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HEALTH

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May 25, 2000

U.S. Nuclear Regulatory Commission
Attn: Office of Nuclear Reactor Regulations
Radiation Protection Branch
Washington, D.C. 20555

**Subject: FY-1999 Mississippi's Annual Environmental Radiological
Monitoring Report**

To Whom It May Concern:

Enclosed find a copy of the FY-1999 Mississippi's Annual Environmental Radiological Monitoring Report. This report presents environmental sample analysis of the Grand Gulf Nuclear Station (GGNS) and other radiological monitoring programs the Division of Radiological Health is conducting within Mississippi.

The Division of Radiological Health provides this report to Federal, State, and local governmental agencies near the GGNS and to several Radiation Control programs in other states. This report concludes that no unusual sample analysis results above normal background or above expected, regulated levels, occurred during FY-1999 at any of the monitoring sites.

Should you have questions or comments, call Dorsey Hamlin at (601) 987-6893.

Sincerely,

Silas Anderson, Director
Environmental Monitoring and Emergency Preparedness Branch
Division of Radiological Health

SA/DH:aw

Enclosure

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***MISSISSIPPI'S
ANNUAL ENVIRONMENTAL
RADIOLOGICAL
MONITORING
REPORT***

MISSISSIPPI STATE DEPARTMENT OF HEALTH

DIVISION OF RADIOLOGICAL HEALTH

ANNUAL
ENVIRONMENTAL RADIOLOGICAL MONITORING
REPORT

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May 22, 2000

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EXECUTIVE SUMMARY

This publication reports the results of the environmental radiation surveillance programs conducted by the Mississippi State Department of Health, Bureau of Environmental Health, Division of Radiological Health, Environmental Monitoring and Emergency Response Branch, from July 1998 through June 1999. The program tracks levels of radionuclides in environmental media and establish a record of background information concerning environmental radiation levels over an extended period. The program also obtains detailed information concerning levels of radioactivity in localized areas of the state and determines compliance with both state and federal regulations concerned with radiation and radioactive materials. We have had no unusual sample analysis results above normal background or above expected, regulated levels, in this past year at any of the monitoring sites.

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STAFF

The Environmental Radiation Surveillance Program is one of several radiological health programs in the Division of Radiological Health, Mississippi State Department of Health. The Environmental Monitoring and Emergency Response Branch, within the Division of Radiological Health, is responsible for administration and operation of the Environmental Radiation Program. Also, the Environmental Monitoring and Emergency Response Branch is responsible for radiological sample analysis and related laboratory services. Staff responsible for the administration and operation of the Environmental Monitoring and Emergency Response Branches are:

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1.0 Introduction

The Environmental Radiation Surveillance Program and Laboratory has the responsibility for the off-site environmental radiological monitoring of air, water, and soil samples for the Grand Gulf Nuclear Station, the Salmon Test Site, and other environmental sites within the State of Mississippi. In conjunction with this responsibility, an environmental monitoring system and laboratory facility have been developed to evaluate existing and future radioactivity levels in air, water, milk, biota and other appropriate pathways. The analysis of this data provides the State with necessary baseline radioactivity measurements that ultimately leads to the protection of the public from radiation hazards.

1.1 Purpose

Environmental radiological monitoring in the state of Mississippi has been a concern of the Mississippi State Department of Health, Division of Radiological Health, for many years. An ongoing state wide program for determining the concentrations of radioactivity in the environment has been in place since the 1960s, and has gone through several program modifications. This publication reports and summarizes the results of the environmental radiation surveillance program for the period July 1998 through June 1999 (FY 1999).

1.2 Organization

Overall responsibility for supervising the environmental surveillance programs rests with the Environmental Monitoring and Emergency Response (EM&ERB) Branch within the Division of Radiological Health (DRH). Responsibility for the programs includes selecting the location and type of samples collected, prescribing the sample analyses requirements, establishing sample collection frequency and quality control procedures, interpreting the laboratory results, and reporting the results of analysis. Some of the programs work require working with other Branches within the Division of Radiological Health for administering a particular program. Sample analysis is done in the Gamma Spectroscopy Laboratory, Radiochemistry Laboratory and Environmental Laboratory of the Environmental Monitoring and Emergency Response Branch in the Division of Radiological Health.

2.0 Program Descriptions

The environmental surveillance programs are designed to meet several different objectives. Some programs are set up to provide continuous information concerning the levels of radioactivity in the environment. Such programs establish a record of background information concerning environmental radiation levels over an extended period by scheduling repeated sampling of selected locations throughout the state. Examples of programs with this objective are the routine environmental surveillance program at the Grand Gulf Nuclear Station (GGNS). Some special programs are intended to obtain detailed information concerning the levels of radioactivity in localized areas of the state where almost no information is available, or where problems have been identified. The GGNS programs are set up to fulfill this objective, as are other facility surveillance programs and

the special sampling studies. Another objective of sampling is to verify compliance with regulations, both radiation regulations and other national regulations. For example, a sampling program following the EPA Safe Drinking Water Act, National Primary Drinking Water Regulations is administered through the Public Water Supply Program, Bureau of Environmental Health, Mississippi State Department of Health.

2.1 Statewide Air Sampling and ERAMS Programs

The EM&ERB collects and records radiological data from air samplers strategically placed over the state to monitor radiological fallout and any instances in which industry might release radiation into the environment. The EM&ERB also participates in the EPA's Environmental Radiation ambient Monitoring Systems (ERAMS) program collecting routine environmental samples of surface water, ground water, milk, air and precipitation in the state. This program continues the state wide program begun in the 1960's for determining the concentrations of radioactivity in the environment.

2.2 Grand Gulf Nuclear Station Environmental Monitoring Programs

The Environmental Radiation Surveillance program in place around the Grand Gulf Nuclear Station (GGNS) in Claiborne County, is designed to examine and monitor the radiological environment surrounding the plant both before and after start-up and operation of the plant. The purpose of pre-operational sampling was to measure naturally occurring and man-made background radiation levels and their variations in the environment surrounding the site. Actual sampling locations and scheduling were based on the type, quantity, and concentrations of radionuclides projected in effluents expected from the GGNS during operation plus the meteorology, demography, and topography of the surrounding region. Approximately 75 percent of both state and NRC monitoring and sample collection sites (Figure 1) are shared with the GGNS to provide the required quality review and verification of the results from the GGNS monitoring programs. GGNS (Figure 1) has been very cooperative in working with the State in this effort.

The purpose of the operational monitoring, instituted in 1985, is to detect, identify and measure any radioactive material released to the environment in effluents resulting from the operation of the facility. If elevated levels of radioactivity are detected, this information will then be used to decide if and what corrective and/or protective actions should be taken.

The program includes monitoring of ambient external radiation levels using thermoluminescent dosimeters (TLDs), (Figure 2) and monitoring of concentrations of radionuclides and specific isotopes present in ambient air through weekly collection and laboratory analysis of continuous air samples (Figure 3). The program also includes monitoring of concentrations of radionuclides and specific isotopes in the environment surrounding GGNS through the scheduled collection and laboratory analysis of water, soil, vegetation, milk, biota, and sediment samples. The environmental monitoring program supplements and provides quality review and verification of the GGNS monitoring program.

The Department's current operational monitoring program includes nine air sampling sites (Appendix 3) with continuously operating low-volume air samples that use high efficiency filters for collection of radioactive particulate and charcoal cartridges for absorption of radioiodine. The filters and cartridges are collected weekly and returned to the laboratory for analysis.

The Department has 23 thermoluminescent dosimeter (TLD) sites surrounding GGNS. These dosimeters are placed in each sector surrounding the plant on the Mississippi side, at locations within 7 miles of the site, and at control locations. The TLDs contain chips of dysprosium-doped calcium fluoride, and lithium fluoride, which undergo certain changes in proportion to how much radiation exposure has occurred. TLDs are the most sensitive and accurate devices currently available for measuring long term radiation levels in the environment. These dosimeters are replaced quarterly with a second set and returned to the EM&ERB Environmental Laboratory for reading, using the Harsaw 6600 TLD Reader (Figure 4), of accumulated exposure.

The remainder of the monitoring program consists of the scheduled routine collection of representative environmental samples, which are analyzed by the EM&ERB laboratories. Sample media collected include surface water, ground water, drinking water, milk, and vegetation. domestic livestock, game animals, and fish are sampled because they are potential pathways for direct human ingestion of radioactive contamination. Soil, surface water, and sediments can be important indicators of radionuclides movement and dispersion within the environment and in certain food chains.

Although not its primary function, the operational monitoring program is also essential to the State's Radiological Emergency Preparedness Plan . It provides a network of sites and means of providing accurate measurements for determining doses to affected populations and the environmental impact in case of accidental release of radioactive materials from the GGNS.

2.3 U.S. Nuclear Regulatory Commission Cooperative Agreement

Under the terms of the cooperative agreement between the Nuclear Regulatory Commission and MSDH, the EM&ERB staff collected samples of environmental media. The EM&ERB Laboratories staff analyzed the samples and reported the results to the NRC on a calendar year schedule. The TLD portion of this program was set up in 1984, with EM&ERB staff and GGNS staff present at the establishment of the NRC TLD network around the plant. EM&ERB staff exchanged the TLDs quarterly. The TLDs were sent to a laboratory at the NRC Region I facility in King of Prussia, PA .Air data from Jackson and Vicksburg were part of the NRC network, and surface water, milk, fish and shoreline sediment samples were also collected and analyzed. This program was terminated at the end of calendar year 1997.

2.4 Public Drinking Water Programs

The drinking water radiological sampling program is only one component of the sampling required by the Environmental Protection Agency (EPA) under their National Primary Drinking Water

Regulations. The responsibility for the drinking water program lies with the Public Water Supply Program within the Bureau of Environmental Health. Radiological sampling is coordinated between the EM&ERB Radiochemistry Laboratory and the Public Water Supply Program. Laboratory reports are generated and sent to the Public Water Supply Program.

Upon promulgation of the National Primary Drinking Water Regulations by the EPA on December 24, 1975, development began on a sampling program for those "community water supplies" in Mississippi requiring analysis for radionuclides. A "community water supply" is any system of piped water for human consumption with at least 10 service connections used by year-round residents or that regularly serves at least 25 year-round residents.

The National Primary Drinking Water Regulations establish Maximum Contaminant Levels (MCL's) for radioactivity of concern typically found in community water systems. The following are the MCL's for radium (^{226}Ra and ^{228}Ra) and gross alpha particle radioactivity:

- (A) Combined radium not to exceed 5 pCi/L and
- (B) Gross alpha particle activity (including radium but excluding radon and uranium) not to exceed 15pCi/L.

Standards for radon and uranium have been proposed by the EPA.

Surface water sources serving more than 100,000 persons also require monitoring for beta particle and photon radioactivity from man-made nuclides. MCL's have been established for beta particle and photon radioactivity from man-made radionuclides that could be introduced into community water systems:

- (A) An average annual concentration that produces an annual dose equivalent to the whole body or internal organs of 4 mrem/year is the limit for beta particle and photon radioactivity, with
- (B) Compliance assumed if gross beta activity is less than 50 pCi/L, and average annual concentrations of tritium (^3H) and strontium (^{90}Sr) are less than 20,000 pCi/L and 42 pCi/L, respectively. If the gross beta activity exceeds 50 pCi/L, the sample or an equivalent sample must be analyzed to identify the major radioactive constituents and associate annual dose equivalents.

The initial phase of this sampling program began in October of 1976 and was completed in June of 1980. Sample collection has been ongoing since the inception of the program. The sampling schedules depend upon previous sampling results. If a sample in the previous phase exceeded the MCL's, sampling must continue quarterly for an annual composite analysis until it can be shown that the average annual concentration no longer exceeds the MCLs or until a monitoring schedule is

established as a condition to a variance exemption, or enforcement action. All other public water supplies must be monitored again within four years of a previous analysis.

2.5 Salmon Test Site Monitoring and Oversight Activities

The EM&ERB Staff is responsible for sample collection and oversight activities of the Department of Energy's Salmon Test Site. The Salmon Test Site is located in Lamar County, near Baxterville, MS (Appendix 6) and is a site whereby two nuclear and two gas explosions were conducted in a Salt cavity during the mid to late sixties. Analyses results are printed in the Salmon Test Site 1999 Annual Report.

2.6 Licensee Facilities

Samples are also taken by the Radioactive Materials Branch at licensee facilities during routine inspections throughout the state, and analyzed by EM&ERB Staff. These samples are generally swipes, checking for possible contamination, but other types of samples are also collected, depending on the facility (theses may include liquids, wipes, swabs, crushed rock, soil, fixtures, debris, etc.).

2.7 Radiological Material Investigations

Sometimes investigations require more than surveys, in which case samples are brought into the laboratory for analysis. Sampling types include liquids, wipes, swabs, crushed rock, soil, pipe scale, sludge, and debris. Most of these samples are classified as naturally occurring radioactive material (NORM), and contain radioisotopes of the uranium and thorium decay series. Oil and Gas NORM is now regulated by the State of Mississippi Oil and Gas Board. All other NORM is regulated by the Division of Radiological Health.

2.8 State Indoor Radon Monitoring Program

A special study of radon levels in single family dwellings and state-supported schools in Mississippi was undertaken jointly by the Environmental Protection Agency (EPA) and the Mississippi State Department of Health/Division of Radiological Health (DRH) during the fall and winter of 1990 and continues to date. The result of this study indicates the approximately 3% of the homes in Mississippi will screen above 4 picocuries of radon per liter of indoor air (pCi/L), EPA's action level (Appendix 4 & 5). The EM&ERB is a Radon Measurement Proficiency (RMP) listed laboratory (Figure 4) for radon measurements using the Electret Passive Environmental Radon Monitors, (Eperm™) methodology. Data developed from the Residential Indoor Radon and the Radon in Schools Programs are available by Statewide Zip Codes from the Mississippi Radon Program upon request at (601) 987-6893 or (1-800-626-7739 in State toll-free only). Additional data is obtained from companies participating in the radon measurement proficiency programs.

2.9 Emergency Preparedness Program

The EM&ERB is responsible for maintaining the DRH's readiness for responding to a radiological incident, whether it is a radioactive materials transportation accident or a nuclear power plant accident. There are two nuclear power plants in which the branch plans and coordinate activities involving emergency planning. They are GGNS near Port Gibson, Mississippi, within the 10-mile Emergency Planning Zone (EPZ), and the Riverbend Station (RBS) near St. Francisville, Louisiana, within the 50-mile EPZ. Ingestion Planning Zone (IPZ). To support the DRH efforts in responding to a radiological incident, the EM&ERB maintains a Mobile Environmental Emergency Response Laboratory (MEERL), (Figure 5). The MEERL houses an EG&G (NOMAD™) PC-based MCA Portable Gamma Spectroscopy system (Figure 6), a single sample Nuclear Enterprises Liquid Scintillation Counter (Figure 7), a single sample Canberra low background alpha / beta counter (Figure 8), a number of field sampling and chemistry supplies and Rueter-Stokes RSS-11 and RSS-112HPICs. The EM&ERB also maintains three Chevrolet Suburbans (Figures 10), with tailoring capability equipped with satellite radios.

The EM&ERB incorporates a training program to train DRH staff on procedures and instrumentations to respond to a radiological emergency. Also, the EM&ERB staff supports the Mississippi Emergency Management Agency (MEMA) in their training activities. Monthly Status Meetings with the power plants personnel, the States of Mississippi and Louisiana EMA and Radiological Health personnel are held in support of the power plants emergency preparedness. The EM&ERB also plans for the DRH participation in the GGNS site drills. Planning and training has begun to prepare for radiological waste shipments entering and passing through the State going to the Waste Isolation Pilot Plant (WIPP) in New Mexico.

3.0 Materials and Methods

3.1 Analyses

Environmental samples are prepared and analyzed according to the procedures outlined in the EM&ERB Laboratory and Procedures Manuals. The results are arranged by sample type. Concentrations of environmental radioactivity are reported as picocuries (pCi) per unit (liter, gram, cubic meter). One (1) pCi is the equivalent to 2.22 disintegrations per minute. One (1) pCi equals 0.037 Becquerel.

Data presented in this report have accompanying terms of uncertainty. The uncertainty terms given are at the two (2) sigma level, where one sigma is the standard deviation or a measure of the spread of the results. Results are reported at the ninety-five percent (95%) confidence level. The uncertainty term refers only to the statistical uncertainty in counting and does not include the systematic uncertainty in counting.

GENERAL FORMULA:

$$\text{Uncertainty} = \pm \frac{(\text{gross counts} + \text{background counts})}{(\text{Efficiency}) (\text{volume}) (2.22) (\text{ct time-min})}$$

Lower limits of detection (LLD) are calculated for each sample type, sample geometry, type and energy of radiation from the sample and detector system used for the counting. The LLD is a predetermined level below which the radiation from the sample cannot be distinguished from background as prescribed by the U.S. Nuclear Regulatory Commission (NRC) for reporting of data in the Radioactivity Verification Contract.

GENERAL FORMULA

$$\text{LLD} = \frac{4.66 (\text{Sb})}{(\text{efficiency}) (\text{volume}) (2.22) (\text{yield}) \exp (-\text{y})}$$

Sb= Standard Deviation of Background

The following is a brief summary of the procedures used for various sample types.

3.2 Surface and Ground Water

Surface and ground water samples are routinely analyzed for gross alpha activity, gross beta activity, and tritium (^3H). Gross alpha and beta analysis is accomplished by evaporating a 100-milliliter (ml) sample onto a two-inch diameter stainless steel planchet. The planchet is then counted in a low background gas flow proportional counter (Figures 11 & 12). Samples are also analyzed for specific gamma emitting radionuclides using a PC-based multichannel analyzer (MCA) with three high purity germanium (HPGe) detectors and one lithium-drifted germanium (GeLi) detector (Figure 13). Selected one gallon samples are routinely analyzed using this system. Tritium analysis is done by adding 7.5 ml of a distillate sample to a scintillation cocktail and counting in a liquid scintillation counter (Figure 14 & 15).

3.2.1 Drinking Water

Drinking water samples collected and analyzed according to the National Drinking Water Regulations are analyzed for gross alpha and beta activity in the same manner as the surface water samples. If the gross alpha activity exceeds 5 pCi/l, the same or an equivalent sample is analyzed for ^{228}Ra . If the concentration of ^{228}Ra exceeds 3 pCi/l, the same or equivalent sample is analyzed for ^{226}Ra . Samples in which the gross alpha activity exceeds 15 pCi/l may also require radon and/or uranium analysis. Drinking water from systems serving more than 100,000 persons also require analysis for gross beta activity.

3.2.2 Mississippi River Water

Quarterly water samples are collected by DRH and GGNS personnel. Areas represented by the sampling include upstream and downstream with respect to GGNS, and one sample from the GGNS discharge canal. Gamma emitters are identified by using the Gamma Spectroscopy HPGe (or GeLi) system. A 3 Liter sample is poured into a Marinelli beaker and counted for a minimum of eight hours or overnight.

3.3 Air

Air particulate samples are collected on a weekly basis from eight sampling stations around the GGNS, and one control station located at DRH Facility. The filters are then analyzed for gross beta activity in a low background alpha/beta counting systems (Figure 4). Gamma isotopic analyses of iodine cartridges and particulate filters are done with the Gamma Spectroscopy HPGe (or GeLi) system.

3.4 Milk

Gamma emitters in milk are identified by using the Gamma Spectroscopy HPGe (or GeLi) system. This procedure calls for a 3 Liter sample placed in a Marinelli beaker to be counted for eight hours or overnight.

3.5 Fish

Semiannual fish samples are collected from the MS River and local lakes surrounding GGNS. Edible portions of fish are homogenized and placed in a Texberry jar. The sample is then counted for a minimum of four hours or overnight on the Gamma Spectroscopy HPGe (or GeLi) system.

3.6 Vegetation

Vegetation samples are collected from the GGNS quarterly. These samples consist of crops, weeds, grasses, and other above ground vegetation. Gamma emitters are identified by first drying the sample and filling a Marinelli beaker and counting it on the Gamma Spectroscopy HPGe (or GeLi) system for a period of eight hours or overnight.

3.7 Soil and Sediment

Eight surface soil samples and three shoreline sediment samples are taken semiannually from areas around the GGNS. These samples are placed in Texberry jars and dried. The samples are then counted for a minimum of four hours or overnight on the Gamma Spectroscopy HPGe (or GeLi) system.

3.8 Game

An annual game sample collected by the GGNS personnel or Mississippi Department of Wildlife, Fisheries and Parks personnel. Edible portions are homogenized and placed in a Texberry jar and analyzed for gamma emitters by the Gamma Spectroscopy HPGe (or GeLi) system.

4.0 Equipment

The EM&ERB laboratory located at DRH analyzes all samples collected under Environmental Monitoring (EM) programs. The laboratories consists of a chemistry laboratory, radio-chemistry laboratory, radiation counting laboratories, a gamma spectroscopy laboratory, and an environmental laboratory. The gamma spectroscopy laboratory is equipped with an EG&G Ortec Multi-Channel Analyzer System including gamma data reduction software (GammaVision II TM) and three high purity germanium detectors and one lithium drifted germanium detector(Figure 13). The radiation counting labs consist of a Beckman LS 1800 series Liquid Scintillation System(Figure 14), a Gamma Products G-5000 low background alpha/beta counting system(figure 11), a Packard Tri-Carb 2200CA Liquid Scintillation Analyzer(Figure 15), a Canberra 2404 low background alpha/beta Counting System(Figure 12) and a EG&G Alpha Spectroscopy system(Figure 16). Each instruments is calibrated using NIST traceable quantified radiological standards.

5.0 Quality Control

Several quality control procedures are routinely employed to maintain the accuracy and precision of equipment used in the laboratories. These include internal quality control procedures such as routine instrument calibration and "blind" duplicate sample analysis. Interlaboratory quality control is evaluated through participation through in the U.S. Environmental Protection Agency's environmental radioactivity laboratory inter comparison studies program (Appendix 7).

6.0 Results

No unusual sample analysis results above normal background or above expected, regulated levels, occurred during FY 1999 at any of the monitoring sites. Data tables for the environmental surveillance of the Grand Gulf Nuclear Station can be found in the following tables. Results from the EPA cross-check program (Appendix 7) as well as lower limits of detection values for the EM&ERB (Appendix 1) is also listed in the following tables.

TABLE 1

**GRAND GULF NUCLEAR STATION
WEEKLY AIR PARTICULATE AND
RADIOIODINE SAMPLE ANALYSES**

STATION 7 ARNOLD ACRES

| <u>Sample Date On</u> | <u>Particulate Number</u> | <u>Gross Beta (pCi/m³)</u> | <u>I-131 Activity</u> | <u>Charcoal Number</u> |
|---------------------------|-------------------------------|-------------------------------------------|---------------------------|----------------------------|
| 07/07/98 | GF99-0001 | 0.024±0.001 | < 0.07 | GF99-0010 |
| 07/14/98 | GF99-0019 | 0.034±0.001 | < 0.07 | GF99-0028 |
| 07/21/98 | GF99-0039 | 0.013±0.001 | < 0.07 | GF99-0048 |
| 07/28/98 | GF99-0059 | 0.042±0.001 | < 0.07 | GF99-0068 |
| 08/04/98 | GF99-0077 | 0.049±0.001 | < 0.07 | GF99-0086 |
| 08/11/98 | GF99-0095 | 0.041±0.001 | < 0.07 | GF99-0104 |
| 08/18/98 | GF99-0113 | 0.005±0.001 | < 0.07 | GF99-0122 |
| 08/25/98 | GF99-0131 | 0.017±0.001 | < 0.07 | GF99-0140 |
| 09/01/98 | GF99-0149 | 0.001±0.001 | < 0.07 | GF99-0158 |
| 09/08/98 | GF99-0167 | 0.010±0.001 | < 0.07 | GF99-0176 |
| 09/15/98 | GF99-0188 | 0.035±0.001 | < 0.07 | GF99-0197 |
| 09/22/98 | GF99-0206 | 0.008±0.001 | < 0.07 | GF99-0215 |
| 09/29/98 | GF99-0224 | 0.009±0.001 | < 0.07 | GF99-0233 |
| 10/06/98 | GF99-0248 | 0.034±0.001 | < 0.07 | GF99-0257 |
| 10/13/98 | GF99-0266 | 0.035±0.001 | < 0.07 | GF99-0275 |
| 10/20/98 | GF99-0286 | 0.057±0.001 | < 0.07 | GF99-0295 |
| 10/27/98 | GF99-0305 | 0.014±0.001 | < 0.07 | GF99-0314 |
| 11/03/98 | GF99-0323 | 0.016±0.001 | < 0.07 | GF99-0332 |
| 11/10/98 | GF99-0341 | 0.020±0.001 | < 0.07 | GF99-0350 |
| 11/17/98 | GF99-0359 | 0.016±0.001 | < 0.07 | GF99-0368 |
| 11/24/98 | GF99-0377 | 0.026±0.001 | < 0.07 | GF99-0386 |
| 12/01/98 | GF99-0395 | 0.013±0.001 | < 0.07 | GF99-0404 |
| 12/08/98 | GF99-0413 | 0.015±0.001 | < 0.07 | GF99-0422 |
| 12/15/98 | GF99-0431 | 0.009±0.001 | < 0.07 | GF99-0440 |
| 12/22/98 | GF99-0449 | 0.012±0.001 | < 0.07 | GF99-0458 |
| 12/29/98 | GF99-0473 | 0.012±0.001 | < 0.07 | GF99-0482 |
| 01/05/98 | GF99-0491 | 0.020±0.001 | < 0.07 | GF99-0500 |
| 01/12/99 | GF99-0509 | 0.019±0.001 | < 0.07 | GF99-0518 |
| 01/19/99 | GF99-0529 | 0.023±0.001 | < 0.07 | GF99-0538 |
| 01/26/99 | GF99-0547 | 0.027±0.001 | < 0.07 | GF99-0556 |
| 02/02/99 | GF99-0565 | 0.013±0.001 | < 0.07 | GF99-0574 |
| 02/09/99 | GF99-0583 | 0.014±0.001 | < 0.07 | GF99-0592 |
| 02/16/99 | GF99-0603 | 0.013±0.001 | < 0.07 | GF99-0612 |
| 02/23/99 | GF99-0621 | 0.024±0.001 | < 0.07 | GF99-0630 |
| 03/02/99 | GF99-0639 | 0.010±0.001 | < 0.07 | GF99-0648 |

TABLE 1 (Cont.)

GRAND GULF NUCLEAR STATION
WEEKLY AIR PARTICULATE AND
RADIOIODINE SAMPLE ANALYSES

STATION 7 ARNOLD ACRES (CONT.)

| <u>Sample Date On</u> | <u>Particulate Number</u> | <u>Gross Beta (pCi/m³)</u> | <u>I-131 Activity</u> | <u>Charcoal Number</u> |
|---------------------------|-------------------------------|-------------------------------------------|---------------------------|----------------------------|
| 03/09/99 | GF99-0658 | 0.015±0.001 | < 0.07 | GF99-0667 |
| 03/16/99 | GF99-0675 | 0.032±0.001 | < 0.07 | GF99-0684 |
| 03/23/99 | GF99-0693 | 0.014±0.001 | < 0.07 | GF99-0702 |
| 03/30/99 | GF99-0711 | 0.011±0.001 | < 0.07 | GF99-0720 |
| 04/06/99 | GF99-0735 | 0.039±0.001 | < 0.07 | GF99-0744 |
| 04/13/99 | GF99-0753 | 0.099±0.002 | < 0.07 | GF99-0762 |
| 04/20/99 | GF99-0771 | 0.016±0.001 | < 0.07 | GF99-0780 |
| 04/27/99 | GF99-0789 | 0.009±0.001 | < 0.07 | GF99-0798 |
| 05/04/99 | GF99-0807 | 0.027±0.001 | < 0.07 | GF99-0816 |
| 05/11/99 | GF99-0825 | 0.014±0.001 | < 0.07 | GF99-0834 |
| 05/18/99 | GF99-0843 | 0.043±0.001 | < 0.07 | GF99-0852 |
| 05/25/99 | GF99-0861 | 0.021±0.001 | < 0.07 | GF99-0870 |
| 06/01/99 | GF99-0881 | 0.002±0.001 | < 0.07 | GF99-0890 |
| 06/08/99 | GF99-0899 | 0.014±0.001 | < 0.07 | GF99-0908 |
| 06/15/99 | GF99-0917 | 0.034±0.001 | < 0.07 | GF99-0926 |
| 06/22/99 | GF99-0935 | 0.015±0.001 | < 0.07 | GF99-0944 |
| 06/29/99 | GF99-0953 | 0.023±0.001 | < 0.07 | GF99-0962 |

TABLE 2

**GRAND GULF NUCLEAR STATION
WEEKLY AIR PARTICULATE AND
RADIODINE SAMPLE ANALYSES**

STATION 8 WATSON JR HIGH

| <u>Sample Date On</u> | <u>Particulate Number</u> | <u>Gross Beta (pCi/m³)</u> | <u>I-131 Activity</u> | <u>Charcoal Number</u> |
|---------------------------|-------------------------------|-------------------------------------------|---------------------------|----------------------------|
| 07/07/98 | GF99-0002 | 0.055±0.001 | < 0.07 | GF99-0011 |
| 07/14/98 | GF99-0020 | 0.019±0.001 | < 0.07 | GF99-0029 |
| 07/21/98 | GF99-0040 | 0.035±0.001 | < 0.07 | GF99-0049 |
| 07/28/98 | GF99-0060 | 0.034±0.001 | < 0.07 | GF99-0069 |
| 08/04/98 | GF99-0078 | 0.049±0.001 | < 0.07 | GF99-0087 |
| 08/11/98 | GF99-0096 | 0.016±0.001 | < 0.07 | GF99-0105 |
| 08/18/98 | GF99-0114 | 0.058±0.001 | < 0.07 | GF99-0123 |
| 08/25/98 | GF99-0132 | 0.078±0.001 | < 0.07 | GF99-0141 |
| 09/01/98 | GF99-0150 | 0.055±0.001 | < 0.07 | GF99-0159 |
| 09/08/98 | GF99-0168 | 0.011±0.001 | < 0.07 | GF99-0177 |
| 09/15/98 | GF99-0189 | 0.053±0.001 | < 0.07 | GF99-0198 |
| 09/22/98 | GF99-0207 | 0.014±0.001 | < 0.07 | GF99-0216 |
| 09/29/98 | GF99-0225 | 0.028±0.001 | < 0.07 | GF99-0234 |
| 10/06/98 | GF99-0249 | 0.081±0.001 | < 0.07 | GF99-0258 |
| 10/13/98 | GF99-0267 | 0.066±0.001 | < 0.07 | GF99-0276 |
| 10/20/98 | GF99-0287 | 0.109±0.003 | < 0.07 | GF99-0296 |
| 10/27/98 | GF99-0306 | 0.032±0.001 | < 0.07 | GF99-0315 |
| 11/03/98 | GF99-0324 | 0.034±0.001 | < 0.07 | GF99-0333 |
| 11/10/98 | GF99-0342 | 0.036±0.001 | < 0.07 | GF99-0351 |
| 11/17/98 | GF99-0360 | 0.065±0.001 | < 0.07 | GF99-0369 |
| 11/24/98 | GF99-0378 | 0.058±0.001 | < 0.07 | GF99-0387 |
| 12/01/98 | GF99-0396 | 0.020±0.001 | < 0.07 | GF99-0405 |
| 12/08/98 | GF99-0414 | 0.047±0.001 | < 0.07 | GF99-0423 |
| 12/15/98 | GF99-0432 | 0.001±0.001 | < 0.07 | GF99-0441 |
| 12/22/98 | GF99-0450 | 0.012±0.001 | < 0.07 | GF99-0459 |
| 12/29/98 | GF99-0474 | 0.012±0.001 | < 0.07 | GF99-0483 |
| 01/05/99 | GF99-0492 | 0.041±0.001 | < 0.07 | GF99-0501 |
| 01/12/99 | GF99-0510 | 0.031±0.001 | < 0.07 | GF99-0519 |
| 01/19/99 | GF99-0530 | 0.041±0.001 | < 0.07 | GF99-0539 |
| 01/26/99 | GF99-0548 | 0.055±0.001 | < 0.07 | GF99-0557 |
| 02/02/99 | GF99-0566 | 0.030±0.001 | < 0.07 | GF99-0575 |
| 02/09/99 | GF99-0584 | 0.029±0.001 | < 0.07 | GF99-0593 |
| 02/16/99 | GF99-0604 | 0.035±0.001 | < 0.07 | GF99-0613 |
| 02/23/99 | GF99-0622 | 0.038±0.001 | < 0.07 | GF99-0631 |
| 03/02/99 | GF99-0640 | 0.002±0.001 | < 0.07 | GF99-0649 |

**GRAND GULF NUCLEAR STATION
WEEKLY AIR PARTICULATE AND
RADIOIODINE SAMPLES ANALYSIS**

STATION 8 WATSON JR HIGH (CONT.)

| <u>Sample Date On</u> | <u>Particulate Number</u> | <u>Gross Beta (pCi/m³)</u> | <u>I-131 Activity</u> | <u>Charcoal Number</u> |
|----------------------------------|--------------------------------------|--------------------------------------------------|----------------------------------|-----------------------------------|
| 03/09/99 | GF99-0659 | 0.037±0.001 | < 0.07 | GF99-0668 |
| 03/16/99 | GF99-0676 | 0.066±0.001 | < 0.07 | GF99-0685 |
| 03/23/99 | GF99-0794 | 0.032±0.001 | < 0.07 | GF99-0703 |
| 03/30/99 | GF99-0712 | 0.023±0.001 | < 0.07 | GF99-0721 |
| 04/06/99 | GF99-0736 | 0.074±0.001 | < 0.07 | GF99-0745 |
| 04/13/99 | GF99-0754 | 0.143±0.003 | < 0.07 | GF99-0763 |
| 04/20/99 | GF99-0772 | 0.033±0.001 | < 0.07 | GF99-0781 |
| 04/27/99 | GF99-0790 | 0.036±0.001 | < 0.07 | GF99-0799 |
| 05/04/99 | GF99-0808 | 0.053±0.001 | < 0.07 | GF99-0817 |
| 05/11/99 | GF99-0826 | 0.033±0.001 | < 0.07 | GF99-0835 |
| 05/18/99 | GF99-0844 | 0.076±0.001 | < 0.07 | GF99-0853 |
| 05/25/99 | GF99-0862 | 0.043±0.001 | < 0.07 | GF99-0871 |
| 06/01/99 | GF99-0882 | 0.046±0.001 | < 0.07 | GF99-0891 |
| 06/08/99 | GF99-0900 | 0.027±0.001 | < 0.07 | GF99-0909 |
| 06/15/99 | GF99-0918 | 0.084±0.001 | < 0.07 | GF99-0927 |
| 06/22/99 | GF99-0936 | 0.016±0.001 | < 0.07 | GF99-0945 |
| 06/29/99 | GF99-0954 | 0.030±0.001 | < 0.07 | GF99-0963 |

TABLE 3

**GRAND GULF NUCLEAR STATION
WEEKLY AIR PARTICULATE AND
RADIOIODINE SAMPLE ANALYSES**

STATION 9 TRIMBLE PROPERTY

| <u>Sample Date On</u> | <u>Particulate Number</u> | <u>Gross Beta (pCi/m³)</u> | <u>I-131 Activity</u> | <u>Charcoal Number</u> |
|---------------------------|-------------------------------|-------------------------------------------|---------------------------|----------------------------|
| 07/07/98 | GF99-0003 | 0.025±0.001 | < 0.07 | GF99-0012 |
| 07/14/98 | GF99-0021 | 0.012±0.001 | < 0.07 | GF99-0030 |
| 07/21/98 | GF99-0041 | 0.013±0.001 | < 0.07 | GF99-0050 |
| 07/28/98 | GF99-0061 | 0.025±0.001 | < 0.07 | GF99-0070 |
| 08/04/98 | GF99-0079 | 0.007±0.001 | < 0.07 | GF99-0088 |
| 08/11/98 | GF99-0097 | 0.029±0.001 | < 0.07 | GF99-0106 |
| 08/18/98 | GF99-0115 | 0.032±0.001 | < 0.07 | GF99-0124 |
| 08/25/98 | GF99-0133 | 0.024±0.001 | < 0.07 | GF99-0142 |
| 09/01/98 | GF99-0151 | 0.022±0.001 | < 0.07 | GF99-0160 |
| 09/08/98 | GF99-0169 | 0.013±0.001 | < 0.07 | GF99-0178 |
| 09/15/98 | GF99-0190 | 0.022±0.001 | < 0.07 | GF99-0199 |
| 09/22/98 | GF99-0208 | 0.000±0.001 | < 0.07 | GF99-0217 |
| 09/29/98 | GF99-0226 | 0.000±0.001 | < 0.07 | GF99-0235 |
| 10/06/98 | GF99-0250 | 0.057±0.001 | < 0.07 | GF99-0259 |
| 10/13/98 | GF99-0268 | 0.027±0.001 | < 0.07 | GF99-0277 |
| 10/20/98 | GF99-0288 | 0.046±0.001 | < 0.07 | GF99-0297 |
| 10/27/98 | GF99-0307 | 0.010±0.001 | < 0.07 | GF99-0316 |
| 11/03/98 | GF99-0325 | 0.010±0.001 | < 0.07 | GF99-0334 |
| 11/10/98 | GF99-0343 | 0.013±0.001 | < 0.07 | GF99-0352 |
| 11/17/98 | GF99-0361 | 0.022±0.001 | < 0.07 | GF99-0370 |
| 11/24/98 | GF99-0379 | 0.019±0.001 | < 0.07 | GF99-0388 |
| 12/01/98 | GF99-0397 | 0.008±0.001 | < 0.07 | GF99-0406 |
| 12/08/98 | GF99-0415 | 0.019±0.001 | < 0.07 | GF99-0424 |
| 12/15/98 | GF99-0433 | 0.006±0.001 | < 0.07 | GF99-0442 |
| 12/22/98 | GF99-0451 | 0.005±0.001 | < 0.07 | GF99-0460 |
| 12/29/98 | GF99-0475 | 0.005±0.001 | < 0.07 | GF99-0484 |
| 01/05/99 | GF99-0493 | 0.013±0.001 | < 0.07 | GF99-0502 |
| 01/12/99 | GF99-0511 | 0.005±0.001 | < 0.07 | GF99-0520 |
| 01/19/99 | GF99-0531 | 0.012±0.001 | < 0.07 | GF99-0540 |
| 01/26/99 | GF99-0549 | 0.012±0.001 | < 0.07 | GF99-0558 |
| 02/02/99 | GF99-0567 | 0.012±0.001 | < 0.07 | GF99-0576 |
| 02/09/99 | GF99-0585 | 0.009±0.001 | < 0.07 | GF99-0694 |
| 02/16/99 | GF99-0605 | 0.010±0.001 | < 0.07 | GF99-0614 |
| 02/23/99 | GF99-0623 | 0.012±0.001 | < 0.07 | GF99-0632 |
| 03/02/99 | GF99-0641 | 0.007±0.001 | < 0.07 | GF99-0650 |

**GRAND GULF NUCLEAR STATION
WEEKLY AIR PARTICULATE AND
RADIOIODINE SAMPLE ANALYSES**

STATION 9 TRIMBLE PROPERTY(CONT.)

| <u>Sample Date On</u> | <u>Particulate Number</u> | <u>Gross Beta (pCi/m³)</u> | <u>I-131 Activity</u> | <u>Charcoal Number</u> |
|----------------------------------|--------------------------------------|--------------------------------------------------|----------------------------------|-----------------------------------|
| 03/09/99 | GF99-0660 | 0.013±0.001 | < 0.07 | GF99-0669 |
| 03/16/99 | GF99-0677 | 0.017±0.001 | < 0.07 | GF99-0686 |
| 03/23/99 | GF99-0695 | 0.011±0.001 | < 0.07 | GF99-0704 |
| 03/30/99 | GF99-0713 | 0.007±0.001 | < 0.07 | GF99-0722 |
| 04/06/99 | GF99-0737 | 0.018±0.001 | < 0.07 | GF99-0746 |
| 04/13/99 | GF99-0755 | 0.000±0.001 | < 0.07 | GF99-0764 |
| 04/20/99 | GF99-0773 | 0.011± 0.001 | < 0.07 | GF99-0782 |
| 04/27/99 | GF99-0791 | 0.008±0.001 | < 0.07 | GF99-0800 |
| 05/04/99 | GF99-0809 | 0.013±0.001 | < 0.07 | GF99-0818 |
| 05/11/99 | GF99-0827 | 0.009±0.001 | < 0.07 | GF99-0836 |
| 05/18/99 | GF99-0845 | 0.023±0.001 | < 0.07 | GF99-0854 |
| 05/25/99 | GF99-0863 | 0.010±0.001 | < 0.07 | GF99-0872 |
| 06/01/99 | GF99-0883 | 0.017±0.001 | < 0.07 | GF99-0992 |
| 06/08/99 | GF99-0901 | 0.007±0.001 | < 0.07 | GF99-0910 |
| 06/15/99 | GF99-0919 | 0.005±0.001 | < 0.07 | GF99-0928 |
| 06/22/99 | GF99-0937 | 0.000±0.001 | < 0.07 | GF99-0946 |
| 06/29/99 | GF99-0955 | 0.016±0.001 | < 0.07 | GF99-0964 |

TABLE 4

**GRAND GULF NUCLEAR STATION
WEEKLY AIR PARTICULATE AND
RADIOIODINE SAMPLE ANALYSES**

STATION 10 MCGEE PROPERTY

| <u>Sample Date On</u> | <u>Particulate Number</u> | <u>Gross Beta (pCi/m³)</u> | <u>I-131 Activity</u> | <u>Charcoal Number</u> |
|---------------------------|-------------------------------|-------------------------------------------|---------------------------|----------------------------|
| 07/07/98 | GF99-0004 | 0.012±0.001 | < 0.07 | GF99-0013 |
| 07/14/98 | GF99-0022 | 0.011±0.001 | < 0.07 | GF99-0031 |
| 07/21/98 | GF99-0042 | 0.007±0.001 | < 0.07 | GF99-0051 |
| 07/28/98 | GF99-0062 | 0.007±0.001 | < 0.07 | GF99-0071 |
| 08/04/98 | GF99-0080 | 0.008±0.001 | < 0.07 | GF99-0089 |
| 08/11/98 | GF99-0098 | 0.016±0.001 | < 0.07 | GF99-0107 |
| 08/18/98 | GF99-0116 | 0.018±0.001 | < 0.07 | GF99-0125 |
| 08/25/98 | GF99-0134 | 0.013±0.001 | < 0.07 | GF99-0143 |
| 09/01/98 | GF99-0152 | 0.003±0.001 | < 0.07 | GF99-0161 |
| 09/08/98 | GF99-0170 | 0.006±0.001 | < 0.07 | GF99-0179 |
| 09/15/98 | GF99-0191 | 0.973±0.003 | < 0.07 | GF99-0200 |
| 09/22/98 | GF99-0209 | 0.734±0.003 | < 0.07 | GF99-0218 |
| 09/29/98 | GF99-0227 | 0.547±0.003 | < 0.07 | GF99-0236 |
| 10/06/98 | GF99-0251 | 0.021±0.001 | < 0.07 | GF99-0260 |
| 10/13/98 | GF99-0269 | 0.040±0.001 | < 0.07 | GF99-0278 |
| 10/20/98 | GF99-0289 | 0.106±0.002 | < 0.07 | GF99-0298 |
| 10/27/98 | GF99-0308 | 0.024±0.001 | < 0.07 | GF99-0317 |
| 11/03/98 | GF99-0326 | 0.025±0.001 | < 0.07 | GF99-0335 |
| 11/10/98 | GF99-0344 | 0.028±0.001 | < 0.07 | GF99-0353 |
| 11/17/98 | GF99-0362 | 0.062±0.001 | < 0.07 | GF99-0371 |
| 11/24/98 | GF99-0380 | 0.044±0.001 | < 0.07 | GF99-0389 |
| 12/01/98 | GF99-0398 | 0.004±0.001 | < 0.07 | GF99-0407 |
| 12/08/98 | GF99-0416 | 0.036±0.001 | < 0.07 | GF99-0425 |
| 12/15/98 | GF99-0434 | 0.005±0.001 | < 0.07 | GF99-0443 |
| 12/22/98 | GF99-0452 | 0.014±0.001 | < 0.07 | GF99-0461 |
| 12/29/98 | GF99-0476 | 0.014±0.001 | < 0.07 | GF99-0485 |
| 01/05/99 | GF99-0494 | 0.042±0.001 | < 0.07 | GF99-0503 |
| 01/12/99 | GF99-0512 | 0.024±0.001 | < 0.07 | GF99-0521 |
| 01/19/99 | GF99-0532 | 0.044±0.001 | < 0.07 | GF99-0541 |
| 01/26/99 | GF99-0550 | 0.050±0.001 | < 0.07 | GF99-0559 |
| 02/02/99 | GF99-0568 | 0.025±0.001 | < 0.07 | GF99-0577 |
| 02/09/99 | GF99-0586 | 0.023±0.001 | < 0.07 | GF99-0595 |
| 02/16/99 | GF99-0606 | 0.031±0.001 | < 0.07 | GF99-0615 |
| 02/23/99 | GF99-0624 | 0.032±0.001 | < 0.07 | GF99-0633 |
| 03/02/99 | GF99-0642 | 0.016±0.001 | < 0.07 | GF99-0651 |

**GRAND GULF NUCLEAR STATION
WEEKLY AIR PARTICULATE AND
RADIOIODINE SAMPLE ANALYSES**

STATION 10 MCGEE PROPERTY(CONT.)

| <u>Sample Date On</u> | <u>Particulate Number</u> | <u>Gross Beta (pCi/m³)</u> | <u>I-131 Activity</u> | <u>Charcoal Number</u> |
|----------------------------------|--------------------------------------|--------------------------------------------------|----------------------------------|-----------------------------------|
| 03/09/99 | GF99-0661 | 0.038±0.001 | < 0.07 | GF99-0670 |
| 03/16/99 | GF99-0678 | 0.040±0.001 | < 0.07 | GF99-0687 |
| 03/23/99 | GF99-0696 | 0.028±0.001 | < 0.07 | GF99-0705 |
| 03/30/99 | GF99-0714 | 0.017±0.001 | < 0.07 | GF99-0723 |
| 04/06/99 | GF99-0738 | 0.054±0.001 | < 0.07 | GF99-0747 |
| 04/13/99 | GF99-0756 | 0.103±0.002 | < 0.07 | GF99-0765 |
| 04/20/99 | GF99-0774 | 0.020±0.001 | < 0.07 | GF99-0783 |
| 04/27/99 | GF99-0892 | 0.023±0.001 | < 0.07 | GF99-0801 |
| 05/04/99 | GF99-0810 | 0.038±0.001 | < 0.07 | GF99-0819 |
| 05/11/99 | GF99-0828 | 0.024±0.001 | < 0.07 | GF99-0837 |
| 05/18/99 | GF99-0846 | 0.060±0.001 | < 0.07 | GF99-0855 |
| 05/25/99 | GF99-0864 | 0.032±0.001 | < 0.07 | GF99-0873 |
| 06/01/99 | GF99-0884 | 0.046±0.001 | < 0.07 | GF99-0893 |
| 06/08/99 | GF99-0902 | 0.029±0.001 | < 0.07 | GF99-0911 |
| 06/15/99 | GF99-0920 | 0.066±0.001 | < 0.07 | GF99-0929 |
| 06/22/99 | GF99-0938 | 0.024±0.001 | < 0.07 | GF99-0947 |
| 06/29/99 | GF99-0956 | 0.035±0.001 | < 0.07 | GF99-0965 |

TABLE 5

**GRAND GULF NUCLEAR STATION
WEEKLY AIR PARTICULATE AND
RADIOIODINE SAMPLE ANALYSES**

STATION 11 BALD HILL RD

| <u>Sample Date On</u> | <u>Particulate Number</u> | <u>Gross Beta (pCi/m³)</u> | <u>I-131 Activity</u> | <u>Charcoal Number</u> |
|----------------------------------|--------------------------------------|--------------------------------------------------|----------------------------------|-----------------------------------|
| 07/07/98 | GF99-0005 | 0.025±0.001 | < 0.07 | GF99-0014 |
| 07/14/98 | GF99-0023 | 0.027±0.001 | < 0.07 | GF99-0032 |
| 07/21/98 | GF99-0043 | 0.020±0.001 | < 0.07 | GF99-0052 |
| 07/28/98 | GF99-0063 | 0.000±0.000 | < 0.07 | GF99-0072 |
| 08/04/98 | GF99-0081 | 0.013±0.001 | < 0.07 | GF99-0090 |
| 08/11/98 | GF99-0099 | 0.033±0.001 | < 0.07 | GF99-0108 |
| 08/18/98 | GF99-0117 | 0.036±0.001 | < 0.07 | GF99-0126 |
| 08/25/98 | GF99-0135 | 0.025±0.001 | < 0.07 | GF99-0144 |
| 09/01/98 | GF99-0153 | 0.021±0.001 | < 0.07 | GF99-0162 |
| 09/08/98 | GF99-0171 | 0.011±0.001 | < 0.07 | GF99-0180 |
| 09/15/98 | GF99-0192 | 0.028±0.001 | < 0.07 | GF99-0201 |
| 09/22/98 | GF99-0210 | 0.019±0.001 | < 0.07 | GF99-0219 |
| 09/29/98 | GF99-0228 | 0.016±0.001 | < 0.07 | GF99-0237 |
| 10/06/98 | GF99-0252 | 0.051±0.001 | < 0.07 | GF99-0261 |
| 10/13/98 | GF99-0270 | 0.032±0.001 | < 0.07 | GF99-0279 |
| 10/20/98 | GF99-0290 | 0.042±0.001 | < 0.07 | GF99-0299 |
| 10/27/98 | GF99-0309 | 0.013±0.001 | < 0.07 | GF99-0318 |
| 11/03/98 | GF99-0327 | 0.012±0.001 | < 0.07 | GF99-0336 |
| 11/10/98 | GF99-0345 | 0.014±0.001 | < 0.07 | GF99-0354 |
| 11/17/98 | GF99-0363 | 0.023±0.001 | < 0.07 | GF99-0372 |
| 11/24/98 | GF99-0381 | 0.021± 0.001 | < 0.07 | GF99-0390 |
| 12/01/98 | GF99-0399 | 0.009±0.001 | < 0.07 | GF99-0408 |
| 12/08/98 | GF99-0417 | 0.015±0.001 | < 0.07 | GF99-0426 |
| 12/15/98 | GF99-0435 | 0.010±0.001 | < 0.07 | GF99-0444 |
| 12/22/98 | GF99-0453 | 0.011±0.001 | < 0.07 | GF99-0462 |
| 12/29/98 | GF99-0477 | 0.011±0.001 | < 0.07 | GF99-0486 |
| 01/05/99 | GF99-0495 | 0.004±0.001 | < 0.07 | GF99-0504 |
| 01/12/99 | GF99-0513 | 0.013±0.001 | < 0.07 | GF99-0522 |
| 01/19/99 | GF99-0533 | 0.018±0.001 | < 0.07 | GF99-0542 |
| 01/26/99 | GF99-0551 | 0.012±0.001 | < 0.07 | GF99-0560 |
| 02/02/99 | GF99-0569 | 0.009±0.001 | < 0.07 | GF99-0578 |
| 02/09/99 | GF99-0587 | 0.014±0.001 | < 0.07 | GF99-0596 |
| 02/16/99 | GF99-0607 | 0.011±0.001 | < 0.07 | GF99-0616 |
| 02/23/99 | GF99-0625 | 0.016±0.001 | < 0.07 | GF99-0634 |
| 03/02/99 | GF99-0643 | 0.009±0.001 | < 0.07 | GF99-0652 |

**GRAND GULF NUCLEAR STATION
WEEKLY AIR PARTICULATE AND
RADIOIODINE SAMPLE ANALYSES**

STATION 11 BALD HILL RD(CONT.)

| Sample Date On | Particulate Number | Gross Beta (pCi/m³) | I-131 Activity | Charcoal Number |
|---------------------------|-------------------------------|-------------------------------------------|---------------------------|----------------------------|
| 03/09/99 | GF99-0662 | 0.009±0.001 | < 0.07 | GF99-0671 |
| 03/16/99 | GF99-0679 | 0.013±0.001 | < 0.07 | GF99-0688 |
| 03/23/99 | GF99-0697 | 0.024±0.001 | < 0.07 | GF99-0706 |
| 03/30/99 | GF99-0715 | 0.014±0.001 | < 0.07 | GF99-0724 |
| 04/06/99 | GF99-0739 | 0.009±0.001 | < 0.07 | GF99-0748 |
| 04/13/99 | GF99-0757 | 0.023±0.001 | < 0.07 | GF99-0766 |
| 04/20/99 | GF99-0775 | 0.058±0.001 | < 0.07 | GF99-0784 |
| 04/27/99 | GF99-0793 | 0.013±0.001 | < 0.07 | GF99-0802 |
| 05/04/99 | GF99-0811 | 0.013±0.001 | < 0.07 | GF99-0820 |
| 05/11/99 | GF99-0829 | 0.021±0.001 | < 0.07 | GF99-0838 |
| 05/18/99 | GF99-0847 | 0.013±0.001 | < 0.07 | GF99-0856 |
| 05/25/99 | GF99-0865 | 0.023±0.001 | < 0.07 | GF99-0874 |
| 06/01/99 | GF99-0885 | 0.027±0.001 | < 0.07 | GF99-0894 |
| 06/08/99 | GF99-0903 | 0.018±0.001 | < 0.07 | GF99-0912 |
| 06/15/99 | GF99-0921 | 0.032±0.001 | < 0.07 | GF99-0930 |
| 06/22/99 | GF99-0939 | 0.012±0.001 | < 0.07 | GF99-0948 |
| 06/29/99 | GF99-0957 | 0.015±0.001 | < 0.07 | GF99-0966 |

TABLE 6

**GRAND GULF NUCLEAR STATION
WEEKLY AIR PARTICULATE AND
RADIOIODINE SAMPLE ANALYSES**

STATION 12 G.G.M PARK

| <u>Sample Date On</u> | <u>Sample Number</u> | <u>Gross Beta (pCi/m³)</u> | <u>I-131 Activity</u> | <u>Charcoal Number</u> |
|---------------------------|--------------------------|-------------------------------------------|---------------------------|----------------------------|
| 07/07/98 | GF99-0006 | 0.027±0.001 | < 0.07 | GF99-0015 |
| 07/14/98 | GF99-0024 | 0.010±0.001 | < 0.07 | GF99-0033 |
| 07/21/98 | GF99-0044 | 0.010±0.001 | < 0.07 | GF99-0053 |
| 07/28/98 | GF99-0064 | 0.017±0.001 | < 0.07 | GF99-0073 |
| 08/04/98 | GF99-0082 | 0.010±0.001 | < 0.07 | GF99-0091 |
| 08/11/98 | GF99-0100 | 0.023±0.001 | < 0.07 | GF99-0109 |
| 08/18/98 | GF99-0118 | 0.041±0.001 | < 0.07 | GF99-0127 |
| 08/25/98 | GF99-0136 | 0.026±0.001 | < 0.07 | GF99-0145 |
| 09/01/98 | GF99-0154 | 0.021±0.001 | < 0.07 | GF99-0163 |
| 09/08/98 | GF99-0172 | 0.013±0.001 | < 0.07 | GF99-0181 |
| 09/15/98 | GF99-0193 | 0.031±0.001 | < 0.07 | GF99-0202 |
| 09/22/98 | GF99-0211 | 0.023±0.001 | < 0.07 | GF99-0220 |
| 09/29/98 | GF99-0229 | 0.029±0.001 | < 0.07 | GF99-0238 |
| 10/06/98 | GF99-0253 | 0.040±0.001 | < 0.07 | GF99-0262 |
| 10/13/98 | GF99-0271 | 0.033±0.001 | < 0.07 | GF99-0280 |
| 10/20/98 | GF99-0291 | 0.045±0.001 | < 0.07 | GF99-0300 |
| 10/27/98 | GF99-0310 | 0.002±0.001 | < 0.07 | GF99-0319 |
| 11/03/98 | GF99-0328 | 0.007±0.001 | < 0.07 | GF99-0337 |
| 11/10/98 | GF99-0346 | 0.013±0.001 | < 0.07 | GF99-0355 |
| 11/17/98 | GF99-0364 | 0.028±0.001 | < 0.07 | GF99-0373 |
| 11/24/98 | GF99-0382 | 0.031±0.001 | < 0.07 | GF99-0391 |
| 12/01/98 | GF99-0400 | 0.014±0.001 | < 0.07 | GF99-0409 |
| 12/08/98 | GF99-0418 | 0.019±0.001 | < 0.07 | GF99-0427 |
| 12/15/98 | GF99-0436 | 0.004±0.001 | < 0.07 | GF99-0445 |
| 12/22/98 | GF99-0454 | 0.009±0.001 | < 0.07 | GF99-0463 |
| 12/29/98 | GF99-0478 | 0.009±0.001 | < 0.07 | GF99-0487 |
| 01/05/99 | GF99-0496 | 0.005±0.001 | < 0.07 | GF99-0505 |
| 01/12/99 | GF99-0514 | 0.015±0.001 | < 0.07 | GF99-0523 |
| 01/19/99 | GF99-0534 | 0.005±0.001 | < 0.07 | GF99-0543 |
| 01/26/99 | GF99-0552 | 0.017±0.001 | < 0.07 | GF99-0561 |
| 02/02/99 | GF99-0570 | 0.018±0.001 | < 0.07 | GF99-0579 |
| 02/09/99 | GF99-0588 | 0.003±0.001 | < 0.07 | GF99-0597 |
| 02/16/99 | GF99-0608 | 0.016±0.001 | < 0.07 | GF99-0617 |
| 02/23/99 | GF99-0626 | 0.021±0.001 | < 0.07 | GF99-0635 |
| 03/02/99 | GF99-0644 | 0.010±0.001 | < 0.07 | GF99-0653 |

**GRAND GULF NUCLEAR STATION
WEEKLY AIR PARTICULATE AND
RADIOIODINE SAMPLE ANALYSES**

STATION 12 G.G.M PARK (CONT.)

| <u>Sample Date On</u> | <u>Particulate Number</u> | <u>Gross Beta (pCi/m³)</u> | <u>I-131 Activity</u> | <u>Charcoal Number</u> |
|---------------------------|-------------------------------|-------------------------------------------|---------------------------|----------------------------|
| 03/09/99 | GF99-0663 | 0.016±0.001 | < 0.07 | GF99-0672 |
| 03/16/99 | GF99-0680 | 0.022±0.001 | < 0.07 | GF99-0689 |
| 03/23/99 | GF99-0698 | 0.019±0.001 | < 0.07 | GF99-0707 |
| 03/30/99 | GF99-0716 | 0.011±0.001 | < 0.07 | GF99-0725 |
| 04/06/99 | GF99-0740 | 0.001±0.001 | < 0.07 | GF99-0749 |
| 04/13/99 | GF99-0758 | 0.081±0.001 | < 0.07 | GF99-0767 |
| 04/20/99 | GF99-0776 | 0.014±0.001 | < 0.07 | GF99-0785 |
| 04/27/99 | GF99-0794 | 0.021±0.001 | < 0.07 | GF99-0803 |
| 05/04/99 | GF99-0812 | 0.018±0.001 | < 0.07 | GF99-0821 |
| 05/11/99 | GF99-0830 | 0.017±0.001 | < 0.07 | GF99-0839 |
| 05/18/99 | GF99-0848 | 0.023±0.001 | < 0.07 | GF99-0857 |
| 05/25/99 | GF99-0866 | 0.021±0.001 | < 0.07 | GF99-0875 |
| 06/01/99 | GF99-0886 | 0.029±0.001 | < 0.07 | GF99-0895 |
| 06/08/99 | GF99-0904 | 0.016±0.001 | < 0.07 | GF99-0913 |
| 06/15/99 | GF99-0922 | 0.036±0.001 | < 0.07 | GF99-0931 |
| 06/22/99 | GF99-0940 | 0.014±0.001 | < 0.07 | GF99-0949 |
| 06/29/99 | GF99-0958 | 0.024±0.001 | < 0.07 | GF99-0967 |

TABLE 7

**GRAND GULF NUCLEAR STATION
WEEKLY AIR PARTICULATE AND
RADIOIODINE SAMPLE ANALYSES**

STATION 13 INGLESIDE AUTHORITY

| <u>Sample Date On</u> | <u>Particulate Number</u> | <u>Gross Beta (pCi/m³)</u> | <u>I-131 Activity</u> | <u>Charcoal Number</u> |
|---------------------------|-------------------------------|-------------------------------------------|---------------------------|----------------------------|
| 07/07/98 | GF99-0007 | 0.062±0.001 | < 0.07 | GF99-0016 |
| 07/14/98 | GF99-0025 | 0.035±0.001 | < 0.07 | GF99-0034 |
| 07/21/98 | GF99-0045 | 0.079±0.001 | < 0.07 | GF99-0054 |
| 07/28/98 | GF99-0065 | ERR | < 0.07 | GF99-0074 |
| 08/04/98 | GF99-0083 | ERR | < 0.07 | GF99-0092 |
| 08/11/98 | GF99-0101 | ERR | < 0.07 | GF99-0110 |
| 08/18/98 | GF99-0119 | ERR | < 0.07 | GF99-0128 |
| 08/25/98 | GF99-0137 | ERR | < 0.07 | GF99-0146 |
| 09/01/98 | GF99-0155 | ERR | < 0.07 | GF99-0164 |
| 09/08/98 | GF99-0173 | ERR | < 0.07 | GF99-0182 |
| 09/15/98 | GF99-0194 | ERR | < 0.07 | GF99-0203 |
| 09/22/98 | GF99-0212 | 0.000±0.000 | < 0.07 | GF99-0221 |
| 09/29/98 | GF99-0230 | 0.000±0.000 | < 0.07 | GF99-0239 |
| 10/06/98 | GF99-0254 | 0.000±0.000 | < 0.07 | GF99-0263 |
| 10/13/98 | GF99-0272 | 0.000±0.000 | < 0.07 | GF99-0281 |
| 10/20/98 | GF99-0292 | 0.000±0.000 | < 0.07 | GF99-0301 |
| 10/27/98 | GF99-0311 | 0.000±0.000 | < 0.07 | GF99-0320 |
| 11/03/98 | GF99-0329 | 0.000±0.000 | < 0.07 | GF99-0338 |
| 11/10/98 | GF99-0347 | 0.000±0.000 | < 0.07 | GF99-0356 |
| 11/17/98 | GF99-0365 | 0.000±0.000 | < 0.07 | GF99-0374 |
| 11/24/98 | GF99-0383 | 0.000±0.000 | < 0.07 | GF99-0392 |
| 12/01/98 | GF99-0401 | 0.000±0.000 | < 0.07 | GF99-0410 |
| 12/08/98 | GF99-0419 | 0.000±0.000 | < 0.07 | GF99-0428 |
| 12/15/98 | GF99-0437 | 0.000±0.000 | < 0.07 | GF99-0446 |
| 12/22/98 | GF99-0455 | 0.000±0.000 | < 0.07 | GF99-0464 |
| 12/29/98 | GF99-0479 | 0.000±0.000 | < 0.07 | GF99-0488 |
| 01/05/99 | GF99-0497 | 0.000±0.000 | < 0.07 | GF99-0506 |
| 01/12/99 | GF99-0515 | 0.000±0.000 | < 0.07 | GF99-0524 |
| 01/19/99 | GF99-0535 | 0.000±0.000 | < 0.07 | GF99-0544 |
| 01/26/99 | GF99-0553 | 0.000±0.000 | < 0.07 | GF99-0562 |
| 02/02/99 | GF99-0571 | 0.000±0.000 | < 0.07 | GF99-0580 |
| 02/09/99 | GF99-0589 | 0.000±0.000 | < 0.07 | GF99-0598 |
| 02/16/99 | GF99-0609 | 0.000±0.000 | < 0.07 | GF99-0618 |
| 02/23/99 | GF99-0627 | 0.000±0.000 | < 0.07 | GF99-0636 |
| 03/02/99 | GF99-0645 | 0.000±0.000 | < 0.07 | GF99-0654 |

**GRAND GULF NUCLEAR STATION
WEEKLY AIR PARTICULATE AND
RADIOIODINE SAMPLE ANALYSES**

STATION 13 INGLESIDE AUTHORITY(CONT.)

| <u>Sample Date On</u> | <u>Particulate Number</u> | <u>Gross Beta (pCi/m³)</u> | <u>I-131 Activity</u> | <u>Charcoal Number</u> |
|----------------------------------|--------------------------------------|--------------------------------------------------|----------------------------------|-----------------------------------|
| 03/09/99 | GF99-0664 | 0.034±0.001 | < 0.07 | GF99-0673 |
| 03/16/99 | GF99-0681 | 0.039±0.001 | < 0.07 | GF99-0690 |
| 03/23/99 | GF99-0699 | 0.031±0.001 | < 0.07 | GF99-0708 |
| 03/30/99 | GF99-0717 | 0.019±0.001 | < 0.07 | GF99-0726 |
| 04/06/99 | GF99-0741 | 0.055±0.001 | < 0.07 | GF99-0750 |
| 04/13/99 | GF99-0759 | 0.145±0.001 | < 0.07 | GF99-0768 |
| 04/20/99 | GF99-0777 | 0.032±0.001 | < 0.07 | GF99-0786 |
| 04/27/99 | GF99-0795 | 0.031±0.001 | < 0.07 | GF99-0804 |
| 05/04/99 | GF99-0813 | 0.045±0.001 | < 0.07 | GF99-0822 |
| 05/11/99 | GF99-0831 | 0.028±0.001 | < 0.07 | GF99-0840 |
| 05/18/99 | GF99-0849 | 0.062±0.001 | < 0.07 | GF99-0858 |
| 05/25/99 | GF99-0867 | 0.048±0.001 | < 0.07 | GF99-0876 |
| 06/01/99 | GF99-0887 | 0.067±0.001 | < 0.07 | GF99-0896 |
| 06/08/99 | GF99-0905 | 0.027±0.001 | < 0.07 | GF99-0914 |
| 06/15/99 | GF99-0923 | 0.077±0.001 | < 0.07 | GF99-0932 |
| 06/22/99 | GF99-0941 | 0.027±0.001 | < 0.07 | GF99-0950 |
| 06/29/99 | GF99-0959 | 0.047±0.001 | < 0.07 | GF99-0968 |

* No samples were collected on dates identified "ERR" due to mechanical problems.

TABLE 8

**GRAND GULF NUCLEAR STATION
WEEKLY AIR PARTICULATE AND
RADIOIODINE SAMPLE ANALYSES**

STATION 14 POINT LOOKOUT

| <u>Sample Date On</u> | <u>Particulate Number</u> | <u>Gross Beta (pCi/m³)</u> | <u>I-131 Activity</u> | <u>Charcoal Number</u> |
|---------------------------|-------------------------------|-------------------------------------------|---------------------------|----------------------------|
| 07/07/98 | GF99-0008 | 0.024±0.001 | < 0.07 | GF99-0017 |
| 07/14/98 | GF99-0026 | 0.014±0.001 | < 0.07 | GF99-0026 |
| 07/21/98 | GF99-0046 | 0.009±0.001 | < 0.07 | GF99-0055 |
| 07/28/98 | GF99-0066 | 0.003±0.001 | < 0.07 | GF99-0075 |
| 08/04/98 | GF99-0084 | 0.011±0.001 | < 0.07 | GF99-0093 |
| 08/11/98 | GF99-0102 | 0.013±0.001 | < 0.07 | GF99-0111 |
| 08/18/98 | GF99-0120 | 0.032±0.001 | < 0.07 | GF99-0129 |
| 08/25/98 | GF99-0138 | 0.026±0.001 | < 0.07 | GF99-0147 |
| 09/01/98 | GF99-0156 | 0.028±0.001 | < 0.07 | GF99-0165 |
| 09/08/98 | GF99-0174 | 0.011±0.001 | < 0.07 | GF99-0183 |
| 09/15/98 | GF99-0195 | 0.022±0.001 | < 0.07 | GF99-0204 |
| 09/22/98 | GF99-0213 | 0.016±0.001 | < 0.07 | GF99-0222 |
| 09/29/98 | GF99-0231 | 0.016±0.001 | < 0.07 | GF99-0240 |
| 10/06/98 | GF99-0255 | 0.038±0.001 | < 0.07 | GF99-0264 |
| 10/13/98 | GF99-0273 | 0.027±0.001 | < 0.07 | GF99-0282 |
| 10/20/98 | GF99-0293 | 0.037±0.001 | < 0.07 | GF99-0302 |
| 10/27/98 | GF99-0312 | 0.009±0.001 | < 0.07 | GF99-0321 |
| 11/03/98 | GF99-0330 | 0.011±0.001 | < 0.07 | GF99-0339 |
| 11/10/98 | GF99-0348 | 0.014±0.001 | < 0.07 | GF99-0357 |
| 11/17/98 | GF99-0366 | 0.019±0.001 | < 0.07 | GF99-0375 |
| 11/24/98 | GF99-0384 | 0.014±0.001 | < 0.07 | GF99-0393 |
| 12/01/98 | GF99-0402 | 0.002±0.001 | < 0.07 | GF99-0411 |
| 12/08/98 | GF99-0420 | 0.013±0.001 | < 0.07 | GF99-0429 |
| 12/15/98 | GF99-0438 | 0.006±0.001 | < 0.07 | GF99-0447 |
| 12/22/98 | GF99-0456 | 0.008±0.001 | < 0.07 | GF99-0465 |
| 12/29/98 | GF99-0480 | 0.008±0.001 | < 0.07 | GF99-0489 |
| 01/05/99 | GF99-0498 | 0.007±0.001 | < 0.07 | GF99-0507 |
| 01/12/99 | GF99-0516 | 0.010±0.001 | < 0.07 | GF99-0525 |
| 01/19/99 | GF99-0536 | 0.007±0.001 | < 0.07 | GF99-0545 |
| 01/26/99 | GF99-0554 | 0.016±0.001 | < 0.07 | GF99-0563 |
| 02/02/99 | GF99-0572 | 0.005±0.001 | < 0.07 | GF99-0581 |
| 02/09/99 | GF99-0590 | 0.007±0.001 | < 0.07 | GF99-0599 |
| 02/16/99 | GF99-0610 | 0.003±0.001 | < 0.07 | GF99-0619 |
| 02/23/99 | GF99-0628 | 0.002±0.001 | < 0.07 | GF99-0637 |
| 03/02/99 | GF99-0655 | 0.008±0.001 | < 0.07 | GF99-0646 |

**GRAND GULF NUCLEAR STATION
WEEKLY AIR PARTICULATE AND
RADIOIODINE SAMPLE ANALYSES**

STATION 14 POINT LOOKOUT(CONT.)

| <u>Sample Date On</u> | <u>Particulate Number</u> | <u>Gross Beta (pCi/m³)</u> | <u>I-131 Activity</u> | <u>Charcoal Number</u> |
|----------------------------------|--------------------------------------|--------------------------------------------------|----------------------------------|-----------------------------------|
| 03/09/99 | GF99-0665 | 0.007±0.001 | < 0.07 | GF99-0674 |
| 03/16/99 | GF99-0682 | 0.014±0.001 | < 0.07 | GF99-0691 |
| 03/23/99 | GF99-0700 | 0.004±0.001 | < 0.07 | GF99-0709 |
| 03/30/99 | GF99-0718 | 0.007±0.001 | < 0.07 | GF99-0727 |
| 04/06/99 | GF99-0742 | 0.018±0.001 | < 0.07 | GF99-0751 |
| 04/13/99 | GF99-0760 | 0.042±0.001 | < 0.07 | GF99-0769 |
| 04/20/99 | GF99-0778 | 0.010±0.001 | < 0.07 | GF99-0787 |
| 04/27/99 | GF99-0796 | 0.011±0.001 | < 0.07 | GF99-0805 |
| 05/04/99 | GF99-0814 | 0.016±0.001 | < 0.07 | GF99-0823 |
| 05/11/99 | GF99-0832 | 0.010±0.001 | < 0.07 | GF99-0841 |
| 05/18/99 | GF99-0850 | 0.018±0.001 | < 0.07 | GF99-0859 |
| 05/25/99 | GF99-0868 | 0.013±0.001 | < 0.07 | GF99-0877 |
| 06/01/99 | GF99-0888 | 0.017±0.001 | < 0.07 | GF99-0897 |
| 06/08/99 | GF99-0906 | 0.011±0.001 | < 0.07 | GF99-0915 |
| 06/15/99 | GF99-0924 | 0.019±0.001 | < 0.07 | GF99-0933 |
| 06/22/99 | GF99-0942 | 0.009±0.001 | < 0.07 | GF99-0951 |
| 06/29/99 | GF99-096 | 0.013±0.001 | < 0.07 | GF99-0969 |

TABLE 9

**GRAND GULF NUCLEAR STATION
WEEKLY AIR PARTICULATE AND
RADIOIODINE SAMPLE ANALYSES**

STATION 15 RAD HEALTH BLDG.

| <u>Sample Date On</u> | <u>Particulate Number</u> | <u>Gross Beta (pCi/m³)</u> | <u>I-131 Activity</u> | <u>Charcoal Number</u> |
|---------------------------|-------------------------------|-------------------------------------------|---------------------------|----------------------------|
| 07/07/98 | GF99-0009 | 0.027±0.001 | < 0.07 | GF99-0018 |
| 07/14/98 | GF99-0027 | 0.028±0.001 | < 0.07 | GF99-0036 |
| 07/21/98 | GF99-0047 | 0.025±0.001 | < 0.07 | GF99-0056 |
| 07/28/98 | GF99-0067 | 0.007±0.001 | < 0.07 | GF99-0076 |
| 08/04/98 | GF99-0085 | 0.008±0.001 | < 0.07 | GF99-0094 |
| 08/11/98 | GF99-0112 | 0.036±0.001 | < 0.07 | GF99-0103 |
| 08/18/98 | GF99-0121 | 0.029±0.001 | < 0.07 | GF99-0130 |
| 08/25/98 | GF99-0139 | 0.044±0.001 | < 0.07 | GF99-0148 |
| 09/01/98 | GF99-0157 | 0.042±0.001 | < 0.07 | GF99-0166 |
| 09/08/98 | GF99-0175 | 0.009±0.001 | < 0.07 | GF99-0184 |
| 09/15/98 | GF99-0196 | 0.027±0.001 | < 0.07 | GF99-0205 |
| 09/22/98 | GF99-0214 | 0.000±0.001 | < 0.07 | GF99-0223 |
| 09/29/98 | GF99-0232 | 0.018±0.001 | < 0.07 | GF99-0241 |
| 10/06/98 | GF99-0256 | 0.003±0.001 | < 0.07 | GF99-0265 |
| 10/13/98 | GF99-0274 | 0.045±0.001 | < 0.07 | GF99-0283 |
| 10/20/98 | GF99-0294 | 0.081±0.001 | < 0.07 | GF99-0303 |
| 10/27/98 | GF99-0313 | 0.000±0.001 | < 0.07 | GF99-0322 |
| 11/03/98 | GF99-0331 | 0.012±0.001 | < 0.07 | GF99-0340 |
| 11/10/98 | GF99-0349 | 0.039±0.001 | < 0.07 | GF99-0358 |
| 11/17/98 | GF99-0367 | 0.003±0.001 | < 0.07 | GF99-0376 |
| 11/24/98 | GF99-0385 | 0.042±0.001 | < 0.07 | GF99-0394 |
| 12/01/98 | GF99-0403 | 0.001±0.001 | < 0.07 | GF99-0412 |
| 12/08/98 | GF99-0421 | 0.023±0.001 | < 0.07 | GF99-0430 |
| 12/15/98 | GF99-0439 | 0.018±0.001 | < 0.07 | GF99-0448 |
| 12/22/98 | GF99-0457 | 0.024±0.001 | < 0.07 | GF99-0466 |
| 12/29/98 | GF99-0481 | 0.024±0.001 | < 0.07 | GF99-0490 |
| 01/05/99 | GF99-0499 | 0.043±0.001 | < 0.07 | GF99-0508 |
| 01/12/99 | GF99-0517 | 0.028±0.001 | < 0.07 | GF99-0526 |
| 01/19/99 | GF99-0537 | 0.000±0.001 | < 0.07 | GF99-0546 |
| 01/26/99 | GF99-0555 | 0.032±0.001 | < 0.07 | GF99-0564 |
| 02/02/99 | GF99-0573 | 0.005±0.001 | < 0.07 | GF99-0582 |
| 02/09/99 | GF99-0591 | 0.003±0.001 | < 0.07 | GF99-0600 |
| 02/16/99 | GF99-0611 | 0.022±0.001 | < 0.07 | GF99-0620 |
| 02/23/99 | GF99-0629 | 0.019±0.001 | < 0.07 | GF99-0638 |
| 03/02/99 | GF99-0647 | 0.018±0.001 | < 0.07 | GF99-0656 |

**GRAND GULF NUCLEAR STATION
WEEKLY AIR PARTICULATE AND
RADIOIODINE SAMPLE ANALYSES**

STATION 15 RAD HEALTH BLDG(CONT.)

| <u>Sample Date On</u> | <u>Particulate Number</u> | <u>Gross Beta (pCi/m³)</u> | <u>I-131 Activity</u> | <u>Charcoal Number</u> |
|----------------------------------|--------------------------------------|--------------------------------------------------|----------------------------------|-----------------------------------|
| 03/09/99 | GF99-0666 | 0.004±0.001 | < 0.07 | GF99-0675 |
| 03/16/99 | GF99-0683 | 0.027±0.001 | < 0.07 | GF99-0692 |
| 03/23/99 | GF99-0701 | 0.002±0.001 | < 0.07 | GF99-0710 |
| 03/30/99 | GF99-0719 | 0.018±0.001 | < 0.07 | GF99-0728 |
| 04/06/99 | GF99-0743 | 0.005±0.001 | < 0.07 | GF99-0752 |
| 04/13/99 | GF99-0761 | 0.043±0.001 | < 0.07 | GF99-0770 |
| 04/20/99 | GF99-0779 | 0.001±0.001 | < 0.07 | GF99-0788 |
| 04/27/99 | GF99-0797 | 0.023±0.001 | < 0.07 | GF99-0806 |
| 05/04/99 | GF99-0815 | 0.034±0.001 | < 0.07 | GF99-0824 |
| 05/11/99 | GF99-0833 | 0.024±0.001 | < 0.07 | GF99-0842 |
| 05/18/99 | GF99-0851 | 0.051±0.001 | < 0.07 | GF99-0860 |
| 05/25/99 | GF99-0869 | 0.027±0.001 | < 0.07 | GF99-0878 |
| 06/01/99 | GF99-0889 | 0.003±0.001 | < 0.07 | GF99-0898 |
| 06/08/99 | GF99-0907 | 0.020±0.001 | < 0.07 | GF99-0916 |
| 06/15/99 | GF99-0925 | 0.002±0.001 | < 0.07 | GF99-0934 |
| 06/22/99 | GF99-0943 | 0.018±0.001 | < 0.07 | GF99-0952 |
| 06/29/99 | GF99-0961 | 0.032±0.001 | < 0.07 | GF99-0970 |

**GRAND GULF NUCLEAR STATION
THERMOLUMINISCENT DOSIMETRY**

| TLD Locations | TLD No. | Date Placed | Date Retrieved | Exposure mR |
|------------------------------------------|----------------|--------------------|-----------------------|--------------------|
| <u>Fort Cobun:</u> | 104 | 06/30/98 | 10/06/98 | 15.1 |
| Station #: 1 | 25 | 10/06/98 | * | |
| Distance: 2.0 miles | 53 | 01/05/99 | 04/06/99 | 13.5 |
| Azimuth: 337.0 | 10 | 04/06/99 | 07/06/99 | 17.2 |
| | | | | |
| <u>G.G.M. Park:</u> | 106 | 06/30/98 | 10/06/98 | 14.2 |
| Station #: 2 | 29 | 10/06/98 | 01/05/99 | 15.5 |
| Distance: 1.6 miles | 417 | 01/05/99 | 04/06/99 | 14.7 |
| Azimuth: 351.0 | 97 | 04/06/99 | 07/06/99 | 13.5 |
| | | | | |
| <u>Evacuation Sign E of GGNS:</u> | 114 | 06/30/98 | 10/06/98 | 18.8 |
| Station #: 3 | 30 | 10/06/98 | 01/05/99 | 19.6 |
| Distance: 1.5 miles | 424 | 01/05/99 | 04/06/99 | 19.2 |
| Azimuth: 20.0 | 102 | 04/06/99 | 07/06/99 | 16.6 |
| | | | | |
| <u>East of Station 3:</u> | 412 | 06/30/98 | 10/06/98 | 18.0 |
| Station #: 4 | 33 | 10/06/98 | 01/05/99 | 18.4 |
| Distance: 2.3 miles | 425 | 01/05/99 | 04/06/99 | 17.8 |
| Azimuth: 51.0 | 104 | 04/06/99 | 07/06/99 | 17.9 |
| | | | | |
| <u>Underground Cable Sign:</u> | 413 | 06/30/98 | 10/06/98 | 19.1 |
| Station #: 5 | 36 | 10/06/98 | 01/05/99 | 20.8 |
| Distance: 2.7 miles | 428 | 01/06/99 | 04/06/99 | 18.5 |
| Azimuth: 68.0 | 106 | 04/06/99 | 07/06/99 | 18.6 |

Footnote: The asterisk (*) denotes dates in which the TLD was missing upon time of retrieval.

**GRAND GULF NUCLEAR STATION
THERMOLUMINESCENT DOSIMETRY**

| TLD Locations | TLD No. | Date Placed | Date Retrieved | Exposure mR |
|-------------------------------------------|----------------|--------------------|-----------------------|--------------------|
| <u>N of YMCA Pole 88:</u> | 415 | 06/30/98 | 10/06/98 | 17.4 |
| Station #: 6 | 38 | 10/06/98 | 01/05/99 | 17.4 |
| Distance: 4.1 miles | 430 | 01/05/99 | 04/06/99 | 16.4 |
| Azimuth: 47 | 109 | 04/06/99 | 07/06/99 | 15.0 |
| <u>Bonner Beauty Shop:</u> | 416 | 06/30/98 | 10/06/98 | 18.9 |
| Station #: 7 | 41 | 10/06/98 | 01/05/99 | 21.3 |
| Distance: 4.9 miles | 432 | 01/05/99 | 04/06/99 | 15.2 |
| Azimuth: 68 | 110 | 04/06/99 | 07/06/99 | 15.2 |
| <u>Lake Claiborne:</u> | 419 | 06/30/98 | 10/06/98 | 18.3 |
| Station #: 8 | 44 | 10/06/98 | 01/05/99 | 20.7 |
| Distance: 3.2 miles | 434 | 01/05/99 | 04/06/99 | 19.0 |
| Azimuth: 91 | 111 | 04/06/99 | 07/06/99 | 18.3 |
| <u>Trimble Property:</u> | 420 | 06/30/98 | 10/06/98 | 16.4 |
| Station #: 9 | 45 | 10/06/98 | 01/05/99 | 19.5 |
| Distance: 1.0 miles | 442 | 01/05/99 | 04/06/99 | 17.9 |
| Azimuth: 81 | 114 | 04/06/99 | 07/06/99 | 16.7 |
| <u>Road Bed Sign ESE of Plant:</u> | 421 | 06/30/98 | 10/06/98 | 18.9 |
| Station #: 10 | 46 | 10/06/98 | 01/05/99 | 19.6 |
| Distance: 0.6 miles | 445 | 01/05/99 | 04/06/99 | 18.3 |
| Azimuth: 109 | 456 | 04/06/99 | 07/06/99 | 19.1 |

**GRAND GULF NUCLEAR STATION
THERMOLUMINESCENT DOSIMETRY**

| TLD Locations | TLD No. | Date Placed | Date Retrieved | Exposure mR |
|-------------------------------------------|----------------|--------------------|-----------------------|--------------------|
| <u>Arnold Acres:</u> | 422 | 06/30/98 | 10/06/98 | 10.3 |
| Station #: 11 | 47 | 10/06/98 | 01/05/99 | 16.4 |
| Distance: 0.8 miles | 447 | 01/05/99 | 04/06/99 | 18.5 |
| Azimuth: 139 | 413 | 04/06/99 | 07/06/99 | 14.2 |
| | | | | |
| <u>S of Plant:</u> | 443 | 06/30/98 | 10/06/98 | 18.0 |
| Station #: 12 | 54 | 10/06/98 | 01/05/99 | 19.4 |
| Distance: 1.6 miles | 452 | 01/05/99 | 04/06/99 | 18.9 |
| Azimuth: 185 | 415 | 04/06/99 | 07/06/99 | 18.0 |
| | | | | |
| <u>Underground Cable Sign (2):</u> | 446 | 06/30/98 | 10/06/98 | 19.9 |
| Station #: 13 | 56 | 10/06/98 | 01/05/99 | 21.5 |
| Distance: 1.9 miles | 461 | 01/05/99 | 04/06/99 | 21.1 |
| Azimuth: 207 | 416 | 04/06/99 | 07/06/99 | 19.7 |
| | | | | |
| <u>Public Dock:</u> | 486 | 06/30/98 | 10/06/98 | 15.5 |
| Station #: 14 | 57 | 10/06/98 | 01/05/99 | 14.7 |
| Distance: 1.5 miles | 462 | 01/05/99 | 04/06/99 | 14.5 |
| Azimuth: 247 | 416 | 04/06/99 | 07/06/99 | 19.7 |
| | | | | |
| <u>Watson Jr. High:</u> | 492 | 06/30/98 | 10/06/98 | 19.3 |
| Station #: 15 | 58 | 10/06/98 | 01/05/99 | 18.9 |
| Distance: 4.2 miles | 470 | 01/05/99 | 04/06/99 | 19.6 |
| Azimuth: 130 | 420 | 04/06/99 | 07/06/99 | 16.0 |

Footnote: The asterisk (*) denotes the dates in which the TLD was missing upon time of retrieval.

**GRAND GULF NUCLEAR STATION
THERMOLUMINESCENT DOSIMETRY**

| TLD Locations | TLD No. | Date Placed | Date Retrieved | Exposure mR |
|---------------------------------------|----------------|--------------------|-----------------------|--------------------|
| <u>Port Gibson Substation:</u> | 493 | 06/30/98 | 10/06/98 | 18.1 |
| Station #: 16 | 61 | 10/06/98 | 01/05/99 | 17.5 |
| Distance: 4.8 miles | 473 | 01/05/99 | 04/06/99 | 20.0 |
| Azimuth: 122 | 421 | 04/06/99 | 07/06/99 | 16.5 |
| | | | | |
| <u>Vine Street:</u> | 494 | 06/30/98 | 10/06/98 | 18.1 |
| Station #: 17 | 62 | 10/06/98 | 01/05/99 | 17.6 |
| Distance: 5.3 miles | 479 | 01/05/99 | 04/06/99 | 19.1 |
| Azimuth: 135 | 440 | 04/06/99 | 07/06/99 | 16.7 |
| | | | | |
| <u>Center Creek:</u> | 495 | 06/30/98 | 10/06/98 | 17.6 |
| Station #: 18 | 64 | 10/06/98 | 01/05/99 | 17.6 |
| Distance: 4.3 miles | 480 | 01/05/99 | 04/06/99 | 15.3 |
| Azimuth: 147 | 443 | 04/06/99 | 07/06/99 | 14.9 |
| | | | | |
| <u>Windsor Ruins:</u> | 497 | 06/30/98 | 10/06/98 | 18.7 |
| Station #: 19 | 66 | 10/06/98 | 01/05/99 | 20.2 |
| Distance: 6.8 miles | 481 | 01/05/99 | 04/06/99 | 17.9 |
| Azimuth: 224 | 446 | 04/06/99 | 07/06/99 | 18.4 |
| | | | | |
| <u>Point Lookout:</u> | 499 | 06/30/98 | 10/06/98 | 16.1 |
| Station #: 20 | 67 | 10/06/98 | 01/05/99 | 16.7 |
| Distance: 3.6 miles | 482 | 01/05/99 | 04/06/99 | 16.2 |
| Azimuth: 172 | 458 | 04/06/99 | 07/06/99 | 16.5 |

**GRAND GULF NUCLEAR STATION
THERMOLUMINESCENT DOSIMETRY**

| TLD Locations | TLD No. | Date Placed | Date Retrieved | Exposure mR |
|-----------------------------------------|----------------|--------------------|-----------------------|--------------------|
| <u>E of Windsor Ruins:</u> | 501 | 06/30/98 | 10/06/98 | 19.0 |
| Station #: 28 | 70 | 10/06/98 | 01/05/99 | 20.9 |
| Distance: 4.8 miles | 488 | 01/05/99 | 04/06/99 | 18.4 |
| Azimuth: 206 | 492 | 04/06/99 | 07/06/99 | 21.0 |
| <u>Maggie Jackson's Trailer:</u> | 505 | 06/30/98 | 10/06/98 | 15.9 |
| Station #: 29 | 75 | 10/06/98 | 01/05/99 | 18.4 |
| Distance: 0.9 miles | 489 | 01/05/99 | 04/06/99 | 16.9 |
| Azimuth: 90 | 493 | 04/06/99 | 07/06/99 | 16.1 |
| <u>Jackson (Mississippi):</u> | 506 | 06/30/98 | 10/06/98 | 12.2 |
| Station #: 30 | 76 | 10/06/98 | 01/05/99 | 12.9 |
| Distance: 51.0 miles | 90 | 01/05/99 | 04/06/99 | 13.6 |
| Azimuth: 67 | 494 | 04/06/99 | 07/06/99 | 12.7 |
| <u>Jackson (Mississippi):</u> | 508 | 06/30/98 | 10/06/98 | 13.4 |
| Station #: 31 | 77 | 10/06/98 | 01/05/99 | 14.1 |
| Distance: 51.0 miles | 491 | 01/05/99 | 04/06/99 | 14.2 |
| Azimuth: 67 | 495 | 04/06/99 | 07/06/99 | 13.8 |

Footnote: The asterisk (*) denotes the dates in which the TLD was missing upon time of retrieval.

**GRAND GULF NUCLEAR STATION
THERMOLUMINESCENT DOSIMETRY**

| TLD Locations | TLD No. | Date Placed | Date Retrieved | Exposure mR |
|--------------------------------------|----------------|--------------------|-----------------------|--------------------|
| <u>Jackson (Mississippi):</u> | 509 | 06/30/98 | 10/06/98 | 11.8 |
| Station #: 32 | 81 | 10/06/98 | 01/05/99 | 15.7 |
| Distance: 51.0 miles | 518 | 01/05/99 | 04/06/99 | 14.1 |
| Azimuth: 67 | 497 | 04/06/99 | 07/06/99 | 12.8 |

**GRAND GULF NUCLEAR STATION
MISSISSIPPI RIVER WATER
GAMMA ISOTOPIC ANALYSIS**

| Location | Sample No. | Date | Activity (pCi/l) |
|------------------------------------------------------------|-------------------|-------------|-------------------------|
| <u>MS River Upstream</u> Distance: 2 miles NNW | GF99-1005 | 07/06/98 | <LLD |
| | GF99-0245 | 09/29/98 | <LLD |
| | GF99-0470 | 12/29/99 | <LLD |
| | GF99-0732 | 04/06/99 | <LLD |
| | GF99-0736 | 04/06/99 | <LLD |
| <u>MS River Downstream</u> Distance: 2 miles WSW | GF99-1006 | 07/06/98 | <LLD |
| | GF99-0247 | 09/29/98 | <LLD |
| | GF99-0471 | 12/29/98 | <LLD |
| | GF99-0733 | 04/06/99 | <LLD |
| <u>GGNS Barge Slip</u> | GF99-1007 | 07/06/98 | <LLD |
| | GF99-0246 | 09/29/98 | <LLD |
| | GF99-0472 | 12/29/98 | <LLD |
| | GF99-0738 | 04/06/99 | <LLD |
| <u>GGNS Discharge Sample</u> | GF99-0304 | 10/22/98 | <LLD |

**GRAND GULF NUCLEAR STATION
MISSISSIPPI RIVER WATER
TRITIUM ANALYSIS**

| Location | Sample No. | Date | Tritium (pCi/l) |
|------------------------------------------------------------|-------------------|-------------|------------------------|
| <u>MS River Upstream</u> Distance: 2 miles NNW | GF99-1008 | 07/06/98 | <330 |
| | GF99-0242 | 09/29/98 | <330 |
| | GF99-0467 | 12/29/98 | <330 |
| | GF99-0729 | 04/06/99 | <330 |
| <u>MS River Downstream</u> Distance: 2 miles WSW | GF99-1009 | 07/06/98 | <330 |
| | GF99-0244 | 09/29/98 | <330 |
| | GF99-0468 | 12/29/98 | <330 |
| | GF99-0730 | 04/06/99 | <330 |
| <u>GGNS Barge Slip</u> | GF99-1010 | 07/06/98 | <330 |
| | GF99-0243 | 09/29/98 | <330 |
| | GF99-0469 | 12/29/98 | <330 |
| | GF99-0731 | 04/06/99 | <330 |

**GRAND GULF NUCLEAR STATION
VEGETATION/SOIL AND SEDIMENT/FISH/GAME SAMPLES
GAMMA ISOTOPIC ANALYSIS**

| <u>Vegetation</u> | <u>Sample No.</u> | <u>Date</u> | <u>Sector</u> | <u>Activity (pCi/kg)</u> |
|-------------------|-------------------|-------------|---------------|--------------------------|
| Cabbage | GF99-057 | 07/23/98 | H | <LLD |
| Cabbage | GF99-058 | 07/23/98 | Control | <LLD |
| Egg Plant | GF99-284 | 10/14/98 | H | <LLD |
| Okra | GF99-285 | 10/14/98 | Control | <LLD |
| Turnip Green | GF99-527 | 01/18/98 | Control | <LLD |
| Turnip Green | GF99-528 | 01/18/98 | H | <LLD |
| Photenia sp. | GF99-879 | 05/04/98 | Alcorn | <LLD |
| Kudzu | GF99-880 | 05/04/98 | J | <LLD |

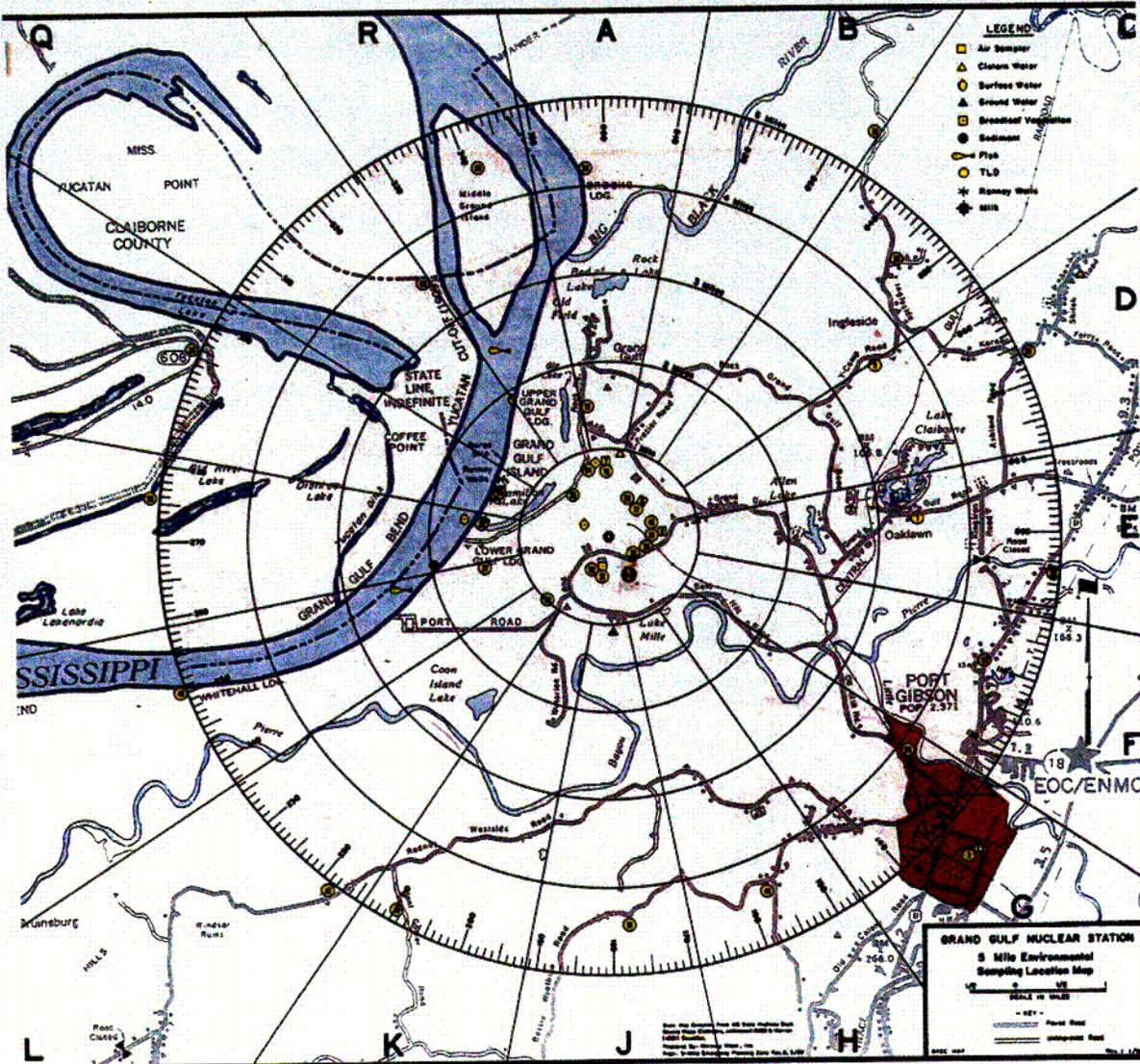
| <u>Location</u> | <u>Sample No.</u> | <u>Date</u> | <u>Sample Type</u> | <u>Activity (pCi/kg)</u> |
|---------------------|-------------------|-------------|--------------------|--------------------------|
| MS River Upstream | GF99-185 | 09/10/98 | Sediment | <LLD |
| MS River Downstream | GF99-186 | 09/10/98 | Sediment | <LLD |
| GGNS Barge Slip | GF99-187 | 09/10/98 | Sediment | <LLD |
| Y Camp | GF99-601 | 02/10/99 | Soil | <LLD |
| Y Camp | GF99-602 | 02/10/99 | Soil | <LLD |

| <u>Location</u> | <u>Sample No.</u> | <u>Date</u> | <u>Sample Type</u> | <u>Activity (pCi/kg)</u> |
|--------------------|-------------------|-------------|--------------------|--------------------------|
| Bow Club | GF99-645 | 02/02/99 | Deer | <LLD |
| Buffalo Downstream | GF99-986 | 06/22/99 | Fish | <LLD |

List of Figures

Grand Gulf Sampling Location (Figure 1)

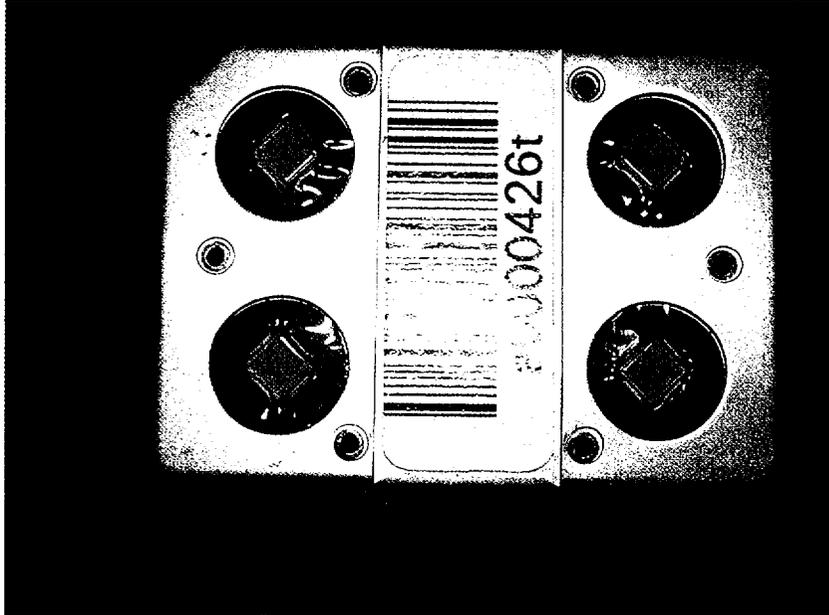
Sample Collection Sites - 5 Mile Map



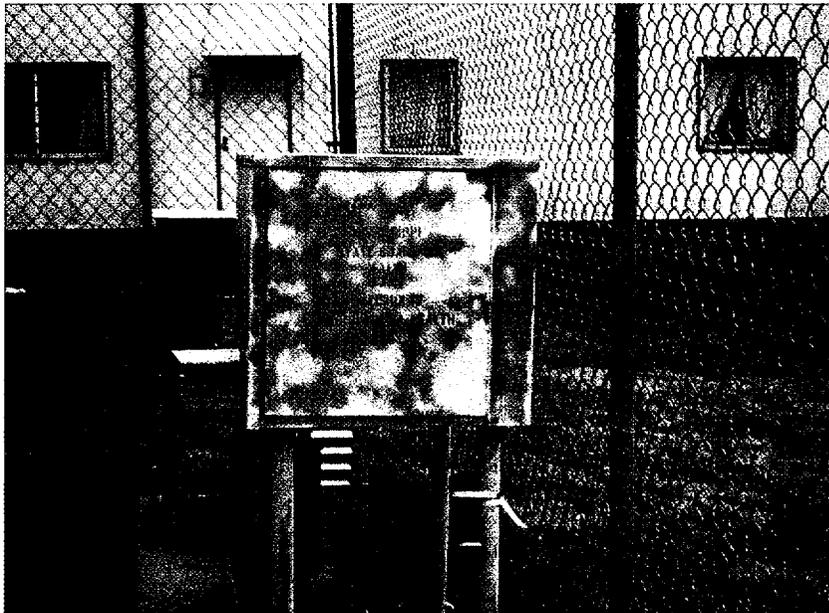
CI

List of Figures (Cont.)

Thermoluminescent Dosimeter (Figure 2)

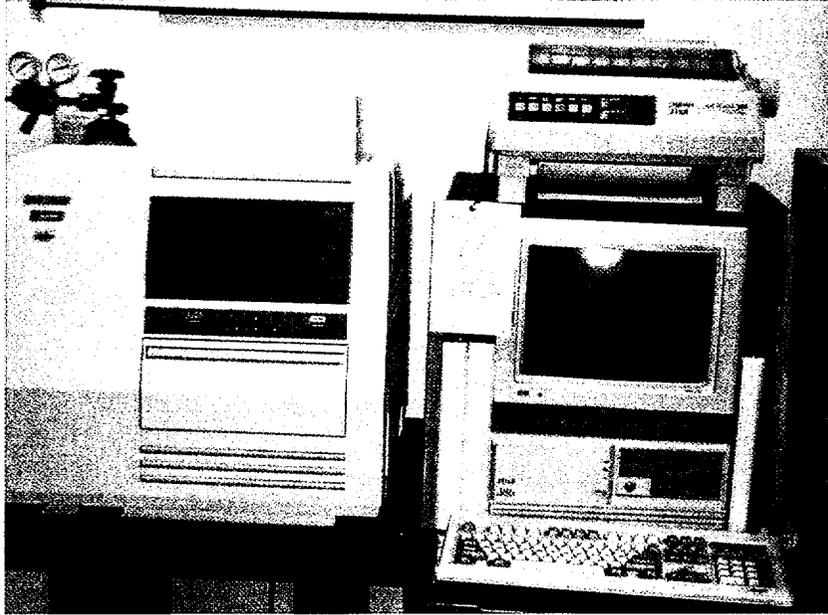


Low Volume Continuous Air Sampler (Figure 3)



List of Figures (Cont.)

Thermoluminescent Dosimeter (Figure 4)



Radon Measurements Laboratory (Figure 4A)

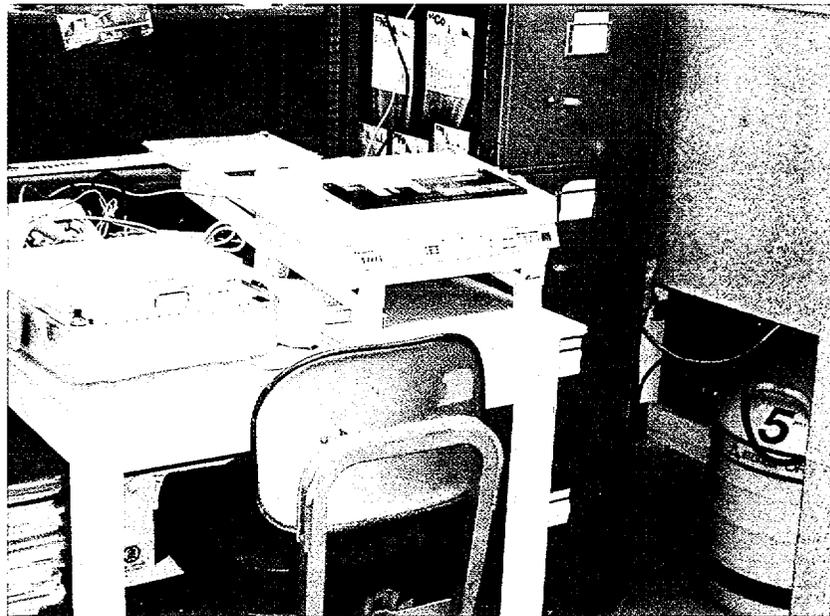


List of Figures (Cont.)

Mobile Environmental Emergency Response Laboratory (Figure 5)

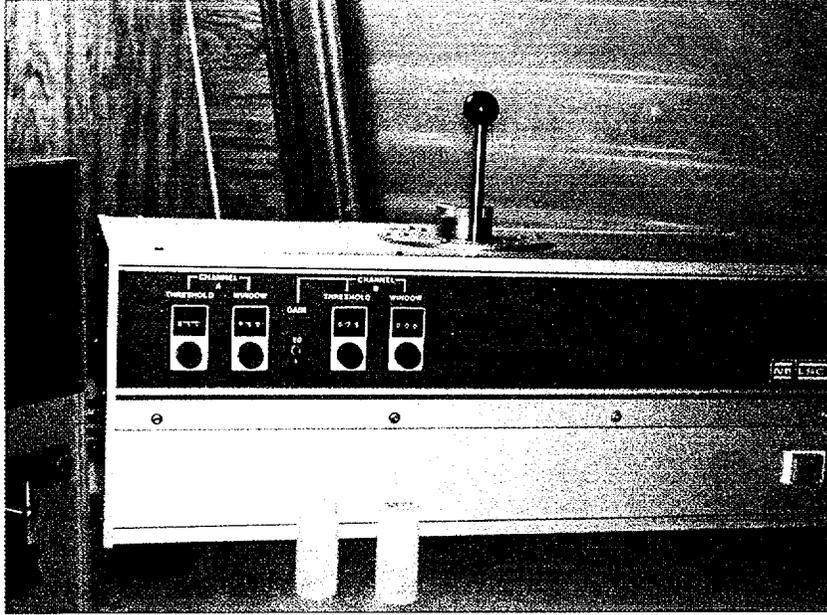


Mobile Laboratory Gamma Spectroscopy System (Figure 6)

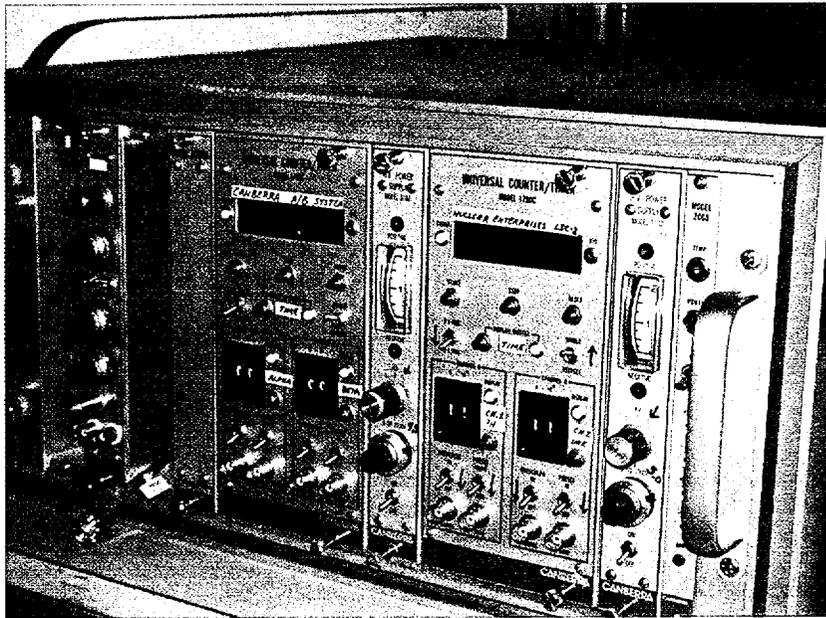


List of Figures (Cont.)

Nuclear Enterprises Liquid Scintillation System (Figure 7)

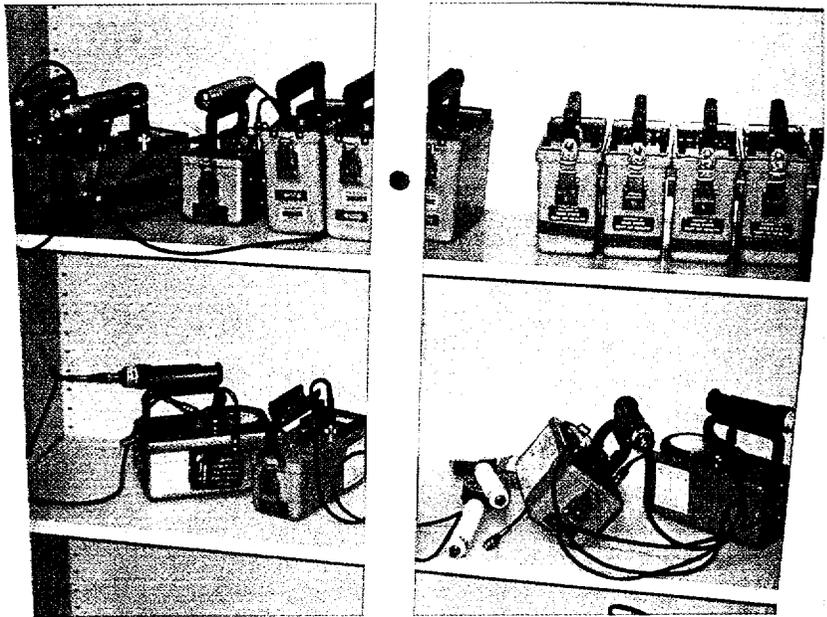
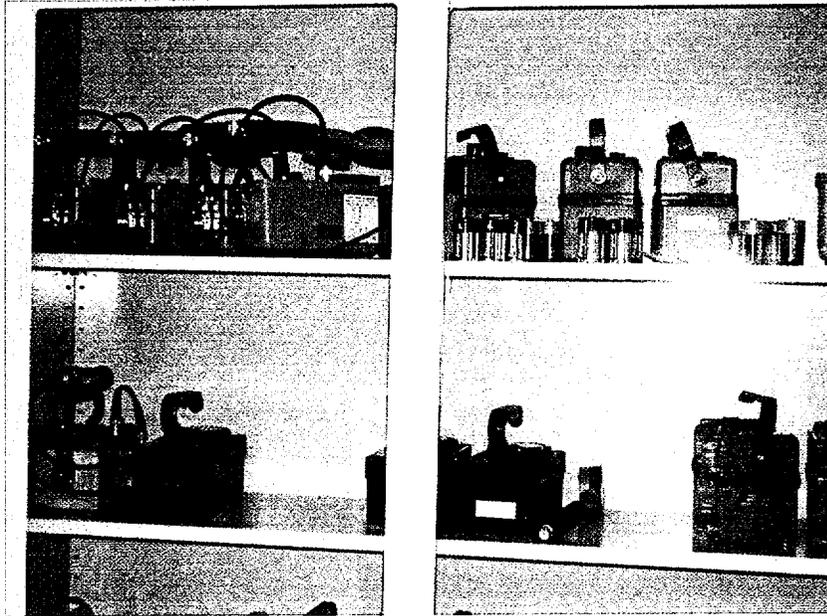


Mobile Laboratory Canberra Alpha/Beta System (Figure 8)



List of Figures (Cont.)

Survey Instruments (Figure 9)



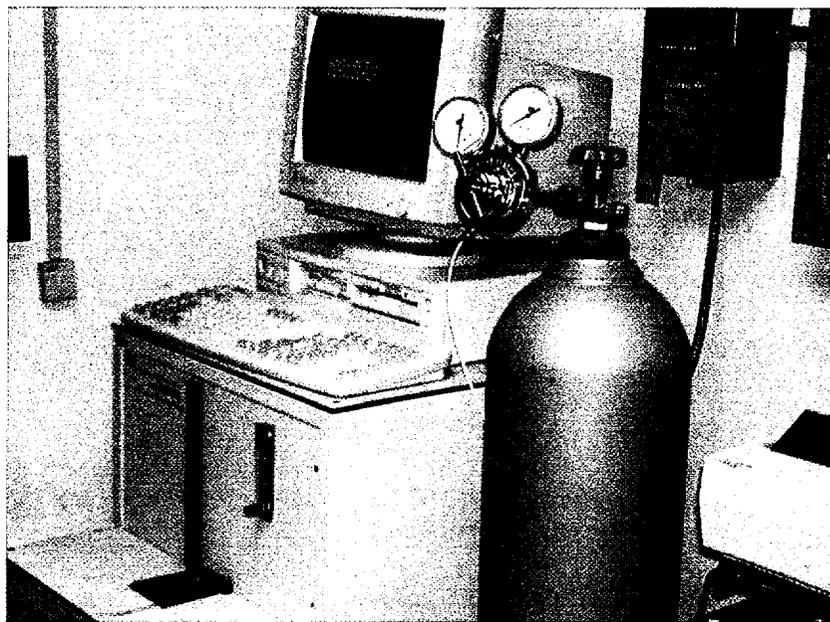
List of Figures (Cont.)

Chevy Suburbans (Figure 10)
(Environmental Monitoring & Emergency Response Vehicles)



List of Figures (Cont.)

**Gamma Products Low Background Gas Flow Proportional Counter
(Figure 11)**

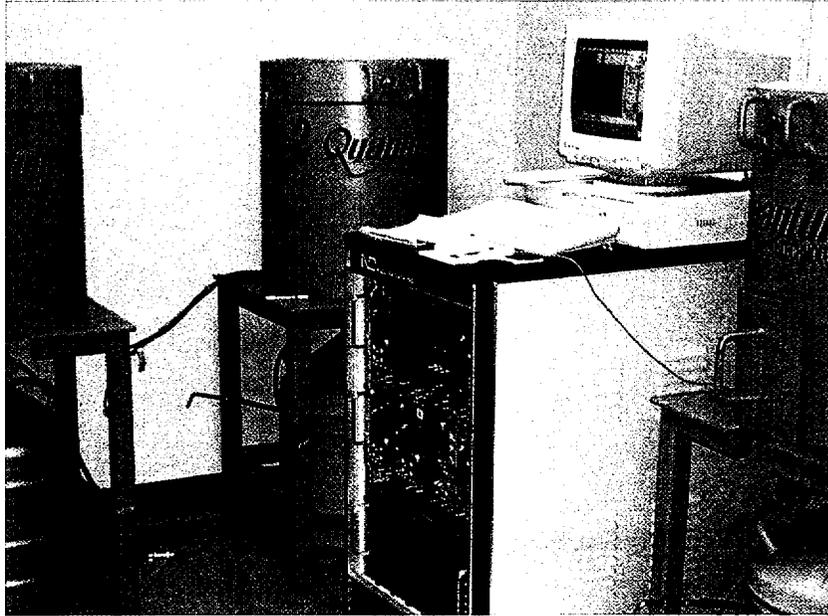


**Canberra 2404 Low Background Gas Flow Proportional Counter
(Figure 12)**



List of Figures (Cont.)

Fixed Laboratory Gamma Spectroscopy System (Figure 13)



Beckman LS-1800 Liquid Scintillation Counter (Figure 14)

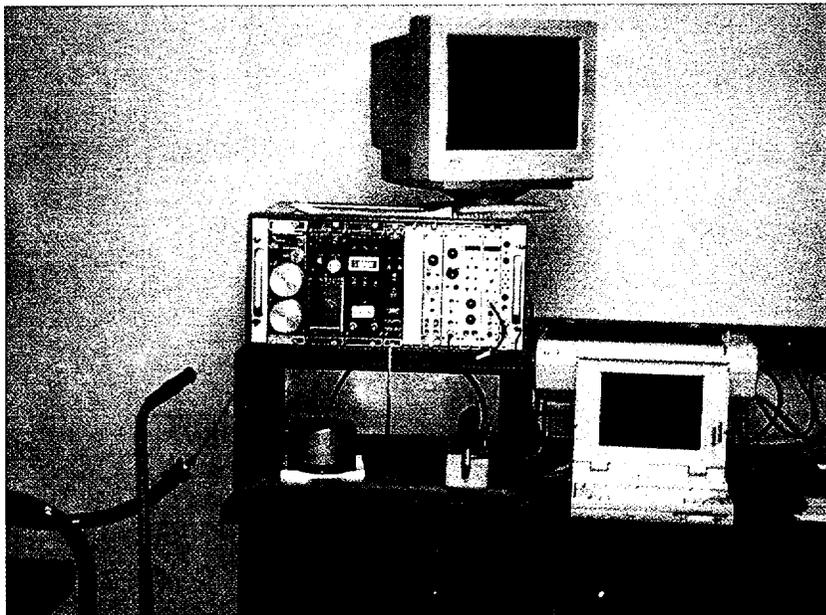


List of Figures (Cont.)

Packard Tri-Carb 2200CA Liquid Scintillation Counter (Figure 15)



Alpha Spectroscopy System (Figure 16)



Appendix I

Lower Limit of Detection (LLD)

The following are detection capability for environmental sample analysis.

| | Water Analysis (<u>pCi/l</u>) | Airborne Particulate or Gas (<u>PCi/m³</u>) | Fish, Meat or Poultry (<u>pCi/g, wet</u>) | Milk (<u>PCi/l</u>) | Food Products (<u>pCi/g, wet</u>) | Sediment (<u>pCi/g, dry</u>) |
|-------------------|---------------------------------------|-------------------------------------------------------------------|---------------------------------------------------|--------------------------|-------------------------------------------|-----------------------------------|
| gross beta | | 1.0E-02 | 1.0E-02 | | | |
| ³ H | 330 | | | | | |
| ⁵⁴ Mg | 15 | 1.0E-02 | 1.3E-01 | | 15 | 1.0E-01 |
| ⁵⁹ Fe | 30 | 2.0E-02 | 2.6E-01 | | 30 | 2.0E-01 |
| ⁵⁸ Co | 15 | 1.0E-02 | 1.3E-01 | | 13 | 1.0E-01 |
| ⁶⁰ Co | 15 | 1.0E-02 | 1.3E-01 | | 10 | 1.0E-01 |
| ⁶⁵ Zn | 30 | 2.0E-02 | 2.6E-01 | | 20 | 2.0E-01 |
| ⁹⁵ Zr | 30 | 2.0E-02 | | | 10 | 2.0E-01 |
| ⁹⁵ Nb | 15 | 2.0E-02 | | | 15 | 2.0E-01 |
| ¹³¹ I | 10 | 7.0E-02 | | 1 | 10 | 2.0E-01 |
| ¹³⁴ Cs | 15 | 5.0E-02 | 1.3E-01 | 8 | 8 | 1.5E-01 |
| ¹³⁷ Cs | 15 | 6.0E-02 | 1.5E-01 | 8 | 8 | 1.8E-01 |
| ¹⁴⁰ Ba | 15 | 2.0E-02 | | 15 | 15 | 2.0E-01 |
| ¹⁴⁰ LA | 15 | 2.0E-02 | 1.5E-01 | 15 | 15 | |

APPENDIX II

GRAND GULF NUCLEAR STATION Nuclear Regulatory commission Lower Limit of Detection

The following were specific contractual detection capabilities for environmental sample analysis.

| | Water Analysis (pCi/l) | Airborne Particulate or Gas (PCi/m ³) | Fish, Meat or Poultry (pCi/g. wet) | Milk (PCi/l) | Food Products (pCi/g. wet) | Sediment (pCi/g. dry) |
|-------------------|------------------------------|------------------------------------------------------------|------------------------------------------|-----------------|----------------------------------|--------------------------|
| | gross beta | 4 ^Q | 1.0E-02 | | | |
| ³ H | 2000 1000 ^Q | | | | | |
| ⁵⁴ Mg | 15 | 1.0E-02 | 1.30 | | 60 | 100 |
| ⁵⁹ Fe | 30 | 2.0E-02 | 2.60 | | 80 | 200 |
| ⁵⁸ Co | 15 | 1.0E-02 | 130 | | 50 | 100 |
| ⁶⁰ Co | 15 | 1.0E-02 | 130 | | 50 | 100 |
| ⁶⁵ Zn | 30 | 2.0E-02 | 260 | | 60 | 200 |
| ⁹⁵ Zr | 30 | 2.0E-02 | | | 80 | 200 |
| ⁹⁵ Nb | 15 | 2.0E-02 | | | 80 | 200 |
| ¹³¹ I | 1 ^Q | 7.0E-02 | | 1 | 60 | 200 |
| ¹³⁴ Cs | 15 | 5.0E-02 | 130 | 15 | 60 | 150 |
| ¹³⁷ Cs | 18 | 6.0E-02 | 150 | 18 | 80 | 180 |
| ¹⁴⁰ Ba | 60 | 2.0E-02 | | 60 | 60 | 200 |
| ¹⁴⁰ LA | 15 | 2.0E-02 | 15 | 60 | 200 | |

^Q LLD for drinking water.

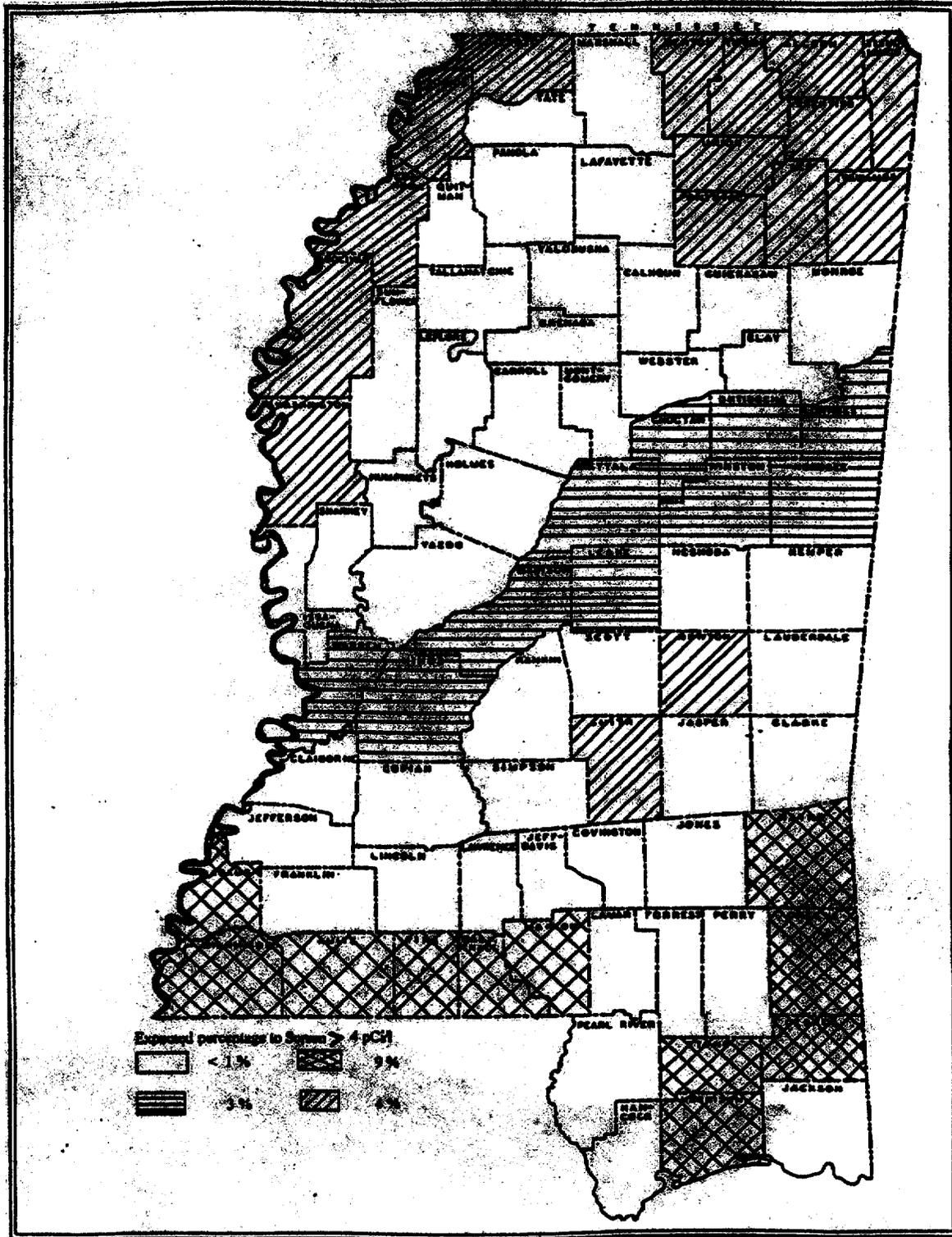
APPENDIX III

GGNS AIR SAMPLER LOCATIONS

| <u>Air Sampler #</u> | <u>Location</u> | <u>Sector</u> |
|----------------------|---------------------------------|---------------|
| Air Sampler #7 | Arnold Acres Property | (Sector J-1) |
| Air Sampler #8 | Watson Junior High School | (Sector G-4) |
| Air Sampler #9 | Trimble Property | (Sector E-1) |
| Air Sampler #10 | Mcgee Property | (Sector A-2) |
| Air Sampler #11 | Bald Hill Road | (Sector L-1) |
| Air Sampler #12 | Grand Gulf Military Park | (Sector R-2) |
| Air Sampler #13 | Ingleside Water Authority | (Sector D-4) |
| Air Sampler #14 | Point Lookout | (Sector K-4) |
| Air Sampler #15 | Division of Radiological Health | Jackson, MS |

APPENDIX IV

STATE OF MISSISSIPPI RADON POTENTIAL MAP



APPENDIX V

RESIDENTIAL INDOOR RADON SURVEY

| COUNTY | NO. OF MEAS. | MEAN | GEOM. MEAN | MEDIAN | STD. DEV. | MAXIMUM | %>4 pCi/L | %>20 pCi/L |
|-----------------|--------------|------|------------|--------|-----------|---------|-----------|------------|
| ADAMS | 9 | 1.4 | 0.5 | 0.8 | 2.5 | 7.3 | 11 | 0 |
| ALCORN | 40 | 0.9 | 0.5 | 0.6 | 1.2 | 6.8 | 5 | 0 |
| AMITE | 3 | 0.7 | 0.6 | 0.9 | 0.3 | 0.9 | 0 | 0 |
| ATTALA | 4 | 0.5 | 0.4 | 0.4 | 0.3 | 0.9 | 0 | 0 |
| BENTON | 7 | 1.8 | 1.1 | 0.9 | 1.8 | 4.6 | 29 | 0 |
| BOLIVAR | 11 | 3.0 | 0.7 | 0.8 | 6.7 | 22.8 | 9 | 9 |
| CALHOUN | 3 | 1.4 | 0.6 | 0.6 | 1.8 | 3.5 | 0 | 0 |
| CARROLL | 5 | 0.5 | 0.3 | 0.3 | 0.5 | 1.2 | 0 | 0 |
| CHICKASAW | 1 | 3.8 | 3.8 | 3.8 | 0.0 | 3.8 | 0 | 0 |
| CHOCTAW | 3 | 0.3 | 0.3 | 0.3 | 0.1 | 0.4 | 0 | 0 |
| CLAIBORNE | 2 | 0.8 | 0.6 | 0.8 | 0.7 | 1.3 | 0 | 0 |
| CLARKE | 6 | 0.5 | 0.3 | 0.4 | 0.6 | 1.6 | 0 | 0 |
| CLAY | 6 | 0.5 | 0.4 | 0.4 | 0.3 | 1.1 | 0 | 0 |
| COAHOMA | 9 | 1.0 | 0.5 | 0.5 | 1.5 | 4.9 | 11 | 0 |
| COPIAH | 6 | 0.8 | 0.6 | 0.6 | 0.6 | 2.0 | 0 | 0 |
| COVINGTON | 6 | 0.7 | 0.5 | 0.7 | 0.4 | 1.4 | 0 | 0 |
| DE SOTO | 19 | 1.1 | 0.7 | 0.9 | 0.9 | 3.4 | 0 | 0 |
| FORREST | 23 | 0.5 | 0.3 | 0.4 | 0.6 | 2.5 | 0 | 0 |
| FRANKLIN | 1 | 0.2 | 0.2 | 0.2 | 0.0 | 0.2 | 0 | 0 |
| GEORGE | 9 | 1.1 | 0.7 | 0.6 | 1.4 | 4.6 | 11 | 0 |
| GREENE | 10 | 1.7 | 0.8 | 0.5 | 2.1 | 5.8 | 20 | 0 |
| GRENADA | 9 | 1.1 | 0.7 | 0.8 | 1.1 | 3.7 | 0 | 0 |
| HANCOCK | 11 | 0.5 | 0.3 | 0.3 | 0.5 | 1.4 | 0 | 0 |
| HARRISON | 40 | 0.3 | 0.2 | 0.3 | 0.4 | 2.0 | 0 | 0 |
| HINDS | 57 | 1.0 | 0.6 | 0.6 | 0.9 | 4.5 | 2 | 0 |
| HOLMES | 3 | 0.3 | 0.2 | 0.4 | 0.3 | 0.5 | 0 | 0 |
| HUMPHREYS | 33 | 0.9 | 0.4 | 0.4 | 1.2 | 3.6 | 0 | 0 |
| ISSAQUENA | 4 | 1.2 | 0.9 | 0.7 | 1.3 | 3.1 | 0 | 0 |
| ITAWAMBA | 23 | 1.2 | 0.9 | 0.9 | 0.8 | 2.7 | 0 | 0 |
| JACKSON | 37 | 0.3 | 0.2 | 0.2 | 0.4 | 1.2 | 0 | 0 |
| JASPER | 7 | 0.3 | 0.2 | 0.1 | 0.4 | 0.8 | 0 | 0 |
| JEFFERSON | 3 | 0.2 | 0.2 | 0.1 | 0.5 | 0.8 | 0 | 0 |
| JEFFERSON DAVIS | 6 | 1.0 | 0.9 | 0.7 | 0.7 | 2.3 | 0 | 0 |
| JONES | 17 | 1.0 | 0.4 | 0.7 | 1.2 | 3.7 | 0 | 0 |
| KEMPER | 2 | 0.5 | 0.5 | 0.5 | 0.1 | 0.6 | 0 | 0 |
| LAFAYETTE | 12 | 0.9 | 0.6 | 0.8 | 0.7 | 2.2 | 0 | 0 |
| LAMAR | 12 | 0.6 | 0.4 | 0.5 | 0.5 | 1.5 | 0 | 0 |
| LAUDERDALE | 13 | 0.8 | 0.5 | 0.5 | 0.8 | 2.7 | 0 | 0 |
| LAWRENCE | 3 | 0.2 | 0.2 | 0.2 | 0.1 | 0.3 | 0 | 0 |
| LEAKE | 7 | 1.0 | 0.3 | 0.2 | 2.0 | 5.4 | 14 | 0 |
| LEE | 67 | 0.9 | 0.5 | 0.5 | 1.1 | 5.3 | 1 | 0 |

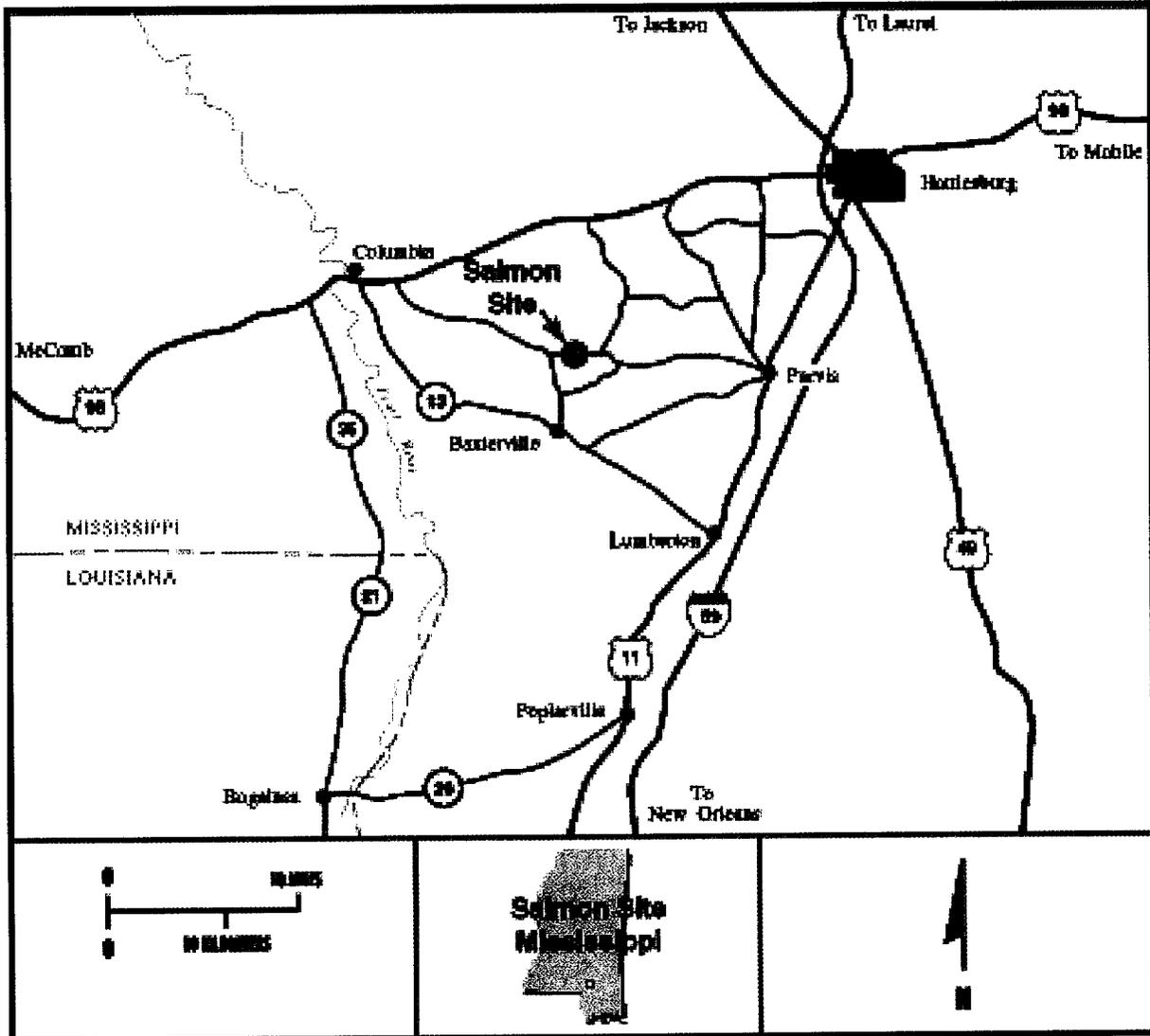
APPENDIX V (CONT)

RESIDENTIAL INDOOR RADON SURVEY

| COUNTY | NO. OF MEAS. | MEAN | GEOM. MEAN | MEDIAN | STD. DEV. | MAXIMUM | %>4 pCi/L | %>20 pCi/L |
|--------------|--------------|------|------------|--------|-----------|---------|-----------|------------|
| LEFLORE | 12 | 1.1 | 0.6 | 0.8 | 1.2 | 4.0 | 0 | 0 |
| LINCOLN | 6 | 1.2 | 0.8 | 0.7 | 1.1 | 3.1 | 0 | 0 |
| LOWNDES | 12 | 1.1 | 0.7 | 0.9 | 1.2 | 4.5 | 8 | 0 |
| MADISON | 10 | 0.4 | 0.3 | 0.6 | 0.5 | 0.9 | 0 | 0 |
| MARION | 6 | 1.5 | 0.5 | 0.4 | 2.9 | 7.5 | 17 | 0 |
| MARSHALL | 1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 0 |
| MONROE | 11 | 0.4 | 0.3 | 0.4 | 0.4 | 1.1 | 0 | 0 |
| MONTGOMERY | 2 | 0.5 | 0.4 | 0.5 | 0.1 | 0.5 | 0 | 0 |
| NESHOBA | 1 | 0.6 | 0.6 | 0.6 | 0.0 | 0.6 | 0 | 0 |
| NEWTON | 5 | 1.4 | 0.8 | 1.3 | 0.9 | 2.3 | 0 | 0 |
| NOXUBEE | 2 | 1.9 | 1.2 | 1.9 | 2.1 | 3.4 | 0 | 0 |
| OKTIBBEHA | 17 | 1.3 | 0.8 | 0.9 | 1.2 | 4.0 | 0 | 0 |
| PANOLA | 8 | 1.3 | 0.7 | 1.0 | 1.2 | 3.3 | 0 | 0 |
| PEARL RIVER | 13 | 0.6 | 0.3 | 0.2 | 0.8 | 2.5 | 0 | 0 |
| PERRY | 8 | 0.6 | 0.5 | 0.6 | 0.3 | 1.1 | 0 | 0 |
| PIKE | 9 | 1.4 | 0.9 | 1.2 | 1.1 | 3.1 | 0 | 0 |
| PONTOTOC | 10 | 1.8 | 0.7 | 0.5 | 2.8 | 9.0 | 10 | 0 |
| PRENTISS | 25 | 0.7 | 0.4 | 0.5 | 0.6 | 1.8 | 0 | 0 |
| QUITMAN | 3 | 0.2 | 0.2 | 0.2 | 0.3 | 0.5 | 0 | 0 |
| RANKIN | 20 | 0.7 | 0.5 | 0.6 | 0.7 | 2.3 | 0 | 0 |
| SCOTT | 4 | 0.4 | 0.3 | 0.2 | 0.3 | 0.8 | 0 | 0 |
| SHARKEY | 19 | 1.3 | 0.8 | 1.2 | 1.1 | 3.9 | 0 | 0 |
| SIMPSON | 5 | 0.3 | 0.3 | 0.3 | 0.2 | 0.6 | 0 | 0 |
| SMITH | 5 | 0.7 | 0.4 | 0.7 | 0.6 | 1.5 | 0 | 0 |
| STONE | 9 | 0.7 | 0.4 | 0.3 | 0.7 | 2.1 | 0 | 0 |
| SUNFLOWER | 7 | 0.6 | 0.4 | 0.6 | 0.5 | 1.3 | 0 | 0 |
| TALLAHATCHIE | 1 | 1.1 | 1.1 | 1.1 | 0.0 | 1.1 | 0 | 0 |
| TATE | 6 | 1.0 | 0.6 | 0.5 | 1.1 | 2.4 | 0 | 0 |
| TIPPAH | 14 | 0.7 | 0.4 | 0.7 | 0.6 | 2.3 | 0 | 0 |
| TISHOMINGO | 24 | 1.4 | 0.8 | 0.9 | 2.1 | 10.5 | 4 | 0 |
| TUNICA | 2 | 0.8 | 0.8 | 0.8 | 0.3 | 1.0 | 0 | 0 |
| UNION | 13 | 1.5 | 1.0 | 0.9 | 1.8 | 7.1 | 8 | 0 |
| WALTHALL | 4 | 0.7 | 0.2 | 0.3 | 1.1 | 2.3 | 0 | 0 |
| WARREN | 14 | 1.6 | 1.0 | 1.3 | 1.8 | 7.0 | 7 | 0 |
| WASHINGTON | 70 | 1.2 | 0.5 | 0.6 | 2.1 | 16.1 | 3 | 0 |
| WAYNE | 6 | 1.6 | 1.2 | 1.2 | 1.3 | 4.1 | 17 | 0 |
| WEBSTER | 5 | 1.2 | 1.2 | 1.2 | 0.2 | 1.5 | 0 | 0 |
| WILKINSON | 3 | 0.4 | 0.2 | 0.2 | 0.5 | 0.9 | 0 | 0 |
| WINSTON | 6 | 0.4 | 0.2 | 0.4 | 0.4 | 1.2 | 0 | 0 |
| YALOBUSHA | 4 | 0.4 | 0.2 | 0.3 | 0.4 | 0.9 | 0 | 0 |
| YAZOO | 9 | 0.9 | 0.5 | 0.5 | 1.1 | 3.3 | 0 | 0 |

APPENDIX VI

SALMON TEST SITE LOCATION MAP



APPENDIX VII

EPA Cross-Check Results--1998

All values reported in pCi/l unless otherwise indicated.

| | Analysis Results Reported | Analysis Results Averaged | Known Results |
|-----------------------------|------------------------------|------------------------------|------------------|
| January | | | |
| Strontium in Water | | | |
| Strontium 89 | 8, 8, 9 | 8.3 | 8±8.7 |
| Strontium 90 | 32, 33, 33 | 32.6 | 32±8.7 |
| Gross Alpha/Beta in Water | | | |
| Alpha | 21.9, 21.9, 22.0 | 21.9 | 30.5±13.2 |
| Beta | 5.3, 5.6, 5.7 | 5.5 | 3.9±8.7 |
| February | | | |
| Iodine in Water | | | |
| Iodine | 103, 104, 104 | 103.6 | 104.9±18.2 |
| Uranium and Radium in Water | | | |
| Uranium | 4.8, 34.8, 34.9 | 34.9 | 32±5.2 |
| Radium 226 | 15.4, 15.4, 15.5 | 15.5 | 16±4.2 |
| Radium 228 | 24.5, 24.5, 24.6 | 24.6 | 33.3±14.4 |
| March | | | |
| Tritium in Water | | | |
| Tritium | 2175, 2183, 2187 | 2182 | 2155±603 |
| April | | | |
| Performance Evaluation | | | |
| Intercomparison Study | | | |
| Alpha | 58.7, 58.9, 59.1 | 58.9 | 54.0±23.6 |
| Radium 226 | 14.1, 14.3, 14.5 | 14.3 | 15.0±2.0 |
| Radium 228 | 7.1, 7.3, 7.5 | 7.3 | 9.3±4.0 |
| Uranium | 6.0, 7.0, 7.0 | 6.6 | 5.0±5.2 |
| Beta | 98.2, 98.4, 98.6 | 98.4 | 4.7±17.3 |
| Strontium 89 | 6.0, 7.0, 7.0 | 6.6 | 6.0±8.7 |
| Strontium 90 | 18.0, 19.0, 19.0 | 18.6 | 18.0±8.7 |
| Cobalt 60 | 53.0, 53.0, 53.0 | 53.0 | 50±8.7 |
| Cesium 134 | 24.0, 25.0, 25.0 | 24.6 | 22±8.7 |
| Cesium 137 | 10.0, 11.0, 11.0 | 10.6 | 10±8.7 |

| | Analysis Results Reported | Analysis Results Averaged | Known Results |
|------------------------------|------------------------------|------------------------------|------------------|
| June | | | |
| Radionuclides in Water | | | |
| Cobalt 60 | 14, 14, 14 | 14.0 | 12±8.7 |
| Zinc 65 | 111, 112, 112 | 111.6 | 104±17.3 |
| Cesium 134 | 28, 28, 29 | 28.3 | 31±8.7 |
| Cesium 137 | 34, 34, 35 | 34.3 | 35±8.7 |
| Barium 133 | 37, 38, 38 | 37.3 | 40±8.7 |
| Uranium and Radium in Water | | | |
| Uranium | 3.0, 3.0, 3.0 | 3.0 | 3.0±5.2 |
| Radium 226 | 4.9, 4.9, 5.0 | 4.9 | 4.9±1.2 |
| Radium 228 | 2.2, 2.4, 2.6 | 2.4 | 2.1±0.9 |
| July | | | |
| Strontium in Water | | | |
| Strontium 89 | 18, 18, 18 | 18.0 | 21±8.7 |
| Strontium 90 | 7, 7, 7 | 7.0 | 7±8.7 |
| Gross Alpha/Beta in Water | | | |
| Alpha | 8.8, 9.5, 9.9 | 9.4 | 7.2±8.7 |
| Beta | 13.6, 13.6, 13.3 | 13.5 | 12.8±8.7 |
| August | | | |
| Tritium in Water | | | |
| Tritium | 17916, 17936, 17956 | 17936 | 17996±3122 |
| September | | | |
| Uranium and Radium in Water | | | |
| Uranium | 9.5, 9.5, 9.5 | 9.5 | 9.1±5.2 |
| Radium 226 | 1.8, 1.8, 1.8 | 1.8 | 1.7±0.9 |
| Radium 228 | 4.1, 4.1, 4.2 | 4.1 | 5.7±2.4 |
| Iodine in Water | | | |
| Iodine | 9.6, 9.8, 10 | 9.8 | 6.1±3.5 |

EPA Cross-Check Results (Cont.)

| | Analysis Results Reported | Analysis Results Averaged | Known Results |
|---------------------------------------|------------------------------|------------------------------|------------------|
| October Performance Evaluation | | | |
| Intercomparison Study | | | |
| Alpha | 32.5, 32.9, 33.5 | 32.9 | 30.1±13 |
| Radium 226 | 4.6, 4.6, 4.7 | 4.6 | 4.5±2 |
| Radium 228 | 1.7, 1.7, 1.8 | 1.7 | 1.5±0.7 |
| Uranium | 26.9, 26.9, 27.0 | 26.9 | 18.1±5.2 |
| Beta | 94.0, 95.0, 96.0 | 95.0 | 94.0±17.3 |
| Strontium 89 | 17.0, 17.0, 17.0 | 17.0 | 19.0±8.7 |
| Strontium 90 | 8.0, 8.0, 8.0 | 8.0 | 8.0±8.7 |
| Cobalt 60 | 23.0, 23.0, 24.0 | 23.6 | 21.0±8.7 |
| Cesium 134 | 10.0, 10.0, 10.0 | 10.0 | 6.0±8.7 |
| Cesium 137 | 49.0, 50.0, 50.0 | 49.6 | 50±8.7 |
| | | | |
| Gross Alpha/Beta in Water | | | |
| Alpha | 30.7, 30.9, 31.0 | 30.9 | 47.2±20.5 |
| Beta | 8.0, 8.0, 8.0 | 8.0 | 3.5±8.7 |
| | | | |
| November | | | |
| Radionuclides in Water | | | |
| Cobalt 60 | 36, 37, 37 | 36.6 | 38±8.7 |
| Zinc 65 | 134, 135, 135 | 135.6 | 131±22.6 |
| Cesium 134 | 99, 100, 100 | 99.6 | 105±8.7 |
| Cesium 137 | 113, 114, 114 | 113.6 | 111±10.4 |
| Barium 133 | 55, 56, 56 | 55.6 | 56±10.4 |

96.9% EPA cross check analysis results reported were within statistical limits.

APPENDIX VIII

Questions or comments concerning information contained in this report should be sent to the following address:

**Mississippi State Department of Health
Division of Radiological Health
Environmental Monitoring and Emergency Response Branch
P. O. Box 1700
3150 Lawson Street
Jackson, MS 39215-1700**