



Entergy Operations, Inc.
River Bend Station
5485 U.S. Highway 61N
St. Francisville, LA 70775
Tel 225 381 4157

David N. Lorfing
Manager-Licensing

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U.S. Nuclear Regulatory Commission
Document Control Desk
11555 Rockville Pike
Rockville, MD 20852-2738

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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 Radioactive Effluent Release Report for the period January 1, 2010, through December 31, 2010. This report is submitted in accordance with the RBS Technical Specifications, Section 5.6.3.

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

Sincerely,

A handwritten signature in black ink that reads "David N. Lorfing".

David N. Lorfing

DNL/wjf
enclosure

JE48
NRK

Radioactive Effluent Release Report for 2010
Page 2 of 2

cc: U.S. Nuclear Regulatory Commission (w/o Enclosure)
Region IV
612 East Lamar Blvd., Suite 400
Arlington, TX 76011-4125

NRC Resident Inspector (w/o Enclosure)
PO Box 1050
St. Francisville, LA 70775

Mr. Alan B. Wang, Project Manager
U.S. Nuclear Regulatory Commission
MS O-8G14
11555 Rockville Pike
Rockville, MD 20852-2738

2010 ANNUAL EFFLUENT RELEASE REPORT

PREPARED BY: William H. Spell 1136 4/27/11
William H. Spell / Senior HP/Chem Specialist

REVIEWED BY: Robert W. Heath 3631 4/27/11
Robert W. Heath / Manager - Chemistry

REVIEWED BY: Glenn Pierce acting RPA for Glenn Pierce 4/27/11
Glenn Pierce / Radiation Protection Manager

APPROVED BY: Eric Olson 4/28/11
Eric Olson / Site Vice President

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I. INTRODUCTION

This is the annual Radioactive Effluent Release Report for the period of January 1, 2010, through December 31, 2010. This report is submitted in accordance with Technical Specification 5.6.3 of Appendix A to River Bend Station (RBS) License Number NPF-47.

II. SUPPLEMENTAL INFORMATION

A. Regulatory Limits

1. 10CFR50, Appendix I Limits

a) Fission and Activation Gases

In accordance with Technical Requirement (TR) 3.11.2.2, the air dose due to noble gases released in gaseous effluent to areas at and beyond the SITE BOUNDARY shall be limited to:

$$\begin{aligned}
 D_{\text{Gamma-Air}} &= \text{gamma air dose from radioactive noble gases in millirad (mrad)} \\
 &= 3.17\text{E-}8 \sum_{i=1}^n M_i \overline{(X/Q)} Q_i \begin{array}{l} \leq 5 \text{ mrad/qtr} \\ \leq 10 \text{ mrad/yr} \end{array}
 \end{aligned}$$

$$\begin{aligned}
 D_{\text{Beta-Air}} &= \text{beta air dose from radioactive noble gases in millirad (mrad)} \\
 &= 3.17\text{E-}8 \sum_{i=1}^n N_i \overline{(X/Q)} Q_i \begin{array}{l} \leq 10 \text{ mrad/qtr} \\ \leq 20 \text{ mrad/yr} \end{array}
 \end{aligned}$$

b) Radioiodines (I-131 & I-133) and Particulate

In accordance with Technical Requirement 3.11.2.3, the dose to a MEMBER OF THE PUBLIC from radioiodines (I-131 and I-133), tritium (H-3) and all radionuclides in particulate form with half-lives greater than 8 days, in gaseous effluent releases to areas at and beyond the SITE BOUNDARY shall be limited to:

$$D_{\text{I\&8DP}\tau} = \text{Dose in mrem to the organ } (\tau) \text{ for the age group of interest from}$$

radioiodine (I-131, I-133, tritium, and 8 day particulate via the pathway of interest.)

$$= 3.17E-08 (F_o) \sum_{I=1}^n P_{i\tau} (X/Q) Q_i \quad \text{and}$$

$$= 3.17E-08 (F_o) \sum_{I=1}^n R_{i\tau} (D/Q) Q_i \quad \text{and}$$

$$D_{\tau} = \sum_{z=1}^n D_{I\&8DP\tau} \leq 7.5 \text{ mrem/qtr}$$

$$\leq 15 \text{ mrem/yr}$$

(above terms defined in the RBS ODCM)

c) Liquid Effluent

In accordance with Technical Requirement 3.11.1.2, the dose or dose commitment to a MEMBER OF THE PUBLIC from radioactive materials in liquid effluent released to UNRESTRICTED AREAS shall be limited to:

$$D_{i\tau} = \frac{A_{i\tau} \Delta t Q_i}{(DF) D_w}$$

and

$$D_{TOTAL\tau} = \sum_{i=1}^n D_{i\tau}$$

$D_{TOTAL\tau}$ = Total dose commitment to the organ (τ) due to all releases during the desired time interval in mrem

and

$$D_{TOTAL} \quad \text{Total Body} \quad \leq 1.5 \text{ mrem/qtr}$$

$$\leq 3 \text{ mrem/yr}$$

$$D_{TOTAL} \quad \text{Any Organ} \quad \leq 5 \text{ mrem/qtr}$$

$$\leq 10 \text{ mrem/yr}$$

(above terms defined in RBS ODCM)

2. 40CFR190 Limits

In accordance with Technical Requirement 3.11.4, the annual (calendar year) dose or dose commitment to any MEMBER OF THE PUBLIC, due to releases of radioactivity and to radiation from uranium fuel cycle sources, shall be limited to:

≤ 25 mrem to the total body or any organ (except the thyroid)

≤ 75 mrem to the thyroid

3. Miscellaneous Limits

a. Technical Requirement 3.11.2.1 - Fission and Activation Gases

In accordance with Technical Requirement 3.11.2.1, the dose rate due to radioactive materials released in gaseous effluents from the site to areas at and beyond the SITE BOUNDARY shall be less than or equal to 500 millirems/year (mrem/yr) to the total body and less than or equal to 3000 mrem/yr to the skin:

DR_{TB} = Dose rate to the total body in mrem/yr

$$= \sum_{i=1}^n K_i \overline{(X/Q)} \dot{Q}_i \leq 500 \text{ mrem/yr and}$$

DR_{SKIN} = Dose rate to the skin in mrem/yr

$$= \sum_{i=1}^n L_i + 1.1M_i \overline{(X/Q)} \dot{Q}_i \leq 3000 \text{ mrem/yr}$$

(above terms defined in RBS ODCM)

b. Technical Requirement 3.11.2.1 - Radioiodine (I-131 & I-133) and Particulate

In accordance with Technical Requirement 3.11.2.1, the dose rate due to radioiodines, tritium, and all radionuclides in particulate form with half-lives greater than 8 days released in gaseous effluents from the site to areas at and beyond the SITE BOUNDARY shall be limited to less than or equal to 1500 mrem/yr to any organ:

$DR_{I\&8DP\tau}$ = Dose rate to the organ τ for the age pathway group of interest from Radioiodines (I-131 & I-133), tritium, and 8 day particulate via the inhalation pathway in mrem/yr.

$$= \sum_{i=1}^n P_i \overline{(X/Q)} \dot{Q}_i \leq 1500 \text{ mrem/yr}$$

(above terms defined in RBS ODCM)

c. Technical Requirement 3.11.1.1 - Liquid Effluent

In accordance with Technical Requirement 3.11.1.1, the concentration of radioactive material released in liquid effluent to UNRESTRICTED AREAS shall be limited to ten times the concentrations specified in 10CFR20, Appendix B, Table 2, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2.0E-04 microcuries/milliliter total concentration.

d. Technical Requirement 3.11.2.5 - Ventilation Exhaust Treatment

In accordance with Technical Requirement 3.11.2.5, the VENTILATION EXHAUST TREATMENT SYSTEM shall be used to reduce radioactive materials in gaseous waste prior to their discharge when the projected doses, due to gaseous effluent releases to areas and beyond the SITE BOUNDARY would exceed 0.3 mrem to any organ in a 31-day period.

e. Technical Requirement 3.11.1.3 - Liquid Radwaste Treatment System

In accordance with Technical Requirement 3.11.1.3, the liquid radwaste treatment system shall be used to reduce the radioactive materials in liquid waste prior to their discharge when the projected doses, due to the liquid effluent, to UNRESTRICTED AREAS would exceed 0.06 mrem to the total body or 0.2 mrem to any organ in a 31-day period.

B. Effluent Concentration Limits

1. Gaseous Releases

The concentrations of radioactive gaseous releases are based on the dose rate restrictions in RBS Technical Requirements, rather than the Effluent Concentration Limits (ECL) listed in 10CFR20 Appendix B, Table 2, Column 1.

2. Liquid Releases

The Effluent Concentration Limits of radioactive materials in liquid effluents are limited to ten times 10CFR20, Appendix B, Table 2, Column 2.

C. Measurements and Approximations of Total Radioactivity

1. Gaseous Effluent

a. Fission and Activation Gases

Periodic grab samples are obtained from the Main Plant Exhaust Duct, Fuel Building Exhaust Vent and Radwaste Building Exhaust Vent. These samples are analyzed using high purity germanium detectors coupled to computerized pulse height analyzers. The sampling and analysis frequencies are described in Table 1F.

Sampling and analysis of these effluent streams provide noble gas radionuclide relative abundance that can then be applied to the noble gas gross activity and gross activity release rate to obtain nuclide specific activities and release rates. The noble gas gross activity released within a specific time period is determined by integrating the stack monitor release rate over the considered time period. If no activity was detected between the stack grab sample and a significant increase in hourly averages was recorded, the nuclide relative abundance of the last sample (or the last similar event), which indicated the presence of activity, was used to obtain nuclide specific activities. Correction factors for the monitors are derived and applied for each sampling period whenever noble gas radionuclides are detected in the effluent stream.

b. Particulate and Radioiodine (I-131 & I-133)

Particulates, Iodine-131 and Iodine-133 are continuously sampled from the three release points using a particulate filter and charcoal cartridge in line with a sample pump (stack monitor pump). These filters and charcoal cartridges are removed and analyzed in accordance with the frequencies specified in Table 1F. Analysis is performed to identify and quantify radionuclides using high purity germanium detectors coupled to computerized pulse height analyzers. Given the nuclide specific activity concentrations, process flow rate, and duration of the

sample, the nuclide specific activity released to the environment can be obtained. Due to the continuous sampling process, it is assumed that the radioactive material is released to the environment at a constant rate within the sampling period. Strontium-89 and Strontium-90 (Sr-89 and Sr-90) are quantitatively analyzed by counting by scintillation techniques (Cherenkov counting). Gross alpha analysis is performed using a zinc sulfide scintillation counter.

c. Tritium

Tritium grab samples are obtained from the three gaseous release points at the specified frequencies listed in Table 1F using an ice bath condensation collection method. The collected sample is then analyzed using a liquid scintillation counter. Given the tritium concentration, process flow rate, and time period for which the sample is obtained, the tritium activity released to the environment can be determined. Due to the frequency of sampling, it is assumed that the tritium is released to the environment at a constant rate within the time period for which the sample is obtained.

d. Carbon-14 (C-14)

C-14 release details are discussed in Section VI.

2. Liquid Effluent

Representative grab samples are obtained from the appropriate sample recovery tank and analyzed prior to release of the tank in accordance with the frequencies listed in Table 2E. Analysis for gamma emitting nuclides (including dissolved and entrained noble gases) is performed using a high purity germanium detector coupled to a computerized pulse height analyzer. Tritium concentration is determined using a liquid scintillation counter. Strontium-89 and Strontium-90 are quantitatively analyzed by scintillation techniques (Cherenkov counting). Iron-55 is counted with a liquid scintillation counter after digestion of the iron. Gross alpha analysis is performed using a zinc sulfide scintillation counter. The activity of each nuclide released to the environment is determined from the nuclide specific concentration and total tank volume released.

D. Batch Releases

1. Liquid Effluents

Batch releases and receiving stream flow from River Bend Station during the reporting period of January 1, 2010, through December 31, 2010 are shown in Table 2D.

The Mississippi River stream flow is obtained by averaging data from the U. S. Army Corp of Engineers website using flow gauge data at Tarbert Landing.

2. Gaseous Effluents

There were no routine batch releases of gaseous effluents from River Bend Station during the reporting period of January 1, 2010, through December 31, 2010.

E. Abnormal Releases

Number of abnormal liquid releases: 0

Number of abnormal gaseous releases: 0

F. Estimate of Total Error

1. Liquid

The maximum error associated with sample collection, laboratory analysis, and discharge volume is collectively estimated to be:

Fission and Activation Products: $\pm 14.2\%$

Tritium: $\pm 14.2\%$

Dissolved and Entrained Noble Gases: $\pm 14.2\%$

Gross Alpha Radioactivity: $\pm 14.2\%$

2. Gaseous

The maximum error (not including sample line loss) associated with sample flow, process flow, sample collection, monitor accuracy and laboratory analysis are collectively estimated to be:

Noble Gases: $\pm 37.0\%$

Iodines : $\pm 18.6\%$

Particulate: $\pm 18.6\%$

Tritium: $\pm 18.2\%$

3. Determination of Total Error

The total error (i.e., collective error due to sample collection, laboratory analysis, sample flow, process flow, monitor accuracy, etc.) is calculated using the following equation:

$$E_T = \sqrt{((E_1)^2 + (E_2)^2 + \dots (E_n)^2)}$$

where:

E_T = total error

$E_1, E_2 \dots E_n$ = individual errors due to sample collection, laboratory analysis, sample flow, process flow, monitor accuracy, etc.

III. GASEOUS EFFLUENT SUMMARY INFORMATION

Refer to the Table 1 series for "Summation of All Releases and "Nuclides Released," respectively. It should be noted that an entry of "0.00E+00" Curie (Ci) or microcurie/second (uCi/sec) in this section indicates that the concentration of the particular radionuclide was below the Lower Limit of Detection (LLD) as listed in Table 1F. Also, any nuclide not appearing in the tables was < LLD for all four quarters.

IV. LIQUID EFFLUENT SUMMARY INFORMATION

Refer to the Table 2 series for "Summation of All Releases and Nuclides Released." It should be noted that an entry of "0.00E+00" Ci or uCi/ml in this section indicates that the concentration of the particular radionuclide was below the Lower Limit of Detection (LLD) as listed in Table 2E. Also, any nuclide not appearing in the tables was < LLD for all four quarters.

V. SOLID WASTE

Refer to Table 3, for Solid Waste and Irradiated Fuel Shipments.

VI. RADIOLOGICAL IMPACT ON MAN (40CFR190)

An assessment (see summary below) was made of radiation doses to the likely most-exposed member of the public from River Bend and other nearby uranium fuel cycle sources (none within five miles). The annual (calendar year) dose or dose commitment to any

MEMBER OF THE PUBLIC, due to releases of radioactivity and to radiation from uranium fuel cycle sources, shall be limited to less than or equal to 25 mrem to the total body or any organ, except the thyroid, which shall be limited to less than or equal to 75 mrem.

Carbon-14

The bounding annual dose from C-14 was calculated using guidance from Regulatory Guide 1.21, Revision 2, and the methodology in Regulatory Guide 1.109, Appendix C and Appendix E. The C-14 source term of 11 curies was taken from the site calculation PR(C)-359-3A, Gaseous Releases per NUREG-0016 Revision 1. Carbon-14 does not have dose factors associated with standing on contaminated ground; therefore, no ground plane dose was calculated. There is no milk pathway within five miles of River Bend Station so this pathway is not evaluated. RBS does not take credit for decay in the X/Q. This calculation assumes the inhalation, meat and vegetation pathways are at the site boundary in the sector with the highest X/Q. The dose from liquid effluents is not calculated as the dose contribution from C-14 is considered to be insignificant as indicated in Regulatory Guide 1.21 Revision 2. According to EPRI 1021106, Estimation of Carbon-14 in Nuclear Power Plant Gaseous Effluents, 95% of the carbon released is in the form of carbon dioxide and this contributes the highest dose to man. The ingestion pathway specifically vegetation, is the most likely route of intake for man. An assumption has been made for gaseous releases that plants obtain all of their C-14 from carbon dioxide.

Dose not including C-14:

Organ	mrem
Total Body	1.17E-01
Skin	3.51E-01
Thyroid	1.18E-01
Other Organ	1.34E-01

Bounding Dose from C-14 only:

Organ	mrem
Total Body	9.39E-01
Skin	0.00E+00
Thyroid	9.39E-01
Other Organ (Bone)	4.70E+01

In addition, an assessment of doses was made for members of the public due to their activities inside the site boundary. Parameters and assumptions used to make this determination can be found in Table 4. The results of the calculations can be found in Table 5. The maximally exposed member of the public was an employee staying at RBS during the week and is conservatively calculated to have stayed at least four days per week for 50 weeks. It should be noted that liquid effluent pathway dose was not considered since these

individuals would not engage in activities that would allow exposure to this pathway.

VII. METEOROLOGICAL DATA

See Tables 6 and 7 for the cumulative joint frequency distributions and annual average data for continuous releases. The meteorological recovery for 2010 was 97.5 %.

VIII. RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION OPERABILITY

Section TR 3.3.11.2 of the River Bend Technical Requirements Manual (TRM) addresses "Radioactive Liquid Effluent Monitoring Instrumentation" requirements and actions to be taken. CWS-FE113 is identified TRM Table 3.3.11.2-1 as a Cooling Tower Blowdown Line Radioactive Liquid Effluent Monitoring instrument monitoring flow rate. Action B.2 of TR 3.3.11.2 addresses restoring inoperable channels to an operable status with a completion time of 30 days, and is applicable for instrument CWS-FE113. If the 30-day time frame is exceeded, Action E.1 requires a suspension of the radioactive effluent release and Action E.2 requires an explanation as to why the inoperability was not corrected in a timely manner in the next Annual Radioactive Effluent Release Report. During the period from January 1, 2010, through December 31, 2010, RBS complied with this requirement and restored to operable status within the required time, except as noted in the following paragraph:

On August 23, 2010 @ 2300, a cooling tower blowdown water low-flow alarm per instrument CWS-FE113 was received in the Auxiliary Control Room. No operator actions or activities were occurring that would have affected blowdown flow. Indicated flow on CWS-FE113 lowered to approximately 2000 gallons-per-minute (gpm). Operators verified blowdown flow with another instrument (CWS-FR112) which indicated approximately 2500 gpm. Beginning on August 24, 2010, CWS-FE113 was vented and calibrated multiple times with no success keeping the low flow alarm cleared. After additional activities, the instrument was subsequently declared operable on September 21, 2010. A liquid radwaste discharge, released per plant procedures via the cooling tower blowdown line, was initiated on September 22, 2010, and continued until 0235 on September 23, 2010. There was no issue until a subsequent question arose later in the day on September 23, 2010, in regard to the testing performed on CWS-FE113 prior to returning it to service [operable status]. After the question arose, CWS-FE113 was administratively declared inoperable, the August 23, 2010, inoperability initiation time was re-instituted, and additional testing was performed with a surveillance test that checked the operability. The surveillance test was performed satisfactorily with no adjustments made. However, restoring the inoperability condition meant that the discharge that began on September 22nd and ended early on September 23rd, exceeded the 30-day time requirement for restoring inoperable channels to an operable status by 3-4 hours. After the additional testing, which confirmed the original operability declaration and supported that CWS-FE113 performed its design function during the liquid radwaste discharge, CWS-FE113 was again restored to an operable status early in the morning on September 24, 2010.

IX. RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION OPERABILITY

The minimum number of channels required to be OPERABLE as described in Table 3.3.11.3-1 of Technical Requirement 3.3.11.3 were, if inoperable at any time in the period January 1, 2010, through December 31, 2010, restored to operable status within the required time. Reporting of inoperable channels is therefore not required in this report.

X. LIQUID HOLD UP TANKS

The maximum quantity of radioactive material, excluding tritium and dissolved or entrained noble gases, contained in any unprotected outdoor tank during the period of January 1, 2010, through December 31, 2010 was less than or equal to the 10 curie limit as required by Technical Specification 5.5.8.b.

XI. RADIOLOGICAL ENVIRONMENTAL MONITORING

There were no changes to the Radiological Environmental Monitoring Program during the reporting period January 1, 2010, through December 31, 2010.

XII. LAND USE CENSUS

The Land Use Census for 2010 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 (TRCO 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 locations were identified in 2010 that would yield a calculated dose or dose commitment greater than those currently calculated in Requirement TSR 3.11.2.3.1. The County Agents also confirmed that there was no commercial harvesting of crawfish within the five-mile radius downstream of RBS. This data is collected to further support the possibility of removing invertebrates from the liquid dose conversion factors. This information represents four consecutive land use census periods that show crawfish consumption from the waters immediately affected by RBS does not occur. RBS conservatively uses the invertebrate pathway although not required by NUREG-0133 liquid dose factor methodology for fresh water nuclear power plants.

XIII. OFFSITE DOSE CALCULATION MANUAL (ODCM)

There were no changes to the ODCM in 2010.

XIV. MAJOR CHANGES TO RADIOACTIVE LIQUID, GASEOUS, AND SOLID WASTE TREATMENT SYSTEMS

Engineering has performed a review of the Asset Suite database to evaluate non-administrative design changes completed or partially completed during 2010 involving the subject systems (i.e. changes classified as evaluations or nuclear changes). These design changes were then reviewed to determine if there have been any major changes to the subject systems. The review was based on a major change being defined as a modification which affected the method of processing or the effluent from the system. Also, to be a "major change" the change must have affected the Updated Safety Analysis Report (USAR).

No engineering change was identified as being completed during this time period that modified any radioactive waste system major component such that the processing method or effluent was changed. Also no changes were identified affecting the method of processing solid, liquid or gaseous waste or the isotopic composition or the quantity of liquid, solid, or gaseous waste as described in the USAR.

In conclusion, no design changes were completed during the specified time period that constituted a major change to liquid, solid or gaseous radwaste treatment systems.

XV. PROCESS CONTROL PROGRAM (PCP)

There were no changes to the PCP (EN-RW-105) in 2010.

XVI. INDUSTRY GROUND WATER PROTECTION INITIATIVE (GPI) – FINAL GUIDANCE DOCUMENT (NEI 07-07) OBJECTIVE ANNUAL REPORTING

Ground water samples for gamma radiation and tritium were taken in support of the GPI. These samples are not part of the Radiological Environmental Monitoring Program. There have been no positive groundwater samples since the NEI groundwater monitoring sampling began in the third quarter 2007. The Minimum Detectable Concentration (MDC) in all samples taken in support of the GPI is less than the Lower Limit of Detection as required in Technical Requirement 3.12.1 (Environmental LLDs). The sample results are located in Table 8.

TABLE 1A
GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

REPORT FOR 2010	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Gases						
1. Total Release	Ci	1.02E+01	1.92E+01	5.85E+01	3.26E+01	1.20E+02
2. Avg. Release Rate	uCi/sec	1.31E+00	2.44E+00	7.36E+00	4.11E+00	3.82E+00
3. % Applicable Limit % (1)		9.98E-02	2.91E-01	5.18E-01	5.33E-01	7.21E-01
Iodine-131						
1. Total Release	Ci	1.07E-03	2.62E-03	1.66E-03	4.22E-04	5.77E-03
2. Avg. Release Rate	uCi/sec	1.37E-04	3.33E-04	2.09E-04	5.31E-05	1.83E-04
3. % Applicable Limit % (2)		4.58E-01	1.15E+00	7.51E-01	2.62E-01	1.28E+00
Particulates Half Life >= 8 days						
1. Total Release	Ci	3.02E-04	9.66E-04	8.66E-04	3.97E-04	2.53E-03
2. Avg. Release Rate	uCi/sec	3.89E-05	1.23E-04	1.09E-04	5.00E-05	8.02E-05
3. % Applicable Limit % (2)		1.34E-01	3.46E-01	2.05E-01	5.42E-02	3.62E-01
Tritium						
1. Total Release	Ci	4.81E+00	6.50E+00	3.48E+00	4.13E+00	1.89E+01
2. Avg. Release Rate	uCi/sec	6.18E-01	8.27E-01	4.38E-01	5.20E-01	6.00E-01
3. % Applicable Limit % (2)		1.30E-01	1.26E-01	9.91E-02	2.05E-01	2.54E-01
Carbon-14						
1. Total Release	Ci	2.72E+00	2.74E+00	2.77E+00	2.77E+00	1.10E+00
2. Avg. Release Rate	uCi/sec	3.50E-01	3.49E-01	3.48E-01	3.48E-01	3.49E-01
3. % Applicable Limit % (2)		1.15E+01	1.56E+01	1.57E+01	1.57E+01	2.71E+01

- 1) Either the gamma air dose limit of 5 mrad/qtr or beta air dose limit of 10 mrad/qtr (T.R. 3.11.2.2.a), which ever is most limiting.
- 2) The % of applicable limit is determined by comparing the dose contribution to the critical organ limits of TRM 3.11.2.3

TABLE 1B
GASEOUS EFFLUENTS - GROUND RELEASES - CONTINUOUS MODE

REPORT FOR 2010	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Gases						
XE-133	Ci	0.00E+00	0.00E+00	1.60E-01	0.00E+00	1.60E-01
XE-133M	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
XE-135	Ci	4.11E-01	2.75E+00	1.22E+00	3.12E+00	7.50E+00
XE-135M	Ci	3.45E-01	7.09E-01	7.92E-01	2.62E+00	4.47E+00
Totals for Period...	Ci	7.55E-01	3.46E+00	2.17E+00	5.74E+00	1.21E+01
Iodines						
I-131	Ci	4.92E-06	3.92E-05	4.47E-05	1.53E-05	1.04E-04
I-133	Ci	0.00E+00	1.42E-04	1.91E-04	4.86E-05	3.82E-04
Totals for Period...	Ci	4.92E-06	1.82E-04	2.36E-04	6.39E-05	4.86E-04
Particulates Half Life >= 8 days						
CE-141	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CO-57	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CO-58	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CO-60	Ci	2.21E-05	7.61E-05	7.60E-05	2.59E-06	1.77E-04
CR-51	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CS-137	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FE-59	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MN-54	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NB-95	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RU-103	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RU-106	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SR-89	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ZN-65	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Totals for Period...	Ci	2.21E-05	7.61E-05	7.60E-05	2.59E-06	1.77E-04

Tritium

H-3	Ci	1.70E+00	1.48E+00	1.31E+00	2.13E+00	6.63E+00
		-----	-----	-----	-----	-----
Totals for Period...	Ci	1.70E+00	1.48E+00	1.31E+00	2.13E+00	6.63E+00

TABLE 1C
GASEOUS EFFLUENTS - GROUND RELEASES - BATCH MODE

REPORT FOR 2010	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Gases						
XE-133	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
XE-135	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
XE-135M	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Totals for Period...	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Iodines						
I-131	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
I-133	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Totals for Period...	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Particulates Half Life >= 8 days						
BA-140	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CO-60	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MN-54	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SR-89	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SR-90	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ZN-65	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Totals for Period...	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Tritium						
H-3	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Totals for Period...	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TABLE 1D
GASEOUS EFFLUENTS - MIXED MODE RELEASES - CONTINUOUS MODE

REPORT FOR 2010	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Gases						
AR-41	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
KR-85	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
KR-85M	Ci	0.00E+00	0.00E+00	2.44E+00	0.00E+00	2.44E+00
KR-87	Ci	0.00E+00	0.00E+00	9.31E-01	0.00E+00	9.31E-01
KR-88	Ci	0.00E+00	0.00E+00	2.23E-01	0.00E+00	2.23E-01
XE-131M	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
XE-133	Ci	1.62E-01	4.23E-01	3.88E+00	5.57E-01	5.02E+00
XE-133M	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
XE-135	Ci	5.78E+00	7.39E+00	2.37E+01	1.59E+01	5.28E+01
XE-135M	Ci	3.47E+00	7.91E+00	1.41E+01	1.04E+01	3.58E+01
XE-137	Ci	0.00E+00	0.00E+00	3.37E+00	0.00E+00	3.37E+00
XE-138	Ci	0.00E+00	0.00E+00	7.71E+00	0.00E+00	7.71E+00
Totals for Period...	Ci	9.40E+00	1.57E+01	5.64E+01	2.69E+01	1.08E+02
Iodines						
I-131	Ci	1.06E-03	2.58E-03	1.62E-03	4.07E-04	5.66E-03
I-132	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
I-133	Ci	1.02E-02	2.53E-02	1.24E-02	3.02E-03	5.09E-02
I-135	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Totals for Period...	Ci	1.12E-02	2.79E-02	1.40E-02	3.43E-03	5.65E-02
Particulates Half Life >= 8 days						
BA-140	Ci	8.80E-05	5.23E-04	4.88E-04	2.05E-04	1.30E-03
CE-139	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CE-141	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CO-58	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CO-60	Ci	3.71E-05	4.12E-05	6.54E-05	0.00E+00	1.44E-04

CR-51	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CS-134	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CS-137	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FE-59	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MN-54	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RU-103	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SR-89	Ci	1.55E-04	3.13E-04	2.37E-04	1.90E-04	8.93E-04
SR-90	Ci	1.52E-07	1.28E-05	0.00E+00	0.00E+00	1.30E-05
ZN-65	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
-----	-----	-----	-----	-----	-----	-----
Totals for Period...	Ci	2.80E-04	8.90E-04	7.90E-04	3.95E-04	2.35E-03
Tritium						
H-3	Ci	3.10E+00	5.02E+00	2.17E+00	2.00E+00	1.23E+01

Carbon-14						
C-14	Ci	2.72E+00	2.74E+00	2.77E+00	2.77E+00	1.10E+01

Table 1E
SUPPLEMENTAL INFORMATION
GASEOUS EFFLUENTS - BATCH MODE

REPORT FOR 2010	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Number of releases		0	0	0	0	0
Total release time	minutes	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Maximum release time	minutes	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Average release time	minutes	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Minimum release time	minutes	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TABLE 1F
RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM

Gaseous Release Type	Sampling Frequency	Minimum Analysis Frequency	Type of Activity Analysis	Lower Limit of Detection (LLD) uCi/ml
A. Main Plant Exhaust Duct	M Grab Sample	M	Principal Gamma Emitters	1.00E-04
			H-3	1.00E-06
B. Fuel Building Ventilation Exhaust Duct	M Grab Sample	M	Principal Gamma Emitters	1.00E-04
			H-3	1.00E-06
C. Radwaste Building Ventilation Exhaust Duct	M Grab Sample	M	Principal Gamma Emitters	1.00E-04
D. All Release Types as listed in A, B, & C above	Continuous	W Charcoal Sample	I-131	1.00E-12
			I-133	1.00E-10
	Continuous	W Particulate Sample	Principal Gamma Emitters (I-131, Others)	1.00E-11
	Continuous	M Composite Particulate Sample	Gross Alpha	1.00E-11
	Continuous	Q Composite Particulate Sample	Sr-89, Sr-90	1.00E-11
	Continuous	Noble Gas Monitor	Noble Gases Gross Beta or Gamma	1.00E-06

W = At least once per 7 days

M = At least once per 31 days

Q = At least once per 92 days

Table 1G
GASEOUS ANNUAL DOSE SUMMARY REPORT

=== I&P DOSE LIMIT ANALYSIS =====

Period-Limit	Age Group	Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Q1 - T.Spec Any Organ	CHILD	THYROID	5.42E-02	7.50E+00	7.22E-01
Q2 - T.Spec Any Organ	CHILD	THYROID	1.22E-01	7.50E+00	1.62E+00
Q3 - T.Spec Any Organ	CHILD	THYROID	7.91E-02	7.50E+00	1.05E+00
Q4 - T.Spec Any Organ	CHILD	THYROID	2.91E-02	7.50E+00	3.88E-01
Yr - T.Spec Any Organ	CHILD	THYROID	2.84E-01	1.50E+01	1.89E+00

Carbon-14 (Bounding calculation)

Q1 - T.Spec Any Organ	CHILD	BONE	1.16E+00	7.50E+00	1.55E+01
Q2 - T.Spec Any Organ	CHILD	BONE	1.17E+00	7.50E+00	1.56E+01
Q3 - T.Spec Any Organ	CHILD	BONE	1.18E+00	7.50E+00	1.57E+01
Q4 - T.Spec Any Organ	CHILD	BONE	1.18E+00	7.50E+00	1.57E+01
Yr - T.Spec Any Organ	CHILD	BONE	4.70E+00	1.50E+01	3.13E+01

=== NG DOSE LIMIT ANALYSIS =====

Period-Limit	Dose (mrad)	Limit (mrad)	% of Limit
Q1 - T.Spec Gamma	4.99E-03	5.00E+00	9.98E-02
Q1 - T.Spec Beta	3.47E-03	1.00E+01	3.47E-02
Q2 - T.Spec Gamma	1.45E-02	5.00E+00	2.91E-01
Q2 - T.Spec Beta	1.23E-02	1.00E+01	1.23E-01
Q3 - T.Spec Gamma	2.59E-02	5.00E+00	5.18E-01
Q3 - T.Spec Beta	2.26E-02	1.00E+01	2.26E-01
Q4 - T.Spec Gamma	2.66E-02	5.00E+00	5.33E-01
Q4 - T.Spec Beta	1.78E-02	1.00E+01	1.78E-01
Yr - T.Spec Gamma	7.21E-02	1.00E+01	7.21E-01
Yr - T.Spec Beta	5.61E-02	2.00E+01	2.81E-01

TABLE 2A
LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

REPORT FOR 2010	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Gases						
1. Total Release	Ci	1.08E-05	1.64E-05	4.78E-04	8.59E-06	5.14E-04
2. Avg. Diluted Conc.	uCi/ml	7.83E-12	1.17E-11	3.31E-10	6.20E-12	9.17E-11
3. % Applicable Limit	% (1)	1.03E-06	3.30E-07	1.33E-04	6.53E-07	3.06E-05
Tritium						
1. Total Release	Ci	1.10E+01	2.25E+00	2.37E+01	6.67E+00	4.35E+01
2. Avg. Diluted Conc.	uCi/ml	7.32E-06	1.61E-06	1.64E-05	4.81E-06	7.77E-06
3. % Applicable Limit	% (1)	1.04E-04	4.52E-06	6.54E-04	5.09E-05	2.58E-04
Dissolved and Entrained Gases						
1. Total Release	Ci	5.80E-03	9.94E-04	2.54E-02	9.42E-03	4.17E-02
2. Avg. Diluted Conc.	uCi/ml	4.21E-09	7.11E-10	1.76E-08	6.80E-09	7.43E-09
3. % Applicable Limit	% (2)	2.10E-03	3.55E-04	8.82E-03	3.39E-03	3.72E-03
Gross Alpha Radioactivity						
1. Total Release	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Volume of liquid waste	liters	8.84E+05	1.90E+05	2.69E+06	7.15E+05	4.48E+06
Volume of dil. water	liters	1.38E+09	1.40E+09	1.44E+09	1.39E+09	5.60E+09

(1) The most limiting dose compared to the total body and critical organ limits of TRM 3.11.1.2.a.

(2) Technical Requirement 3.11.1.1 limit of 2.00E-04 uCi/ml for dissolved and entrained noble gases in liquid effluent.

TABLE 2B
LIQUID EFFLUENTS - CONTINUOUS MODE

REPORT FOR 2010	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
-----	-----	-----	-----	-----	-----	-----
Fission and Activation Gases						
** No Nuclide Activities **	
Tritium						
** No Nuclide Activities **	
Dissolved and Entrained Gases						
** No Nuclide Activities **	
Gross Alpha Radioactivity						
** No Nuclide Activities **	

TABLE 2C
LIQUID EFFLUENTS - BATCH MODE

REPORT FOR 2010	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Gases						
CO-60	Ci	1.08E-05	1.64E-05	4.78E-04	8.59E-06	5.14E-04
Totals for Period...	Ci	1.08E-05	1.64E-05	4.78E-04	8.59E-06	5.14E-04
Tritium						
H-3	Ci	1.10E+01	2.25E+00	2.37E+01	6.67E+00	4.35E+01
Totals for Period...	Ci	1.10E+01	2.25E+00	2.37E+01	6.67E+00	4.35E+01
Dissolved and Entrained Gases						
XE-133	Ci	2.12E-03	2.18E-04	9.31E-03	3.97E-03	1.56E-02
XE-133M	Ci	3.92E-05	0.00E+00	6.29E-05	0.00E+00	1.02E-04
XE-135	Ci	3.64E-03	7.76E-04	1.61E-02	5.45E-03	2.60E-02
Totals for Period...	Ci	5.80E-03	9.94E-04	2.54E-02	9.42E-03	4.17E-02
Gross Alpha Radioactivity						
** No Nuclide Activities **	

Table 2D
 SUPPLEMENTAL INFORMATION
 LIQUID EFFLUENTS - BATCH MODE

REPORT FOR 2010	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
-----	-----	-----	-----	-----	-----	-----
Number of releases		16	4	49	13	82
Total release time	minutes	5.71E+03	1.23E+03	1.75E+04	4.62E+03	2.90E+04
Maximum release time	minutes	3.94E+02	3.77E+02	4.03E+02	3.96E+02	4.03E+02
Average release time	minutes	3.57E+02	3.07E+02	3.57E+02	3.55E+02	3.54E+02
Minimum release time	minutes	3.37E+02	1.68E+02	3.14E+02	3.21E+02	1.68E+02

		<u>QTR 1</u>	<u>QTR 2</u>	<u>QTR 3</u>	<u>QTR 4</u>
Average Mississippi River stream flow during periods of release of effluent into a flowing stream	ft ³ /sec	777.311	746.846	466.152	301.087

TABLE 2E
RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM

Liquid Release Type	Sampling Frequency	Minimum Analysis Frequency	Type of Activity Analysis	Lower Limit of Detection (LLD) uCi/ml
A. Batch Waste Release (Liquid Radwaste Recovery Sample Tanks)	P Each Batch	P Each Batch	Principal Gamma Emitters: <u>except</u> for Ce-144	5.00E-07
			I-131	5.00E-06
				1.00E-06
	P One Batch/M	M	Dissolved and Entrained Gases (Gamma Emitters)	1.00E-05
	P Each Batch	M Composite	H-3	1.00E-05
			Gross Alpha	1.00E-07
	P Each Batch	Q Composite	Sr-89, Sr-90	5.00E-08
			Fe-55	1.00E-06

P = Prior to each radioactive release

M = At least once per 31 days

Q = At least once per 92 days

Table 2F
LIQUID ANNUAL DOSE SUMMARY REPORT

Report for: 2010

Release ID: 10 All Liquid Release Points

Liquid Receptor

=== SITE DOSE LIMIT ANALYSIS =====

Period - Limit	Age Group	Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Qtr 1 - T.Spec Any Organ	ADULT	GILLI	1.61E-06	5.00E+00	3.22E-05
Qtr 1 - T.Spec Total Body	ADULT	TBODY	1.57E-06	1.50E+00	1.04E-04
Qtr 2 - T.Spec Any Organ	ADULT	GILLI	8.43E-08	5.00E+00	1.69E-06
Qtr 2 - T.Spec Total Body	ADULT	TBODY	6.97E-08	1.50E+00	4.65E-06
Qtr 3 - T.Spec Any Organ	ADULT	GILLI	1.65E-05	5.00E+00	3.30E-04
Qtr 3 - T.Spec Total Body	ADULT	TBODY	1.06E-05	1.50E+00	7.07E-04
Qtr 4 - T.Spec Any Organ	ADULT	GILLI	7.96E-07	5.00E+00	1.59E-05
Qtr 4 - T.Spec Total Body	ADULT	TBODY	7.67E-07	1.50E+00	5.11E-05
2010 - T.Spec Any Organ	ADULT	GILLI	1.08E-05	1.00E+01	1.08E-04
2010 - T.Spec Total Body	ADULT	TBODY	8.10E-06	3.00E+00	2.70E-04

TABLE 3
Solid Waste and Irradiated Fuel Shipments
Reporting Period from 01/01/10 to 12/31/10

A. Solid Waste Shipped for Burial or Disposal (Not Irradiated Fuel)

<u>1. Type of Waste</u>	<u>Units</u>	<u>12 Month Period</u>	<u>Waste Class</u>	<u>Estimated Error %</u>
Spent Resins, Filter	m3	5.57E+01	A	± 25%
Sludges, Evaporator	Ci	1.71E+02	A	
Bottoms, Etc.	m3	0.00E+00	B	
	Ci	0.00E+00	B	
	m3	2.69E+00	C	
	Ci	9.34E+02	C	
<hr/>				
Dry Compressible Wastes,	m3	2.10E+02	A	± 25%
Contaminated Equipment	Ci	5.24E+01	A	
Etc.				
<hr/>				
Irradiated Components,	m3	0.00E+00		
Control Rods, Etc.	Ci	0.00E+00		
<hr/>				
Other	m3	1.46E+01	A	± 25%
(Water, EHC, Waste Oil, etc.)	Ci	4.03E-02	A	
<hr/>				

Effluent and Waste Disposal Annual Report 2010 Year
 Solid Waste and Irradiated Fuel Shipments
 Reporting Period from 01/01/10 to 12/31/10
 Table 3 (continued)

2. Estimates of Major Nuclides by Waste Stream

Resins, Filters, Evaporator Bottoms, Etc. (Min 1%)			Dry Compressible Wastes, Contaminated Equipment, Etc. (Min 1%)			Other Water, EHC, Waste Oil, Etc. (Min 1%)		
Isotope	% Abundance	Curies	Isotope	% Abundance	Curies	Isotope	% Abundance	Curies
FE-55	77.63	8.58E+02	MN-54	2.161	1.13E-02	MN-54	2.233	9.01E-04
CO-60	12.09	1.34E+02	FE-55	63.907	3.35E-01	FE-55	59.539	2.40E-02
NI-63	2.985	3.30E+01	CO-60	30.997	1.63E-01	CO-60	35.551	1.43E-02
ZN-65	2.82	3.12E+01						
SR-90	2.604	2.88E+01						

No Control Rods, Etc. were shipped in 2010

3. Solid Waste Disposition

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
8	Truck	Energy Solutions (Bear Creek)- Oak Ridge, TN
1	Truck	Energy Solutions (Gallaher)-Oak Ridge, TN
9	Truck	Clive Disposal Facility (Containerized) – Clive, UT
1	Truck	Studsvik Processing Facility LLC – Erwin, TN

B. Irradiated Fuel Shipments Disposition

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
0	N/A	N/A

TABLE 4
ASSUMPTIONS/PARAMETERS FOR DOSES TO
A MEMBER OF THE PUBLIC INSIDE SITE BOUNDARY

MEMBER OF THE PUBLIC	LOCATION	DISTANCE ⁽¹⁾ METERS	SECTOR	DURATION (HR/YEAR) ⁽²⁾
People Entering Site Without Consent	Alligator Bayou	2500	SW	40
National Guard	Activity Center	994	WNW	0 ⁽³⁾
Workers staying onsite	Activity Center Trailer City	994	WNW	2400 ⁽⁴⁾

- (1) The approximate distances from main plant vent exhaust to location.
- (2) Liquid pathways dose is not considered due to the nature of activities that individuals are engaged in.
- (3) National Guard/State Police are being evaluated, if applicable, for dose while stationed on site as members of the public. The adult age group is the only age group considered in this category. No National Guard in 2010.
- (4) Workers began staying at the Activity Center Trailer City beginning April 10, 2007 and have been permitted to stay long term. During refueling outages additional workers were on site for about 60 days. The long term individuals will be the receptors for this pathway. For 2010, this estimate is based on 12 hours per day, 4 days per week for 50 weeks, totaling 2400 hours. The adult age group is the only age group considered for this activity.

TABLE 5
DOSES TO MEMBERS OF THE PUBLIC ON SITE
FROM GASEOUS RELEASES 2010

	<u>Critical Organ Dose Annual (mrem)</u>	<u>Total Body Dose Annual (mrem)</u>	<u>Skin Dose Annual (mrem)</u>	<u>Annual Duration Factor</u>
Alligator Bayou	1.32E-04	1.48E-05	2.80E-04	4.57E-03
Workers staying onsite	1.11E-02	1.85E-02	3.41E-02	2.74E-01

Table 6
2010 Year Meteorological Data - Joint Frequency Tables

RIVER BEND STATION
 JOINT FREQUENCY TABLE
 ALL STABILITY CLASSES

FROM 1/01/10 0:00 TO 3/31/10 23:00

PRIMARY SENSORS - 30 FOOT

WIND SPEED (METERS/SECOND)

WIND DIR	.22-	.51-	.76-	1.1-	1.6-	2.1-	3.1-	5.1-	7.1-	10.1-	13.1-	>18	TOT.
N	12	11	17	26	39	64	58	0	0	0	0	0	227
NNE	14	15	12	29	25	26	3	0	0	0	0	0	124
NE	11	18	9	24	29	30	3	0	0	0	0	0	124
ENE	11	24	22	24	24	40	23	2	0	0	0	0	170
E	8	15	13	17	13	8	0	0	0	0	0	0	74
ESE	2	12	37	34	44	26	3	0	0	0	0	0	158
SE	2	11	15	28	19	47	3	0	0	0	0	0	125
SSE	0	0	5	13	8	45	41	1	0	0	0	0	113
S	1	1	2	11	25	40	25	0	0	0	0	0	105
SSW	2	2	7	5	10	21	16	0	0	0	0	0	63
SW	3	1	9	7	7	11	1	0	0	0	0	0	39
WSW	6	7	9	13	6	27	19	0	0	0	0	0	87
W	8	10	7	17	17	25	34	0	0	0	0	0	118
WNW	12	23	14	31	19	33	56	3	0	0	0	0	191
NW	8	20	11	27	22	41	54	4	1	0	0	0	188
NNW	9	17	12	23	19	57	73	1	0	0	0	0	211
TOTAL	109	187	201	329	326	541	412	11	1	0	0	0	2117

NUMBER OF CALMS: 11

NUMBER OF INVALID HOURS: 32

NUMBER OF VALID HOURS: 2128

TOTAL HOURS FOR THE PERIOD: 2160

RIVER BEND STATION
 JOINT FREQUENCY TABLE
 ALL STABILITY CLASSES

FROM 1/01/10 0:00 TO 3/31/10 23:00

PRIMARY SENSORS - 150 FOOT

WIND SPEED (METERS/SECOND)

WIND	.22-	.51-	.76-	1.1-	1.6-	2.1-	3.1-	5.1-	7.1-	10.1-	13.1-	>18	TOT.
DIR	.50	.75	1.0	1.5	2.0	3.0	5.0	7.0	10.0	13.0	18.0		
N	0	2	2	3	11	65	95	25	0	0	0	0	203
NNE	0	1	4	4	15	64	49	3	0	0	0	0	140
NE	0	1	0	5	7	28	71	10	1	0	0	0	123
ENE	1	1	0	5	5	20	48	23	16	1	0	0	120
E	1	0	2	4	8	20	15	7	5	0	0	0	62
ESE	0	1	0	2	8	21	120	43	1	0	0	0	196
SE	0	2	1	3	5	19	58	9	0	0	0	0	97
SSE	1	0	1	5	5	19	69	21	0	0	0	0	121
S	0	1	2	4	10	28	59	9	0	0	0	0	113
SSW	1	1	1	3	5	14	44	4	0	0	0	0	73
SW	2	0	2	1	13	24	15	1	0	0	0	0	58
WSW	1	0	1	5	7	29	60	7	3	0	0	0	113
W	0	0	2	2	7	49	68	36	4	0	0	0	168
WNW	1	0	3	3	6	39	53	41	10	0	0	0	156
NW	1	0	0	7	10	41	83	31	2	1	0	0	176
NNW	1	0	2	2	10	60	84	47	2	0	0	0	208
TOTAL	10	10	23	58	132	540	991	317	44	2	0	0	2127

NUMBER OF CALMS: 1

NUMBER OF INVALID HOURS: 32

NUMBER OF VALID HOURS: 2128

TOTAL HOURS FOR THE PERIOD: 2160

RIVER BEND STATION
 JOINT FREQUENCY TABLE
 ALL STABILITY CLASSES

FROM 4/01/10 0:00 TO 6/30/10 23:00

PRIMARY SENSORS - 30 FOOT

WIND SPEED (METERS/SECOND)

WIND	.22-	.51-	.76-	1.1-	1.6-	2.1-	3.1-	5.1-	7.1-	10.1-	13.1-	>18	TOT.
DIR	.50	.75	1.0	1.5	2.0	3.0	5.0	7.0	10.0	13.0	18.0		
N	21	17	17	17	11	9	5	0	0	0	0	0	97
NNE	25	10	16	20	10	6	4	0	0	0	0	0	91
NE	23	8	17	19	24	19	0	0	0	0	0	0	110
ENE	16	14	20	21	14	8	0	0	0	0	0	0	93
E	10	13	19	14	5	1	1	0	0	0	0	0	63
ESE	11	12	30	23	9	7	0	0	0	0	0	0	92
SE	6	22	31	88	54	70	11	0	0	0	0	0	282
SSE	4	12	14	59	52	115	128	6	0	0	0	0	390
S	6	10	14	38	66	76	65	2	0	0	0	0	277
SSW	3	6	13	21	32	38	19	0	0	0	0	0	132
SW	4	7	16	17	12	14	3	0	0	0	0	0	73
WSW	5	3	9	13	19	13	1	0	0	0	0	0	63
W	8	18	13	15	19	24	4	0	0	0	0	0	101
WNW	14	18	8	10	12	16	4	0	0	0	0	0	82
NW	23	25	10	15	10	17	20	0	0	0	0	0	120
NNW	17	19	17	11	13	4	11	0	0	0	0	0	92
TOTAL	196	214	264	401	362	437	276	8	0	0	0	0	2158

NUMBER OF CALMS: 26

NUMBER OF INVALID HOURS: 0

NUMBER OF VALID HOURS: 2184

TOTAL HOURS FOR THE PERIOD: 2184

RIVER BEND STATION
 JOINT FREQUENCY TABLE
 ALL STABILITY CLASSES

FROM 4/01/10 0:00 TO 6/30/10 23:00

PRIMARY SENSORS - 150 FOOT

WIND SPEED (METERS/SECOND)

WIND	.22-	.51-	.76-	1.1-	1.6-	2.1-	3.1-	5.1-	7.1-	10.1-	13.1-	>18	TOT.
DIR	.50	.75	1.0	1.5	2.0	3.0	5.0	7.0	10.0	13.0	18.0		
N	2	2	5	8	12	13	17	2	0	0	0	0	61
NNE	0	2	3	9	4	17	13	2	0	0	0	0	50
NE	1	1	5	6	9	51	37	3	1	0	0	0	114
ENE	0	1	1	9	19	37	46	10	0	0	0	0	123
E	1	0	6	19	21	36	20	3	0	0	0	0	106
ESE	0	2	5	16	15	74	130	35	4	0	0	0	281
SE	0	2	3	8	13	60	97	25	1	0	0	0	209
SSE	1	0	5	6	12	68	154	69	5	0	0	0	320
S	1	1	2	6	10	97	135	28	2	0	0	0	282
SSW	0	0	7	12	20	61	43	11	0	0	0	0	154
SW	2	2	4	5	15	46	7	1	0	0	0	0	82
WSW	2	3	6	11	16	49	22	2	0	0	0	0	111
W	1	0	3	10	17	46	13	5	1	0	0	0	96
WNW	0	0	1	9	13	24	10	6	2	0	0	0	65
NW	0	0	6	5	7	20	20	14	1	0	0	0	73
NNW	1	2	5	8	4	24	9	3	1	0	0	0	57
TOTAL	12	18	67	147	207	723	773	219	18	0	0	0	2184

NUMBER OF CALMS: 0

NUMBER OF INVALID HOURS: 0

NUMBER OF VALID HOURS: 2184

TOTAL HOURS FOR THE PERIOD: 2184

RIVER BEND STATION
 JOINT FREQUENCY TABLE
 ALL STABILITY CLASSES

FROM 7/01/10 0:00 TO 9/30/10 23:00

PRIMARY SENSORS - 30 FOOT

WIND SPEED (METERS/SECOND)

WIND	.22-	.51-	.76-	1.1-	1.6-	2.1-	3.1-	5.1-	7.1-	10.1-	13.1-	>18	TOT.
DIR	.50	.75	1.0	1.5	2.0	3.0	5.0	7.0	10.0	13.0	18.0		
N	26	24	25	42	26	29	1	0	0	0	0	0	173
NNE	15	11	19	40	23	19	2	0	0	0	0	0	129
NE	18	16	19	29	28	12	1	0	0	0	0	0	123
ENE	14	17	15	19	15	9	0	0	0	0	0	0	89
E	10	17	17	12	11	3	0	0	0	0	0	0	70
ESE	11	20	10	21	21	10	0	0	0	0	0	0	93
SE	12	22	31	73	63	66	6	0	0	0	0	0	273
SSE	9	10	24	54	56	46	11	1	0	0	0	0	211
S	2	14	13	25	20	33	6	0	0	0	0	0	113
SSW	4	9	16	37	18	16	1	1	0	0	0	0	102
SW	12	7	20	26	26	20	1	0	0	0	0	0	112
WSW	9	17	17	11	19	15	0	0	0	0	0	0	88
W	13	10	17	16	20	24	0	0	0	0	0	0	100
WNW	19	18	19	22	26	26	0	0	0	0	0	0	130
NW	31	28	17	20	17	26	6	0	0	0	0	0	145
NNW	22	26	19	23	18	26	8	0	0	0	0	0	142
TOTAL	227	266	298	470	407	380	43	2	0	0	0	0	2093

NUMBER OF CALMS: 55

NUMBER OF INVALID HOURS: 60

NUMBER OF VALID HOURS: 2148

TOTAL HOURS FOR THE PERIOD: 2208

RIVER BEND STATION
JOINT FREQUENCY TABLE
ALL STABILITY CLASSES

FROM 7/01/10 0:00 TO 9/30/10 23:00

PRIMARY SENSORS - 150 FOOT

WIND SPEED (METERS/SECOND)

WIND	.22-	.51-	.76-	1.1-	1.6-	2.1-	3.1-	5.1-	7.1-	10.1-	13.1-	>18	TOT.
DIR	.50	.75	1.0	1.5	2.0	3.0	5.0	7.0	10.0	13.0	18.0		
N	2	2	1	9	12	33	43	0	0	0	0	0	102
NNE	1	2	5	10	22	48	51	1	0	0	0	0	140
NE	0	2	4	7	19	68	65	3	0	0	0	0	168
ENE	1	0	5	17	29	33	48	6	0	0	0	0	139
E	0	4	1	20	16	35	52	7	0	0	0	0	135
ESE	0	1	4	8	18	78	209	25	2	0	0	0	345
SE	1	1	3	7	15	53	73	5	0	0	0	0	158
SSE	0	1	1	8	22	28	13	3	1	0	0	0	77
S	1	1	3	11	15	53	24	1	0	0	0	0	109
SSW	1	3	1	5	13	58	18	0	1	0	0	0	100
SW	1	1	6	15	31	66	23	0	0	0	0	0	143
WSW	1	1	2	8	28	82	17	0	0	0	0	0	139
W	1	4	2	16	24	81	23	0	0	0	0	0	151
WNW	0	2	1	11	18	31	24	0	0	0	0	0	87
NW	0	1	2	7	15	38	16	4	0	0	0	0	83
NNW	1	0	1	1	9	24	29	4	0	0	0	0	69
TOTAL	11	26	42	160	306	809	728	59	4	0	0	0	2145

NUMBER OF CALMS: 3

NUMBER OF INVALID HOURS: 60

NUMBER OF VALID HOURS: 2148

TOTAL HOURS FOR THE PERIOD: 2208

RIVER BEND STATION
 JOINT FREQUENCY TABLE
 ALL STABILITY CLASSES

FROM 10/01/10 0:00 TO 12/31/10 23:00

PRIMARY SENSORS - 30 FOOT

WIND SPEED (METERS/SECOND)

WIND	.22-	.51-	.76-	1.1-	1.6-	2.1-	3.1-	5.1-	7.1-	10.1-	13.1-	>18	TOT.
DIR	.50	.75	1.0	1.5	2.0	3.0	5.0	7.0	10.0	13.0	18.0		
N	35	26	12	42	44	77	52	1	0	0	0	0	289
NNE	22	9	13	44	38	53	7	0	0	0	0	0	186
NE	23	14	11	25	26	19	0	0	0	0	0	0	118
ENE	22	20	18	27	12	3	1	0	0	0	0	0	103
E	12	15	14	18	4	1	0	0	0	0	0	0	64
ESE	3	11	23	26	17	13	2	0	0	0	0	0	95
SE	6	12	21	49	46	63	4	0	0	0	0	0	201
SSE	2	5	11	22	35	56	50	2	0	0	0	0	183
S	3	5	5	18	33	50	61	1	0	0	0	0	176
SSW	1	2	9	14	10	28	17	3	0	0	0	0	84
SW	1	3	3	12	13	13	8	0	0	0	0	0	53
WSW	7	3	10	11	20	20	0	0	0	0	0	0	71
W	9	9	11	11	21	15	2	0	0	0	0	0	78
WNW	7	24	13	10	14	12	9	0	0	0	0	0	89
NW	13	35	17	12	12	25	32	7	1	0	0	0	154
NNW	16	36	19	23	16	51	64	1	0	0	0	0	226
TOTAL	182	229	210	364	361	499	309	15	1	0	0	0	2170

NUMBER OF CALMS: 38

NUMBER OF INVALID HOURS: 0

NUMBER OF VALID HOURS: 2208

TOTAL HOURS FOR THE PERIOD: 2208

RIVER BEND STATION
 JOINT FREQUENCY TABLE
 ALL STABILITY CLASSES

FROM 10/01/10 0:00 TO 12/31/10 23:00

PRIMARY SENSORS - 150 FOOT

WIND SPEED (METERS/SECOND)

WIND DIR	.22-	.51-	.76-	1.1-	1.6-	2.1-	3.1-	5.1-	7.1-	10.1-	13.1-	>18	TOT.
N	0	0	2	2	9	41	131	28	1	0	0	0	214
NNE	0	0	0	7	6	73	134	6	0	0	0	0	226
NE	1	1	1	5	13	35	68	6	1	0	0	0	131
ENE	0	0	0	8	8	29	30	5	0	0	0	0	80
E	0	1	0	3	13	36	16	10	1	0	0	0	80
ESE	0	0	1	1	5	29	128	24	1	0	0	0	189
SE	0	0	0	2	12	37	101	16	0	0	0	0	168
SSE	0	1	0	6	11	43	96	24	1	0	0	0	182
S	0	0	1	3	10	45	84	36	1	0	0	0	180
SSW	0	1	0	4	7	35	44	18	2	0	0	0	111
SW	0	1	1	5	11	37	22	7	0	0	0	0	84
WSW	0	2	0	7	16	46	20	0	0	0	0	0	91
W	0	1	2	9	21	54	20	4	0	0	0	0	111
WNW	0	0	2	4	14	28	23	12	3	0	0	0	86
NW	0	0	0	2	5	23	53	17	9	0	0	0	109
NNW	0	1	3	5	7	29	89	29	1	0	0	0	164
TOTAL	1	9	13	73	168	620	1059	242	21	0	0	0	2206

NUMBER OF CALMS: 2

NUMBER OF INVALID HOURS: 0

NUMBER OF VALID HOURS: 2208

TOTAL HOURS FOR THE PERIOD: 2208

Table 7
ATMOSPHERIC DISPERSION AND DEPOSITION RATES FOR
THE MAXIMUM INDIVIDUAL DOSE CALCULATIONS

Analysis	Location (meters)	Ground Level Releases	Mixed Mode Releases
Gamma air dose (3) and Beta Air Dose	994 m WNW (Containment)	CHI/Q - 421.0	CHI/Q - 33.1
Maximum Receptor (4)	994 m WNW	CHI/Q - 421.0	CHI/Q - 33.1
Resident		D/Q - 50.3	D/Q - 18.0
Garden			
Meat animal Immersion			
Milk animal (5)	7,000 m WNW	CHI/Q - 3.58 D/Q - 0.38	CHI/Q - .870 D/Q - .223
Other on-site Receptors	115 m ENE	CHI/Q - 5977.0 D/Q - 529.7	CHI/Q - 407.5 D/Q - 46.9
	275 m N	CHI/Q - 1644.0 D/Q - 345.6	CHI/Q - 169.1 D/Q - 68.4
	2500 SW	CHI/Q - 34.45 D/Q - 3.35	CHI/Q - 4.65 D/Q - 1.40

Notes:

(1) All CHI/Q = 10^{-7} sec/m³

(2) All D/Q = 10^{-9} m⁻²

(3) Maximum offsite location (property boundary) with highest CHI/Q (unoccupied).

(4) Maximum hypothetical occupied offsite location with highest CHI/Q and D/Q.

(5) No milk animal within 5 miles radius, hypothetical location in worst sector.

(6) Other onsite receptors

(7) Revisions to X/Q and D/Q can be performed using NUREG/CR-2929, XOQDOQ, Computer Program for the Meteorological Evaluation of Routine Effluent Releases at Nuclear Power Stations

Table 8
Groundwater Monitoring Well Sample Results

H-3

LLD (pCi/l)			3000
LAB ID	LOCATION	DATE	TRITIUM
20100141	MW-20	2/24/2010	< 564
20100143	MW-19	2/24/2010	< 566
20100145	Mw-17	2/24/2010	< 564
20100147	MW-11	2/24/2010	< 562
20100149	MW-15	2/24/2010	< 565
20100152	MW-21	2/24/2010	< 564
20100154	MW-16	2/24/2010	< 566
20100156	MW-03	2/24/2010	< 562
20100157	MW-03D	2/24/2010	< 564
20100159	MW-18	2/24/2010	< 561
20100161	MW-14	2/25/2010	< 603
20100163	MW-01	2/25/2010	< 604
20100165	MW-05	2/25/2010	< 595
20100167	MW-12	2/25/2010	< 600
20100169	MW-08	2/25/2010	< 591
20100172	MW-02	2/25/2010	< 603
20100173	MW-02D	2/25/2010	< 602
20100175	MW-13	2/25/2010	< 601
20100177	MW-07	2/25/2010	< 603
20100179	MW-04	2/25/2010	< 589
20100181	MW-10	2/25/2010	< 600
20100183	MW-09	2/25/2010	< 600
20100488	MW-20	5/12/2010	< 529

LLD (pCi/l)			3000
LAB ID	LOCATION	DATE	TRITIUM
20100490	MW-16	5/12/2010	< 528
20100492	MW-03	5/12/2010	< 534
20100493	MW-03D	5/12/2010	< 533
20100495	MW-05	5/12/2010	< 527
20100497	MW-15D	5/12/2010	< 530
20100499	MW-15	5/12/2010	< 528
20100500	MW-08	5/13/2010	< 530
20100502	MW-19	5/13/2010	< 526
20100511	MW-21	5/13/2010	< 521
20100513	MW-17	5/13/2010	< 520
20100515	MW-18	5/13/2010	< 523
20100517	MW-12	5/13/2010	< 519
20100519	MW-14	5/13/2010	< 528
20100523	MW-11	5/13/2010	< 525
20100524	MW-02	5/13/2010	< 523
20100525	MW-01	5/13/2010	< 523
20100530	MW-07	5/14/2010	< 519
20100531	MW-13	5/14/2010	< 521
20100532	MW-10	5/14/2010	< 524
20100533	MW-04	5/14/2010	< 524
20100537	MW-09	5/14/2010	< 526
20101098	MW-21	8/24/2010	< 383
20101099	MW-19	8/24/2010	< 397
20101100	MW-16	8/24/2010	< 386

LLD (pCi/l)			3000
LAB ID	LOCATION	DATE	TRITIUM
20101101	MW-20	8/24/2010	< 437
20101102	MW-17	8/24/2010	< 369
20101103	MW-03	8/24/2010	< 404
20101104	MW-03D	8/24/2010	< 412
20101105	MW-11	8/24/2010	< 432
20101106	MW-05	8/24/2010	< 451
20101107	MW-18	8/25/2010	< 585
20101108	MW-15	8/25/2010	< 419
20101109	MW-12	8/25/2010	< 408
20101110	MW-8	8/25/2010	< 401
20101111	MW-14	8/25/2010	< 402
20101112	MW-09	8/25/2010	< 419
20101113	MW-04D	8/25/2010	< 453
20101114	MW-02	8/25/2010	< 463
20101115	MW-01	8/25/2010	< 432
20101116	MW-04	8/25/2010	< 430
20101117	MW-10	8/25/2010	< 445
20101124	MW-13	8/25/2010	< 499
20101125	MW-07	8/25/2010	< 477
20101571	MW-02	12/6/2010	< 405
20101572	MW-04	12/7/2010	< 401
20101573	MW-10	12/7/2010	< 402
20101574	MW-08	12/6/2010	< 404
20101575	MW-19	12/7/2010	< 403

LLD (pCi/l)**3000**

LAB ID	LOCATION	DATE	TRITIUM
20101576	MW-18	12/7/2010	< 438
20101577	MW-99	12/7/2010	< 403

GROUND MONITORING WELL SAMPLES (GAMMA)

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
20100141	MW-20	2/24/2010	< 13.21	< 9.64	< 18.31	< 9.64	< 21.63	< 9.01	< 13.06	< 10.95	< 10.99	< 8.34	< 40.43	< 12.22
20100143	MW-19	2/24/2010	< 11.94	< 7.65	< 22.65	< 8.72	< 27.43	< 12.07	< 18.12	< 12.81	< 13.01	< 12.29	< 43.32	< 9.69
20100145	MW-17	2/24/2010	< 8.56	< 7.96	< 13.06	< 5.98	< 22.43	< 10.01	< 14.58	< 9.26	< 8.06	< 9.40	< 27.77	< 11.41
20100147	MW-11	2/24/2010	< 12.55	< 7.35	< 15.26	< 6.31	< 16.16	< 8.66	< 16.91	< 7.73	< 9.91	< 11.99	< 27.47	< 14.67
20100149	MW-15	2/24/2010	< 8.57	< 6.46	< 13.05	< 9.46	< 12.95	< 6.27	< 13.22	< 10.15	< 10.52	< 8.08	< 34.34	< 7.48
20100152	MW-21	2/24/2010	< 9.55	< 11.18	< 15.57	< 8.83	< 27.30	< 11.92	< 16.72	< 11.14	< 12.63	< 9.44	< 32.12	< 11.48
20100154	MW-16	2/24/2010	< 8.74	< 4.99	< 12.17	< 8.67	< 14.53	< 8.37	< 14.60	< 8.40	< 10.61	< 9.11	< 34.77	< 13.42
20100156	MW-03	2/24/2010	< 10.90	< 8.96	< 25.44	< 9.55	< 20.03	< 11.67	< 11.93	< 11.54	< 11.99	< 10.20	< 39.81	< 14.49
20100157	MW-03D	2/24/2010	< 10.51	< 9.11	< 16.69	< 9.95	< 18.06	< 9.24	< 9.62	< 9.62	< 8.77	< 7.72	< 33.57	< 10.57
20100159	MW-18	2/24/2010	< 9.80	< 6.22	< 17.20	< 8.85	< 19.95	< 8.91	< 18.04	< 10.53	< 10.81	< 8.00	< 46.69	< 9.41
20100161	MW-14	2/25/2010	< 7.56	< 6.24	< 16.33	< 5.82	< 13.96	< 7.82	< 12.19	< 13.38	< 9.38	< 7.24	< 33.51	< 9.14

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
20100163	MW-01	2/25/2010	< 11.13	< 8.10	< 12.91	< 9.97	< 21.19	< 11.95	< 14.61	< 8.73	< 9.44	< 11.00	< 30.16	< 10.71
20100165	MW-05	2/25/2010	< 5.85	< 8.56	< 18.62	< 9.27	< 20.06	< 10.81	< 15.21	< 14.55	< 9.11	< 7.77	< 47.98	< 7.98
20100167	MW-12	2/25/2010	< 8.36	< 9.83	< 15.61	< 10.08	< 28.33	< 11.67	< 14.09	< 12.45	< 10.77	< 9.59	< 38.14	< 14.93
20100169	MW-08	2/25/2010	< 9.75	< 6.35	< 18.95	< 10.00	< 20.25	< 12.36	< 13.97	< 14.87	< 9.56	< 9.58	< 36.92	< 12.28
20100172	MW-02	2/25/2010	< 9.77	< 11.15	< 19.20	< 6.77	< 18.68	< 13.31	< 15.28	< 14.86	< 12.28	< 9.97	< 42.03	< 14.99
20100173	MW-02D	2/25/2010	< 8.56	< 8.21	< 19.56	< 6.48	< 18.77	< 8.37	< 12.41	< 13.37	< 7.40	< 7.63	< 29.84	< 14.92
20100175	MW-13	2/25/2010	< 11.87	< 8.01	< 20.57	< 10.72	< 21.37	< 10.65	< 16.52	< 14.12	< 12.00	< 10.57	< 38.66	< 14.84
20100177	MW-07	2/25/2010	< 7.46	< 8.06	< 15.06	< 5.98	< 18.07	< 8.91	< 15.09	< 13.57	< 10.38	< 9.06	< 30.56	13.92
20100179	MW-04	2/25/2010	< 10.44	< 7.80	< 16.62	< 8.20	< 19.69	< 9.72	< 12.70	< 11.79	< 10.39	< 9.15	< 33.78	< 14.56
20100181	MW-10	2/25/2010	< 12.25	< 5.89	< 12.25	< 7.19	< 23.13	< 8.84	< 16.92	< 14.03	< 12.79	< 10.75	< 52.37	< 12.91
20100183	MW-09	2/25/2010	< 7.07	< 6.70	< 17.04	< 6.34	< 17.97	< 10.66	< 12.71	< 14.74	< 10.43	< 7.80	< 35.62	< 13.60
20100488	MW-20	5/12/2010	< 13.32	< 9.28	< 18.86	< 10.35	< 23.50	< 8.82	< 16.77	< 10.54	< 12.88	< 12.29	< 25.59	< 14.73

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
20100490	MW-16	5/12/2010	< 7.24	< 10.24	< 17.56	< 8.61	< 15.17	< 10.95	< 14.04	< 11.44	< 8.97	< 10.53	< 37.44	< 12.88
20100492	MW-03	5/12/2010	< 10.45	< 9.75	< 17.85	< 10.14	< 23.94	< 9.96	< 19.09	< 12.28	< 11.10	< 13.64	< 32.15	< 13.72
20100493	MW-03D	5/12/2010	< 9.70	< 6.47	< 21.07	< 8.34	< 17.09	< 11.04	< 15.56	< 9.36	< 7.59	< 10.16	< 32.93	< 9.07
20100495	MW-05	5/12/2010	< 8.23	< 14.12	< 22.05	< 8.50	< 13.48	< 11.44	< 14.04	< 10.02	< 9.00	< 11.78	< 26.93	< 12.09
20100497	MW-15D	5/12/2010	< 7.05	< 8.79	< 14.45	< 8.13	< 17.79	< 10.42	< 15.68	< 10.10	< 5.31	< 9.17	< 21.59	< 14.24
20100499	MW-15	5/12/2010	< 7.71	< 7.41	< 11.26	< 10.01	< 18.31	< 8.77	< 12.24	< 8.77	< 9.38	< 7.90	< 34.56	< 10.43
20100500	MW-08	5/13/2010	< 10.22	< 11.34	< 17.98	< 11.13	< 25.21	< 11.39	< 17.88	< 11.20	< 9.01	< 14.59	< 35.82	< 13.97
20100502	MW-19	5/13/2010	< 9.64	< 6.51	< 5.40	< 10.81	< 18.46	< 9.93	< 15.03	< 9.09	< 9.45	< 8.27	< 31.09	< 14.26
20100511	MW-21	5/13/2010	< 9.30	< 11.26	< 16.94	< 8.50	< 25.49	< 8.04	< 15.34	< 8.99	< 12.10	< 8.25	< 33.38	< 11.93
20100513	MW-17	5/13/2010	< 10.34	< 6.31	< 14.46	< 9.60	< 20.46	< 12.05	< 16.91	< 10.65	< 11.41	< 9.45	< 39.29	< 13.45
20100515	MW-18	5/13/2010	< 10.50	< 7.19	< 16.35	< 13.34	< 17.67	< 12.94	< 17.24	< 12.55	< 11.50	< 9.17	< 50.03	< 11.78
20100517	MW-12	5/13/2010	< 12.25	< 9.13	< 18.39	< 8.01	< 25.44	< 9.84	< 16.38	< 9.76	< 10.60	< 11.02	< 37.93	< 8.78

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
20100519	MW-14	5/13/2010	< 10.66	< 11.87	< 15.17	< 6.65	< 15.30	< 9.73	< 14.33	< 11.73	< 11.10	< 12.76	< 34.84	< 13.45
20100523	MW-11	5/13/2010	< 7.32	< 6.21	< 16.85	< 5.43	< 20.77	< 12.34	< 12.52	< 12.49	< 10.70	< 9.47	< 42.55	< 6.48
20100524	MW-02	5/13/2010	< 10.08	< 8.63	< 14.95	< 6.18	< 21.51	< 7.45	< 17.35	< 13.42	< 10.37	< 8.67	< 42.63	< 14.72
20100525	MW-01	5/13/2010	< 10.82	< 8.95	< 15.62	< 9.74	< 23.83	< 8.72	< 15.62	< 10.09	< 8.46	< 8.12	< 37.68	< 12.20
20100530	MW-07	5/14/2010	< 10.23	< 9.92	< 13.28	< 9.97	< 25.52	< 9.14	< 16.55	< 11.37	< 9.71	< 8.65	< 24.59	< 13.87
20100531	MW-13	5/14/2010	< 10.18	< 9.46	< 16.44	< 5.99	< 19.59	< 6.62	< 13.61	< 9.13	< 9.31	< 8.87	< 29.26	< 13.28
20100532	MW-10	5/14/2010	< 10.88	< 8.58	< 12.13	< 9.96	< 23.96	< 11.21	< 14.25	< 14.52	< 11.20	< 9.17	< 37.27	< 13.25
20100533	MW-04	5/14/2010	< 14.50	< 10.09	< 14.12	< 10.90	< 18.15	< 7.57	< 18.99	< 13.52	< 11.65	< 12.56	< 36.99	< 7.35
20100537	MW-09	5/14/2010	< 14.23	< 9.77	< 16.18	< 9.05	< 18.76	< 13.60	< 18.25	< 13.15	< 11.53	< 9.93	< 44.32	< 10.73
20101098	MW-21	8/24/2010	< 10.15	< 12.02	< 15.30	< 8.44	< 12.39	< 9.14	< 10.34	< 12.07	< 11.62	< 10.28	< 47.84	< 12.95
20101099	MW-19	8/24/2010	< 12.00	< 9.28	< 11.32	< 6.30	< 17.80	< 8.26	< 17.71	< 9.91	< 11.46	< 9.33	< 28.85	< 5.31
20101100	MW-16	8/24/2010	< 11.18	< 10.23	< 15.60	< 7.63	< 19.11	< 8.18	< 16.89	< 10.67	< 9.05	< 11.50	< 35.29	< 13.06

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
20101101	MW-20	8/24/2010	< 9.94	< 10.85	< 25.54	< 7.39	< 24.79	< 8.53	< 19.13	< 12.48	< 11.33	< 7.68	< 34.31	< 11.30
20101102	MW-17	8/24/2010	< 8.46	< 11.19	< 14.05	< 10.59	< 19.23	< 10.69	< 14.78	< 9.23	< 11.03	< 10.52	< 40.16	< 14.03
20101103	MW-03	8/24/2010	< 6.77	< 8.62	< 14.29	< 11.13	< 25.70	< 14.04	< 19.40	< 10.17	< 9.60	< 12.84	< 27.08	< 9.93
20101104	MW-03D	8/24/2010	< 8.25	< 7.44	< 10.77	< 8.45	< 16.94	< 7.13	< 14.40	< 8.38	< 8.68	< 8.68	< 29.58	< 11.48
20101105	MW-11	8/24/2010	< 10.26	< 8.29	< 13.45	< 8.46	< 16.25	< 10.72	< 19.06	< 10.28	< 7.68	< 10.68	< 36.46	< 14.63
20101106	MW-05	8/24/2010	< 8.24	< 11.97	< 17.51	< 10.10	< 14.94	< 8.66	< 17.80	< 9.42	< 11.91	< 8.33	< 26.98	< 14.12
20101107	MW-18	8/25/2010	< 8.16	< 7.15	< 12.91	< 9.39	< 19.19	< 7.82	< 10.89	< 8.25	< 8.50	< 9.33	< 26.75	< 8.36
20101108	MW-15	8/25/2010	< 11.44	< 10.98	< 21.00	< 11.26	< 21.32	< 10.46	< 20.65	< 12.19	< 12.82	< 9.17	< 40.52	< 10.01
20101109	MW-12	8/25/2010	< 8.71	< 9.75	< 17.39	< 7.23	< 17.09	< 10.86	< 14.11	< 11.56	< 9.85	< 12.35	< 41.17	< 10.78
20101110	MW-8	8/25/2010	< 12.61	< 10.27	< 26.53	< 8.68	< 21.27	< 9.20	< 17.02	< 9.65	< 9.57	< 13.75	< 35.68	< 14.43
20101111	MW-14	8/25/2010	< 10.58	< 8.09	< 18.00	< 9.39	< 16.00	< 9.40	< 16.90	< 9.46	< 9.03	< 7.52	< 28.99	< 8.78
20101112	MW-09	8/25/2010	< 9.71	< 6.91	< 18.38	< 13.26	< 19.58	< 11.71	< 17.03	< 10.93	< 11.00	< 13.77	< 43.29	< 9.58
20101113	MW-04D	8/25/2010	< 10.09	< 9.57	< 17.98	< 7.87	< 26.95	< 11.88	< 21.51	< 11.21	< 10.14	< 11.58	< 38.44	< 13.23

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
20101114	MW-02	8/25/2010	< 9.31	< 8.27	< 13.25	< 7.12	< 9.95	< 8.86	< 16.34	< 10.39	< 10.57	< 10.66	< 34.58	< 14.26
20101115	MW-01	8/25/2010	< 14.42	< 12.23	< 24.79	< 8.72	< 26.71	< 12.33	< 16.94	< 10.84	< 14.48	< 11.45	< 36.12	< 14.07
20101116	MW-04	8/25/2010	< 9.83	< 7.14	< 13.70	< 8.57	< 16.48	< 10.74	< 19.77	< 10.69	< 8.88	< 8.56	< 38.66	< 10.12
20101117	MW-10	8/25/2010	< 10.16	< 8.40	< 19.37	< 6.37	< 14.71	< 11.21	< 17.76	< 9.50	< 11.32	< 8.05	< 29.74	< 10.54
20101124	MW-13	8/25/2010	< 8.38	< 9.66	< 15.52	< 9.20	< 22.35	< 10.05	< 17.85	< 8.81	< 10.07	< 10.55	< 31.91	< 13.91
20101125	MW-07	8/25/2010	< 11.81	< 6.89	< 23.57	< 7.23	< 21.09	< 8.37	< 12.84	< 9.54	< 13.06	< 11.74	< 31.54	< 12.44
20101571	MW-02	12/6/2010	< 8.88	< 6.14	< 13.37	< 7.54	< 13.46	< 6.75	< 11.18	< 12.56	< 7.26	< 9.02	< 36.78	< 14.89
20101572	MW-04	12/7/2010	< 5.02	< 6.86	< 12.47	< 5.45	< 12.53	< 6.57	< 10.75	< 14.17	< 6.27	< 5.74	< 35.17	< 14.69
20101573	MW-10	12/7/2010	< 8.14	< 6.77	< 14.48	< 8.02	< 13.83	< 10.44	< 15.87	< 14.58	< 7.79	< 9.54	< 43.59	< 13.73
20101574	MW-08	12/6/2010	< 5.73	< 5.89	< 10.73	< 4.62	< 11.39	< 5.05	< 8.94	< 14.90	< 5.90	< 5.49	< 38.08	< 11.28
20101575	MW-19	12/7/2010	< 8.86	< 6.09	< 13.20	< 7.54	< 13.43	< 6.65	< 11.09	< 11.73	< 7.26	< 9.02	< 35.24	< 14.27

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
20101576	MW-18	12/7/2010	< 5.11	< 6.28	< 11.53	< 5.34	< 11.00	< 7.09	< 9.14	< 14.53	< 4.36	< 5.91	< 40.07	< 11.59
20101577	MW-99	12/7/2010	< 5.29	< 5.14	< 12.75	< 5.04	< 11.91	< 5.18	< 8.74	< 14.95	< 4.88	< 4.89	< 33.49	< 11.67

D – Duplicate (ex: MW-20D)

MW – Monitoring Well