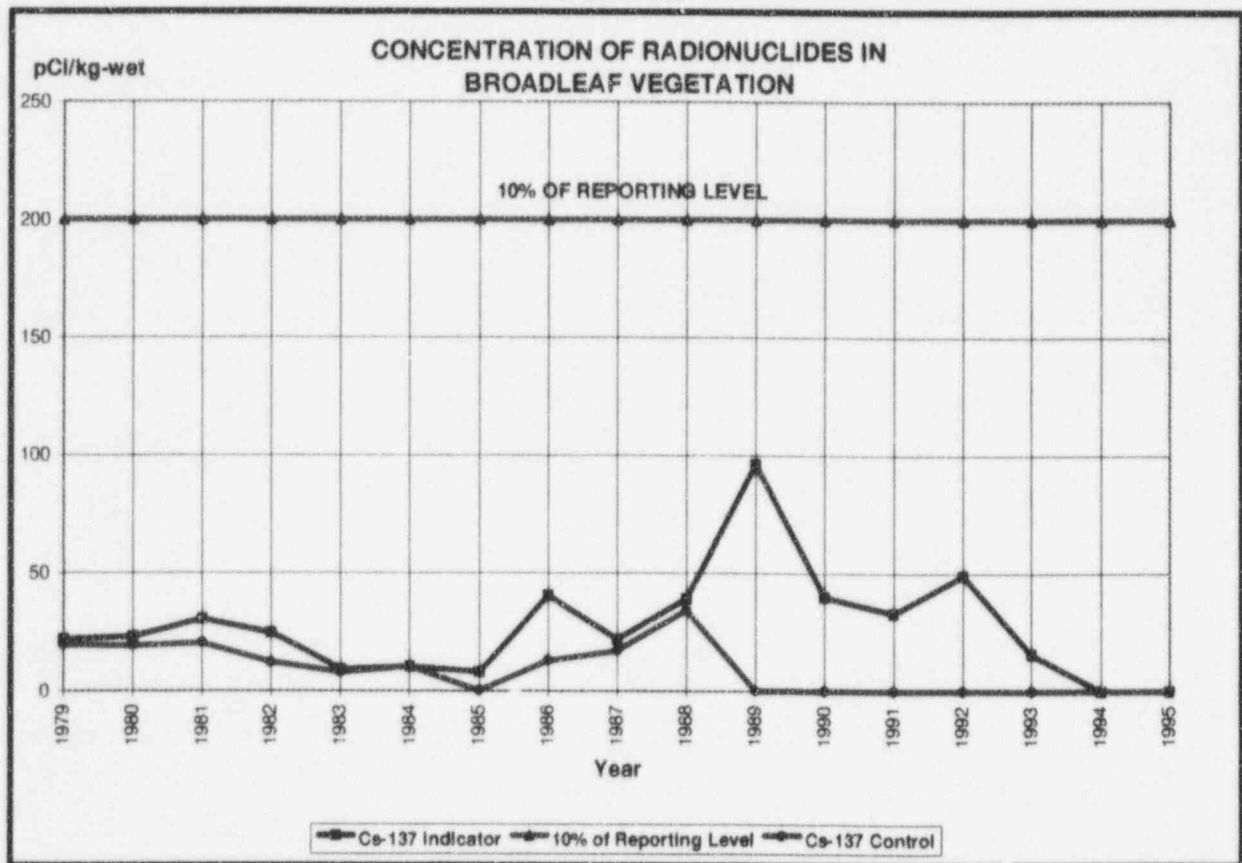
### 3.5 BROADLEAF VEGETATION

In 1995, 36 broadleaf vegetation samples were analyzed, 27 at the three indicator locations and nine at the control location.

No detectable activity was found in vegetation samples in 1995. Cs-137 has not been detected in vegetation samples since 1993 and all other radionuclides have not been detected since 1987. Figure 3.5 shows Cs-137 indicator and control location concentrations with comparisons to 10% of the reporting level. Table 3.5-A gives indicator location highest annual means since 1979 for Cs-137. Preoperational and sixteen year averages are also shown. The correlation coefficient, which was slightly above zero, indicated an increasing trend for Cs-137. All other radionuclides have decreasing or no trends.

Table 3.5-B shows control location means and the percentages of environmental concentrations to the Selected Licensee Commitments reporting levels for the indicators at the locations with the highest annual means for 1995. No activity was detected and therefore no reporting levels were approached.

FIGURE 3.5



**Table 3.5-A Concentration of Radionuclides in Broadleaf Vegetation**

YEAR	Cs-137 Indicator (pCi/kg-wet)
1979	2.19E1
1980	2.30E1
1981	3.04E1
1982	2.46E1
1983	9.07E0
1984	1.02E1
1985	8.05E0
1986	4.03E1
1987	2.20E1
1988	3.90E1
1989	9.60E1
1990	4.00E1
1991	3.30E1
1992	4.90E1
1993	1.60E1
1994	0.00E0
16 Year Average	2.89E1
1995	0.00E0
Correlation Coefficient	0.03

**Table 3.5-B Percentages of Reporting Levels for Broadleaf Vegetation**

Radionuclide	Indicator Highest Mean (pCi/kg)	Reporting Level (pCi/kg)	Percentage of Reporting Level	Control Mean (pCi/kg)
I-131	0.00E0	1.00E2	0.00%	0.00E0
Cs-134	0.00E0	1.00E3	0.00%	0.00E0
Cs-137	0.00E0	2.00E3	0.00%	0.00E0

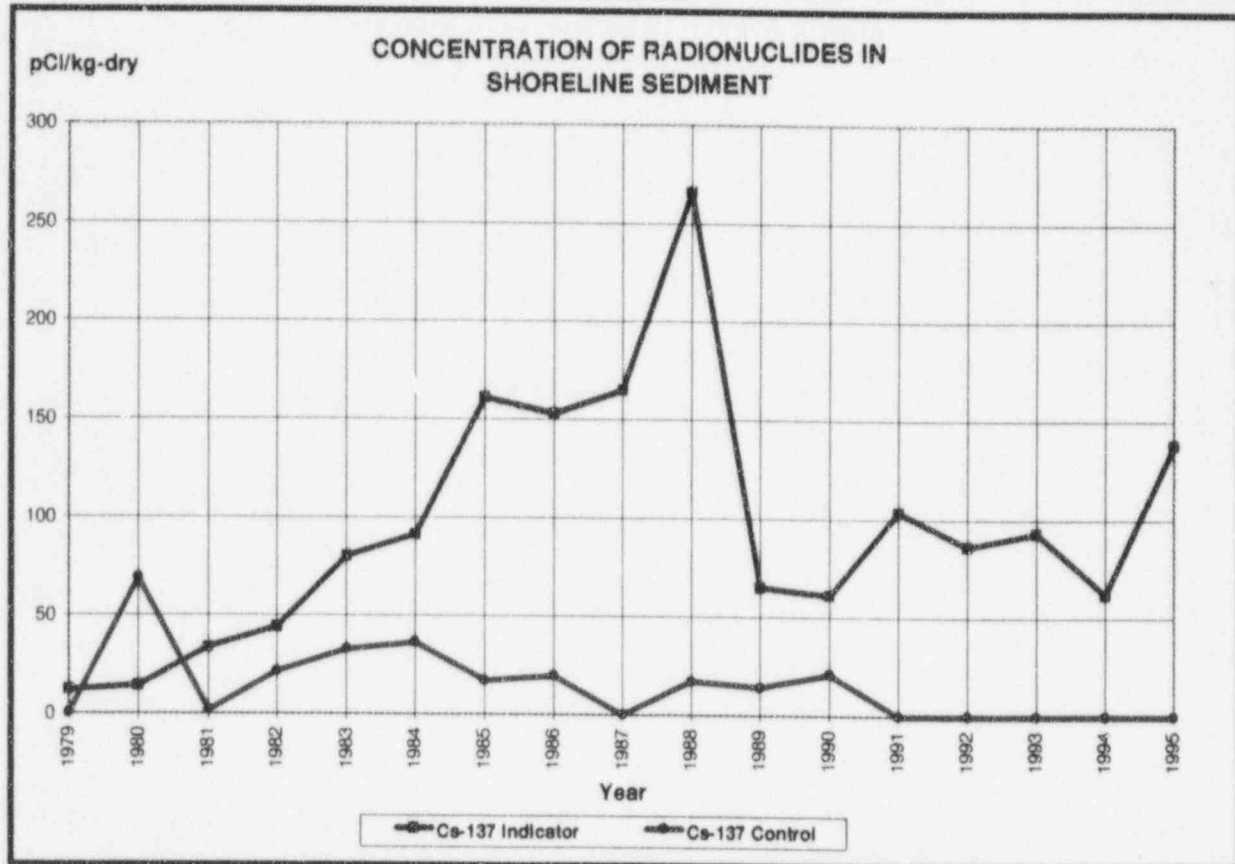
### 3.6 SHORELINE SEDIMENT

In 1995, six shoreline sediment samples were analyzed, four from two indicator locations and two at the control location.

Figure 3.6 shows Cs-137 indicator and control location concentrations since 1979. Table 3.6-A gives indicator location highest annual means since 1979 for Cs-134 and Cs-137. Preoperational data and sixteen year averages are also shown. The correlation coefficient for Cs-134 indicated a decreasing trend. Cs-134 was not detected in 1995 and has not been detected since 1992. The correlation coefficient for Cs-137 indicated an increasing trend.

Table 3.6-B shows indicator and control location means for Cs-134 and Cs-137. There are no Selected Licensee Commitments reporting levels for shoreline sediment.

FIGURE 3.6



**Table 3.6-A Concentration of Radionuclides in Shoreline Sediment**

YEAR	Cs-134 Indicator (pCi/kg-dry)	Cs-137 Indicator (pCi/kg-dry)
1979	0.00E0	1.20E1
1980	-3.53E0	1.44E1
1981	3.97E1	3.36E1
1982	7.67E1	4.40E1
1983	7.65E1	8.02E1
1984	3.34E1	9.13E1
1985	2.02E1	1.61E2
1986	6.35E1	1.53E2
1987	4.20E1	1.65E2
1988	9.10E0	2.66E2
1989	5.30E1	6.50E1
1990	0.00E0	6.10E1
1991	0.00E0	1.03E2
1992	9.20E0	8.60E1
1993	0.00E0	9.30E1
1994	0.00E0	6.20E1
16 Year Average	2.65E1	9.32E1
1995	0.00E0	1.38E2
Correlation Coefficient	-0.42	0.35

NOTE: All negative values were replaced with "zero's" for calculational purposes.

**Table 3.6-B Comparison of Indicator and Control Means for Shoreline Sediment**

Radionuclide	Indicator Highest Mean (pCi/kg)	Control Mean (pCi/kg)
Cs-134	0.00E0	0.00E0
Cs-137	1.38E2	0.00E0



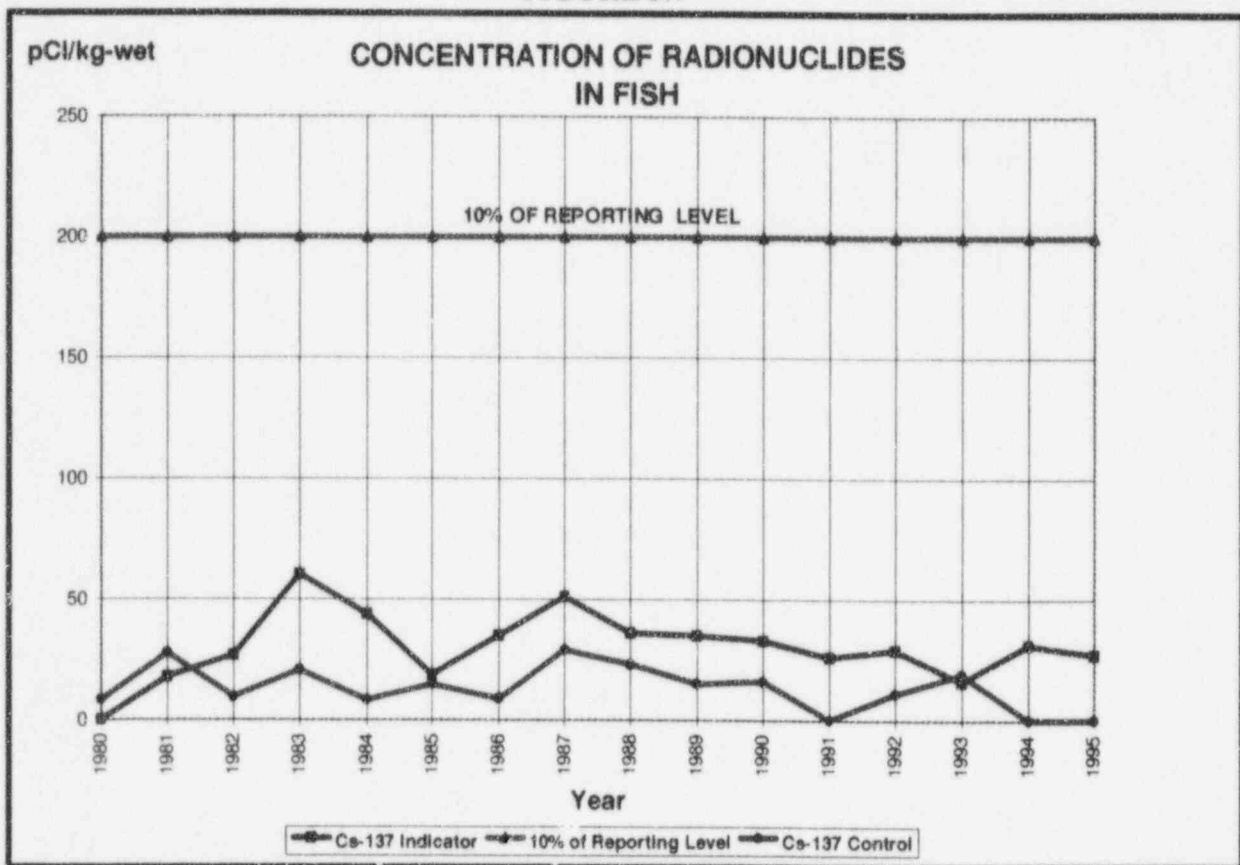
### 3.7 FISH

In 1995, 12 fish samples were analyzed for gamma emitting radionuclides, six at the indicator locations and six at the control location.

Figure 3.7 shows Cs-137 indicator and control location concentrations with comparisons to 10% of the reporting level. Table 3.7-A gives indicator location highest annual means since 1980 for Mn-54, Co-58, Co-60, Cs-134 and Cs-137. Preoperational data and fifteen year averages are also shown. No indicator samples were analyzed in 1979. The correlation coefficients, which were slightly above zero, indicated increasing trends for Mn-54, Co-58, Co-60 and Cs-137 with a decreasing trend for Cs-134. Only Cs-137 activity was detected in 1995 in two of the six indicator samples. All other radionuclides not mentioned above have indicated no detectable activity since 1985 and demonstrate decreasing or no trends.

Table 3.7-B shows control location means and the percentages of environmental concentrations to the SLCS reporting levels for the indicators at the locations with the highest annual mean for 1995. The highest annual mean for Cs-137 activity resulted in only 1.35% of the reporting level and was less than the fifteen year average.

FIGURE 3.7



**Table 3.7-A Concentration of Radionuclides in Fish**

YEAR	Mn-54 Indicator (pCi/kg-wet)	Co-58 Indicator (pCi/kg-wet)	Co-60 Indicator (pCi/kg-wet)	Cs-134 Indicator (pCi/kg-wet)	Cs-137 Indicator (pCi/kg-wet)
1980	-1.97E1	8.36E0	-2.25E1	-2.70E1	-4.13E0
1981	-2.71E0	-2.98E0	-2.65E0	-1.99E0	1.80E1
1982	-3.83E0	8.16E0	-4.34E-1	-8.22E-1	2.69E1
1983	-2.60E0	2.60E1	1.11E1	-1.32E0	6.03E1
1984	3.61E0	1.45E2	2.82E1	3.11E1	4.38E1
1985	2.53E-1	7.19E0	1.72E1	-1.56E0	1.86E1
1986	1.03E0	3.17E1	2.96E1	1.67E1	3.49E1
1987	0.00E0	2.71E2	1.25E2	2.60E1	5.10E1
1988	1.20E1	7.70E1	0.00E0	2.70E1	3.60E1
1989	9.00E1	4.05E2	2.99E2	1.10E1	3.50E1
1990	0.00E0	5.60E1	4.10E1	0.00E0	3.30E1
1991	6.20E0	1.40E1	6.50E1	5.90E0	2.60E1
1992	0.00E0	0.00E0	0.00E0	0.00E0	2.90E1
1993	0.00E0	8.20E1	1.30E1	0.00E0	1.60E1
1994	0.00E0	0.00E0	0.00E0	0.00E0	3.10E1
15 Year Average	7.54E0	7.54E1	4.19E1	7.85E0	3.06E1
1995	0.00E0	0.00E0	0.00E0	0.00E0	2.70E1
Correlation Coefficient	0.09	0.04	0.10	-0.12	0.05

NOTE: All negative values were replaced with "zero's" for calculational purposes.

**Table 3.7-B Percentages of Reporting Levels for Fish**

Radionuclide	Indicator Highest Mean (pCi/kg)	Reporting Level (pCi/kg)	Percentage of Reporting Level	Control Mean (pCi/kg)
Mn-54	0.00E0	3.00E4	0.00%	0.00E0
Fe-59	0.00E0	1.00E4	0.00%	0.00E0
Co-58	0.00E0	3.00E4	0.00%	0.00E0
Co-60	0.00E0	1.00E4	0.00%	0.00E0
Zn-65	0.00E0	2.00E4	0.00%	0.00E0
Cs-134	0.00E0	1.00E3	0.00%	0.00E0
Cs-137	2.70E1	2.00E3	1.35%	0.00E0

### 3.8 DIRECT GAMMA RADIATION

In 1995, 188 TLD's were analyzed, 184 at indicator locations and four at the control location.

Figure 3.8 shows TLD highest mean indicator and control location exposure rates in millirem per year. Table 3.8-A gives indicator and control location highest annual means since 1979. Preoperational data and sixteen year averages are also given.

FIGURE 3.8

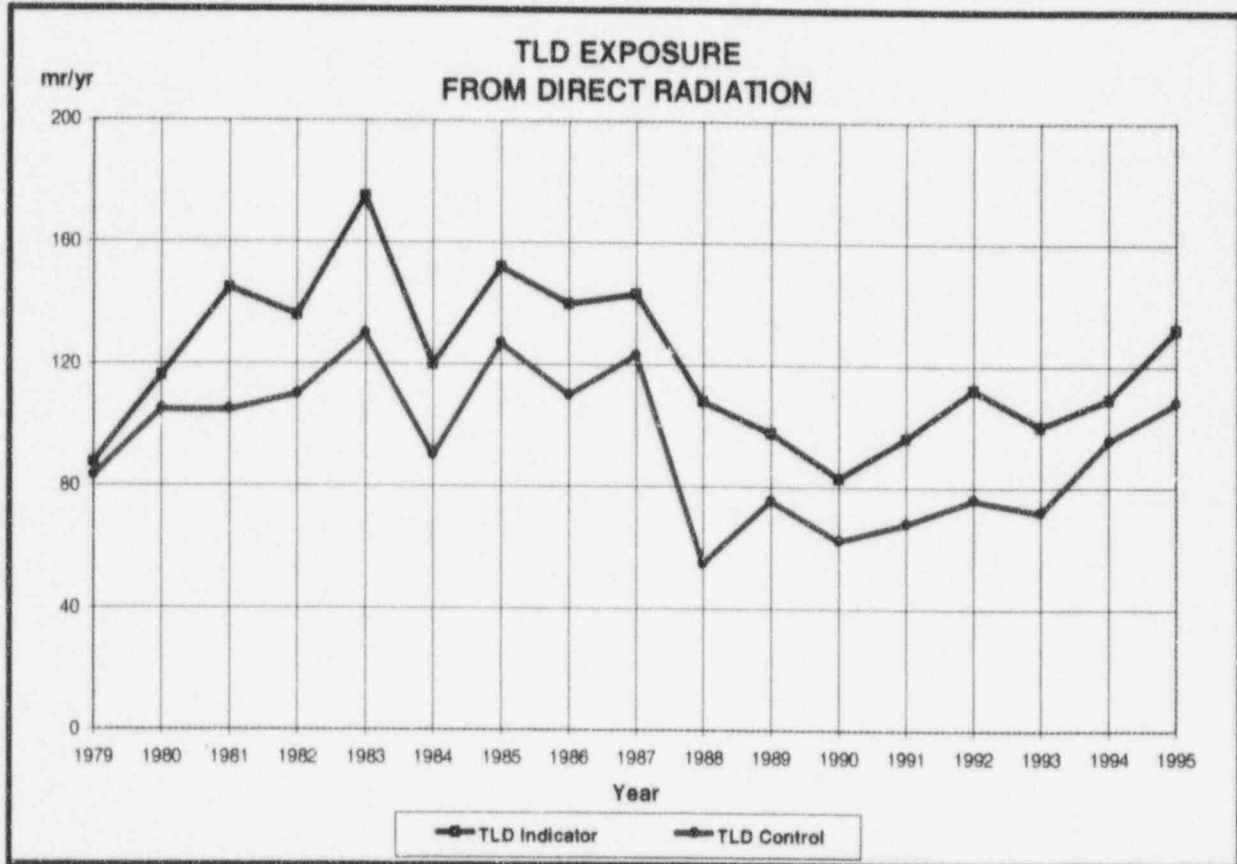


Table 3.8-A TLD Exposure from Direct Radiation

YEAR	Indicator (mrem/yr)	Control (mrem/yr)
1979	8.76E1	8.32E1
1980	1.16E2	1.05E2
1981	1.45E2	1.05E2
1982	1.36E2	1.10E2
1983	1.75E2	1.30E2
1984	1.20E2	9.02E1
1985	1.52E2	1.27E2
1986	1.40E2	1.10E2
1987	1.43E2	1.23E2
1988	1.08E2	5.48E1
1989	9.77E1	7.55E1
1990	8.30E1	6.23E1
1991	9.60E1	6.80E1
1992	1.12E2	7.60E1
1993	1.00E2	7.20E1
1994	1.09E2	9.55E1
16 Year Average	1.20E2	9.30E1
1995	1.32E2	1.08E2

NOTE: The expected background for North Carolina is 120 mrem per year from FSAR 11.6.1.

The test statistic, or t-test, was used to compare the TLD measurements during preoperation to those taken during 1995.

The value of the t-statistic was calculated by comparing preoperational results to 1995. As shown in Table 3.8-B, the t-value was -2.115. This is slightly higher than the expected value of  $\pm 2.056$ , based on 26 degrees of freedom and 95% confidence level ( $\alpha = 0.025$ ,  $n = 26$ ), but is well within the acceptable value of  $\pm 2.779$  ( $\alpha = 0.005$ ,  $n = 26$ ) for the 99% confidence level. Also, because the calculated whole body dose from gaseous effluents for 1995 was 0.14 mrem (0.1% of total TLD dose), it can be concluded that discharges from the plant had very little impact on the measured TLD values.

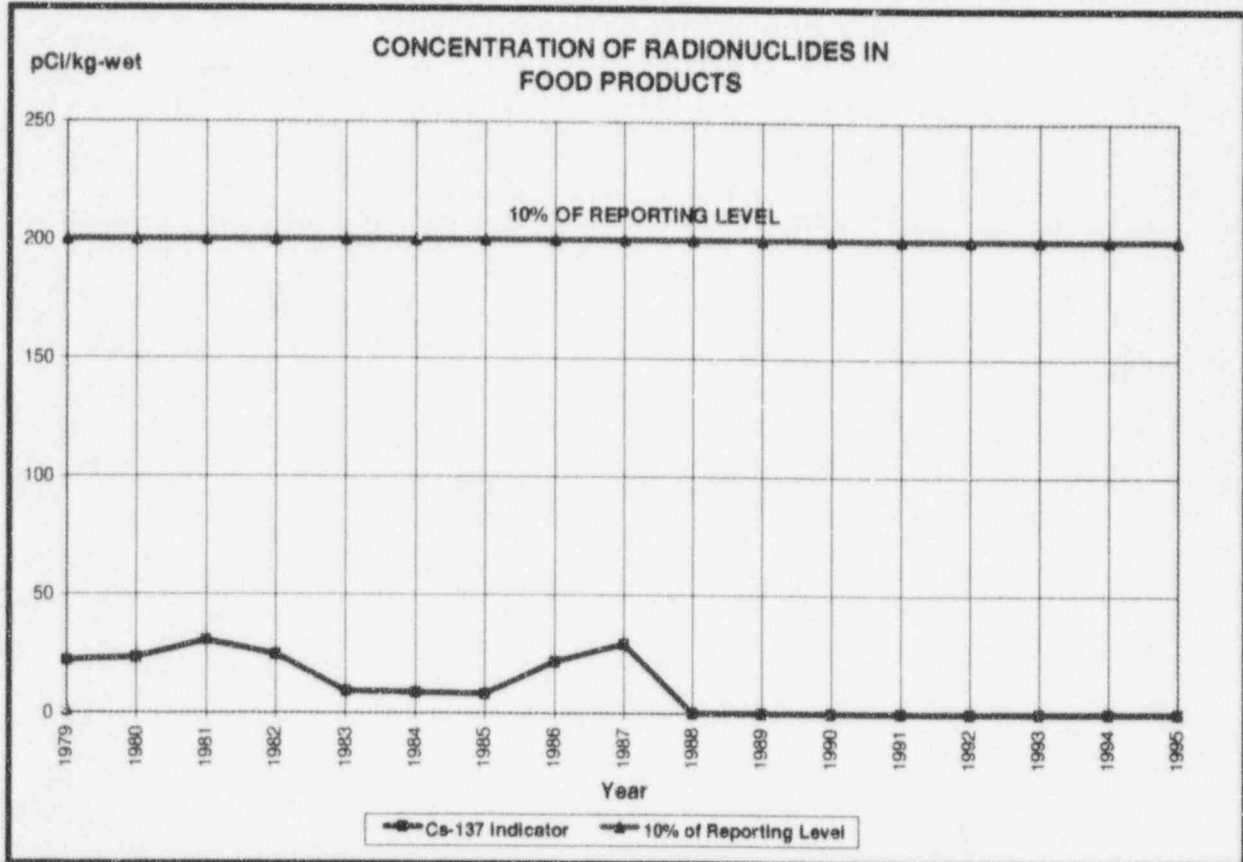
<b>Table 3.8-B</b> <b>Comparison of Inner Ring/Outer Ring TLD Results</b>		
	1995 (mr/yr)	Preop (mr/yr)
Inner Ring	83.6	79.14
Outer Ring	82.5	88.16
Ratio	1.03	0.91
Variance	0.02	0.02
t-value	-2.115	
t-table (95%)	$\pm 2.056$	
t-table (99%)	$\pm 2.779$	

### 3.9 FOOD PRODUCTS

In 1995, 10 food products (crops) samples were analyzed, all at one indicator location. There is no control location for this media.

No detectable activity was found in food products samples in 1995. Since no activity has been detected in this media since 1987, any possible trends are decreasing or nonexistent. Figure 3.9 shows Cs-137 indicator highest annual means since 1979 with comparisons to 10% of the reporting level. Table 3.9 shows percentages of environmental concentrations to the SLCS reporting levels for the indicator highest annual mean for 1995. No activity was detected and therefore no reporting levels were approached.

FIGURE 3.9



**Table 3.9 Percentages of Reporting Levels for Food Products**

<b>Radionuclide</b>	<b>Indicator Highest Mean (pCi/kg)</b>	<b>Reporting Level (pCi/kg)</b>	<b>Percentage of Reporting Level</b>
I-131	0.00E0	1.00E2	0.00%
Cs-134	0.00E0	1.00E3	0.00%
Cs-137	0.00E0	2.00E3	0.00%

### **3.10 LAND USE CENSUS**

The land use census was completed July 6, 1995 and the results are shown in Table 3.10 and Figure 3.10. During the 1995 census, 19 irrigated gardens were identified. These gardens were reviewed with respect to amount of irrigation, size, willingness to participate, crop types, and location. The Davenport garden (Location 184, 2.5 miles ENE) was not planted in 1995 due to the age of the residents. Therefore, the Davenport garden was deleted from the program after the growing season. The Austin garden (Location 188, 2.8 miles N) was determined to be the best overall garden with respect to sample reliability, crop variety, and size. The census also revealed eight milk animal locations that were not included in the 1995 sampling program. However, seven of the locations do not produce sufficient volume to be added to the program and the eighth is outside the five kilometer area of participation. The nearest residence is located in the East sector at 0.46 miles.



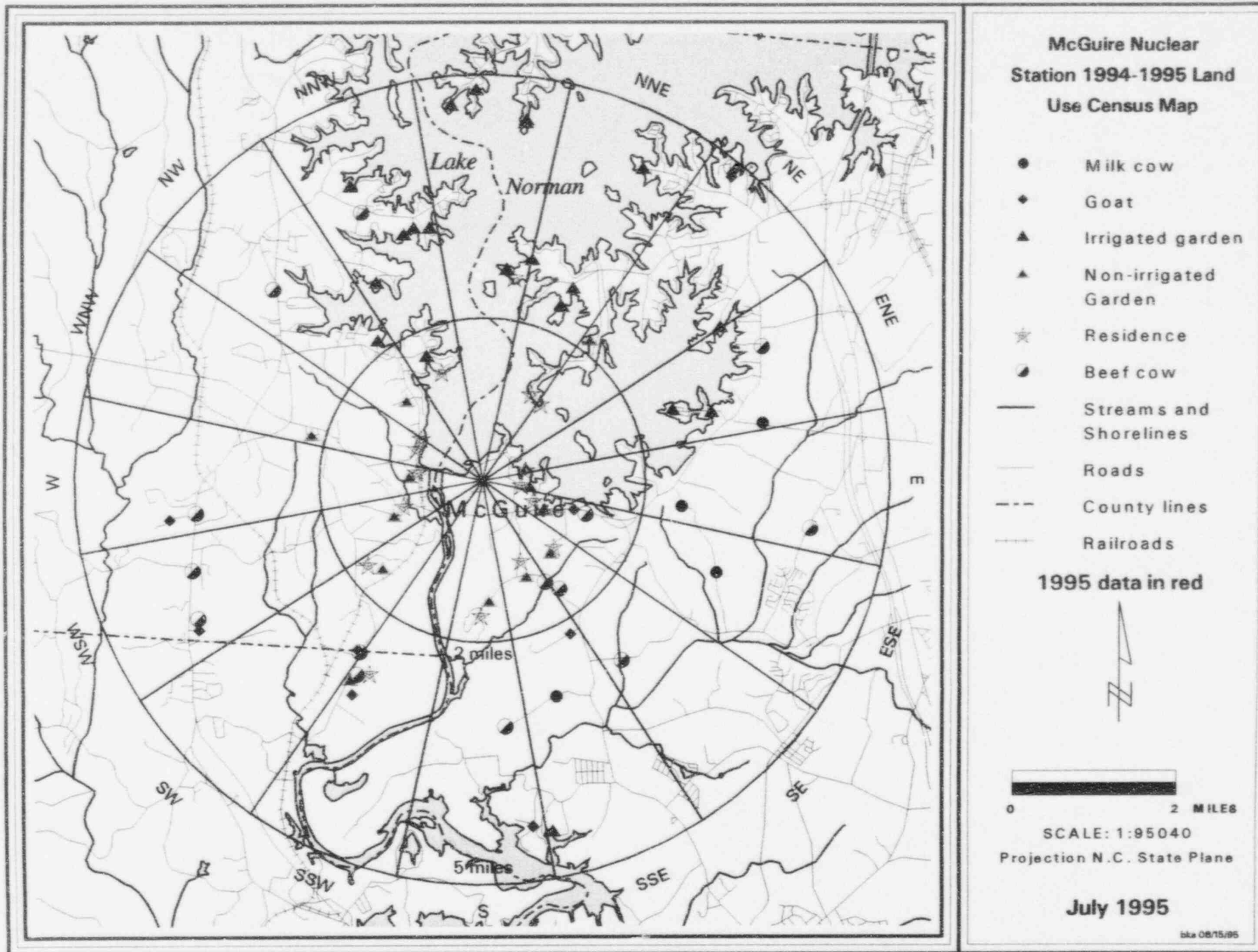
**Table 3.10 Land Use Census Results**

SECTOR		DISTANCE
N	Nearest Residence	2.5 miles
	Nearest Meat Animal	None in 5 miles
	Nearest Garden	2.56 miles
	Nearest Cow	None in 5 miles
	Nearest Goat	None in 5 miles
NNE	Nearest Residence	1.29 miles
	Nearest Meat Animal	None in 5 miles
	Nearest Garden	2.37 miles
	Nearest Cow	None in 5 miles
	Nearest Goat	None in 5 miles
NE	Nearest Residence	1.2 miles
	Nearest Meat Animal	4.95 miles
	Nearest Garden	2.1 miles
	Nearest Cow	None in 5 miles
	Nearest Goat	4.95 miles
ENE	Nearest Residence	0.56 miles
	Nearest Meat Animal	3.81 miles
	Nearest Garden	2.55 miles
	Nearest Cow	3.51 miles
	Nearest Goat	None in 5 miles
E	Nearest Residence	0.46 miles
	Nearest Meat Animal	4.08 miles
	Nearest Garden	0.47 miles
	Nearest Cow	2.46 miles
	Nearest Goat	None in 5 miles
ESE	Nearest Residence	0.67 miles
	Nearest Meat Animal	1.3 miles
	Nearest Garden	0.85 miles
	Nearest Cow	3.07 miles
	Nearest Goat	1.4 miles
SE	Nearest Residence	1.17 miles
	Nearest Meat Animal	2.79 miles
	Nearest Garden	1.21 miles
	Nearest Cow	None in 5 miles
	Nearest Goat	None in 5 miles
SSE	Nearest Residence	1.06 miles
	Nearest Meat Animal	1.48 miles
	Nearest Garden	1.26 miles
	Nearest Cow	2.76 miles
	Nearest Goat	2.09 miles

**Table 3.10 Land Use Census Results**

SECTOR		DISTANCE
S	Nearest Residence	1.62 miles
	Nearest Meat Animal	3.01 miles
	Nearest Garden	1.49 miles
	Nearest Cow	None in 5 miles
	Nearest Goat	4.30 miles
SSW	Nearest Residence	2.57 miles
	Nearest Meat Animal	2.75 miles
	Nearest Garden	2.95 miles
	Nearest Cow	None in 5 miles
	Nearest Goat	3.06 miles
SW	Nearest Residence	1.8 miles
	Nearest Meat Animal	None in 5 miles
	Nearest Garden	1.8 miles
	Nearest Cow	None in 5 miles
	Nearest Goat	None in 5 miles
WSW	Nearest Residence	1.01 miles
	Nearest Meat Animal	3.97 miles
	Nearest Garden	1.16 miles
	Nearest Cow	None in 5 miles
	Nearest Goat	3.97 miles
W	Nearest Residence	0.82 miles
	Nearest Meat Animal	3.53 miles
	Nearest Garden	0.90 miles
	Nearest Cow	None in 5 miles
	Nearest Goat	3.83 miles
WNW	Nearest Residence	0.91 miles
	Nearest Meat Animal	None in 5 miles
	Nearest Garden	2.15 miles
	Nearest Cow	None in 5 miles
	Nearest Goat	None in 5 miles
NW	Nearest Residence	0.93 miles
	Nearest Meat Animal	None in 5 miles
	Nearest Garden	1.37 miles
	Nearest Cow	None in 5 miles
	Nearest Goat	None in 5 miles
NNW	Nearest Residence	1.53 miles
	Nearest Meat Animal	3.67 miles
	Nearest Garden	1.69 miles
	Nearest Cow	None in 5 miles
	Nearest Goat	None in 5 miles

Figure 3.10



---

## **4.0 EVALUATION OF DOSE FROM ENVIRONMENTAL MEASUREMENTS VERSUS ESTIMATED DOSE FROM RELEASES**

---

### **4.1 DOSE FROM ENVIRONMENTAL MEASUREMENTS**

Doses were estimated for measured concentrations of radionuclides in direct pathways to man using NRC Regulatory Guide 1.109 methodology and factors. A dose factor of zero was used when the Reg. Guide listed "NO DATA" for a factor. The highest annual mean values for each sample type and radionuclide as given in Appendix B were used after the background concentrations, as measured at the control location, had been subtracted. The maximum exposed individual doses are summarized in Tables 4.1-A and 4.1-B.

### **4.2 ESTIMATED DOSE FROM RELEASES**

Doses were estimated for release concentrations of radionuclides in direct pathways to man using NRC Regulatory Guide 1.109 methodology. The doses were calculated using GASPAP and LADTAP computer programs as reported in the 1995 McGuire Annual Radioactive Effluent Release Report (reference 6.6). The effluent liquid release doses are summations of the dose contributions from the liquid pathways. Noble gas exposure and iodine, particulate, and tritium exposure gaseous release doses are reported separately. For noble gas exposure, there is no critical age group, as the maximum exposed individuals are assumed to receive the same doses, regardless of their age group. For iodine, particulate, and tritium exposure, the maximum total organ dose for the highest dose location is given for the maximum organ (thyroid) for the critical age group (child). The maximum exposed individual doses are summarized in Table 4.1-A with the critical age and critical pathway listed.

### **4.3 COMPARISON OF DOSES**

The environmental and effluent doses 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 modelling of the environmental exposure pathways.

In calculations based on liquid release effluent pathways, drinking water consumption is the predominant dose path based on effluent data and fish consumption is the predominant dose path based on environmental samples. The only radionuclide detected in fish in 1995 was from two samples indicating Cs-137. Tritium from surface water samples also was included in the fish pathway. For the drinking water pathway, the only radionuclide detected in 1995 was one sample indicating tritium.

No environmental doses resulted from the gaseous pathway in 1995. Broadleaf vegetation, milk, and airborne radioiodines and particulates indicated no activity in 1995. The effluent data dose for iodine, particulate, and tritium is based on the vegetation pathway to the child with the majority of the dose contributed by tritium.

The doses, as calculated using the environmental sample results, are well below the limits specified in Selected Licensee Commitments Manual Section 16.11-12 and do not exceed the 40CFR190 dose commitment limits for members of the public.

#### **4.4 PATHWAY DOSE CALCULATIONS**

Dose calculations sheets for each age and pathway that indicated environmental doses greater than zero can be found following Tables 4.1-A and 4.1-B.

TABLE 4.1-A

1995 ENVIRONMENTAL AND EFFLUENT DOSE COMPARISON  
FOR LIQUID AND GASEOUS WASTE RELEASE PATHWAYS

LIQUID RELEASE PATHWAY

Organ	Environmental or Effluent Data	Critical Age	Critical Pathway	Maximum Dose* (mrem)
Skin	Environmental	Teen	Shoreline Sediment	6.71E-04
Skin	Effluent	Teen	Shoreline Sediment	4.22E-04
Bone	Environmental	Child	Fish	6.09E-02
Bone	Effluent	Child	Fish	8.47E-03
Liver	Environmental	Child	Fish	9.58E-02
Liver	Effluent	Child	Drinking Water	5.41E-02
T. Body	Environmental	Adult	Fish	6.86E-02
T. Body	Effluent	Child	Drinking Water	4.67E-02
Thyroid	Environmental	Child	Drinking Water	3.75E-02
Thyroid	Effluent	Child	Drinking Water	4.52E-02
Kidney	Environmental	Child	Drinking Water	5.65E-02
Kidney	Effluent	Child	Drinking Water	4.79E-02
Lung	Environmental	Child	Drinking Water	4.43E-02
Lung	Effluent	Child	Drinking Water	4.61E-02
GI-LLI	Environmental	Child	Drinking Water	3.79E-02
GI-LLI	Effluent	Child	Drinking Water	4.68E-02

\* Maximum dose is a summation of the fish, drinking water and shoreline sediment pathways.

GASEOUS RELEASE PATHWAY

Organ	Environmental or Effluent Data	Critical Age	Critical Pathway	Maximum Dose (mrem)
NOBLE GAS EXPOSURE				
Skin	Environmental	-	-	Not Sampled
Skin	Effluent	N/A	Noble Gas	3.18E-01
T. Body	Environmental	-	-	Not Sampled
T. Body	Effluent	N/A	Noble Gas	1.40E-01

Organ	Environmental or Effluent Data	Critical Age	Critical Pathway	Maximum Dose* (mrem)
IODINE, PARTICULATE, and TRITIUM				
Bone	Environmental	-	-	0.00E+00
Liver	Environmental	-	-	0.00E+00
T. Body	Environmental	-	-	0.00E+00
Thyroid	Environmental	-	-	0.00E+00
Thyroid	Effluent	Child	Vegetation	1.34E-01
Kidney	Environmental	-	-	0.00E+00
Lung	Environmental	-	-	0.00E+00
GI-LLI	Environmental	-	-	0.00E+00

\* Maximum dose is a summation of the inhalation, milk and vegetation pathways.

TABLE 4.1-B

## Maximum Individual Dose for 1995 based on Environmental Measurements (mrem) for McGuire 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	3.64E-02	3.64E-02	3.64E-02	3.64E-02	3.64E-02	3.64E-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
	TOTAL	0.00E+00	3.64E-02	3.64E-02	3.64E-02	3.64E-02	3.64E-02	3.64E-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	3.71E-02	3.71E-02	3.71E-02	3.71E-02	3.71E-02	3.71E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Fish	6.09E-02	5.87E-02	9.00E-03	3.98E-04	1.94E-02	7.24E-03	7.63E-04	0.00E+00
	Shoreline Sediment	0.00E+00	0.00E+00	1.20E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.40E-04
	TOTAL	6.09E-02	9.58E-02	4.62E-02	3.75E-02	5.65E-02	4.43E-02	3.79E-02	1.40E-04
<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	1.94E-02	1.94E-02	1.94E-02	1.94E-02	1.94E-02	1.94E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Fish	4.84E-02	6.48E-02	2.29E-02	4.82E-04	2.24E-02	8.99E-03	1.40E-03	0.00E+00
	Shoreline Sediment	0.00E+00	0.00E+00	5.73E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.71E-04
	TOTAL	4.84E-02	8.42E-02	4.29E-02	1.99E-02	4.18E-02	2.84E-02	2.08E-02	6.71E-04
<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	2.74E-02	2.74E-02	2.74E-02	2.74E-02	2.74E-02	2.74E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Fish	4.52E-02	6.24E-02	4.11E-02	6.26E-04	2.16E-02	7.60E-03	1.82E-03	0.00E+00
	Shoreline Sediment	0.00E+00	0.00E+00	1.03E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.20E-04
	TOTAL	4.52E-02	8.98E-02	6.86E-02	2.80E-02	4.90E-02	3.50E-02	2.92E-02	1.20E-04

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





*Dose from Drinking Water Pathway for 1995 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	Ingestion Dose Factor											Highest Annual Net Mean		Dose (mrem)						
	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-ILL	Indicator Location	Water (pCi/l)	Concentration		Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-ILL		
										GI-ILL	Water									
Mn-54	NO DATA	1.07E-05	2.85E-06	NO DATA	3.00E-06	NO DATA	8.98E-06	ALL	0.00	0.00	0.00E+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	0.00	0.00E+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	0.00	0.00E+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	5.29E-06	1.56E-05	NO DATA	NO DATA	NO DATA	2.93E-05	ALL	0.00	0.00	0.00E+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	0.00	0.00E+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	0.00	0.00E+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	0.00	0.00E+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	0.00	0.00E+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	2.97E-06	ALL	0.00	0.00	0.00E+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	0.00	0.00E+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	0.00	0.00E+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	119	358.00	0.00E+00	3.71E-02	3.71E-02	3.71E-02	3.71E-02	3.71E-02	3.71E-02	3.71E-02	3.71E-02		

Dose Commitment (mrem) =

3.71E-02

3.71E-02

3.71E-02

3.71E-02

3.71E-02

3.71E-02

3.71E-02

3.71E-02

3.71E-02

**Dose from Fish Pathway for 1995 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/l = 315 pCi/l x 0.9 = 284 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
Co-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	129	27.00	6.09E-02	5.83E-02	8.61E-03	0.00E+00	1.90E-02	6.84E-03	3.65E-04
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	128	284.00	0.00E+00	3.98E-04	3.98E-04	3.98E-04	3.98E-04	3.98E-04	3.98E-04
Dose Commitment (mrem) =										6.09E-02	5.87E-02	9.00E-03	3.98E-04	1.94E-02	7.24E-03	7.63E-04

*Dose from Shoreline Sediment Pathway for 1995 Data  
Maximum Exposed Child*

Shoreline Recreation = 14 hr (in one year)  
 Shore Width Factor = 0.3 (lake shore - location 129)  
 Shore Width Factor = 0.2 (river shoreline - location 130)  
 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 (mrem/hr per pCi/m <sup>2</sup> )		Indicator Location	Highest Annual Net Mean Concentration Sediment (pCi/kg)	Dose (mrem)	
	T. Body	Skin			T. Body	Skin
Mn-54	5.80E-09	6.80E-09	130	17.00	1.10E-05	1.39E-05
Co-58	7.00E-09	8.20E-09	ALL	0.00	0.00E+00	0.00E+00
Fe-59	8.00E-09	9.40E-09	ALL	0.00	0.00E+00	0.00E+00
Co-60	1.70E-08	2.00E-08	130	23.00	4.38E-05	5.15E-05
Zn-65	4.00E-09	4.60E-09	ALL	0.00	0.00E+00	0.00E+00
Nb-95	5.10E-09	6.00E-09	ALL	0.00	0.00E+00	0.00E+00
Zr-95	5.00E-09	5.80E-09	ALL	0.00	0.00E+00	0.00E+00
I-131	2.80E-09	3.40E-09	ALL	0.00	0.00E+00	0.00E+00
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	130	138.00	6.49E-05	7.57E-05
BaLa-140	2.10E-09	2.40E-09	ALL	0.00	0.00E+00	0.00E+00
Dose Commitment (mrem) =					1.20E-04	1.40E-04



*Dose from Fish Pathway for 1995 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/l = 315 pCi/l x 0.9 = 284 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	(kg/yr)	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-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
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	129	27.00	4.84E-02	6.44E-02	2.24E-02	0.00E+00	2.19E-02	8.51E-03	9.16E-04
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	1.96E-07	1.06E-07	128	284.00	0.00E+00	4.82E-04	4.82E-04	4.82E-04	4.82E-04	4.82E-04	4.82E-04
Dose Commitment (mrem) =										4.84E-02	6.48E-02	2.29E-02	4.82E-04	2.24E-02	8.99E-03	1.40E-03

*Dose from Shoreline Sediment Pathway for 1995 Data  
Maximum Exposed Teen*

Shoreline Recreation = 67 hr (in one year)  
 Shore Width Factor = 0.3 (lake shore - location 129)  
 Shore Width Factor = 0.2 (river shoreline - location 130)  
 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 on Contaminated Ground (mrem/hr per pCi/m <sup>2</sup> )		Indicator Location	Highest Annual Net Mean Concentration Sediment (pCi/kg)	Dose (mrem)	
	T. Body	Skin			T. Body	Skin
Mn-54	5.80E-09	6.80E-09	130	17.00	5.28E-05	6.20E-05
Co-58	7.00E-09	8.20E-09	ALL	0.00	0.00E+00	0.00E+00
Fe-59	8.00E-09	9.40E-09	ALL	0.00	0.00E+00	0.00E+00
Co-60	1.70E-08	2.00E-08	130	23.00	2.10E-04	2.47E-04
Zn-65	4.00E-09	4.60E-09	ALL	0.00	0.00E+00	0.00E+00
Nb-95	5.10E-09	6.00E-09	ALL	0.00	0.00E+00	0.00E+00
Zr-95	5.00E-09	5.80E-09	ALL	0.00	0.00E+00	0.00E+00
I-131	2.80E-09	3.40E-09	ALL	0.00	0.00E+00	0.00E+00
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	130	138.00	3.11E-04	3.62E-04
BaLa-140	1.50E-08	1.70E-08	ALL	0.00	0.00E+00	0.00E+00
Dose Commitment (mrem) =					5.73E-04	6.71E-04





*Dose from Fish Pathway for 1995 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/l = 315 pCi/l x 0.9 = 284 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
Ce-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	7.79E-05	1.23E-05	2.11E-06	129	27.00	4.52E-02	6.18E-02	4.05E-02	0.00E+00	2.10E-02	6.97E-03	1.20E-03
BaLa-140	2.03E-05	2.55E-08	1.33E-06	NO DATA	8.67E-08	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	128	284.00	0.00E+00	6.26E-04	6.26E-04	6.26E-04	6.26E-04	6.26E-04	6.26E-04
Dose Commitment (mrem) =										4.52E-02	6.24E-02	4.11E-02	6.26E-04	2.16E-02	7.60E-03	1.82E-03

***Dose from Shoreline Sediment Pathway for 1995 Data  
Maximum Exposed Adult***

Shoreline Recreation = 12 hr (in one year)  
 Shore Width Factor = 0.3 (lake shore - location 129)  
 Shore Width Factor = 0.2 (river shoreline - location 130)  
 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 on Contaminated Ground (mrem/hr per pCi/m <sup>2</sup> )		Highest Annual Net Mean Concentration		Dose (mrem)	
	T. Body	Skin	Indicator Location	Sediment (pCi/kg)	T. Body	Skin
Mn-54	5.80E-09	6.80E-09	130	17.00	9.47E-06	1.11E-05
Co-58	7.00E-09	8.20E-09	ALL	0.00	0.00E+00	0.00E+00
Fe-59	8.00E-09	9.40E-09	ALL	0.00	0.00E+00	0.00E+00
Co-60	1.70E-08	2.00E-08	130	23.00	3.75E-05	4.42E-05
Zn-65	4.00E-09	4.60E-09	ALL	0.00	0.00E+00	0.00E+00
Nb-95	5.10E-09	6.00E-09	ALL	0.00	0.00E+00	0.00E+00
Zr-95	5.00E-09	5.80E-09	ALL	0.00	0.00E+00	0.00E+00
I-131	2.80E-09	3.40E-09	ALL	0.00	0.00E+00	0.00E+00
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	130	138.00	5.56E-05	6.49E-05
BaLa-140	2.10E-09	2.40E-09	ALL	0.00	0.00E+00	0.00E+00
Dose Commitment (mrem) =					1.03E-04	1.20E-04

---

## **5.0 QUALITY ASSURANCE**

---

### **5.1 DUKE POWER COMPANY'S RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM**

#### **5.1.1 SAMPLE COLLECTION**

Radiological and Environmental Services, Fisheries, and Aquatic Ecology performed the environmental sample collections as specified by approved sample collection procedures.

#### **5.1.2 SAMPLE ANALYSIS**

The Radiological and Environmental Services Group performed the environmental sample analyses as specified by approved analysis procedures.

#### **5.1.3 DOSIMETRY ANALYSIS**

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

#### **5.1.4 INTRALABORATORY QUALITY ASSURANCE**

Radiological and Environmental Services 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.

Additionally, 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 out of limits.

## **5.1.5 INTERLABORATORY QUALITY ASSURANCE**

### **5.1.5.1 DUKE POWER'S AUDIT DIVISION**

The McGuire Nuclear Station Radiation Protection Section participated in a Quality Assurance audit in April 1995. This audit was conducted by the Nuclear Assessment and Issues Division, Regulatory Audit Group. No recommendations pertaining to the McGuire Radiological Environmental Monitoring Program were identified in the audit.

### **5.1.5.2 DUKE POWER'S NUCLEAR PRODUCTION INTERCOMPARISON PROGRAM**

The Radiological and Environmental Services group participated in the Duke Power Nuclear Generation Department Intercomparison Program during 1995. Interlaboratory cross-check standards, including marinelli beakers, air filters, air cartridges, gross alpha/beta on smears, and tritium in water samples were analyzed at various times of the year by the four counting laboratories in Duke Power Company for this program. A summary of these Intercomparison Reports for 1995 is documented in Table 5.0-A.

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

The Radiological Environmental Monitoring Program was not audited by the NRC in 1995. The McGuire Nuclear Station Radiation Protection section participated in an NRC audit in 1995. Improvement of environmental monitoring equipment reliability was listed as a recommendation. A thorough description of improvements can be found in Appendix C, Section 3.0.

### **5.1.5.4 UNITED STATES ENVIRONMENTAL PROTECTION AGENCY INTERCOMPARISON PROGRAM**

The Radiological and Environmental Services Group participated in the Environmental Protection Agency (EPA) Environmental Monitoring Systems Laboratory Intercomparison Program. The EPA sample types included mixed gamma in water, mixed gamma in milk, gamma in air filters, iodine in milk, tritium in water, iodine in water, gross beta in air filters and gross beta in water.

Radiological and Environmental Services prepared and analyzed each sample as quickly as possible. Data obtained greater than EPA limits is documented by follow-up investigations. The Radiological and Environmental Services EPA Intercomparison Report code is "CP". A summary of the EPA Intercomparison Reports for 1995 is documented in Table 5.0-B.

An investigation was made into failed Beta in Water and Gamma in Water dated 4/18/95. Both tests conducted by Radiological and Environmental Services failed high due to cross-contamination of the samples. The investigation reviewed preparation of samples, training of personnel, materials used for sample preparation, laboratory area used for preparation, and review of data.

One sample was analyzed but results were not reported by the required date. (See corrective action #1 below)

After careful review of preparation of samples, it was determined that all procedure steps were accurately followed. No deviation in preparation procedures were found. Laboratory personnel that performed the analysis were sufficiently trained and had conducted similar analyses with acceptable results. The contamination of the cross-checks is believed to have resulted from analysis of primary reactor coolant samples by Radiological and Environmental Services. The potential existed for glassware and work surfaces to be contaminated with primary coolant in the preparation area. This is considered to be the root cause of the contamination.

Corrective actions are as follows:

- 1) The receipt and tracking of EPA samples was refined in order to meet all future deadlines.
- 2) An entire process improvement initiative was implemented that distinctly isolates all lab work by potential activity.
- 3) Specific glassware has been physically identified for all analyses types, e.g. environmental, effluent, primary reactor coolant, EPA, etc..
- 4) Cleaning procedures have been reviewed and improved for glassware and counter surfaces, minimizing the potential for contamination.
- 5) Data reviewers have been reminded to use historical information as "benchmark" data to find potential anomalies.

- 6) Procedures will be modified for 1996 samples to include a blank to be prepared with each set of samples. This will verify the presence of any interfering contaminants in sample matrices.

#### **5.1.5.5 NRC/STATE OF N.C. SAMPLING INTERCOMPARISON PROGRAM**

Radiological and Environmental Services routinely participates with the State of North Carolina Department of Environmental Health and Natural Resources (DEHNR) in an intercomparison program. Radiological and Environmental Services sends air, water, milk, vegetation, sediment, and fish samples which have been collected to the State of North Carolina Radiation Protection Section for intercomparison analysis.

#### **5.1.5.6 STATE OF N.C. TLD INTERCOMPARISON PROGRAM**

Radiation Dosimetry and Records routinely participates in a TLD intercomparison program. Every six to eight months, the State of North Carolina Radiation Protection Section irradiates environmental dosimeters and sends them to the Radiation Dosimetry and Records group for analysis of the unknown estimated delivered exposure. A summary of the State of North Carolina Environmental Dosimetry Intercomparison Report for 1995 is documented in Table 5.0-C.

### **5.2 CONTRACTOR LABORATORIES**

No contractor laboratories were used during 1995.

# TABLE 5.0-A

## DUKE POWER COMPANY INTERLABORATORY COMPARISON PROGRAM

1995 CROSS-CHECK RESULTS FOR THE RADIOLOGICAL & ENVIRONMENTAL  
SERVICES LABORATORY

*Gamma:*

Collection Date	Geometry	Nuclide	Acceptance Range (pCi/l)	Reference Value (pCi/l)	Reported Value (pCi/l)
6/23/95	3.5 Liter	Cr-51	1.93E4 - 3.42E4	2.57E4	2.60E4
		Mn-54	1.30E4 - 2.30E4	1.73E4	1.77E4
		Co-58	5.82E3 - 1.03E4	7.76E3	8.01E3
		Fe-59	5.46E3 - 9.68E3	7.28E3	7.51E3
		Co-60	1.31E4 - 2.33E4	1.75E4	1.78E4
		Zn-65	1.31E4 - 2.33E4	1.75E4	1.84E4
		Cs-134	7.95E3 - 1.41E4	1.06E4	9.8E3
		Cs-137	7.36E3 - 1.31E4	9.81E3	9.97E3
		Ce-141	5.62E3 - 9.96E3	7.49E3	7.70E3
Collection Date	Geometry	Nuclide	Acceptance Range (pCi/total)	Reference Value (pCi/total)	Reported Value (pCi/total)
6/23/95	1.0 Liter	Cr-51	4.45E4 - 7.89E4	5.93E4	6.02E4
		Mn-54	3.02E4 - 5.35E4	4.02E4	4.16E4
		Co-58	1.36E4 - 2.41E4	1.81E4	1.88E4
		Fe-59	1.27E4 - 2.25E4	1.69E4	1.84E4
		Co-60	3.04E4 - 5.39E4	4.05E4	4.20E4
		Zn-65	3.03E4 - 5.37E4	4.04E4	4.34E4
		Cs-134	1.83E4 - 3.25E4	2.44E4	2.26E4
		Cs-137	1.70E4 - 3.02E4	2.27E4	2.28E4
		Ce-141	1.31E4 - 2.31E4	1.74E4	1.85E4

*Gamma:*

Collection Date	Geometry	Nuclide	Acceptance Range (pCi/total)	Reference Value (pCi/total)	Reported Value (pCi/total)
8/18/95	Cartridge	I-131	4.43E-1 - 7.86E-1	5.91E-1	6.07E-1

*Tritium:*

Collection Date	Geometry	Nuclide	Acceptance Range (uCi/ml)	Reference Value (uCi/ml)	Reported Value (uCi/ml)
8/18/95	20ml vial	H-3	1.22E-3 - 3.39E-3	2.04E-3	1.74E-3



# TABLE 5.0-B

## U.S. ENVIRONMENTAL PROTECTION AGENCY INTERLABORATORY COMPARISON PROGRAM

1995 CROSS-CHECK RESULTS FOR  
THE RADIOLOGICAL & ENVIRONMENTAL SERVICES LABORATORY

*Gamma in Water:*

Collection Date	Nuclide(s)	Control Limits (3 Sigma; N=3) (pCi/l)	Known Value (pCi/l)	Reported Value (pCi/l)
2/3/95	I-131	82.7 - 117.3	100	98.7
4/18/95	Co-60	20.3 - 37.7	29	30.7
	Cs-134	11.3 - 28.7	20	213.7 <sup>(1)</sup>
	Cs-137	2.3 - 19.7	11	276.3 <sup>(1)</sup>
6/9/95	Ba-133	65.1 - 92.9	79	81.0
	Co-60	31.3 - 48.7	40	41.7
	Zn-65	62.1 - 89.9	76	81.0
	Cs-134	41.3 - 58.9	50	46.7
	Cs-137	26.3 - 43.7	35	34.7
10/6/95	I-131	122.0 - 174.0	148	158.7
10/17/95	Co-60	40.3 - 57.7	49	50.0
	Cs-134	31.3 - 48.7	40	37.7
	Cs-137	21.3 - 38.7	30	30.0
11/3/95	Ba-133	81.7 - 116.3	99	100
	Co-60	51.3 - 68.7	60	55.7
	Zn-65	102.5 - 147.5	125	132.7
	Cs-134	31.3 - 48.7	40	35.3
	Cs-137	40.3 - 57.7	49	51.3

**Gamma in Milk:**

Collection Date	Nuclide(s)	Control Limits (3 Sigma; N=3) (pCi/l)	Known Value (pCi/l)	Reported Value (pCi/l)
9/29/95	I-131	81.7 - 116.3	99	106.3
	Cs-137	41.3 - 58.7	50	49.3

**Beta in Water:**

Collection Date	Nuclide(s)	Control Limits (3 Sigma; N=3) (pCi/l)	Known Value (pCi/l)	Reported Value (pCi/l)
1/27/95	Gross Beta	0.0 - 13.7	5.0	8.33 <sup>(2)</sup>
4/18/95	Gross Beta	69.3 - 103.9	86.6	405.0 <sup>(1)</sup>
7/21/95	Gross Beta	10.7 - 28.1	19.4	27.33
10/27/95	Gross Beta	16.1 - 33.5	24.8	29.0

**Tritium in Water:**

Collection Date	Nuclide(s)	Control Limits (3 Sigma; N=3) (pCi/l)	Known Value (pCi/l)	Reported Value (pCi/l)
3/10/95	H-3	6144.2 - 8725.8	7435	7132.3
8/4/95	H-3	4028.5 - 5715.5	4872	4626.7

**Air Filter:**

Collection Date	Nuclide(s)	Control Limits (3 Sigma; N=3) (pCi/l)	Known Value (pCi/l)	Reported Value (pCi/l)
8/25/95	Cs-137	16.3 - 33.7	25.0	26.7
	Gross Beta	69.3 - 103.9	86.6	86.7

(1) See Explanation in Section 5.1.5.4.

(2) This value was not reported before the due date and was not included in the reports

# TABLE 5.0-C

## STATE OF NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL HEALTH AND NATURAL RESOURCES

### 1995 ENVIRONMENTAL DOSIMETER CROSS-CHECK RESULTS

Cross-Check Date	State of N.C. Delivered Value (mR)	Radiation Dosimetry & Records Reported Value (mR)	Acceptance Criteria +/- 10 %
May-95	100	92.5	Pass
Nov-95	60	56.9	Pass

---

## 6.0 REFERENCES

---

- 6.1 McGuire Selected License Commitments
- 6.2 McGuire Technical Specifications
- 6.3 McGuire Final Safety Analysis Review
- 6.4 McGuire Offsite Dose Calculation Manual
- 6.5 McGuire Annual Environmental Operating Report 1979 - 1994
- 6.6 McGuire Annual Radioactive Effluent Release Report 1995
- 6.7 Probability and Statistics in Engineering and Management Science, Hines and Montgomery, 1969, pages 287-293.
- 6.8 Practical Statistics for the Physical Sciences, Havilcek and Crain, 1988, pages 83-93.
- 6.9 Nuclear Regulatory Commission Regulatory Guide 1.109, Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purposes of Evaluating Compliance with 10CFR50, Appendix I.
- 6.10 Radiological and Environmental Services Operating Procedures
- 6.11 NUREG/CR-1276, Users Manual for LADTAP II - A Computer Program for Calculating Radiation Exposure to Man from Routine Release of Nuclear Reactor Liquid Effluents.

**APPENDIX A**

**ENVIRONMENTAL  
SAMPLING AND  
ANALYSIS PROCEDURES**

---

# APPENDIX A

---

## ENVIRONMENTAL SAMPLING AND ANALYSIS PROCEDURES

Adherence to established procedures for sampling and analysis of all environmental media at McGuire 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 Radiological and Environmental Services, Dosimetry and Records, and Fisheries and Aquatic Ecology.

Starting at Section A.1, this appendix describes the environmental sampling frequencies and analysis procedures by media type.

### I. CHANGE OF SAMPLING PROCEDURES

In the environmental program, the air deposition parameters (D/Q) are used to determine air, broadleaf vegetation and milk sampling locations. McGuire's sectors with the three highest values have not changed in 1995.

Changes to the environmental program are listed below:

*Deletions* to the sampling program for 1995 are as follows:

Food product location #184 was deleted in September due to the discontinuation of the garden by the residents.

Drinking water location #142 was deleted at the end of 1994 due to the closing of the water treatment facility.

*Additions* to the sampling program for 1995 are as follows:

Drinking water site #119 was first collected in January of 1995.

TLD special interest #163 was added the beginning of the fourth quarter 1995 to investigate the differences between the NRC and the Duke Power co-located TLDs.

Descriptions of all above changes are given under applicable media headings.

## 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 an ion exchange resin to remove and concentrate any iodine in the aqueous sample (milk or water). The resin is then dried and 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.

Gross beta analysis is performed by concentrating a designated aliquot of sample precipitate and analyzing by gas-flow proportional counters.

## III. CHANGE OF ANALYSIS PROCEDURES

Low Level Iodine 131 (LLI-131) analysis was discontinued for all surface water sites on January 28, 1995. This analysis was not required for surface water samples by Selected License Commitments.

## IV. SAMPLING AND ANALYSIS PROCEDURES

### A.1 AIRBORNE PARTICULATE AND RADIOIODINE

Airborne particulate and radioiodine samples at each of seven 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 situated 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 weekly gamma analysis and gross beta analysis was performed on each filter and a weekly gamma analysis was performed on each charcoal cartridge. The filter and charcoal cartridge were analyzed independently. The continuous composite samples were collected from the locations listed below.

Location 120	=	Site Boundary (0.459 mi. NNE)
Location 121	=	Site Boundary (0.466 mi. NE)
Location 125	=	Site Boundary (0.390 mi. SW)

Location 133	=	Cornelius, NC (6.228 mi. NE)
Location 134	=	East Lincoln Junior High School (8.762 mi. WNW)
Location 192	=	Peninsula development (2.810 mi. NNE)
Location 195	=	Fishing Access Road (0.200 mi. N)

## **A.2 DRINKING WATER**

Biweekly composite samples were collected. A low-level Iodine-131 analysis was performed on each composite sample. A gross beta and gamma analysis was performed on monthly composites. Tritium analysis was performed on the quarterly composites. The composites were collected biweekly from the locations listed below.

Location 119	=	Mt. Holly Municipal Water Supply (7.403 mi. SSW)
Location 132	=	Charlotte Municipal Water Supply (11.162 mi. SSE)
Location 136	=	Mooresville Municipal Water Supply (12.675 mi. NNE)
Location 194	=	East Lincoln Water Supply (6.7 mi. NNW)

## **A.3 SURFACE WATER**

Biweekly composite samples were collected. A low-level Iodine-131 analysis was performed on each composite sample until January 28, 1995. A gamma analysis was performed on the monthly composites. Tritium analysis was performed on the quarterly composites sample. The composites were collected biweekly from the locations listed below.

Location 128	=	Discharge Canal Bridge (0.442 mi. ENE)
Location 131	=	Cowans Ford Dam (0.6 mi. W)
Location 135	=	Plant Marshall Intake Canal (11.920 mi. N)

## **A.4 MILK**

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

Location 138	=	Henry Cook Dairy - COWS (3.078 mi. ESE)
Location 139	=	William Cook Dairy - COWS (2.494 mi. E)
Location 140	=	Kidd Dairy - COWS (2.760 mi. SSE)
Location 141	=	Lynch Dairy - COWS (14.800 mi. WNW)

## **A.5 BROADLEAF VEGETATION**

Monthly samples were collected as available and a gamma analysis was performed on each sample. The samples were collected from the locations listed below.



Location 120	=	Site Boundary (0.459 mi. NNE)
Location 125	=	Site Boundary (0.390 mi. SW)
Location 134	=	East Lincoln Junior High School (8.762 mi. WNW)
Location 193	=	Site Boundary (0.2 mi. N)

#### **A.6 SHORELINE SEDIMENT**

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

Location 129	=	Discharge Canal Entrance to Lake Norman (0.508 mi. ENE)
Location 130	=	Highway 73 Bridge Downstream (0.535 mi. SW)
Location 137	=	Pinnacle Access Area (11.988 mi. N)

#### **A.7 FISH**

Semiannual samples were collected and 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 129	=	Discharge Canal Entrance to Lake Norman (0.508 mi.ENE)
Location 137	=	Pinnacle Access Area (11.988 mi. N)

#### **A.8 DIRECT GAMMA RADIATION (TLD)**

Thermoluminescent dosimeters (TLD) were collected quarterly at forty-eight locations for the first three quarters of 1995. A new special interest TLD was placed in the field at location #163 at the beginning of the 4th quarter, making a total of forty-nine locations. A gamma dose rate was determined for each TLD. The TLDs were placed as indicated below.

- \* An inner ring of 14 TLDs at the site boundary, one in each available meteorological sector. The site boundary locations in the N and NNW sectors are over water; however, two special interest TLD's were placed in these sectors inside the site boundary in March, 1991.
- \* 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 control locations.

TLD locations are listed in Table 2.1-B.

## **A.9 FOOD PRODUCTS**

Samples were collected monthly when available during the harvest season and a gamma analysis was performed on each. The samples were collected at the locations listed below. Location 184 was discontinued in September 1995 due to the sparse availability of crops and indication of the residents to discontinue the quantity necessary for continued collection.

Location 184 = 5 Mile Radius (2.5 mi ENE) Gardens (Davenport)  
Location 188 = 5 Mile Radius (2.8 mi N) Gardens (Austin)

## **A.10 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 Meat Animal
- \* The Nearest Garden greater than 50 square meters or 500 square feet
- \* The Nearest Milk-giving Animal (cow, goat, etc.)

This census was completed July 6, 1995 and the results are shown in Table 3.10 on pages 3-24 and 3-25.

## V. PROGRAM IMPROVEMENTS

Trending of both air sampler and site location is performed for continuous identification of trends impacting the deviation rate in the Radiological Environmental Monitoring Program (REMP). Each air site has been evaluated for correct grounding, proper voltage range and the equipment requirement to install surge and lightning suppressers. A work request was submitted on 10/09/95 to have surge protectors, lightning arrestors, electrical conduit and water resistant quad outlets installed in each of the environmental air sampler weather houses.

A work request was submitted on 09/12/95 to have annual planned maintenance performed on each of the surface water sites. The work request encompasses screen cleaning, solenoid valve inspection, and plumbing clog inspection. To improve winter reliability, heat trace element installation for surface water sites #131 and #128 has been completed.

Various equipment upgrades and purchases were made in 1995 to enhance the radiological environmental monitoring program for McGuire Nuclear Station. A thorough description of the purchases and upgrades to the environmental program may be found in the "Sampling Deviation Reduction Plan for 1995 and 1996" in Appendix C, Section C.3.

## **APPENDIX B**

# **RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM**

## **SUMMARY OF RESULTS 1995**

**Note:** Locations, respective sectors and distances are included in Section 2.1, Site Descriptions

Environmental Radiological Monitoring Program Summary

Name of Facility : MCGUIRE NUCLEAR STATION      Docket Number : 50-369,370  
 Location of Facility : MECKLENBURG COUNTY, N.C.      Reporting Period : 1-JAN-1995 through 31-DEC-1995  
 Time Report Generated : 11-JAN-1996 10:57:57      Database Name : \$DISK1:[USER.ASC]MCGUIRE NUCLEAR STATION95.SAF;4

Medium or Pathway Sampled (Units)	Type & Total Number of Analyses Performed	Lower Limit of Detection (LLD)	All Indicator Locations Mean (Fraction) Range	Location with Highest Mean		Control Locations Mean (Fraction) Range	No. of Non-Routine Report Meas.
				Name, Distance and Direction Location Code	Mean (Fraction) Range		
AIR PARTICULATE (PC1/M3)						134 (8.7 Mi WNW)	
7 LOCATIONS	MN-54	364	0.00E+00	0.00E+00( 0/ 312) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0
	CO-58	364	0.00E+00	0.00E+00( 0/ 312) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0
	FE-59	364	0.00E+00	0.00E+00( 0/ 312) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0
	CO-60	364	0.00E+00	0.00E+00( 0/ 312) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0
	ZN-65	364	0.00E+00	0.00E+00( 0/ 312) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0
	NB-95	364	0.00E+00	0.00E+00( 0/ 312) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0
	ZR-95	364	0.00E+00	0.00E+00( 0/ 312) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0
	I-131	364	7.00E-02	0.00E+00( 0/ 312) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0
	CS-134	364	5.00E-02	0.00E+00( 0/ 312) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0
	CS-137	364	6.00E-02	0.00E+00( 0/ 312) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0
	BALA-140	364	0.00E+00	0.00E+00( 0/ 312) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0
	BETA	364	1.00E-02	2.71E-02( 312/ 312) 1.24E-02-- 8.06E-02	125 (0.4 Mi SW) 3.02E-02( 52/ 52) 1.58E-02-- 7.12E-02	5.17E-02( 52/ 52) 1.66E-02-- 0.26	0

Mean and range based upon detectable measurements only  
 Fraction of detectable measurements at specified locations is indicated in parentheses, (Fraction)  
 Zero range indicates no detectable activity measurements  
 If LLD is equal to 0, then LLD is not required by Selected Licensee Commitments

Environmental Radiological Monitoring Program Summary

Name of Facility : MCGUIRE NUCLEAR STATION  
 Location of Facility : MECKLENBURG COUNTY, N.C.  
 Time Report Generated : 11-JAN-1996 10:57:57

Docket Number : 50-369,370  
 Reporting Period : 1-JAN-1995 through 31-DEC-1995  
 Database Name : \$DISK1:[USER.ASC]MCGUIRE NUCLEAR STATION95.SAF;4

Medium or Pathway Sampled (Units)	Type & Total Number of Analyses Performed	Lower Limit of Detection (LLD)	All Indicator Locations Mean (Fraction) Range	Location with Highest Mean		Control Locations Mean (Fraction) Range	No. of Non-Routine Report Meas.
				Name, Distance and Direction Location Code	Mean (Fraction) Range		
AIR RADIOIODINES (PCI/M3)						134 (8.7 Mi WNW)	
7 LOCATIONS	MN-54	364	0.00E+00	0.00E+00( 0/ 312) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0
	CO-58	364	0.00E+00	0.00E+00( 0/ 312) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0
	FE-59	364	0.00E+00	0.00E+00( 0/ 312) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0
	CO-60	364	0.00E+00	0.00E+00( 0/ 312) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0
	ZN-65	364	0.00E+00	0.00E+00( 0/ 312) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0
	NB-95	364	0.00E+00	0.00E+00( 0/ 312) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0
	ZR-95	364	0.00E+00	0.00E+00( 0/ 312) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0
	I-131	364	7.00E-02	0.00E+00( 0/ 312) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0
	CS-134	364	5.00E-02	0.00E+00( 0/ 312) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0
	CS-137	364	6.00E-02	5.89E-03( 3/ 312) 3.33E-03-- 9.78E-03	9.78E-03( 1/ 52) 9.78E-03-- 9.78E-03	7.55E-03( 2/ 52) 7.49E-03-- 7.60E-03	0
	BALA-140	364	0.00E+00	0.00E+00( 0/ 312) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 52) 0.00E+00-- 0.00E+00	0

Mean and range based upon detectable measurements only  
 Fraction of detectable measurements at specified locations is indicated in parentheses, (Fraction)  
 Zero range indicates no detectable activity measurements  
 If LLD is equal to 0, then LLD is not required by Selected Licensee Commitments

Environmental Radiological Monitoring Program Summary

Name of Facility : MCGUIRE NUCLEAR STATION  
 Location of Facility : MECKLENBURG COUNTY, N.C.  
 Time Report Generated : 11-JAN-1996 10:57:57

Docket Number : 50-369,370  
 Reporting Period : 1-JAN-1995 through 31-DEC-1995  
 Database Name : \$DISK1:[USER.ASC]MCGUIRE NUCLEAR STATION95.SAF;4

Medium or Pathway Sampled (Units)	Type & Total Number of Analyses Performed	Lower Limit of Detection (LLD)	All Indicator Locations Mean (Fraction) Range	Location with Highest Mean		Control Locations Mean (Fraction) Range	No. of Non-Routine Report Meas.
				Name, Distance and Direction Location Code	Mean (Fraction) Range		
BROAD LEAF VEGET (PC1/WET/KG)				134 (8.7 Mi WNW)			
4 LOCATIONS	MN-54 36	0.00E+00	0.00E+00( 0/ 27) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0
	CO-58 36	0.00E+00	0.00E+00( 0/ 27) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0
	FE-59 36	0.00E+00	0.00E+00( 0/ 27) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0
	CO-60 36	0.00E+00	0.00E+00( 0/ 27) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0
	ZN-65 36	0.00E+00	0.00E+00( 0/ 27) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0
	NB-95 36	0.00E+00	0.00E+00( 0/ 27) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0
	2R-95 36	0.00E+00	0.00E+00( 0/ 27) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0
	I-131 36	60.	0.00E+00( 0/ 27) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0
	CS-134 36	60.	0.00E+00( 0/ 27) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0
	CS-137 36	80.	0.00E+00( 0/ 27) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0
	BALA-140 36	0.00E+00	0.00E+00( 0/ 27) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 9) 0.00E+00-- 0.00E+00	0

Mean and range based upon detectable measurements only  
 Fraction of detectable measurements at specified locations is indicated in parentheses, (Fraction)  
 Zero range indicates no detectable activity measurements  
 If LLD is equal to 0, then LLD is not required by Selected Licensee Commitments

Environmental Radiological Monitoring Program Summary

Name of Facility : MCGUIRE NUCLEAR STATION      Docket Number : 50-369,370  
 Location of Facility : MECKLENBURG COUNTY, N.C.      Reporting Period : 1-JAN-1995 through 31-DEC-1995  
 Time Report Generated : 11-JAN-1996 10:57:57      Database Name : \$DISK1:[USER.ASC]MCGUIRE NUCLEAR STATION95.SAF;4

Medium or Pathway Sampled (Units)	Type & Total Number of Analyses Performed	Lower Limit of Detection (LLD)	All Indicator Locations Mean (Fraction) Range	Location with Highest Mean		Control Locations Mean (Fraction) Range	No. of Non-Routine Report Meas.
				Name, Distance and Direction Location Code	Mean (Fraction) Range		
CROPS (PCI/WET/KG)							
NO CONTROL LOCATIONS							
1 LOCATION	MN-54	10	0.00E+00	0.00E+00( 0/ 10) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 10) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 0) 0.00E+00-- 0.00E+00	0
	CO-58	10	0.00E+00	0.00E+00( 0/ 10) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 10) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 0) 0.00E+00-- 0.00E+00	0
	FF-59	10	0.00E+00	0.00E+00( 0/ 10) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 10) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 0) 0.00E+00-- 0.00E+00	0
	CO-60	10	0.00E+00	0.00E+00( 0/ 10) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 10) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 0) 0.00E+00-- 0.00E+00	0
	ZN-65	10	0.00E+00	0.00E+00( 0/ 10) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 10) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 0) 0.00E+00-- 0.00E+00	0
	NB-95	10	0.00E+00	0.00E+00( 0/ 10) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 10) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 0) 0.00E+00-- 0.00E+00	0
	ZR-95	10	0.00E+00	0.00E+00( 0/ 10) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 10) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 0) 0.00E+00-- 0.00E+00	0
	I-131	10	60.	0.00E+00( 0/ 10) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 10) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 0) 0.00E+00-- 0.00E+00	0
	CS-134	10	60.	0.00E+00( 0/ 10) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 10) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 0) 0.00E+00-- 0.00E+00	0
	CS-137	10	80.	0.00E+00( 0/ 10) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 10) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 0) 0.00E+00-- 0.00E+00	0
	BALA-140	10	0.00E+00	0.00E+00( 0/ 10) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 10) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 0) 0.00E+00-- 0.00E+00	0

Mean and range based upon detectable measurements only  
 Fraction of detectable measurements at specified locations is indicated in parentheses, (Fraction)  
 Zero range indicates no detectable activity measurements  
 If LLD is equal to 0, then LLD is not required by Selected Licensee Commitments



Environmental Radiological Monitoring Program Summary

Name of Facility : MCGUIRE NUCLEAR STATION  
 Location of Facility : MECKLENBURG COUNTY, N.C.  
 Time Report Generated : 11-JAN-1996 10:57:57

Docket Number : 50-369,370  
 Reporting Period : 1-JAN-1995 through 31-DEC-1995  
 Database Name : \$DISK1:[USER.ASC]MCGUIRE NUCLEAR STATION95.SAF;4

Medium or Pathway Sampled (Units)	Type & Total Number of Analyses Performed	Lower Limit of Detection (LLD)	All Indicator Locations Mean (Fraction) Range	Location with Highest Mean		Control Locations Mean (Fraction) Range	No. of Non-Routine Report Meas.
				Name, Distance and Direction Location Code	Mean (Fraction) Range		
DRINKING WATER (PCI/LITER)				136 (12.5 Mi NNE)			
4 LOCATIONS	ANAL1-LL 52	1.0	0.00E+00( 0/ 39) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13)	0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0
	ANAL2-LL 52	1.0	0.00E+00( 0/ 39) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13)	0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0
	MN-54 52	15.	0.00E+00( 0/ 39) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13)	0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0
	CO-58 52	15.	0.00E+00( 0/ 39) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13)	0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0
	FE-59 52	30.	0.00E+00( 0/ 39) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13)	0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0
	CO-60 52	15.	0.00E+00( 0/ 39) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13)	0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0
	ZN-65 52	30.	0.00E+00( 0/ 39) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13)	0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0
	NB-95 52	15.	0.00E+00( 0/ 39) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13)	0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0
	ZR-95 52	15.	0.00E+00( 0/ 39) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13)	0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0
	I-131 52	15.	0.00E+00( 0/ 39) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13)	0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0
	CS-134 52	15.	0.00E+00( 0/ 39) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13)	0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0
	CS-137 52	18.	0.00E+00( 0/ 39) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13)	0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0
	BALA-140 52	15.	0.00E+00( 0/ 39) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13)	0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0

Mean and range based upon detectable measurements only

Fraction of detectable measurements at specified locations is indicated in parentheses, (Fraction)

Zero range indicates no detectable activity measurements

If LLD is equal to 0, then LLD is not required by Selected Licensee Commitments

Environmental Radiological Monitoring Program Summary

Name of Facility : MCGUIRE NUCLEAR STATION  
 Location of Facility : MECKLENBURG COUNTY, N.C.  
 Time Report Generated : 11-JAN-1996 10:57:57

Docket Number : 50-369,370  
 Reporting Period : 1-JAN-1995 through 31-DEC-1995  
 Database Name : \$DISK1:[USER.ASC]MCGUIRE NUCLEAR STATION95.SAF;4

Medium or Pathway Sampled (Units)	Type & Total Number of Analyses Performed	Lower Limit of Detection (LLD)	All Indicator Locations Mean (Fraction) Range	Location with Highest Mean		Control Locations Mean (Fraction) Range	No. of Non-Routine Report Meas.
				Name, Distance and Direction Location Code	Mean (Fraction) Range		
DRINKING WATER (PCI/LITER) 4 LOCATIONS	BETA 52	4.0	3.7 ( 36/ 39) 0.84 -- 17.	119 (7.4 Mi SSW) 4.2 ( 13/ 13) 0.98 -- 17.		136 (12.5 Mi NNE) 3.3 ( 12/ 13) 1.6 -- 7.4	0
DW TRITIUM (PCI/LITER) 4 LOCATIONS	H-3 16	2.00E+03	3.58E+02( 1/ 12) 3.58E+02-- 3.58E+02	119 (7.4 Mi SSW) 3.58E+02( 1/ 4) 3.58E+02-- 3.58E+02		0.00E+00( 0/ 4) 0.00E+00-- 0.00E+00	0

Mean and range based upon detectable measurements only

Fraction of detectable measurements at specified locations is indicated in parentheses, (Fraction)

Zero range indicates no detectable activity measurements

If LLD is equal to 0, then LLD is not required by Selected Licensee Commitments

Environmental Radiological Monitoring Program Summary

Name of Facility : MCGUIRE NUCLEAR STATION  
 Location of Facility : MECKLENBURG COUNTY, N.C.  
 Time Report Generated : 11-JAN-1996 10:57:57

Docket Number : 50-369,370  
 Reporting Period : 1-JAN-1995 through 31-DEC-1995  
 Database Name : \$DISK1:[USER.ASC]MCGUIRE NUCLEAR STATION95.SAF;4

Medium or Pathway Sampled (Units)	Type & Total Number of Analyses Performed	Lower Limit of Detection (LLD)	All Indicator Locations Mean (Fraction) Range	Location with Highest Mean		Control Locations Mean (Fraction) Range	No. of Non-Routine Report Meas.
				Name, Distance and Direction Location Code	Mean (Fraction) Range		
FISH (PCI/WET/KG)						137 (12.0 Mi N)	
2 LOCATIONS	MN-54	12	1.30E+02	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0
	CO-58	12	1.30E+02	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0
	FE-59	12	2.60E+02	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0
	CO-60	12	1.30E+02	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0
	ZN-65	12	2.60E+02	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0
	NB-95	12	0.00E+00	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0
	ZR-95	12	0.00E+00	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0
	I-131	12	0.00E+00	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0
	CS-134	12	1.30E+02	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0
	CS-137	12	1.50E+02	27. ( 2/ 6) 19. -- 34.	129 (0.9 Mi ENE) 27. ( 2/ 6) 19. -- 34.	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0
	BALA-140	12	0.00E+00	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 6) 0.00E+00-- 0.00E+00	0

Mean and range based upon detectable measurements only

Fraction of detectable measurements at specified locations is indicated in parentheses, (Fraction)

Zero range indicates no detectable activity measurements

If LLD is equal to 0, then LLD is not required by Selected Licensee Commitments

Environmental Radiological Monitoring Program Summary

Name of Facility : MCGUIRE NUCLEAR STATION  
 Location of Facility : MECKLENBURG COUNTY, N.C.  
 Time Report Generated : 11-JAN-1996 10:57:57

Docket Number : 50-369,370  
 Reporting Period : JAN-1995 through 31-DEC-1995  
 Database Name : \$DISK1:[USER.ASC]MCGUIRE NUCLEAR STATION95.SAF;4

Medium or Pathway Sampled (Units)	Type & Total Number of Analyses Performed	Lower Limit of Detection (LLD)	All Indicator Locations Mean (Fraction) Range	Location with Highest Mean		Control Locations Mean (Fraction) Range	No. of Non-Routine Report Meas.
				Name, Distance and Direction Location Code	Mean (Fraction) Range		
MILK (PCI/LITER)						141 (14.8 Mi WNW)	
4 LOCATIONS	MN-54	104	0.00E+00	0.00E+00( 0/ 78) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0
	CO-58	104	0.00E+00	0.00E+00( 0/ 78) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0
	FE-59	104	0.00E+00	0.00E+00( 0/ 78) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0
	CO-60	104	0.00E+00	0.00E+00( 0/ 78) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0
	ZN-65	104	0.00E+00	0.00E+00( 0/ 78) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0
	NB-95	104	0.00E+00	0.00E+00( 0/ 78) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0
	ZR-95	104	0.00E+00	0.00E+00( 0/ 78) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0
	I-131	104	15.	0.00E+00( 0/ 78) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0
	LLI-131	104	1.0	0.00E+00( 0/ 78) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0
	CS-134	104	15.	0.00E+00( 0/ 78) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0
	CS-137	104	18.	0.00E+00( 0/ 78) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0
	BALA-140	104	15.	0.00E+00( 0/ 78) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0

Mean and range based upon detectable measurements only

Fraction of detectable measurements at specified locations is indicated in parentheses, (Fraction)

Zero range indicates no detectable activity measurements

If LLD is equal to 0, then LLD is not required by Selected Licensee Commitments

Environmental Radiological Monitoring Program Summary

Name of Facility : MCGUIRE NUCLEAR STATION  
 Location of Facility : MECKLENBURG COUNTY, N.C.  
 Time Report Generated : 11-JAN-1996 10:57:57

Docket Number : 50-369,370  
 Reporting Period : 1-JAN-1995 through 31-DEC-1995  
 Database Name : \$DISK1:[USER.ASC]MCGUIRE NUCLEAR STATION95.SAF;4

Medium or Pathway Sampled (Units)	Type & Total Number of Analyses Performed	Lower Limit of Detection (LLD)	All Indicator Locations Mean (Fraction) Range	Location with Highest Mean		Control Locations Mean (Fraction) Range	No. of Non-Routine Report Meas.
				Name, Distance and Direction Location Code	Mean (Fraction) Range		
SEDIMENT (PCI/DRY/KG)						137 (12.0 Mi N)	
3 LOCATIONS	MN-54	6	0.00E+00	17. ( 1/ 4) 17. -- 17.	130 (0.6 Mi SW) 17. ( 1/ 2) 17. -- 17.	0.00E+00( 0/ 2) 0.00E+00-- 0.00E+00	0
	CO-58	6	0.00E+00	0.00E+00( 0/ 4) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 2) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 2) 0.00E+00-- 0.00E+00	0
	FE-59	6	0.00E+00	0.00E+00( 0/ 4) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 2) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 2) 0.00E+00-- 0.00E+00	0
	CO-60	6	0.00E+00	23. ( 1/ 4) 23. -- 23.	130 23. ( 1/ 2) 23. -- 23.	0.00E+00( 0/ 2) 0.00E+00-- 0.00E+00	0
	ZN-65	6	0.00E+00	0.00E+00( 0/ 4) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 2) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 2) 0.00E+00-- 0.00E+00	0
	NB-95	6	0.00E+00	0.00E+00( 0/ 4) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 2) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 2) 0.00E+00-- 0.00E+00	0
	ZR-95	6	0.00E+00	0.00E+00( 0/ 4) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 2) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 2) 0.00E+00-- 0.00E+00	0
	I-131	6	0.00E+00	0.00E+00( 0/ 4) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 2) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 2) 0.00E+00-- 0.00E+00	0
	CS-134	6	1.50E+02	0.00E+00( 0/ 4) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 2) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 2) 0.00E+00-- 0.00E+00	0
	CS-137	6	1.80E+02	1.38E+02( 2/ 4) 50. -- 2.27E+02	130 1.38E+02( 2/ 2) 50. -- 2.27E+02	0.00E+00( 0/ 2) 0.00E+00-- 0.00E+00	0
	BALA-140	6	0.00E+00	0.00E+00( 0/ 4) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 2) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 2) 0.00E+00-- 0.00E+00	0

Mean and range based upon detectable measurements only  
 Fraction of detectable measurements at specified locations is indicated in parentheses, (Fraction)  
 Zero range indicates no detectable activity measurements  
 If LLD is equal to 0, then LLD is not required by Selected Licensee Commitments

Environmental Radiological Monitoring Program Summary

Name of Facility : MCGUIRE NUCLEAR STATION      Docket Number : 50-369,370  
 Location of Facility : MECKLENBURG COUNTY, N.C.      Reporting Period : 1-JAN-1995 through 31-DEC-1995  
 Time Report Generated : 11-JAN-1996 10:57:57      Database Name : \$DISK1:[USER.ASC]MCGUIRE NUCLEAR STATION95.SAF;4

Medium or Pathway Sampled (Units)	Type & Total Number of Analyses Performed	Lower Limit of Detection (LLD)	All Indicator Locations Mean (Fraction) Range	Location with Highest Mean		Control Locations Mean (Fraction) Range	No. of Non-Routine Report Meas.
				Name, Distance and Direction Location Code	Mean (Fraction) Range		
SURFACE WATER (PCI/LITER)							
135 (12.0 Mi N)							
3 LOCATIONS	MN-54	39	15.	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0
	CO-58	39	15.	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0
	FE-59	39	30.	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0
	CO-60	39	15.	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0
	ZN-65	39	30.	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0
	NB-95	39	15.	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0
	ZR-95	39	15.	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0
	I-131	39	15.	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0
	CS-134	39	15.	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0
	CS-137	39	18.	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0
	BALA-140	39	15.	0.00E+00( 0/ 26) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0.00E+00( 0/ 13) 0.00E+00-- 0.00E+00	0
SW TRITIUM (PCI/LITER)							
128 (0.4 Mi ENE)							
3 LOCATIONS	H-3	12	2.00E+03	3.04E+02( 3/ 8) 2.06E+02-- 4.23E+02	3.15E+02( 2/ 4) 2.06E+02-- 4.23E+02	0.00E+00( 0/ 4) 0.00E+00-- 0.00E+00	0

Mean and range based upon detectable measurements only  
 Fraction of detectable measurements at specified locations is indicated in parentheses, (Fraction)  
 Zero range indicates no detectable activity measurements  
 If LLD is equal to 0, then LLD is not required by Selected Licensee Commitments

Environmental Radiological Monitoring Program Summary

Name of Facility : MCGUIRE NUCLEAR STATION      Docket Number : 50-369,370  
 Location of Facility : MECKLENBURG COUNTY, N.C.      Reporting Period : 1-JAN-1995 through 31-DEC-1995  
 Time Report Generated : 17-JAN-1996 15:56:28      Database Name : \$DISK1:[USER.ASC]MNS95.SAF;4

Medium or Pathway Sampled (Units)	Type & Total Number of Analyses Performed	Lower Limit of Detection (LLD)	All Indicator Locations Mean (Fraction) Range	Location with Highest Mean		Control Locations Mean (Fraction) Range	No. of Non-Routine Report Meas.
				Name, Distance and Direction Location Code	Mean (Fraction) Range		
DIRECT RAD-TLD (mR/QUARTER)				180 (11.5 Mi NNE)		175 (12.7 Mi WNW)	
48 LOCATIONS	mR/QTR 188	0.00E+00	21. ( 184/ 184) 13. -- 34.	33. ( 3/ 3) 31. -- 34.	27. ( 4/ 4) 24. -- 29.		0

Mean and range based upon detectable measurements only  
 Fraction of detectable measurements at specified locations is indicated in parentheses, (Fraction)  
 Zero range indicates no detectable activity measurements  
 If LLD is equal to 0, then LLD is not required by Selected Licensee Commitments

**APPENDIX C**

**SAMPLING DEVIATIONS  
&  
UNAVAILABLE ANALYSES**



# APPENDIX C

## MCGUIRE 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	Incliment Weather	SL	Sample Loss/Lost due to Laboratory Accident
LC	Line Clog to Sampler	SM	Motor / Rotor Seized
OT	Other	TF	Torn Filter
PI	Power Interrupt	VN	Vandalism
PM	Preventive Maintenance		

### C.1 SAMPLING DEVIATIONS

The following deviations from sampling requirements occurred during 1995:

#### *Air Particulate and Air Radioiodines*

Location	Scheduled Collection Dates	Actual Collection Dates	Reason	Corrective Action
120	5/16-5/23/95	5/16-5/23/95	BF	Replaced fuse and restarted sampler. Tagged sampler #0691 for first BF during this period.
121	3/21-3/28/95	3/21-3/22/95	BF	Replaced fuse and restarted sampler. This sampler, #9, will be checked periodically during the next week.
134	7/11-7/18/95	7/11-7/13/95	BF	Replaced fuse and restarted sampler. Probable cause was due to thunderstorms in the area.
192	7/25-8/1/95	7/25-8/1/95	PI	Reason unknown. Restarted sampler.
195	5/16-5/23/95	5/16-5/18/95	BF	Replaced fuse and tagged sampler #19 for first blown fuse during this period.
	6/13-6/20/95	6/13-6/18/95	SM	Replaced sampler. Probable cause was due to mechanical failure. Sampler will be repaired.

Note: Blown fuses caused the majority of air sampling deviations for 1995. Samplers are trended for problems by tagging each sampler as problems occur. After two consecutive blown fuses, the air sampler is taken out of service to be checked for operability. See Appendix C, Section C.3, Sample Deviation and Unavailable Reduction Plan for resolutions and future preventative measures.

## Drinking Water

Location	Scheduled Collection Dates	Actual Collection Dates	Reason	Corrective Action
194	8/29-9/12/95	9/12/95	PS	Grab sample collected. Notified Commodities and Facilities and submitted work request 95-MC3662 to repair/replace cracked PVC on the supply line to the solenoid valve at the Lincoln County Water Treatment plant.
	9/12-9/26/95	9/26/95	PS	Grab sample collected. Sampler not yet repaired. Work request 95-MC3662.
	9/26-10/10/95	9/27-10/10/95	PS	Abbreviated sample collected. Sampler repaired on 9/27. Work request 95-MC3662 closed out.

Note: All 1995 drinking water deviations were due to this one supply line problem which was fixed within two weeks of discovery.

## Surface Water

Location	Scheduled Collection Dates	Actual Collection Dates	Reason	Corrective Action
131	3/14-3/28/95	3/20-3/28/95	PS	Abbreviated sample collected. Notified Commodities and Facilities. Submitted work request 95-MC2363 on 3/14 to repair the inoperable pump.
135	2/14-2/28/95	2/28/95	PS	Grab sample collected. Notified Commodities and Facilities. Submitted work request 95-MC2235 on 3/1 to replace/repair the solenoid switch. Pump is operable, but no water in sample tank.
	2/28-3/14/95	3/8-3/14/95	PS	Abbreviated sample collected. Work request 95-MC2235 was completed on 3/8 and the sampler was returned to service.
	6/20-7/3/95	7/3/95	PS	Grab sample collected. Notified Commodities and Facilities. Submitted work request 95-3344 to unclog sample line. There is power to the pump, but sample line is clogged.

*Surface Water (cont'd)*

Location	Scheduled Collection Dates	Actual Collection Dates	Reason	Corrective Action
135	7/3-7/18/95	7/5-7/18/95	PS	Abbreviated sample collected. Sampler was inoperable at beginning of sampling period. Work request 95-3344 completed on 7/5.
	8/29-9/12/95	9/12/95	PS	Grab sample collected. Solenoid valve clogged. Valve was cleaned and sampler placed back in service.

Note: Location 135 had various mechanical problems in 1995. See Appendix C, Section C.3, Sample Deviation and Unavailable Reduction Plan for resolutions and future preventative measures.

## C.2 UNAVAILABLE ANALYSES

The following unavailables from sampling requirements occurred during 1995:

### *TLD*

Location	Scheduled Collection Dates	Reason	Corrective Action
156	3/27-6/27/95	VN	TLD was missing. 4th Quarter TLD was placed in field.
166	3/27-6/27/95	VN	TLD was missing. 4th Quarter TLD was placed in field.
180	9/25-12/27/95	VN	TLD was missing. 1st Quarter '96 TLD was placed in field.
181	3/27-6/27/95	VN	TLD was missing. 4th Quarter TLD was placed in field.

## C.3 SAMPLE DEVIATION AND UNAVAILABLE REDUCTION PLAN

The sampling deviation and reduction plan was initiated by the REMP working group on 9/25/95. Items were identified to be addressed and/or implemented to bring about a reduction in the number of sample deviations and unavailable samples. The information in Table C.3-A was the schedule for which the identified activities took place.

**TABLE C.3-A**  
**Deviation Reduction Plan Overview**

*Activity description information is sorted by ascending target date completion.*

Activity Description	Date Initiated	Target Date Completion	STATUS CODE*
Purchase additional air samplers for dual air monitoring	10/5/95	10/5/95	C
Purchase "ISCO" portable composite water samplers	10/5/95	10/5/95	C
Consistent Deviation/Unavailable codes implemented	10/5/95	10/5/95	C
Heat tracing of applicable water sites	9/12/95	10/30/95	C
Deviation section of AEOR to include more detail	10/17/95	11/15/95	C
Air site electrical modifications	10/9/95	12/1/95	I
Air site grounding	10/10/95	12/1/95	I
Preventive maintenance of water sites implemented	11/16/95	12/7/95	P
Water site electrical modifications	10/26/95	12/31/95	P
Modify air sampler housing to accommodate dual samplers	1/1/96	3/31/96	P

\* Time frame STATUS CODES: P = Pending, I = In Process, C = Completed, D = Deleted

### PURCHASE ITEMS

Table C.3-B lists items for the environmental monitoring program that were purchased to improve and enhance the environmental sample collection program. Included are sampling equipment and supplemental sampling items.

## C.2 UNAVAILABLE ANALYSES

The following unavailables from sampling requirements occurred during 1995:

### *TLD*

Location	Scheduled Collection Dates	Reason	Corrective Action
156	3/27-6/27/95	VN	TLD was missing. 4th Quarter TLD was placed in field.
166	3/27-6/27/95	VN	TLD was missing. 4th Quarter TLD was placed in field.
180	9/25-12/27/95	VN	TLD was missing. 1st Quarter '96 TLD was placed in field.
181	3/27-6/27/95	VN	TLD was missing. 4th Quarter TLD was placed in field.

## C.3 SAMPLE DEVIATION AND UNAVAILABLE REDUCTION PLAN

The sampling deviation and reduction plan was initiated by the REMP working group on 9/25/95. Items were identified to be addressed and/or implemented to bring about a reduction in the number of sample deviations and unavailable samples. The information in Table C.3-A was the schedule for which the identified activities took place.

**TABLE C.3-A**  
**Deviation Reduction Plan Overview**

*Activity description information is sorted by ascending target date completion.*

Activity Description	Date Initiated	Target Date Completion	STATUS CODE*
Purchase additional air samplers for dual air monitoring	10/5/95	10/5/95	C
Purchase "ISCO" portable composite water samplers	10/5/95	10/5/95	C
Consistent Deviation/Unavailable codes implemented	10/5/95	10/5/95	C
Heat tracing of applicable water sites	9/12/95	10/30/95	C
Deviation section of AEOR to include more detail	10/17/95	11/15/95	C
Air site electrical modifications	10/9/95	12/1/95	I
Air site grounding	10/10/95	12/1/95	I
Preventive maintenance of water sites implemented	11/16/95	12/7/95	P
Water site electrical modifications	10/26/95	12/31/95	P
Modify air sampler housing to accommodate dual samplers	1/1/96	3/31/96	P

\* Time frame STATUS CODES: P = Pending, I = In Process, C = Completed, D = Deleted

### PURCHASE ITEMS

Table C.3-B lists items for the environmental monitoring program that were purchased to improve and enhance the environmental sample collection program. Included are sampling equipment and supplemental sampling items.

**TABLE C.3-B**  
**Deviation Reduction Plan Equipment Purchases**

Sample Stream	ITEM DESCRIPTION	ITEM QUANTITY
AIR	1/3 HP low volume air sample pump	8
AIR	elapsed time meter, 0.0 - 999.9 hours (may be reset)	8
AIR	NEMA conduit box for elapsed time meter	8
WATER	"ISCO" model 3710 portable composite sampler	2
WATER	Model 913 power converter & battery charger, 120/60	2
WATER	100' of 3/8" bulk vinyl suction tube	2
WATER	3/8" vinyl suction line accessory kit	2
WATER	Weighted 3/8" stainless steel strainer	2
WATER	Silicone rubber pump tube, 50' roll	1
WATER	Model 934 nickel-cadmium rechargeable battery pack	1

**SITE MODIFICATIONS**

*Air sampling electrical and grounding equipment will be provided by Consolidated Electrical Distributors (CED).*

**AIR SITES** - Air sampler modifications will include the following items:

- 1 - Purchase additional air samplers for dual air monitoring to be implemented at each environmental air monitoring site. The dual samplers will be housed in existing sample houses.
  
- 2 - Upgrade electrical equipment at each air sample site. This will include the installation of lightning arrestors, waterproof outlets, GFCI breakers, and surge protectors. *This work request was submitted on 10/9/95 and can be referenced by work order 95-MC3835.*
  
- 3 - Grounding of air sample houses and air sample cages to < 0.025 ohms. *This work request was submitted on 10/9/95 and can be referenced by work order 95-MC3835.*
  
- 4 - Modify air sample houses to allow for sufficient heat removal during summer months. Currently, each air sample house is cooled by a continuously operating electrical cooling fan. After electrical modifications and grounding are completed, the sample houses will be physically altered to allow for natural cross-ventilation to occur to supplement the electrical fan. Sample house door hinges on both sides of the house will be moved and reversed to allow for a small, free, open air space to be created. This modification will create additional heat removal capability during the summer months while still protecting the air samplers inside the house from the

environment (i.e. wind, rain, snow). *This work request will be initiated following the completion of work order 95-MC3835.*

Sample site visits and evaluations for all of McGuire air sampling sites was performed on October 16, 1995. The purpose of the visit was to identify the exact electrical equipment upgrade needs for each individual site. Results of these site visits are displayed in Table C.3-C.

**TABLE C.3-C**  
**Deviation Reduction Plan**  
**Air Site Upgrade Equipment Purchases**

SPECIFIC UPGRADE ITEM	120	121	125	133	134	192	195
Ground Rod w/clamps 5/8 x 8	1	1	1	1	1	n/a	n/a
2/0 Bare Copper ft	10'	10'	10'	10'	10'	3'	2'
20 AMP GFCI Breaker	n/a	2	2	2	2	2	2
WP Male Plug Woodhead	4	4	4	4	4	4	4
Multioutlet Box (4) WP receptacles	1	1	1	1	1	1	1
Vertical Fence Grd clamp	n/a	n/a	n/a	2'3"	n/a	1'2"	2'4"
Horizontal Fence Grd. Clamp	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Equip. Grd. Clamp 2/0	2	2	2	1	2	1	1
Single phase panel arrestor SDSA1175	n/a	n/a	n/a	n/a	n/a	n/a	1
Surge suppresser	1	1	1	1	1	1	1
Ground Clamp	n/a	n/a	n/a	n/a	n/a	n/a	1

WATER SITES - Water sampler modifications include the following items:

- 1 - Purchase portable water compositors (ISCO) for utilization when water sites are undergoing preventive maintenance or repair.
- 2 - Upgrade electrical supply at each surface water site to sufficiently accommodate the ISCO portable water composite samplers.
- 3 - Heat tracing of water site #131 (Cowan's Ford Dam) and site #128 (McGuire Discharge Canal) is complete under work request 95-MC3660.
- 4 - 110 volt outlets needed include:  
SITE # 128 - DISCHARGE CANAL (under bridge)  
SITE # 135 - MARSHALL INTAKE (site being evaluated)
- 5 - Work Request 95-MC3661 was initiated on 9/12/95 with a requested completion date of 10/31/95. This work request was written to establish the preventive maintenance program for water sites for McGuire's three surface water sample sites.

## **APPENDIX D**

# **ANALYTICAL DEVIATIONS**

**No analytical deviations were incurred for the 1995 Radiological Environmental Monitoring Program.**



# **APPENDIX E**

## **RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM RESULTS**

**1995**

This appendix includes all of the sample analysis reports generated from each sample medium for 1995. Appendix E is located separately from this report and is permanently archived at Duke Power Company's Environmental Center radiological environmental master file, located at the McGuire Nuclear Station Site in Huntersville, North Carolina.