October 26, 1987

Docket No. 50-458

Mr. James C. Deddens
Senior Vice President, (RBNG)
Gulf States Utilities
P. O. Box 220
St. Francisville, LA 70775
ATTN: Nuclear Licensing

DISTRIBUTION

Docket File	OGC-Bethesda	ARM/LFMB
NRC PDR	DHagan	GPA/PA
LPDR	EJordan	Plant File
PD4 Rdg.	JPartlow	
FSchroeder	TBarnhart (4)	
JCalvo	Wanda Jones	
WPaulson	EButcher	
PNoonan (3)	ACRS (10)	

Dear Mr. Deddens:

SUBJECT: RIVER BEND STATION, UNIT 1, AMENDMENT NO. 13 TO FACILITY OPERATING LICENSE NO. NPF-47 (TAC NO. 65880)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 13 to Facility Operating License No. NPF-47 for the River Bend Station, Unit 1. The amendment consists of changes to the Technical Specifications (TSs) in response to your application dated August 24, 1987.

This amendment modifies the standby liquid control system TSs because of system modifications required to meet the rule on anticipated transients without scram, 10 CFR 50.62.

A copy of our Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

The staff's evaluation of your conformance to the requirements of 10 CFR 50.62 regarding alternate rod insertion and reactor recirculation pump trip will be the subject of a separate safety evaluation.

Sincerely,

Walter A. Paulson, Project Manager
Project Directorate - IV
Division of Reactor Projects - III,
IV, V and Special Projects
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 13
to License No. NPF-47
2. Safety Evaluation

cc w/enclosures:
See next page

LTR NAME: RIVER BEND AMENDMENT 10/6/87

PD4/LA	PD4/PM	OGC-Bethesda	PD#4/D
PNoonan	WPaulson:		JCalvo
10/ /87	10/6 /87	10/9 /87	10/26/87

STATE + SECY may check before issuance. Hold issuance until comment period expires

8712080434 871026
PDR ADOCK 05000458
P PDR

cc:
Troy B. Conner, Jr., Esq.
Conner and Wetterhahn
1747 Pennsylvania Avenue, NW
Washington, D.C. 20006

Mr. Eddie Grant
Director - Nuclear Licensing
Gulf States Utilities Company
P. O. Box 220
St. Francisville, LA 70775

Richard M. Troy, Jr., Esq.
Assistant Attorney General in Charge
State of Louisiana Department of Justice
234 Loyola Avenue
New Orleans, Louisiana 70112

Resident Inspector
P. O. Box 1051
St. Francisville, Louisiana 70775

Gretchen R. Rothschild
Louisianians for Safe Energy, Inc.
1659 Glenmore Avenue
Baton Rouge, Louisiana 70775

Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
Office of Executive Director
for Operations
611 Ryan Plaza Drive, Suite 1000
Arlington, Texas 76011

Philip G. Harris
Cajun Electric Power Coop. Inc.
10719 Airline Highway
P. O. Box 15540
Baton Rouge, LA 70895

Mr. J. E. Booker
Manager-River Bend Oversight
P. O. Box 2951
Beaumont, TX 77704

Mr. William H. Spell, Administrator
Nuclear Energy Division
Office of Environmental Affairs
P. O. Box 14690
Baton Rouge, Louisiana 70898

Mr. J. David McNeill, III
William G. Davis, Esq.
Department of Justice
Attorney General's Office
7434 Perkins Road
Baton Rouge, Louisiana 70808

H. Anne Plettinger
3456 Villa Rose Drive
Baton Rouge, Louisiana 70806

President of West Feliciana
Police Jury
P. O. Box 1921
St. Francisville, Louisiana 70775

Mr. Frank J. Uddo
Uddo & Porter
6305 Elysian Fields Avenue
Suite 400
New Orleans, Louisiana 70122

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

GULF STATES UTILITIES COMPANY

DOCKET NO. 50-458

RIVER BEND STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 13
License No. NPF-47

1. The Nuclear Regulatory Commission (the Commission or the NRC) has found that:

   A. The application for amendment filed by Gulf States Utilities Company, dated August 14, 1987, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the regulations of the Commission;

   C. There is reasonable assurance: (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. NPF-47 is hereby amended to read as follows:

   (2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 13 and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. GSU shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

José A. Calvo

Jose A. Calvo, Director
Project Directorate - IV
Division of Reactor Projects - III,
IV, V and Special Projects
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: October 26, 1987

ATTACHMENT TO LICENSE AMENDMENT NO. 13

FACILITY OPERATING LICENSE NO. NPF-47

DOCKET NO. 50-458

Replace the following page of the Appendix "A" Technical Specifications with the enclosed page. The revised page is identified by Amendment number and contains a vertical line indicating the area of change. Overleaf page provided to maintain document completeness.

REMOVE	INSERT
xxii	xxii
3/4 1-19	3/4 1-19
3/4 1-20	3/4/ 1-20
3/4 1-21	-
3/4 1-22	-
B 3/4 1-4	B 3/4 1-4
B 3/4 1-5	B 3/4 1-5

INDEX

ADMINISTRATIVE CONTROLS

LIST OF FIGURES

3/4.1.5 STANDBY LIQUID CONTROL SYSTEM

LIMITING CONDITION FOR OPERATION

3.1.5 Two standby liquid control subsystems shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2 and 5*.

ACTION:

a. In OPERATIONAL CONDITION 1 or 2:

1. With one subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours.

2. With both subsystems inoperable, restore at least one subsystem to OPERABLE status within 8 hours or be in at least HOT SHUTDOWN within the next 12 hours.

b. In OPERATIONAL CONDITION 5*:

1. With one subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 30 days or insert all insertable control rods within the next hour.

2. With both subsystems inoperable, insert all insertable control rods within one hour.

SURVEILLANCE REQUIREMENTS

4.1.5 Each standby liquid control subsystem shall be demonstrated OPERABLE:

a. At least once per 24 hours by verifying that;

1. The temperature of the sodium pentaborate solution is greater than or equal to 45°F.

2. The available volume of sodium pentaborate solution is greater than or equal to the minimum required available volume determined once per 31 days per Specification 4.1.5.b.2.

b. At least once per 31 days by;

1. Verifying the continuity of the explosive charge.

*With any control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.

SURVEILLANCE REQUIREMENTS (Continued)

2. Determining*, that the available weight of Boron-10 is greater than or equal to 143 lbs, the percent weight concentration of sodium pentaborate in solution is equal to or less than 9.5% by weight, and the minimum required solution volume.

3. Verifying that each valve, manual, power operated or automatic, in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

4. Determining that the Standby Liquid Control System satisfies the following equation:

$$(C)(E) \geq 413$$

Where:

C = sodium pentaborate concentration, in weight percent, as determined per specification 4.1.5.b.2.

E = Boron-10 enrichment, in atom percent**.

c. Demonstrating that, when tested pursuant to Specification 4.0.5, the minimum flow requirement of 41.2 gpm per pump at a pressure of greater than or equal to 1220 psig is met.

d. At least once per 18 months during shutdown by;

1. Initiating one of the standby liquid control system loops, including an explosive valve, and verifying that a flow path from the pumps to the reactor pressure vessel is available by pumping demineralized water into the reactor vessel. The replacement charge for the explosive valve shall be from the same manufactured batch as the one fired or from another batch which has been certified by having one of that batch successfully fired. Both injection loops shall be tested in 36 months.

*This test shall also be performed anytime water or boron is added to the solution or when the solution temperature drops below 45°F.

**The Boron-10 enrichment of the solution shall be determined anytime boron is added to the solution.

CONTROL RODS (Continued)

Control rod coupling integrity is required to ensure compliance with the analysis of the rod drop accident in the FSAR. The overtravel position feature provides the only positive means of determining that a rod is properly coupled and, therefore, this check must be performed prior to achieving criticality after completing CORE ALTERATIONS that could have affected the control rod coupling integrity. The subsequent check is performed as a backup to the initial demonstration.

In order to ensure that the control rod patterns can be followed and, therefore, that other parameters are within their limits, the control rod position indication system must be OPERABLE.

The control rod housing support restricts the outward movement of a control rod to less than 3 inches in the event of a housing failure. The amount of rod reactivity which could be added by this small amount of rod withdrawal is less than a normal withdrawal increment and will not contribute to any damage to the primary coolant system. The support is not required when there is no pressure to act as a driving force to rapidly eject a drive housing.

The required surveillance intervals are adequate to determine that the rods are OPERABLE and not so frequent as to cause excessive wear on the system components.

3/4.1.4 ROD PATTERN CONTROL SYSTEM

The rod withdrawal limiter system input power signal originates from the first stage turbine pressure. When operating with the steam bypass valves open, this signal indicates a core power level which is less than the true core power. Consequently, near the low power setpoint and high power setpoint of the rod pattern control system, the potential exists for non-conservative control rod withdrawals. Therefore, when operating at a sufficiently high power level, there is a small probability of violating fuel Safety Limits during a licensing-basis rod withdrawal error transient. To ensure that fuel Safety Limits are not violated, this specification prohibits control rod withdrawal when a biased power signal exists and core power exceeds the specified level.

Control rod withdrawal and insertion sequences are established to assure that the maximum in-sequence individual control rod or control rod segments which are withdrawn at any time during the fuel cycle could not be worth enough to result in a peak fuel enthalpy greater than 280 cal/gm in the event of a control rod drop accident. The specified sequences are characterized by homogeneous, scattered patterns of control rod withdrawal. When THERMAL POWER is greater than 20% of RATED THERMAL POWER, there is no possible rod worth which, if dropped at the design rate of the velocity limiter, could result in a peak enthalpy of 280 cal/gm. Therefore, requiring the RPCS to be OPERABLE, when THERMAL POWER is less than or equal to 20% of RATED THERMAL POWER, provides adequate control.

ROD PATTERN CONTROL SYSTEM (Continued)

The RPCS provides automatic supervision to assure that out-of-sequence rods will not be withdrawn or inserted.

The analysis of the rod drop accident is presented in Section 15.4.9 of the FSAR and the techniques of the analysis are presented in a topical report[1] and two supplements[2, 3].

The RPCS is also designed to automatically prevent fuel damage, during higher power operation, in the event of erroneous rod withdrawal from locations of high power density.

A dual channel system is provided that, above the low power setpoint, restricts the withdrawal distances of all non-peripheral control rods. This restriction is greatest at highest power levels.

3/4.1.5 STANDBY LIQUID CONTROL SYSTEM

The standby liquid control system provides a backup capability for bringing the reactor from full power to a cold, xenon-free shutdown, assuming that the withdrawn control rods remain fixed in the rated power pattern. To meet this objective it is necessary to inject a quantity of Boron-10 which produces a concentration of 122 ppm in the reactor core and other piping systems connected to the reactor vessel. This concentration is increased by 25% to allow for potential leakage and imperfect mixing. The required concentration is achieved by having a minimum available quantity of 143 pounds of Boron-10 contained in the net amount of solution which is above the pump suction, thus allowing for the portion that cannot be injected. The pumping rate of 41.2 gallons per minute (gpm) per pump provides a negative reactivity insertion rate, which adequately compensates for the positive reactivity effects due to temperature and xenon decay during shutdown.

The Standby Liquid Control System is also required to meet the criteria of 10CFR50.62, "Requirements for reduction of risk from Anticipated Transients Without Scram (ATWS) Events For Light-Water-Cooled Nuclear Power Plants" by having the equivalent control capacity of a 66 gpm system using 13 weight percent natural sodium pentaborate. The equivalency requirement is fulfilled by having a system which satisfies the equation given in surveillance requirement 4.1.5.b.4. Each parameter is tested at an interval consistent with the

1. C. J. Paone, R. C. Stirn and J. A. Woolley, "Rod Drop Accident Analysis for Large BWR's," G. E. Topical Report NEDO-10527, March 1972
2. C. J. Paone, R. C. Stirn and R. M. Young, Supplement 1 to NEDO-10527, July 1972
3. J. M. Haun, C. J. Paone and R. C. Stirn, Addendum 2, "Exposed Cores," Supplement 2 to NEDO-10527, January 1973

STANDBY LIQUID CONTROL SYSTEM (Continued)

potential for that parameter to vary and also to assure proper equipment performance where applicable. Enrichment testing is only required when boron addition occurs since change cannot occur by any other process.

With redundant pumps and explosive injection valves and with a highly reliable control rod scram system, operation of the reactor is permitted to continue for short periods of time with the system inoperable or for longer periods of time with one of the redundant components inoperable.

Surveillance requirements are established on a frequency that assures a high reliability of the system. Once the solution is established, Boron-10 concentration will not vary unless more boron or water is added. Therefore, a check on the temperature and volume once each 24 hours assures that the solution is available for use.

Replacement of the explosive charges in the valves at regular intervals will assure that these valves will not fail due to deterioration of the charges.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 13 TO FACILITY OPERATING LICENSE NO. NPF-47

GULF STATES UTILITIES COMPANY

RIVER BEND STATION, UNIT 1

DOCKET NO. 50-458

1.0 INTRODUCTION

By letter dated July 31, 1987, Gulf States Utilities Company (GSU) (the licensee) submitted proposed system modifications to the River Bend Station Unit 1 required to meet the rule on Anticipated Transients Without Scram (ATWS), 10 CFR 50.62. This submittal addressed paragraphs 10 CFR 50.62(c)(3), (c)(4), and (c)(5) which are applicable to boiling water reactors such as River Bend Station, Unit 1. These paragraphs of the rule describe requirements for alternate rod insertion, standby liquid control system, and reactor recirculation pump trip. In addition, by letter dated August 24, 1987, GSU requested an amendment to Facility Operating License No. NPF-47 for River Bend Station, Unit 1. The proposed amendment would modify the River Bend Station Unit 1 Technical Specifications as a result of system modifications regarding the use of boron, enriched in the isotope boron-10 (B-10), in the Standby Liquid Control System (SLCS).

This safety evaluation addresses the licensee's conformance with the requirements for the standby liquid control system and the proposed August 24, 1987 license amendment. The staff's evaluation of alternate rod insertion and reactor recirculation pump trip will be the subject of a separate safety evaluation.

2.0 EVALUATION

The ATWS rule requires that the SLCS be equivalent in control capacity to a system with an 86 gpm injection rate, using 13 weight percent unenriched sodium pentaborate solution, in a system with a 251 inch diameter reactor vessel. The 86 gpm injection rate in a 251 inch diameter vessel plant is equivalent to 66 gpm in a 218 inch diameter vessel. Of the several proposed approaches presented in the General Electric report (Ref. 1) and approved in the NRC evaluation (Ref. 2), GSU has chosen to use enriched (in B-10) boron. Using the calculation methods of Reference 1 results in a minimum concentration of 6.5 weight percent sodium pentaborate when using an enrichment of 65 percent B-10 and a pump flow rate of 41.2 gpm and an equivalent required flow rate of 66 gpm for a 218 inch diameter vessel. The concentration will be limited to a maximum of 9.5 percent by weight. Instead of creating enriched sodium pentaborate by mixing boric acid and borax in water, the solution at River Bend will be prepared by mixing enriched granular sodium pentaborate in water. This is acceptable.

The proposed change to the Technical Specification surveillance requirements have been made to reflect the revised SLCS as follows:

1. The surveillance requirements related to precipitation of sodium pentaborate including heat tracing and tank heaters as well as Figure 3.1.5-1 illustrating saturation temperature have been deleted. Also, the sodium pentaborate concentration in solution is limited to 9.5 weight percent. Since the maximum concentration has been decreased to 9.5 weight percent, precipitation of the sodium pentaborate will not oocur at normal ambient temperatures. The saturation temperature of sodium pentaborate is less than 39° F which is less than the minimum ambient temperature of the SLC tank room and therefore heat tracing is not required and the deletion of the surveillance requirements is acceptable.

2. The solution volume surveillance requirements have been changed and Figure 3.1.5-2 illustrating solution volume/concentration requirements has been deleted. This is acceptable since the minimum volume is determined by calculation once per 31 days as a function of both concentration and enrichment and the available volume of solution is verified to be greater than or equal to this minimum available volume.

3. The available weight of sodium pentaborate has been put in terms of B-10. This is acceptable since B-10 is the isotope which provides reactivity control by neutron absorption.

4. Surveillance requirements have been added to demonstrate compliance with 10 CFR 50.62 by calculations once per 31 days using analyzed concentration and enrichment values. The B-10 enrichment of the solution will be determined anytime boron is added to the solution as this is the only way by which the enrichment would vary. These additions are acceptable to the staff.

The NRC staff concludes that the licensee's proposed design for the SLCS and the associated Technical Specification modifications meet the requirements of 10 CFR 50.62 and are acceptable.

3.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and/or changes to the surveillance requirements. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement nor environmental assessment need be prepared in connection with the issuance of this amendment.

4.0 CONCLUSION

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public. The staff therefore concludes that the proposed changes are acceptable, and they are hereby incorporated into the River Bend Unit 1 Technical Specifications.

Principal Contributors: L. Kopp

Dated: October 26, 1987

5.0 REFERENCES

1. "Anticipated Transients Without Scram, Response to NRC ATWS Rule, 10 CFR 50.62," NEDE-31096-P, General Electric Company, December 1985.

2. "Acceptance for Referencing of Licensing Topical Report NEDE-31096-P, 'Anticipated Transients Without Scram; Response to NRC ATWS Rule, 10 CFR 50.62,'" letter from Gus Lainas to Terry A. Pickens, dated October 21, 1986.