RIVER BEND STATION, UNIT 1

SEMIANNUAL RADIOACTIVE

EFFLUENT RELEASE REPORT

REPORT PERIOD: January 1, 1986 to June 30, 1986

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SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

FACILITY: River Bend Station, Unit 1

LICENSEE: Gulf States Utilities

REPORT PERIOD: January 1, 1986 to June 30, 1986

I. INTRODUCTION

This Semiannual Radioactive Effluent Release Report for the period of January 1, 1986 through June 30, 1986, is submitted in accordance with Technical Specification 6.9.1.8 of Appendix A to River Bend Station (RBS) License Number NPF-47.

II. SUPPLEMENTAL INFORMATION

A. Regulatory Limits

1. 10CFR20 Limits

a. Fission and Activation Gases

In accordance with Technical Specification 3.11.2.1, the dose rate due to noble gases released in gaseous effluents from the site to areas at and beyond the SITE BOUNDARY shall be limited to less than or equal to 500 mrems/yr to the total body and less than or equal to 3000 mrems/yr to the skin:

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

$$= 3.15 \times 10^7 \sum_{i=1}^{n} K_i \ \overline{(X/Q)} \ \dot{Q}_i \leq 500 \text{ mrems/yr}$$

and

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

$$= 3.15 \times 10^7 \sum_{i=1}^{n} (L_i + 1.1M_i)\overline{(X/Q)} \ \dot{Q}_i \leq 3000 \text{ mrems/yr}$$

(above terms defined in RBS ODCM).

b. Radioiodines and Particulates

In accordance with Technical Specification 3.11.2.1, the dose rate due to iodine-131, iodine-133, 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 mrems/yr to any organ:

$DR_{I\&8DP\tau}$ = Dose rate to the organ τ for the age group of interest from iodines, tritium, and 8 day particulates via the inhalation pathway in mrems/yr

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

(above terms defined in RBS ODCM)

c. Liquid Effluents

In accordance with Technical Specification 3.11.1.1, the concentration of radioactive material released in liquid effluents to UNRESTRICTED AREAS shall be limited to the concentrations specified in 10CFR20, Appendix B, Table II, Column 2 for radionuclides other than dissolved and entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2×10^{-4} microcuries/ml total activity.

2. 10CFR50, Appendix I Limits

a. Fission and Activation Gases

In accordance with Technical Specification 3.11.2.2, the air dose due to noble gases released in gaseous effluents to areas at or beyond the SITE BOUNDARY shall be limited to:

$D_{Gamma\text{-}Air}$ = The gamma air dose from radioactive noble gases in mrad

$$= \sum_{i=1}^{n} M_i \, (\overline{X/Q}) \, Q_i \leq 5 \text{ mrads/qtr}$$
$$\leq 10 \text{ mrads/yr}$$

$D_{Beta\text{-}Air}$ = Beta air dose from radioactive noble gases in mrad

$$= \sum_{i=1}^{n} N_i \, (\overline{X/Q}) \, Q_i \leq 10 \text{ mrads/qtr}$$
$$\leq 20 \text{ mrads/yr}$$

(above terms defined in RBS ODCM)

b. Radioiodines and Particulates

In accordance with Technical Specification 3.11.2.3, the dose to a MEMBER OF THE PUBLIC from iodine-131, iodine-133, and all radionuclides in particulate form with half-lives greater than 8 days, in gaseous effluents releases to areas at and beyond the SITE BOUNDARY shall be limited to:

$D_{I\&8DP\tau}$ = Dose in mrem to the organ (τ) of a specified age group from radioiodines, tritium, and 8 day particulates via the pathway of interest.

$$= 3.17 \times 10^{-8} \sum_{i=1}^{n} R_{i\tau} \overline{(X/Q)}_D Q_i$$

and/or

$$= 3.17 \times 10^{-8} \sum_{i=1}^{n} R_{i\tau} \overline{(D/Q)} Q_i$$

and

D_τ = Dose in mrem to the organ (τ) of a specified age group from radioiodines, tritium, and 8 day particulates from all pathways

$$= \sum_{z=1}^{n} D_{I\&8DP\tau} \quad \begin{array}{l} \leq 7.5 \text{ mrems/qtr} \\ \leq 15 \text{ mrems/yr} \end{array}$$

(above terms defined in RBS ODCM)

c. Liquid Effluents

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

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

where: $D_{TOTAL\tau} = \sum_{i=1}^{n} (D_{\tau a})_i$

and $D_{\tau a} = \sum_{i=1}^{n} D_{i\tau} = \sum_{i=1}^{n} \dfrac{A_{i\tau} \Delta t_1 Q_{i1}}{(DF)_1 D_w}$

and D_{TOTAL} $\leq$ 1.5 mrems/qtr
Total Body

$\leq$ 3 mrems/yr

D_{TOTAL} $\leq$ 5 mrems/qtr
ANY ORGAN

$\leq$ 10 mrems/yr

(above terms defined in RBS ODCM)

3. 40CFR190 Limits

In accordance with Technical Specification 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:

$\leq$ 25 mrems to the total body or any organ (except the thyroid)

$\leq$ 75 mrems to the thyroid

4. Miscellaneous Limits

a. Ventilation Exhaust Treatment System
In accordance with Technical Specification 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 at and beyond the SITE BOUNDARY would exceed 0.3 mrem to any organ in a 31 day period.

b. Liquid Radwaste Treatment System
In accordance with Technical Specification 3.11.1.3, the liquid radwaste treatment system shall be used to reduce the radioactive materials in liquid wastes 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. Maximum Permissible Concentrations

1. Gaseous Releases

The RBS Radiological Effluents Technical Specifications (RETS) for gaseous releases are based on the dose rate restrictions of 10CFR20, rather than the Maximum Permissible Concentrations (MPC) listed in 10CFR20 Appendix B, Table II, Column 1.

2. Liquid Releases

The Maximum Permissible Concentration of radioactive materials in liquid effluents is limited by 10CFR20, Appendix B, Table II, Column 2. The MPC chosen is the most conservative value (i.e., the lowest) of either the soluble or insoluble MPC for each radionuclide.

C. Average Energy

Not applicable to RBS RETS

D. Measurements and Approximations of Total Radioactivity

1. Gaseous Effluents

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 utilizing high resolution germanium detectors coupled to computerized pulse height analyzers. The sampling and analysis frequencies are described in Table 1. Sampling and analysis of these effluent streams provide noble gas radionuclide relative abundances which 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. A Xe-135 correlation factor (laboratory analysis derived sample activity concentration - monitor response in uCi/cc) of 0.136 was used for determining the total amount of noble gas activity released in the month of June. Prior to June, a correlation factor of 1.0 was used. If no activity was detected in the stack sample, the nuclide relative abundances of the last sample which indicated the presence of activity was utilized to obtain nuclide specific activities.

b. Particulates and Iodines

Particulates and iodines are continuously sampled from each of the three release points utilizing 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 1. Analysis is performed to identify and quantify radionuclides utilizing high resolution germanium detectors coupled to computerized pulse height analyzers. Given the nuclide specific activity concentrations, process flow rate, and time which the sample covered; 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. Sr-89 and Sr-90 are quantitatively analyzed by counting the digested filter precipitate with a gas flow proportional counter. Gross alpha analysis is performed using a zinc sulfide scintillation counter.

c. Tritium

Tritium grab samples are obtained from the three release points at the specified frequencies listed in Table 1 utilizing an acetone/water ice bath condensation collection method. The collected sample is then analyzed utilizing 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.

2. Liquid Effluents

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 2. Analysis for gamma emitting nuclides (including dissolved and entrained noble gases) is performed utilizing a high resolution germanium detector coupled to a computerized pulse height analyzer. Tritium concentration is determined utilizing a Liquid Scintillation Counter. Sr-89 and Sr-90 are quantitatively analyzed by counting the precipitate with a gas flow proportional counter. Fe-55 is counted with a Liquid Scintillation Counter after digestion of the iron. Gross alpha analysis is performed using a zinc sulfide scintillation counter.

Given the nuclide specific activity concentration and total volume of the tank that was released, the activity of each nuclide released to the environment can be determined.

E. Batch Releases

1. Liquid

1st Quarter 1986

a.	Number of batch releases	:	181
b.	Total time period for batch releases	:	1041.98 hr
c.	Maximum time period for batch releases	:	8.17 hr
d.	Average time period for batch releases	:	5.76 hr
e.	Minimum time period for a batch release	:	2.18 hr
f.	Average stream flow during periods of release of effluent into a flowing stream	:	536,000 ft^3/sec

2nd Quarter 1986

a.	Number of batch releases	:	192
b.	Total time period for batch releases	:	1139.10 hr
c.	Maximum time period for batch releases	:	10.86 hr
d.	Average time period for batch releases	:	5.93 hr
e.	Minimum time period for a batch release	:	2.46 hr
f.	Average stream flow during periods of release of effluent into a flowing stream	:	558,000 ft^3/sec

2. Gaseous

Primary Containment/Drywell purges are considered gaseous batch releases. Purges are directed through the Main Plant Exhaust Duct prior to release to the environment and are therefore monitored by the Main Plant Exhaust Duct stack monitor. For purposes of this report, a purge is in effect only when purge inlet valves *AOV-128 and *AOV-166, and purge outlet valves *AOV-165 and *AOV-123 are open. Containment venting (i.e., for pressure reduction) is not considered a release due to the short time duration of each venting period and limited motive force of the release. Due to logistical considerations, all releases through the Main Plant Exhaust Duct for the duration of the purge are considered as part of the batch.

1st Quarter 1986

a.	Number of batch releases	:	25
b.	Total time period for batch releases	:	76.4 hr
c.	Maximum time period for a batch release	:	22.8 hr
d.	Average time period for batch releases	:	3.1 hr
e.	Minimum time period for a batch release	:	0.15 hr

2nd Quarter 1986

a.	Number of batch releases	:	31
b.	Total time period for batch releases	:	42.3 hr
c.	Maximum time period for a batch release	:	6.3 hr
d.	Average time period for batch releases	:	1.36 hr
e.	Minimum time period for a batch releases	:	0.08 hr

F. Abnormal Releases

1. Liquid

1st Quarter 1986

a. Number of releases : 1
b. Total activity releases : 1.21E-3 Curies

2nd Quarter 1986

a. Number of releases : 0
b. Total activity released : 0 Curies

On January 14, 1986 at 1624 hrs, radioactive liquid discharge no. 86-0044 was initiated without the radwaste liquid effluent monitor (1RMS-RE107) sample pump being started. At 2150 hours the radwaste operator terminated the release and observed that the sample pump was not running. The entire contents of recovery sample tank 1LWS-TK4A had been discharged without the required radiation monitor which provides an automatic termination of the release at a preset activity concentration HIGH ALARM limit. Samples taken before the incident indicated the presence of only tritium. No gamma-emitting radionuclides were detected in samples taken before and after the discharge. A total of 1210.11 uCi of tritium was discharged to the environment during this unmonitored release. An investigation proved that the sample pump was never started due to procedural inadequacies and miscommunication between operators.

All discharges were terminated until the required procedure changes and training were conducted. These changes require the operators to initial the permit indicating initiation of sample pump operation and to physically verify the operation of the pump. In addition, a modification request was initiated to provide automatic closure of discharge isolation valve 1LWS-AOV257 in the event of a low sample flow rate signal from the 1RMS-RE107 monitor.

There were no safety and health consequences to the public as a result of this event as indicated by samples taken before and after the discharge.

2. Gaseous

1st Quarter 1986

a. Number of releases : 0
b. Total activity releases : 0 Curies

2nd Quarter 1986

a. Number of releases : 1
b. Total activity released : 1.92E-05 Curies

On April 2, 1986, it was discovered that air was exiting the Main Steam Tunnel blow out panels on top of the Auxiliary Building roof (170' elevation). Since this flow of air represented a possible pathway for unmonitored radioactive releases, air samplers were positioned in front of these panels. On April 15, analysis of air samples indicated the presence of radioactive material in the air exiting the panels. It is estimated that approximately 19 uCi of particulate ($T_{1/2}$>8 days) and radioiodine activity were released from the blow out panels from 4/2/86 through 6/30/86. These releases coincided with reactor power levels of at least 50 percent or greater. No activity was detected in air samples when the unit was shut down. A Modification Request was initiated on 6/6/86 to prevent further releases. The field work for this Modification Request is scheduled to be completed by 9/1/86.

G. Estimate of Total Error

1. Liquid

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

Fission and Activation Products :	± 14.2%
Tritium :	± 14.2%
Dissolved and Entrained Noble Gases :	± 14.2%
Gross Alpha Radioactivity :	± 14.2%

2. Gaseous

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

Fission and Activation Gases :	± 37.0%
Iodines :	± 18.6%
Particulates :	± 18.6%
Tritium :	± 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:

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

where:

E_T = total error

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

III. GASEOUS EFFLUENTS SUMMARY INFORMATION

Refer to Tables 3, 4 and 5 for Summation of All Releases and Nuclides Released, respectively. It should be noted that an entry of "0.00E+00" Ci or uCi/sec in this section does not indicate the absence of a radionuclide; but, rather, indicates that the concentration of the particular radionuclide was below the Lower Limit of Detection (LLD) as listed in Table 1.

IV. LIQUID EFFLUENTS SUMMARY INFORMATION

Refer to Table 6 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 does not indicate the absence of a radionuclide; but, rather, indicates that the concentration of the particular radionuclide was below the Lower Limit of Detection (LLD) as listed in Table 2.

V. SOLID WASTE

Refer to Table 7

VI. RADIOLOGICAL IMPACT ON MAN

This information will be provided in the end-of-year report as described in Technical Specification 6.9.1.8.

VII. METEOROLOGICAL DATA

This information will be provided in the end-of-year report as described in Technical Specification 6.9.1.8.

VIII. RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION OPERABILITY

The minimum number of channels required to be OPERABLE as described in Table 3.3.7.10-1 of Technical Specification 3.3.7.10 were, if inoperable at any time in the period January 1, 1986 through June 30, 1986, restored to operable status within the required time. Reporting of these inoperable channels in this report is, therefore, not required.

IX. RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION OPERABILITY

The minimum number of channels required to be OPERABLE as described in Table 3.3.7.11-1 of Technical Specification 3.3.7.11 were, if inoperable at any time in the period January 1, 1986 through June 30, 1986, restored to operable status within the required time. Reporting of these inoperable channels in this report is, therefore, not required.

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, 1986 through June 30, 1986 was 1.67E-04 Curies, which is less than the 10 Curie limit as required by Technical Specification 3.11.1.4

XI. RADIOLOGICAL ENVIRONMENTAL MONITORING

There were no changes in sampling locations for the Radiological Environmental Monitoring Program (REMP) during the reporting period January 1, 1986 through June 30, 1986.

XII. LAND USE CENSUS

This information will be presented in the end-of-year report. The Land Use Census results will be available in September 1986.

XIII. OFFSITE DOSE CALCULATION MANUAL (ODCM)

No changes were made to the RBS ODCM, Revision 3 for the period January 1, 1986 through June 30, 1986.

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

There were no licensee-initiated major changes made to the radioactive liquid, gaseous, and solid waste treatment systems for the period of January 1, 1986 through June 30, 1986.

XV. PROCESS CONTROL PROGRAM (PCP)

No changes were made to the RBS Process Control Program (PCP) for the period January 1, 1986 through June 30, 1986.

TABLE 1

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	$1x10^{-4}$
			H-3	$1x10^{-6}$
B. Fuel Building Ventilation Exhaust Duct	M Grab Sample	M	Principal Gamma Emitters	$1x10^{-4}$
			H-3	$1x10^{-6}$
C. Radwaste Building Ventilation Exhaust Duct	M Grab Sample	M	Principal Gamma Emitters	$1x10^{-4}$
D. All Release Types as listed in A,B, C above.	Continuous	W Charcoal Sample	I-131	$1x10^{-12}$
			I-133	$1x10^{-10}$
	Continuous	W Particulate Sample	Principal Gamma Emitters (I-131, Others)	$1x10^{-11}$
	Continuous	M Composite Particulate Sample	Gross Alpha	$1x10^{-11}$
	Continuous	Q Composite Particulate Sample	SR-89, SR-90	$1x10^{-11}$

W = At least once per 7 days
M = At least once per 31 days
Q = At least once per 92 days

TABLE 2

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; except for Ce-144	$5x10^{-7}$ $5x10^{-6}$
			I-131	$1x10^{-6}$
	P One Batch/M	M	Dissolved and Entrained Gases (Gamma Emitters)	$1x10^{-5}$
	P Each Batch	M Composite	H-3	$1x10^{-5}$
			Gross Alpha	$1x10^{-7}$
	P Each Batch	Q Composite	Sr-89, Sr-90	$5x10^{-8}$
			Fe-55	$1x10^{-6}$

P = Prior to each radioactive release
M = At least once per 31 days
Q = At least once per 92 days

TABLE 3

Effluent and Waste Disposal Semi-Annual Report 1986 Year
Gaseous Effluents - Summation of All Releases 1/2 Quarters

	Unit	Quarter 1	Quarter 2	Est. Total Error, %
A. Noble Gases				
1. Total release	Ci	2.52E+02	8.65E+01	3.70E+01
2. Average release rate for period	uCi/sec	3.24E+01	1.10E+01	
3. Percent of technical specification limit (1)	%	3.58E+00	5.74E-01	
B. Iodines				
1. Total I-131 and I-133	I-131 Ci	0.00E+00	0.00E+00	1.86E+01
	I-133 Ci	0.00E+00	2.59E-06	1.86E+01
2. Average release rate for period	I-131 uCi/sec	0.00E+00	0.00E+00	
	I-133	0.00E+00	3.30E-07	
3. I-131 + I-133 contribution percent of technical specification limit (2)	%	0.00E+00	7.35E-04	
C. Particulates				
1. Particulates with half-lives of > 8 days	Ci	1.95E-06	1.29E-05	1.86E+01
2. Average release rate for period	uCi/sec	2.51E-07	1.64E-06	
3. Percent of technical specification limit (2)	%	6.55E-04	2.99E-05	
4. Gross alpha radioactivity	Ci	0.00E+00	0.00E+00	

	Unit	Quarter 1	Quarter 2	Est. Total Error, %

D. Tritium

1. Total release	Ci	1.09E-01	1.65E-01	1.82E+01
2. Average release rate for period	uCi/sec	1.40E-02	2.09E-02	
3. Percent of technical specification limit (2)	%	2.95E-03	1.57E-03	

(1) Gamma airdose limit of 5 mrads/qtr (T.S.3.11.2.2.a).

(2) Organ dose limit (from radioiodines, 8 day particulates, and tritium) of 7.5 mrems/qtr (T.S.3.11.2.3.a). It should be noted that the Quarter 2 particulates percent of technical specification limit is calculated for only Mn-54. The percent of the technical specification dose limit for particulate radionuclides other than Mn-54 will be provided in a supplemental report.

TABLE 4

Effluent and Waste Disposal Semi-Annual Report 1986 **Year**
Gaseous Effluents - Conditionally Elevated Releases 1/2 **Quarters**

		Continuous Mode		Batch Mode	
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 1	Quarter 2
1. Fission Gases					
Argon-41	Ci	1.42E+02	1.76E+01	4.60E+00	7.83E-02
Krypton-85m	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Krypton-85	Ci	0.00E+00	0.00E+00	0.00E+00	2.60E-02
Krypton-87	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Krypton-88	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Xenon-133m	Ci	0.00E+00	5.18E+00	0.00E+00	1.22E-01
Xenon-133	Ci	0.00E+00	0.00E+00	0.00E+00	1.03E-04
Xenon-135m	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Xenon-135	Ci	4.78E+01	5.70E+01	2.73E+00	2.64E+00
Xenon-137	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Xenon-138	Ci	5.42E+01	3.70E+00	7.42E-01	1.44E-02
unidentified	Ci	N/A	N/A	N/A	N/A
Total for period	Ci	2.44E+02	8.35E+01	8.07E+00	2.88E+00
2. Gaseous Iodines					
Iodine-131	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Iodine-132	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Iodine-133	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Iodine-134	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Iodine-135	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Nuclides Released	Unit	Continuous Mode Quarter 1	Continuous Mode Quarter 2	Batch Mode Quarter 1	Batch Mode Quarter 2
3. Particulates					
Strontium-89	Ci	1.88E-06	(1)	6.56E-08	(1)
Strontium-90	Ci	0.00E+00	(1)	0.00E+00	(1)
Cesium-134	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cesium-137	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Barium-lanthanum-140	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cobalt-60	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium-51	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zirconium-niobium-95	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc-65	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Iron-59	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese-54	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Iodine-131	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cerium-141	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cerium-144	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cobalt-57	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Silver-110m	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Molybdenum-99	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
unidentified	Ci	N/A	N/A	N/A	N/A
Total for period	Ci	1.88E-06	(1)	6.56E-08	(1)

		Continuous Mode		Batch Mode	
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 1	Quarter 2
4.0 Tritium					
Hydrogen-3	Ci	5.96E-02	1.49E-01	3.12E-03	4.20E-03

(1) Not available for submission at this time, supplemental report to follow.

Main Plant Exhaust Duct is considered a conditionally elevated release point.

TABLE 5

Effluent and Waste Disposal Semi-Annual Report 1986 Year
Gaseous Effluents - Ground Level Releases 1/2 Quarters

		Continuous Mode		Batch Mode	
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 1	Quarter 2
1. Fission Gases					
Argon-41	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Krypton-85m	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Krypton-85	Ci	0.00E+00	0.00E+00	0.00E+00	1.18E-04
Krypton-87	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Krypton-88	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Xenon-133m	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Xenon-133	Ci	0.00E+00	0.00E+00	0.00E+00	1.16E-04
Xenon-135m	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Xenon-135	Ci	0.00E+00	1.17E-01	0.00E+00	0.00E+00
Xenon-137	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Xenon-138	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
unidentified	Ci	N/A	N/A	N/A	N/A
Total for period	Ci	0.00E+00	1.17E-01	0.00E+00	2.34E-04
2. Gaseous Iodines					
Iodine-131	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Iodine-132	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Iodine-133	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Iodine-134	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Iodine-135	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00

		Continuous Mode		Batch Mode	
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 1	Quarter 2

3. Particulates

Strontium-89	Ci	0.00E+00	(1)	0.00E+00	(1)
Strontium-90	Ci	0.00E+00	(1)	0.00E+00	(1)
Cesium-134	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cesium-137	Ci	0.00E+00	0.00E+00	0+00E+00	0.00E+00
Barium-lanthanum-140	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cobalt-60	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium-51	Ci	0.00E+00	1.16E-05	0.00E+00	0.00E+00
Zirconium-niobium-95	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc-65	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Iron-59	Ci	0.00E+00	1.34E-07	0.00E+00	0.00E+00
Manganese-54	Ci	0.00E+00	7.94E-07	0.00E+00	0.00E+00
Iodine-131	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Iodine-132	Ci	0.00E+00	3.65E-06	0.00E+00	0.00E+00
Iodine-133	Ci	0.00E+00	2.59E-06	0.00E+00	0.00E+00
Cerium-141	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cerium-144	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cobalt-57	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Silver-110m	Ci	0.00E+00	3.70E-07	0.00E+00	0.00E+00
Molybdenum-99	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00
unidentified	Ci	N/A	N/A	N/A	N/A
Total for period	Ci	0.00E+00	(1)	0.00E+00	(1)

		Continuous Mode		Batch Mode	
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 1	Quarter 2
4.0 Tritium					
Hydrogen-3	Ci	4.59E-02	1.13E-02	0.00E+00	0.00E+00

(1) Not available for submission at this time, suppemental report to follow.

Fuel Building Exhaust Vent and Radwaste Building Exhaust Vent are considered ground level release points.

TABLE 6

Effluent and Waste Disposal Semi-Annual Report 1986 Year
Liquid Effluents - Summation of All Releases

	Unit	Quarter 1	Quarter 2	Est. Total Error, %
A. Fission and activation products				
1. Total release (not including tritium, gases, alpha	Ci	3.59E-04	8.07E-03	1.42E+01
2. Average diluted concentration during period	uCi/ml	5.20E-10	1.44E-08	
3. Percent of applicable limit (1)	%	2.87E-02	6.46E-01	
B. Tritium				
1. Total release	Ci	6.03E-01	1.79E+00	1.42E+01
2. Average diluted concentration during period	uCi/ml	8.73E-07	3.20E-06	
3. Percent of applicable limit (2)	%	2.91E-02	1.07E-1	
C. Dissolved and entrained gases				
1. Total release	Ci	1.43E-03	4.74E-03	1.42E+01
2. Average diluted concentration during period	uCi/ml	2.07E-09	8.48E-09	
3. Percent of applicable limit (3)	%	1.04E-03	4.24E-03	

	Unit	Quarter 1	Quarter 2	Est. Total Error, %
D. Gross alpha radioactivity				
1. Total release	Ci	0.00E+00	0.00E+00	1.42E+01
E. Volume of waste released (prior to dilution)	liters	1.05E+07	1.11E+07	8.73E-01
F. Volume of dilution water used during period	liters	6.80E+08	5.48E+08	5.70E-01

(1) One quarter of 5 Ci annual limit (1.25 Ci) for liquid releases except for tritium and dissolved or entrained noble gases from 10CFR50 Appendix I.

(2) 10CFR20, Appendix B, Table II, Column 2 MPC limit of 3.00E-03 uCi/ml.

(3) Technical Specification 3.11.1.1 limit of 2.0E-04 uCi/ml for dissolved or entrained noble gases in liquid effluents.

Effluent and Waste Disposal Semi-Annual Report 1986 Year
G. Liquid Effluents 1/2 Quarters

		Continuous Mode		Batch Mode	
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 1	Quarter 2
Hydrogen-3	Ci	N/A	N/A	6.03E-01	1.79E+00
Arsenic-76	Ci	N/A	N/A	0.00E+00	4.59E-04
Strontium-89	Ci	N/A	N/A	0.00E+00	(1)
Strontium-90	Ci	N/A	N/A	0.00E+00	(1)
Cesium-134	Ci	N/A	N/A	0.00E+00	0.00E+00
Cesium-137	Ci	N/A	N/A	0.00E+00	0.00E+00
Iodine-131	Ci	N/A	N/A	0.00E+00	0.00E+00
Iodine-132	Ci	N/A	N/A	0.00E+00	0.00E+00
Iodine-133	Ci	N/A	N/A	0.00E+00	0.00E+00
Iodine-134	Ci	N/A	N/A	0.00E+00	0.00E+00
Iodine-135	Ci	N/A	N/A	0.00E+00	0.00E+00
Sodium-24	Ci	N/A	N/A	0.00E+00	8.11E-05
Cobalt-58	Ci	N/A	N/A	0.00E+00	8.51E-04
Cobalt-60	Ci	N/A	N/A	0.00E+00	1.07E-04
Iron-55	Ci	N/A	N/A	0.00E+00	(1)
Iron-59	Ci	N/A	N/A	0.00E+00	2.46E-04
Zinc-65	Ci	N/A	N/A	0.00E+00	0.00E+00
Manganese-54	Ci	N/A	N/A	0.00E+00	1.06E-04
Manganese-56	Ci	N/A	N/A	2.43E-04	7.84E-04
Chromium-51	Ci	N/A	N/A	1.16E-04	5.38E-03
Zirconium-niobium-95	Ci	N/A	N/A	0.00E+00	1.35E-05
Molybdenum-99	Ci	N/A	N/A	0.00E+00	2.11E-05
Technicium-99m	Ci	N/A	N/A	0.00E+00	2.21E-05

		Continuous Mode		Batch Mode	
Nuclides Released	Unit 1	Quarter 3	Quarter 4	Quarter 3	Quarter 4
Barium-lanthanum-140	Ci	N/A	N/A	0.00E+00	0.00E+00
Cerium-141	Ci	N/A	N/A	0.00E+00	0.00E+00
Cerium-144	Ci	N/A	N/A	0.00E+00	0.00E+00
Total for period	Ci	N/A	N/A	6.03E-01	1.80E+00

H. Dissolved and Entrained Gases

		Continuous Mode		Batch Mode	
Nuclides Released	Unit	Quarter 1	Quarter 2	Quarter 1	Quarter 2
Argon 41	Ci	N/A	N/A	0.00E+00	0.00E+00
Krypton-85m	Ci	N/A	N/A	0.00E+00	2.17E-05
Krypton-85	Ci	N/A	N/A	0.00E+00	0.00E+00
Krypton-87	Ci	N/A	N/A	0.00E+00	0.00E+00
Krypton-88	Ci	N/A	N/A	0.00E+00	3.40E-05
Xenon-133m	Ci	N/A	N/A	0.00E+00	0.00E+00
Xenon-133	Ci	N/A	N/A	8.03E-04	2.36E-03
Xenon-135m	Ci	N/A	N/A	0.00E+00	0.00E+00
Xenon-135	Ci	N/A	N/A	6.25E-04	2.31E-03
Xenon-137	Ci	N/A	N/A	0.00E+00	0.00E+00
Xenon-138	Ci	N/A	N/A	0.00E+00	1.13E-05
unidentified	Ci	N/A	N/A	N/A	N/A
Total for period	Ci	N/A	N/A	1.43E-03	4.74E-03

(1) Not available at this time, supplemental report to follow.

TABLE 7

Effluent and Waste Disposal Semiannual Report 1986 Year

Solid Waste and Irradiated Fuel Shipments
Reporting Period 01/01/86 to 06/30/86 Qtr 1/2

A. Solid Waste Shipped for Burial or Disposal (Not irradiated fuel)

1. Type of waste	Unit	6-month Period	Waste Class	Est. Total Error, %
a. Spent resins, filter sludges evaporator bottoms, etc.	m^3	2.06E+02	A	
	Ci	1.98E+00		2.24E+01
b. Dry compressible waste, contaminated equip, etc.	m^3	0.00E+00	N/A	
	Ci	0.00E+00		0.00E+00
c. Irradiated components, control rods, etc.	m^3	0.00E+00	N/A	
	Ci	0.00E+00		0.00E+00
d. Other (None)	m^3	0.00E+00	N/A	
	Ci	0.00E+00		0.00E+00

2.

TYPE OF WASTE	Spent Resins, filter sludges, evaporator bottoms, etc.		Dry compressible waste, contaminated equip, etc.	Irradiated Components control rods, etc.	Other (None)
Principle Radionuclides (Identify and % Abundance)	H-3	5.88E+00	N/A	N/A	N/A
	C-14	8.20E-02			
	Na-24	4.09E-08			
	Cr-51	2.47E+01			
	Mn-54	2.51E+01			
	Co-57	3.97E-03			
	Co-58	2.72E+01			
	Fe-59	6.38E+00			
	Co-60	6.13E+00			
	Ni-63	1.21E-01			
	Cu-64	7.37E-03			
	Zn-65	2.92E+00			
	As-76	3.28E-02			
	Nb-95	3.20E-01			
	Zr-95	4.42E-01			
	Mo-99	4.14E-02			
	Ag-110m	3.10E-03			
	Sn-113	4.86E-03			
	Sb-122	3.33E-02			
	Sb-124	2.78E-01			
	I-131	1.87E-02			
	Te-131m	1.77E-04			
	Te-132	1.98E-04			
	Ba-140	1.94E-01			
	La-140	1.02E-02			
	Ce-141	5.00E-04			
	Ce-144	2.80E-02			
	W-187	2.22E-02			
	Np-239	7.79E-04			
	Cm-242	1.10E-04			
	TRU	2.24E-04			

TYPE OF WASTE	Spent Resins, filter sludges, evaporator bottoms, etc.	Dry compressible waste, contaminated equip, etc.	Irradiated Components control rods, etc.	Other (None)
Above Determined by: A. measurement B. estimation C. measurement and correlation	C	N/A	N/A	N/A
TYPE OF CONTAINER	Strong, Tight Liners	N/A	N/A	N/A
SOLIDIFICATION AGENT OR ABSORBANT	Cement	N/A	N/A	N/A

3. SOLID WASTE DISPOSITION

Number of Shipments	Mode of Transportation	Destination
18	Truck, Exclusive Use	CNSI, Barnwell, South Carolina

B. IRRADIATED FUEL SHIPMENTS (Disposition)

Number of Shipments	Mode of Transportation	Destination
0	N/A	N/A

GULF STATES UTILITIES COMPANY

RIVER BEND STATION POST OFFICE BOX 220 ST. FRANCISVILLE, LOUISIANA 70775

AREA CODE 504 635-6094 346-8651

RECEIVED SEP - 8 1986

August 28, 1986
RBG- 24299
File Nos. G9.5, G9.25.1.5

Mr. Robert D. Martin, Regional Administrator
U.S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011

Dear Mr. Martin:

River Bend Station - Unit 1
Docket No. 50-458

Enclosed is the Semiannual Radioactive Effluent Release Report for the period of January 1 to June 30, 1986. This report is submitted in accordance with Technical Specification 6.9.1.8 of Appendix A to River Bend Station (RBS) License Number NPF-47.

Sincerely,

J. E. Booker

J. E. Booker
Manager-Engineering
Nuclear Fuels & Licensing
River Bend Nuclear Group

JEB/ERG/JWC/je

Enclosure

86-1011

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