October 5, 2000

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

SUBJECT: GRAND GULF NUCLEAR STATION, UNIT 1 - RELIEF REQUEST RE: EVALUATION OF ALTERNATIVE EXAMINATION REQUEST IWL-001 FOR INSERVICE INSPECTION OF CONTAINMENT STRUCTURE (TAC NO. MA8645)

Dear Mr. Eaton:

By letter dated March 30, 2000, Entergy Operations, Inc. (the licensee), submitted a request (IWL-001) to the Nuclear Regulatory Commission (NRC) staff for an alternative to the requirements of the Grand Gulf Nuclear Station (GGNS) inservice inspection (ISI) program, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(g)(6)(ii)(B) and the requirements of the American Society of Mechanical Engineers (ASME) Boiler & Pressure Vessel Code (ASME Code, or the Code), Section XI. The ASME Code, Section XI, Subsection IWL provides requirements for the ISI of concrete containment structures for light-water reactor facilities.

The licensee requested authorization of an alternative examination pursuant to 10 CFR 50.55a(a)(3)(i). In Alternative Request IWL-001, the licensee proposed alternative examination methods to those specified in the 1992 edition of ASME Code Table IWL-2500-1, Examination Category L-A (Item Nos. L1.11 and L1.12), Subarticles IWL-2310 and IWL-2510. The proposed alternative examination consists of a general visual examination of the accessible areas of the concrete containment structure, and a detailed visual examination of those areas showing evidence of degradation. The proposed examination methods for the alternatives requested will be consistent with the methods described in the 1997 Addenda of the ASME Code, Section XI, Subsection IWL.

The NRC staff has evaluated the information in IWL-001 and finds that the proposed alternative provides an acceptable level of quality and safety. Therefore, this proposed alternative examination is authorized, pursuant to 10 CFR 50.55a(a)(3)(i), for the GGNS

containment structure inservice inspections required in accordance with 10 CFR 50.55a(g)(6)(ii)B. The staff's evaluation and conclusions are detailed in the enclosed Safety Evaluation.

Sincerely,

/RA by David Jaffe for/

Robert A. Gramm, Chief, Section 1
Project Directorate IV & Decommissioning
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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Grand Gulf Nuclear Station

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO CONTAINMENT INSERVICE INSPECTION PROGRAM

ENTERGY OPERATIONS, INC.

GRAND GULF NUCLEAR STATION

DOCKET NUMBER 50-416

1.0 INTRODUCTION

In the August 8, 1996, *Federal Register*, the U. S. Nuclear Regulatory Commission (the Commission or NRC) amended Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a, to incorporate by reference Section XI of the American Society of Mechanical Engineers (ASME) Boiler & Pressure Vessel Code (ASME Code), 1992 Edition through 1992 Addenda of Subsections IWE and IWL. Subsection IWE provides the requirements for inservice inspection (ISI) of Class MC (metallic containment components) and the metallic liner of Class CC (concrete containment components). Subsection IWL provides the requirements for ISI of Class CC components.

The regulation at 10 CFR 50.55a(g)(6)(ii)B requires that ISI of certain ASME Code Class MC and CC components be performed in accordance with Section XI of the ASME Code and applicable addenda, except where alternatives have been authorized or relief has been requested by the licensee and granted by the Commission pursuant to paragraphs (a)(3)(i), (a)(3)(ii), or (g)(6)(i) of 10 CFR 50.55a. In proposing alternatives or requesting relief, the licensee must demonstrate that: (1) the proposed alternatives provide an acceptable level of quality and safety, (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety, or (3) conformance is impractical for its facility.

By letter dated March 30, 2000, Entergy Operations, Inc. (Entergy or the licensee), proposed an alternative to the requirements of IWL for the Grand Gulf Nuclear Station. The NRC's findings with regard to Relief Request Number IWL-001 are provided below.

2.0 RELIEF REQUEST

Relief Request Number IWL-001

The licensee proposes alternative visual examination methods to those specified in Table IWL-2500-1, Examination Category L-A (Item Nos. L1.11 and L1.12). Instead of performing VT-1C and VT-3C examinations, the licensee proposes to perform a general visual examination of the accessible areas and a detailed visual examination of those areas determined to be suspect.

Licensee's Basis for Requesting Relief

The licensee states:

> The visual examination methods (VT-1C and VT-3C), specified in Examination Category L-A of Table IWL-2500-1, require that examiners meet applicable visual examination, and qualification requirements of IWA-2210 and IWA-2300. The requirements specified in these ASME Code provisions were developed for detecting flaws in metal components and, as such, are more stringent than those that would be required for detecting degradation on a concrete structure. Degradation mechanisms for a concrete structure are different from the degradation mechanisms of Class 1, 2, and 3 components to which the applicable requirements of IWA-2210 and IWA-2300 were developed. The requirements of IWA-2210 and IWA-2300 were first introduced in Subsection IWL in the 1992 Addenda. Until the issuance of these Addenda to Subsection IWL, Examination Categories L-A only required visual examination performed by or under direction of the Responsible Engineer, a Registered Professional Engineer.
>
> In its response to Public Comment 2.3 in Part III of Attachment 6 to SECY 96-080, "Issuance of Final Amendment to 10 CFR §50.55a to Incorporate by Reference the ASME Boiler & Pressure Vessel Code (ASME Code), Section XI, Division 1, Subsection IWE and (ASME Code) Subsection IWL," the NRC stated:
>
>> "Comments received from ASME members on the containment committees indicate that the newer more stringent requirements of IWA-2210 were not intended to be used for the examination of containments and were inadvertently included in Subsection IWL. The NRC agrees that remote examinations are the only practical method for inspecting much of the containment surface area. §50.55a(b)(2)(x)(B) has been added to the final rule which contains alternative lighting and resolution requirements which may be used in lieu of the requirements contained in Table IWA-2210-1."
>
> The ASME Main Committee and the Board of Nuclear Codes and Standards have also determined that ASME Code provisions outlined in IWA-2210 and IWA-2300 are not warranted for visually examining concrete surfaces or post-tensioning system anchorage hardware or surrounding concrete. Both organizations approved a rewrite of Subsection IWL that eliminated the requirements of IWA-2210 and IWA-2300. This rewrite of Subsection IWL was published in the 1997 Addenda of the ASME Code, Section XI.
>
> In evaluating the requirements of these ASME Code provisions, Entergy has concluded that concrete deterioration and distress, as defined in ACI 201.1, "Guide for Making a Condition Survey of Concrete in Service," can be effectively identified by performing a general visual examination. As such, the licensee will establish procedures for performing a general visual examination of the concrete structure, as specified in the Alternative Examination section (below).

To ensure the controls and techniques are adequate for detecting evidence of degradation, the Responsible Engineer will periodically witness the performance of these examinations in accordance with Entergy-approved procedures.

The general visual examination of the concrete surfaces and the detailed visual examination of the suspect areas detected by the general visual examination will be performed in accordance with the approved procedure. The examination methods outlined the in the procedure will be consistent with the methods approved in the rewrite of Subsection IWL (1997 Addenda) and will be approved by the Responsible Engineer. These approved methods will delineate the necessary controls for ensuring these examinations are performed in a manner sufficient to detect evidence of degradation.

Certified and properly trained personnel will perform the general and/or detailed visual examination. Personnel performing these visual examinations will be certified in accordance with American Nuclear Standards Institute (ANSI) N45.2.6, "Qualification of Inspection, Examination, and Testing Personnel for Nuclear Power Plants," and by Entergy procedure. This level of certification ensures that the capability and visual acuity of the examiners is sufficient to detect evidence of degradation in the concrete structure.

Prior to performing examinations, the examiners will successfully complete approved training (i.e., training developed by the Electric Power Research Institute (EPRI) or equivalent) on the proper techniques for examining components subject to the requirements of Subsection IWL. In addition, examiners will receive site-specific training conducted under the direction of the Responsible Engineer and will be held at the beginning of each subsequent ISI used to satisfy the applicable requirements of IWL-2410. Successfully completing the above training ensures the examiners have a basic, working knowledge of the components being examined and the types of degradation to be detected.

The regulation at 10 CFR 50.55a(a)(3)(i) states that a proposed alternative may be used if the applicant demonstrates the proposed alternative provides an acceptable level of quality and safety. Based on the above discussion, the licensee believes the proposed alternative examination actions specified in the Alternative Examination section (below) meet this criterion and requests the NRC to authorize their use.

Alternative Examination

The licensee proposes:

To satisfy the requirements of Table IWL-2500-1, Examination Category L-A (Item Nos. L1.11 and L1.12), Entergy proposes the following alternative actions:

1. General Visual Examination

A general visual examination of the accessible concrete surfaces will be performed. The general visual examination will be a thorough examination of the accessible areas. Certified and properly trained examiners will perform the examinations.

2. Detailed Visual Examination

If the examiner detects evidence of degradation, a detailed visual examination will be performed and compared to established acceptance criteria. The acceptance criteria will be approved by the Responsible Engineer and will be consistent with the guidance outlined in the American Concrete Institute (ACI) Standard 349.3R-96, "Evaluation of Existing Nuclear Safety-Related Concrete Structure."

If the detailed visual examination cannot be performed for some reason (e.g., access limitation), Entergy will evaluate the acceptability of the suspect area. This engineering evaluation will assume the suspect area is inaccessible and will address the requirements outlined in 10CFR50.55a(b)(2)(viii)(E). The Responsible Engineer will approve the engineering evaluation.

3.0 EVALUATION

The 1992 Edition and Addenda of the ASME Code, Table IWL-2500-1, Examination Category L-A (Item Nos. L1.11 and L1.12), uses VT-1C and VT-3C to designate visual examinations to be performed on concrete containments. Requirements for the visual examination are contained in Subsection IWA-2210 and include minimum illumination, maximum direct examination distance, and maximum procedure demonstration lower case character height. The requirements for qualification of examination personnel are contained in IWA-2300. As an alternative to VT-1C and VT-3C, the licensee proposes to perform a general visual examination of the accessible areas and a detailed visual examination of those areas determined to be suspect. This proposed alternative is consistent with the visual examination requirements of the 1998 Edition of the Code.

In the 1998 Edition of the Code, the requirements for VT-1C and VT-3C were removed and replaced with requirements for general and detailed visual examinations. The definition of general and detailed examinations has been left to the individual owners. In order to provide an acceptable level of quality and safety, licensees who have been authorized to use the 1998 Edition of IWE and IWL, have augmented these visual examination requirements.

In its submittal, the licensee provided details of its visual examination program and described areas where the program has been augmented from the owner-defined requirements of the 1997 Addenda of the ASME Code. The licensee's submittal states that a general visual examination of the accessible areas and a detailed visual examination of those areas determined to be suspect will be performed when invoked by Table IWL-2500-1. If the detailed visual examination cannot be performed for some reason (i.e., access limitations), an evaluation addressing the requirements of 10 CFR 50.55a(b)(2)(viii)(E) will be conducted to determine acceptability of the suspect area.

The licensee states that the visual examinations will be performed in accordance with approved plant procedures and will be sufficient to allow identification of concrete deterioration and distress as defined in ACI Standard 201.1, "Guide for Making a Condition Survey of Concrete in Service." Acceptance criteria for the examinations will be approved by the Responsible Engineer and be consistent with the guidance of ACI 349.3R-96 "Evaluation of Existing Nuclear Safety-Related Concrete Structure."

The licensee also states that personnel performing visual examinations will be certified in accordance with ANSI N45.2.6 “Qualification of Inspection, Examination, and Testing Personnel for Nuclear Power Plants.” Prior to performing the examinations, personnel will also complete training approved by the EPRI (or equivalent) and site-specific training conducted under the direction of the responsible engineer.

Incorporation of these provisions into the licensee’s containment ISI procedures provides reasonable assurance that the licensee’s defined visual examination methods and personnel qualification procedures are adequate. Use of the general and detailed visual examination requirements in lieu of VT-1C and VT-3C, as augmented by the licensee, provides an acceptable level of quality and safety.

4.0 CONCLUSION

The licensee’s proposed alternative visual examination methods to those specified in Table IWL-2500-1, Examination Category L-A (Item Nos. L1.11 and L1.12) is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the first containment ISI interval. The proposed alternative provides an acceptable level of quality and safety.

Principal Contributor: M. Kotzalas
D. Terao

Date: October 5, 2000