Entergy

Entergy Operations, Inc.
7003 Bald Hill Road
P.O. Box 756
Port Gibson, MS 39150
Tel 601 437 6299

Christina L. Perino
Manager
Licensing

GNRO-2010/00027

April 20, 2009

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

Subject: Grand Gulf Nuclear Station (GGNS) 2009 Annual Radiological Environmental Operating Report (AREOR)

Grand Gulf Nuclear Station, Unit 1
Docket No. 50-416
License No. NPF-29

Dear Sir or Madam:

In accordance with the Grand Gulf Nuclear Station Unit 1 Technical Specification 5.6.2, attached is the Annual Radiological Environmental Operating Report for the period January 1, 2009 through December 31, 2009.

This letter does not contain any commitments.

If you have questions or require additional information concerning these reports, please contact Mr. Richard Scarbrough (601) 437-6978 or Michael Larson at (601) 437-6685.

Sincerely,

CLP/MJL

Attachment: 2009 Annual Radiological Environmental Operating Report

cc: (See Next Page)

cc:

NRC Senior Resident Inspector Grand Gulf Nuclear Station Port Gibson, MS 39150
U.S. Nuclear Regulatory Commission ATTN: Mr. Elmo E. Collins, Jr. (w/2) 612 East Lamar Blvd, Suite 400 Arlington, TX 76011-4005
U. S. Nuclear Regulatory Commission ATTN: Mr. Carl F. Lyon, NRR/ADRO/DORL (w/2) Mail Stop OWFN/8 B1 Washington, DC 20555-0001

ENTERGY OPERATIONS, INC.
GRAND GULF NUCLEAR STATION

ANNUAL
RADIOLOGICAL ENVIRONMENTAL
OPERATING REPORT

January 1, 2009-December 31, 2009

Gloria W. Bewley, 4/13/10

Prepared By

, 4.15.10

Reviewed By

, 4-15-10

Approved By

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Summary

The Annual Radiological Environmental Operating Report presents data obtained through analyses of environmental samples collected for Grand Gulf Nuclear Station's (GGNS) Radiological Environmental Monitoring Program (REMP) for the period January 1, 2009 through December 31, 2009. This report fulfills the requirements of GGNS Technical Specification 5.6.2.

To supplement the REMP, GGNS personnel collected duplicate surface water, vegetation, and fish samples during the reporting period. Special samples collected during the reporting period included surface water.

Radiological Environmental Monitoring Program

GGNS established the REMP in 1978 prior to the station becoming operational (1985) to provide data on background radiation and radioactivity normally present in the area. GGNS has continued to monitor the environment by sampling air, water, sediment, fish and food products, as well as measuring radiation directly. GGNS also samples milk if commercial milk production is occurring within five miles of the plant.

The REMP includes sampling indicator and control locations within an 18-mile radius of the plant. The REMP utilizes indicator locations near the site to show any increases or buildup of radioactivity that might occur due to station operation, and control locations farther away from the site to indicate the presence of only naturally occurring radioactivity. GGNS personnel compare indicator results with control and preoperational results to assess any impact GGNS operation might have had on the surrounding environment.

In the current year, GGNS personnel collected environmental samples for radiological analysis. They compared results of indicator locations with control locations and previous studies, and concluded that overall no significant relationship exists between GGNS operation and effect on the plant environs. Their review of current year data, in many cases, showed undetectable radiation levels in the environment and near background level in significant pathways associated with GGNS.

Harmful Effects or Irreversible Damage

The REMP monitoring did not detect any harmful effects or evidence of irreversible damage in the current year. Therefore, no analysis or planned course of action to alleviate problems was necessary.

Reporting Levels

GGNS' review indicates that no samples equaled or exceeded reporting levels for radioactivity concentration in environmental samples, as outlined in ODCM Specifications Table 6.12.1-2 when averaged over any calendar quarter, due to GGNS effluents. Therefore, results did not trigger any Radiological Monitoring Program Special Reports.

Radioactivity Not Attributable to GGNS

In previous years, the GGNS REMP detected radioactivity attributable to other sources twice. These include the Chinese nuclear test explosion in 1980, and the radioactive release due to reactor core degradation at the Chernobyl Nuclear Power Plant in 1986.

Comparison to Federal and State Programs

GGNS personnel compared REMP data to federal and state monitoring programs as results became available. Historically, the programs used for comparison have included the U.S. Nuclear Regulatory Commission (NRC) Thermoluminescent Dosimeter (TLD) Direct Radiation Monitoring Network and the Mississippi State Department of Health (MSDH), Division of Radiological Health.

The NRC TLD Network Program was discontinued in 1998. Historically these results compared favorably to those from the GGNS REMP.

The MSDH and the GGNS REMP have similar radiological environmental monitoring program requirements. These programs include concurrent air sampling and sharing sample media such as water, sediment, fish and food products. Both programs have obtained similar results. The results of MSDH's monitoring program for the reporting period compared favorably with the GGNS REMP and did not indicate elevated levels of radiation or radioactivity build-up attributed to plant operations.

Sample Deviations

- **Milk**

  The REMP did not include milk sampling within five miles (8 km) of GGNS in the current year due to unavailability. ODCM Specifications require collection of milk samples if available commercially within 8 km (5 miles) of the plant. GGNS personnel collected vegetation samples to monitor the ingestion pathway, as specified in ODCM Specifications Table 6.12.1-1, because of milk unavailability.

- **Required Lower Limit of Detection (LLD) Values**

  AS-1 PG did not meet the LLD requirement for the sample period of 3/24/09 – 3/25/09 due to the low sample collection time. Deviations in the Radiological Environmental Monitoring Program are addressed in ODCM Table 6.12.1-3. "Occasionally background fluctuations, unavoidable small sample size, the presence of interfering nuclides, or other uncontrollable circumstances may render these LLDs unachievable".

♦ Air Samples

The following air sample locations had reduced run times due to weather-related outages or mechanical problems. As described in footnote (a) to ODCM Specification Table 6.12.1-1, deviations from the required sampling schedule are permitted due to malfunction of sampling equipment and other legitimate reasons.

Sample Location	Date In	Date Out	Run Time Hours	Out-of-service hours	Comments
AS-1 PG	3/10/09	3/17/09	136.99	26	Equipment Failure
AS-1 PG	3/17/09	3/24/09	14.70	157.57	Equipment Failure
AS-1 PG	3/24/09	3/25/09	5.03	15.47	Equipment Failure
AS-7 UH	3/24/09	3/31/09	162.93	2.65	Power Outage
AS-3 61VA	8/11/09	8/18/09	167.98	0.48	Power Outage
AS-7 UH	10/13/09	10/20/09	166.98	5.55	Power Outage
AS-3 61VA	12/14/09	12/21/09	162.21	5.72	Power Outage
AS-7 UH	12/22/09	12/29/09	160.41	7.3	Power Outage
AS-3 61VA	12/21/09	12/28/09	168.11	0.22	Power Outage

Based on the sample collection period reductions, air samples were collected the following percentages of the available time:

AS-1 PG	97.7%
AS-3 61VA	99.9%
AS-7 UH	99.8%

♦ Missed Samples

All required samples were collected in accordance with REMP requirements. No samples were missed.

♦ Unavailable Results

GGNS received analytical results in adequate time for inclusion in this report. In addition, GGNS' review identified no missing results.

Program Modifications

No REMP modifications took place during this sampling period.

Attachments

Attachment 1 contains results of TLD, air, water, sediment, fish, food products and special samples collected. TLDs were analyzed by AREVA NP Inc.. All other samples were analyzed by River Bend Station's (RBS) Environmental Laboratory. Attachment 1 also contains RBS' results from participation in the interlaboratory comparison program.

1.0 Introduction

1.1 Radiological Environmental Monitoring Program

GGNS established the REMP to ensure that plant operating controls properly function to minimize any associated radiation endangerment to human health or the environment. The REMP is designed for:

- Analyzing important pathways for anticipated types and quantities of radionuclides released into the environment.
- Considering the possibility of a buildup of long-lived radionuclides in the environment and identifying physical and biological accumulations that may contribute to human exposures.
- Considering the potential radiation exposure to plant and animal life in the environment surrounding GGNS.
- Correlating levels of radiation and radioactivity in the environment with radioactive releases from station operation.

1.2 Pathways Monitored

The airborne, direct radiation, waterborne and ingestion pathways, as seen in Figure 1-1, are monitored as required by GGNS ODCM Table 6.12.1-1. A description of the GGNS REMP utilized to monitor the exposure pathways is provided in Table 1.1 and shown in Figures 1-2 and 1-3. GGNS may supplement this program with additional sampling in order to provide a comprehensive and well-balanced program.

Section 2.0 of this report provides a discussion of sampling results with Section 3.0 providing a summary of results for the monitored exposure pathways.

1.3 Land Use Census

GGNS personnel conduct a land use census biannually, as required by ODCM Specification 6.12.2. Data for the most recent land use census is included. The purpose of this census is to identify changes in uses of land within five miles of GGNS that would require modifications to the REMP or the ODCM The most important criteria during this census are to determine location in each sector of the nearest:

1) Residence
2) Animal milked for human consumption
3) Garden of greater than 50 m^2 (500 ft^2) producing broadleaf vegetation.

GGNS personnel conduct the land use census by:

- Conducting Field surveys in each meteorological sector out to five miles in order to confirm:
  - Nearest permanent residence
  - Nearest unoccupied residence
  - Nearest garden and approximate size
  - Nearest milking animal.
- Identifying locations on maps, measuring distances to GGNS and recording results on surveillance data sheets.
- Comparing current land use census results to previous results.
- Contacting the Claiborne County Agent for verification of nearest dairy animals.

Table 1.1

Radiological Environmental Sampling Program

Exposure Pathway	Requirement	Sample Point Description, Distance and Direction	Sampling and Collection Frequency	Type and Frequency Of Analyses
Airborne	**Radioiodine and Particulates** 1 sample close to the SITE BOUNDARY having the highest calculated annual average groundlevel D/Q.	**AS-7 UH (Sector H, Radius 0.5 Miles)** – South-southeast of GGNS at the IBEW Union Hall.	Continuous sampler operation with sample collection per 7 days or as required by dust loading, whichever is more frequent	Radioiodine Cannister – I-131; 7 days Particulate Sampler – Gross beta radioactivity following filter change, composite (by location) for gamma isotopic; 92 days
	Radioiodine and Particulates 1 sample from the vicinity of a community having the highest calculated annual average groundlevel D/Q.	**AS-1 PG (Sector G, Radius 5.5 Miles)** – Southeast of GGNS at the Port Gibson City Barn.		
	Radioiodine and Particulates 1 sample from a control location 15 - 30 km (10 - 20 miles) distance.	**AS-3 61VA (Sector B, Radius 18 Miles)** – North-northeast of GGNS on Hwy 61, North of the Vicksburg Airport.		
Direct Radiation	**TLDs** An inner ring of stations in the general areas of the SITE BOUNDARY.	**M-16 (Sector A, Radius 0.9 Miles)** – Meteorological Tower. **M-17 (Sector C, Radius 0.5 Miles)** – South Side, Grand Gulf Road. **M-19 (Sector E, Radius 0.5 Miles)** – Eastern SITE BOUNDARY Property line, North-northeast of HWSA.	92 days	Gamma dose; 92 days

Table 1.1

Radiological Environmental Sampling Program

Exposure Pathway	Requirement	Sample Point Description, Distance and Direction	Sampling and Collection Frequency	Type and Frequency Of Analyses
Direct Radiation	**TLDs** An inner ring of stations in the general areas of the SITE BOUNDARY.	**M-21 (Sector J, Radius 0.4 Miles)** – Near Former Training Center Building on Bald Hill Road. **M-22 (Sector G, Radius 0.5 Miles)** – Former RR Entrance Crossing On Bald Hill Road. **M-23 (Sector Q, Radius 0.5 Miles)** – Gin Lake Road 50 Yards North of Heavy Haul Road on Power Pole. **M-25 (Sector N, Radius 1.6 Miles)** – Radial Well Number 1. **M-28 (Sector L, Radius 0.9 Miles)** – Former Residence. **M-94 (Sector R, Radius 0.8 Miles)** – Sector R Near Meteorological Tower.	92 days	Gamma dose; 92 days

Table 1.1

Radiological Environmental Sampling Program

Exposure Pathway	Requirement	Sample Point Description, Distance and Direction	Sampling and Collection Frequency	Type and Frequency Of Analyses
Direct Radiation	**TLDs** An inner ring of stations in the general areas of the SITE BOUNDARY.	**M-95 (Sector F, Radius 0.5 mi)** – Spoils Area, fence of old storage area, near entrance gate **M-96 (Sector B, Radius 0.7 mi.)** – North Gate Fence **M-97 (Sector D, Radius 0.8 mi.)** – Grand Gulf Road entrance gate to spoils area **M-98 (Sector H, Radius 0.5 mi.)** – Bald Hill Road, across form Union Hall in curve **M-99 (Sector K, Radius 0.4 mi.)** – North Fence of old Ball Field near utility pole **M-100 (Sector C, Radius 0.6 mi.)** – Grand Gulf Road	92 days	Gamma dose; 92 days
	TLDs An outer ring approximately 3 to 5 miles from the site.	**M-36 (Sector P, Radius 5.0 Miles)** – Curve on HW 608, Point Nearest GGNS at Power Pole. **M-40 (Sector M, Radius 2.3 Miles)** – Headly Drive, Near River Port Entrance.		

Table 1.1

Radiological Environmental Sampling Program

Exposure Pathway	Requirement	Sample Point Description, Distance and Direction	Sampling and Collection Frequency	Type and Frequency Of Analyses
Direct Radiation	**TLDs** An outer ring approximately 3 to 5 miles from the site.	**M-48 (Sector K, Radius 4.8 Miles)** – 0.4 Miles South on Mont Gomer Road on West Side. **M-49 (Sector H, Radius 4.5 Miles)** – Fork in Bessie Weathers Road/Shaifer Road. **M-50 (Sector B, Radius 5.3 Miles)** – Panola Hunting Club Entrance. **M-55 (Sector D, Radius 5.0 Miles)** – Near Ingelside Karnac Ferry Road/Ashland Road Intersection. **M-57 (Sector F, Radius 4.5 Miles)** – Hwy 61, Behind the Welcome to Port Gibson Sign at Glensdale Subdivision.	92 days	Gamma dose; 92 days
	TLDs 8 stations in special interest areas such as population centers, nearby residences, schools, and in 1 or 2 areas to serve as control stations.	**M-01 (Sector E, Radius 3.5 Miles)** – Across the road from Lake Claiborne Entry Gate. (Special Interest) **M-07 (Sector G, Radius 5.5 Miles)** – AS-1 PG, Port Gibson City Barn. (Special Interest) **M-09 (Sector D, Radius 3.5 Miles)** – Warner Tully Y-Camp. (Special Interest) **M-10 (Sector A, Radius 1.5 Miles)** – Grand Gulf Military Park. (Special Interest)		

Table 1.1

Radiological Environmental Sampling Program

Exposure Pathway	Requirement	Sample Point Description, Distance and Direction	Sampling and Collection Frequency	Type and Frequency Of Analyses
Direct Radiation	**TLDs** 8 stations in special interest areas such as population centers, nearby residences, schools, and in 1 or 2 areas to serve as control stations	**M-14 (Sector B, Radius 18.0 Miles)** – AS-3-61VA, Hwy 61, North of Vicksburg Airport. (Control) **M-33 (Sector P, Radius 12.5 Miles)** – Newellton, Louisiana Water Tower. (Special Interest) **M-38 (Sector M, Radius 9.5 Miles)** – Lake Bruin State Park, Entrance Road. (Special Interest) **M-39 (Sector M, Radius 13.0 Miles)** – St. Joseph, Louisiana, Auxiliary Water Tank. (Special Interest)	92 days	Gamma dose; 92 days

Table 1.1

Radiological Environmental Sampling Program

Exposure Pathway	Requirement	Sample Point Description, Distance and Direction	Sampling and Collection Frequency	Type and Frequency Of Analyses
Waterborne	**Surface Water** 1 sample upstream.	**MRUP (Sector R, Radius 1.8 Miles)** - At least 4500 ft upstream of the GGNS discharge point into the Mississippi River to allow adequate mixing of the Mississippi and Big Black Rivers.	92 days	Gamma isotopic and tritium analyses; 92 days
	1 sample downstream.	**MRDOWN (Sector N, Radius 1.6 Miles)** - At least 5000 ft downstream of the GGNS discharge point into the Mississippi River near Radial Well No. 1.		
	1 sample downstream during a Liquid Radwaste Discharge.	**MRDOWN (Sector P, Radius 1.3 Miles)** – Downstream of the GGNS discharge point into the Mississippi River near Radial Well No. 5.	366 days	Gamma isotopic and tritium analyses; 366 days
	1 sample from Outfall 007	**OUTFALL 007 (Sector N, Radius 0.2 Miles)** – Storm Drain System	31 days	Tritium; 31 days

Table 1.1

Radiological Environmental Sampling Program

Exposure Pathway	Requirement	Sample Point Description, Distance and Direction	Sampling and Collection Frequency	Type and Frequency Of Analyses
Waterborne	**Groundwater** Samples from 2 sources.	**PGWELL (Sector G, Radius 5.0 Miles)** - Port Gibson Wells – Take from distribution system or one of the five wells. **CONSTWELL (Sector Q, Radius 0.4 Miles)** – GGNS Construction Water Well – Taken from distribution system or the well.	366 days	Gamma isotopic and tritium analyses; 366 days
	Sediment From Shoreline 1 sample from downstream area. 1 sample from upstream area.	**SEDHAM (Sector N, Radius 1.6 Miles)** – Downstream of the GGNS discharge point in the Mississippi River near Hamilton Lake outlet. **SEDCONT (Minimum of 100 yds)** – Upstream of the GGNS discharge point in the Mississippi River.	366 days	Gamma isotopic; 366 days
Ingestion	**Milk** 1 sample from milking animals within 8 km if milk is available commercially. 1 control sample (only if indicator exists) >8 km if milk is available.	Currently, no available milking animals within 8 km of GGNS. **ALCONT (Sector K, Radius 10.5 Miles)** - Located South-southwest of GGNS at Alcorn State University.	92 days when required	Gamma isotopic and I-131; 92 days

Table 1.1

Radiological Environmental Sampling Program

Exposure Pathway	Requirement	Sample Point Description, Distance and Direction	Sampling and Collection Frequency	Type and Frequency Of Analyses
Ingestion	**Fish** 1 sample in vicinity of GGNS discharge point.	**FISHDOWN** – Downstream of the GGNS discharge point into the Mississippi River	366 days	Gamma isotopic on edible portion; 366 days
	1 sample uninfluenced by GGNS discharge.	**FISHUP** – Upstream of the GGNS discharge point in the Mississippi River uninfluenced by plant operations.		
	Food Products 1 sample of broadleaf vegetation grown in one of two different offsite locations with highest anticipated annual average ground level D/Q if milk sampling is not performed.	**VEG-J (Sector J, Radius 0.4 Miles)** – South of GGNS near former Training Center on Bald Hill Road.	92 days when available	Gamma isotopic and I-131; 92 days
	1 sample of similar vegetation grown 15 – 30 km distant if milk sampling is not performed.	**VEG-CONT (Sector K, Radius 10.5 Miles)** – Alcorn State University south-southwest of GGNS when available, otherwise a location 15-30 km distant.		

FIGURE 1-1

Exposure Pathways

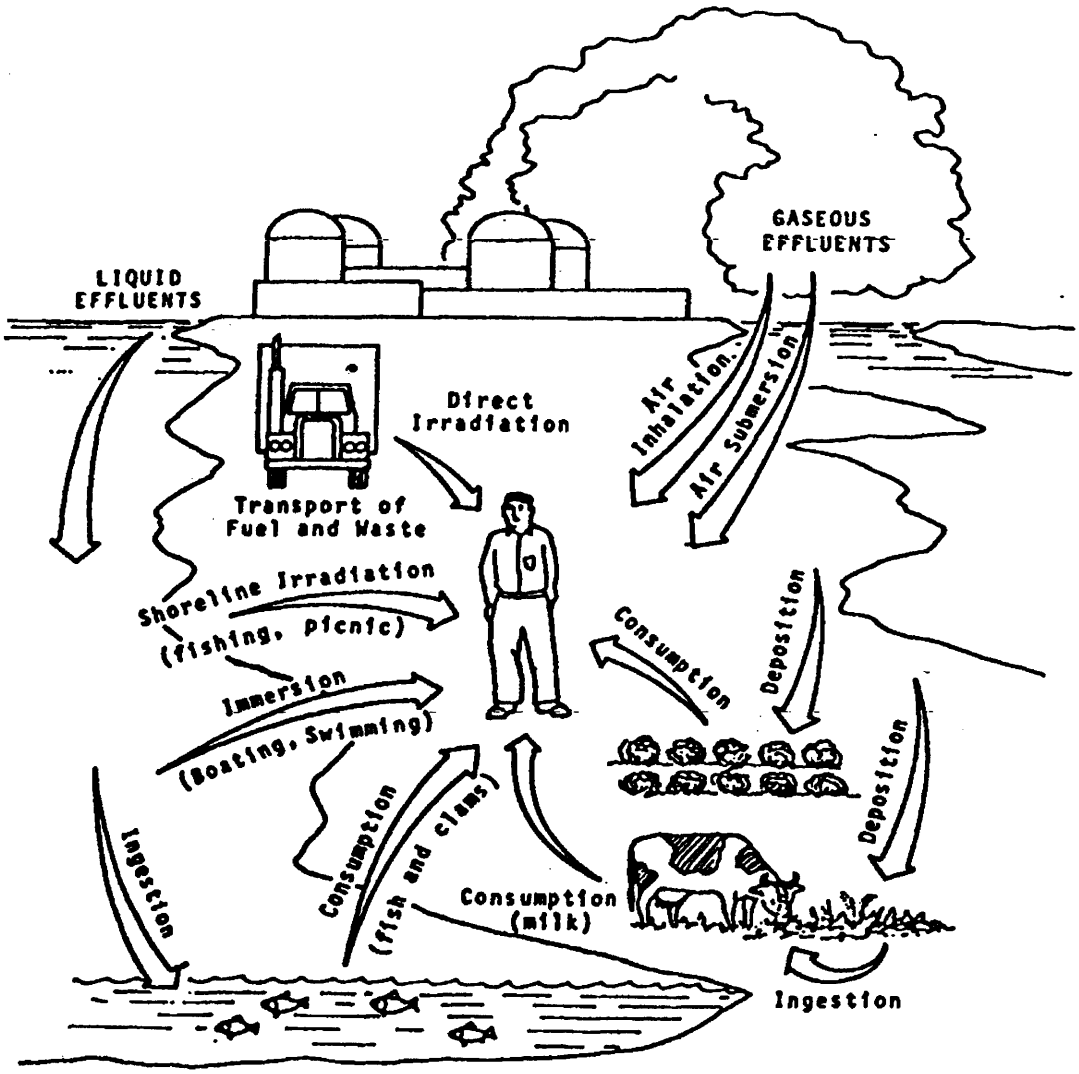


FIGURE 1-2

SAMPLE COLLECTION SITES – NEAR FIELD

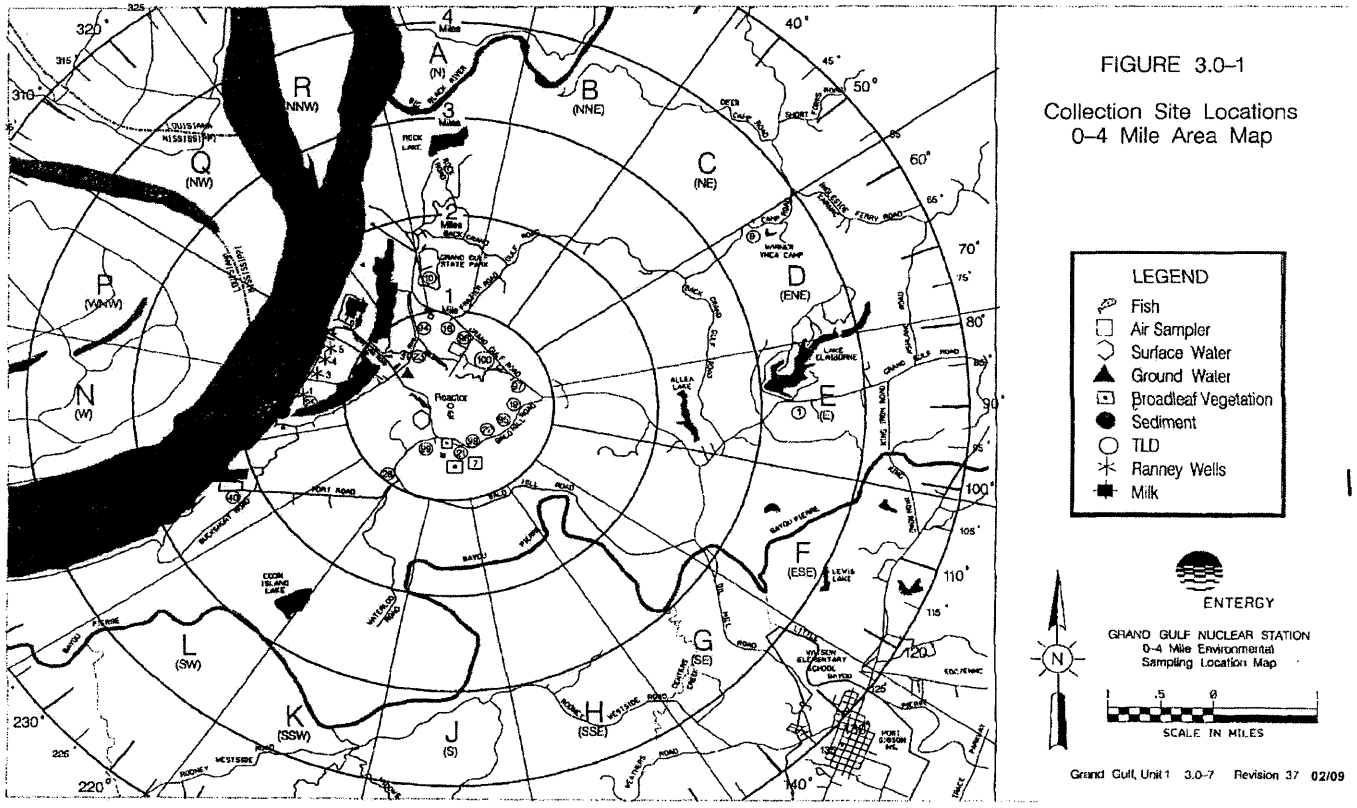
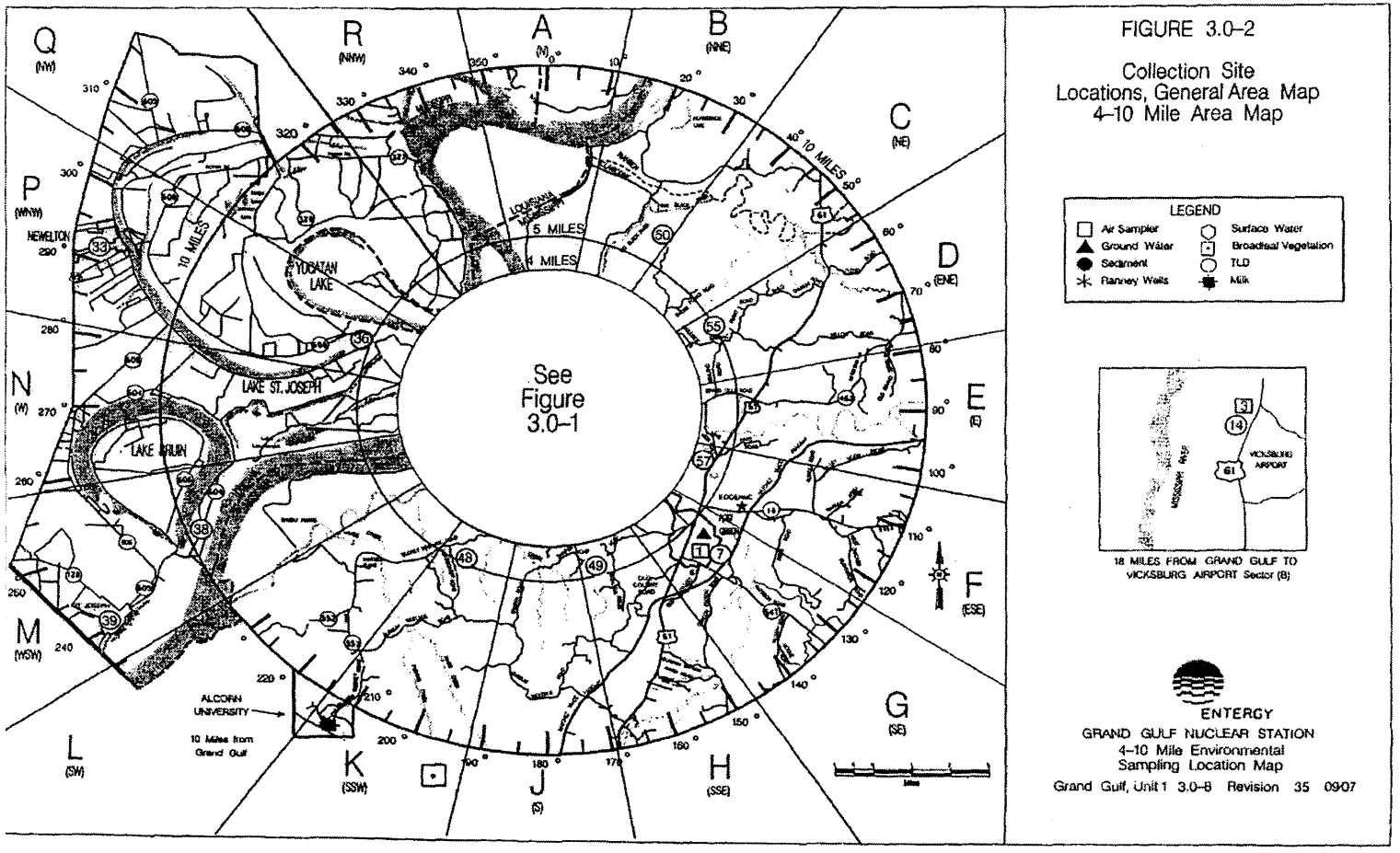


FIGURE 1-3

SAMPLE COLLECTION SITES – FAR FIELD



2.0 Interpretation and Trends of Results

2.1 Air Particulate and Radioiodine Sample Results

GGNS did not detect any plant related gamma emitting radionuclides in the quarterly air particulate composites or Iodine-131 in the radioiodine cartridges during the reporting period, as has been the case in previous years. The REMP detected radioactivity in this pathway attributable to other sources twice. These include the Chinese nuclear test in 1980, and the radioactive release due to reactor core degradation at Chernobyl Nuclear Power Plant in 1986. Therefore, the airborne exposure pathway has been unaffected by the operation of GGNS and airborne concentrations continue to be at background levels.

Table 3.1, which includes gross beta concentrations, provides a comparison of the indicator and control means and ranges, further emphasizes that the airborne pathway continues to remain at background levels. In the absence of plant-related gamma radionuclides, gross beta activity is attributed to naturally occurring radionuclides. Similar trends are present for control and indicator locations. This supports the presence of naturally occurring activity.

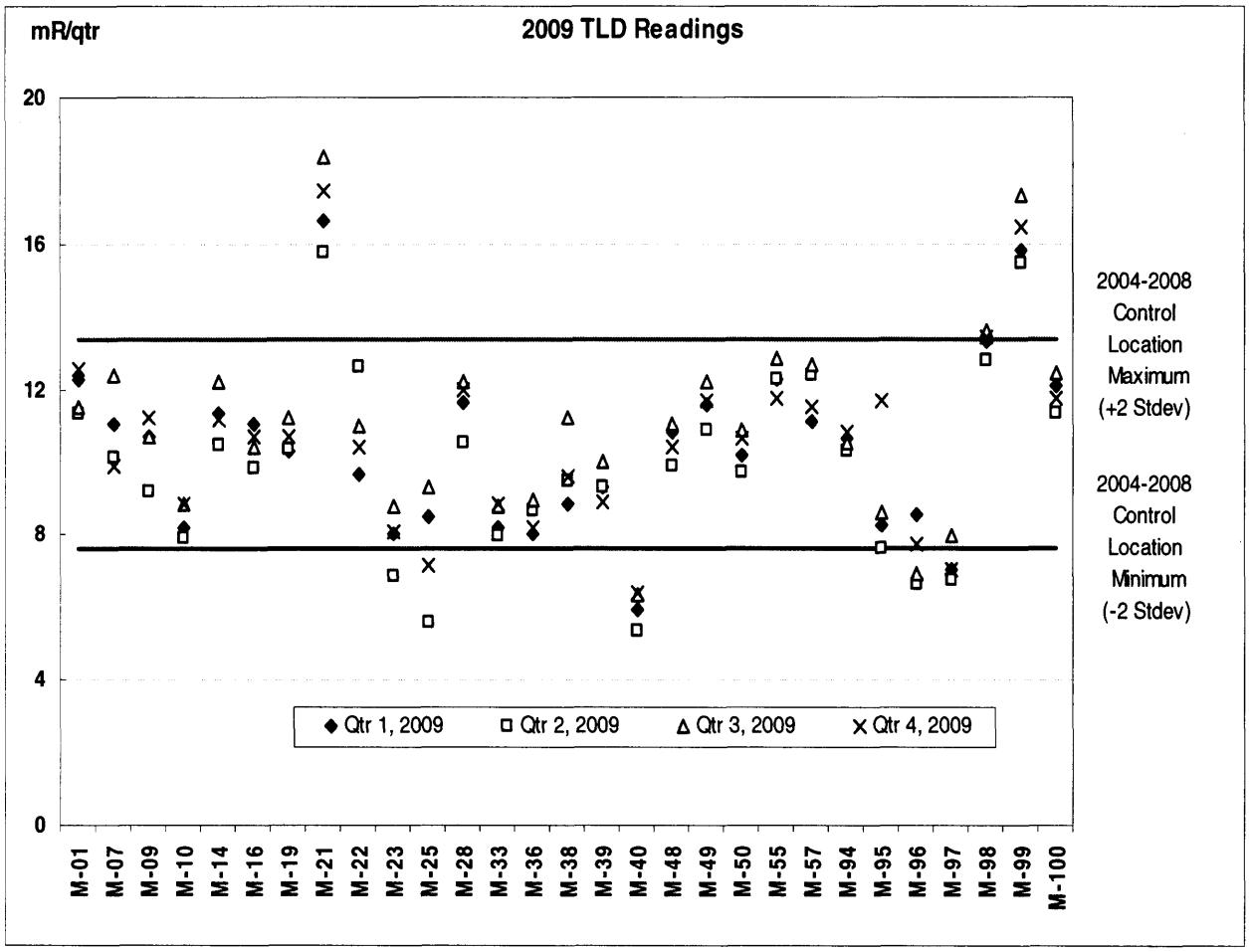
2.2 Thermoluminescent Dosimetry Sample Results

GGNS calculates dose by subtracting shield readings from control and indicator location readings and reports measured dose as net exposure normalized to 92 days. GGNS relies on comparison of the indicator locations to the control location as a measure of plant impact. Gamma radiation dose in the reporting period is compared to control location readings for previous years as shown in Figure 2-1.

GGNS' comparison of the indicator results to the control and to previous indicator results, as seen in Figure 2-1 and Table 3.1, indicates that plant operations had no significant impact on ambient radiation levels during the reporting period.

With the exception of TLD locations M-21 (Sector J, 0.4 miles), M-98 (Sector H 0.5 miles and M-99 (Sector K, 0.4 miles) direct radiation levels continue to remain at or near background. The dose rate at these three locations is a result of increased Nitrogen-16 levels associated with hydrogen injection. Hydrogen injection into the feedwater system provides protection against Intergranular Stress Corrosion of plant components. Dose rates at locations M-21 [5.7 millirem per quarter], M-98 [2.0 millirem per quarter] and M-99 [5.0 millirem per quarter] above Control location M-14 (sector B, 18.0 miles) remain well below the limitations of 10CFR20.1301(a)(2) and 10CFR 20.1302(b)(2)(ii).

Figure 2-1


mR/qtr
2009 TLD Readings
20
16
12
8
4
0
2004-2008 Control Location Maximum (+2 Stdev)
2004-2008 Control Location Minimum (-2 Stdev)
Qtr 1, 2009
Qtr 2, 2009
Qtr 3, 2009
Qtr 4, 2009
M-01
M-07
M-09
M-10
M-14
M-16
M-19
M-21
M-22
M-23
M-25
M-28
M-33
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M-57
M-94
M-95
M-96
M-97
M-98
M-99
M-100

2.3 Water Sample Results

Surface water samples were collected from three indicator locations (Outfall 007, MRDOWN, and MRDOWN During Discharge) and one control location (MRUP) and analyzed for gamma emitting radionuclides and tritium. Plant related gamma emitting radionuclides and tritium remained undetectable in the upstream and downstream Mississippi River locations, which is consistent with preoperational and previous operational years. Storm waters contribute to Outfall 007 and can include tritium as a result of washout and entrainment of routine, previously monitored gaseous effluents. As a result, tritium is occasionally observed. When detected, tritium was measured at an average (one sample) concentration of 902 ± 258 pCi/L in the Outfall 007 (indicator) location.

In addition to the tritium samples required by the REMP, five special surface water samples for gamma were collected at the Outfall 007 location. Plant related gamma emitting radionuclides remained undetectable in these samples.

Based on review of results and historical data, GGNS concluded that plant operations had no significant impact on this pathway during the reporting period.

Groundwater samples were collected from two locations (indicator and control) and analyzed for gamma emitting radionuclides and tritium. GGNS did not detect any plant related gamma emitting radionuclides or tritium in groundwater samples during the reporting period.

Based on review of results and historical data, GGNS concluded that plant operations had no significant impact on this pathway during the reporting period.

2.4 Sediment Sample Results

Sediment samples were collected from two ODCM Specification locations (indicator and control) and analyzed for gamma emitting radionuclides. In this reporting period, plant related gamma emitting radionuclides were below detectable concentrations in the upstream (control) and downstream (indicator) locations.

Based on review of results and historical data, GGNS concluded that plant operations had no significant impact on this pathway during the reporting period.

2.5 Milk Sample Results

GGNS personnel did not collect milk samples within five miles of the site in the reporting period due to the absence of milking animals. Since there are no dairies within five miles of GGNS, and based on non-detectable radioiodine in air and vegetation samples, it is concluded GGNS' operation had no impact on this pathway.

2.6 Fish Sample Results

Fish samples were collected from two locations (indicator and control) and analyzed for gamma emitting radionuclides. GGNS did not detect any plant related gamma emitting radionuclides in fish samples (edible portions) during the reporting period, as has been the case in preoperational and previous operational years. These results indicate that this pathway has not been affected by plant operations.

2.7 Food Product (Vegetation) Sample Results

Food product samples were collected from control and indicator locations when available and analyzed for gamma emitting radionuclides. GGNS did not detect any plant related gamma emitting radionuclides in vegetation samples during the reporting period. Nuclides detected previously at the control and indicator locations are attributed to the Chernobyl release and atmospheric weapons testing. These results indicate that this pathway has not been affected by plant operations.

2.8 Land Use Census Results

Results from the Land Use Census performed April 9-14, 2008 are included in this report. Methods utilized include: visual surveys, door to door surveys, telephone interviews, GPS, Aerial Photography, and consultation with the local county agent concerning dairy production in Claiborne County.

During the survey the following questions were asked:

1) Name of occupant
2) Address
3) Number of people residing at residence
4) Age group of occupants
5) Any farm animal raised for human consumption
6) Any dairy production
7) Maintain a garden

Changes from the previous Land Use Census were evaluated in accordance with GGNS surveillance 06-EN-S000-0-0002. The differences were compared to the locations and assumptions used in calculations for compliance with the Offsite Dose Calculation Manual (ODCM), LCO 6.11.6. It was determined that the locations and assumptions currently used in ODCM are more conservative than any of the changes. Determinations from the most recent Land Use Census results are:

- One unoccupied location in the previous land use census is now occupied, sector E (East) at 0.83 miles, which becomes the nearest occupied residence. Because of downwind location and/or distance from the site, the occupancy of an existing unoccupied residence will not cause any ODCM critical receptor calculation results to be less conservative.

- No additional sampling locations are required as the onsite vegetation sampling location (Sector J, 0.4 miles) is more conservative than changes identified in the land use census.

- Cattle are raised for human consumption (most notably Sector H, J, and K). GGNS uses the Grass/Cow/Meat pathway.

- The milk pathway does not need to be activated because no commercial dairy production is occurring within 5 miles.

- Sectors M, N, P, and Q are remote areas in which the primary use is hunting. Area was surveyed by vehicle and aerial photographs. Also, all areas in Louisiana within 5 miles belong to a private hunting club with no permanent residence or garden receptor.

- Gardens, regardless of size, were included in the census data.

Table 2.1
Land Use Census Results

Parameter		Sector A	Sector B*	Sector C	Sector D
I. Nearest Occupied Residence	a. Distance (mile)	0.98	0.83	0.67	2.57
	b. Number of Occupants	2	2	2	6
	c. Degrees from true north	354.0	15.1	42.1	60.5
II. Nearest Unoccupied Residence (closer than occupied residence)	a. Distance (mile)	0.94	None	None	None
III. Nearest Milk Animal	a. Distance	None	None	None	None
IV. Nearest Broadleaf Garden	a. Distance (mile)	1.78	1.52	0.67	2.86
	b. Garden size (ft^2)	≈ 1200	≈ 4050	≈ 1250	≈ 500
	c. Degrees from true north	352.2	21.9	42.1	59.7
V. Census Comparison	a. Is nearest occupied residence in same location as last census?	Yes	Yes	Yes	Yes
	b. Is nearest milk animal in same location as last census?	N/A	N/A	N/A	N/A
	c. Is nearest broadleaf garden in same location as last census?	Yes	Yes	Yes	Yes

* Change from last census, see attached table of Land Use Census Changes

Table 2.1
Land Use Census Results

Parameter		Sector E *	Sector F *	Sector G	Sector H
I. Nearest Occupied Residence	a. Distance (mile)	0.83	2.25	2.10	1.11
	b. Number of Occupants	1	1	3	6
	c. Degrees from true north	95.1	101.5	129.7	152.5
II. Nearest Unoccupied Residence (closer than occupied residence)	a. Distance (mile)	None	None	1.93	1.08
III. Nearest Milk Animal	a. Distance	None	None	None	None
IV. Nearest Broadleaf Garden	a. Distance (mile)	0.89	4.05	3.81	1.11
	b. Garden size (ft^2)	≈1000	≈50	≈1600	≈ 500
	c. Degrees from true north	86.9	114.3	129.1	152.5
V. Census Comparison	a. Is nearest occupied residence in same location as last census?	No	Yes	Yes	Yes
	b. Is nearest milk animal in same location as last census?	N/A	N/A	N/A	N/A
	c. Is nearest broadleaf garden in same location as last census?	Yes	Yes	Yes	Yes

* Change from last census, see attached table of Land Use Census Changes

Table 2.1
Land Use Census Results

Parameter		Sector J	Sector K	Sector L	Sector M
I. Nearest Occupied Residence	a. Distance (mile) b. Number of Occupants c. Degrees from true north	3.16 2 174.3	2.23 1 196.9	0.89 2 219.7	None
II. Nearest UnoccupiedResidence (closer than occupied residence)	a. Distance (mile)	None	None	None	None
III. Nearest Milk Animal	a. Distance	None	None	None	None
IV. Nearest Broadleaf Garden	a. Distance (mile) b. Garden size (ft^2) c. Degrees from true north	3.16 ≈ 500 174.3	2.23 ≈ 2500 196.9	0.89 ≈ 300 219.7	None
V. Census Comparison	a. Is nearest occupied residence in same location as last census? b. Is nearest milk animal in same location as last census? c. Is nearest broadleaf garden in same location as last census?	Yes N/A Yes	Yes N/A Yes	Yes N/A Yes	N/A N/A N/A

* Change from last census, see attached table of Land Use Census Changes

Table 2.1
Land Use Census Results

Parameter		Sector N	Sector P	Sector Q	Sector R
I. Nearest Occupied Residence	a. Distance (mile) b. Number of Occupants c. Degrees from true north	None	None	None	1.11 2 346.1
II. Nearest UnoccupiedResidence (closer than occupied residence)	a. Distance (mile)	1.61	4.83	3.5	None
III. Nearest Milk Animal	a. Distance	None	None	None	None
IV. Nearest Broadleaf Garden	a. Distance (mile) b. Garden size (ft^2) c. Degrees from true north	None	None	None	1.46 ≈ 4000 342.9
V. Census Comparison	a. Is nearest occupied residence in same location as last census? b. Is nearest milk animal in same location as last census? c. Is nearest broadleaf garden in same location as last census?	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	Yes N/A Yes

* Change from last census, see attached table of Land Use Census Changes

Land Use Census Changes

SECTOR	PARAMETER	Reason for Change
B	Nearest Broadleaf Garden	Clarification of address
E	Nearest Occupied Residence	Residence is now occupied
E	Nearest Unoccupied Residence	Residence is now occupied by different individual. No house is unoccupied closer than occupied residence in this sector.
F	Nearest Occupied Residence	Residence is now occupied by different individual

2.9 Interlaboratory Comparison Results

River Bend Station (RBS) Environmental Laboratory analyzed interlaboratory comparison samples to fulfill the requirements of the ODCM Specifications 6.12.1. Attachment 1, Radiological Environmental Monitoring Report, contains these results in Table 9.1. GGNS' review of RBS' interlaboratory comparison indicated that 100% of results were within control limits for accuracy, and 100% of results were within control limits for precision.

3.0 Radiological Environmental Monitoring Program Summary

3.1 Program Results Summary

Table 3.1 summarizes the REMP results. GGNS personnel did not use values reported as less than the lower limit of detection (<LLD) when determining ranges and means for indicator and control locations.

TABLE 3.1

Radiological Environmental Monitoring Program Summary

Name of Facility: Grand Gulf Nuclear Station Docket No: 50-416
Location of Facility: Claiborne County, Mississippi Reporting Period: January - December 2009

Sample Type (Units)	Type & Number of Analyses [a]	LLD [b]	Indicator Locations Mean (F) [c] [Range]	Location with Highest Annual Mean		Control Locations Mean (F) [c] [Range]	Number of Nonroutine Results [e]
				Location [d]	Mean (F) [c] [Range]		
Air Particulates (pCi/m^3)	GB 157	0.01	0.024 (105 / 105) [0.009 - 0.049]	AS-3 VA (Sector B, 18 mi)	0.026 (52 / 52) [0.012 - 0.055]	0.026 (52 / 52) [0.012- 0.055]	0
	GS 12						
	Cs-134	0.05	<LLD	N/A	N/A	<LLD	0
	Cs-137	0.06	<LLD	N/A	N/A	<LLD	0
Airborne Iodine (pCi/m^3)	I-131 157	0.07	<LLD	N/A	N/A	<LLD	0
Inner Ring TLDs (mR/Qtr)	Gamma 56	(f)	10.9 (56 /56) [5.6-18.4]	M-21 (Sector K, 0.4 mi.)	17.0 (4 / 4) [15.7-18.4]	N/A	0
Outer Ring TLDs (mR/Qtr)	Gamma 28	(f)	10.2 (28 / 28) [5.3 – 12.8]	M-55 (Sector D, 5.0 mi.)	12.3 (4 / 4) [11.7-12.8]	N/A	0
Special Interest TLDs (mR/Qtr)	Gamma 28	(f)	9.9 (28 / 28) [7.9 – 12.6]	M-01 (Sector E, 3.5 mi.)	11.9 (4 / 4) [11.3-12.6]	N/A	0
Control TLDs (mR/Qtr)	Gamma 4	(f)	N/A	N/A	N/A	11.3 (4 / 4) [10.5-12.2]	0

TABLE 3.1

Radiological Environmental Monitoring Program Summary

Name of Facility: Grand Gulf Nuclear Station Docket No: 50-416
Location of Facility: Claiborne County, Mississippi Reporting Period: January - December 2009

Sample Type (Units)	Type & Number of Analyses [a]	LLD [b]	Indicator Location Mean (F) [c] [Range]	Location with Highest Annual Mean		Control Locations Mean (F) [c] [Range]	Number of Nonroutine Results [e]
				Location [d]	Mean (F) [c] [Range]		
Surface Water (pCi/l)	H-3 28	3000	909 (1/23) [909]	Outfall 007 (Sector N, Radius 0.2 mi.)	909 (1 / 15) [909]	<LLD	0
	GS 13						
	I-131	15	<LLD	N/A	N/A	<LLD	0
	Mn-54	15	<LLD	N/A	N/A	<LLD	0
	Fe-59	30	<LLD	N/A	N/A	<LLD	0
	Co-58	15	<LLD	N/A	N/A	<LLD	0
	Co-60	15	<LLD	N/A	N/A	<LLD	0
	Zn-65	30	<LLD	N/A	N/A	<LLD	0
	Zr-95	30	<LLD	N/A	N/A	<LLD	0
	Nb-95	15	<LLD	N/A	N/A	<LLD	0
	Cs-134	15	<LLD	N/A	N/A	<LLD	0
	Cs-137	18	<LLD	N/A	N/A	<LLD	0
	Ba-140	60	<LLD	N/A	N/A	<LLD	0
	La-140	15	<LLD	N/A	N/A	<LLD	0

TABLE 3.1

Radiological Environmental Monitoring Program Summary

Name of Facility: Grand Gulf Nuclear Station Docket No: 50-416
Location of Facility: Claiborne County, Mississippi Reporting Period: January - December 2009

Sample Type (Units)	Type & Number of Analyses [a]	LLD [b]	Indicator Locations Mean (F) [c] [Range]	Location with Highest Annual Mean		Control Locations Mean (F) [c] [Range]	Number of Nonroutine Results [e]
				Location [d]	Mean (F) [c] [Range]		
Groundwater (pCi/1)	H-3 2	2000	<LLD	N/A	N/A	<LLD	0
	I-131 2	1	<LLD	N/A	N/A	<LLD	0
	GS 2						
	Mn-54	15	<LLD	N/A	N/A	<LLD	0
	Fe-59	30	<LLD	N/A	N/A	<LLD	0
	Co-58	15	<LLD	N/A	N/A	<LLD	0
	Co-60	15	<LLD	N/A	N/A	<LLD	0
	Zn-65	30	<LLD	N/A	N/A	<LLD	0
	Zr-95	30	<LLD	N/A	N/A	<LLD	0
	Nb-95	15	<LLD	N/A	N/A	<LLD	0
	Cs-134	15	<LLD	N/A	N/A	<LLD	0
	Cs-137	18	<LLD	N/A	N/A	<LLD	0
	Ba-140	60	<LLD	N/A	N/A	<LLD	0
	La-140	15	<LLD	N/A	N/A	<LLD	0
Sediment (pCi/kg)	GS 2						
	Cs-134	150	<LLD	N/A	N/A	<LLD	0
	Cs-137	180	<LLD	N/A	N/A	<LLD	0

TABLE 3.1

Radiological Environmental Monitoring Program Summary

Name of Facility: Grand Gulf Nuclear Station Docket No: 50-416
Location of Facility: Claiborne County, Mississippi Reporting Period: January - December 2009

Sample Type (Units)	Type & Number of Analyses [a]	LLD [b]	Indicator Location Mean (F) [c] [Range]	Location with Highest Annual Mean		Control Locations Mean (F) [c] [Range]	Number of Nonroutine Results [e]
				Location [d]	Mean (F) [c] [Range]		
Fish (pCi/kg)	GS 4						
	Mn-54	130	<LLD	N/A	N/A	<LLD	0
	Fe-59	260	<LLD	N/A	N/A	<LLD	0
	Co-58	130	<LLD	N/A	N/A	<LLD	0
	Co-60	130	<LLD	N/A	N/A	<LLD	0
	Zn-65	260	<LLD	N/A	N/A	<LLD	0
	Cs-134	130	<LLD	N/A	N/A	<LLD	0
	Cs-137	150	<LLD	N/A	N/A	<LLD	0
Food Products/Vegetation (pCi/kg)	I-131 10	60	<LLD	N/A	N/A	<LLD	0
	GS 10						
	Cs-134	60	<LLD	N/A	N/A	<LLD	0
	Cs-137	80	<LLD	N/A	N/A	<LLD	0

TABLE 3.1

Radiological Environmental Monitoring Program Summary

Name of Facility: Grand Gulf Nuclear Station Docket No: 50-416
Location of Facility: Claiborne County, Mississippi Reporting Period: January - December 2009

Sample Type (Units)	Type & Number of Analyses [a]	LLD [b]	Indicator Location Mean (F) [c] [Range]	Location with Highest Annual Mean		Control Locations Mean (F) [c] [Range]	Number of Nonroutine Results [e]
				Location [d]	Mean (F) [c] [Range]		
Surface Water (Special) (pCi/l)	GS 5						
	I-131	15	<LLD	N/A	N/A	<LLD	0
	Mn-54	15	<LLD	N/A	N/A	<LLD	0
	Fe-59	30	<LLD	N/A	N/A	<LLD	0
	Co-58	15	<LLD	N/A	N/A	<LLD	0
	Co-60	15	<LLD	N/A	N/A	<LLD	0
	Zn-65	30	<LLD	N/A	N/A	<LLD	0
	Zr-95	30	<LLD	N/A	N/A	<LLD	0
	Nb-95	15	<LLD	N/A	N/A	<LLD	0
	Cs-134	15	<LLD	N/A	N/A	<LLD	0
	Cs-137	18	<LLD	N/A	N/A	<LLD	0
	Ba-140	60	<LLD	N/A	N/A	<LLD	0
	La-140	15	<LLD	N/A	N/A	<LLD	0

a GB = Gross beta; I-131 = Iodine-131; H-3 = Tritium; GS = Gamma scan.

b LLD = Required lower limit of detection based on GGNS ODCM Table 6.12.1-3.

c Mean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parenthesis (F).

d Where applicable, locations are specified by name, distance from reactor site and meteorological sector.

e Non-routine results are those which exceed ten times the control station value. If no control station value is available, the result is considered non-routine if it exceeds ten times the preoperational value for the location.

f LLD is not defined in GGNS ODCM Table 6.12.1-3.

Attachment 1

Radiological Monitoring Report

Summary of Monitoring Results

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Table 1.1
Sample Type: Air Particulate Filter and Radioiodine Cartridge
Analysis: Gross Beta and I-131
Units: pCi/m^3

AIR SAMPLE AS-1 PG - GGNS Nearest Community

LLD (pCi/m^3)	AS-1 PG		0.07	0.01
LAB ID	**START DATE**	**END DATE**	**I-131**	**GROSS BETA**
20090003	12/30/2008	1/6/2009	< 0.015	0.025 +/- 0.0010
20090057	1/6/2009	1/13/2009	< 0.024	0.034 +/- 0.001
20090063	1/13/2009	1/20/2009	< 0.017	0.029 +/- 0.0010
20090084	1/20/2009	1/27/2009	< 0.016	0.034 +/- 0.0011
20090098	1/27/2009	2/3/2009	< 0.016	0.025 +/- 0.0011
20090126	2/3/2009	2/10/2009	< 0.028	0.022 +/- 0.0010
20090130	2/10/2009	2/17/2009	< 0.020	0.025 +/- 0.0010
20090154	2/17/2009	2/24/2009	< 0.020	0.035 +/- 0.0011
20090183	2/24/2009	3/3/2009	< 0.020	0.029 +/- 0.0010
20090213	3/3/2009	3/10/2009	< 0.025	0.029 +/- 0.0010
20090222	3/10/2009	3/17/2009	< 0.024	0.018 +/- 0.0010
20090280	3/17/2009	3/24/2009	< 0.066	0.029 +/- 0.0046
20090283	3/24/2009	3/25/2009	< 0.061	<0.012
20090309	3/25/2009	3/31/2009	< 0.026	0.014 +/- 0.0007
20090343	3/31/2009	4/7/2009	< 0.023	0.018 +/- 0.0010
20090368	4/7/2009	4/14/2009	< 0.029	0.021 +/- 0.0009
20090398	4/14/2009	4/21/2009	< 0.026	0.017 +/- 0.0009
20090426	4/21/2009	4/28/2009	< 0.024	0.029 +/- 0.0011

LLD (pCi/m^3)	AS-1 PG			0.07	0.01
LAB ID		START DATE	END DATE	I-131	GROSS BETA
20090466		4/28/2009	5/5/2009	< 0.023	0.015 +/- 0.0008
20090492		5/5/2009	5/12/2009	< 0.025	0.015 +/- 0.0008
20090502		5/12/2009	5/19/2009	< 0.020	0.016 +/- 0.0009
20090506		5/19/2009	5/26/2009	< 0.017	0.013 +/- 0.0008
20090560		5/26/2009	6/2/2009	< 0.025	0.026 +/- 0.0010
20090571		6/2/2009	6/9/2009	< 0.026	0.021 +/- 0.0009
20090602		6/9/2009	6/16/2009	< 0.032	0.027 +/- 0.0010
20090651		6/16/2009	6/23/2009	< 0.022	0.030 +/- 0.0011
20090706		6/23/2009	6/30/2009	< 0.031	0.030 +/- 0.0011
20090737		6/30/2009	7/7/2009	< 0.024	0.026 +/- 0.0010
20090755		7/7/2009	7/14/2009	< 0.028	0.034 +/- 0.0011
20090825		7/14/2009	7/21/2009	< 0.033	0.021 +/- 0.0009
20090860		7/21/2009	7/28/2009	< 0.025	0.022 +/- 0.0010
20090847		7/28/2009	8/4/2009	< 0.030	0.019 +/- 0.0008
20090873		8/4/2009	8/11/2009	< 0.020	0.022 +/- 0.0009
20090918		8/11/2009	8/18/2009	< 0.034	0.016 +/- 0.0008
20090922		8/18/2009	8/25/2009	< 0.028	0.022 +/- 0.0009
20090938		8/25/2009	9/1/2009	< 0.023	0.029 +/- 0.0010
20090965		9/1/2009	9/8/2009	< 0.025	0.030 +/- 0.0010
20090998		9/8/2009	9/15/2009	< 0.023	0.020 +/- 0.0009

LLD (pCi/m^3)	AS-1 PG			0.07	0.01
LAB ID		**START DATE**	**END DATE**	**I-131**	**GROSS BETA**
20091019		9/15/2009	9/22/2009	< 0.036	0.020 +/- 0.0009
20091024		9/22/2009	9/29/2009	< 0.020	0.016 +/- 0.0009
20091065		9/29/2009	10/6/2009	< 0.030	0.020 +/- 0.0009
20091100		10/6/2009	10/13/2009	< 0.018	0.011 +/- 0.0007
20091130		10/13/2009	10/20/2009	< 0.023	0.016 +/- 0.0008
20091160		10/20/2009	10/27/2009	< 0.033	0.019 +/- 0.0009
20091164		10/27/2009	11/3/2009	< 0.019	0.020 +/- 0.0009
20091174		11/3/2009	11/10/2009	< 0.019	0.037 +/- 0.0011
20091212		11/10/2009	11/17/2009	< 0.026	0.038 +/- 0.0011
20091237		11/17/2009	11/24/2009	< 0.028	0.038 +/- 0.0012
20091257		11/24/2009	12/1/2009	< 0.017	0.030 +/- 0.0010
20091295		12/1/2009	12/8/2009	< 0.020	0.027 +/- 0.0010
20091344		12/8/2009	12/15/2009	< 0.026	0.030 +/- 0.0011
20091363		12/15/2009	12/22/2009	< 0.019	0.049 +/- 0.0013
20091379		12/22/2009	12/29/2009	< 0.026	0.030 +/- 0.0010
Average:					0.024
Maximum:					0.049
Minimum:					0.011

Table 1.1
Sample Type: **Air Particulate Filter and Radioiodine Cartridge**
Analysis: Gross Beta and I-131
Units: pCi/m^3

AIR SAMPLE AS-3 61VA - GGNS – Control

LLD (pCi/m^3)	AS-3 61VA		0.07	0.01
LAB ID	**START DATE**	**END DATE**	**I-131**	**GROSS BETA**
20090004	12/30/2008	1/6/2009	< 0.017	0.023 +/- 0.0009
20090058	1/6/2009	1/13/2009	< 0.027	0.034 +/- 0.0011
20090064	1/13/2009	1/20/2009	< 0.021	0.031 +/- 0.0011
20090085	1/20/2009	1/27/2009	< 0.018	0.036 +/- 0.0011
20090099	1/27/2009	2/3/2009	< 0.017	0.024 +/- 0.0010
20090127	2/3/2009	2/10/2009	< 0.035	0.023 +/- 0.0010
20090131	2/10/2009	2/17/2009	< 0.019	0.025 +/- 0.0010
20090155	2/17/2009	2/24/2009	< 0.014	0.038 +/- 0.0012
20090184	2/24/2009	3/3/2009	< 0.017	0.030 +/- 0.0010
20090214	3/3/2009	3/10/2009	< 0.027	0.033 +/- 0.0011
20090223	3/10/2009	3/17/2009	< 0.029	0.021 +/- 0.0010
20090281	3/17/2009	3/24/2009	< 0.033	0.029 +/- 0.0007
20090310	3/24/2009	3/31/2009	< 0.023	0.016 +/- 0.0006
20090344	3/31/2009	4/7/2009	< 0.024	0.020 +/- 0.0010
20090369	4/7/2009	4/14/2009	< 0.031	0.022 +/- 0.0009
20090399	4/14/2009	4/21/2009	< 0.027	0.022 +/- 0.0010
20090427	4/21/2009	4/28/2009	< 0.028	0.029 +/- 0.0011
20090467	4/28/2009	5/5/2009	< 0.019	0.014 +/- 0.0008

LLD (pCi/m^3)	AS-3 61VA			0.07	0.01
LAB ID		START DATE	END DATE	I-131	GROSS BETA
20090493		5/5/2009	5/12/2009	< 0.027	0.015 +/- 0.0008
20090503		5/12/2009	5/19/2009	< 0.022	0.017 +/- 0.0010
20090507		5/19/2009	5/26/2009	< 0.020	0.013 +/- 0.0009
20090561		5/26/2009	6/2/2009	< 0.024	0.025 +/- 0.0009
20090572		6/2/2009	6/9/2009	< 0.028	0.021 +/- 0.0010
20090603		6/9/2009	6/16/2009	< 0.021	0.028 +/- 0.0010
20090652		6/16/2009	6/23/2009	< 0.025	0.030 +/- 0.0011
20090707		6/23/2009	6/30/2009	< 0.025	0.030 +/- 0.0011
20090738		6/30/2009	7/7/2009	< 0.025	0.030 +/- 0.0011
20090756		7/7/2009	7/14/2009	< 0.030	0.038 +/- 0.0012
20090826		7/14/2009	7/21/2009	< 0.035	0.022 +/- 0.0009
20090861		7/21/2009	7/28/2009	< 0.027	0.023 +/- 0.0010
20090848		7/28/2009	8/4/2009	< 0.025	0.022 +/- 0.0009
20090874		8/4/2009	8/11/2009	< 0.019	0.025 +/- 0.0010
20090919		8/11/2009	8/18/2009	< 0.025	0.020 +/- 0.0009
20090923		8/18/2009	8/25/2009	< 0.029	0.025 +/- 0.0009
20090939		8/25/2009	9/1/2009	< 0.024	0.034 +/- 0.0011
20090966		9/1/2009	9/8/2009	< 0.027	0.030 +/- 0.0010
20090999		9/8/2009	9/14/2009	< 0.027	0.022 +/- 0.0010
20091020		9/14/2009	9/22/2009	< 0.027	0.019 +/- 0.0008

LLD (pCi/m^3)	AS-3 61VA		0.07	0.01
LAB ID	**START DATE**	**END DATE**	**I-131**	**GROSS BETA**
20091025	9/22/2009	9/29/2009	< 0.021	0.017 +/- 0.0009
20091066	9/29/2009	10/6/2009	< 0.027	0.020 +/- 0.0009
20091101	10/6/2009	10/12/2009	< 0.020	0.012 +/- 0.0008
20091131	10/12/2009	10/19/2009	< 0.034	0.015 +/- 0.0008
20091161	10/19/2009	10/27/2009	< 0.030	0.021 +/- 0.0009
20091165	10/27/2009	11/3/2009	< 0.019	0.022 +/- 0.0009
20091175	11/3/2009	11/10/2009	< 0.016	0.038 +/- 0.0011
20091213	11/10/2009	11/16/2009	< 0.034	0.041 +/- 0.0012
20091238	11/16/2009	11/24/2009	< 0.025	0.035 +/- 0.0010
20091258	11/24/2009	12/1/2009	< 0.016	0.032 +/- 0.0011
20091296	12/1/2009	12/7/2009	< 0.019	0.029 +/- 0.0011
20091345	12/7/2009	12/14/2009	< 0.030	0.036 +/- 0.0011
20091364	12/14/2009	12/21/2009	< 0.019	0.055 +/- 0.0013
20091380	12/21/2009	12/28/2009	< 0.033	0.035 +/- 0.0011
Average:				0.026
Maximum:				0.055
Minimum:				0.012

Table 1.1
Sample Type: **Air Particulate Filter and Radioiodine Cartridge**
Analysis: Gross Beta and I-131
Units: pCi/m^3

AIR SAMPLE AS-7 - GGNS – Indicator

LLD (pCi/m^3) AS-7UH			0.07	0.01
LAB ID	**START DATE**	**END DATE**	**I-131**	**GROSS BETA**
20090005	12/30/2008	1/6/2009	< 0.015	0.022 +/- 0.0009
20090059	1/6/2009	1/13/2009	< 0.022	0.034 +/- 0.0011
20090065	1/13/2009	1/20/2009	< 0.016	0.030 +/- 0.0010
20090086	1/20/2009	1/27/2009	< 0.017	0.031 +/- 0.0010
20090100	1/27/2009	2/3/2009	< 0.022	0.024 +/- 0.0010
20090128	2/3/2009	2/10/2009	< 0.028	0.021 +/- 0.0010
20090132	2/10/2009	2/17/2009	< 0.019	0.025 +/- 0.0010
20090156	2/17/2009	2/24/2009	< 0.016	0.034 +/- 0.0011
20090185	2/24/2009	3/3/2009	< 0.022	0.031 +/- 0.0011
20090215	3/3/2009	3/10/2009	< 0.029	0.027 +/- 0.0010
20090224	3/10/2009	3/17/2009	< 0.020	0.020 +/- 0.0009
20090282	3/17/2009	3/24/2009	< 0.024	0.029 +/- 0.0007
20090311	3/24/2009	3/31/2009	< 0.028	0.015 +/- 0.0006
20090345	3/31/2009	4/7/2009	< 0.025	0.020 +/- 0.0010
20090370	4/7/2009	4/14/2009	< 0.027	0.022 +/- 0.0010
20090400	4/14/2009	4/21/2009	< 0.030	0.021 +/- 0.0009
20090428	4/21/2009	4/28/2009	< 0.023	0.028 +/- 0.0010
20090468	4/28/2009	5/5/2009	< 0.026	0.015 +/- 0.0008

LLD (pCi/m^3)	AS-7UH			0.07	0.01
LAB ID		START DATE	END DATE	I-131	GROSS BETA
20090494		5/5/2009	5/12/2009	< 0.029	0.016 +/- 0.0008
20090504		5/12/2009	5/19/2009	< 0.023	0.017 +/- 0.0010
20090508		5/19/2009	5/26/2009	< 0.017	0.012 +/- 0.0008
20090562		5/26/2009	6/2/2009	< 0.023	0.025 +/- 0.0009
20090573		6/2/2009	6/9/2009	< 0.029	0.021 +/- 0.0009
20090604		6/9/2009	6/16/2009	< 0.032	0.027 +/- 0.0010
20090653		6/16/2009	6/23/2009	< 0.023	0.030 +/- 0.0011
20090708		6/23/2009	6/30/2009	< 0.024	0.030 +/- 0.0011
20090739		6/30/2009	7/7/2009	< 0.030	0.029 +/- 0.0010
20090757		7/7/2009	7/14/2009	< 0.022	0.036 +/- 0.0011
20090827		7/14/2009	7/21/2009	< 0.031	0.020 +/- 0.0009
20090862		7/21/2009	7/28/2009	< 0.025	0.021 +/- 0.0010
20090849		7/28/2009	8/4/2009	< 0.022	0.018 +/- 0.0008
20090875		8/4/2009	8/11/2009	< 0.015	0.019 +/- 0.0009
20090920		8/11/2009	8/18/2009	< 0.026	0.016 +/- 0.0008
20090924		8/18/2009	8/25/2009	< 0.025	0.025 +/- 0.0009
20090940		8/25/2009	9/1/2009	< 0.028	0.027 +/- 0.0009
20090967		9/1/2009	9/8/2009	< 0.027	0.027 +/- 0.0010
20091000		9/8/2009	9/15/2009	< 0.023	0.018 +/- 0.0008
20091021		9/15/2009	9/22/2009	< 0.029	0.018 +/- 0.0009

LLD (pCi/m^3)	AS-7UH			0.07	0.01
LAB ID		**START DATE**	**END DATE**	**I-131**	**GROSS BETA**
20091026		9/22/2009	9/29/2009	< 0.029	0.014 +/- 0.0008
20091067		9/29/2009	10/6/2009	< 0.025	0.019 +/- 0.0009
20091107		10/6/2009	10/13/2009	< 0.018	0.009 +/- 0.0007
20091132		10/13/2009	10/20/2009	< 0.023	0.015 +/- 0.0008
20091162		10/20/2009	10/27/2009	< 0.031	0.017 +/- 0.0009
20091166		10/27/2009	11/3/2009	< 0.026	0.018 +/- 0.0009
20091176		11/3/2009	11/10/2009	< 0.017	0.033 +/- 0.0011
20091214		11/10/2009	11/17/2009	< 0.028	0.033 +/- 0.0011
20091239		11/17/2009	11/24/2009	< 0.026	0.032 +/- 0.0011
20091259		11/24/2009	12/1/2009	< 0.016	0.025 +/- 0.0010
20091297		12/1/2009	12/8/2009	< 0.015	0.022 +/- 0.0009
20091346		12/8/2009	12/15/2009	< 0.019	0.026 +/- 0.0010
20091365		12/15/2009	12/22/2009	< 0.017	0.047 +/- 0.0012
20091381		12/22/2009	12/29/2009	< 0.026	0.026 +/- 0.0010
Average:					0.024
Maximum:					0.047
Minimum:					0.009

Table 1.2
Sample Type: **Air Particulate Filter**
Analysis: Gamma Isotopic
Units: pCi/m^3

AIR PARTICULATE FILTER QUARTERLY COMPOSITES (GAMMA) – GGNS

LLD (pCi/m^3)			**0.05**	**0.06**
LAB ID	**LOCATION**	**DATE**	**CS-134**	**CS-137**
20090355	AS-1 PG	2/13/2009	< 0.006	< 0.004
20090356	AS-3 61VA	2/13/2009	< 0.002	< 0.004
20090357	AS-7 UH	2/13/2009	< 0.004	< 0.004
20090724	AS-1 PG	5/15/2009	< 0.005	< 0.003
20090725	AS-3 61VA	5/15/2009	< 0.005	< 0.003
20090726	AS-7 UH	5/15/2009	< 0.005	< 0.003
20091061	AS-1 PG	8/14/2009	< 0.005	< 0.004
20091062	AS-3 61VA	8/14/2009	< 0.005	< 0.004
20091063	AS-7 UH	8/14/2009	< 0.004	< 0.004
20091388	AS-1 PG	11/13/2009	< 0.006	< 0.004
20091389	AS-3 61VA	11/13/2009	< 0.006	< 0.005
20091390	AS-7 UH	11/13/2009	< 0.006	< 0.005

Table 2.1
Sample Type: **Thermoluminescent Dosimeters**
Analysis: Gamma Dose
Units: mrem/Qtr

Inner Ring - Within General Area of Site Boundary (ODCM Specifications)					
Station	**1st Qtr**	**2nd Qtr**	**3rd Qtr**	**4th Qtr**	**Annual Mean**
M-16	11.0	9.8	10.4	10.7	10.5
M-19	10.3	10.4	11.2	10.7	10.6
M-21*	16.6	15.7	18.4	17.4	17.0
M-22	9.6	12.6	11.0	10.4	10.9
M-23	8.0	6.9	8.8	8.1	7.9
M-25	8.5	5.6	9.3	7.1	7.6
M-28	11.7	10.5	12.2	12.0	11.6
M-94	10.7	10.3	10.5	10.8	10.6
M-95	8.2	7.6	8.6	11.7	9.0
M-96	8.5	6.6	6.9	7.7	7.5
M-97	7.1	6.7	8.0	7.0	7.2
M-98	13.3	12.8	13.6	13.4	13.3
M-99	15.8	15.5	17.3	16.4	16.3
M-100	12.1	11.4	12.4	11.7	11.9

*Location with highest annual mean

Outer Ring – Approximately Three (3) to Five (5) Miles from the Site (ODCM Specifications)					
Station	**1st Qtr**	**2nd Qtr**	**3rd Qtr**	**4th Qtr**	**Annual Mean**
M-36	8.0	8.7	9.0	8.2	8.5
M-40	5.9	5.3	6.3	6.4	6.0
M-48	10.8	9.9	11.1	10.4	10.5
M-49	11.6	10.9	12.2	11.7	11.6
M-50	10.2	9.7	10.9	10.6	10.3
M-55	12.3	12.3	12.8	11.7	12.3
M-55 *	11.1	12.4	12.7	11.5	11.9

*** Location with highest annual mean.**

Table 2.2
Sample Type: **Thermoluminescent Dosimeters**
Analysis: Gamma Dose
Units: mrem/Qtr

Special Interest Areas – Population Centers & Schools (ODCM Specifications)					
Station	**1st Qtr**	**2nd Qtr**	**3rd Qtr**	**4th Qtr**	**Annual Mean**
M-01*	12.2	11.3	11.5	12.6	11.9
M-07	11.0	10.1	12.4	9.9	10.9
M-09	10.7	9.2	10.7	11.2	10.4
M-10	8.2	7.9	8.8	8.8	8.4
M-33	8.2	8.0	8.8	8.9	8.5
M-38	8.8	9.5	11.2	9.6	9.8
M-39	9.3	9.3	10.0	8.9	9.4

*** Location with highest annual mean.**

Table 2.3
Sample Type: **Thermoluminescent Dosimeters**
Analysis: Gamma Dose
Units: mrem/Qtr

Special Interest Areas – Control (ODCM Specifications)					
Station	**1st Qtr**	**2nd Qtr**	**3rd Qtr**	**4th Qtr**	**Annual Mean**
M-14	11.4	10.5	12.2	11.2	11.3

Table 3.1
Sample Type: **Surface Water**
Analysis: Gamma Isotopic
Units: pCi/l

SURFACE WATER SAMPLES (GAMMA) - GGNS

LLD/LIQUID (pCi/l)			15	15	30	15	30	15	30	15	15	18	60	15
LAB ID	**LOCATION**	**DATE**	**MN-54**	**C0-58**	**FE-59**	**CO-60**	**ZN-65**	**NB-95**	**ZR-95**	**I-131**	**CS-134**	**CS-137**	**BA-140**	**LA-140**
20090087	MRUP	1/27/2009	< 7.92	< 8.95	< 14.13	< 9.19	< 14.13	< 8.33	< 10.94	< 10.08	< 9.37	< 7.33	< 33.86	< 11.93
20090089	MRDOWN	1/27/2009	< 8.28	< 9.04	< 19.27	< 11.02	< 12.22	< 7.78	< 20.61	< 12.58	< 9.52	< 12.35	< 32.36	< 6.84
20090472	MRUP	5/7/2009	< 5.96	< 5.22	< 12.30	< 5.72	< 14.38	< 8.66	< 12.97	< 14.88	< 7.22	< 4.83	< 41.14	< 13.87
20090474	MRDOWN	5/7/2009	< 5.53	< 4.86	< 9.76	< 5.32	< 9.21	< 6.37	< 10.43	< 14.74	< 5.24	< 6.12	< 31.87	< 11.27
20090476	MRDOWN GG	5/7/2009	< 4.81	< 5.24	< 12.16	< 5.94	< 12.24	< 7.57	< 11.80	< 14.21	< 6.17	< 5.46	< 35.79	< 10.36
20090886	MRUP	8/13/2009	< 6.03	< 8.52	< 14.27	< 8.85	< 16.65	< 7.82	< 13.03	< 14.87	< 8.71	< 8.33	< 30.85	< 12.03
20090888	MRDOWN	8/13/2009	< 6.93	< 7.28	< 13.20	< 6.93	< 16.44	< 8.60	< 12.86	< 13.13	< 8.53	< 7.86	< 39.93	< 14.43
20091217	MRUP	11/17/2009	< 10.98	< 11.13	< 15.34	< 5.13	< 19.12	< 10.38	< 12.66	< 14.88	< 11.30	< 9.19	< 51.07	< 11.10
20091219	MRUPGG	11/17/2009	< 9.01	< 7.43	< 16.78	< 8.98	< 13.89	< 10.06	< 14.82	< 13.36	< 9.70	< 9.23	< 33.75	< 14.06
20091221	MRDOWN	11/17/2009	< 6.40	< 8.63	< 19.60	< 10.04	< 18.86	< 10.01	< 15.53	< 14.79	< 7.68	< 9.43	< 49.78	< 13.28

LLD/LIQUID (pCi/l)			15	15	30	15	30	15	30	15	15	18	60	15
LAB ID	**LOCATION**	**DATE**	**MN-54**	**C0-58**	**FE-59**	**CO-60**	**ZN-65**	**NB-95**	**ZR-95**	**I-131**	**CS-134**	**CS-137**	**BA-140**	**LA-140**
20091223	MRDOWN GG	11/17/2009	< 8.39	< 9.05	< 12.48	< 9.06	< 15.25	< 8.22	< 12.19	< 14.63	< 6.81	< 6.85	< 34.38	< 14.45
20091366	MRDOWN*	12/21/2009	< 8.30	< 7.35	< 15.02	< 9.04	< 16.02	< 8.19	< 12.44	< 11.73	< 9.44	< 9.01	< 39.08	< 12.70
20091367	MRDOWN GG*	12/21/2009	< 7.30	< 6.51	< 15.08	< 6.23	< 15.00	< 7.84	< 11.34	< 12.32	< 7.48	< 8.18	< 41.54	< 11.95

"GG" – indicates duplicate sample.
* Annual Sample collected during liquid discharge

Table 3.2
Sample Type: **Surface Water**
Analysis: Tritium
Units: pCi/l

SURFACE WATER SAMPLES (TRITIUM) – GGNS

LLD (pCi/l)	SURFACE WATER H-3		3000
LAB ID	**LOCATION**	**DATE**	**TRITIUM**
20090088	MRUP	1/27/2009	< 560
20090090	MRDOWN	1/27/2009	< 560
20090473	MRUP	5/7/2009	< 547
20090475	MRDOWN	5/7/2009	< 552
20090477	MRDOWN GG	5/7/2009	< 551
20090887	MRUP	8/13/2009	< 548
20090889	MRDOWN	8/13/2009	< 549
20091216	MRUP	11/17/2009	< 540
20091218	MRUPGG	11/17/2009	< 545
20091220	MRDOWN	11/17/2009	< 542
20091222	MRDOWN GG	11/17/2009	< 543
20091366	MRDOWN*	12/21/2009	< 631
20091367	MRDOWN GG*	12/21/2009	< 628
20090032	OUTFALL 007	1/12/2009	909+/- 258.14
20090129	OUTFALL 007	2/12/2009	< 539
20090254	OUTFALL 007	3/13/2009	< 550
20090401	OUTFALL 007	4/17/2009	< 533
20090505	OUTFALL 007	5/19/2009	< 554
20090592	OUTFALL 007	6/12/2009	< 571
20090763	OUTFALL 007	7/16/2009	< 544
20090877	OUTFALL 007	8/17/2009	< 560
20090900	OUTFALL 007	8/17/2009	< 539
20090968	OUTFALL 007	9/8/2009	< 548
20091017	OUTFALL 007	9/17/2009	< 544
20091125	OUTFALL 007	10/19/2009	< 553
20091215	OUTFALL 007	11/18/2009	< 540
20091355	OUTFALL 007	12/17/2009	< 630
20091356	OUTFALL 007 GG	12/17/2009	< 629

* Annual Sample collected during liquid discharge
"GG" – indicates duplicate sample.

Table 4.1
Sample Type: **Groundwater**
Analysis: Gamma Isotopic
Units: pCi/l

GROUND WATER SAMPLES (GAMMA) - GGNS

LLD (pCi/l)			15	15	30	15	30	15	30	15	15	18	60	15
LAB ID	**LOCATION**	**DATE**	**MN-54**	**C0-58**	**FE-59**	**CO-60**	**ZN-65**	**NB-95**	**ZR-95**	**I-131**	**CS-134**	**CS-137**	**BA-140**	**LA-140**
20091351	PGWELL	12/15/2009	< 6.66	< 7.17	< 13.80	< 6.79	< 18.06	< 8.91	< 12.32	< 11.00	< 4.87	< 6.43	< 29.53	< 13.78
20091352	CONSTWELL	12/16/2009	< 10.92	< 10.92	< 19.22	< 4.36	< 21.64	< 14.76	< 17.66	< 13.79	< 8.99	< 11.70	< 47.08	< 14.64

Table 4.2
Sample Type: **Groundwater**
Analysis: Tritium
Units: pCi/l

GROUND WATER SAMPLES (TRITIUM) - GGNS

LLD (pCi/l)			2000
LAB ID	**LOCATION**	**DATE**	**TRITIUM**
20091351	PGWELL	12/15/2009	< 632.70
20091352	CONSTWELL	12/16/2009	< 629.57

Table 4.3
Sample Type: **Groundwater**
Analysis: Iodine
Units: pCi/l

GROUND WATER SAMPLES (Iodine-131) - GGNS

LLD(pCi/l)			**1.0**
LAB ID	**LOCATION**	**DATE**	**I-131**
20091351	PGWELL	12/15/2009	< 0.88
20091352	CONSTWELL	12/16/2009	< 0.97

Table 5.1
Sample Type: **Sediment**
Analysis: Gamma Isotopic
Units: pCi/kg

SEDIMENT SAMPLES (GAMMA) - GGNS

LLD (pCi/kg)			**150**	**180**
LAB ID	**LOCATION**	**DATE**	**CS-134**	**CS-137**
20091353	SEDHAM	12/16/2009	< 27.96	< 27.74
20091354	SEDCONT	12/16/2009	< 24.83	< 23.85

Table 6.1
Sample Type: **Fish**
Analysis: Gamma Isotopic
Units: pCi/kg

FISH SAMPLES (GAMMA) - GGNS

LLD (pCi/kg)			130	130	260	130	260	130	150
LAB ID	**LOCATION**	**DATE**	**MN-54**	**C0-58**	**FE-59**	**CO-60**	**ZN-65**	**CS-134**	**CS-137**
20091096	FISHUP	10/6/2009	< 21.01	< 20.71	< 45.35	< 27.87	< 41.48	< 17.14	< 18.89
20091097	FISHDOWN	10/6/2009	< 14.66	< 17.84	< 33.94	< 18.57	< 45.40	< 18.53	< 12.71
20091098	FISHUP GG	10/6/2009	< 18.26	< 15.85	< 55.19	< 21.06	< 48.26	< 17.40	< 21.01
20091099	FISHDOWN GG	10/6/2009	< 17.08	< 27.07	< 53.48	< 17.82	< 55.46	< 22.32	< 19.66

"GG" – indicates duplicate sample.

Table 7.1
Sample Type: **Food Products**
Analysis: Iodine-131 and Gamma Isotopic
Units: pCi/kg

VEGETATION SAMPLES (GAMMA) - GGNS

LLD (pCi/kg)			60	60	80
LAB ID	**LOCATION**	**DATE**	**I-131**	**CS-134**	**CS-137**
20090124	VEG-CONT	2/9/2009	< 54.78	< 28.94	< 28.38
20090125	VEG-J	2/9/2009	< 58.87	< 47.39	< 48.63
20090552	VEG-CONT	5/27/2009	< 58.40	< 36.06	< 34.34
20090553	VEG-J	5/26/2009	< 59.98	< 35.52	< 30.07
20090912	VEG-J	8/18/2009	< 57.11	< 56.37	< 36.99
20090937	VEG-CONT	8/27/2009	< 59.99	< 29.23	< 18.66
20091224	VEG-CONT	11/19/2009	< 58.08	< 50.78	< 42.93
20091225	VEG-CONT GG	11/19/2009	< 56.65	< 36.85	< 40.39
20091226	VEG-J	11/18/2009	< 52.84	< 35.40	< 41.28
20091227	VEG-J GG	11/19/2009	< 59.20	< 49.88	< 56.71

"GG" – indicates duplicate sample.

Table 8.1
Sample Type: **Special Samples**
Analysis: Gamma Isotopic
Units: pCi/kg

SPECIAL SURFACE WATER SAMPLES (GAMMA) – GGNS

LLD (pCi/l)			15	15	30	15	30	15	30	15	15	18	60	15
LAB ID	**LOCATION**	**DATE**	**MN-54**	**C0-58**	**FE-59**	**CO-60**	**ZN-65**	**NB-95**	**ZR-95**	**I-131**	**CS-134**	**CS-137**	**BA-140**	**LA-140**
20090031	OUTFALL 007	1/12/2009	< 13.55	< 10.70	< 18.41	< 7.05	< 21.33	< 7.95	< 13.10	< 14.28	< 10.76	< 10.89	< 29.63	< 13.05
20090453	OUTFALL 007	5/1/2009	< 8.21	< 8.60	< 14.61	< 7.54	< 20.11	< 11.25	< 19.01	< 14.57	< 8.56	< 7.05	< 37.79	< 10.94
20090878	OUTFALL 007	8/17/2009	< 8.97	< 9.36	< 21.76	< 11.30	< 21.21	< 9.43	< 15.49	< 9.90	< 9.39	< 10.75	< 39.70	< 9.05
20090969	OUTFALL 007	9/8/2009	< 11.52	< 10.84	< 18.09	< 9.48	< 14.81	< 12.31	< 16.61	< 13.95	< 9.34	< 8.53	< 40.24	< 12.97
20091355	OUTFALL 007	12/17/2009	< 6.52	< 6.67	< 17.39	< 6.83	< 15.15	< 9.21	< 11.31	< 13.65	< 7.27	< 8.81	< 40.57	< 9.15

Table 9.1
Sample Type: **Interlaboratory Comparison**
Analysis: Gross Beta, Tritium, Iodine-131 and Gamma Isotopic

RIVER BEND STATION

ENVIRONMENTAL (CROSS-CHECK) PROGRAM PARTICIPATION RESULTS

Analytics E6674-125 March 19, 2009	Gamma in Water						
Nuclide	**RBS Mean**	**RBS 1-s**	**Ref Lab Value**	**Ref Lab Uncertainty**	**Resolution**	**RBS/Ref Lab Ratio**	**Pass/ Fail**
I-131	73.3	0.13	69.0	1.15	60	1.06	Pass
Ce-141	126	2.54	120	2.01	59.7	1.05	Pass
Cr-51	371	10.9	387	6.46	59.9	0.96	Pass
Cs-134	118	2.11	119	1.98	60.1	0.99	Pass
Cs-137	151	2.91	141	2.36	59.7	1.07	Pass
Co-58	154	2.65	151	2.52	59.9	1.02	Pass
Mn-54	173	4.05	162	2.70	60	1.07	Pass
Fe-59	134	2.84	127	2.11	60.2	1.06	Pass
Zn-65	199	2.71	197	3.30	59.7	1.01	Pass
Co-60	189	0.31	180	3.01	59.8	1.05	Pass

Analytics E6675-125 March 19, 2009	Gross Beta in Water						
Nuclide	**RBS Mean**	**RBS 1-s**	**Ref Lab Value**	**Ref Lab uncertainty**	**Resolution**	**RBS/Ref Lab Ratio**	**Pass/ Fail**
Cs-137	240	2.66	235	3.92	59.9	1.02	Pass

Analytics E6676-125 March 19, 2009	I-131 cartridge						
Nuclide	**RBS Mean**	**RBS 1-s**	**Ref Lab Value**	**Ref Lab uncertainty**	**Resolution**	**RBS/Ref Lab Ratio**	**Pass/ Fail**
I-131	76.0	2.75	78.6	1.31	60.0	0.97	Pass

RIVER BEND STATION

ENVIRONMENTAL (CROSS-CHECK) PROGRAM PARTICIPATION RESULTS

Analytics E6677-125 March 19, 2009	Gamma in Milk						
Nuclide	RBS Mean	RBS 1-s	Ref Lab Value	Ref Lab uncertainty	Resolution	RBS/Ref Lab Ratio	Pass/ Fail
I-131	74.0	4.10	79.3	1.32	60.1	0.93	Pass
Ce-141	91.2	3.91	94.9	1.58	60.1	0.96	Pass
Cr-51	283	20.9	305	5.10	59.8	0.93	Pass
Cs-134	95.5	2.04	93.7	1.57	59.7	1.02	Pass
Cs-137	107	0.95	111	1.86	59.7	0.96	Pass
Co-58	111	2.80	119	1.99	59.8	0.93	Pass
Mn-54	136	3.79	128	2.13	60.1	1.06	Pass
Fe-59	109	5.85	99.9	1.67	59.8	1.09	Pass
Zn-65	159	6.00	156	2.60	60.0	1.02	Pass
Co-60	143	1.22	142	2.38	59.7	1.01	Pass

Analytics E6707-125 June 18, 2009	H-3 in water						
Nuclide	RBS Mean	RBS 1-s	Ref Lab Value	Ref Lab uncertainty	Resolution	RBS/Ref Lab Ratio	Pass/ Fail
H-3	12591	368	13300	223	59.6	0.95	Pass

Analytics E6708-125 June 18, 2009	Gross Beta filter						
Nuclide	RBS Mean	RBS 1-s	Ref Lab Value	Ref Lab uncertainty	Resolution	RBS/Ref Lab Ratio	Pass/ Fail
Cs-137	91.6	0.59	86.5	1.44	60.1	1.06	Pass

Analytics E6709-125 June 18, 2009	Gamma Filter						
Nuclide	RBS Mean	RBS 1-s	Ref Lab Value	Ref Lab Uncertainty	Resolution	RBS/Ref Lab Ratio	Pass/ Fail
Ce-141	119	2.5	120	2.0	60	0.99	Pass
Cr-51	172	11.1	169	2.82	59.9	1.02	Pass
Cs-134	66.9	1.2	69.8	1.17	59.7	0.96	Pass
Cs-137	83.3	0.8	80.8	1.35	59.9	1.03	Pass
Co-58	40.1	0.6	38.7	0.646	59.9	1.03	Pass
Mn-54	60.5	1.4	57.7	0.964	59.9	1.05	Pass
Fe-59	55.5	1.3	51.5	0.860	59.9	1.08	Pass
Zn-65	80.4	1.7	73.9	1.23	60.1	1.09	Pass
Co-60	136	2.4	131	2.19	59.8	1.04	Pass

RIVER BEND STATION

ENVIRONMENTAL (CROSS-CHECK) PROGRAM PARTICIPATION RESULTS

Analytics E6710-125 June 18, 2009	Gamma Soil						
Nuclide	RBS Mean	RBS 1-s	Ref Lab Value	Ref Lab Uncertainty	Resolution	RBS/Ref Lab Ratio	Pass/ Fail
Ce-141	0.461	1.99e-3	0.462	7.72e-3	59.8	1.00	Pass
Cr-51	0.631	5.69e-3	0.652	1.09e-2	59.8	0.97	Pass
Cs-134	0.269	1.32e-3	0.270	4.51e-3	59.9	1.00	Pass
Cs-137	0.428	4.94e-3	0.406	6.78e-3	59.9	1.05	Pass
Co-58	0.144	2.26e-3	0.150	2.51e-3	59.8	0.96	Pass
Mn-54	0.231	1.99e-3	0.223	3.72e-3	59.9	1.04	Pass
Fe-59	0.201	1.50e-3	0.199	3.32e-3	59.9	1.01	Pass
Zn-65	0.299	4.70e-3	0.286	4.78e-3	59.8	1.05	Pass
Co-60	0.509	3.72e-3	0.507	8.47e-3	59.9	1.00	Pass

100% of interlaboratory crosscheck results were within control limits for accuracy and 100% were within control limits for precision.