

November 4, 2003

Mr. Jeff S. Forbes
Vice President, Operations GGNS
Entergy Operations, Inc.
P. O. Box 756
Port Gibson, MS 39150

SUBJECT: GRAND GULF NUCLEAR STATION, UNIT 1 - ISSUANCE OF AMENDMENT
RE: CHANGE TO THE REACTOR VESSEL MATERIAL SURVEILLANCE
PROGRAM (TAC NO. MB8393)

Dear Mr. Forbes:

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 160 to Facility Operating License No. NPF-29 for the Grand Gulf Nuclear Station, Unit 1. This amendment revises the Updated Final Safety Analysis Report (UFSAR) in response to your application dated April 3, 2003.

The amendment revises the UFSAR to change the Reactor Vessel Material Surveillance Program. The change will reflect participation in the Boiling Water Reactor Vessel and Internals Project Integrated Surveillance Program.

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.

Be aware that the changes to the UFSAR document are controlled in accordance with the requirements of Title 10 of the *Code of Federal Regulations*, Section 50.59, "Changes, tests, and experiments."

Sincerely,

/RA by M.Webb for/

Bhalchandra Vaidya, Project Manager, Section 1
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-416

Enclosures: 1. Amendment No. 160 to NPF-29
2. Safety Evaluation

cc w/encls: See next page

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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.160
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 April 3, 2003, 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, by Amendment No. 160, the license is amended to authorize revision to the Updated Final Safety Analysis Report (UFSAR), as set forth in the application for amendment by the licensee dated April 3, 2003. The licensee shall update the UFSAR to incorporate the revision to the basis for compliance with the requirements of Appendix H to 10 CFR Part 50, "Reactor Vessel Material Surveillance Program Requirements," as described in the amendment application of April 3, 2003, and the staff Safety Evaluation attached to this amendment, and shall submit the revised description authorized by these amendments with the next update of the UFSAR.
3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days from the date of issuance. The UFSAR changes shall be implemented in the next periodic update to the UFSAR in accordance with 10 CFR 50.71(e).

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

Date of Issuance: November 4, 2003

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 160 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 April 3, 2003 (Reference 1), Entergy Operations, Inc., et al. (Entergy or the licensee), requested changes to the Updated Final Safety Analysis Report (UFSAR) for Grand Gulf Nuclear Station, Unit 1 (GGNS), to incorporate the Boiling Water Reactor (BWR) Vessel and Internals Project (BWRVIP) Integrated Surveillance Program (ISP) into the GGNS licensing basis in accordance with U. S. Nuclear Regulatory Commission (NRC) Regulatory Issue Summary 2002-05, "NRC Approval of Boiling Water Reactor Pressure Vessel Integrated Surveillance Program," dated April 8, 2002. Specifically, the proposed changes would revise the Reactor Vessel Material Surveillance Program requirements in Section 5.3 of the UFSAR to reflect participation in the BWRVIP ISP. Under the BWRVIP ISP, the test specimens currently in the GGNS reactor capsules need not be removed or tested, because other BWRVIP ISP participants will remove and test specimens that represent the GGNS vessel materials. The GGNS capsule withdrawal schedule described in the UFSAR will refer to the withdrawal time as "deferred" since they will be retained in the reactor for contingency.

The BWRVIP Reactor Pressure Vessel (RPV) ISP was submitted for NRC staff review and approval in topical reports BWRVIP-78, "BWR Vessel and Internals Project, BWR Integrated Surveillance Program Plan" (Reference 2), and BWRVIP-86, "BWR Vessel and Internals Project, BWR Integrated Surveillance Program Implementation Plan" (Reference 3). Additional information necessary to establish the technical basis for, and proposed implementation of, the BWRVIP ISP was provided in letters from the BWRVIP to the NRC dated December 15, 2000 (Reference 4), and May 30, 2001 (Reference 5). The NRC staff approved the proposed BWRVIP ISP in a safety evaluation (SE) which was provided to the BWRVIP by letter dated February 1, 2002 (Reference 6). However, the NRC staff SE required that plant-specific information be provided by BWR licensees who wish to implement the BWRVIP ISP for their facilities. Reference 1 addressed the plant-specific information required in the Reference 6 SE.

2.0 REGULATORY EVALUATION

The staff finds that the licensee in Reference 1, Section 5.0 identified the applicable regulatory requirements. The regulatory requirements for which the NRC staff based its acceptance are described below.

Nuclear power plant licensees are required by Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Appendix H, to implement RPV surveillance programs to "...monitor changes in the fracture toughness properties of ferritic materials in the reactor vessel beltline region...which result from exposure of these materials to neutron irradiation and the thermal environment...." Two specific alternatives are provided with regard to the design of a facility's RPV surveillance program that may be used to address the requirements of Appendix H to 10 CFR Part 50.

The first alternative is the implementation of a plant-specific RPV surveillance program consistent with the requirements of American Society for Testing and Materials (ASTM) Standard Practice E 185, "Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels." In the design of a plant-specific RPV surveillance program, a licensee may use the edition of ASTM Standard Practice E 185 that was current on the issue date of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code to which the reactor vessel was purchased, or later editions through the 1982 edition.

The second alternative provided in Appendix H to 10 CFR Part 50 is the implementation of an ISP. An ISP is defined in Appendix H to 10 CFR Part 50 as occurring when "...the representative materials chosen for surveillance for a reactor are irradiated in one or more other reactors that have similar design and operating features...." Five specific criteria are stated in Appendix H to 10 CFR Part 50 that must be met to support approval of an ISP:

- a. The reactor in which the materials will be irradiated and the reactor for which the materials are being irradiated must have sufficiently similar design and operating features to permit accurate comparisons of the predicted amount of radiation damage.
- b. Each reactor must have an adequate dosimetry program.
- c. There must be adequate arrangement for data sharing between plants.
- d. There must be a contingency plan to assure that the surveillance program for each reactor will not be jeopardized by operation at reduced power level or by an extended outage of another reactor from which data are expected.
- e. There must be substantial advantages to be gained, such as reduced power outages or reduced personnel exposure to radiation, as a direct result of not requiring surveillance capsules in all reactors in the set.

The NRC staff approved the proposed BWRVIP ISP in Reference 6, in which all of the criteria cited above for approval of an ISP were addressed either completely or partially. For those criteria that could not be fully addressed in Reference 6, plant-specific information was required. In Reference 6, the NRC staff identified the specific information that would be required from licensees who plan to implement the BWRVIP for their facilities. Reference 6 states that:

[L]icensees who wish to participate in the BWR ISP must provide, for NRC staff review and approval, information which defines how they will determine RPV and/or surveillance capsule fluences based on the dosimetry data which will be

available for their facilities. This information must be submitted concurrently with each licensee's submittal to replace their existing plant-specific surveillance program with the BWR ISP as part of their facility's licensing basis. The information submitted must be sufficient for the staff to determine that:

- (1) RPV and surveillance capsule fluences will be established as based on the use of an NRC-approved fluence methodology that will provide acceptable results based on the available dosimetry data,
- (2) if one methodology is used to determine the neutron fluence values for a licensee's RPV and one or more different methodologies are used to establish the neutron fluence values for the ISP surveillance capsules which "represent" that RPV in the ISP, the results of these differing methodologies are compatible (i.e., within acceptable levels of uncertainty for each calculation).

Regulatory Guide (RG) 1.190, "Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence," describes methods and assumptions acceptable to the NRC staff for determining the pressure vessel neutron fluence. The RG is intended to ensure the accuracy and reliability of the fluence determination required by General Design Criteria 14, 30, and 31 of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50.

This plant-specific information was required by the NRC staff to ensure that criterion III.C.1.b and III.C.1.c for an ISP from Appendix H to 10 CFR Part 50 could be met by each facility and that the data that would be shared as a part of BWRVIP ISP could be effectively utilized by each licensee for the monitoring of RPV embrittlement for their facility.

The regulations in 10 CFR 50.90, "Application for amendment of license or construction permit," 10 CFR 50.91, "Notice for public comment; State consultation," and 10 CFR 50.92, "Issuance of amendment," describe the requirements for application of amendments to the operating license and determination of no significant hazards consideration.

3.0 TECHNICAL EVALUATION

The NRC staff has reviewed the licensee's regulatory and technical analyses in support of its proposed license amendment which are described in Sections 3.0, 4.0, and 5.0 of Reference 1. The detailed evaluation below will support the conclusion 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.

In Reference 1, Entergy submitted information for GGNS which addressed the information requested in Reference 6. Entergy submitted a revised Section 5.3.1.6.2 of the GGNS UFSAR by Reference 1, which stated:

Neutron fluence calculations performed after 2002 will be in accordance with a methodology which has been approved by the NRC staff and is consistent with the attributes identified in U. S. Nuclear Regulatory Commission Regulatory Guide 1.190,

“Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence.”

The NRC staff has concluded that the inclusion of this statement in the GGNS UFSAR is sufficient to address both items (1) and (2) from Reference 6. Regarding item (1), the licensee's use of a methodology for determining the GGNS RPV neutron fluence values, which is consistent with the attributes of RG 1.190 and has been approved by the NRC staff, will provide acceptable results based upon the available dosimetry data. Regarding item (2), RPV surveillance capsules tested under the BWRVIP ISP will have their fluences determined by the use of a methodology which is consistent with the attributes of RG 1.190 and has been approved by the NRC staff. The NRC staff has concluded that any two (or more) different fluence methodologies will provide “compatible” results (as defined in Reference 6), provided that the best estimate fluence values are within each other's uncertainty bounds. In addition, Entergy provided an additional commitment in Reference 1 regarding when they will perform an updated RPV fluence analysis for the GGNS RPV:

Entergy will perform new fluence calculations by December 2006. A neutron fluence calculation methodology which has been approved by the Nuclear Regulatory Commission staff and is consistent with the attributes identified in United States NRC Regulatory Guide 1.190, “Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence,” will be used for the determination of Reactor Pressure Vessel and surveillance capsule neutron fluence values. Based on the results of this updated fluence analysis and the results/data available through the Boiling Water Reactor Vessel Internals Program for the reactor vessel surveillance capsule testing, the current pressure/temperature Limit Curves will be reevaluated for validity and new ones will be developed, if needed.

The NRC staff found this commitment by Entergy to be acceptable since the current RPV fluence calculations for the GGNS RPV are expected to remain conservative with respect to the actual, accumulated RPV neutron fluence through December 2006 to support operation of the facility.

Entergy provided a revised Section 5.3.1.6.1 of the GGNS UFSAR by Reference 1, which documented the licensee's incorporation of the BWRVIP ISP into the GGNS licensing basis, which states, in part:

The Grand Gulf [Nuclear Station, Unit 1] material surveillance program is administered in accordance with the BWR Vessel and Internals Project Integrated Surveillance Program (BWRVIP ISP) as described in References 3 [Letter from W. H. Bateman (NRC) to C. Terry (BWRVIP), “Safety Evaluation Regarding EPRI [Electric Power Research Institute] Proprietary Reports 'BWR Vessel and Internals Project - BWR Integrated Surveillance Program Plan (BWRVIP-78)' and 'BWRVIP-86: BWR Vessel and Internals Project, BWR Integrated Surveillance Program Implementation Plan'” dated February 1, 2002] and 4 [EPRI Technical Report 1003346, entitled “BWRVIP-86-A: BWR Vessel and Internals Project Updated Integrated Surveillance Program (ISP) Implementation Plan, Final Report,” dated October 2002].

In addition, Entergy provided, in Section 5.3.1.6.1 of the GGNS UFSAR, the revised withdrawal schedule for the surveillance capsules in GGNS in accordance with the NRC staff-approved BWRVIP-86.

The NRC staff has concluded that the information provided in the revised GGNS UFSAR is adequate to document the licensee's intent to appropriately implement the BWRVIP ISP as the method for demonstrating the compliance of GGNS with the requirements of Appendix H to 10 CFR Part 50.

Based on the above discussion, the NRC staff finds that the information provided by Entergy was sufficient to conclude that the BWRVIP ISP, as approved in Reference 6, can be implemented for GGNS as the basis for demonstrating the facility's continued compliance with the requirements of Appendix H to 10 CFR Part 50 and as part of the implementation and documentation, the licensee shall modify the GGNS UFSAR as proposed in Reference 1.

4.0 LIST OF REGULATORY COMMITMENTS

The licensee, in Reference 1, included regulatory commitments. The commitments are listed in the following table.

List of Regulatory Commitment

COMMITMENT	TYPE (Check one)		SCHEDULED COMPLETION DATE (If Required)
	ONE-TIME ACTION	CONTINUING COMPLIANCE	
<p>Entergy will perform new fluence calculations by December 2006. A neutron fluence calculation methodology which has been approved by the Nuclear Regulatory Commission staff and is consistent with the attributes identified in United States NRC Regulatory Guide 1.190, "Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence" will be used for the determination of Reactor Pressure Vessel and surveillance capsule neutron fluence values.</p> <p>Based on the results of this updated fluence analysis and the results/data available through the Boiling Water Reactor Vessel Internals Program for the reactor vessel surveillance capsule testing, the current pressure/temperature Limit Curves will be reevaluated for validity and new ones will be developed, if needed.</p>	X		12/2006

The NRC staff finds that reasonable controls for the implementation and for subsequent evaluation of proposed changes pertaining to the above regulatory commitments are best provided by the licensee's administrative processes, including its commitment management program. The above regulatory commitments do not warrant the creation of regulatory requirements (items requiring prior NRC approval of subsequent changes).

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 amendments change 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 amendments involve 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 amendments involve no significant hazards consideration, and there has been no public comment on such finding (68 FR 25653, published May 13, 2003). 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 amendments.

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

8.0 REFERENCES

1. William A. Eaton (Entergy) to NRC Document Control Desk, "Grand Gulf Nuclear Station - Unit 1, Docket No.50-416, License Amendment Request, "Change to the Reactor Vessel Material Surveillance Program" (LDC 2002-103)," April 3, 2003.
2. C. Terry (BWRVIP) to NRC Document Control Desk, "Project No. 704 - BWR Vessel and Internals Project, BWR Integrated Surveillance Program Plan (BWRVIP-78)," December 22, 1999.
3. C. Terry (BWRVIP) to NRC Document Control Desk, "Project No. 704 - BWRVIP-86: BWR Vessel and Internals Project, BWR Integrated Surveillance Program Implementation Plan," EPRI Technical Report 1000888, December 22, 2000.

4. C. Terry (BWRVIP) to NRC Document Control Desk, "Project No. 704 - BWRVIP Response to NRC Request for Additional Information Regarding BWRVIP-78," December 15, 2000.
5. C. Terry (BWRVIP) to NRC Document Control Desk, "Project No. 704 - BWRVIP Response to Second NRC Request for Additional Information on the BWR Integrated Surveillance Program," May 30, 2001.
6. W. H. Bateman (NRC) to C. Terry, "Safety Evaluation Regarding EPRI Proprietary Reports "BWR Vessel and Internals Project, BWR Integrated Surveillance Program Plan (BWRVIP-78)" and "BWRVIP-86: BWR Vessel and Internals Project, BWR Integrated Surveillance Program Implementation Plan," February 1, 2002."

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Date: November 4, 2003

Grand Gulf Nuclear Station

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