
Safety Evaluation Report

related to the operation of
River Bend Station

Docket No. 50-458

Gulf States Utilities Company
Cajun Electric Power Cooperative

**U.S. Nuclear Regulatory
Commission**

Office of Nuclear Reactor Regulation

October 1984



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NUREG-0989
Supplement No. 1

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ABSTRACT

Supplement No. 1 to the Safety Evaluation Report on the application filed by Gulf States Utilities Company as applicant and for itself and Cajun Electric Power Cooperative, as owners, for a license to operate River Bend Station has been prepared by the Office of Nuclear Reactor Regulation of the U.S. Nuclear Regulatory Commission. The facility is located in West Feliciana Parish, near St. Francisville, Louisiana. This supplement reports the status of certain items that had not been resolved at the time of publication of the Safety Evaluation Report.

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1 INTRODUCTION AND GENERAL DESCRIPTION

1.1 Introduction

In May 1984, the Nuclear Regulatory Commission (NRC) staff issued its Safety Evaluation Report (SER) (NUREG-0989) on the application filed by Gulf States Utilities Company (applicant or GSU), acting on behalf of itself and for Cajun Electric Power Cooperative (CEPCO), for a license to operate the River Bend Station, Docket No. 50-458. At that time, the staff identified items that were not yet resolved with the applicant. The purpose of this supplement to the SER is to provide the staff evaluation of open items that have been resolved, to report on the status of all open items, and to address those recommendations that are contained in the Advisory Committee on Reactor Safeguards (ACRS) letter of July 17, 1984.

At its 291st meeting on July 12, 1984, the ACRS completed its interim review of the application. The Committee, in a July 17, 1984 letter from Chairman Jesse C. Ebersole to NRC Chairman Dr. Nunzio J. Palladino, concluded that if due consideration is given to the items mentioned in its letter and subject to satisfactory completion of construction, staffing, and preoperational testing, River Bend Station can be operated at power levels up to 5% of full power (2894 MWt) without undue risk to the health and safety of the public. The ACRS has not completed its review of hydrogen control for River Bend Station, particularly as it may be impacted by differences in containment design features between River Bend Station and other Mark III boiling water reactors (BWRs) previously reviewed. The Committee will complete its review of the full power operating license when the staff and applicant have made sufficient additional progress in resolving the matter of hydrogen control.

Each of the following sections or appendices is numbered the same as the corresponding SER section or appendix that is being updated. Appendix A is a continuation of the chronology of the staff's actions related to the processing of the River Bend application. Appendix B is a list of references cited in this report.* Appendix D is a list of acronyms used herein, and Appendix E is a list of the principal staff members who contributed to this supplement. Appendix F is a copy of the letter from the Advisory Committee on Reactor Safeguards on River Bend Station, and Appendix G contains the errata to the SER.

Copies of this SER supplement are available for inspection at the NRC Public Document Room at 1717 H Street, N.W., Washington, D.C. and at the Government Documents Department, Louisiana State University, Baton Rouge, Louisiana. Copies are also available for purchase from the sources indicated on the inside front cover.

*Availability of all material cited is described on the inside front cover of this report.

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1.5 Outstanding Issues

The staff identified certain outstanding issues in the SER that had not been resolved with the applicant. The status of these issues is listed in an updated version of Table 1.3 below and discussed further in the sections of this report as indicated. If the staff review is completed for an issue, the item has the notation "closed." The staff will complete its review of these items before the operating license is issued. Resolution of each of these items will be discussed in a supplement to the SER.

1.6 Confirmatory Issues

The staff identified confirmatory issues in its SER that required additional information to confirm preliminary conclusions. The status of these issues is listed in an updated version of Table 1.4 below and discussed further in the sections of this report as indicated. If the staff review is completed for an issue, the item has the notation "closed."

1.7 License Conditions

In Section 1.7 of the SER, the staff identified eight license conditions. These include several issues that must be resolved by the applicant as a condition for issuance of an operating license, and other longer term resolution issues that will be cited in the operating license issued, to ensure that NRC requirements are met during plant operation.

As discussed in Section 4.2.1.1 of this SSER, the applicant has stated that a GE criterion for fuel rod internal pressure is applicable to the River Bend Station initial core. Because the GE criterion for fuel rod internal pressure has been found acceptable by the staff, License Condition (3) is removed.

License Condition (5), "ESF reset control," was incorrectly listed (in SER Table 1.5) and will not be a license condition. This requirement for a preoperational test to demonstrate that all equipment remains in its emergency mode upon removal of the actuating signal and/or resetting of the various isolating or actuation signals will be included under Confirmatory Issue (29), "ESF reset controls."

The current status of License Conditions is in the updated version of Table 1.5 below.

Table 1.3 Listing of outstanding issues

Issue	Status	SER Section(s)
(1) Hydrostatic loading	Closed	2.4.2.2, 2.4.12
(2) Moderate-energy line break	Awaiting information	
(3) High-energy line break	Awaiting information	
(4) Inservice test program (including RCS pressure boundary valve leakage)	Awaiting information	
(5) Equipment qualification	Awaiting information	
(6) Preservice inspection program	Awaiting information	
(7) Containment loads	Awaiting information	
(8) ECCS LOCA analysis (II.K.3.31)	Awaiting information	
(9) Bypassed and inoperable status	Awaiting information	
(10) Emergency diesel generators	Under review	
(11) Submergence of electrical equipment	Awaiting information	
(12) Heavy-load handling system	Awaiting information	
(13) Safe/alternate shutdown	Awaiting information	
(14) Communications systems	Under review	
(15) Lighting systems	Under review	
(16) HPCS diesel generator	Under review	
(17) Fuel oil storage	Under review	
(18) Emergency preparedness	Under review	

Table 1.4 Listing of confirmatory items

Issue	Status	SER Section(s)
(1) West Creek sediment removal	Staff inspection required prior to startup	
(2) Ultimate heat sink	Closed	2.4.J1.2
(3) Slope stability	Under review	
(4) Pipe failure modes and check valve stress analysis	Awaiting information	
(5) Annulus pressurization	Awaiting information	
(6) Minimum wall thickness	Closed	3.9.3
(7) Thermal and anchor displacement loads	Under review	
(8) Fuel rod mechanical fracturing	Awaiting information	
(9) Fuel assembly structural damage	Awaiting information	
(10) Post-irradiation surveillance	Closed	4.2.4.3
(11) LOCTVS/CONTEMPT-LT 28 computer codes	Under review	
(12) Reactor vessel cooldown rate	Awaiting information	
(13) SRV discharge testing	Awaiting information	
(14) Mark III-related issues	Awaiting information	
(15) Containment repressurization	Awaiting information	
(16) Inleakage limit	Closed	6.2.3
(17) ECCS test return line design	Closed	6.2.4.2
(18) Containment purge valves	Awaiting information	
(19) Hydrogen control	Awaiting information	
(20) PVLCS leakage	Awaiting information	
(21) Electrical and instrumentation and control diagrams	Awaiting information	
(22) Routing of circuits and sensors	Under review	

Table 1.4 (Continued)

Issue	Status	SER Section(s)
(23) Instrumentation setpoints	Awaiting information	
(24) RPS power supply protection	Awaiting information	
(25) RPS and ESF channel separation	Staff site visit (October 1984)	
(26) Isolation devices	Awaiting information	
(27) Reactor mode switch	Awaiting information	
(28) ADS actuation	Awaiting information	
(29) ESF reset controls	Awaiting information	
(30) Initiation of ESF support systems	Awaiting information	
(31) Instrumentation and control power bus loss	Awaiting information	
(32) RCIC system	Awaiting information	
(33) SLCS	Awaiting information	
(34) Post-accident monitoring instrumentation	Under review	
(35) Temperature effects on level measurements	Awaiting information	
(36) High/low pressure interlocks	Awaiting information	
(37) EOC-RPT	Awaiting information	
(38) NMS and RCIS isolation	Under review	
(39) Rod pattern control system microprocessors	Under review	
(40) DRMS	Awaiting information	
(41) High-energy line break control system failures	Awaiting information	
(42) Multiple control system failures	Awaiting information	
(43) ERIS	Awaiting information	
(44) LPCS/RHRA pump procedures	Awaiting information	

Table 1.4 (Continued)

Issue	Status	SER Section(s)
(45) EPA/RPS motor generator set interconnection	Awaiting information	
(46) Second level undervoltage protection relay setpoint	Awaiting information	
(47) Verification of test results for station electric distribution system voltage	Awaiting testing and test results	
(48) Safety cable identification	Awaiting staff site visit	
(49) Lighting overcurrent device coordination	Awaiting staff site visit	
(50) Post-accident sampling system	Awaiting information	
(51) Diesel generators	Under review	
(52) TMI Item II.F.1 Attachment 2	Awaiting information	
(53) Spent fuel transfer canal	Closed	12.3.2
(54) TMI Item II.B.2	Awaiting information	
(55) Backup RPM designate	Awaiting information	
(56) Personnel résumés	Awaiting information	
(57) Licensed operator review	Awaiting information	
(58) Offsite fire department training	Awaiting information	
(59) Emergency planning	Under review	
(60) TMI Item I.C.1	Awaiting information	
(61) Initial test program revisions	Under review	
(62) Proper ESF function	Awaiting information	
(63) Safety system operability status	Awaiting information	
(64) QA organization	Closed	17.4

Table 1.5 Listing of license conditions

License condition	SER Section
(1) Oil and gas exploration	2.2.2
(2) Turbine system maintenance program	3.5.1.3.3
(3) Fuel rod internal pressure	Removed SSER 1, 4.2.1.1
(4) Inadequate core cooling (TMI Item II.F.2)	4.4.7
(5) ESF reset control	Included in Confirmatory Issue (29) SSER 1
(6) Post-accident capability (TMI Item II.B.3)	10.4.6
(7) Solid waste process control program	11.4.2
(8) Partial feedwater heating	15.1

2 SITE CHARACTERISTICS

2.4 Hydrologic Engineering

2.4.1 Hydrologic Description

At the time of publication of the SER, only a two-unit plant layout drawing was available and the staff stated that a single-unit layout drawing would be included in a supplement to the SER. Figure 2.1 below shows the single-unit plant layout for River Bend Station.

2.4.2 Floods

2.4.2.2 Effects of Local Intense Precipitation

In the SER, the staff concluded that the applicant had not demonstrated that safety-related facilities were adequately protected against the effects of a local probable maximum precipitation (PMP) event at the site. The staff made this determination based on two factors:

- (1) There is an open excavation, originally intended to be used in the construction of Unit 2. During a local intense rainfall event, rainfall and runoff could enter the excavation and raise the hydrostatic load on structures.
- (2) The applicant used the 6-hour, 10 mi² PMP value from Hydrometeorological Report (HMR) 51 (U.S. National Weather Service, 1978). The staff considers the PMP value from HMR 52 (U.S. National Weather Service, 1982) to be more appropriate for areas down to 1 mi² and likely to increase the calculated flood depths at the site.

In response to this open item, the applicant re-evaluated the effects of runoff from the local PMP using data on a 72-hour storm obtained using information in HMRs 51 and 52.

The applicant determined that flooding as a result of local intense precipitation would not adversely affect safety-related structures, systems, and components. When the Unit 2 excavation is filled in (as the applicant now intends to do since the cancellation of Unit 2 in January 1984), rainfall over the originally intended Unit 2 site will result in runoff into West Creek over the railroad tracks that run adjacent to the creek. The tracks have a top of rail elevation of 95 feet msl, which will limit the depth to which water can pond. The staff concludes that ponding will not exceed the minimum flood protection level of 98 feet msl for safety-related equipment.

Before the Unit 2 excavation is filled, some of the rainfall on the site will fall directly into the open excavation. Runoff from adjacent areas will be prevented from entering the excavation by a 2-foot berm that the applicant has committed to construct and maintain around the excavation. This runoff will be

directed to West Creek, in the same way runoff will flow when the Unit 2 excavation is filled in. Assuming there is no infiltration of water, the applicant calculated a maximum water level in the excavation from incident precipitation of 80 feet msl. A 9-day PMP storm series (72-hour PMP preceded by a 72-hour 1/2 PMP with 72 hours between storms) was used for the calculation. The applicant also assumed that initially there would be 2 feet of water in the excavation (average bottom elevation of 66 feet msl). The staff finds that this combination of storms is in agreement with the guidance in Regulatory Guide (RG) 1.59, Revision 2.

The staff has reviewed the applicant's analysis using the procedures described in Section 2.4.2 of the Standard Review Plan (SRP, NUREG-0800). On the basis of that review and the applicant's commitment to build and maintain a berm around the Unit 2 excavation until this excavation is filled to plant grade, the staff concludes that the plant meets General Design Criterion (GDC 2) (of Appendix A to Part 50 of Title 10 of the Code of Federal Regulations (10 CFR 50)) with respect to local intense precipitation. This resolves Outstanding Issue (1).

2.4.11 Cooling Water Supply

2.4.11.2 Emergency Cooling Water Supply

In the SER, the staff could not conclude that the plant met the requirements of RG 1.27 and GDC 44. The staff had not yet completed its independent analysis of the thermal and hydrologic performance of the emergency cooling water supply.

Since the SER was written, the NRC staff contractor, Argonne National Laboratory (ANL), has completed an analysis of the thermal performance of and evaporative losses from the mechanical draft cooling towers that make up the ultimate heat sink (Dunn and Sullivan, 1984). The analysis by ANL involved modeling the performance of the cooling towers under accident conditions, during the periods of worst case meteorology for the historical record of July 1948 through December 1982. During the postulated accident conditions, it was assumed that only one-half of the fan cells were in operation.

The results of the analysis showed that the maximum temperature in the tower basin was 89.9°F, which is well below the maximum allowable return temperature of 95°F cited by the applicant. The evaporative losses after 30 days of the worst case meteorological conditions for evaporation was a little over 6 million gallons, leaving 443,000 gallons in the basin. On the basis of these results, the staff concludes that the plant meets the requirements of RG 1.27 and GDC 44 with respect to emergency cooling and this item, listed as Confirmatory Issue (2) in SER Table 1.4, is closed.

2.4.12 Groundwater

2.4.12.2 Design-Basis Groundwater Level

In SER Section 2.4.12.2, the staff expressed concern about additional groundwater-induced hydrostatic loading as a result of the open excavation.

In response to this concern, the applicant determined that the maximum water level in the open excavation (that could exert hydrostatic loading on the radwaste building and the adjacent tunnels) would be 80 feet msl. This is the maximum level resulting from a PMP storm series (see Section 2.4.2.2).

The applicant also calculated water levels in the open excavation to be used in combination with seismic events. Although the combination of high water levels and seismic events is not specifically addressed in Appendix A of RG 1.59, this RG does address combinations of floods and seismic events for the evaluation of potential dam failures. The applicant used similar combinations in the evaluation of load combinations. The applicant combined the water level resulting from 1/2 PMP (73 feet msl), with the operating basis earthquake (OBE) and the level resulting from the 25-year precipitation event (68 feet msl), with a safe shutdown earthquake (SSE). The staff agrees that the precipitation events used are appropriate for combination with the seismic events considered. Further, based on its review of the applicant's analysis, the staff concludes that the water levels calculated for the precipitation events are correct.

The applicant also analyzed the groundwater level under and around the excavation, assuming infiltration through the soil. The applicant concluded the rainfall in the open excavation would not result in additional loads to those structures that are not immediately adjacent to the excavation.

The staff has reviewed the applicant's analysis and concludes that it is conservative. The staff further concludes that the plant meets GDC 2 with respect to design-basis groundwater level.

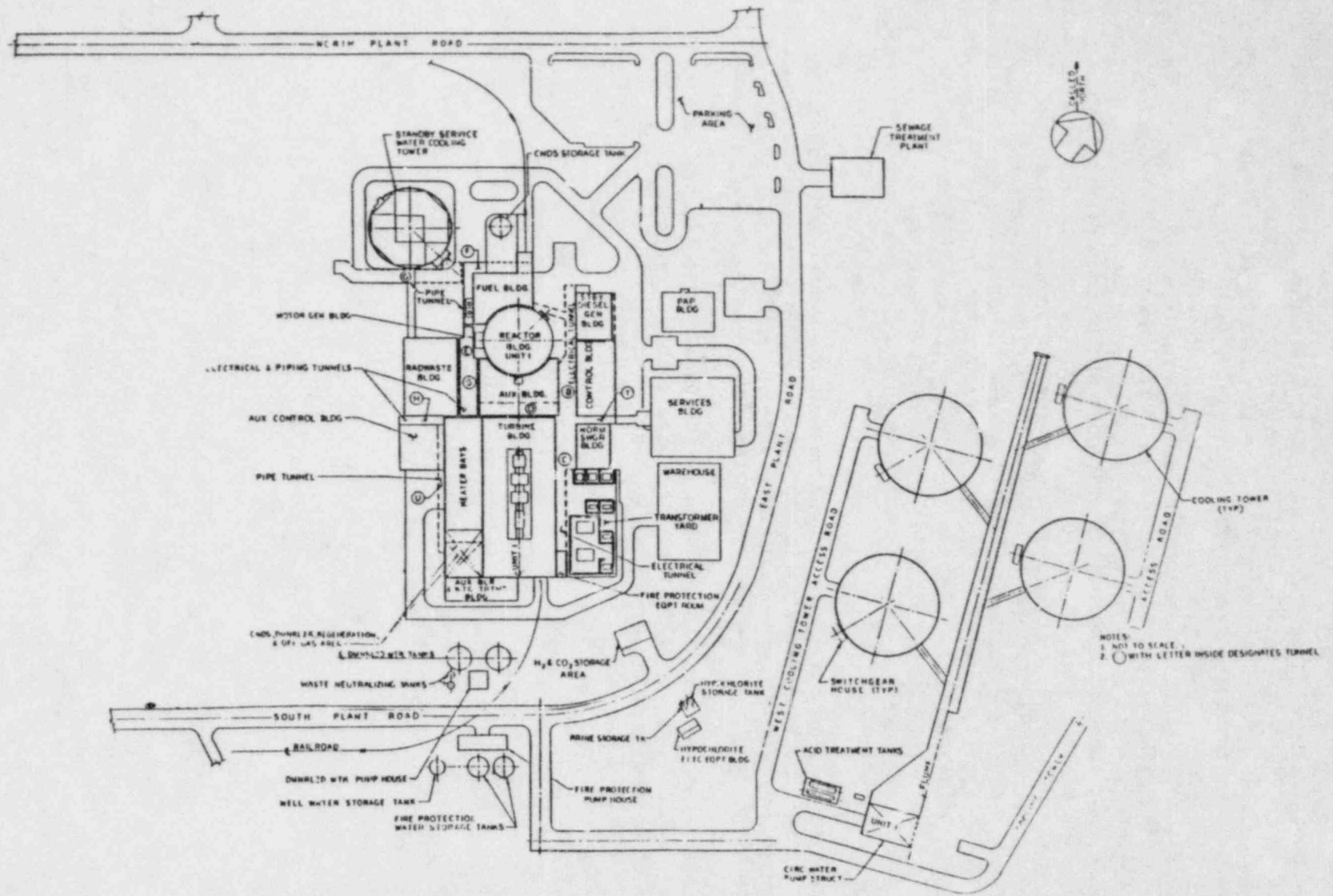


Figure 2.1 Single-unit layout for River Bend Station

3 DESIGN CRITERIA FOR STRUCTURES, SYSTEMS, AND COMPONENTS

3.9 Mechanical Systems and Components

3.9.3 ASME Code Class 1, 2, and 3 Components, Component Supports, and Core Support Structures

SER Section 3.9.3.1 identified a confirmatory item (6) regarding the minimum piping wall thickness requirements provided in the design specifications. In a letter from J. E. Booker (GSU) to H. R. Denton dated May 25, 1984, the applicant stated that dimensional checks are made on a surveillance basis to ensure the counterbore of piping is in accordance with the design specification and that the material specification minimum pipe wall thickness requirements have not been violated. The applicant is still retaining the prerogative to have wall thicknesses less than the material specification minimum wall thickness with specific approval obtained by the engineers. To ensure compliance with the Boiler and Pressure Vessel Code of the American Society of Civil Engineers (ASME Code), the applicant has clarified that appropriate measures have been established to properly account for piping wall thicknesses less than the material specification minimum wall thickness in the piping stress analyses when the above condition exists. Based on the discussion above and the applicant's measures that ensure ASME Code compliance, the staff considers this confirmatory item to be closed.

4 REACTOR

4.2 Fuel System Design

4.2.1 Design Bases

4.2.1.1 Fuel System Design Criteria

(6) Fuel and Poison Rod Pressures

The SER stated that River Bend fuel does not meet the SRP criterion that the internal fuel rod pressure be less than or equal to the coolant system pressure for all burnups considered, as required by SRP 4.2.II.A.1.F. The staff made this issue a license condition.

In a letter dated December 19, 1983, GE stated that the criterion proposed by GE that relates cladding creepout rate to fuel swelling rate will not (1) result in fuel system damage during normal operation and anticipated operational occurrences, (2) prevent control rod insertion, (3) lead to loss of coolable geometry, or (4) result in an underestimate of the number of fuel failures in or radiological consequences of postulated accidents.

In this submittal, GE describes a design basis for rod pressure in which the effects of fuel rod internal pressure during normal steady-state operation will not result in fuel failure because of excessive cladding pressure loading. GE contends that a rod internal pressure limit of less than or equal to the reactor cooling system (RCS) pressure is not necessary. Instead, GE proposes that the rod pressure be limited so that the instantaneous cladding creepout rate due to internal pressure greater than RCS pressure is not expected to exceed the instantaneous fuel swelling rate.

To demonstrate that this proposed criterion is acceptable in terms of items (1) through (4) above, GE demonstrates that for the design-basis transients and accidents of interest in a BWR, either the cladding does not heat up significantly or the existing fuel damage criteria used are still applicable when the initial fuel rod internal pressure exceeds the initial RCS pressure.

In the case where the cladding does not heat up significantly (that is, the safety limit minimum critical power ratio (MCPR) is not exceeded), there is no significant change in the fuel rod geometry so that control rod insertion and bundle coolability will be maintained.

For those events in which the cladding does heat up significantly above its normal temperature, GE has demonstrated that there are other criteria that ensure that conditions (1) through (4) will not occur. For example, the loss-of-coolant accident (LOCA) event is governed by the criteria set forth in 10 CFR 50.46 that the cladding temperature will not exceed 2200°F, the maximum amount of local oxidation on any fuel rod will not exceed 17%, and a coolable geometry will be maintained. These criteria are independent of the initial internal pressure of the fuel rod. However, the internal pressure of the fuel

rod is taken into account explicitly in determining the stored energy and in calculating the amount of fuel rod swelling and rupturing. In addition, the number of failed fuel rods assumed for radiological calculations is 100% of those in the core. Therefore, a rod internal pressure greater than the RCS pressure will not result in underestimating the radiological consequences of a LOCA. Therefore, a fuel rod internal pressure greater than RCS pressure is acceptable for a LOCA.

Similarly GE has evaluated the rod drop accident and has demonstrated in a letter dated April 2, 1983, in response to a staff question, that the criterion for fuel failure in a rod drop accident is still applicable.

Therefore, the staff finds the GE criterion for fuel rod internal pressure to be acceptable.

In a letter dated September 7, 1984, the applicant stated that the GE submittal of December 19, 1984, was applicable to the River Bend initial core. Therefore, the staff concludes that this issue is resolved and may be removed as a license condition for River Bend.

4.2.4 Testing and Inspection Plans

4.2.4.3 Post-Irradiation Surveillance

By letter dated September 7, 1984, the applicant stated that it will participate in the GE fuel program. The staff has accepted the GE surveillance program as identified in the letter from L. S. Rubenstein (NRC) to R. L. Gridley (GE), dated June 27, 1984. Therefore, Confirmatory Issue (10) is resolved.

6 ENGINEERED SAFETY FEATURES

6.2 Containment Systems

6.2.3 Secondary Containment Functional Design

In the SER, the staff required that before plant operation begins and at each refueling outage, the shield building, auxiliary building, and the fuel building must be tested to verify that the inleakage will not exceed 2000 cfm, 5000 cfm, and 5000 cfm at a pressure of -0.50 inch wg, -0.25 inch wg, and -0.25 inch wg, respectively. The staff will require that these periodic testing requirements be included in the Technical Specifications. This resolves Confirmatory Issue (16).

6.2.4 Containment Isolation System

6.2.4.2 Conclusion

In the SER, the staff stated additional staff evaluation of the containment isolation provision of a single containment isolation valve on the emergency core cooling system (ECCS) was needed. This evaluation has been done, and the staff concludes that the minimum flow valve for an ECCS pump is open only between ECCS initiation and when system flow to the reactor pressure vessel exceeds the minimum flow required for the system. The valve is closed at all other times. The minimum flow line is essential for the operation of an ECCS system; therefore, the SRP provision for isolation of an ECCS system (single isolation valve with remote manual isolation capability) is an acceptable alternative to the GDC 56 requirements. This resolves Confirmatory Issue (17).

12 RADIATION PROTECTION

12.3 Radiation Protection Design Features

12.3.2 Shielding

In the SER, the staff stated that it would make a pre-fuel load site visit to verify that the shielding of the spent fuel transfer canal meets the SRP. The staff visited the site in late July 1984 and verified the design features of the fuel transfer tube intended to control access to areas adjacent to the fuel transfer tube and to prohibit inadvertent exposure of personnel during fuel transfer. This resolves Confirmatory Issue (53).

16 TECHNICAL SPECIFICATIONS

In SER Table 16.1, the staff identified 29 issues that were to be included in the Technical Specifications. One additional issue is identified in this supplement. This issue is shown in the update to Table 16.1 below and discussed further in the section of this report as indicated.

Table 16.1 Technical Specification issues (update)

Issue	SER Section
(30) Secondary containment inleakage	6.2.3

17 QUALITY ASSURANCE

17.4 Conclusions

In the SER the staff reported that changes had been made in the River Bend Station Quality Assurance (QA) organization about the time of issuance of the SER. According to the applicant, the changes were administrative in nature. As a result, in the SER the staff identified a confirmatory issue requiring additional staff review of the QA organization to verify that this reorganization was administrative and that the staff's evaluation in the SER remained valid.

The staff has completed its review of the QA organization as reflected through FSAR Amendment 13 and confirms that the changes are acceptable. The administrative changes include the change in title of the Director-Quality Assurance to Manager-Quality Assurance, and a change in the QA Department staff reporting to the Manager-Quality Assurance. The Manager-Quality Assurance is now assisted by the QA Department staff, which consists of Quality Systems, Operational QA, Quality Engineering, and Quality Control. As discussed in the SER, the Manager-Quality Assurance has delegated the responsibility for the QA program during operation to the Operational Quality Assurance Supervisor (OQAS). However, as a result of the administrative changes, the OQAS now evaluates and reports the status and adequacy of the quality assurance program at the station to the Director-QA, the Manager-Quality Assurance, and, on a periodic basis, to the Plant Manager. The administrative and functional reporting organization is shown in the revised version of Figure 17.1 below. The revised QA organization is shown in the revised version of Figure 17.2 which follows. This resolves Confirmatory Issue (64).

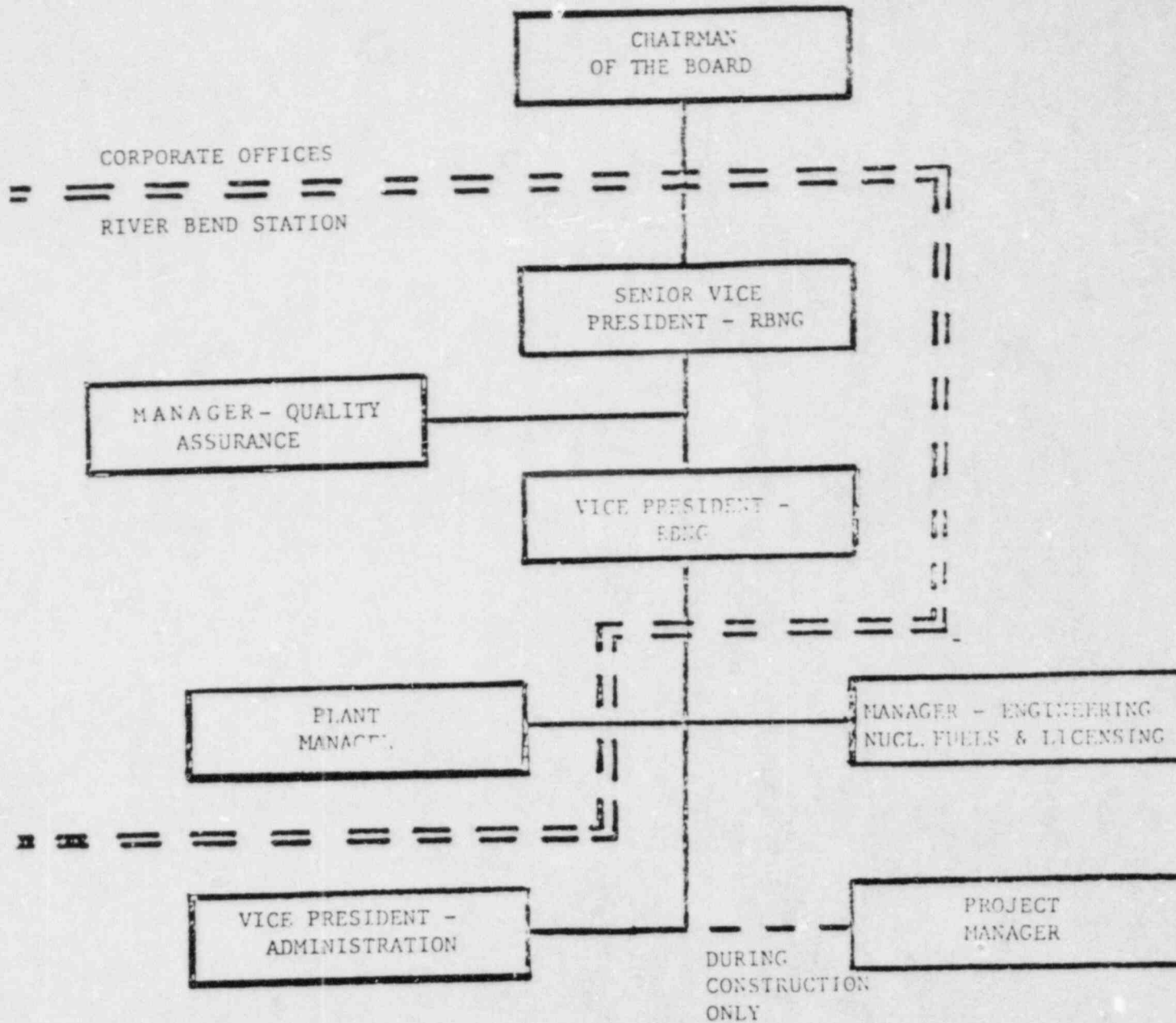


Figure 17.1 River Bend corporate structure for nuclear operations

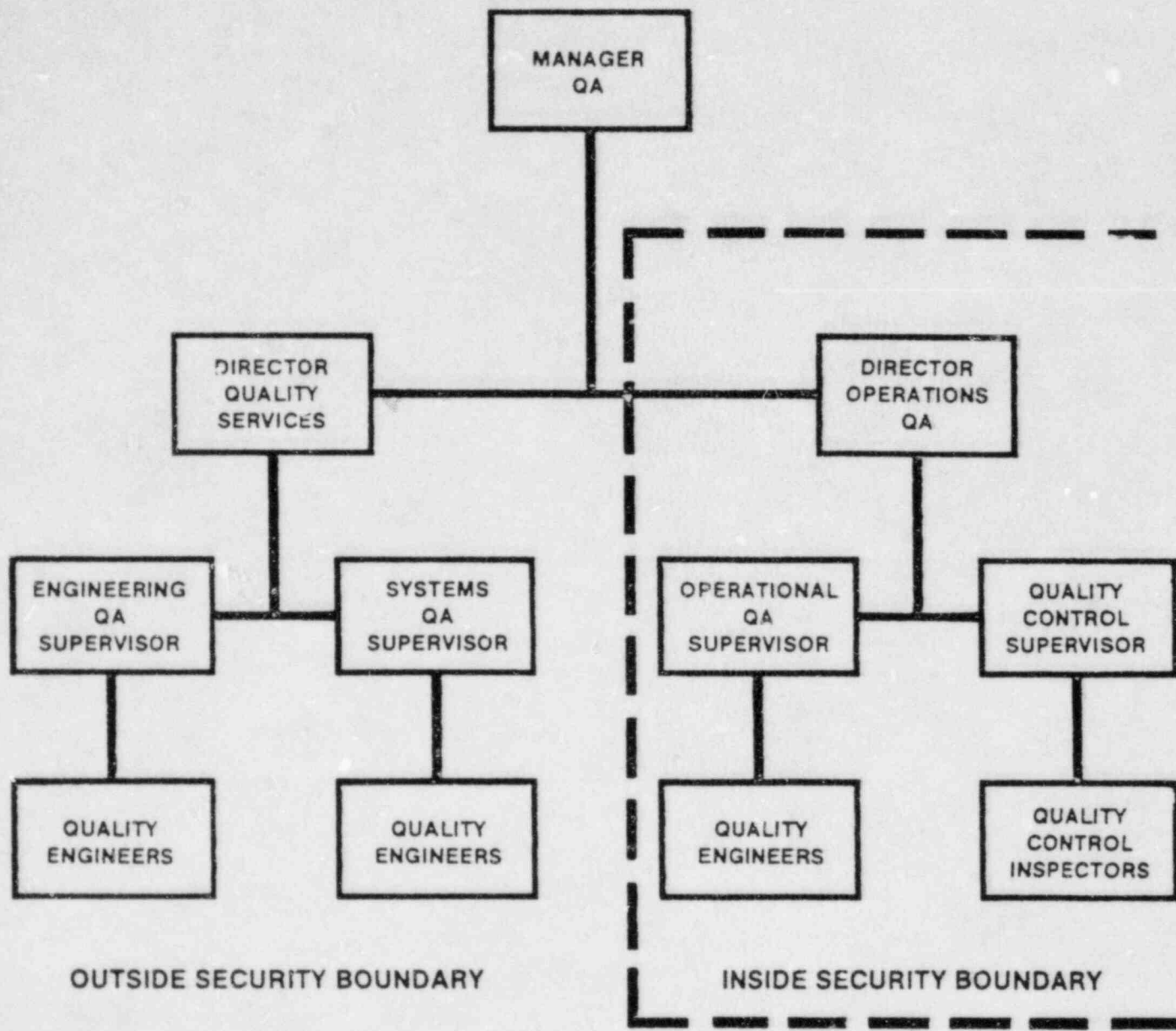


Figure 17.2 River Bend QA organization

19 REPORT OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

A Subcommittee of the Advisory Committee on Reactor Safeguards (ACRS) considered the application for an operating license for River Bend Station at a meeting in Baton Rouge, Louisiana, on June 7-8, 1984. The Subcommittee visited the site and toured the facility on June 7, 1984. The full committee reviewed the application at its 291st meeting on July 12, 1984. A copy of the Committee's report to the Chairman of the Nuclear Regulatory Commission dated July 17, 1984 is included in this supplement as Appendix F.

The Committee's review included an evaluation of the management organization. It was noted that the structuring of this organization is along project team lines and appears to have provided good control and interfacing among the utility, the general contractor-architect/engineer, and the NSSS designer.

The Committee noted three areas in which it had specific recommendations for further action by the applicant. First, the Committee recommended further examination of the dependency of the high pressure core spray diesel engine on service water, provided by the standby diesel generators, to find a means of removing this dependency. Secondly, the Committee recommended that the applicant include seismic- and fire-induced accident scenarios in its scheduled limited probabilistic risk assessment (PRA) for River Bend Station. Finally, the Committee recommended that the applicant review, in detail, the seismic capability of the emergency ac power supplies, the dc power supplies, and small components such as actuators, relays, and instrument lines that are part of the decay heat removal system. The applicant plans to provide a written response to the above recommendations by November 1, 1984.

The Committee asked that it be advised when the staff reaches a position on containment venting under certain accident conditions and that it be given the opportunity to comment generically or specifically. Additionally, several other questions arose as a result of the full Committee meeting. The staff is reviewing these questions and will provide a response in future SER supplements.

The Committee also noted that the SER identified a number of outstanding issues, confirmatory matters, and license conditions that remain to be resolved. With the exception of hydrogen control, the Committee was satisfied with progress on the other topics and believes that these will be resolved in a manner satisfactory to the NRC staff.

The Committee has not completed its review of hydrogen control for River Bend Station, particularly as it may be impacted by differences in containment design features between River Bend Station and Mark III BWRs previously reviewed. The Committee will complete its review of the full-power operating license when the staff and applicant have made sufficient additional progress in resolving the matter of hydrogen control.

APPENDIX A

CONTINUATION OF CHRONOLOGY OF NRC STAFF RADIOLOGICAL
REVIEW OF RIVER BEND STATION

- April 11, 1984 Letter to applicant forwarding initial comments and questions on two Transamerica Delaval, Inc. (TDI) Owners Group reports on rod bearing shells and rocker arm capscrew stress. Additional information is required on failure mechanisms, referenced calculations, and quality of materials.
- April 11, 1984 Letter to applicant forwarding comments on "Design Review of Connecting Rod Bearing Shells for TDI Enterprise Engines" and "Emergency Diesel Generator Rocker Arm Capscrew Stress Analysis." The reports do not present sufficient data to support bearing life.
- April 12, 1984 Letter from TDI forwarding fatigue data for nodular cast iron used in piston skirt evaluation, in response to a request made at the March 22, 1984, meeting between NRC and the TDI Owners Group.
- April 13, 1984 Letter from TDI forwarding "Supplement to Emergency Diesel Generator Air Start Valve Capscrew Dimension and Stress Analysis" and "Supplement to Emergency Diesel Generator Cylinder Head Stud Stress Analysis."
- April 13, 1984 Letter from TDI forwarding calculations for rocker arm capscrew stress analysis and cylinder head stud evaluation.
- April 16, 1984 Letter from TDI forwarding "Emergency Diesel Generator Engine Driven Jacket Water Pump Design Review" (also forwarded to Battelle Northwest Laboratory (BNWL) per NRC request).
- April 16, 1984 Summary issued of Caseload Forecast Panel December 13-15, 1983 meetings with the applicant at the site on the construction program and schedule. The applicant's construction completion date is optimistic. The facility will not be ready for fuel load until the second quarter of calendar year 1986.
- April 16, 1984 Letter from TDI forwarding, "Emergency Diesel Generator Engine Driven Jacket Water Pump Design Review."
- April 17, 1984 Letter from applicant responding to the staff's March 19, 1984 letter on noise impact assessment.

April 17, 1984 Letter from applicant forwarding the March 13, 1984 letter from the State of Louisiana on the historical and archaeological investigation of ruins of a 19th century sugar mill in West Feliciana Parish. The property is ineligible for inclusion in the National Register of Historic Places.

April 19, 1984 Generic letter 84-11 issued to all licensees of operating reactors, applicants for OLs, and holders of CPs for BWRs on the inspection of BWR stainless steel piping.

April 19, 1984 Letter from TDI forwarding "Design Review of Push Rods for TDI Generators."

April 20, 1984 Letter from TDI forwarding "Evaluation of Emergency Diesel Generator Crankshafts at Shoreham and Grand Gulf Nuclear Power Stations" on behalf of the TDI Diesel Generator Owners Group.

April 20, 1984 Letter from Sacramento Municipal Utility District responding to a January 31, 1984 staff request for information on TDI diesel generators. A loss of voltage to emergency buses has not occurred since Rancho Seco startup in 1974.

April 24, 1984 Letter from TDI forwarding proposed agenda for the TDI Owners Group May 2, 1984 meeting at NRC.

April 24, 1984 Letter from TDI forwarding Stone and Webster's "Emergency Diesel Generator Engine and Auxiliary Module Wiring and Termination Qualification to IEEE-383-1974."

April 24, 1984 Letter from applicant forwarding "Safety Parameter Display System Accident Monitoring Instrumentation Database Identification Study for River Bend Unit 1," per the NUREG-0737, Supplement 1 requirements for emergency response capability.

April 24, 1984 Letter from TDI forwarding "Supplement to Emergency Diesel Generator Rocker Arm Capscrew Stress Analysis." This supplement extends the applicability of the report to all TDI nuclear service engines.

April 25, 1984 Letter to applicant commenting on the applicant's detailed control room design review program plan. The methodology used to conduct the task analysis is questionable; an onsite audit of design review is anticipated.

April 26, 1984 Generic letter 84-10 issued to all applicants for OLs re administration of operating tests prior to initial criticality (10 CFR 55.25).

April 26, 1984 Letter from applicant forwarding revisions to the February 13, 1984 fire hazards analysis. The revisions will be incorporated in an FSAR amendment.

April 27, 1984 Letter from TDI transmitting "Design Review of Connecting Rods of TDI Inline DSR-48 Emergency Diesel Generators" (also forwarded to BNWL, per NRC request).

April 27, 1984 Letter from TDI forwarding "Design Review of Engine Base and Bearing Caps for TDI Diesel Engines."

April 27, 1984 Letter from TDI forwarding "Emergency Diesel Generator Fuel Oil Injection Tubing."

April 27, 1984 Letter from TDI forwarding current engine inspection schedule. The schedule may be used for planning purposes.

April 30, 1984 Generic letter 84-12 issued to all licensees of operating reactors and applicants for OLs on compliance with 10 CFR 61 and implementation of Radiological Effluent Technical Specifications (RETS) and the attendant process control program (PCP).

April 30, 1984 Letter from TDI forwarding interim reports on remaining Phase I components, turbochargers, cylinder heads, and cylinder blocks/cylinder liners. TDI emergency diesel generators will be adequate to perform, on an interim basis, through the first fuel cycle.

May 1, 1984 Letter from applicant forwarding "River Bend Station Environmental Report, OL Stage."

May 2, 1984 Letter from TDI forwarding calculations 11600.60-245.1-M3 on air start valve capscrew and dimensional and stress analysis, unnumbered calculation on jacket water pump, and sketches of intake and exhaust tappet valve system in response to a staff request of April 26, 1984.

May 3, 1984 Generic letter 84-13 issued to all power reactor licensees (except SEP licensees) and all applicants for OLs to operate power reactors on Technical Specifications for snubbers.

May 4, 1984 Letter from Long Island Lighting Co. forwarding letters transmitting TDI diesel component weights for piston and connecting rod components, sketches from intake tappet valve system and "Design Review of Engine Base and Bearing Caps for TDI Engines."

May 6, 1984 Letter from Mississippi Power and Light Co. forwarding additional information supporting the conclusion that little technical justification exists for disassembly of TDI diesel generator before the first refueling outage.

May 7, 1984 Letter to TDI owners group forwarding preliminary comments on TDI Owners Group reports. Supplemental information should be provided to thoroughly review the bases and conclusions for each component.

May 8, 1984 Generic letter 84-09 issued to all licensees of operating reactors on the recombiner capability requirements of 10 CFR 50.44(c)(3)(ii).

May 11, 1984 Generic letter 84-14 issued to all operating reactor licensees on requalification training programs.

May 14, 1984 Letter from TDI forwarding "Design Review of Elliott Model 90G Turbocharger Used on TDI DSR-48 and DSRV-16 Emergency Diesel Generator Sets."

May 14, 1984 Letter from TDI forwarding "Evaluation of Cylinder Heads of TDI Series R-4 Diesel Engines."

May 15, 1984 Letter to Philadelphia Electric Co. forwarding an NRC report on setpoint methodology for GE-supplied protection system instrumentation resulting from July 14, 1983 and January 31, 1984 meetings with the Licensing Review Group and GE in Bethesda, MD.

May 17, 1984 Letter from TDI forwarding cover letters transmitting and evaluation of cylinder heads of TDI Series R-4 diesel engines and design review of Elliott Model 90G turbocharger used on TDI diesel generators.

May 17, 1984 Letter from TDI forwarding cover letter transmitting report on investigation of Types AF and AE piston skirts.

May 17, 1984 Letter from Long Island Lighting Co. advising that the TDI Owners Group May 16, 1984 letter and report "Evaluation of Emergency Diesel Generator Crankshafts at Shoreham and Grand Gulf Nuclear Power Stations" were issued per commitments.

May 18, 1984 Letter from TDI forwarding a report on the design review of connecting rods for TDI DSRV-4 series diesel generator.

May 24, 1984 Letter from TDI forwarding "Investigation of Types AF and AE Piston Skirts."

May 24, 1984 Letter from TDI forwarding "Design Review of Connecting Rods for TDI DSRV-4 Series Diesel Generators." This report completes the TDI Owners Group analysis of component for all TDI diesels in nuclear service.

May 24, 1984 Letter from TDI forwarding "Evaluation of Emergency Diesel Generator Crankshafts at Shoreham and Grand Gulf Nuclear Power Stations."

May 25, 1984 Letter from applicant forwarding FSAR Revision 12 and the environmental qualification document.

May 25, 1984 Letter from applicant forwarding supplemental response to Question 210.101 on minimum wall thickness at girth butt welds. The response will be included in an FSAR amendment.

May 25, 1984 Summary issued of May 22, 1984 meeting with the applicant and TDI on the standby diesel qualification program.

May 31, 1984 Letter to applicant forwarding the SER (NUREG-0989) and Federal Register notice of issuance. Work should continue on the resolution of remaining open and confirmatory issues.

May 31, 1984 Letter to applicant discussing evaluation of operator shift crew operating experience and shift advisor qualifications, including an industry working group proposal on shift crew evaluation.

May 31, 1984 Letter from Long Island Lighting Co. forwarding "Evaluation of Emergency Diesel Generator Crankshafts at Shoreham and Grand Gulf," "Design Review of Connecting Rods for TDI DSRV-4 Series Diesel Generators," and "Investigation of Types AF and AE Piston Skirts."

May 31, 1984 Letter from applicant advising that an appendix to Section 13.3 of the FSAR on interim emergency response facilities will be submitted in July 1984, with responses to issues raised in SER Section 13.3.

June 1, 1984 Letter from TDI forwarding two proprietary oversize drawings in response to a BNWL request (drawings withheld from public disclosure per 10 CFR 2.790, TDI diesel generator owners group application of March 23, 1984).

June 1, 1984 Letter from Duke Power Company forwarding "Catawba Nuclear Station Diesel Engine 1A Component Revalidation Inspection Report." TDI diesel generators at Catawaba will provide a reliable source of backup power.

June 4, 1984 Letter from TDI forwarding calculations requested by BNWL on push rods and fuel oil injection tubing.

June 5, 1984 Letter from TDI forwarding a supplement to "Emergency Diesel Generator Auxiliary Module Control Wiring and Termination Qualification Review for TDI Diesel Generators."

June 6, 1984 Letter from Long Island Lighting Co. forwarding "Proposed Torsional and Lateral Critical Speed Analysis," "Field Test of Emergency Diesel Generator 103 W/13x13 Crankshaft," and the table of torsional loading due to pressure at 100% load.

June 11, 1984 Letter from Long Island Lighting Co. forwarding calculations of plug weld end connections, friction welded pushrod, and pre-existing longitudinal flaws on diesel fuel injection line tubing.

June 13, 1984 Letter from TDI forwarding a supplement to "Emergency Diesel Generator Auxiliary Module Control Wiring and Termination Qualification Review for TDI Diesel Generators."

June 14, 1984 Letter to TDI Owners Group forwarding a preliminary assessment of five technical reports submitted by the TDI Owners Group.

June 16, 1984 Letter from TDI forwarding "Influence of Thermal Distortion on Fatigue Performance of AF and AE Piston Skirts."

June 15, 1984 Letter from TDI forwarding "Design Review of Elliott Model 65G Turbocharger Used on TDI DSRV-12-4 and DSRV-20-4 Emergency Diesel Generator Sets."

June 15, 1984 Letter from TDI forwarding "Supplement to Emergency Diesel Generator Auxiliary Module Control Wiring and Termination Qualification Report."

June 15, 1984 Letter from TDI forwarding "Supplement to Emergency Diesel Generator Engine Driven Jacket Water Pump Design Review."

June 15, 1984 Letter from TDI forwarding "Evaluation of Emergency Diesel Generator Crankshafts at Midland and San Onofre Nuclear Generating Stations."

June 16, 1984 Summary issued of June 4, 1984 meeting with the applicant and S&W on SER Open Item 9 (bypassed and inoperable status indication). The applicant will evaluate the addition of an "inoperable" light on the vertical benchboard face.

June 18, 1984 Letter from TDI forwarding "Design Review of Connecting Rods of TDI In-Line DSR-48 Emergency Diesel Generators."

June 19, 1984 Letter from TDI noting that J. George became Chairman of the TDI Diesel Generator Owners Group on May 30, 1984.

June 20, 1984 Letter to applicant requesting information on emergency action levels listed in Table 13.3-1 of the radiological emergency plan (FSAR Amendment 11, January 1984), per NUREG-0654 guidelines.

June 20, 1984 Letter from TDI forwarding response to questions posed in 3NWL's June 4, 1984 letter. Topics include rocker arm capscrews, cylinder head studs, air start valve capscrews, fuel oil injection tubing, DSR-48 connecting rods, and crankshaft.

June 20, 1984 Letter from TDI forwarding Revision 1 to "Project Interface Document Between Duke Power Co., TDI Diesel Generator Owners Technical Program Consultants and NRC." The document will be updated as necessary to assist communications between all parties involved.

June 21, 1984 Summary issued of May 15, 1984 meeting with the applicant, S&W, and BNWL in Bethesda on equipment qualification programs.

June 22, 1984 Letter from TDI forwarding "Design Review of Connecting Rod Bearing Shells for TDI Enterprise Engines."

June 22, 1984 Letter from applicant forwarding a partial response to SER Confirmatory Item 3, Section 2.5.5.2, on the factor of safety against failure for all slopes adjacent to structures. An additional response will be provided by July 2, 1984.

June 25, 1984 Letter forwarding "Design Review of TDI R-4 and RV-4 Series Emergency Diesel Generator Cylinder Blocks and Liners."

June 25, 1984 Letter forwarding response to a request for additional information on combustible gas control system. On the basis of the evaluation, the applicant will select equipment protection measures appropriate for equipment location and degraded core thermal environment.

June 26, 1984 Summary issued of April 26, 1984 meeting with TDI Owners Group in Wading River, NY on the status and progress of the program to establish the reliability of diesel generators.

June 27, 1984 Generic letter 84-16 issued to all licensees of operating reactors, applicants for OLs, and holders of CPs on the adequacy of on-shift operating experience for near-term OL applicants.

June 29, 1984 Letter from applicant forwarding Amendment 10 to OL application and "Report on Termination of Construction Activities for River Bend Station - Unit 2," per the January 6, 1984 notification on cancellation of Unit 2. The letter requests termination of CPPR-146.

June 29, 1984 Letter from applicant forwarding FSAR Amendment 13, which includes responses to NRC questions and text, table, and figure revisions.

July 2, 1984 Generic letter 84-15 issued to all licensees of operating reactors, applicants for OLs, and holders of CPs on proposed staff actions to improve and maintain diesel generator reliability.

July 2, 1984 Letter from applicant submitting final response to IE Bulletin 83-06, "Nonconforming Materials Supplied by Tube-Line Corp Facilities at Long Island City, NY; Houston, TX; and Carol Stream, IL." No Tube-Line material is supplied through TVA.

July 3, 1984 Generic letter 84-17 issued to all power reactor licensees, applicants for OLs, NSSS vendors, reactor vendors, and architect-engineers on the annual meeting to discuss recent developments concerning operator training, qualifications, and exams.

July 3, 1984 Letter to applicant confirming July 24 to 27, 1984 in-progress audit of detailed control room design at the site.

July 6, 1984 Generic letter 84-18 issued to all nonpower reactor licensees on filing applications for licenses and amendments.

July 9, 1984 Letter from applicant forwarding equipment qualification master list for listed categories of balance of plant equipment including environmental qualification of electrical equipment and seismic Category I and dynamically qualified safety-related equipment.

July 10, 1984 Letter from TDI addressing open items identified in NRC/BNWL/TDI Diesel Generator Owners Group June 22, 1984 meeting.

July 11, 1984 Summary issued of June 20, 1984 meeting with the applicant and S&W on S&W's shear reinforcement design philosophy. The interpretation of applicable code for design procedure is reasonable and the Z-bar length is acceptable.

July 12, 1984 Summary issued of May 1, 1984 meeting with the applicant, EG&G, and Rockwell in Bethesda, MD on preservice/in-service inspection programs.

July 12, 1984 Letter from applicant forwarding an updated FSAR and ER-OL, per the staff's June 22, 1984 request.

July 16, 1984 Letter from Duke Power Co. forwarding "Supplement to Emergency Diesel Generator Engine Driven Jacket Water Pump Design Review."

July 16, 1984 Letter to applicant forwarding "Review and Evaluation of TDI Diesel Generator Owners Group Program Plan."

July 17, 1984 Letter from the Advisory Committee on Reactor Safeguards to Chairman, NRC, submitting the ACRS interim report on River Bend. The review of hydrogen controls is incomplete because the review may be impacted by differences in containment design features between River Bend and the Mark II^c BWR.

July 19, 1984 Letter from applicant forwarding program plan for evaluating and testing TDI standby diesel generators. The program includes all recommended actions of the TDI Owners Group and TDI. Changes to the number of start tests and overload tests requested.

July 19, 1984 Letter to applicant forwarding comments from June 22, 1984 meeting with TDI Owners Group and Failure Analysis Assoc. (FaAA), including open items and comments on FaAA reports on the Grand Gulf crankshaft, Elliott Model 90G turbocharger, and cylinder heads.

July 23, 1984 Letter to applicant requesting information resulting from the June 22, 1984 meeting on TDI Diesel Generator Owners Group reports on crankshaft, cylinder heads, and connecting rods.

July 24, 1984 Letter from TDI forwarding Revision 1 to "Emergency Diesel Generator Rocker Arm Capscrew Stress Analysis," prepared for the TDI Diesel Generator Owners Group.

July 26, 1984 Letter from TDI commenting on BNWL report PNL-5161 (dated June 1984), on key engine component endurance testing. Hot crankshaft deflection readings should be taken within 4 hours after shutdown.

July 27, 1984 IE Information Notice 84-57, "Operating Experience re Moisture Intrusion in Safety-Related Electrical Equipment at Commercial Power Plants," issued.

July 27, 1984 Letter from TDI Owners Group forwarding "Emergency Diesel Generator Auxiliary Module Control Wiring and Termination Qualification Review."

July 30, 1984 Letter to applicant acknowledging receipt of June 21, 1984 transmittal of current description of QA program.

July 30, 1984 Letter from applicant forwarding response to close out Item 17 of SER Table 1.3, "Listing of Outstanding Issues." Changes will be incorporated in an FSAR amendment.

July 30, 1984 Summary issued of May 1, 1984 meeting with the applicant, Rockwell, and EG&G Idaho in Bethesda, MD on recording of ultrasonic indications in piping systems susceptible to intergranular stress corrosion cracking and examinations of reactor vessel feedwater inlet nozzles.

July 31, 1984 Letter from applicant stating that the final submittal on the containment issues raised by Humphreys will be provided by October 15, 1984.

July 31, 1984 Letter from applicant forwarding master lists for categories of NSSS and balance-of-plant equipment, including NSSS electrical equipment requiring qualification per 10 CFR 50.49 and seismic Category I safety-related NSSS equipment.

August 1, 1984 Letter from TDI forwarding "Design Review of Elliott Model 65G Turbocharger Used on TDI DSRV-12-4 and DSRV-20-4 Emergency Diesel Generator Sets."

August 2, 1984 Letter to applicant forwarding the ACRS interim report on River Bend and requesting a meeting to discuss the issues raised.

August 3, 1984 Letter to applicant requesting additional information on reduced ESF loads on TDI 13x12 crankshafts to evaluate the impact of reduced loads on projected reliability/operability.

August 3, 1984 Letter from applicant forwarding a final response to Sections 1.1, 2.1, 2.2, and 4.5 of generic letter 83-28, "Required Actions Based on Generic Implications of Salem ATWS Events." The response to Sections 3.1 and 3.2 will be provided before fuel load.

August 6, 1984 Generic letter 84-19 issued to all licensees of operating reactors, applicants for OLs, and holders of CPs on the availability of Supplement 1 to NUREG-0933 "Prioritization of Generic Safety Issues."

August 8, 1984 Letter from applicant forwarding a supplement to the June 22, 1984, response to SER Confirmatory Item 3 on service water tunnel. Changes to FSAR Section 2.5.4.11 and Table 2.5-16 will be included in a future amendment.

August 9, 1984 Letter from applicant forwarding a supplement to the June 22, 1984 response to SER Confirmatory Item 3 on service water tunnel. Changes to FSAR Section 2.5.4.11 and Table 2.5-16 to be included in a future amendment are enclosed.

August 9, 1984 Letter to applicant forwarding the DES (NUREG-1073) and the Federal Register notice of availability.

August 10, 1984 Letter from TDI forwarding "Design Review of Engine Base and Bearing Caps for TDI DSRV-16 Diesel Engines."

August 13, 1984 Letter from applicant forwarding operating shift experience tables, in response to the staff's May 31, 1984 request. This information updates a March 6, 1984 letter. Shift advisors will not be used to augment operating staff.

August 13, 1984 Letter to TDI forwarding the staff SER on the TDI Owners Group program plan. The SER addresses the design review/quality revalidation program, testing and inspection, and maintenance and surveillance; it sets forth requirements for operation before the program plan is completed.

August 14, 1984 Letter from applicant forwarding responses to SER Outstanding Issue 18, Confirmatory Item 59, and the staff's June 20, 1984 letter on emergency action levels and the emergency medical assistance program.

August 14, 1984 Letter from the TDI Owners Group forwarding "Design Review of Elliott Model 90G Turbocharger used on TDI DSR-48 and DSRV-16 Emergency Diesel Generator Sets," representing the final QA-verified report.

August 20, 1984 Generic letter 84-20 issued to all licensees of operating reactors and applicants for OLS on scheduling guidance for licensee submittals of reloads that involve unreviewed safety questions.

August 20, 1984 Letter to applicant commenting on Revision 2 to physical security plan submitted March 7, 1984. The comments identify concerns on upgrading or changes to the plan to satisfy regulatory requirements (enclosure withheld per 10 CFR 73.21).

August 21, 1984 Letter from applicant responding to request for additional information on Item 16 of SER Table 1.3 and Item 51 of SER Table 1.4.

August 22, 1984 Letter to applicant requesting additional information on the April 16, 1984 application for a license to store unirradiated fuel on the site. An attempt will be made to process the application by December 1, 1984 if the information is received by September 24, 1984.

August 23, 1984 Letter from the TDI Owners Group responding to the staff's July 23, 1984 request for additional information on TDI Owners Group reports.

August 29, 1984 Letter to applicant transmitting comments and guidance on minimum requirements for acceptable bypass and inoperable status indication system design. The item was classified as an outstanding issue in SER Chapter 7.

August 30, 1984 Letter to applicant requesting information on safety parameter display system. The project manager should be informed of the schedule for response and clarification of further discussion on topic.

August 31, 1984 Letter from applicant requesting an extension of the due date for responses to generic letter 84-11 on inspections of BWR stainless steel piping to October 15, 1984 because the generic letter was not received until August 30, 1984.

September 9, 1984 Letter to applicant requesting information on hydrogen control for Mark III containments during postulated degraded core accidents.

September 9, 1984 Letter from TDI forwarding Revision 1 to FAAA-84-4-1, "Design Review of Engine Base and Bearing Caps for TDI Diesel Engines," prepared for the TDI Diesel Generator Owners Group. The report represents the final QA-verified report on this subject.

- September 7, 1984 Letter from applicant forwarding responses to License Condition 3 (SER Table 1.5) on fuel rod internal pressure and to Confirmatory Item 10 (Table 1.4) on post-irradiation surveillance.
- September 7, 1984 Letter from Duke Power Co. forwarding "Design Review of Connecting Rods for TDI DSRV-4 Series Diesel Generators." This report represents the final QA-verified report on this subject.
- September 10, 1984 Letter from applicant forwarding the master list for balance of plant and NSSS safety-related active mechanical equipment located in a harsh environment for review. It is anticipated that the environmental qualification audit will be held during the week of November 12, 1984.

APPENDIX B
BIBLIOGRAPHY

Booker, J. E., GSU, letter to H. R. Denton, NRC, "River Bend Station-Unit 1, Docket No. 50-458-RBG-18,838," September 7, 1984.

Charnley, J. S., GE, letter to R. Lobel, NRC, "NRC Questions on Amendent 7 to NED-24011-P-A," dated April 2, 1983.

---, letter to C. O. Thomas, NRC, "Response to Request for Additional Information on Proposed Amendment to GE Licensing Topical Report, NEDE-24011-P-A," December 19, 1983.

Dunn, W. E. and S. M. Sullivan, "Analysis of the Thermal Performance and Evaporative Losses of the River Bend Ultimate Heat Sink Cooling Tower System," Argonne National Laboratory, September 1984.

U.S. Nuclear Regulatory Commission, NUREG-0800, "Standard Review Plan," July 1981.

U.S. National Weather Service, Hydrometeorological Report 51, 1978.

---, Hydrometeorological Report 52, 1982.

APPENDIX D

ACRONYMS AND INITIALISMS

ACRS	Advisory Committee on Reactor Safeguards
BWR	boiling water reactor
CEPCO	Cajun Electric Power Cooperative
ECCS	emergency core cooling system
FSAR	Final Safety Analysis Report
GDC	General Design Criteria(on)
GE	General Electric Co.
GSU	Gulf States Utilities
HMR	Hydrometeorological Report
LOCA	loss-of-coolant accident
MCPR	minimum critical power ratio
NRC	Nuclear Regulatory Commission
OBE	operating basis earthquake
OQAS	operational quality assurance supervisor
PRA	probabilistic risk assessment
PMP	probable maximum precipitation
QA	quality assurance
RCS	reactor coolant system
RG	Regulatory Guide
SER	Safety Evaluation Report
SSE	safe shutdown earthquake

APPENDIX E

PRINCIPAL STAFF CONTRIBUTORS

<u>Name</u>	<u>Title</u>	<u>Review Branch</u>
Farouk Eltawila	Senior Containment Systems Engineer	Containment Systems
Amira Gill	Nuclear Engineer	Core Performance
John Gilray	QA Engineer	Quality Assurance
John Minns	Health Physicist	Radiological Assessment
David Terao	Mechanical Engineer	Mechanical Engineering
Rex Wescott	Hydraulic Engineer	Environmental and Hydraulic Engineering

ACRS INTERIM REPORT
ON RIVER BEND STATION



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

July 17, 1984

Honorable Kunzio J. Palladino
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Dr. Palladino:

SUBJECT: ACRS INTERIM REPORT ON RIVER BEND STATION

During its 291st meeting, July 12-14, 1984, the Advisory Committee on Reactor Safeguards reviewed the application of Gulf States Utilities Company (Applicant), acting on behalf of itself and as agent for the Cajun Electric Power Cooperative, for a license to operate the River Bend Station. A tour of the facilities was made by members of the Subcommittee on the morning of June 7, 1984, and a Subcommittee meeting was held in Baton Rouge, Louisiana on June 7 and 8, 1984 to consider the application. During our review, we had the benefit of discussions with representatives of the Applicant, the NRC Staff, and members of the public. We also had the benefit of the documents referenced. The Committee commented on the construction permit application for this Station in its report dated January 14, 1975.

The River Bend Station is located in west Feliciana Parish, Louisiana on the east side of the Mississippi River approximately 24 miles north-northwest of Baton Rouge. Originally the River Bend Station was to consist of two units. Unit 2 was cancelled on January 5, 1984. Unit 1 is approximately 90% complete, with an estimated fuel load date of April 1985.

The River Bend Station uses a General Electric BWR-6 nuclear steam supply system (NSSS) with a rated core thermal power of 2894 Mwt and a Mark III pressure suppression containment system with a design pressure of 15 psig.

The Applicant has structured its organization, and has provided for continuity from project initiation up to and including operation, in a notable manner. This structuring is along project team lines and appears to have provided good control and interfacing among the utility, the general contractor-architect engineer, and the NSSS designer. Further, it appears this structuring has provided this first time nuclear utility with good personnel development for the utility's overall nuclear plant responsibilities. In addition to this, the

July 17, 1984

Applicant has practiced aggressive recruiting and careful selection of qualified people and has phased them into the project in a timely manner.

The dedicated diesel generator that drives the high pressure core spray pump currently depends on cooling water supplied by pumps powered by the other two diesel generators during loss of offsite power conditions. We recommend that the merit of removing this dependency be examined.

The Applicant stated that they plan to conduct a limited probabilistic risk assessment (PRA) for the River Bend Station. We support the proposal to perform a plant-specific PRA and recommend that it include seismic- and fire-induced accident scenarios.

Although River Bend is in a relatively quiet seismic portion of the country, NRC contractor estimates of the recurrence interval for the safe shutdown earthquake are similar to those for most eastern sites. We recommend that the Applicant review, in detail, the seismic capability of the emergency AC power supplies, the DC power supplies, and small components such as actuators, relays, and instrument lines that are part of the decay heat removal system.

The Applicant has proposed to include in the River Bend Emergency Procedures a procedure for venting the containment under certain accident conditions. The bases for the decision to take this action are not yet clear. The NRC Staff has not completed its review of this proposal. We wish to be advised when the NRC Staff has reached a position on this matter and to have an opportunity to comment generically or specifically.

The NRC Staff has identified a number of license conditions and confirmatory matters, and several outstanding issues which remain to be resolved. Except for the matter of hydrogen control, we are satisfied with progress on the other topics and believe that they should be resolved in a manner satisfactory to the NRC Staff. We have not completed our review of hydrogen control for the River Bend Station, particularly as it may be impacted by differences in containment design features between River Bend and Mark III BWRs previously reviewed.

The Committee will complete its review of the full power operating license when the NRC Staff and the Applicant have made sufficient additional progress in resolving the matter of hydrogen control. In the interim, we believe that if due consideration is given to the recommendations above, and subject to satisfactory completion of construction, staffing, and preoperational testing, the River Bend Station can

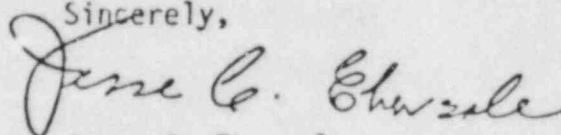
Honorable Nunzio J. Palladino

- 3 -

July 17, 1984

be operated at power levels up to 5% of full power without undue risk to the health and safety of the public.

Sincerely,



Jesse C. Ebersole
Chairman

References:

1. Gulf States Utilities Company, "Final Safety Analysis Report, River Bend Station," Volumes 1-18 and Amendments 1-11
2. U. S. Nuclear Regulatory Commission, "Safety Evaluation Report Related to the Operation of River Bend Station," NUREG-0989, dated May 1984

APPENDIX G

ERRATA TO RIVER BEND STATION SAFETY EVALUATION REPORT

<u>Page</u>	<u>Line/Item</u>	<u>Change</u>
1-13	Rated thermal power, Mwt	Clinton column from "2984" to "2894"
1-15	Outstanding Issue (4)	Delete "6.6"
1-15	Outstanding Issue (6)	Add "6.6"
1-16	Confirmatory Issue (13)	Add "3.9.3.1"
1-16	Confirmatory Issue (14)	Delete "3.9.3.1"
1-18	Confirmatory Issue (56)	Change "13.1.6" to "13.1.7"
2-8	35	Change "Cirardeau" to "Girardeau"
2-11	7	Change "Morgana" to "Morganza"
2-14	44	Change "133.3" to "113.3"
2-15	15	Change "51.75" to "51.67"
5-10	12	Change "steam" to "stem"
5-15	24	Change "185-23" to "185-73"
6-4	1	Delete "free-standing"
6-5	7	Change "26" to "24"
6-21	24	Change "200 ^o " to "20000"
6-28	Last line	Change "601E, E" to "601E, F"
9-30	24	Change "each unit's" to "the"
9-36	23/24	Delete "for each unit"
10-8	41	Change "forced-draft" to "induced-draft"
11-2	35	Change "deminieralizer" to "demineralizer"
11-6	45	Change "adequte" to "adequate"

<u>Page</u>	<u>Line/Item</u>	<u>Change</u>
13-4	25	Change "Nuclear Operations" to "Administration"
13-12	39	Insert at the start of line 39: "FSAR amendment. This matter is confirmatory, and the staff will provide its"
13-12	42	Delete entire line
13-32	25	Change "assitance" to "assistance"
15-4	13	Change "Tropical" to "Topical"
15-15	26	Change "contianing" to "containing"
App C, 10	36	Delete the remainder of the sentence following "...by its own dedicated diesel."

BIBLIOGRAPHIC DATA SHEET

NUREG-0989
Supplement No. 1

SEE INSTRUCTIONS ON THE REVERSE

2. TITLE AND SUBTITLE

Safety Evaluation Report related to the operation of
River Bend Station

Docket No. 50-458

3. LEAVE BLANK

4. DATE REPORT COMPLETED

MONTH

YEAR

October

1984

5. DATE REPORT ISSUED

MONTH

YEAR

October

1984

5. AUTHOR(S)

7. PERFORMING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code)

Division of Licensing
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

8. PROJECT/TASK/WORK UNIT NUMBER

9. FUNDING OR GRANT NUMBER

10. SPONSORING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code)

Same as 7. above

11a. TYPE OF REPORT

Safety Evaluation Report

b. PERIOD COVERED (Inclusive dates)

12. SUPPLEMENTARY NOTES

Pertains to Docket No. 50-458

13. ABSTRACT (200 words or less)

Supplement No. 1 to the Safety Evaluation Report for the application filed by Gulf States Utilities Company as applicant and for itself and Cajun Electric Power Cooperative, as owners, for a license to operate River Bend Station has been prepared by the Office of Nuclear Reactor Regulation of the U. S. Nuclear Regulatory Commission. The facility is located in West Feliciana Parish, near St. Francisville, Louisiana. This supplement reports the status of certain items that had not been resolved at the time of publication of the Safety Evaluation Report.

14. DOCUMENT ANALYSIS -- a. KEYWORDS/DESCRIPTORS

Safety Evaluation Report
River Bend
Closing Outstanding Issue No. 1
Certain Confirmatory Items

b. IDENTIFIERS/OPEN ENDED TERMS

15. AVAILABILITY STATEMENT

Unlimited

16. SECURITY CLASSIFICATION

(This page)

Unclassified

(This report)

Unclassified

17. NUMBER OF PAGES

18. PRICE

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

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, \$300

FIRST CLASS MAIL
POSTAGE & FEES PAID
USNRC
WASH. D.C.
PERMIT No. G-67

NUREG-0989, Supp. No. 1

SER RELATED TO THE OPERATION OF RIVER BEND STATION

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OCTOBER 1984