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May 1, 2013

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Subject: Annual Radiological Environmental Operating Report For 2012  
River Bend Station - Unit 1  
License No. NPF-47  
Docket No. 50-458

RBG-47360  
RBF1-13-0061

Dear Sir or Madam,

Enclosed is the River Bend Station (RBS) Annual Radiological Environmental Operating Report for the period January 1, 2012, through December 31, 2012. 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. Joseph Clark at (225) 381-4177.

Sincerely,

JAC/wjf  
enclosure

JE25  
NRL

Annual Radioactive Effluent Release Report for 2012  
RBG-47360  
Page 2 of 2

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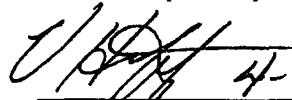
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**RIVER BEND STATION**

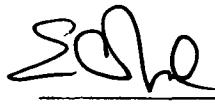
**ANNUAL RADIOLOGICAL ENVIRONMENTAL  
OPERATING REPORT FOR 2012**

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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, 2012 through December 31, 2012. 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 2012, 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 2012. No measurable levels of radiation above baseline levels attributable to River Bend Station operation were detected in the vicinity of RBS. The 2012 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 2012, 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 2012 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 2012. Therefore, no analysis or planned course of action to alleviate problems was necessary.

## **Reporting Levels**

River Bend Station reviews indicate that no REMP sample 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, 2012 results did not require any Radiological Monitoring Program Special Reports.

## **Radioactivity Not Attributable to RBS**

The RBS REMP has detected radioactivity attributable to other sources not associated with the operation of RBS. These instances are summarized as follows:

- ◆ In 2011, I-131 was detected in a control vegetation sample, and indicator and control air sample media, which was credibly attributed to the trans-Pacific transport of airborne releases from Dai-Ichi, Fukushima following the March 11, 2011 Tohoku earthquake.
- ◆ In 1986, following the radioactive plume release due to reactor core degradation at the Chernobyl Nuclear Power Plant, RBS REMP detected I-131 in water, vegetation, and air samples.
- ◆ I-131 was also detected during 1998 in the wastewater treatment plant effluent, which 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 2012 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 elements. These programs include co-located air samplers, and similar locations for 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 2012 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 LLD values during this reporting period were within the acceptable limits required by the RBS Technical Requirement Manual (TRM).

### **◆ Sampling Deviations**

Listed below are sampling deviations that occurred during 2012. 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.

<b>Station</b>	<b>Sampling Period</b>	<b>Problem Description</b>	<b>Comment</b>
AN1 AP1	03/27/12 to 04/10/12	Power Outage	Air sampler locations AN1 & AP1 were short for period 03/27/12 to 04/10/12. (CR-RBS-2012-2505)
AN1 AP1	04/24/12 to 05/08/12	Power Outage	Air sampler locations AN1 and AP1 were short for period 04/24/12 to 05/08/12. (CR-RBS-2012-3168)
AQS2 AGC	06/19/12 to 07/03/12	Power Outage	Air sample locations AQS2 & AGC were short for period 06/19/12 to 07/03/12. (CR-RBS-2012-4419)
AN1 AQS2	07/03/12 to 07/17/12	Power Outage	Air sample locations AN1 & AQS2 were short for period 07/03/12 to 07/17/12. (CR-RBS-2012-4694)
TRS	2 <sup>nd</sup> Quarter	TLD Missing	TLD TRS was missing. (CR-RBS-2012-4695)
AGC	07/17/2012 to 07/31/12	Power Outage	Air sampler location AGC was short for period 07/17/2012 to 07/31/12. (CR-RBS-2012-4990)
AGC	07/31/2012 to 08/14/12	Power Outage	Air sampler location AGC was short for period 07/31/2012 to 08/14/12. (CR-RBS-2012-5308)



Station	Sampling Period	Problem Description	Comment
AGC	08/14/12 to 08/28/12	Power Outage	Air sampler location AGC was short for period 08/14/12 to 08/28/12. (CR-RBS-2012-5619)
AN1 AP1 AGC	08/28/12 to 09/11/12	Power Outage	Air sample locations AN1, AP1 & AGC were short for period 08/28/12 to 09/11/12. (CR-RBS-2012-5770)
AGC	10/09/12 to 10/23/12	Power Outage	Air sampler location AGC was short for period 10/09/12 to 10/23/12. (CR-RBS-2012-6685)

◆ **Missed Samples**

No samples were missed during 2012.

◆ **Unavailable Results**

Results of one TLD from the second quarter 2012 from location TRS was unavailable due to the TLD being missing at change out. This deviation is noted above.

**Program Modifications**

RBS made no modifications to the REMP during the year 2012.

**Attachments**

Attachment 1 contains results of air, TLD, water, sediment, fish, food products and special samples collected in 2012. River Bend's REMP TLDs were analyzed by Stanford Dosimetry. The River Bend Station Environmental Laboratory analyzed all remaining samples. Attachment 1 also contains River Bend Station's participation in the Interlaboratory Comparison Program during the year 2012.

## **1. Introduction**

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

River Bend Station 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 2012 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 2012. The next scheduled Land Use Census will be performed in 2014. Section 2.8 of this report contains a narrative on the results of the 2012 land use census.

**Table 1.1**  
**Radiological Environmental Sampling Program**

<b>Exposure Pathway</b>	<b>Requirement</b>	<b>Sample Point Description, Distance and Direction</b>	<b>Sampling and Collection Frequency</b>	<b>Type and Frequency Of Analyses</b>
Airborne	<b><u>Radioiodine and Particulates</u></b> 2 samples from close to the 2 SITE BOUNDARY locations, in different sectors, of the highest calculated annual average ground level D/Q.	<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.	Continuous sampler operation with sample collection every two weeks, or more frequently if required by dust loading.	Radioiodine Canisters - I-131 analysis every two weeks.  Air Particulate - Gross beta radioactivity analysis following filter change.
	<b><u>Radioiodine and Particulates</u></b> 1 sample from the vicinity of a community having the highest calculated annual average ground level D/Q.	<b>AQS2 (5.8 km NW)</b> - St. Francis Substation on US Hwy. (Bus.) 61 in St. Francisville.		
	<b><u>Radioiodine and Particulates</u></b> 1 sample from a control location, as for example 15 - 30 km distance and in the least prevalent wind direction.	<b>AGC (17.0 km SE)</b> - Entergy Service Center compound in Zachary. (Control)		
Direct Radiation	<b><u>TLDs</u></b> One ring of stations, one in each meteorological sector in the general area of the SITE BOUNDARY.	<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.	Quarterly	mR exposure quarterly.

**Table 1.1**

**Radiological Environmental Sampling Program**

<b>Exposure Pathway</b>	<b>Requirement</b>	<b>Sample Point Description, Distance and Direction</b>	<b>Sampling and Collection Frequency</b>	<b>Type and Frequency Of Analyses</b>
Direct Radiation	<p><b><u>TLDs</u></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**

<b>Exposure Pathway</b>	<b>Requirement</b>	<b>Sample Point Description, Distance and Direction</b>	<b>Sampling and Collection Frequency</b>	<b>Type and Frequency Of Analyses</b>
Direct Radiation	<p><b><u>TLDs</u></b> 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><b><u>TLDs</u></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>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><u>TLDs</u></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><u>Surface Water</u></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><u>Groundwater</u></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><u>Sediment From Shoreline</u></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><u>Milk</u></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><u>Fish and Invertebrates</u></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**

<b>Exposure Pathway</b>	<b>Requirement</b>	<b>Sample Point Description, Distance and Direction</b>	<b>Sampling and Collection Frequency</b>	<b>Type and Frequency Of Analyses</b>
Ingestion	<p><b><u>Food Products</u></b></p> <p>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>	Quarterly during the growing season.	Gamma isotopic and I-131 analysis quarterly.



Figure 1-1  
Exposure Pathways

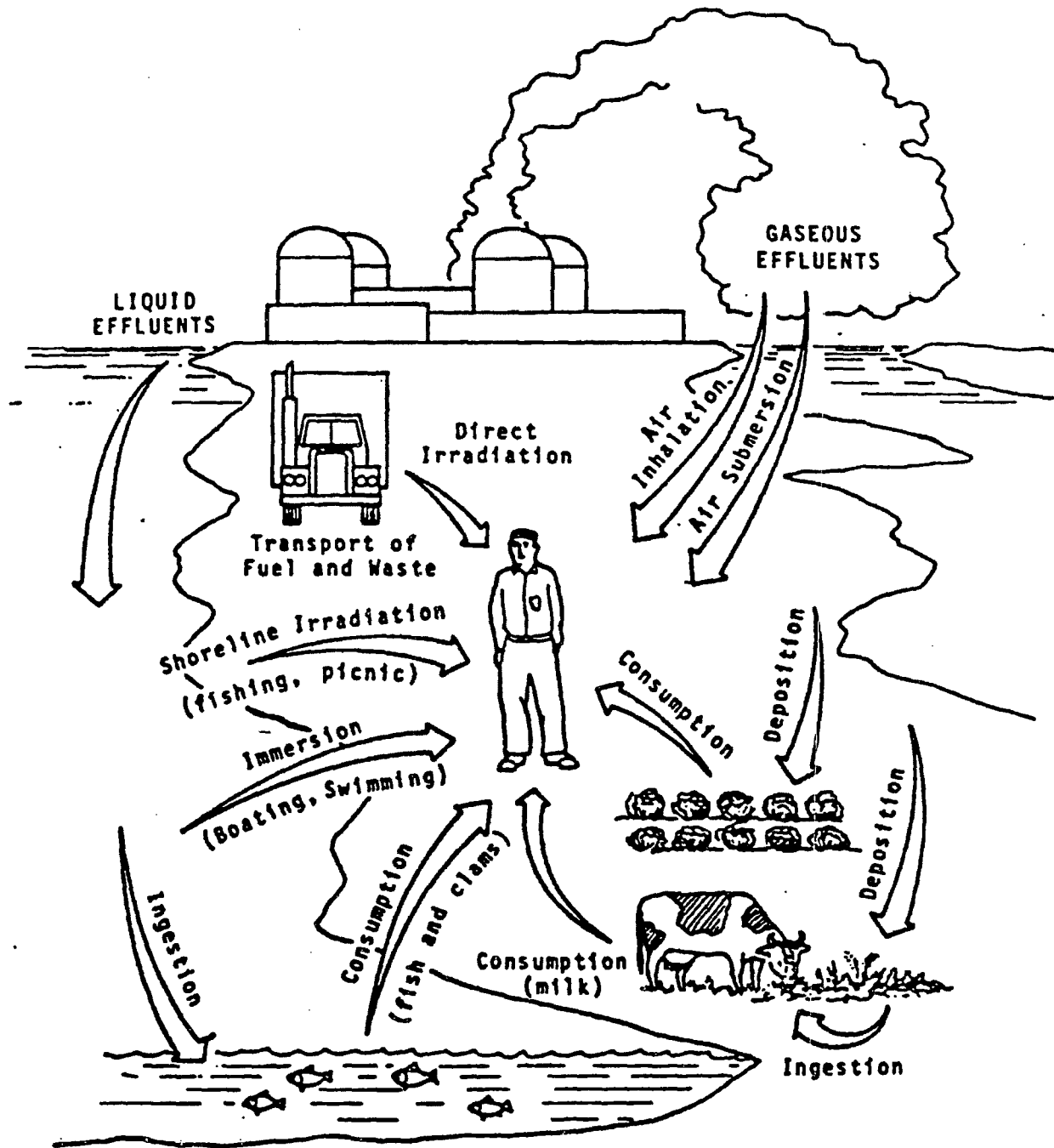
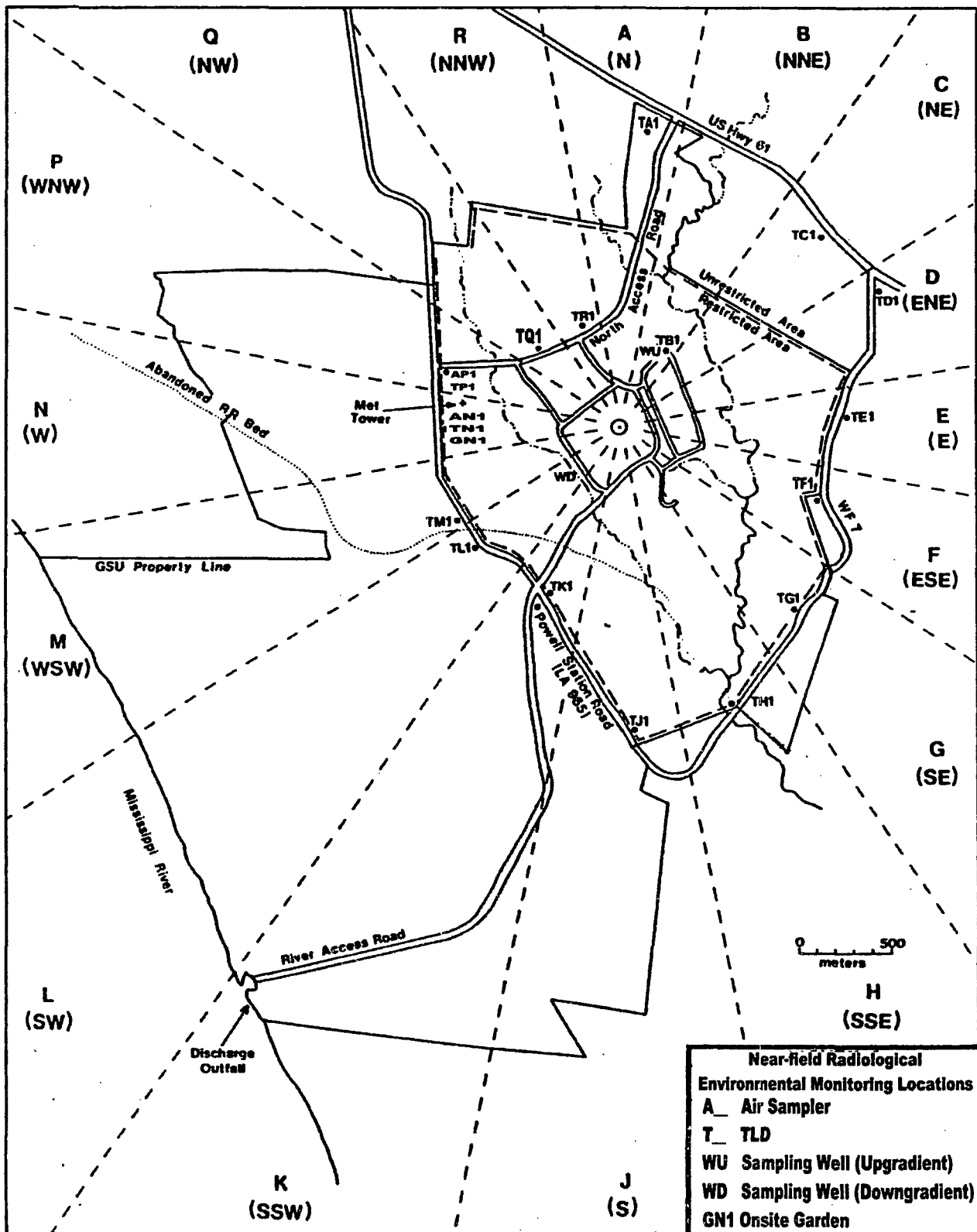
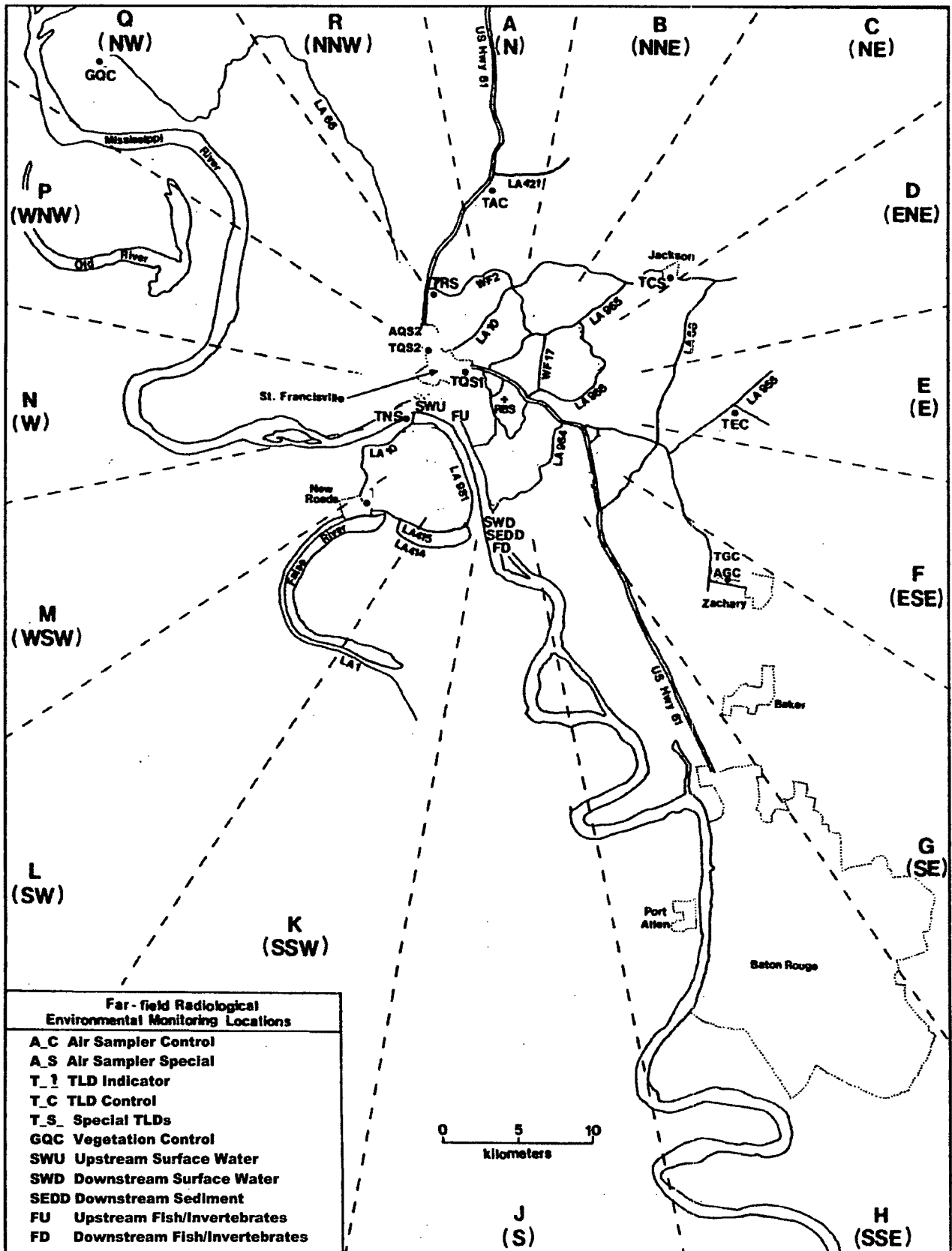


Figure 1-2  
Sample Collection Sites – Near Field



**Figure 1-3**  
**Sample Collection Sites – Far Field**



## 2. Interpretation and Trends of Results

### 2.1. Air Particulate and Radioiodine Sample Results

Iodine-131 attributable to RBS was not detected in the radioiodine cartridges during 2012 as has been the case in previous years. Indicator gross beta air particulate results for 2012 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
2012	0.025
2011	0.026
2010	0.024
2009	0.023
2008	0.023

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 shows a comparison of indicator results from 2012.

### 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 2012 with control location data from 1986 to 2011. All indicator results were within three-sigma of the control data.

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 indicator 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 result of one 2<sup>nd</sup> quarter 2012 special TLD (TRS) was unavailable due to that TLD being missing at change out.

### 2.3. Water Sample Results

Analytical results for 2012 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 2012 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>2012</u>	<u>2003 – 2011</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 2012 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>2012</u>	<u>2003 – 2011</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 2012, 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 2012 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 2012. 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 2012 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 2012.

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

Fish samples were collected from two locations (indicator and control) and analyzed for gamma radionuclides. In 2012, gamma radionuclides were below detectable limits that were 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 2012 and analyzed for gamma radionuclides in accordance with Table TRM 3.12.1-1. The 2012 levels attributable to RBS 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 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.

No resident census changes were noted, as indicated in Table 2.1.

No locations were identified in 2012 that would yield a calculated dose or dose commitment greater than those contained in the TRM (TR 3.11).

An evaluation of ground water usage down gradient of River Bend Station was conducted. It verified that no residents down gradient of RBS utilize ground water as a significant source of drinking water, confirming that there is no drinking water pathway between River Bend Station and the Mississippi River.

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

## **2.9. Interlaboratory Comparison Results**

The River Bend Station Environmental Laboratory analyzed interlaboratory comparison samples to fulfill the requirements of Technical Requirements Manual 3.12.3. Attachment 8.1 contains these results.

One result was outside the control limits for accuracy in the 2012 Interlaboratory Comparison program studies. The I-131 in milk had a River Bend (RBS) to Reference Lab (EZA) ratio of 0.67 with the passing lower limit being 0.80 (Ratio for Agreement range of 0.80 – 1.25). The mean for RBS was 67 pCi/L while EZA's mean was 99.7 pCi/L.

Review of the data results for I-131 in milk shows consistently low values whereas the other isotopes did not and were well within the passing range. Analytics was contacted to see if there was a low bias of reporting I-131 in milk by other participants. All other participant results looked normal with no low bias responses with the sample.

A mixed gamma in water sample was also counted in the same time period as the mixed gamma in milk. The I-131 in the water sample had a RBS to EZA ratio of 1.03 indicating that RBS had a slightly higher result than the known EZA value. Data review of the weekly system background and daily background checks were performed and showed nothing out of the ordinary. There are no anomalies to explain the low reporting value of I-131 in milk. A new milk sample was ordered. The I-131 ratio results for the new sample were 1.05 which is well within the passing range. There are no sample preparation procedures or techniques to change in order to eliminate the low sample results in the future.

Environmental samples are analyzed and reported with a ninety-five percent confidence level. A known standard is counted daily prior to any samples and must read within the control limits of the decay corrected activity; therefore, there is no impact assessed on previously reported data due to these results.

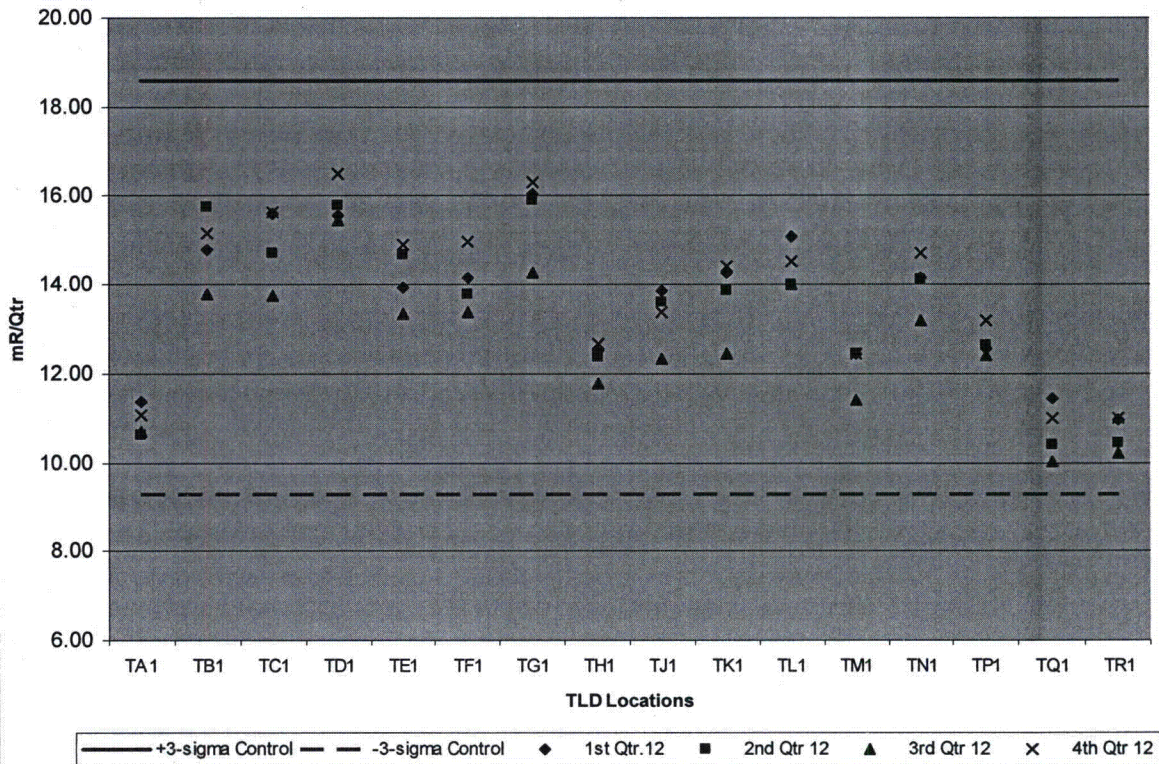
**Table 2-1**  
**Land Use Census Results**  
**2012**

<b>Item #</b>	<b>Sector</b>	<b>Nearest Residence</b>	<b>Range (km)</b>	<b>Nearest Milk Animal</b>	<b>Range (km)</b>	<b>Comment #</b>
1	A (N)	5498 Hwy 61 St.Francisville, LA 70775	1.9	-	-	
2	B (NNE)	4549 Old Hwy 61 St.Francisville, LA 70775	1.4	-	-	
3	C (NE)	4553 Old Hwy 61 St.Francisville, LA 70775	1.5	-	-	
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	-	-	
6	F (ESE)	12019 Fairview Way Jackson, LA 7748	2.6	-	-	
7	G (SE)	3319 Hwy 964 Jackson, LA 70748	3.7	-	-	
8	H (SSE)	11813 Powell Station Rd. St.Francisville, LA 70775	1.7	-	-	
9	J (S)	11649 Powell Station Rd. St.Francisville, LA 70775	1.9	-	-	
10	K (SSW)	8909 Hwy 981 New Roads, LA 70760	6.5	-	-	
11	L (SW)			-	-	<b>1</b>
12	M (WSW)	10933 Cajun 2 Rd. New Roads, LA 70760	5.1	-	-	
13	N (W)			-	-	<b>1</b>
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	-	-	

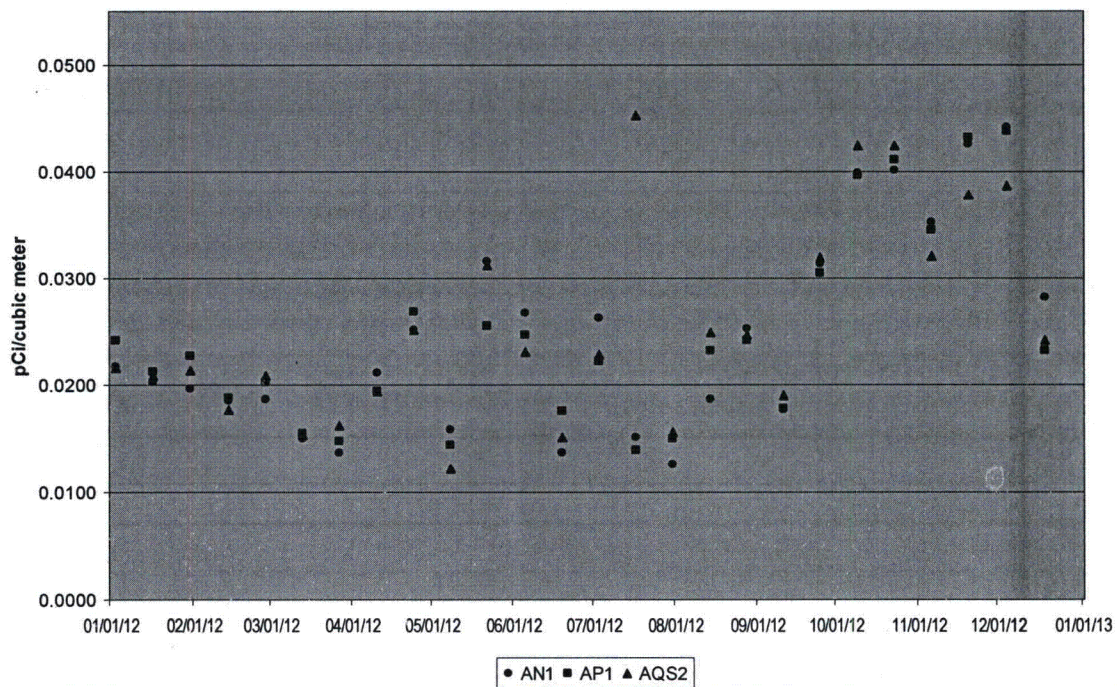
<b>#</b>	<b>Comment</b>
<b>1</b>	No residence located within 8 km.



**FIGURE 2-1**  
**TLD Indicator Results (2012) Versus Control Data (1986-2011)**



**FIGURE 2-2**  
**Gross Beta Indicator Results (2012)**



### **3. Radiological Environmental Monitoring Program Summary**

#### **3.1. 2012 Program Results Summary**

Table 3.1 summarizes the 2012 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**Docket No: **50-458**Location of Facility: **West Feliciana Parish, Louisiana**Reporting Period: **January - December 2012**

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	0.025 ( 78 / 78 ) [ 0.012 - 0.045 ]	AQS2 ( 5.8 km NW )	0.026 ( 26 / 26 ) [ 0.012 - 0.045 ]	0.024 ( 26 / 26 ) [ 0.013 - 0.044 ]	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)	13.41 ( 64 / 64 ) [ 10.03 – 16.49 ]	TD1 (1.6 km ENE)	15.82 ( 4 / 4 ) [ 15.45 – 16.49 ]	N/A	0
Special Interest TLDs ( mR/Qtr )	Gamma 23	(e)	14.14 ( 23 / 23 ) [ 12.31 – 16.01 ]	TGS ( 17.0 km SE )	15.89 ( 4 / 4 ) [ 15.60 – 16.01 ]	N/A	0
Control TLDs ( mR/Qtr )	Gamma 8	(e)	N/A	N/A	N/A	15.22 ( 8 / 8 ) [ 13.85 – 16.32 ]	0

TABLE 3.1

Radiological Environmental Monitoring Program SummaryName of Facility: River Bend StationDocket No: 50-458Location of Facility: West Feliciana Parish, LouisianaReporting Period: January - December 2012

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 SummaryName of Facility: River Bend StationDocket No: 50-458Location of Facility: West Feliciana Parish, LouisianaReporting Period: January - December 2012

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 SummaryName of Facility: River Bend StationDocket No: 50-458Location of Facility: West Feliciana Parish, LouisianaReporting Period: January - December 2012

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 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 (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	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.

**2012 Radiological Monitoring Report**  
**Summary of Monitoring Results**

**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> ) LAB ID	START DATE	END DATE	0.07 I-131	0.01 GROSS BETA
20120002	12/20/2011	1/3/2012	< 0.008	0.022 +/- 0.0007
20120049	1/3/2012	1/17/2012	< 0.008	0.020 +/- 0.0005
20120116	1/17/2012	1/31/2012	< 0.008	0.020 +/- 0.0005
20120173	1/31/2012	2/14/2012	< 0.008	0.019 +/- 0.0005
20120286	2/14/2012	2/28/2012	< 0.007	0.019 +/- 0.0005
20120348	2/28/2012	3/13/2012	< 0.008	0.015 +/- 0.0005
20120401	3/13/2012	3/27/2012	< 0.006	0.014 +/- 0.0005
20120449	3/27/2012	4/10/2012	< 0.008	0.021 +/- 0.0006
20120522	4/10/2012	4/24/2012	< 0.008	0.025 +/- 0.0006
20120642	4/24/2012	5/8/2012	< 0.007	0.016 +/- 0.0005
20120692	5/8/2012	5/22/2012	< 0.008	0.032 +/- 0.0007
20120778	5/22/2012	6/5/2012	< 0.011	0.027 +/- 0.0006
20120831	6/5/2012	6/12/2012	< 0.008	0.014 +/- 0.0005
20120910	6/19/2012	7/3/2012	< 0.007	0.026 +/- 0.0006
20120937	7/3/2012	7/17/2012	< 0.011	0.015 +/- 0.0006
20121037	7/17/2012	7/31/2012	< 0.007	0.013 +/- 0.0004
20121086	7/31/2012	8/14/2012	< 0.007	0.019 +/- 0.0005
20121204	8/14/2012	8/28/2012	< 0.009	0.025 +/- 0.0006
20121245	8/28/2012	9/11/2012	< 0.009	0.018 +/- 0.0005
20121299	9/11/2012	9/25/2012	< 0.008	0.031 +/- 0.0007
20121382	9/25/2012	10/9/2012	< 0.009	0.040 +/- 0.0008
20121501	10/9/2012	10/23/2012	< 0.008	0.040 +/- 0.0007
20121593	10/23/2012	11/6/2012	< 0.007	0.035 +/- 0.0007
20121652	11/6/2012	11/20/2012	< 0.008	0.043 +/- 0.0008
20121738	11/20/2012	12/4/2012	< 0.008	0.044 +/- 0.0008
20121850	12/4/2012	12/18/2012	< 0.011	0.028 +/- 0.0006

**Totals:**

**Average:** 0.025  
**Maximum:** 0.044  
**Minimum:** 0.013



## 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> ) LAB ID	START DATE	END DATE	0.07 I-131	0.01 GROSS BETA
20120001	12/20/2011	1/3/2012	< 0.008	0.024 +/- 0.0007
20120048	1/3/2012	1/17/2012	< 0.006	0.021 +/- 0.0005
20120115	1/17/2012	1/31/2012	< 0.005	0.023 +/- 0.0006
20120172	1/31/2012	2/14/2012	< 0.006	0.019 +/- 0.0005
20120285	2/14/2012	2/28/2012	< 0.008	0.020 +/- 0.0005
20120347	2/28/2012	3/13/2012	< 0.008	0.016 +/- 0.0005
20120400	3/13/2012	3/27/2012	< 0.008	0.015 +/- 0.0005
20120448	3/27/2012	4/10/2012	< 0.008	0.019 +/- 0.0005
20120521	4/10/2012	4/24/2012	< 0.008	0.027 +/- 0.0006
20120641	4/24/2012	5/8/2012	< 0.008	0.014 +/- 0.0005
20120691	5/8/2012	5/22/2012	< 0.008	0.026 +/- 0.0006
20120777	5/22/2012	6/5/2012	< 0.007	0.025 +/- 0.0006
20120830	6/5/2012	6/12/2012	< 0.008	0.018 +/- 0.0005
20120909	6/19/2012	7/3/2012	< 0.006	0.022 +/- 0.0006
20120936	7/3/2012	7/17/2012	< 0.008	0.014 +/- 0.0005
20121036	7/17/2012	7/31/2012	< 0.007	0.015 +/- 0.0005
20121085	7/31/2012	8/14/2012	< 0.007	0.023 +/- 0.0006
20121203	8/14/2012	8/28/2012	< 0.008	0.024 +/- 0.0006
20121244	8/28/2012	9/11/2012	< 0.007	0.018 +/- 0.0005
20121298	9/11/2012	9/25/2012	< 0.008	0.031 +/- 0.0006
20121381	9/25/2012	10/9/2012	< 0.009	0.040 +/- 0.0007
20121500	10/9/2012	10/23/2012	< 0.005	0.041 +/- 0.0007
20121592	10/23/2012	11/6/2012	< 0.008	0.035 +/- 0.0007
20121651	11/6/2012	11/20/2012	< 0.007	0.043 +/- 0.0008
20121737	11/20/2012	12/4/2012	< 0.007	0.044 +/- 0.0007
20121849	12/4/2012	12/18/2012	< 0.010	0.023 +/- 0.0006

### Totals:

Average:	0.025
Maximum:	0.044
Minimum:	0.014

**Attachment 1.3**

Sample Type: **Air Particulate and Charcoal Cartridge – Indicator Location AOS2**  
 Analysis: Gross Beta and Iodine  
 Units: pCi/m<sup>3</sup>

<b>LLD (pCi/m<sup>3</sup>)</b>			<b>0.07</b>	<b>0.01</b>
<b>LAB ID</b>	<b>START DATE</b>	<b>END DATE</b>	<b>I-131</b>	<b>GROSS BETA</b>
20120003	12/20/2011	1/3/2012	< 0.007	0.022 +/- 0.0007
20120050	1/3/2012	1/17/2012	< 0.008	0.021 +/- 0.0005
20120117	1/17/2012	1/31/2012	< 0.007	0.021 +/- 0.0005
20120174	1/31/2012	2/14/2012	< 0.008	0.018 +/- 0.0005
20120287	2/14/2012	2/28/2012	< 0.007	0.021 +/- 0.0005
20120349	2/28/2012	3/13/2012	< 0.007	0.015 +/- 0.0005
20120402	3/13/2012	3/27/2012	< 0.008	0.016 +/- 0.0005
20120450	3/27/2012	4/10/2012	< 0.007	0.019 +/- 0.0005
20120523	4/10/2012	4/24/2012	< 0.006	0.025 +/- 0.0006
20120643	4/24/2012	5/8/2012	< 0.008	0.012 +/- 0.0004
20120693	5/8/2012	5/22/2012	< 0.006	0.031 +/- 0.0007
20120779	5/22/2012	6/5/2012	< 0.009	0.023 +/- 0.0006
20120832	6/5/2012	6/12/2012	< 0.009	0.015 +/- 0.0005
20120911	6/19/2012	7/3/2012	< 0.007	0.023 +/- 0.0006
20120938	7/3/2012	7/17/2012	< 0.022	0.045 +/- 0.0015
20121038	7/17/2012	7/31/2012	< 0.008	0.016 +/- 0.0005
20121087	7/31/2012	8/14/2012	< 0.008	0.025 +/- 0.0006
20121205	8/14/2012	8/28/2012	< 0.008	0.025 +/- 0.0006
20121246	8/28/2012	9/11/2012	< 0.007	0.019 +/- 0.0006
20121300	9/11/2012	9/25/2012	< 0.010	0.032 +/- 0.0007
20121383	9/25/2012	10/9/2012	< 0.010	0.043 +/- 0.0008
20121502	10/9/2012	10/23/2012	< 0.006	0.043 +/- 0.0008
20121594	10/23/2012	11/6/2012	< 0.008	0.032 +/- 0.0006
20121653	11/6/2012	11/20/2012	< 0.006	0.038 +/- 0.0007
20121739	11/20/2012	12/4/2012	< 0.008	0.039 +/- 0.0007
20121851	12/4/2012	12/18/2012	< 0.007	0.024 +/- 0.0006

**Totals:**

**Average:** 0.025  
**Maximum:** 0.045  
**Minimum:** 0.012

## 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> ) LAB ID	START DATE	END DATE	0.07 I-131	0.01 GROSS BETA
20120004	12/20/2011	1/3/2012	< 0.008	0.022 +/- 0.0007
20120051	1/3/2012	1/17/2012	< 0.006	0.016 +/- 0.0005
20120118	1/17/2012	1/31/2012	< 0.006	0.021 +/- 0.0005
20120175	1/31/2012	2/14/2012	< 0.006	0.019 +/- 0.0005
20120288	2/14/2012	2/28/2012	< 0.007	0.017 +/- 0.0005
20120350	2/28/2012	3/13/2012	< 0.007	0.013 +/- 0.0004
20120403	3/13/2012	3/27/2012	< 0.008	0.015 +/- 0.0005
20120451	3/27/2012	4/10/2012	< 0.007	0.017 +/- 0.0005
20120524	4/10/2012	4/24/2012	< 0.005	0.019 +/- 0.0005
20120644	4/24/2012	5/8/2012	< 0.008	0.014 +/- 0.0005
20120694	5/8/2012	5/22/2012	< 0.008	0.031 +/- 0.0007
20120780	5/22/2012	6/5/2012	< 0.007	0.031 +/- 0.0007
20120833	6/5/2012	6/12/2012	< 0.008	0.016 +/- 0.0005
20120912	6/19/2012	7/3/2012	< 0.009	0.030 +/- 0.0007
20120939	7/3/2012	7/17/2012	< 0.010	0.016 +/- 0.0005
20121039	7/17/2012	7/31/2012	< 0.009	0.015 +/- 0.0005
20121088	7/31/2012	8/14/2012	< 0.010	0.023 +/- 0.0006
20121206	8/14/2012	8/28/2012	< 0.008	0.024 +/- 0.0006
20121247	8/28/2012	9/11/2012	< 0.010	0.016 +/- 0.0006
20121301	9/11/2012	9/25/2012	< 0.014	0.035 +/- 0.0009
20121384	9/25/2012	10/9/2012	< 0.011	0.044 +/- 0.0010
20121503	10/9/2012	10/23/2012	< 0.011	0.031 +/- 0.0008
20121595	10/23/2012	11/6/2012	< 0.008	0.031 +/- 0.0006
20121654	11/6/2012	11/20/2012	< 0.008	0.038 +/- 0.0007
20121740	11/20/2012	12/4/2012	< 0.009	0.038 +/- 0.0007
20121852	12/4/2012	12/18/2012	< 0.007	0.027 +/- 0.0006

**Totals:**

<b>Average:</b>	0.024
<b>Maximum:</b>	0.044
<b>Minimum:</b>	0.013

## Attachment 2.1

Sample Type: Thermoluminescent Dosimeters (TLD)

Analysis: mR Exposure

Units: mR/Qtr

<u>INDICATORS</u>	<u>1ST QTR</u>	<u>2ND QTR</u>	<u>3RD QTR</u>	<u>4TH QTR</u>	<u>MEAN</u>
TA1	11.37	10.61	10.70	11.07	10.93
TB1	14.80	15.74	13.78	15.17	14.87
TC1	15.61	14.70	13.73	15.66	14.92
TD1	15.55	15.80	15.45	16.49	15.82
TE1	13.92	14.67	13.34	14.89	14.20
TF1	14.14	13.77	13.38	14.97	14.06
TG1	16.05	15.91	14.26	16.31	15.63
TH1	12.53	12.36	11.76	12.68	12.33
TJ1	13.85	13.60	12.34	13.37	13.29
TK1	14.25	13.86	12.46	14.43	13.75
TL1	15.08	14.01	14.01	14.51	14.40
TM1	12.44	12.44	11.40	12.45	12.18
TN1	14.17	14.12	13.20	14.73	14.05
TP1	12.57	12.62	12.41	13.19	12.70
TQ1	11.45	10.38	10.03	11.00	10.71
TR1	10.96	10.42	10.22	10.99	10.65
MAX	16.05	15.91	15.45	16.49	15.82
AVG	13.67	13.44	12.65	13.87	13.41
MIN	10.96	10.38	10.03	10.99	10.65

<u>SPECIAL INTEREST</u>	<u>1ST QTR</u>	<u>2ND QTR</u>	<u>3RD QTR</u>	<u>4TH QTR</u>	<u>MEAN</u>
TCS	12.99	12.31	13.15	13.06	12.88
TGS	15.98	15.60	15.96	16.01	15.89
TNS	13.82	13.22	13.60	13.43	13.52
TRS	14.67		14.91	14.48	14.69
TQS1	14.85	15.22	15.05	15.68	15.20
TQS2	13.35	12.39	12.65	13.17	12.89
MAX	15.98	15.60	15.96	16.01	15.89
AVG	14.28	13.75	14.22	14.30	14.18
MIN	12.99	12.31	12.65	13.06	12.88

<u>CONTROLS</u>	<u>1ST QTR</u>	<u>2ND QTR</u>	<u>3RD QTR</u>	<u>4TH QTR</u>	<u>MEAN</u>
TAC	16.32	15.61	15.95	16.01	15.97
TEC	14.92	14.23	13.85	14.83	14.46
MAX	16.32	15.61	15.95	16.01	15.97
AVG	15.62	14.92	14.90	15.42	15.22
MIN	14.92	14.23	13.85	14.83	14.46

	<u>INDICATOR</u>	<u>CONTROL</u>	<u>SPECIAL</u>
MAX	16.49	16.32	16.01
AVG	13.41	15.22	14.14
MIN	10.03	13.85	12.31

# Attachment 3.1

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

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
20120089	SWD	1/25/2012	< 5.53	< 4.50	< 9.18	< 5.42	< 12.20	< 5.46	< 7.81	< 4.83	< 5.31	< 5.18	< 15.70	< 5.68
20120090	SWD dup	1/25/2012	< 3.75	< 2.52	< 2.07	< 4.67	< 10.40	< 5.72	< 10.00	< 4.38	< 4.92	< 4.52	< 16.60	< 1.66
20120092	SWU	1/25/2012	< 3.55	< 5.66	< 6.63	< 5.01	< 10.60	< 5.64	< 6.25	< 4.46	< 3.77	< 3.93	< 16.40	< 7.91
20120093	SWU dup	1/25/2012	< 6.43	< 5.42	< 7.70	< 5.55	< 8.67	< 4.67	< 1.53	< 5.47	< 4.24	< 3.53	< 17.90	< 6.67
20120543	SWD	4/26/2012	< 5.23	< 4.84	< 10.00	< 3.70	< 11.30	< 4.30	< 9.29	< 3.99	< 3.70	< 5.18	< 15.70	< 6.59
20120544	SWU	4/26/2012	< 4.96	< 4.26	< 9.36	< 3.93	< 11.40	< 4.67	< 9.49	< 4.17	< 4.01	< 4.29	< 16.40	< 6.73
20121091	SWD	8/14/2012	< 6.72	< 6.61	< 9.56	< 5.40	< 15.00	< 6.01	< 12.00	< 6.70	< 5.60	< 7.70	< 18.80	< 7.56
20121092	SWU	8/14/2012	< 6.28	< 5.23	< 6.08	< 1.47	< 11.20	< 6.18	< 7.74	< 4.73	< 5.11	< 5.60	< 22.80	< 4.89
20121385	SWU	10/9/2012	< 4.96	< 5.66	< 3.42	< 3.62	< 10.10	< 4.81	< 10.40	< 5.90	< 3.95	< 4.48	< 18.70	< 9.56
20121386	SWD	10/9/2012	< 5.05	< 5.67	< 10.40	< 5.42	< 13.10	< 4.17	< 7.48	< 6.67	< 4.08	< 4.99	< 19.40	< 4.89

**Attachment 3.1**

Sample Type: Surface Water  
Analysis: Tritium  
Units: pCi/l

LLD (pCi/l) LAB ID	LOCATION	DATE	3000 TRITIUM
20120089	SWD	1/25/2012	< 710.79
20120090	SWD dup	1/25/2012	< 700.38
20120092	SWU	1/25/2012	< 719.46
20120093	SWU dup	1/25/2012	< 703.48
20120543	SWD	4/26/2012	< 627.15
20120544	SWU	4/26/2012	< 625.93
20121091	SWD	8/14/2012	< 618.49
20121092	SWU	8/14/2012	< 625.56
20121385	SWU	10/9/2012	< 590.02
20121386	SWD	10/9/2012	< 589.97

#### 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
20120044	GWU	1/12/2012	< 7.02	< 6.11	< 13.00	< 7.58	< 13.90	< 7.46	< 14.60	< 6.94	< 6.99	< 7.12	< 28.40	< 9.13
20120045	GWD	1/12/2012	< 6.07	< 5.15	< 10.80	< 13.60	< 10.40	< 6.60	< 8.95	< 4.98	< 5.31	< 5.75	< 21.00	< 4.51
20120394	GWU	3/26/2012	< 7.73	< 7.14	< 12.30	< 4.99	< 12.10	< 7.85	< 10.10	< 6.48	< 7.15	< 7.79	< 21.30	< 4.75
20120395	GWD	3/26/2012	< 4.96	< 5.42	< 11.30	< 3.93	< 12.10	< 5.64	< 7.41	< 4.97	< 4.66	< 4.62	< 17.10	< 7.90
20120689	GWU	5/21/2012	< 7.02	< 5.51	< 13.00	< 4.99	< 15.40	< 8.04	< 12.80	< 6.60	< 7.44	< 6.63	< 23.90	< 9.11
20120690	GWD	5/21/2012	< 4.91	< 5.97	< 10.80	< 4.90	< 10.40	< 4.62	< 11.20	< 4.67	< 5.16	< 5.75	< 15.70	< 8.02
20121233	GWU	9/6/2012	< 4.53	< 6.74	< 9.09	< 5.05	< 8.66	< 8.19	< 11.50	< 6.50	< 7.49	< 6.22	< 28.10	< 10.60
20121234	GWD	9/6/2012	< 4.89	< 7.19	< 11.40	< 6.26	< 13.30	< 7.72	< 7.73	< 7.62	< 5.62	< 5.58	< 24.60	< 11.50

LLD (pCi/l)			3000
LAB ID	LOCATION	DATE	TRITIUM
20120044	GWU	1/12/2012	< 676
20120045	GWD	1/12/2012	< 645
20120394	GWU	3/26/2012	< 664
20120395	GWD	3/26/2012	< 663
20120689	GWU	5/21/2012	< 664
20120690	GWD	5/21/2012	< 667
20121233	GWU	9/6/2012	< 590
20121234	GWD	9/6/2012	< 545

**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>
20121089	8/14/2012	< 17.80	< 23.10

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>
20121090	8/14/2012	< 15.90	< 19.80



**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
20120047	GN1	1/12/2012	< 36.80	< 50.00	< 50.10
20120061	GQC	1/19/2012	< 26.40	< 36.80	< 35.90
20120454	GN1	4/16/2012	< 28.70	< 32.50	< 31.30
20120575	GQC	5/1/2012	< 36.70	< 51.30	< 39.90
20120935	GN1	7/12/2012	< 19.70	< 22.00	< 24.70
20121118	GQC	8/16/2012	< 19.30	< 26.40	< 21.60
20121390	GN1	10/9/2012	< 20.00	< 29.10	< 32.00
20121741	GQC	12/4/2012	< 14.50	< 12.50	< 15.40

**Attachment 7.1**

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

LLD (pCi/kg)			130	130	260	130	260	130	150
LAB ID	LOCATION	DATE	MN-54	CO-58	FE-59	CO-60	ZN-65	CS-134	CS-137
20120815	FU	6/13/2012	< 10.50	< 11.80	< 18.70	< 8.66	< 28.10	< 10.80	< 8.35
20120816	FU	6/13/2012	< 14.30	< 10.70	< 28.70	< 14.30	< 47.10	< 11.70	< 13.80
20120817	FD	6/13/2012	< 10.50	< 11.80	< 18.70	< 8.66	< 28.10	< 10.80	< 8.35
20120818	FD	6/13/2012	< 8.28	< 11.00	< 25.00	< 9.19	< 22.30	< 7.52	< 9.69

## Attachment 8.1

Sample Type: Interlaboratory Comparison

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

Calendar Year: 2012

2nd Quarter dated June 14, 2012

<b>Analytics E7481-125</b>	<b>Gross Beta in Water</b>					<b>Range of 0.80 to 1.25</b>	
<b>Nuclide</b>	<b>RBS Mean pCi/L</b>	<b>RBS 1-s pCi/L</b>	<b>Ref Lab Value pCi/L</b>	<b>Ref Lab uncertainty pCi/L</b>	<b>Resolution</b>	<b>RBS/Ref Lab Ratio</b>	<b>Pass/ Fail</b>
<b>Cs-137</b>	227	1	273	4.57	60	0.83	Pass

<b>Analytics E7480-125</b>	<b>Gamma in Water</b>					<b>Range of 0.80 to 1.25</b>	
<b>Nuclide</b>	<b>RBS Mean pCi/L</b>	<b>RBS 1-s pCi/L</b>	<b>Ref Lab Value pCi/L</b>	<b>Ref Lab Uncertainty pCi/L</b>	<b>Resolution</b>	<b>RBS/Ref Lab Ratio</b>	<b>Pass/ Fail</b>
<b>I-131</b>	102	27.0	99.4	1.66	60	1.03	Pass
<b>Ce-141</b>	112	9.00	112	1.87	60	1.00	Pass
<b>Cr-51</b>	538	67.0	548	9.14	60	0.98	Pass
<b>Cs-134</b>	219	11.0	238	3.97	60	0.92	Pass
<b>Cs-137</b>	279	9.00	289	4.82	60	0.97	Pass
<b>Co-58</b>	117	12.0	126	2.10	60	0.93	Pass
<b>Mn-54</b>	192	20.0	180	3.01	60	1.06	Pass
<b>Fe-59</b>	198	24.0	174	2.91	60	1.14	Pass
<b>Zn-65</b>	300	40.0	272	4.54	60	1.10	Pass
<b>Co-60</b>	485	25.0	484	8.09	60	1.00	Pass

<b>Analytics E7483-125</b>	<b>Gamma in Milk</b>					<b>Range of 0.80 to 1.25</b>	
<b>Nuclide</b>	<b>RBS Mean pCi/L</b>	<b>RBS 1-s pCi/L</b>	<b>Ref Lab Value pCi/L</b>	<b>Ref Lab uncertainty pCi/L</b>	<b>Resolution</b>	<b>RBS/Ref Lab Ratio</b>	<b>Pass/ Fail</b>
<b>I-131</b>	67.0	25.0	99.7	1.66	60	0.67	Fail
<b>Ce-141</b>	85.0	13.0	82.2	1.37	60	1.03	Pass
<b>Cr-51</b>	399	82.0	402	6.71	60	0.99	Pass
<b>Cs-134</b>	150	7.00	174	2.91	60	0.86	Pass
<b>Cs-137</b>	197	11.0	212	3.54	60	0.93	Pass
<b>Co-58</b>	89.0	10.0	92.3	1.54	60	0.96	Pass
<b>Mn-54</b>	139	13.0	132	2.21	60	1.05	Pass
<b>Fe-59</b>	132	11.0	128	2.13	60	1.03	Pass
<b>Zn-65</b>	207	27.0	199	3.33	60	1.04	Pass
<b>Co-60</b>	346	9.00	355	5.93	60	0.97	Pass

<b>Analytics E7482-125</b>	<b>I-131 cartridge</b>					<b>Range of 0.80 to 1.25</b>	
<b>Nuclide</b>	<b>RBS Mean pCi/each</b>	<b>RBS 1-s pCi/each</b>	<b>Ref Lab Value pCi/each</b>	<b>Ref Lab uncertainty pCi/each</b>	<b>Resolution</b>	<b>RBS/Ref Lab Ratio</b>	<b>Pass/ Fail</b>
<b>I-131</b>	94.0	6.00	96.4	1.61	60	0.97	Pass

Attachment 8.1

Sample Type: Interlaboratory Comparison

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

3<sup>rd</sup> Quarter dated Sept. 13, 2012

<b>Analytics E8137-125</b>	<b>Gross Beta filter</b>					<b>Range of 0.80 to 1.25</b>	
<b>Nuclide</b>	<b>RBS Mean pCi/filter</b>	<b>RBS 1-s pCi/filter</b>	<b>Ref Lab Value pCi/filter</b>	<b>Ref Lab uncertainty pCi/filter</b>	<b>Resolution</b>	<b>RBS/Ref Lab Ratio</b>	<b>Pass/ Fail</b>
<b>Cs-137</b>	88.3	0.210	90.5	1.51	60	0.98	Pass

<b>Analytics E8136-125</b>	<b>H-3 in water</b>					<b>Range of 0.80 to 1.25</b>	
<b>Nuclide</b>	<b>RBS Mean pCi/L</b>	<b>RBS 1-s pCi/L</b>	<b>Ref Lab Value pCi/L</b>	<b>Ref Lab uncertainty pCi/L</b>	<b>Resolution</b>	<b>RBS/Ref Lab Ratio</b>	<b>Pass/ Fail</b>
<b>H-3</b>	13500	103	13000	217	60	1.03	Pass

<b>Analytics E8138-125</b>	<b>Gamma Filter</b>					<b>Range of 0.80 to 1.25</b>	
<b>Nuclide</b>	<b>RBS Mean pCi/filter</b>	<b>RBS 1-s pCi/filter</b>	<b>Ref Lab Value pCi/filter</b>	<b>Ref Lab Uncertainty pCi/filter</b>	<b>Resolution</b>	<b>RBS/Ref Lab Ratio</b>	<b>Pass/ Fail</b>
<b>Ce-141</b>	134	8	134	2.23	60	1.00	Pass
<b>Cs-134</b>	78.9	1.6	88.3	1.47	60	0.89	Pass
<b>Cs-137</b>	143	2.0	142	2.37	60	1.01	Pass
<b>Co-58</b>	77.8	3.6	82.0	1.37	60	0.95	Pass
<b>Mn-54</b>	169	9.5	160	2.67	60	1.06	Pass
<b>Fe-59</b>	133	12.8	124	2.07	60	1.07	Pass
<b>Zn-65</b>	161	8.5	157	2.62	60	1.02	Pass
<b>Co-60</b>	127	2.6	124	2.07	60	1.03	Pass

<b>Analytics E8139-125</b>	<b>Gamma Soil</b>					<b>Range of 0.80 to 1.25</b>	
<b>Nuclide</b>	<b>RBS Mean pCi/g</b>	<b>RBS 1-s pCi/g</b>	<b>Ref Lab Value pCi/g</b>	<b>Ref Lab Uncertainty pCi/g</b>	<b>Resolution</b>	<b>RBS/Ref Lab Ratio</b>	<b>Pass/ Fail</b>
<b>Ce-141</b>	0.471	0.108	0.419	0.00699	60	1.12	Pass
<b>Cs-134</b>	0.256	0.013	0.277	0.00462	60	0.92	Pass
<b>Cs-137</b>	0.529	0.022	0.536	0.00895	60	0.99	Pass
<b>Co-58</b>	0.240	0.030	0.257	0.00429	60	0.93	Pass
<b>Mn-54</b>	0.515	0.009	0.501	0.00836	60	1.03	Pass
<b>Fe-59</b>	0.444	0.035	0.389	0.00649	60	1.14	Pass
<b>Zn-65</b>	0.508	0.050	0.492	0.00822	60	1.03	Pass
<b>Co-60</b>	0.388	0.014	0.389	0.00649	60	1.00	Pass

**Attachment 8.1**

Sample Type: **Interlaboratory Comparison**

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

2<sup>nd</sup> sample of Gamma in Milk

<b>Analytics E10513</b>	<b>Gamma in Milk</b>					<b>Range of 0.80 to 1.25</b>	
<b>Nuclide</b>	<b>RBS Mean pCi/L</b>	<b>RBS 1-s pCi/L</b>	<b>Ref Lab Value pCi/L</b>	<b>Ref Lab uncertainty pCi/L</b>	<b>Resolution</b>	<b>RBS/Ref Lab Ratio</b>	<b>Pass/ Fail</b>
<b>I-131</b>	105	9	100	1.67	60	1.05	Pass
<b>Ce-141</b>	196	13	187	3.13	60	1.05	Pass
<b>Cr-51</b>	495	74	472	7.88	60	1.05	Pass
<b>Cs-134</b>	215	17	214	3.57	60	1.01	Pass
<b>Cs-137</b>	272	17	266	4.44	60	1.02	Pass
<b>Co-58</b>	218	14	208	3.47	60	1.05	Pass
<b>Mn-54</b>	218	11	208	3.48	60	1.05	Pass
<b>Fe-59</b>	257	9	252	4.21	60	1.02	Pass
<b>Zn-65</b>	316	23	301	5.02	60	1.05	Pass
<b>Co-60</b>	396	8	400	6.68	60	0.99	Pass