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River Bend Station - Unit 1  
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Dear Sir or Madam,

Enclosed is the River Bend Station (RBS) Annual Radiological Environmental Operating Report for the period January 1, 2009, through December 31, 2009. This report is submitted in accordance with the RBS Technical Specifications, Section 5.6.2.

Should you have any questions regarding the enclosed information, please contact Mr. David Lorfing at (225) 381-4157.

Sincerely,

David N. Lorfing

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enclosure

TEAS  
MRR

Radiological Environmental Operating Report for 2009  
Page 2 of 2

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**RIVER BEND STATION**

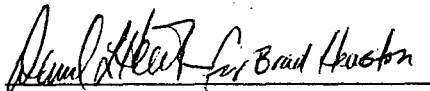
**ANNUAL RADIOLOGICAL ENVIRONMENTAL  
OPERATING REPORT FOR 2009**

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**LIST OF ATTACHMENTS**

**ATTACHMENT 1      2009 RADIOLOGICAL MONITORING REPORT  
SUMMARY OF MONITORING RESULTS**

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## **Summary**

The Annual Radiological Environmental Operating Report presents data obtained through analyses of environmental samples collected for the River Bend Station (RBS) Radiological Environmental Monitoring Program (REMP) for the period January 1, 2009 through December 31, 2009. This report fulfills a requirement specified in RBS Technical Requirements Manual (TRM) 5.6.2 as required by Technical Specification 5.6.2 of Appendix A to RBS License Number NPF-47. During 2009, REMP results remained at background levels as has been the case in previous years.

All required lower limit of detection (LLD) capabilities were achieved in all sample analyses during 2009. No measurable levels of radiation above baseline levels were detected in the vicinity of River Bend Station. The 2009 Radiological Environmental Monitoring Program thus substantiated the adequacy of source control and effluent monitoring at River Bend Station with no observed impact of plant operations on the environment.

### **Radiological Environmental Monitoring Program**

RBS established the REMP prior to the station's becoming operational (1985) to provide data on background radiation and radioactivity normally present in the area. RBS has continued to monitor the environment by sampling air, water, sediment, fish and food products, as well as measuring direct radiation. RBS also samples milk if milk-producing animals used for human consumption are present within five miles (8 km) of the plant.

The REMP includes sampling indicator and control locations within an approximate 20 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. RBS personnel compare indicator results with control and preoperational results to assess any impact RBS operation might have had on the surrounding environment.

In 2009, environmental samples were collected for radiological analysis. The results of indicator locations were compared with control locations and previous studies. It was concluded that overall, no significant relationship exists between RBS operation and effect on the area around the plant. The review of 2009 data, in many cases, showed radioactivity levels in the environment were undetectable in many locations and near background levels in significant pathways.

### **Harmful Effects or Irreversible Damage**

The REMP monitoring did not detect any harmful effects or evidence of irreversible damage in 2009. Therefore, no analysis or planned course of action to alleviate problems was necessary.



## **Reporting Levels**

RBS's review indicates that no samples equaled or exceeded reporting levels for radioactivity concentration in environmental samples, as outlined in RBS Technical Requirements Manual Table 3.12.1-2, when averaged over any calendar quarter. Therefore, 2009 results did not result in any Radiological Monitoring Program Special Reports.

## **Radioactivity Not Attributable to RBS**

The RBS REMP detected no radioactivity attributable to other sources during year 2009. Following the radioactive plume release due to reactor core degradation at the Chernobyl Nuclear Power Plant in 1986, RBS REMP detected I-131 in water, vegetation, and air samples. I-131 was also detected during 1998 in the wastewater treatment plant effluent. This was attributed to the medical treatment of a RBS employee. In 2006, Cs-137 was detected in upstream and downstream Mississippi River sediment samples. This activity was not present in the 2009 samples.

## **Comparison to Federal and State Programs**

RBS 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) TLD (Thermoluminescent Dosimeter) Direct Radiation Monitoring Network and the Environmental Radiological Laboratory – Department of Environmental Quality Laboratory Services Division (ERL-DEQLSD).

The NRC TLD Network Program was discontinued in 1998. Historically these results have compared to those from the RBS REMP. RBS TLD results continue to remain similar to the historical average and continue to verify that plant operation is not affecting the ambient radiation levels in the environment.

The ERL-DEQLSD and the RBS REMP entail similar radiological environmental monitoring program requirements. These programs include co-located air sample locations, and splitting or sharing sample media such as water, fish and food products. Both programs have obtained similar results over previous years.

## **Sample Deviations**

### **◆ Milk**

The REMP did not include milk sampling within five miles (8 km) of RBS in 2009 due to unavailability of milk-producing animals used for human consumption. The RBS Technical Requirements Manual requires collection of milk samples if available commercially within 8 km (5 miles) of the plant. RBS personnel collected vegetation

samples to monitor the ingestion pathway, as specified in RBS Technical Requirements Manual Table 3.12.1-1, because of milk unavailability.

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

All LLDs during this reporting period were more conservative than the acceptable limits required by the RBS Technical Requirement Manual (TRM).

◆ **Sampling Deviations**

Listed below are sampling deviations that occurred during 2009. No LLD values were exceeded in the air sampling deviations. As described in footnote (a) to RBS Technical Requirements Manual Table 3.12.1-1, deviations are permitted from the required sampling schedule due to malfunction of equipment or other legitimate reasons.

Station	Sampling Period	Problem Description	Comment
TGS	1 <sup>st</sup> Quarter	TLD Missing	TLD missing due to vandalism. (CR-RBS-2009-1526)
AGC	03/24/09 to 03/26/09	Power Outage	Air sampler location AGC was vandalized (power cord was severed). Volume of sample was adequate to achieve required LLD for I-131. (CR-RBS-2009-1526)
AN1 AP1	05/5/09 to 05/19/09	Power Outage	Air sampler locations AP1 and AN1 were short 3.6 hours and 3.3 hours due to local power interruptions caused by the loss of Grant Substation during sampling period 5/5/09 to 5/19/09. Volume of sample adequate to achieve required LLD for I-131. (CR-RBS-2009-2323)
AGC	06/02/09 to 06/12/09	Power Outage	Discovered the RBS air sampler for Environmental Service air sample location "AGC" in Entergy Zachary lay-down yard de-energized. The power cord was unplugged and the outlet was removed from the pole where it was originally installed. Volume of sample adequate to achieve required LLD for I-131. (CR-RBS-2009-2702)
AP1	06/02/09 to 06/15/09	Power Outage	Air sampler location AP1 had a 1.1 hour sample time deviation due to local power interruptions for sampling period 6/2/09 to 6/15/09. Sampler operating normal at time of sample change out. Sample volume adequate to achieve required LLD for I-131. (CR-RBS-2009-2778)

Station	Sampling Period	Problem Description	Comment
AN1	06/15/09 to 06/30/09	Power Outage	Air sampler location AN1 (site boundary) had a loss of 17 hours due to local power interruptions during sampling period 6/15/09 to 6/30/09. Sampler operating normal once tripped breaker was reset. Volume of sample adequate to achieve required LLD for I-131. (CR-RBS-2009-2952)
AQS2	12/16/09 to 12/29/09	Power Outage	Air sampler location AQS2 had a run time duration delta of 106.5 hours due to loss of power during the sampling period. Sampler operating normal at time sample change out. Volume of sample adequate to achieve required LLD for I-131. (CR-RBS-2009-6507)

### **Missed Samples**

No samples were missed during 2009.

### **Unavailable Results**

Results of one TLD from the first quarter 2009 from location TGS was unavailable due to the TLD being missing. This deviation is noted above.

### **Program Modifications**

RBS made no modifications to the REMP during the year 2009.

### **Attachments**

Attachment 1 contains results of air, TLD, water, sediment, fish, food products and special samples collected in 2009. TLDs were analyzed by AREVA. All remaining samples were analyzed by RBS Environmental Laboratory. Attachment 1 also contains RBS' participation in the Interlaboratory Comparison Program during the year 2009.

## **1.0 Introduction**

### **1.1 Radiological Environmental Monitoring Program**

RBS 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 the following:

- 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 RBS.
- 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 the RBS Technical Requirements Manual 3.12.1. A description of the RBS REMP sample locations utilized to monitor exposure pathways are described in Table 1.1 and shown in Figures 1-2 and 1-3. RBS may occasionally 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 2009 sampling results with Section 3.0 providing a summary of results for the monitored exposure pathways.

### **1.3 Land Use Census**

RBS personnel conduct a land use census biannually as required by RBS Technical Requirements Manual 3.12.2. The last land use census was performed in 2008. The next scheduled Land Use Census will be performed in 2010. Section 2.8 of this report contains a narrative on the results of the 2008 land use census.

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	<p><b>Radioiodine and Particulates</b> 2 samples from close to the 2 SITE BOUNDARY locations, in different sectors, of the highest calculated annual average ground level D/Q.</p>	<p><b>AN1 (0.9 km W)</b> - RBS site Hwy 965; 0.4 km south of Activity Center. <b>AP1 (0.9 km WNW)</b> - Behind River Bend Station Activity Center.</p>	Continuous sampler operation with sample collection every two weeks, or more frequently if required by dust loading.	<p>Radioiodine Canisters - I-131 analysis every two weeks. Air Particulate - Gross beta radioactivity analysis following filter change.</p>
	<p><b>Radioiodine and Particulates</b> 1 sample from the vicinity of a community having the highest calculated annual average ground level D/Q.</p>	<p><b>AQS2 (5.8 km NW)</b> - St. Francis Substation on US Hwy. (Bus.) 61 in St. Francisville.</p>		
	<p><b>Radioiodine and Particulates</b> 1 sample from a control location, as for example 15 - 30 km distance and in the least prevalent wind direction.</p>	<p><b>AGC (17.0 km SE)</b> - Entergy Service Center compound in Zachary. (Control)</p>		
Direct Radiation	<p><b>TLDs</b> One ring of stations, one in each meteorological sector in the general area of the SITE BOUNDARY.</p>	<p><b>TA1 (1.7 km N)</b> - River Bend Training Center. <b>TB1 (0.5 km NNE)</b> - Utility pole near River Bend Station cooling tower yard area. <b>TC1 (1.7 km NE)</b> - Telephone pole at Jct. US Hwy. 61 and Old Highway 61.</p>	Quarterly	mR exposure quarterly.

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	<p><b>TLDs</b> One ring of stations, one in each meteorological sector in the general area of the SITE BOUNDARY.</p>	<p><b>TD1 (1.6 km ENE)</b> – Stub pole along WF7, 150m S of Jct. WF7 and US Hwy. 61.</p> <p><b>TE1 (1.3 km E)</b> – Stub pole along WF7, 1 km S of Jct. WF7 and US Hwy. 61.</p> <p><b>TF1 (1.3 km ESE)</b> – Stub pole along WF7, 1.6 km S of Jct. WF7 and US Hwy. 61.</p> <p><b>TG1 (1.6 km SE)</b> – Stub pole along WF7, 2 km S of Jct. WF7 and US Hwy. 61.</p> <p><b>TH1 (1.7 km SSE)</b> – Stub pole at power line crossing of WF7 (near Grants Bayou).</p> <p><b>TJ1 (1.5 km S)</b> – Stub pole near River Bend Station Gate #23 on Powell Station Road (LA Hwy. 965).</p> <p><b>TK1 (0.9 km SSW)</b> – Utility pole on Powell Station Road (LA Hwy. 965), 20 m S of River Bend Station River Access Road.</p> <p><b>TL1 (1.0 km SW)</b> – First utility pole on Powell Station Road (LA Hwy. 965) S of former Illinois Central Gulf RR crossing.</p>	Quarterly	mR exposure quarterly.

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	<p><u>TLDs</u> One ring of stations, one in each meteorological sector in the general area of the SITE BOUNDARY.</p>	<p><b>TM1 (0.9 km WSW)</b> - Third utility pole on Powell Station Road (LA Hwy. 965) N of former Illinois Central Gulf RR crossing.</p> <p><b>TN1 (0.9 km W)</b> - Utility pole along Powell Station Road (LA Hwy. 965), near garden and AN1 air sampler location.</p> <p><b>TP1 (0.9 km WNW)</b> - Behind River Bend Station Activity Center at AP1 air sampler location.</p> <p><b>TQ1 (0.6 km NW)</b> - Across from MA-1 on RBS North Access Road.</p> <p><b>TR1 (0.8 km NNW)</b> - River Bend Station North Access Road across from Main Plant entrance.</p>	Quarterly	mR exposure quarterly.
	<p><u>TLDs</u> The balance of the stations (8) to be placed in special interest areas such as population centers, nearby residences, schools, and in 1 or 2 areas to serve as control locations.</p>	<p><b>TAC (15.8 km N)</b> - Utility pole at Jct. of US Hwy. 61 and LA Hwy. 421, 7.9 km north of Bains. (Control)</p> <p><b>TCS (12.3 km NE)</b> - Utility pole at gate to East Louisiana State Hospital in Jackson. (Special)</p> <p><b>TEC (16.0 km E)</b> - Stub pole at jct. of Hwy. 955 and Greenbrier Road, 4.8 km North of Jct. of Hwys 955 and 964. (Control)</p>		

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	<p><b>TLDs</b> The balance of the stations (8) to be placed in special interest areas such as population centers, nearby residences, schools, and in 1 or 2 areas to serve as control locations.</p>	<p><b>TGS (17.0 km SE)</b> – Entergy Service Center compound in Zachary. (Special)</p> <p><b>TNS (6.0 km W)</b> – Utility pole with electrical meter at west bank ferry landing (LA Hwy. 10). (Special)</p> <p><b>TQS1 (4.0 km NW)</b> – Utility pole front of Pentecostal church (opposite West Feliciana Parish Hospital) near Jct. US Hwy. 61 and Commerce Street. (Special)</p> <p><b>TQS2 (5.8 km NW)</b> – St. Francis Substation on business US Hwy. 61 in St. Francisville. (Special)</p> <p><b>TRS (9.2 km NNW)</b> - Stub pole at Jct. of US Hwy. 61 and WF2 near Bains (West Feliciana High School). (Special)</p>	Quarterly	mR exposure quarterly.
Waterborne	<p><b>Surface Water</b> 1 sample upstream and 1 sample downstream.</p>	<p><b>SWU (5.0 km W)</b> - Mississippi River about 4 km upstream from the plant liquid discharge outfall, near LA Hwy. 10 ferry crossing.</p> <p><b>SWD (7.75 km S)</b> - Mississippi River about 4 km downstream from plant liquid discharge outfall, near paper mill.</p>	Grab samples quarterly	Gamma isotopic analysis, and tritium analysis quarterly.



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	<b>Groundwater</b> Samples from 1 or 2 sources only if likely to be affected.	<b>WU (~470 m NNE)</b> - Upland Terrace Aquifer well upgradient from plant.  <b>WD (~470 m SW)</b> - Upland Terrace Aquifer well downgradient from plant.	Semiannually	Gamma isotopic and tritium analysis semiannually.
	<b>Sediment From Shoreline</b> 1 sample from downstream area with existing or potential recreational value.	<b>SEDD (7.75 km S)</b> - Mississippi River about 4 km downstream from plant liquid discharge outfall, near paper mill.	Annually	Gamma isotopic analysis annually.
Ingestion	<b>Milk</b> If commercially available, 1 sample from milking animals within 8 km distant where doses are calculated to be greater than 1 mrem per year.  1 sample from milking animals at a control location 15 - 30 km distant when an indicator location exists.	Currently, no available milking animals within 8 km of RBS.	Quarterly when animals are on pasture.	Gamma isotopic and I-131 analysis quarterly when animals are on pasture.
	<b>Fish and Invertebrates</b> 1 sample of a commercially and/or recreationally important species in vicinity of plant discharge area.  1 sample of similar species in area not influenced by plant discharge.	<b>FD (7.75 km S)</b> - One sample of a commercially and/or recreationally important species from downstream area influenced by plant discharge.  <b>FU (4.0 km WSW)</b> - One sample of a commercially and/or recreationally important species from upstream area not influenced by plant discharge.	Annually	Gamma isotopic analysis on edible portions annually

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	<p><b>Food Products</b>                      1 sample of one type of broadleaf vegetation grown near the SITE BOUNDARY location of highest predicted annual average ground level D/Q if milk sampling is not performed.</p> <p>1 sample of similar broadleaf vegetation grown 15 – 30 km distant, if milk sampling is not performed.</p>	<p><b>GN1 (0.9 km W)</b> – Sampling will be performed in accordance with Table 3.12.1-1 Section 4.a of the Technical Requirements Manual.</p> <p><b>GQC (32.0 km NW)</b> - One sample of similar vegetables from LA State Penitentiary at Angola. (Control)</p>	<p>Quarterly during the growing season.</p>	<p>Gamma isotopic and I-131 analysis quarterly.</p>

FIGURE 1-1  
EXPOSURE PATHWAYS

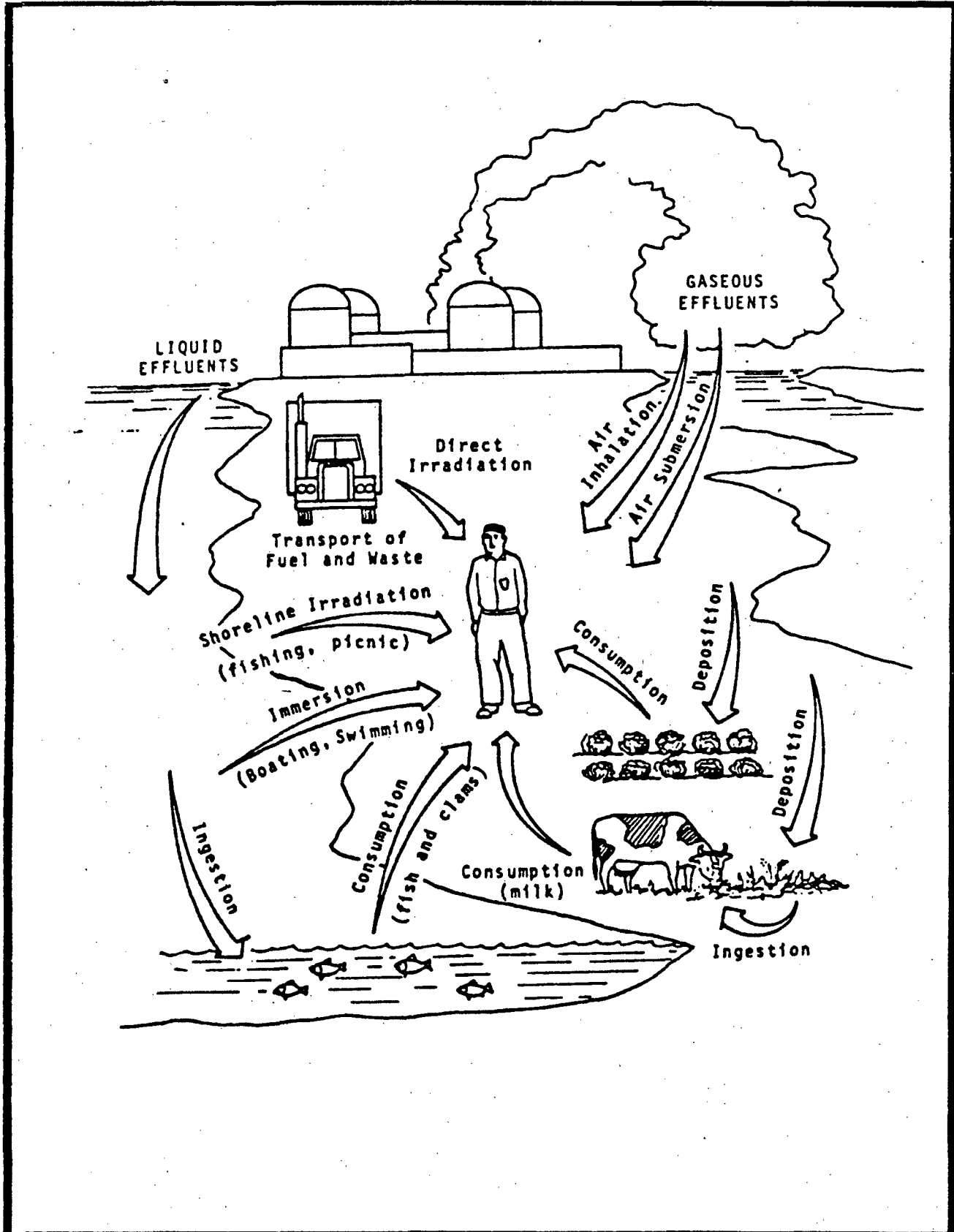


FIGURE I-2  
 SAMPLE COLLECTION SITES - NEAR FIELD

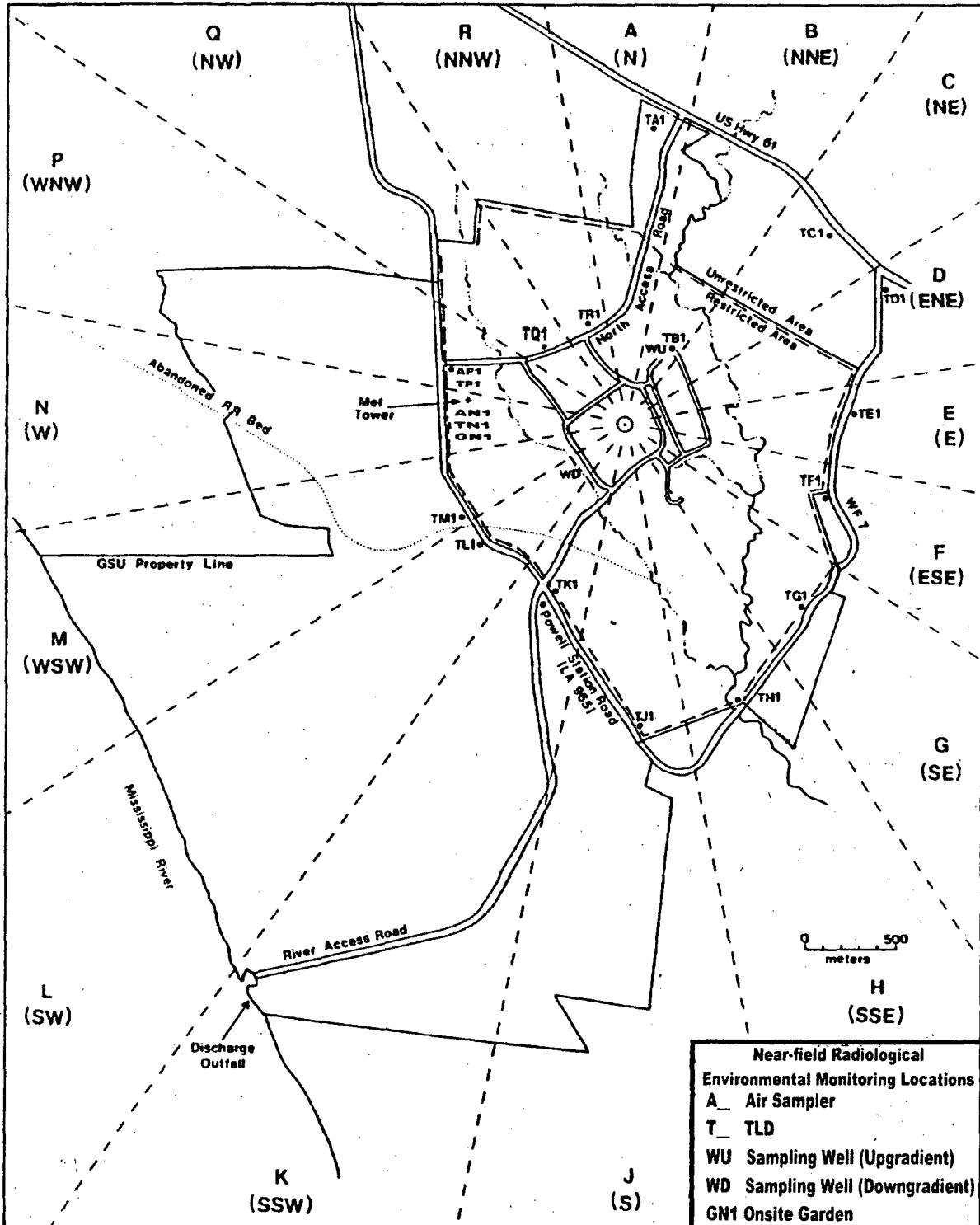
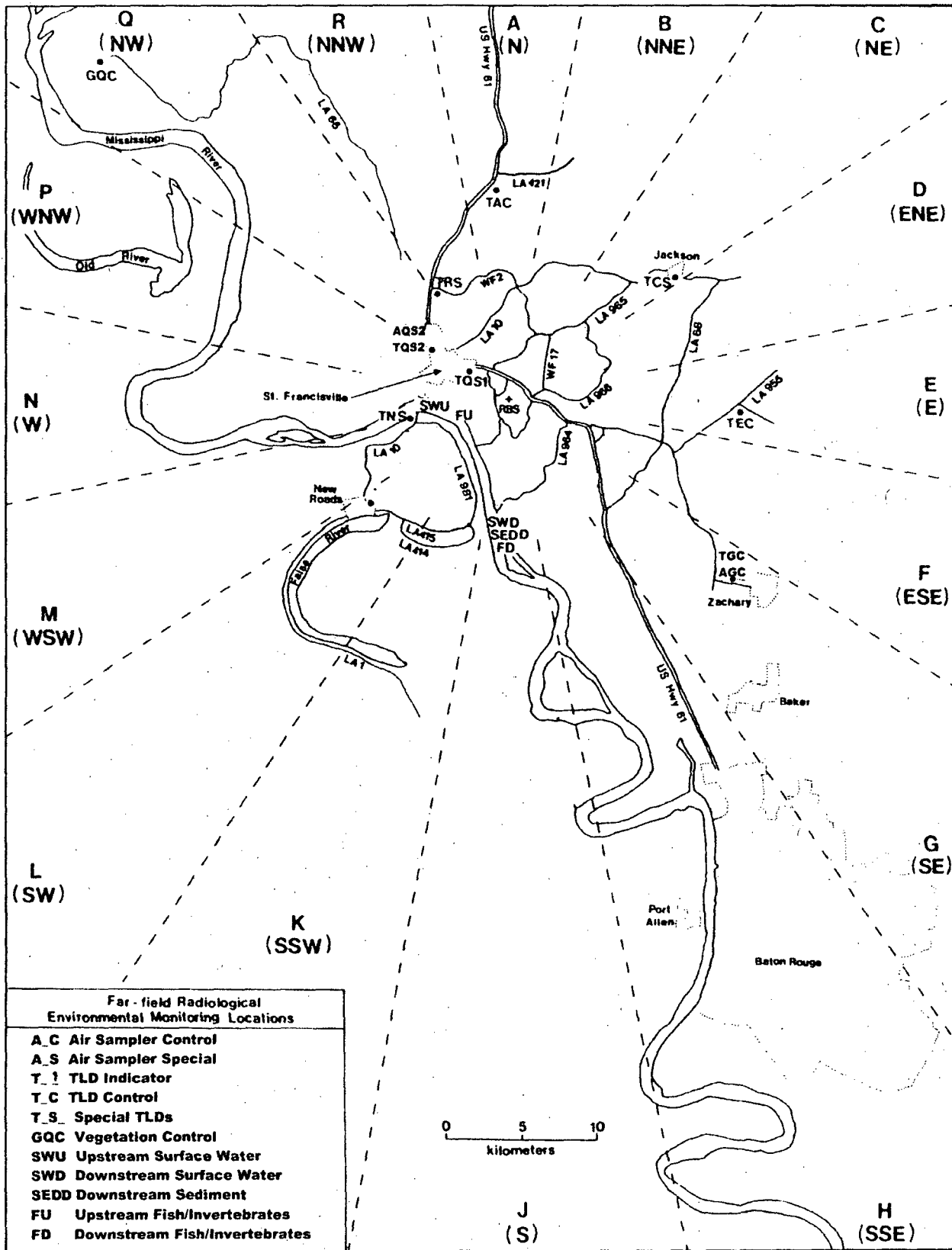


FIGURE 1-3  
SAMPLE COLLECTION SITES-FAR FIELD



## 2.0 Interpretation and Trends of Results

### 2.1 Air Particulate and Radioiodine Sample Results

Iodine-131 was not detected in the radioiodine cartridges during 2009 as has been the case in previous years. Indicator gross beta air particulate results for 2009 were similar to preoperational and operational levels as seen below. Results are reported as annual average pCi/m<sup>3</sup> (picocuries per cubic meter).

<u>Monitoring Period</u>	<u>Result</u>
Preoperational	0.030
2009	0.023
2008	0.023
2007	0.024
2006	0.024
2005	0.022

Table 3.1 provides a comparison of the indicator and control location mean values which further emphasizes that the airborne pathway continues to remain at background levels. Figure 2-2 also shows a comparison of indicator results from 2009 versus control location data from 1986 to 2008. Sixteen indicator results for 2009 were out of the three-sigma levels. A review of the gross beta counter quality control data indicated no anomalies that would account for these readings. River Bend results for the last five years and the 2009 results from three other nuclear facilities were reviewed. The data was comparable to the 2009 River Bend results and indicated that the results that were above the three sigma level are due to seasonal meteorological conditions.

### 2.2 Thermoluminescent Dosimetry Sample Results

Gamma radiation exposure in the reporting period compares to previous years. Figure 2-1 compares quarterly indicator results for 2009 with control location data from 1986 to 2008. One third quarter indicator result was above the upper control three-sigma level. The averages for the indicator, special, and control locations were slightly elevated in the third quarter. The control TLDs are located at a distance that they will not be influenced by the station, and are an indication of the background radiation level. Since the control locations were elevated during the third quarter, this indicates that the background radiation level was slightly elevated and not attributable to River Bend Station, therefore the indicated TLD result is not considered to be abnormal.

RBS normalizes measured exposure to 90 days and relies on comparison of the indicator locations to the control as a measure of plant impact. RBS's comparison of the inner ring and special interest area TLD results to the controls, as seen in Table 3.1, indicates that

the ambient radiation levels are unaffected by plant operations. Therefore, levels continue to remain at or near background.

The results of one TLD from the first quarter 2009 from location TGS was unavailable due to that TLD being missing at change out. This deviation is noted in the appropriate section above.

### 2.3 Water Sample Results

Analytical results for 2009 surface water and groundwater samples were similar to those reported in previous years.

Surface water samples were collected from two locations (indicator and control) and analyzed for gamma radionuclides and tritium. Gamma radionuclides were below detectable limits at the indicator and control locations. Tritium was also below detectable limits at all locations. Listed below is a comparison of 2009 results from the indicator location as compared to the preoperational and previous operational years. Results are reported as annual average pCi/l (picocuries per liter).

<u>Radionuclide</u>	<u>2009</u>	<u>2003 – 2008</u>	<u>Preoperational</u>
Gammas	<LLD	<LLD	<LLD
Tritium	<LLD	<LLD	<LLD

Groundwater samples were collected from two locations (indicator and control) and analyzed for gamma radionuclides and tritium. Gamma radionuclides and Tritium were below detectable limits at the indicator and control locations. Listed below is a comparison of 2009 results from the indicator location as compared to the preoperational and previous operational years. Results are reported as annual average pCi/l.

<u>Radionuclide</u>	<u>2009</u>	<u>2003 – 2008</u>	<u>Preoperational</u>
Gammas	<LLD	<LLD	<LLD
Tritium	<LLD	<LLD	<LLD

Based on these comparisons, the operation of RBS had no impact on this pathway during 2009, and levels of radionuclides monitored for this pathway continue to remain similar to those obtained in operational and preoperational years.

### 2.4 Shoreline Sediment Sample Results

A shoreline sediment sample was collected from the indicator location in 2009 and analyzed for gamma radionuclides. RBS also samples a non-REMP upstream control sediment sample. A review of historical indicator and upstream sediment samples periodically shows Cs-137. No Cs-137 was indicated on the samples in 2009.

Therefore, based on these measurements, RBS operations had no significant radiological impact upon the environment or public via this pathway.

## **2.5 Milk Sample Results**

Milk samples were not collected during 2009 due to the unavailability of indicator locations within 5 miles (8 km) of RBS. Since there are no dairies within five miles of the RBS site, it is concluded RBS's operation had no impact on this pathway in 2009.

## **2.6 Fish and Invertebrate Sample Results**

Fish samples were collected from two locations (indicator and control) and analyzed for gamma radionuclides. In 2009, gamma radionuclides were below detectable limits which is consistent with the preoperational and operational monitoring periods. Therefore, based on these measurements, RBS operations had no significant radiological impact upon the environment or public by this pathway.

## **2.7 Food Product Sample Results**

Food product samples were collected when available from two locations (indicator and control) in 2009 and analyzed for gamma radionuclides in accordance with Table TRM 3.12-1. The 2009 levels remained undetectable which is consistent with previous operational years. Therefore, since levels continue to remain at background, it can be concluded that plant operations is not impacting this pathway.

## **2.8 Land Use Census Results**

The Land Use Census for 2008 was conducted in accordance with procedure ESP-8-051, as required by Technical Requirements Manual (TRM) (TR 3.12.2).

A garden census is not conducted pursuant to the note in the TRM (TLCO 3.12.2) that allows the sampling of broadleaf vegetation in the highest calculated average ground-level D/Q sector near site boundary in lieu of the garden census.

The milk animal census identified no milk animals within 8 km (5 miles) of River Bend site. This information was verified by the County Agents from West Feliciana, East Feliciana, and Pointe Coupee parishes.

The resident census changes are noted in Table 2.1. Changes are primarily due to the use of a GPS instrument during field observations and satellite imagery in locating the resident's bearing and range from the reactor building as compared to previous methods used in this process. See the comments in Table 2.1 for specific information regarding changes.



No locations were identified in 2009 that would yield a calculated dose or dose commitment greater than those currently calculated in Requirement TSR 3.11.2.3.

Table 2.1 contains data from the most recently completed Land Use Census.

## **2.9 Interlaboratory Comparison Results**

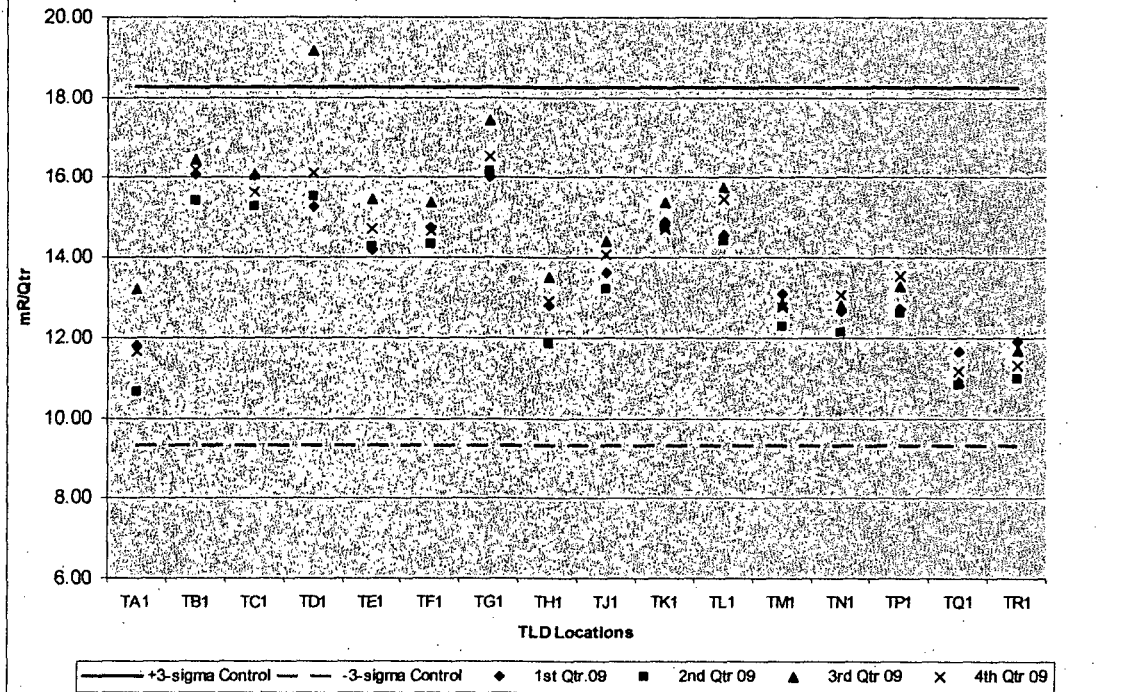
RBS' Environmental Laboratory analyzed interlaboratory comparison samples to fulfill the requirements of Technical Requirements Manual 3.12.3. Attachment 8.1 contains these results. The interlaboratory comparison results indicated that 100% of the sample results for accuracy and precision were within the acceptable control limits.

**Table 2-1  
Land Use Census Results  
2008**

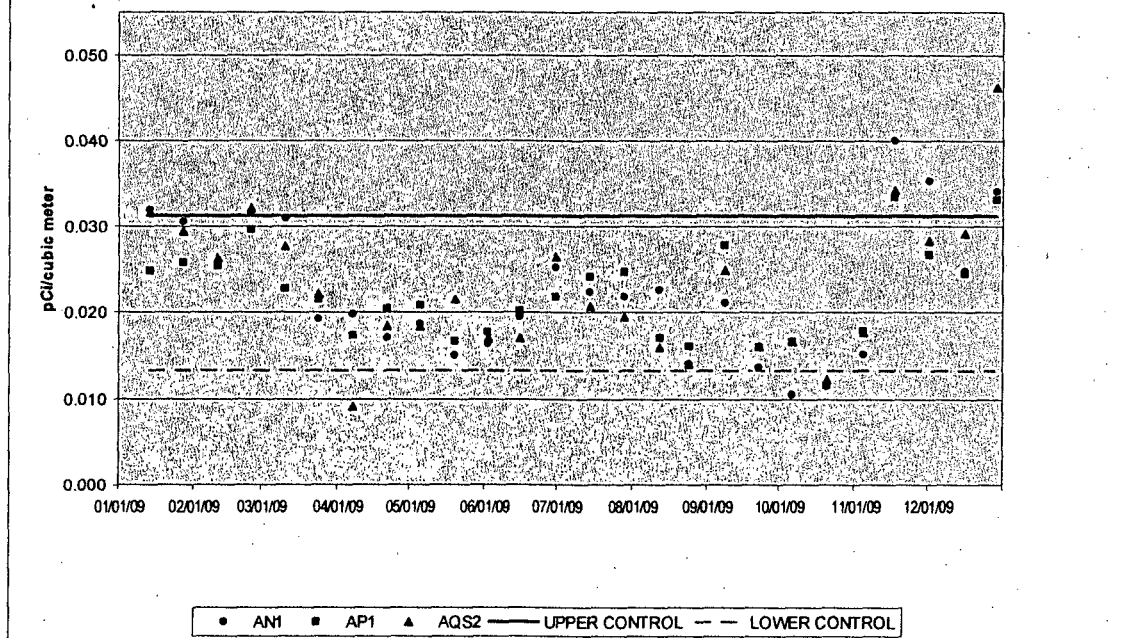
Item #	Sector	Nearest Residence	Range (km)	Nearest Milk Animal	Range (km)	Comment #
1	A (N)	5498 Hwy 61 St. Francisville, LA 70775	1.9	-	-	1
2	B (NNE)	4549 Old Hwy 61 St. Francisville, LA 70775	1.4	-	-	2
3	C (NE)	4553 Old Hwy 61 St. Francisville, LA 70775	1.5	-	-	3
4	D (ENE)	12657 Powell Station Rd. St. Francisville, LA 70775	1.4	-	-	
5	E (E)	4635 Hwy 61 St. Francisville, LA 70775	2.6	-	-	1
6	F (ESE)	12019 Fairview Way Jackson, LA 7748	2.6	-	-	4
7	G (SE)	3319 Hwy 964 Jackson, LA 70748	3.7	-	-	4
8	H (SSE)	11813 Powell Station Rd. St. Francisville, LA 70775	1.7	-	-	1
9	J (S)	11649 Powell Station Rd. St. Francisville, LA 70775	1.9	-	-	1
10	K (SSW)	8909 Hwy 981 New Roads, LA 70760	6.5	-	-	
11	L (SW)			-	-	5
12	M (WSW)			-	-	5
13	N (W)			-	-	6
14	P (WNW)	10426 Old Field Rd. St. Francisville, LA 70775	3.7	-	-	
15	Q (NW)	9537 Hwy 965 St. Francisville, LA 70775	1.3	-	-	
16	R (NNW)	9794 Hwy 965 St. Francisville, LA 70775	1.6	-	-	4

#	Comment
1	Change in distance from previous land use census due to using actual residence versus mailbox location.
2	Residence previously in sector C. Moved to sector B due to using actual residence location versus mailbox location.
3	New residence listing due to moving previous census residence to sector B.
4	New residence identified by satellite imagery and field observation. Coordinates marked per GPS or satellite imagery.
5	No residence located within 8 km distance in sectors L or M.
6	Address in previous census is no longer a residence. No other residence in this sector within 8 km.

**FIGURE 2-1**  
**TLD Indicator Results (2009) Versus Control Data (1986-2008)**



**FIGURE 2-2**  
**Gross Beta Indicator Results (2009) Versus Control Data (1986-2008)**



### **3.0 Radiological Environmental Monitoring Program Summary**

#### **3.1 2009 Program Results Summary**

Table 3.1 summarizes the 2009 REMP results. RBS 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: River Bend Station  
 Location of Facility: West Feliciana Parish, Louisiana

Docket No: 50-458  
 Reporting Period: January - December 2009

Sample Type (Units)	Type & Number of Analyses	LLD <sup>a</sup>	Indicator Locations Mean (F) <sup>b</sup> [ Range ]	Location with Highest Annual Mean		Control Locations Mean (F) <sup>b</sup> [ Range ]	Number of Nonroutine Results <sup>d</sup>
				Location <sup>c</sup>	Mean (F) <sup>b</sup> [ Range ]		
Air Particulates (pCi/m <sup>3</sup> )	Gross Beta 104	0.01	0.023 (78 / 78) [ 0.009 - 0.046 ]	AQS2 (5.8 km NW)	0.023 (26 / 26) [ 0.009 - 0.046 ]	0.022 (26 / 26) [ 0.012 - 0.043 ]	0
Airborne Iodine (pCi/m <sup>3</sup> )	I-131 104	0.07	<LLD	N/A	N/A	<LLD	0
Indicators TLDs (mR/Qtr)	Gamma 64	(e)	13.99 (64 / 64) [ 10.67 - 19.17 ]	TG1 (1.6 km SE)	16.54 (4 / 4) [ 16.01 - 17.41 ]	N/A	0
Special Interest TLDs (mR/Qtr)	Gamma 23	(e)	14.78 (23 / 23) [ 13.09 - 17.11 ]	TQS1 (4.0 km NW)	16.35 (4 / 4) [ 15.80 - 17.11 ]	N/A	0
Control TLDs (mR/Qtr)	Gamma 8	(e)	N/A	N/A	N/A	15.60 (8 / 8) [ 14.22 - 17.29 ]	0

TABLE 3.1

Radiological Environmental Monitoring Program Summary

Name of Facility: River Bend Station

Docket No: 50-458

Location of Facility: West Feliciana Parish, Louisiana

Reporting Period: January - December 2009

Sample Type ( Units )	Type & Number of Analyses	LLD <sup>a</sup>	Indicator Location Mean ( F ) <sup>b</sup> [ Range ]	Location with Highest Annual Mean		Control Locations Mean ( F ) <sup>b</sup> [ Range ]	Number of Nonroutine Results <sup>d</sup>
				Location <sup>c</sup>	Mean ( F ) <sup>b</sup> [ Range ]		
Surface Water ( pCi/L )	H-3      10	3000	<LLD	N/A	N/A	<LLD	0
	Gamma    10						
	Mn-54	15	<LLD	N/A	N/A	<LLD	0
	Co-58	15	<LLD	N/A	N/A	<LLD	0
	Fe-59	30	<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
	I-131	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: River Bend Station  
 Location of Facility: West Feliciana Parish, Louisiana

Docket No: 50-458  
 Reporting Period: January - December 2009

Sample Type (Units)	Type & Number of Analyses <sup>a</sup>	LLD <sup>a</sup>	Indicator Locations Mean (F) <sup>b</sup> [ Range ]	Location with Highest Annual Mean		Control Locations Mean (F) <sup>b</sup> [ Range ]	Number of Nonroutine Results <sup>d</sup>
				Location <sup>c</sup>	Mean (F) <sup>b</sup> [ Range ]		
Groundwater (pCi/L)	H-3 8	3000	<LLD	N/A	N/A	<LLD	0
	Gamma 8						
	Mn-54	15	<LLD	N/A	N/A	<LLD	0
	Co-58	15	<LLD	N/A	N/A	<LLD	0
	Fe-59	30	<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
	I-131	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
Shoreline Sediment (pCi/kg) <sup>f</sup>	Gamma 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: River Bend Station  
 Location of Facility: West Feliciana Parish, Louisiana

Docket No: 50-458  
 Reporting Period: January - December 2009

Sample Type (Units)	Type & Number of Analyses	LLD <sup>a</sup>	Indicator Location Mean ( F ) <sup>b</sup> [ Range ]	Location with Highest Annual Mean		Control Locations Mean ( F ) <sup>b</sup> [ Range ]	Number of Nonroutine Results <sup>d</sup>
				Location <sup>c</sup>	Mean ( F ) <sup>b</sup> [ Range ]		
Fish (pCi/kg)	Gamma 5						
	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	<LLD	N/A	N/A	<LLD	0
Food Products (pCi/kg)	I-131 8	60	<LLD	N/A	N/A	<LLD	0
	Gamma 8						
	Cs-134	60	<LLD	N/A	N/A	<LLD	0
Cs-137	80	<LLD	<LLD	N/A	N/A	<LLD	0

a LLD = Required lower limit of detection based on RBS Technical Requirements Manual Table 3.12.1-3.

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

c Locations are specified (1) by name and (2) direction and distance relative to reactor site.

d 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.

e LLD is not defined in RBS Technical Requirements Manual Table 3.12.1-3.

f Control location for sediment is upstream surface water sample.



**Attachment 1**

**2009 Radiological Monitoring Report**

**Summary of Monitoring Results**

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Attachment 1.1

Sample Type: Air Particulate and Charcoal Cartridge – Indicator Location AN1

Analysis: Gross Beta and Iodine

Units: pCi/m<sup>3</sup>

LLD (pCi/m <sup>3</sup> )			0.07	0.01
LAB ID	START DATE	END DATE	I-131	GROSS BETA
20090020	12/30/2008	1/13/2009	< 0.009	0.032 +/- 0.0007
20090076	1/13/2009	1/27/2009	< 0.009	0.031 +/- 0.0007
20090114	1/27/2009	2/10/2009	< 0.007	0.025 +/- 0.0006
20090139	2/10/2009	2/24/2009	< 0.007	0.032 +/- 0.0007
20090189	2/24/2009	3/10/2009	< 0.009	0.031 +/- 0.0007
20090251	3/10/2009	3/24/2009	< 0.009	0.019 +/- 0.0006
20090306	3/24/2009	4/7/2009	< 0.009	0.020 +/- 0.0005
20090364	4/7/2009	4/21/2009	< 0.009	0.017 +/- 0.0005
20090435	4/21/2009	5/5/2009	< 0.009	0.019 +/- 0.0005
20090479	5/5/2009	5/19/2009	< 0.007	0.015 +/- 0.0005
20090526	5/19/2009	6/2/2009	< 0.008	0.016 +/- 0.0005
20090568	6/2/2009	6/15/2009	< 0.009	0.020 +/- 0.0006
20090675	6/15/2009	6/30/2009	< 0.008	0.025 +/- 0.0006
20090719	6/30/2009	7/14/2009	< 0.008	0.022 +/- 0.0006
20090811	7/14/2009	7/28/2009	< 0.009	0.022 +/- 0.0006
20090856	7/28/2009	8/12/2009	< 0.009	0.023 +/- 0.0006
20090902	8/12/2009	8/24/2009	< 0.008	0.014 +/- 0.0005
20090934	8/24/2009	9/8/2009	< 0.008	0.021 +/- 0.0005
20091002	9/8/2009	9/22/2009	< 0.009	0.014 +/- 0.0005
20091045	9/22/2009	10/6/2009	< 0.010	0.011 +/- 0.0004
20091110	10/6/2009	10/20/2009	< 0.008	0.012 +/- 0.0004
20091152	10/20/2009	11/4/2009	< 0.008	0.015 +/- 0.0005
20091191	11/4/2009	11/17/2009	< 0.010	0.040 +/- 0.0008
20091241	11/17/2009	12/1/2009	< 0.009	0.035 +/- 0.0007
20091341	12/1/2009	12/16/2009	< 0.009	0.025 +/- 0.0005
20091369	12/16/2009	12/29/2009	< 0.008	0.034 +/- 0.0007

**Totals:**

**Average:** 0.023

**Maximum:** 0.040

**Minimum:** 0.011

## Attachment 1.2

Sample Type: Air Particulate and Charcoal Cartridge – Indicator Location AP1

Analysis: Gross Beta and Iodine

Units: pCi/m<sup>3</sup>

LLD (pCi/m <sup>3</sup> )			0.07	0.01
LAB ID	START DATE	END DATE	I-131	GROSS BETA
20090019	12/30/2008	1/13/2009	< 0.007	0.025 +/- 0.0006
20090075	1/13/2009	1/27/2009	< 0.009	0.026 +/- 0.0006
20090113	1/27/2009	2/10/2009	< 0.007	0.025 +/- 0.0006
20090138	2/10/2009	2/24/2009	< 0.006	0.030 +/- 0.0007
20090188	2/24/2009	3/10/2009	< 0.009	0.023 +/- 0.0006
20090250	3/10/2009	3/24/2009	< 0.007	0.022 +/- 0.0006
20090305	3/24/2009	4/7/2009	< 0.008	0.017 +/- 0.0005
20090363	4/7/2009	4/21/2009	< 0.008	0.021 +/- 0.0006
20090434	4/21/2009	5/5/2009	< 0.010	0.021 +/- 0.0006
20090478	5/5/2009	5/19/2009	< 0.008	0.017 +/- 0.0006
20090525	5/19/2009	6/2/2009	< 0.010	0.018 +/- 0.0006
20090567	6/2/2009	6/15/2009	< 0.011	0.020 +/- 0.0006
20090674	6/15/2009	6/30/2009	< 0.009	0.022 +/- 0.0006
20090718	6/30/2009	7/14/2009	< 0.008	0.024 +/- 0.0007
20090810	7/14/2009	7/28/2009	< 0.008	0.025 +/- 0.0006
20090855	7/28/2009	8/12/2009	< 0.009	0.017 +/- 0.0005
20090901	8/12/2009	8/24/2009	< 0.012	0.016 +/- 0.0006
20090933	8/24/2009	9/8/2009	< 0.008	0.028 +/- 0.0006
20091001	9/8/2009	9/22/2009	< 0.010	0.016 +/- 0.0005
20091044	9/22/2009	10/6/2009	< 0.008	0.017 +/- 0.0005
20091109	10/6/2009	10/20/2009	< 0.009	0.012 +/- 0.0005
20091151	10/20/2009	11/4/2009	< 0.007	0.018 +/- 0.0005
20091190	11/4/2009	11/17/2009	< 0.009	0.033 +/- 0.0007
20091240	11/17/2009	12/1/2009	< 0.011	0.027 +/- 0.0006
20091340	12/1/2009	12/16/2009	< 0.007	0.025 +/- 0.0006
20091368	12/16/2009	12/29/2009	< 0.009	0.033 +/- 0.0007

**Totals:**

<b>Average:</b>	0.022
<b>Maximum:</b>	0.033
<b>Minimum:</b>	0.012

## Attachment 1.3

Sample Type:

Air Particulate and Charcoal Cartridge – Indicator Location AQS2

Analysis:

Gross Beta and Iodine

Units:

pCi/m<sup>3</sup>

LLD (pCi/m <sup>3</sup> )			0.07	0.01
LAB ID	START DATE	END DATE	I-131	GROSS BETA
20090021	12/30/2008	1/13/2009	< 0.007	0.032 +/- 0.0007
20090077	1/13/2009	1/27/2009	< 0.009	0.030 +/- 0.0007
20090115	1/27/2009	2/10/2009	< 0.010	0.026 +/- 0.0006
20090140	2/10/2009	2/24/2009	< 0.009	0.032 +/- 0.0007
20090190	2/24/2009	3/10/2009	< 0.006	0.028 +/- 0.0006
20090252	3/10/2009	3/24/2009	< 0.008	0.022 +/- 0.0006
20090307	3/24/2009	4/7/2009	< 0.009	0.009 +/- 0.0004
20090365	4/7/2009	4/21/2009	< 0.009	0.018 +/- 0.0005
20090436	4/21/2009	5/5/2009	< 0.008	0.018 +/- 0.0006
20090480	5/5/2009	5/19/2009	< 0.009	0.022 +/- 0.0006
20090527	5/19/2009	6/2/2009	< 0.009	0.017 +/- 0.0005
20090569	6/2/2009	6/15/2009	< 0.007	0.017 +/- 0.0006
20090676	6/15/2009	6/30/2009	< 0.008	0.027 +/- 0.0006
20090720	6/30/2009	7/14/2009	< 0.007	0.021 +/- 0.0006
20090812	7/14/2009	7/28/2009	< 0.006	0.020 +/- 0.0006
20090857	7/28/2009	8/12/2009	< 0.007	0.016 +/- 0.0005
20090903	8/12/2009	8/24/2009	< 0.007	0.014 +/- 0.0005
20090935	8/24/2009	9/8/2009	< 0.007	0.025 +/- 0.0006
20091003	9/8/2009	9/22/2009	< 0.007	0.016 +/- 0.0005
20091046	9/22/2009	10/6/2009	< 0.007	0.017 +/- 0.0005
20091111	10/6/2009	10/20/2009	< 0.007	0.012 +/- 0.0004
20091153	10/20/2009	11/4/2009	< 0.008	0.018 +/- 0.0005
20091192	11/4/2009	11/17/2009	< 0.008	0.034 +/- 0.0007
20091242	11/17/2009	11/30/2009	< 0.007	0.028 +/- 0.0006
20091342	11/30/2009	12/16/2009	< 0.008	0.029 +/- 0.0006
20091370	12/16/2009	12/29/2009	< 0.013	0.046 +/- 0.0010

**Totals:****Average:**

0.023

**Maximum:**

0.046

**Minimum:**

0.009

## Attachment 1.4

Sample Type: **Air Particulate and Charcoal Cartridge – Control Location AGC**  
 Analysis: Gross Beta and Iodine  
 Units: pCi/m<sup>3</sup>

LLD (pCi/m <sup>3</sup> )			0.07	0.01
LAB ID	START DATE	END DATE	I-131	GROSS BETA
20090022	12/30/2008	1/13/2009	< 0.008	0.030 +/- 0.0007
20090078	1/13/2009	1/27/2009	< 0.008	0.024 +/- 0.0006
20090116	1/27/2009	2/10/2009	< 0.007	0.024 +/- 0.0006
20090141	2/10/2009	2/24/2009	< 0.010	0.030 +/- 0.0007
20090191	2/24/2009	3/10/2009	< 0.007	0.024 +/- 0.0006
20090253	3/10/2009	3/24/2009	< 0.007	0.043 +/- 0.0008
20090308	3/24/2009	3/26/2009	< 0.048	0.017 +/- 0.0016
20090366	4/8/2009	4/21/2009	< 0.007	0.017 +/- 0.0005
20090437	4/21/2009	5/5/2009	< 0.007	0.017 +/- 0.0005
20090481	5/5/2009	5/19/2009	< 0.007	0.017 +/- 0.0005
20090528	5/19/2009	6/2/2009	< 0.009	0.017 +/- 0.0005
20090570	6/2/2009	6/12/2009	< 0.012	0.019 +/- 0.0006
20090677	6/15/2009	6/30/2009	< 0.006	0.024 +/- 0.0005
20090721	6/30/2009	7/14/2009	< 0.008	0.023 +/- 0.0006
20090813	7/14/2009	7/28/2009	< 0.007	0.019 +/- 0.0005
20090858	7/28/2009	8/12/2009	< 0.007	0.015 +/- 0.0004
20090904	8/12/2009	8/24/2009	< 0.008	0.016 +/- 0.0005
20090936	8/24/2009	9/8/2009	< 0.006	0.020 +/- 0.0005
20091004	9/8/2009	9/22/2009	< 0.009	0.017 +/- 0.0005
20091047	9/22/2009	10/6/2009	< 0.008	0.016 +/- 0.0005
20091112	10/6/2009	10/20/2009	< 0.009	0.012 +/- 0.0004
20091154	10/20/2009	11/4/2009	< 0.006	0.016 +/- 0.0005
20091193	11/4/2009	11/17/2009	< 0.007	0.029 +/- 0.0006
20091243	11/17/2009	12/1/2009	< 0.007	0.032 +/- 0.0006
20091343	12/1/2009	12/16/2009	< 0.007	0.020 +/- 0.0005
20091371	12/16/2009	12/29/2009	< 0.008	0.031 +/- 0.0007
<b>Totals:</b>				
<b>Average:</b>				0.022
<b>Maximum:</b>				0.043
<b>Minimum:</b>				0.012

Attachment 2.1

Sample Type: **Thermoluminescent Dosimeters (TLD)**  
 Analysis: mR Exposure  
 Units: mR/Qtr

<u>INDICATOR</u>	<u>1ST QTR</u>	<u>2ND QTR</u>	<u>3RD QTR</u>	<u>4TH QTR</u>	<u>MEAN</u>
<b>S</b>					
TA1	11.81	10.67	13.23	11.67	11.85
TB1	16.09	15.41	16.47	16.20	16.04
TC1	16.04	15.26	16.08	15.64	15.76
TD1	15.26	15.55	19.17	16.12	16.52
TE1	14.19	14.28	15.47	14.70	14.66
TF1	14.74	14.32	15.37	14.66	14.77
TG1	16.01	16.18	17.41	16.54	16.54
TH1	12.81	11.86	13.53	12.92	12.78
TJ1	13.62	13.23	14.41	14.07	13.83
TK1	14.90	14.74	15.37	14.72	14.93
TL1	14.57	14.40	15.75	15.46	15.04
TM1	13.10	12.31	12.87	12.79	12.77
TN1	12.66	12.14	12.82	13.06	12.67
TP1	12.75	12.63	13.30	13.54	13.06
TQ1	11.67	10.85	10.92	11.18	11.16
TR1	11.93	10.97	11.71	11.33	11.49
<b>MAX</b>	16.09	16.18	19.17	16.54	16.54
<b>AVG</b>	13.89	13.43	14.62	14.04	13.99
<b>MIN</b>	11.67	10.67	10.92	11.18	11.16

<u>SPECIAL INTEREST</u>	<u>1ST QTR</u>	<u>2ND QTR</u>	<u>3RD QTR</u>	<u>4TH QTR</u>	<u>MEAN</u>
TCS	13.55	13.28	13.79	13.09	13.43
TGS		15.38	17.09	16.19	16.22
TNS	14.29	13.17	14.76	13.55	13.94
TRS	15.79	15.08	15.58	15.28	15.43
TQS1	16.66	15.80	17.11	15.83	16.35
TQS2	13.93	13.22	13.69	13.73	13.64
<b>MAX</b>	16.66	15.80	17.11	16.19	16.35
<b>AVG</b>	14.84	14.32	15.34	14.61	14.84
<b>MIN</b>	13.55	13.17	13.69	13.09	13.43

<u>CONTROLS</u>	<u>1ST QTR</u>	<u>2ND QTR</u>	<u>3RD QTR</u>	<u>4TH QTR</u>	<u>MEAN</u>
TAC	15.81	15.47	17.29	16.18	16.18
TEC	14.56	14.22	16.05	15.22	15.01
<b>MAX</b>	15.81	15.47	17.29	16.18	16.18
<b>AVG</b>	15.18	14.84	16.67	15.70	15.60
<b>MIN</b>	14.56	14.22	16.05	15.22	15.01

	<u>INDICATOR</u>	<u>CONTROL</u>	<u>SPECIAL</u>
<b>MAX</b>	19.17	17.29	17.11
<b>AVG</b>	13.99	15.60	14.78
<b>MIN</b>	10.67	14.22	13.09

Attachment 3.1

Sample Type: Surface Water

Analysis: Gamma Isotopic and Tritium

Units: pCi/l

LLD (pCi/l)			15	15	30	15	30	15	30	15	15	18	60	15
LAB ID	LOCATION	DATE	MN-54	CO-58	FE-59	CO-60	ZN-65	NB-95	ZR-95	I-131	CS-134	CS-137	BA-140	LA-140
20090071	SWU	1/27/2009	< 1.79	< 3.94	< 11.14	< 4.62	< 11.60	< 6.34	< 8.81	< 5.97	< 5.20	< 5.93	< 16.37	< 8.61
20090072	SWU dup	1/27/2009	< 5.15	< 5.18	< 7.27	< 3.73	< 8.17	< 6.12	< 8.27	< 5.52	< 5.32	< 7.57	< 15.18	< 8.25
20090073	SWD	1/27/2009	< 4.33	< 3.49	< 7.66	< 5.69	< 11.81	< 5.79	< 8.53	< 5.48	< 5.61	< 5.31	< 13.59	< 5.87
20090074	SWD dup	1/27/2009	< 3.18	< 3.94	< 7.53	< 5.22	< 7.52	< 4.54	< 7.68	< 4.81	< 4.35	< 5.55	< 12.83	< 4.67
20090438	SWU	5/5/2009	< 6.61	< 3.80	< 9.97	< 3.84	< 14.41	< 5.79	< 7.73	< 5.31	< 5.61	< 5.03	< 17.69	< 14.18
20090439	SWD	5/5/2009	< 7.29	< 4.55	< 10.29	< 5.65	< 8.02	< 6.10	< 9.43	< 5.20	< 6.01	< 5.68	< 15.97	< 8.30
20090835	SWU	8/4/2009	< 5.39	< 5.06	< 9.23	< 5.06	< 10.01	< 4.06	< 6.86	< 5.67	< 4.19	< 4.24	< 16.85	< 4.56
20090836	SWD	8/4/2009	< 4.26	< 4.41	< 8.04	< 3.16	< 8.33	< 5.17	< 7.51	< 4.37	< 4.46	< 5.17	< 13.22	< 5.12
20091172	SWU	11/12/2009	< 5.87	< 4.95	< 9.55	< 5.74	< 11.45	< 5.68	< 6.68	< 4.47	< 4.05	< 6.04	< 17.98	< 6.07
20091173	SWD	11/12/2009	< 4.64	< 5.01	< 6.50	< 6.25	< 13.01	< 5.46	< 6.95	< 4.75	< 5.94	< 3.55	< 14.97	< 4.80

LLD (pCi/l)			3000
LAB ID	LOCATION	DATE	TRITIUM
20090071	SWU	1/27/2009	< 576.38
20090072	SWU dup	1/27/2009	< 574.71
20090073	SWD	1/27/2009	< 570.16
20090074	SWD dup	1/27/2009	< 569.37
20090438	SWU	5/5/2009	< 540.00
20090439	SWD	5/5/2009	< 557.99
20090835	SWU	8/4/2009	< 550.14
20090836	SWD	8/4/2009	< 552.40
20091172	SWU	11/12/2009	< 530.34
20091173	SWD	11/12/2009	< 524.29



Attachment 4.1

Sample Type: Groundwater

Analysis: Gamma Isotopic and Tritium

Units: pCi/l

LLD (pCi/l)			15	15	30	15	30	15	30	15	15	18	60	15
LAB ID	LOCATION	DATE	MN-54	CO-58	FE-59	CO-60	ZN-65	NB-95	ZR-95	I-131	CS-134	CS-137	BA-140	LA-140
20090202	GWU	3/12/2009	< 8.40	< 7.20	< 12.46	< 6.73	< 14.07	< 7.91	< 14.05	< 7.32	< 7.23	< 8.36	< 23.52	< 9.42
20090203	GWD	3/12/2009	< 8.12	< 7.82	< 13.69	< 7.49	< 16.16	< 11.52	< 13.92	< 8.25	< 7.89	< 5.37	< 22.77	< 6.99
20090588	GWU	6/17/2009	< 6.87	< 6.69	< 13.78	< 7.17	< 13.86	< 7.36	< 10.92	< 7.67	< 6.34	< 7.17	< 24.39	< 5.80
20090589	GWD	6/17/2009	< 4.89	< 5.35	< 11.93	< 4.84	< 12.98	< 8.97	< 11.26	< 6.67	< 6.67	< 6.97	< 21.59	< 6.54
20090782	GWU	7/23/2009	< 7.66	< 5.20	< 13.83	< 6.25	< 13.30	< 9.69	< 9.81	< 7.61	< 7.34	< 6.76	< 20.89	< 10.03
20090802	GWD	7/23/2009	< 5.34	< 4.04	< 8.76	< 4.01	< 10.64	< 6.78	< 9.92	< 5.31	< 5.34	< 5.95	< 18.70	< 5.90
20091087	GWD	10/14/2009	< 5.22	< 6.40	< 13.31	< 5.31	< 13.30	< 7.51	< 9.45	< 5.29	< 6.67	< 6.07	< 24.83	< 8.95
20091088	GWU	10/14/2009	< 6.72	< 7.57	< 16.16	< 5.77	< 13.56	< 11.37	< 14.11	< 7.87	< 7.14	< 8.02	< 26.43	< 9.37

LLD (pCi/l)			3000
LAB ID	LOCATION	DATE	TRITIUM
20090202	GWU	3/12/2009	< 551
20090203	GWD	3/12/2009	< 549
20090588	GWU	6/17/2009	< 542
20090589	GWD	6/17/2009	< 544
20090782	GWU	7/23/2009	< 549
20090802	GWD	7/23/2009	< 549
20091087	GWD	10/14/2009	< 533
20091088	GWU	10/14/2009	< 529

Attachment 5.1

Sample Type: Shoreline Sediment SEDD

Analysis: Gamma Isotopic

Units: pCi/kg, dry

LLD (pCi/kg)		150	180
<u>LAB ID</u>	<u>DATE</u>	<u>CS-134</u>	<u>CS-137</u>
20090723	7/14/2009	< 25.15	< 28.90

Sample Type: Shoreline Sediment SEDU

Analysis: Gamma Isotopic

Units: pCi/kg, dry

LLD (pCi/kg)		150	180
<u>LAB ID</u>	<u>DATE</u>	<u>CS-134</u>	<u>CS-137</u>
20090722	7/14/2009	< 21.75	< 21.58

Attachment 6.1

Sample Type: **Food Products**  
 Analysis: Gamma Isotopic  
 Units: pCi/kg, wet

LLD (pCi/kg, wet)			60	60	80
LAB ID	LOCATION	DATE	I-131	CS-134	CS-137
20090030	GN1	1/15/2009	< 51.95	< 58.92	< 69.40
20090031	GQC	1/14/2009	< 40.14	< 47.34	< 48.49
20090346	GQC	4/14/2009	< 36.34	< 28.82	< 35.39
20090349	GN1	4/16/2009	< 44.53	< 56.53	< 56.51
20090837	GQC	8/4/2009	< 49.75	< 57.64	< 30.67
20090838	GN1	8/4/2009	< 42.08	< 40.64	< 76.56
20091113	GN1	10/20/2009	< 54.25	< 58.21	< 46.41
20091211	GQC	11/23/2009	< 33.07	< 36.62	< 35.91

Attachment 7.1

Sample Type: **Fish**  
 Analysis: Gamma Isotopic  
 Units: pCi/kg, wet

LLD (pCi/kg)			130	130	260	130	260	130	150
LAB	LOCATION	DATE	MN-54	CO-58	FE-59	CO-60	ZN-65	CS-134	CS-137
20091034	FISHDOWN Drum	9/30/2009	< 21.71	< 21.38	< 62.03	< 16.01	< 53.85	< 20.92	< 17.12
20091035	FISHDOWN Catfish	9/30/2009	< 40.86	< 30.06	< 71.01	< 35.68	< 72.88	< 29.74	< 32.71
20091127	FISHUP Buffalo	10/22/2009	< 18.94	< 24.22	< 46.81	< 25.24	< 7.12	< 22.59	< 21.40
20091128	FISHUP Catfish	10/22/2009	< 19.27	< 22.84	< 51.20	< 23.73	< 56.63	< 18.90	< 18.14
20091129	FISHUP Mullet	10/22/2009	< 25.10	< 20.80	< 41.48	< 24.77	< 59.08	< 20.48	< 27.54

## Attachment 8.1

Sample Type: Interlaboratory Comparison

Analysis: Gross Beta, Iodine-131, Tritium, and Gamma Isotopic

Analytics E6674-125 March 19, 2009		Gamma in Water						
Nuclide	RBS Mean pCi/L	RBS 1-s dev	Ref Lab Value pCi/L	Ref Lab Uncertainty 1-s dev	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	0.98	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 pCi/L	RBS 1-s dev	Ref Lab Value pCi/L	Ref Lab uncertainty 1-s dev	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 pCi	RBS 1-s dev	Ref Lab Value pCi	Ref Lab uncertainty 1-s dev	Resolution	RBS/Ref Lab Ratio	Pass/ Fail	
I-131	76.0	2.75	78.6	1.31	60.0	0.97	Pass	

Analytics E6677-125 March 19, 2009		Gamma in Milk						
Nuclide	RBS Mean pCi/L	RBS 1-s dev	Ref Lab Value pCi/L	Ref Lab uncertainty 1-s dev	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	

## Attachment 8.1

Sample Type: **Interlaboratory Comparison**

Analysis: Gross Beta, Iodine-131, Tritium, and Gamma Isotopic

Analytics E6707-125 June 18, 2009		H-3 in water						
Nuclide	RBS Mean pCi/L	RBS 1-s dev	Ref Lab Value pCi/L	Ref Lab uncertainty 1-s dev	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 pCi	RBS 1-s dev	Ref Lab Value pCi	Ref Lab uncertainty 1-s dev	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 pCi	RBS 1-s dev	Ref Lab Value pCi	Ref Lab Uncertainty 1-s dev	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	

Analytics E6710-125 June 18, 2009		Gamma Soil						
Nuclide	RBS Mean pCi/gram	RBS 1-s dev	Ref Lab Value pCi/gram	Ref Lab Uncertainty 1-s dev	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	