

UNITED STATES NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

March 4, 2009

Vice President, Operations Entergy Operations, Inc. Grand Gulf Nuclear Station P.O. Box 756 Port Gibson, MS 39150

SUBJECT: GRAND GULF NUCLEAR STATION, UNIT 1 - ISSUANCE OF AMENDMENT RE: SURVEILLANCE REQUIREMENTS FOR DIESEL GENERATOR SLOW-START TESTING (TAC NO. MD9641)

Dear Sir or Madam:

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 182 to Facility Operating License No. NPF-29 for the Grand Gulf Nuclear Station, Unit 1. This amendment consists of changes to the Technical Specifications (TSs) in response to your application dated September 11, 2008.

The amendment revises several surveillance requirements (SRs) and adds SR 3.8.1.21 in Technical Specification (TS) 3.8.1, "AC [alternating current] Sources - Operating," and TS 3.8.2, "AC Sources - Shutdown." The changes allow the slow-start testing sequence of the diesel generators in order to reduce the stress and wear on the equipment.

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

Sincerely,

Carl F. Lyon, Project Manager Plant Licensing Branch IV Division of Operating Reactor Licensing Office of Nuclear Reactor Regulation

Docket No. 50-416

Enclosures:

- 1. Amendment No. 182 to NPF-29
- 2. Safety Evaluation

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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

ENTERGY MISSISSIPPI, INC.

DOCKET NO. 50-416

GRAND GULF NUCLEAR STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 182 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 11, 2008, 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.

- 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) <u>Technical Specifications</u>

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 182 are hereby incorporated in the 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 and shall be implemented within 45 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Milent T. Markley

Michael T. Markley, Chief Plant Licensing Branch IV Division of Operating Reactor Licensing Office of Nuclear Reactor Regulation

Attachment: Changes to the Facility Operating License No. NPF-29 and the Technical Specifications

Date of Issuance: March 4, 2009

ATTACHMENT TO LICENSE AMENDMENT NO. 182

FACILITY OPERATING LICENSE NO. NPF-29

DOCKET NO. 50-416

Replace the following pages of the Facility Operating License No. NPF-29 and the Appendix A, Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Facility Operating License

Remove	Insert
-4-	-4-

Technical Specifications

Remove	Insert
3.8-5	3.8-5
3.8-6	3.8-6
3.8-16	3.8-16
3.8-21	3.8-21

- SERI is required to notify the NRC in writing (b) prior to any change in (i) the terms or conditions of any new or existing sale or lease agreements executed as part of the above authorized financial transactions, (ii) the GGNS Unit 1 operating agreement, (iii) the existing property insurance coverage for GGNS Unit 1 that would materially alter the representations and conditions set forth in the Staff's Safety Evaluation Report dated December 19, 1988 attached to Amendment No. 54. In addition, SERI is required to notify the NRC of any action by a lessor or other successor in interest to SERI that may have an effect on the operation of the facility.
- C. The license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:
- (1) Maximum Power Level

Entergy Operations, Inc. is authorized to operate the facility at reactor core power levels not in excess of 3898 megawatts thermal (100 percent power) in accordance with the conditions specified herein.

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 182 are hereby incorporated into this license. Entergy Operations, Inc. shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

The Surveillance Requirements (SRs) for Diesel Generator 12 contained in the Technical Specifications and listed below, are not required to be performed immediately upon implementation of Amendment No. <u>169</u>. The SRs listed below shall be successfully demonstrated at the next regularly scheduled performance.

> SR 3.8.1.9, SR 3.8.1.10, and SR 3.8.1.14

ACTIONS (continued)

CONDITION		REQUIRED ACTION		COMPLETION TIME	
Н.	Three or more required AC sources inoperable.	Н.1	Enter LCO 3.0.3.	Immediately	

SURVEILLANCE REQUIREMENTS

		FREQUENCY	
SR	3.8.1.1	Verify correct breaker alignment and indicated power availability for each required offsite circuit.	7 days
SR	3.8.1.2	 Performance of SR 3.8.1.21 satisfies this SR. All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. A modified DG start involving idling and gradual acceleration to synchronous speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.21 must be met. 	
		Verify each DG starts from standby conditions and achieves steady state voltage \geq 3744 V and \leq 4576 V and frequency \geq 58.8 Hz and \leq 61.2 Hz.	31 days

(continued)

	SURVEILLANCE	REQUIREMENTS	(continued)
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		SURVEILLANCE				
SR	3.8.1.3	 DG loadings may include gradual loading as recommended by the manufacturer. 				
		2. Momentary transients outside the load range do not invalidate this test.				
		 This Surveillance shall be conducted on only one DG at a time. 				
		4. This SR shall be preceded by, and immediately follow, without shutdown, a successful performance of SR 3.8.1.2 or SR 3.8.1.21.				
		Verify each DG operates for ≥ 60 minutes at a load ≥ 5450 kW and ≤ 5740 kW for DG 11 and DG 12, and ≥ 3300 kW for DG 13.	31 days			
SR	3.8.1.4	Verify each DG day tank contains ≥ 220 gal of fuel oil.	31 days			
SR	3.8.1.5	Check for and remove accumulated water from each day tank.	31 days			
SR	3.8.1.6	Verify the fuel oil transfer system operates to automatically transfer fuel oil from the storage tank to the day tank.	31 days			
SR	3.8.1.7	Verify the load shedding and sequencing panels respond within design criteria.	31 days			

(continued)

SURVEILLANCE REQUIREMENTS (continued)

		FREQUENCY	
SR	3.8.1.20	 NOTE	10 years
SR	3.8.1.21	 NOTE	184 days

SURVEILLANCE REQUIREMENTS

	FREQUENCY	
SR 3.8.2.1	 NOTES- 1. The following SRs are not required to be performed: SR 3.8.1.3, SR 3.8.1.9 through SR 3.8.1.11, SR 3.8.1.13 through SR 3.8.1.16, SR 3.8.1.18, and SR 3.8.1.19. 2. SR 3.8.1.12 and SR 3.8.1.19 are not required to be met when the associated ECCS subsystem(s) are not required to be OPERABLE per LCO 3.5.2, "ECCS - Shutdown." For AC sources required to be OPERABLE, the following SRs are applicable: SR 3.8.1.1 SR 3.8.1.7 SR 3.8.1.14 SR 3.8.1.2 SR 3.8.1.10 SR 3.8.1.15 SR 3.8.1.3 SR 3.8.1.10 SR 3.8.1.16 SR 3.8.1.4 SR 3.8.1.11 SR 3.8.1.19 SR 3.8.1.2 SR 3.8.1.11 SR 3.8.1.19 SR 3.8.1.21 	In accordance with applicable SRs



SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 182 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 application dated September 11, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML082560136), Entergy Operations, Inc. (the licensee), requested changes to the Technical Specifications (TSs) for Grand Gulf Nuclear Station, Unit 1 (GGNS).

The proposed changes would revise several TS surveillance requirements (SRs) and add SR 3.8.1.21 in TS 3.8.1, "AC [alternating current] Sources - Operating," and TS 3.8.2, "AC Sources - Shutdown." The changes would allow the slow-start testing sequence of the diesel generators (DGs) in order to reduce the stress and wear on the equipment.

Specifically, the licensee proposes the following changes:

- SR 3.8.1.2 would be revised to eliminate the start time requirements. Additionally, two notes would be added to the revised SR 3.8.1.2. Note 1 would indicate that performance of the new SR 3.8.1.21 (which will be identical to the original SR 3.8.1.2 with the exception of a 184-day frequency and which is more restrictive than revised SR 3.8.1.2) would satisfy the requirements of the revised SR 3.8.1.2. The second note, added as Note 3, would clarify that if modified procedures, which result in gradual acceleration to synchronous speed, are not used, then the start time requirements of the new SR 3.8.1.21 would apply.
- The proposed change to SR 3.8.1.3 would reflect the addition of the new SR 3.8.1.21 (i.e., that SR 3.8.1.2 or SR 3.8.1.21 may be used to start the DG for the purposes of performing SR 3.8.1.3).
- New SR 3.8.1.21 would be added. New SR 3.8.1.21 is identical to existing SR 3.8.1.2 with the exception of the new Frequency of 184 days.
- Editorial changes to SR 3.8.2.1 would be made to reflect the addition of the new SR 3.8.1.21.

2.0 REGULATORY EVALUATION

The following regulatory requirements and guidance documents were applicable to the NRC staff's review of the licensee's amendment request:

Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Appendix A , General Design Criterion (GDC) 17, "Electric power systems," requires, in part, that "An onsite electric power system and an offsite electric power system shall be provided to permit functioning of structures, systems, and components important to safety...The onsite electric power supplies, including the batteries, and the onsite electric distribution system, shall have sufficient independence, redundancy, and testability to perform their safety functions assuming a single failure. Electric power from the transmission network to the onsite electric distribution system shall be supplied by two physically independent circuits (not necessarily on separate rights of way) designed and located so as to minimize to the extent practical the likelihood of their simultaneous failure under operating and postulated accident and environmental conditions...Provisions shall be included to minimize the probability of losing electric power from any of the remaining supplies as a result of, or coincident with, the loss of power generated by the nuclear power unit, the loss of power from the transmission network, or the loss of power from the onsite electric power supplies."

GDC 18, "Inspection and testing of electric power systems," requires, in part, that "Electric power systems important to safety shall be designed to permit appropriate periodic inspection and testing of important areas and features"

In Section 50.36 of 10 CFR Part 50, the Commission established its regulatory requirements related to the content of the TSs. Pursuant to 10 CFR 50.36, TSs are required to include items in the following categories: (1) safety limits, limiting safety system settings, and limiting control settings; (2) limiting conditions for operation (LCOs); (3) SRs; (4) design features; and (5) administrative controls.

Paragraph 50.36(c)(3) of 10 CFR states, "Surveillance requirements are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met."

Regulatory Guide (RG) 1.9, Revision 3, "Selection, Design, Qualification, and Testing of Emergency Diesel Generator Units Used As Class 1E Onsite Electric Power Systems at Nuclear Power Plants," dated July 1993 (ADAMS Accession No. ML003739929), provided guidance with respect to design and testing of safety-related DGs.

Generic Letter (GL) 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," dated July 2, 1984 (ADAMS Accession No. ML031180013), identified the NRC staff's approach to assess and enhance, where necessary, the reliability of DGs at all operating plants.

NUREG-1366, "Improvements to Technical Specifications Surveillance Requirements," dated December 1992, provided recommendations based on a comprehensive NRC staff examination of SRs. NUREG/CR-5057, "Aging Mitigation and Improved Programs for Nuclear Service Diesel Generators," dated December 1989 (ADAMS Accession No. ML040360146), identified fast starting and fast loading tests of DGs as an aging stressor.

The NRC staff compared the proposed changes with NUREG-1434, "Standard Technical Specifications General Electric Plants, BWR/6," for consistency.

3.0 TECHNICAL EVALUATION

At GGNS, the licensee has replaced the existing Division 1 and 2 DG governors with a model that will accelerate the engines to operating speed within a range of approximately 15 to 40 seconds in the test mode. This is considered a slow start for these DGs, which are designed to start in less than 10 seconds, and typically start in less than 8 seconds. The licensee proposes to revise the SRs for TS 3.8.1 and 3.8.2 and add a new SR to TS 3.8.1 to require monthly DG testing by idling and gradually accelerating each DG to operating speed. The purpose of the change to a monthly slow-start test mode is to reduce stress and wear on the equipment.

As noted by the licensee, the TS surveillances which require verification of a fast start on an 18-month frequency are not affected by the proposed changes. In addition, the licensee proposed adding a new surveillance to test the DG fast start on a 184-day frequency. Therefore, the licensee would continue to be required to periodically verify the capability of the DGs to achieve the start times assumed in the accident analyses.

The existing GGNS TS SRs 3.8.1 and 3.8.2 require routine DG testing from standby conditions by accelerating the DG to operating voltage and frequency (steady state conditions) within 10 seconds. This method of testing of the DG is known as "fast start" surveillance testing in the industry. NRC-sponsored aging research on nuclear grade DGs, documented in NUREG/CR-5057, identified fast starting and loading of DGs as an aging stressor. NUREG/CR-5057 states that test programs involving slow starting and loading have little aging effects on DGs. By contrast, fast starting and loading of DGs can produce significant engine stress and wear. The NRC staff concluded that the overall reliability and availability of DGs could be improved by performing DG starts for surveillance testing using engine prelube and other manufacturer recommended procedures to reduce engine stress and wear. However, the staff also determined that the demonstration of fast-start capability of DGs from standby conditions could not be totally eliminated, because the design basis for the plant requires such capability. In view of the above, the staff concluded that the frequency of fast-start tests from standby conditions of DGs should be decreased from once per 30 days to once per 184 days. The NRC issued GL 84-15 on July 2, 1984, to communicate to the industry the benefit of reducing the number of fast-start surveillance tests for DGs. GL 84-15 contained provisions for DG fast starts (within 10 seconds) from standby conditions at least once per 184 days. The staff recommended that all other DG starts for the purpose of surveillance testing be performed as slow starts to minimize the stress and wear on the engine. The staff also documented this guidance in paragraph 2.2.1 of RG 1.9, Revision 3, which stated that the DG can be slow started for surveillance tests and reach rated speed on a schedule prescribed to minimize stress and wear on the engine. GGNS complies with Revisions 2 and 3 of RG 1.9 as detailed in GGNS Updated Final Safety Analysis Report Section 8.3.1.2.1 "Compliance."

NUREG-1366 stated a concern with this relaxation of fast starting, that the slow-start feature might be incorporated at the cost of reducing DG reliability by eliminating a redundant overspeed protection in the form of the backup mechanical governor. To resolve this concern, the licensee stated that the backup mechanical governor will remain in service during the slow start.

The three DGs at GGNS are designated as DG 11, DG 12, and DG 13 (or Division 1 DG, Division 2 DG, and Division 3 DG, respectively). These three DGs were originally equipped with governors that do not have the capability of slow starting the engines. Therefore, the licensee initially chose not to request to amend the TSs to allow slow starting of the DGs. During its fall 2008 refueling outage (RF16), the licensee replaced the governors of DG 11 and DG 12 with a model that will accelerate the engines to operating speed within 15 to 40 seconds (slow start) in the test mode. The licensee has no plans to change the governor of DG 13 at this time, but might choose to do so in the future to permit slow starting to reduce the stress and wear on the engine. The licensee proposed the changes in this amendment request for all three DGs so that slow start routine monthly testing of DGs can be performed as the governors are replaced. Routine monthly testing of DGs 11 and 12 will consist of fast starts until the governors are replaced and until this license amendment request is issued. DG 13 will continue to be fast started during routine monthly testing, unless its current design is modified in the future. To demonstrate fast-start test capability for DGs from standby conditions (a requirement of the plant design basis), the licensee proposed adding new SR 3.8.1.21, which will require fast-start testing of DGs at 184-day intervals for the DGs that use the slow-start capability during routine monthly testing.

The NRC staff finds that the proposed revisions to SR 3.8.1.2 to eliminate the start time requirements for the DGs, and add Notes 1 and 3, are in conformance with the guidance of GL 84-15 and RG 1.9, Revision 3, paragraph 2.2.1. When the DGs are in standby for emergency operation, they will continue to fast start in accordance with their emergency function, which is consistent with NUREG-1434. Further, the fast-start capability of the DGs will be verified every 184 days by performing new SR 3.8.1.21 to assure that the DGs can perform their intended safety functions. Since the proposed changes are consistent with the regulatory guidance, the NRC staff finds the proposed changes acceptable.

The NRC staff finds the proposed revision to SR 3.8.1.3 to reflect the addition of SR 3.8.1.21 (i.e., that SR 3.8.1.2 or SR 3.8.1.21 may be used to start the DG for the purposes of performing SR 3.8.1.3) to be editorial in nature and, therefore, acceptable. This surveillance requires the DGs to be tested every 31 days, which remains unchanged. New SR 3.8.1.21 is identical to the original SR 3.8.1.2, except that the frequency is 184 days. SR 3.8.1.21 includes the start time requirements for the DGs that were in the original SR 3.8.1.2, to ensure that the DGs can perform their intended safety functions. Based on the above, the staff finds the proposed changes acceptable.

The NRC staff finds the additional proposed changes to SR 3.8.2.1 (i.e., editorial changes to reflect the addition of SR 3.8.1.21) to be editorial in nature, and therefore, acceptable.

The licensee also proposed changes to the TS Bases to be consistent with the proposed changes to the TSs. The NRC staff has no objections to the proposed changes to the TS Bases.

Since the proposed changes are consistent with GL 84-15, RG 1.9, Revision 3, NUREG-1366, NUREG-1434, and NUREG/CR-5057, and comply with the requirements of 10 CFR 50.36, GDC 17, and GDC 18, the NRC staff finds the proposed changes acceptable.

4.0 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.

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 and changes a surveillance requirement. 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 published in the *Federal Register* on October 7, 2008 (73 FR 58673). Accordingly, the amendments meet 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 <u>CONCLUSION</u>

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 amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: M. McConnell

Date: March 4, 2009

Vice President, Operations Entergy Operations, Inc. Grand Gulf Nuclear Station P.O. Box 756 Port Gibson, MS 39150

SUBJECT: GRAND GULF NUCLEAR STATION, UNIT 1 - ISSUANCE OF AMENDMENT RE: SURVEILLANCE REQUIREMENTS FOR DIESEL GENERATOR SLOW-START TESTING (TAC NO. MD9641)

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Sincerely,

/RA/

Carl F. Lyon, Project Manager Plant Licensing Branch IV Division of Operating Reactor Licensing Office of Nuclear Reactor Regulation

Docket No. 50-416

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