

March 16, 2007

Mr. William R. Brian
Vice President of Operations
Grand Gulf Nuclear Station
Entergy Operations, Inc.
P.O. Box 756
Port Gibson, MS 39150

SUBJECT: GRAND GULF NUCLEAR STATION, UNIT 1 - ISSUANCE OF AMENDMENT
RE: A TECHNICAL SPECIFICATION CHANGE TO ALLOW USE OF
CONTROL ROD ASSEMBLIES WITH DIFFERENT CONTROL MATERIAL
(TAC NO. MD4052)

Dear Mr. Brian:

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 174 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 January 18, 2007.

The amendment revised the description of the control rod assemblies in Grand Gulf Nuclear Station, Unit 1, TS 4.2.2, "Control Rod Assemblies," to allow the use of hafnium as an additional type of control material.

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,

/RA/

Bhalchandra Vaidya, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-416

Enclosures: 1. Amendment No. 174 to NPF-29
2. Safety Evaluation

cc w/encls: See next page

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ADAMS Accession Nos. Pkg ML070530644 (Amendment/License ML070530648; TS Pgs ML070530654)

OFFICE	NRR/LPL4/PM	NRR/LPL4/LA	NRR/SBWB/BC	NRR/SNPB/BC	NRR/ITSB/BC	OGC - NLO	NRR/LPL4/BC
NAME	BVaidya	LFeizollahi	GCranston	AMendiola	TKobetz	JRund	DTerao
DATE	3/14/07	3/14/07	2/27/07	2/27/07	2/27/07	3/6/07	3/16/07

OFFICIAL RECORD COPY

Grand Gulf Nuclear Station

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November 2006

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. 174
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 January 18, 2007, 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 and paragraph 2.C.(2) of Facility Operating License No. NPF-29, as indicated in the attachment to this license amendment.
3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

David Terao, 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 16, 2007

ATTACHMENT TO LICENSE AMENDMENT NO. 174

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

<u>Remove</u>	<u>Insert</u>
4	4

Technical Specifications

<u>Remove</u>	<u>Insert</u>
4.0-1	4.0-1

(b) SERI is required to notify the NRC in writing 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. 174 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. 169. 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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 174 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 January 18, 2007 (Reference 1), Entergy Operations, Inc., et al. (the licensee), requested changes to the Technical Specifications (TSs) for Grand Gulf Nuclear Station, Unit 1 (GGNS).

The proposed change would revise the description of the control rod assemblies in GGNS, TS 4.2.2, "Control Rod Assemblies," to allow the use of hafnium as a type of control material, in addition to the current control material boron carbide. The revised GGNS, TS 4.2.2 would allow the use of control rod assemblies containing "boron carbide, hafnium metal, or both."

The licensee plans to replace eight control rods at GGNS during the upcoming spring refueling outage with the General Electric (GE) Marathon control rod design, which incorporates many design enhancements. The current GGNS control rod design consists of a sheathed cruciform with four blades. Each blade of the cruciform consists of a U-shaped sheath that contains 18 to 21 cylindrical absorber tubes of high-purity Type 304 stainless steel filled with compacted boron carbide (B_4C) powder. The primary difference between the Marathon control rod and the previously approved designs is the use of externally square absorber tubes that are welded full length to each other to form the four wings of the Marathon control rod.

2.0 REGULATORY EVALUATION

The regulatory requirements and guidance which the Nuclear Regulatory Commission (NRC) staff considered in its review of the application are as follows:

1. Section 50.36 of Title 10 of the *Code of Federal Regulations* (10 CFR), "Technical specifications," specify the requirements for the content of the TSs. The regulations in 10 CFR 50.90, "Application for amendment of license or construction permit," allow a licensee to amend or change the original license application. Section 50.92 of 10 CFR, "Issuance of amendment," specifies that the NRC staff will be guided by the considerations which govern the issuance of initial licenses to the extent applicable and appropriate in determining whether an amendment will be issued to the applicant.

2. Part 50 of 10 CFR, Appendix A, General Design Criterion (GDC) 4, requires that structures, systems, and components important to safety be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents.
3. Part 50 of 10 CFR, Appendix A, GDC 10 requires that the reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that specified acceptable fuel design limits (SAFDLs) are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences (AOOs).
4. Part 50 of 10 CFR, Appendix A, GDC 26 requires that control rods shall be capable of reliably controlling reactivity changes to assure that under conditions of normal operation, including AOOs such as stuck rods, SAFDLs are not exceeded.
5. Part 50 of 10 CFR, Appendix A, GDC 29 requires that the protection and reactivity control systems shall be designed to assure an extremely high probability of accomplishing their safety functions in the event of AOOs.
6. The Design Basis Accident (DBA) and transient analyses in the GGNS Updated Final Safety Analysis Report assume that all of the control rods scram at a specified insertion rate. The resulting negative scram reactivity forms the basis for determination of plant thermal limits (for example, minimum critical power ratio). Surveillance of each individual control rod scram time ensures the scram reactivity assumed in the DBA and transient analyses can be met. The control rod scram time testing meets the requirements of Criterion 3 of 10 CFR 50.36(c)(2)(ii).

3.0 TECHNICAL EVALUATION

TS 4.2.2 contains a simplified description of the control rod assemblies including the number of control rods in the core, basic shape of the control rod in the horizontal plane, and the control material. The proposed TS 4.2.2 change to allow the use of hafnium as a type of control material, in addition to the current control material boron carbide, is consistent with the Standard TS for Boiling-Water Reactor (BWR)/6, NUREG-1434, "Standard Technical Specifications General Electric Plants, BWR/6," Revision 3.0 (Reference 2) for control assemblies. The lack of reference to other neutron absorbing materials in current TS 4.2.2 precludes the use of control rod designs utilizing a different composition of control materials such as hafnium. The licensee's submission stated that the ability to utilize different control rod designs containing hafnium would be beneficial in achieving longer control rod lifetimes, thus resulting in a smaller number of control rods having to be replaced over the life of the plant. Other benefits include a reduction in overall waste handling, waste storage, fuel movement, and core component handling associated with blade replacement activities, which may result in an overall improvement in refueling outage safety.

The licensee plans to replace eight control rods at GGNS during the upcoming spring refueling outage with the GE Marathon control rod design. The NRC has previously approved the GE topical report, "GE Marathon Control Rod Assembly," NEDE-31758P-A (Reference 3), which includes the information required to support the licensing basis for implementation of the

Marathon control rod assembly in GE BWR cores. The industry testing and plant operational experience have demonstrated that the Marathon control rod is compatible with the environmental conditions associated with normal operation, maintenance, and testing.

In its submission, the licensee stated, and the NRC staff agrees, that the change does not significantly affect the neutronic characteristics of the control rods since the hafnium containing rods are designed to be compatible with the existing design and reload licensing criteria, there is no significant change in the margin of safety, the Control Rod Drive system (CRD) does not require any modification to accommodate the Marathon control rod, and the CRD system's extremely high probability of accomplishing its safety functions in the event of AOOs is not affected. Also, the required scram insertion times are not affected by the proposed TS change. Therefore, the NRC staff finds that the proposed TS 4.2.2 change is acceptable.

4.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION (NSHCD):

The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration, and published for public comments, such finding on February 13, 2007 (72 FR 6782). Because this amendment is being issued after the 30-day comment period and before the expiration of the 60-day period providing opportunity to request a hearing, a final NSHCD is included in this safety evaluation.

As required by 10 CFR 50.91(a), the licensee, in its submission, provided its analysis of the issue of no significant hazards consideration. The NRC staff has reviewed the licensee's analysis against the standards of 10 CFR 50.92(c). The NRC staff's review is presented below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The NRC has specifically approved the use of hafnium as neutron absorbing material for use in BWR control rod assemblies. The use of hafnium in control rods as a neutron absorber material does not significantly alter the neutronic or mechanical functional characteristics of the control rods. Control rod designs using hafnium have been successfully used in other BWRs. Since control rods that utilize hafnium have a longer lifetime, the probability of some accidents involving the handling, on-site storage, and shipping of irradiated rods will actually be reduced. The proposed change does not alter the required number of control rods nor does it affect any of the specifications related to the control rods (e.g., the shutdown margin and scram timing requirements are unaffected).

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The application of a control rod design using hafnium as an absorber material does not produce any new mode of plant operation or alter the control rods in such a way as to affect their function or operability since the new control rods are designed to be compatible with the existing control rods.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

Response: No.

The proposed change does not significantly affect the neutronic or mechanical characteristics of the control rods since the hafnium containing control rods are designed to be compatible with the existing design and reload licensing criteria; therefore, there is no significant change in the margin of safety. It does not change the required number of existing control rods. It does not affect the existing Technical Specifications related to control rods (e.g., required shutdown margin and scram time, etc.).

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

The NRC staff has determined, based on this review, that the three standards of 10 CFR 50.92(c) are satisfied. Therefore, the NRC staff has determined that the amendment request involves no significant hazards consideration.

5.0 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.

6.0 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 published February 13, 2007 (72 FR 6782). 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.

7.0 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.

8.0 REFERENCES

1. Entergy Operations, Inc., License Amendment Request, "Request for a Technical Specification Change to Allow Use of Control Rod Assemblies With Different Control Material," dated January 18, 2007, Agencywide Documents and Access Management System (ADAMS) Accession No. ML070230083.
2. NUREG-1434, "Standard Technical Specifications General Electric Plants, BWR/6," Revision 3.0, dated March 2004.
3. GE Topical Report, NEDE-31758P-A, "GE Marathon Control Rod Assembly," October 1991.

Principal Contributors: S. Wu, SNPB
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Date: March 16, 2007