

January 16, 2003

Mr. Paul D. Hinnenkamp
Vice President - Operations
Entergy Operations, Inc.
River Bend Station
P. O. Box 220
St. Francisville, LA 70775

SUBJECT: RIVER BEND STATION, UNIT 1 - ISSUANCE OF AMENDMENT RE:
DEGRADED VOLTAGE SETPOINT REVISION (TAC NO. MB5091)

Dear Mr. Hinnenkamp:

The Commission has issued the enclosed Amendment No. 128 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 May 14, 2002, as supplemented by letter dated December 17, 2002.

The amendment revises TS Table 3.3.8.1-1, "Loss of Power Instrumentation," by changing the degraded voltage - voltage basis and loss-of-coolant accident time delay allowable values to reflect the results of new calculations performed in association with a design basis reconstitution.

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

Sincerely,

/RA/

Michael Webb, Project Manager, Section 1
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-458

Enclosures: 1. Amendment No. 128 to NPF-47
2. Safety Evaluation

cc w/encls: See next page

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*No substantive change since SE input

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ENERGY GULF STATES, INC. **

AND

ENERGY OPERATIONS, INC.

DOCKET NO. 50-458

RIVER BEND STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 128
License No. NPF-47

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Entergy Gulf States, Inc.* (the licensee) dated May 14, 2002, as supplemented by letter dated December 17, 2002, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, as amended, the provisions of the Act, and the rules and 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 license amendment will not be inimical to the common defense and security or to the health and safety of the public; and

* Entergy Operations, Inc. is authorized to act as agent for Entergy Gulf States, Inc., and has exclusive responsibility and control over the physical construction, operation and maintenance of the facility.

**Entergy Gulf States, Inc., has merged with a wholly owned subsidiary of Entergy Corporation. Entergy Gulf States, Inc., was the surviving company in the merger.

- 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. 128 and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. EOI shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.
3. The license amendment is effective as of its date of issuance and shall be implemented no later than November 30, 2003. The implementation period will allow for flexibility in the modification schedule for each divisional relay modification.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Robert A. Gramm, Chief, Section 1
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications

Date of Issuance: January 16, 2003

ATTACHMENT TO LICENSE AMENDMENT NO. 128

FACILITY OPERATING LICENSE NO. NPF-47

DOCKET NO. 50-458

Replace the following page of the Appendix A Technical Specifications with the attached revised page. The revised page is identified by Amendment number and contains marginal lines indicating the areas of change.

Remove

Insert

3.3-74

3.3-74

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 128 TO FACILITY OPERATING LICENSE NO. NPF-47

ENTERGY OPERATIONS, INC.

RIVER BEND STATION, UNIT 1

DOCKET NO. 50-458

1.0 INTRODUCTION

By application dated May 14, 2002, as supplemented by letter dated December 17, 2002, Entergy Operations, Inc. (Entergy) requested changes to the Technical Specifications (TSs) (Appendix A to Facility Operating License No. NPF-47) for the River Bend Station, Unit 1 (RBS). The proposed changes would revise the setpoint allowable values of the degraded voltage protection given in RBS TS Table 3.3.8.1-1. Changes are also being made to the Bases section of the TSs that are applicable to the degraded voltage protection. Entergy states that the existing RBS TSs require this change to resolve a degraded condition under which Class 1E motor operated valves (MOVs) are currently considered operable but degraded.

The December 17, 2002, supplemental letter provided clarifying information that did not change the scope of the original *Federal Register* notice (67 FR 42823, dated June 25, 2002) or the original no significant hazards consideration determination.

2.0 REGULATORY EVALUATION

General Design Criterion (GDC) 17 in Appendix A to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50 requires that an onsite electric power system and an offsite power system be provided to permit functioning of structures, systems, and components important to safety. The GDCs for various other safety related systems require that the systems be able to accomplish their safety function assuming a single failure when powered from either the offsite power system or the onsite power system. In 1977 the U.S. Nuclear Regulatory Commission (NRC) issued a generic action, B-23, that required nuclear power plant licensees to install degraded voltage protection at their plants. The purpose of the degraded voltage protection was to preclude multiple losses of electrically powered safety equipment, by separating them from the offsite power source when its voltage is insufficient to support reliable operation of the equipment. In 1979 the NRC issued another generic action, B-48, that required licensees to perform analyses to demonstrate that the offsite power systems at their plants have sufficient capacity and capability, and could provide adequate voltages to power the required safety equipment at the plant. These two generic actions were later incorporated into the NRC Standard Review Plan (NUREG-0800) as Branch Technical Position PSB-1. The degraded voltage protection at RBS, the subject of this amendment request, is designed to satisfy the NRC requirements for this feature.

3.0 TECHNICAL EVALUATION

The undervoltage protection scheme at RBS consists of two levels of protection for Class 1E equipment. The first level, or loss of voltage protection, is set at approximately 70 percent of nominal bus voltage with a time delay of three seconds. Following this delay the Class 1E distribution system is automatically separated from the offsite power system. The second level, or degraded voltage protection, is designed to actuate when grid voltage falls below 0.95 per unit, which corresponds to an emergency bus voltage of approximately 90 percent rated. There currently is a time delay of approximately 3 seconds associated with the degraded voltage protection to separate from offsite power when there is a loss-of-coolant accident (LOCA), and a time delay of 60 seconds when there is no LOCA. The loss of voltage protection is principally designed to detect a total loss of voltage or power from the offsite power system. The degraded voltage protection, which is the subject of this amendment request, is principally designed to detect voltage from the offsite power system that is not totally lost but rather is degraded to the point that it can no longer support reliable operation of the equipment that it supplies.

Entergy states in its submittal that this amendment request is necessary to resolve a degraded condition under which Class 1E MOVs are currently considered operable but degraded. The offsite power system voltage to the valves, as allowed by the existing degraded voltage protection, may not be sufficient to ensure correct operation of the valves. Calculations performed by Entergy in conjunction with a design basis reconstitution effort, determined that the TS minimum allowable degraded voltage value did not support operation of all Generic Letter (GL) 89-10 applicable MOVs, and the maximum allowable value did not provide sufficient margin to ensure that the protection would reset following an Emergency Core Cooling System (ECCS) pump start. The allowable value for the degraded voltage time delay-LOCA was also too short to prevent relay actuation during the LOCA sequencing of multiple ECCS pumps. Based on these results, Entergy determined that the allowable voltage band for the degraded voltage relays must be smaller. Because the currently installed Division 1 and 2 degraded voltage relays are not compatible with the revised allowable band, Entergy states in its amendment request that actions have been initiated to modify the circuit design and install degraded voltage relays with the required accuracy and deadband.

3.1 Degraded Voltage Relay Setpoints

The revised narrower allowable voltage band of the degraded voltage relays must be low enough to prevent inadvertent power supply transfer, but high enough to ensure that sufficient voltage is available to safety related equipment.

3.1.1 Maximum Allowable Voltage

The maximum allowable voltage of the degraded voltage relays must be low enough to prevent inadvertent power supply transfer when the grid voltage is at its low value, but is still capable of providing sufficient voltage for reliable operation of safety equipment. Entergy calculated the maximum allowable values using a grid voltage value of 0.95 per unit and the associated preferred station transformer (RTX-XSR1C or RTX-XSR1D) supplying all automatically connected emergency loads (ten minute loading), in addition to the maximum postulated non-safety 4160 Volts Alternating Current (Vac) bus loads, with the exception of heater drain pumps. Calculations were performed for both Division 3 lineups (i.e., supplied by either

preferred station transformer). Entergy determined from these calculations that the maximum allowable value of the Division 1 and Division 2 degraded voltage relays should be 3735.2 Vac and the maximum allowable value of the Division 3 degraded voltage relays should be 3721.2 Vac. These are the maximum values that will still preclude inadvertent safety bus transfer assuming normal load distribution on the non-safety related buses with grid voltage down to 0.95 per unit (218.5 kiloVolts (kV)). Entergy states that the 218.5 kV is a conservative value of grid voltage initially used in the RBS design basis as the minimum anticipated value.

Following the calculation at a grid voltage of 218.5 kV, Entergy performed a calculation at a grid voltage of 220 kV, which Entergy states is the RBS licensing basis. This case assumed maximum postulated non-safety 4160 Vac bus loads on the preferred station transformers that included both heater drain pumps (only one pump was assumed in the previous case). Entergy states that this is a highly unusual lineup. The calculation determined that, with the degraded voltage relay maximum allowable values determined in the previous calculation, inadvertent transfers of Division 2 and Division 3 4160 Volt safety buses would occur with preferred station transformer RST-XSR1D carrying its maximum load. Entergy subsequently determined that these transfers would not occur with the grid at 220.524 kV. Because this value is below a main control room Low-Low Grid Voltage alarm set at 221.95 kV, Entergy commits in this amendment request to revise the alarm response procedure to ensure that preferred station transformer RTX-XSR1D is supplying no more than three 1250 horsepower motors with the grid voltage below the alarm setpoint. This would preclude the inadvertent transfer with grid voltage below 220.524 kV.

The NRC staff was concerned that relying on the Low-Low Grid Voltage alarm, that is only indicating the current grid voltage, may not be sufficiently proactive. Following an event (e.g., a LOCA) that results in loss of a plant's generator, the offsite grid voltage at the plant switchyard can drop to a lower value if the generator had been helping to support that voltage. The NRC staff was concerned that the difference between the required grid voltage of 220.524 kV and the alarm setpoint of 221.95 kV may not be sufficiently large to account for the drop in the RBS switchyard (Fancy Point) when the RBS generator trips. Entergy's response (dated December 17, 2002) to NRC staff questions, states that the grid is very stiff at RBS. Entergy states that a current stability study shows the impact of the loss of RBS at 1130 Megawatts-electric with LOCA motor sequencing would only cause a change in voltage at the offsite source of 0.69 kV assuming 2002 peak loading. The loss of RBS alone results in a change of 0.667 kV. Thus the required pre-event voltage of $220.524 + 0.69$ kV (or 221.214 kV) is less than the existing alarm point of 221.95 kV. Entergy also states that RBS Operations is proactive and contacts the system dispatcher when the initial low grid voltage alarm comes in at 0.98 per unit or 225 kV, which is considered an abnormal condition.

In their December 17, 2002, response, Entergy further provided information about the latest grid studies that were performed to determine the impact of various contingencies on RBS offsite sources. Eleven double contingencies were studied, including the loss of each transmission line out of Fancy Point and the loss of five nearby generation plants. The latest grid study shows the minimum grid voltage condition should be 1.008 per unit under 2003 spring light load conditions (worse than the 2005 summer peak case) with RBS off line. Under double contingency conditions, the grid drops to 0.989 per unit with the loss of Fancy Point to Big Cajun1 - 230 kV line under 2005 summer peak conditions, and to 0.991 per unit with the loss of four Big Cajun 230 kV units. All other double contingencies resulted in Fancy Point voltages over 1.00 per unit. Because the evaluation of future grid studies is important, Entergy

provided the following commitment: "Entergy will evaluate the adequacy of the low grid voltage alarm setpoint and the degraded voltage relay setpoints following completion of future grid stability studies. If the setpoints are found inadequate, actions will be taken to revise the setpoints. This will ensure that grid conditions do not degrade beyond those assumed in the current setpoint calculations without appropriate indication to plant operators."

The NRC staff finds that Entergy's response to the NRC staff concerns on this issue, and the alarm response and future grid study commitments, are acceptable. The NRC staff finds that reasonable controls for the implementation and the subsequent evaluation of the proposed changes pertaining to the above regulatory commitments are best provided by Entergy's administrative process, including its commitment management process. The above regulatory commitments do not warrant the creation of regulatory requirements (items requiring prior NRC approval of subsequent changes).

The NRC staff also finds that, based on the above discussion, the maximum allowable voltages of the degraded voltage relays are low enough to prevent inadvertent power supply transfer when the grid voltage is at its low value, but is still capable of providing sufficient voltage for reliable operation of safety equipment. This aspect of the design is, therefore, also acceptable.

3.1.2 Minimum Allowable Voltage

The minimum allowable voltage of the degraded voltage relays must be high enough to ensure that sufficient voltage is available for the safety related equipment to perform reliably. Entergy determined the value of the minimum allowable voltage of the degraded voltage relays using the total loop uncertainty. Entergy states that this methodology results in an adequate range of voltages in which the relay's trip setpoint may be adjusted while providing sufficient margin to the allowable values to account for instrument drift. The total loop uncertainty for the degraded voltage relays on the Division 1 and 2 4160 Vac buses was determined to be 22.9 Vac. The total loop uncertainty for the degraded voltage relays on the Division 3 4160 Vac bus was determined to be 23.4 Vac. From this, Entergy determined that the minimum allowable voltage for the degraded voltage relays on the Division 1 and 2 buses is 3689.0 Vac, and the minimum allowable voltage for the relays on the Division 3 bus is 3674.0 Vac.

Entergy states that the above values were validated by ensuring that all GL 89-10 applicable MOVs were capable of performing their safety function at these voltages. In addition, they state that all other loads were determined to have adequate voltage to operate, once minor modifications to certain 120 Vac loads are performed during the upcoming refueling outage (RF11). The modifications consist of transferring three instrumentation circuits from one 120 Vac panel board to another safety related panel of the same division to provide additional voltage (due to transformer tap differences). In the December 17, 2002, response, Entergy states that, after discussions with the instrumentation manufacturer, this instrumentation was determined to be operable in the degraded grid condition, but Entergy decided to transfer the loads to comply with normal design practices.

Based on the above discussion, the NRC staff finds that the minimum allowable voltage of the degraded voltage relays is high enough to ensure that sufficient voltage is available to safety-related equipment for them to perform reliably and is therefore acceptable.

3.2 Degraded Voltage Protection Time Delays

The allowable values for the time delay of the degraded voltage protection must be long enough to provide time for the offsite power supply and emergency equipment motor starting transients to recover to normal voltages, but short enough to ensure that offsite power separation will occur prior to degradation of the required equipment or operation of their individual equipment protection features.

3.2.1 Time Delay Allowable Values

Entergy performed a dynamic motor starting analysis for the initial emergency load sequence assuming the worst case drift on the load sequencing relays. This evaluation determined that the maximum time the voltage took to return to the reset value following a motor starting transient at 0.95 per unit grid voltage was approximately 3.5 seconds. The motor starting voltage transient at the approximate minimum allowable pickup value of the degraded voltage relays was determined to be approximately 3.8 seconds. Entergy therefore selected a minimum allowable time delay of 4.5 seconds for the LOCA short time degraded voltage time delay. The NRC staff finds that this minimum time delay is long enough to allow the degraded voltage protection system to override any normal motor starting transient and is, therefore, acceptable.

With regard to the maximum allowable value of the LOCA short time degraded voltage time delay, Entergy reviewed the time characteristic curves for motor circuit breakers. They found that a 5.7 second time delay for the maximum allowable value of the LOCA short time degraded voltage time delay was short enough to prevent breaker tripping of any safety motor that is attempting to start. The NRC staff finds that this maximum time delay is short enough to preclude tripping of individual safety related motor circuit breaker protection prior to offsite power separation via the degraded voltage relays following an actual degraded voltage condition, and is, therefore, acceptable.

3.3 Evaluation Summary

The NRC staff finds that the allowable value changes proposed for the setpoints of the degraded voltage relays and their associated time delays, along with the existing Low and Low-Low Grid Voltage alarms and associated commitment to revise the Low-Low Grid Voltage alarm response procedure, provide assurance that GDC 17 will continue to be met for degraded voltage events. The proposed amendment request is, therefore, acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Louisiana State official was notified of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC 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 the amendment involves no significant hazards consideration, and there has been no public comment on such finding (67 FR 42823, dated June 25, 2002). Accordingly, the 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 or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The Commission 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, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: J. Lazevnick

Date: January 16, 2003