June 21, 2001

Mr. William A. Eaton
Vice President, Operations GGNS
Entergy Operations, Inc.
P. O. Box 756
Port Gibson, MS 39150

SUBJECT: GRAND GULF NUCLEAR STATION - RELIEF REQUEST TO USE AMERICAN SOCIETY OF MECHANICAL ENGINEERS BOILER AND PRESSURE VESSEL CODE CASE N-561-1 (TAC NO. MB1919)

Dear Mr. Eaton:

By letter dated May 11, 2001, as supplemented by letter dated May 15, 2001, Entergy Operations, Inc. (the licensee) proposed an alternative to the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code), Section XI, Repair/Replacement Activities, pursuant to Title 10 of the *Code of Federal Regulations*, Section 50.55.a(a)(3)(ii). The licensee-proposed alternative consists of the use of ASME Code Case N-561-1, "Alternative Requirements for Wall Thickness Restoration of Class 2 and High Energy Class 3 Carbon Steel Piping," for weld overlay repair of a degraded piping elbow at Grand Gulf Nuclear Station.

The supplemental letter dated May 15, 2001, and the authorization documented herein follows the Nuclear Regulatory Commission (NRC) staff's verbal authorization during a telephone call on May 11, 2001, to use Code Case N-561-1 for a specific application for repair of a pinhole leak in the minimum flow line of the "A" train of the Residual Heat Removal (RHR) System, piping component number 4"-HBB-120.

The NRC staff concludes that compliance with the specified ASME Section XI Code repair requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Pursuant to 10 CFR Part 50.55a(a)(3)(ii), the NRC staff authorizes the use of the proposed alternative to repair the leak in the RHR system minimum flow line. Our Safety Evaluation is enclosed.

Sincerely,

/RA/

Robert A. Gramm, Chief, Section1
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-416

Enclosure: Safety Evaluation

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

ALTERNATIVE TO AMERICAN SOCIETY OF MECHANICAL ENGINEERS

BOILER AND PRESSURE VESSEL CODE, SECTION XI,

REPAIR/REPLACEMENT ACTIVITIES

RELIEF REQUEST NO. GG-R&R-001, REVISION 0

ENTERGY OPERATIONS, INC.

GRAND GULF NUCLEAR STATION

DOCKET NO. 50-416

1.0 INTRODUCTION

By letter dated May 11, 2001, as supplemented by letter dated May 15, 2001, Entergy Operations, Inc. (the licensee) proposed use of an alternative to the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code), Section XI, Repair/Replacement Activities, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a(a)(3)(ii). The licensee-proposed alternative consists of the use of Code Case N-561-1, "Alternative Requirements for Wall Thickness Restoration of Class 2 and High Energy Class 3 Carbon Steel Piping," for weld overlay repair of a degraded piping elbow at Grand Gulf Nuclear Station (GGNS).

On May 9, 2001, leakage from a small pin hole was found on a 90° elbow in the Residual Heat Removal (RHR) System "A" loop minimum flow line (4"-HBB-120). The pin hole was located in an eroded area of the elbow. The subject elbow is 4 inches in diameter and is made of carbon steel material (SA234, Grade WPB). The nominal thickness of the elbow is 0.237 inch and the minimum design thickness is 0.043 inch. Ultrasonic Testing (UT) examination was performed to measure the wall thickness at 1-inch increments on an area of 8 inches by 12 inches centered on the pin hole of the elbow. Additional measurements were performed on a 3 inch by 3 inch grid centered on the pin hole. The results of the UT measurements showed that the wall thickness varied from 0.070 inch to 0.265 inch. Since the elbow is an ASME Code Class 2 pressure boundary component, repair of the subject component to restore its structural integrity is necessary for continued plant operation.

Twelve additional locations with 8 locations on the RHR "A" loop and 4 locations in the RHR "B" loop were inspected by UT examinations. No significant degradation was found. These twelve additional locations have been added to the GGNS Flow Accelerated Corrosion (FAC) program data base and will be monitored accordingly.

Pursuant to 10 CFR 50.55a(a)(3)(ii), the proposed alternatives to the requirements of 10 CFR 50.55a(g) may be used when authorized by the Nuclear Regulatory Commission (NRC). The licensee must demonstrate that compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

2.0 EVALUATION

2.1 ASME Section XI Code Repair/Replacement Activities

The current ASME Code Section XI applicable to GGNS is the 1992 Edition with portions of the 1993 Addenda. Article IWA-4000, "Repair/Replacement Activities" of the subject Section XI Code Edition provides rules and requirements for repair of the pressure retaining components and their supports. To perform a Code repair, Sub-article IWA-4310 requires that defects shall be removed from the degraded components prior to performing a repair by welding.

2.2 Proposed Alternative

The licensee proposed to restore the wall thickness of the elbow in accordance with ASME Section XI Code Case N-561-1. The proposed repair is to apply a patch of carbon steel weld overlay with sufficient thickness on the outside diameter surface of the elbow where wall thinning has occurred.

2.3 Bases for the Proposed Alternative

The licensee's bases for the proposed alternative are summarized below:

(1) It is necessary to use the Code Case N-561-1 for weld overlay repair of the degraded elbow because it is not practical to perform the Code repair, which requires the removal of the defects from the degraded component as the degradation is initiated from the inside-diameter surface of the component.

(2) The subject code case provides strict requirements in the fabrication of the repair overlay regarding materials, design, installation, examination, and follow-up inspections.

(3) The repair overlay will restore the thinned area of the elbow to its original nominal wall thickness. The material used for welding is similar in composition to the low carbon steel elbow and its FAC characteristics are expected to be similar.

(4) Since the elbow is a pressure boundary component, its replacement would require the plant to be shut down.

2.4 NRC Staff Evaluation

The licensee-proposed alternative to ASME Code Section XI repair is based on the use of Code Case N-561-1 to perform weld overlay repair on the degraded 90° elbow in the RHR “A” loop minimum flow line (4"-HBB-120). Code Case N-561-1 has not been approved by NRC for incorporation in Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability--ASME

Section XI, Division 1," for generic use. The NRC staff has reviewed the subject Code Case and has determined that use of the subject Code Case, as modified by the licensee's commitments, is an acceptable alternative. The licensee's commitments to support the use of Code Case N-561-1 are identified in their submittals. The licensee's commitments are summarized below:

(i) The operating period of the repaired elbow will be limited to the remainder of the current operating cycle. The repaired elbow will be replaced during the next scheduled refueling outage.

(ii) UT measurements of the weld overlay thickness will be performed to monitor the degradation of the repair overlay to ensure that the minimum design thickness requirements are met through the present operating cycle. Initially, the measurements will be performed after each of the first two pump (RHR Pump "A") starts. Subsequently, it may extend to a frequency of once every three pump starts when justified by the results of the UT thickness measurements.

(iii) The licensee will perform destructive metallurgical testing of the degraded elbow as part of the root cause determination. The root cause determination will be completed six months following replacement of the elbow.

The NRC staff has also determined that plant shutdown for the sole purpose of replacement of the degraded piping elbow would result in hardship and unusual difficulty for the licensee, given that an acceptable alternative repair method is available which does not require plant shutdown.

In addition, the NRC staff has determined that the licensee-proposed use of Code Case N-561-1, as modified by their commitments, will provide reasonable assurance that the structural integrity of the repaired elbow will be maintained through the remainder of the current operating cycle. Furthermore, the licensee's root cause determination is designed to identify the degradation mechanism. Thus, the results of the root cause determination will provide guidance in mitigating the degradation found in the subject elbow.

3.0 CONCLUSION

Based on review of the licensee's submittals, the NRC staff concludes that compliance with the specified ASME Section XI Code repair requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the NRC staff authorizes the licensee's proposed use of Code Case N-561-1, as modified by the licensee's commitments, for weld overlay repair of the degraded elbow in the RHR "A" loop minimum flow line (4"-HBB-120) at GGNS.

Principal Contributor: W. Koo

Date: June 21, 2001

cc:

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