Docket No. 50-416 January 4 994

Mr. C. Randy Hutchinson
Vice President, Operations GGNS
Entergy Operations, Inc.
Post Office Box 756
Port Gibson, Mississippi 39150

Dear Mr. Hutchinson:

SUBJECT: ISSUANCE OF AMENDMENT NO. 110 TO FACILITY OPERATING LICENSE NO. NPF-29 - GRAND GULF NUCLEAR STATION, UNIT 1 (TAC NO. M87778)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 110 to Facility Operating License No. NPF-29 for the Grand Gulf Nuclear Station, Unit 1. This amendment revises the Technical Specifications (TSs) in response to your application dated September 23, 1993.

The amendment deletes the current surveillance requirement for jet pump differential pressure measurement for operating loops when power is less than or equal to 25% rated thermal power (RTP) and replaces the requirement with a provision which, during operation at more than 25% RTP, allows continued operation if the jet pump surveillance is performed within 24 hours after 25% RTP is exceeded or within 4 hours after an associated recirculation loop is placed in service.

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

Sincerely,
ORIGINAL SIGNED BY:
Paul W. O'Connor, Senior Project Manager
Project Directorate IV-1
Division of Reactor Projects III/IV/V
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 110 to NPF-29
2. Safety Evaluation

cc w/enclosures:
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

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See next page

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Entergy Operations, Inc.

Grand Gulf Nuclear Station

cc:

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

ENTERGY OPERATIONS, INC.

SYSTEM ENERGY RESOURCES, INC.

SOUTH MISSISSIPPI ELECTRIC POWER ASSOCIATION

MISSISSIPPI POWER AND LIGHT COMPANY

DOCKET NO. 50-416

GRAND GULF NUCLEAR STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 110
License No. NPF-29

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

   A. The application for amendment by Entergy Operations, Inc. (the licensee) dated September 23, 1993, 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, 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 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.

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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-29 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 110, are hereby incorporated into this license. Entergy Operations, Inc. 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

Paul W Johnson

for William D. Beckner, Director
Project Directorate IV-1
Division of Reactor Projects III/IV/V
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical Specifications

Date of Issuance: January 4, 1994

ATTACHMENT TO LICENSE AMENDMENT NO. 110

FACILITY OPERATING LICENSE NO. NPF-29

DOCKET NO. 50-416

Replace the following page of the Appendix A Technical Specifications with the attached page. The revised page is identified by amendment number and contains vertical lines indicating the area of change.

REMOVE PAGE	INSERT PAGE
3/4 4-2	3/4 4-2

JET PUMPS

LIMITING CONDITION FOR OPERATION

3.4.1.2 All jet pumps shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITIONS 1 and 2.

ACTION:

With one or more jet pumps inoperable, be in at least HOT SHUTDOWN within 12 hours.

SURVEILLANCE REQUIREMENTS

4.4.1.2.1 Each of the above required jet pumps in an operating loop shall be demonstrated OPERABLE with THERMAL POWER in excess of 25% of RATED THERMAL POWER and at least once per 24 hours by determining recirculation loop flow, total core flow and diffuser-to-lower plenum differential pressure for each jet pump and verifying that no two of the following conditions occur:

a. The indicated recirculation loop flow differs by more than 10% from the established flow control valve position-loop flow characteristics.

b. The indicated total core flow differs by more than 10% from the established total core flow value derived from recirculation loop flow measurements.

c. The indicated diffuser-to-lower plenum differential pressure of any individual jet pump differs from established patterns by more than 10%.

The provisions of Specification 4.0.4 are not applicable provided the above surveillance is performed within 24 hours after reactor power exceeds 25% or 4 hours after the associated recirculation loop is in operation.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 110 TO FACILITY OPERATING LICENSE NO. NPF-29

ENTERGY OPERATIONS, INC., ET AL.

GRAND GULF NUCLEAR STATION, UNIT 1

DOCKET NO. 50-416

1.0 INTRODUCTION

By letter dated September 23, 1993, the licensee, Entergy Operations, Inc. (EOI or the licensee), submitted a request for changes to the Grand Gulf Nuclear Station, Unit 1 (GGNS) Technical Specifications (TSs). The change deletes the current jet pump differential pressure measurement for operating loops when power is less than or equal to 25% rated thermal power (RTP) and replaces it with a provision which, when operating with power in excess of 25% RTP, allows continued operation if the jet pump surveillance is performed within 24 hours of exceeding 25% RTP or within 4 hours of placing an associated recirculation loop in service.

2.0 EVALUATION

The proposed TS change removes the requirement to perform the jet pump differential pressure measurement surveillance on an operating loop when less than or equal to 25% rated thermal power (RTP) and replaces it with a provision which, when operating with power greater than 25% RTP, would allow continued operation if the surveillance is performed within 24 hours of exceeding 25% RTP or within 4 hours of placing an associated recirculation loop in service. The proposed change is an adoption of provisions stated in the bases of NUREG-1434, "Standard Technical Specifications for General Electric Plants, BWR/6" (Ref. 2), and previously approved for two boiling water reactors (BWRs) of similar vintage.

The licensee originally intended to submit this TS change with a future submittal of standard TS changes as part of its participation as the lead plant in the BWR Improved Technical Specification Program, but circumstances forced GGNS to make an early application. During a startup from a spurious scram, the plant power ascension was delayed due to problems with condenser vacuum. The power was being held at approximately 5% power, and when the surveillance was performed, GGNS was unable to meet the requirements for loop A. Because the power and flow were too low for meaningful flow data to be acquired, the NRC granted a Notice of Enforcement Discretion on September 20, 1993 (Ref. 8), to allow continued operation at less than or equal to 25% RTP with jet pump and loop flow indications not meeting the surveillance requirements. Since submitting the application, GGNS attempted a

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power ascension to determine the cause of the anomalous readings on the jet pump instrumentation. At power and flow levels that would allow meaningful and repeatable data to be collected, the licensee observed reactor water level oscillations of 10-15 inches and further indications of anomalous jet pump operation. The reactor was shut down, and, on further investigation of data and inspection of the jet pumps, it was found that jet pump #10 had failed and its mixer section had separated from the diffuser section. The surveillance had been able to indicate probable failure of a jet pump. This indication, along with the indications of oscillating water level, led to the initiation of an orderly shutdown of the plant in a timely manner.

Jet pump operability is an explicit assumption in the design basis loss-of-coolant accident (LOCA) analysis evaluated as part of GGNS Final Safety Analysis Report. The capability of reflooding the core to two-thirds (2/3) core height is dependent upon the structural integrity of the jet pumps. If the structural system, including the beam holding a jet pump in place, fails, jet pump displacement and performance degradation could occur, resulting in an increased flow area through the jet pump and a potential for a lower core flooding elevation. This could adversely affect the water level in the core during the reflood phase of a LOCA as well as the assumed blowdown flow during a LOCA (Ref. 2). Because a jet pump failure could reduce the margin of safety for emergency core cooling for postulated accidents and would place the plant outside of the assumptions for the design bases, this occurrence was judged to be safety related. Therefore, the TSs require that when one or more of the jet pumps are inoperable, the plant must be in at least HOT SHUTDOWN within 12 hours.

In response to the failures and crack indications of jet pump hold-down beams found at the Dresden, Quad Cities, and Pilgrim plants in 1980, the NRC issued Bulletin 80-07 (IEB 80-07, Ref. 3) to request nondestructive testing of the hold-down beams and surveillances that can help detect degraded or failed jet pump performance. The jet pump failure of concern is a complete mixer displacement due to jet pump beam failure. Jet pump plugging is also of concern since it adds flow resistance to the recirculation loop. A General Electric Service Information Letter (GE-SIL-330, Ref. 4) described the jet pump failures and recommended periodic monitoring of jet pump performance to provide early indication of jet pump beam failure. The indicated flow readings can be applied to diagnose a jet pump failure when it occurs. NUREG/CR-3052 (Ref. 5) presents the closeout of the jet pump failure bulletin and provides a justification for using either the IEB-80-07 or GE-SIL-330 surveillance requirements for showing jet pump operability. Significant degradation is indicated if the specified criteria confirm unacceptable deviations from established patterns or relations. Individual jet pumps in a recirculation loop typically do not have the same flow. The unequal flow is due to the drive flow manifold, which does not distribute flow equally to all risers. The flow (as indicated by jet pump diffuser-to-lower-plenum differential pressure) pattern or relationship of one jet pump to the loop average is repeatable. An appreciable change in this relationship is an indication that reduced (or increased) resistance has occurred in one of the jet pumps.

In order to obtain repeatable and meaningful differential pressure data, there must be sufficient flow through the recirculation loop. Due to the turbulence in the jet pump diffuser where the flow measurement pressure tap is located, the differential pressure signal is extremely noisy. When power and flow conditions are too low, the effects of natural circulation, moderator subcooling changes, and varying core differential pressure result in large data uncertainties. During low flow conditions, jet pump noise can approach the threshold response of the flow instruments. At power levels above 25% RTP, the flow conditions are such that meaningful data can be gathered and comparisons to the allowable deviations from baseline flow patterns can be made. A 24-hour frequency was specified in IEB-80-07 for the surveillance to adequately show jet pump operability and to be consistent with the recirculation loop operability verification.

Surveillance requirements were adopted by GGNS in TS Section 4.4.1.2.1, when in excess of 25% RTP and at least once per 24 hours, to show jet pump operability. The jet pumps are considered operable if, after determining the recirculation loop flow, total core flow, and diffuser-to-lower-plenum differential pressure for each jet pump, no two of the following conditions exist (Ref. 1):

a. The indicated recirculation loop flow differs by more than 10% from the established flow control valve position-loop flow characteristics.

b. The indicated total core flow differs by more than 10% from the established total core flow value derived from recirculation loop flow measurements.

c. The indicated diffuser-to-lower-plenum differential pressure of any individual jet pump differs from established patterns by more than 10%.

As part of the GGNS initial Startup Test Program, an additional surveillance was added to allow entry into power operation while preparing to verify yet pump operability (Ref. 6). This surveillance allows continued operation at less than or equal to 25% RTP provided the diffuser-to-lower-plenum differential pressures of the individual jet pumps are determined to be within 50% of the loop average within 72 hours of entering OPERATIONAL CONDITION 2 and at least once per 24 hours thereafter. The 50% criterion (when power is less than or equal to 25% RTP) was based on an extrapolation of information provided in GE-SIL-330. The allowed deviation is larger at these lower power levels to account for the larger data uncertainties in the jet pump differential pressure measurement.

After more review of jet pump operability as part of the Improved Technical Specification Program (ITSP), the NRC staff included jet pump surveillance requirements bases in NUREG-1434 for use in developing plant specific TS. The bases include two notes that make allowances for when the surveillance must be completed. Note 1 allows a delay in the completion of the surveillance of up

to 4 hours after the associated recirculation loop is in operation, since the checks can only be performed during jet pump operation. This time delay is acceptable in order to establish conditions appropriate for data collection and evaluation. Note 2 allows the surveillance to be omitted when core thermal power is less than or equal to 25% RTP. The surveillance interval times are adequate for the timely detection of a jet pump failure and meet the surveillance requirements for closeout and resolution of the jet pump integrity issue (Refs. 5 and 7).

In their application, the licensee proposes to delete the section that pertains to operation at power less than or equal to 25% RTP and to clarify the existing surveillance requirements of TS Section 4.4.1.2.1 by adopting wording consistent with that being adopted for plant-specific TS development in NUREG-1434. The requested change does not affect the requirement to shut down in case of an inoperable jet pump, but delays the performance of the surveillance requirements until the plant conditions allow meaningful information about jet pump operability to be gathered. The flexibility to proceed to greater than 25% RTP and then commence the surveillance of the jet pump every 24 hours is consistent with TSs previously approved for the Perry Nuclear Power Plant and the River Bend Station.

The TS change proposed by the licensee is consistent with the wording in the Standard TS Bases of NUREG-1434. Because data measurements made at power levels less than or equal to 25% RTP have large uncertainties, it is difficult to draw conclusions about jet pump operability. There is no significant effect due to delaying the surveillance until power exceeds 25% RTP. The reasoning given for the TS change to the jet pump operability surveillance has been reviewed and the staff concludes it is acceptable. The proposed TS change is acceptable for GGNS.

The following changes to the Reactor Coolant System, Jet Pumps Section of the GGNS TS are proposed in the application:

a. Delete Section 4.4.1.2.2 and the asterisk (*) note on page 3/4 4-2.

- and -

b. Add a new paragraph to Section 4.4.1.2.1 with wording: "The provisions of Specification 4.0.4 are not applicable provided the above surveillance is performed within 24 hours after reactor power exceeds 25% or 4 hours after the associated recirculation loop is in operation."

Upon review of the application and the proposed Technical Specification amendment, the staff concludes that plant safety is not adversely affected by the change and that it is acceptable.

3.0 STATE CONSULTATION

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

4.0 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 and changes in surveillance requirements. 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 (58 FR 52984). 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.

5.0 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.

6.0 REFERENCES

1. C. R. Hutchinson, EOI, letter (GNRO-93/00118) to USNRC, September 23, 1993.

2. NUREG-1434, "Standard Technical Specifications for General Electric Plants, BWR/6," September 1992.

3. NRC Bulletin IEB 80-07, "BWR Jet Pump Assembly Failure," April 4, 1980.

4. General Electric Service Information Letter No. 330, "Jet Pump Assembly Failures," June 9, 1980.

5. NUREG/CR-3052, "Closeout of IE Bulletin 80-07: BWR Jet Pump Assembly Failure," November 1984.

6. NUREG-0831, "Safety Evaluation Report Related to the Operation of Grand Gulf Nuclear Station, Units 1 & 2," August 1984.

7. NUREG-0933, "A Prioritization of Generic Safety Issues," Issue B-12: BWR Jet Pump Integrity, August 1987.

8. Notice of Enforcement Discretion, NRC Region II, September 20, 1993.

Principal Contributor: Jonathan Witter

Date: January 4, 1994