October 27, 2008

Mr. Thomas L. Williamson
Manager, GGNS COLA Project
Entergy Nuclear
1340 Echelon Parkway
Jackson, MS 39213

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 17 RELATED TO THE SRP SECTION 3.7.1 FOR THE GRAND GULF COMBINED LICENSE APPLICATION

Dear Mr. Williamson:

By letter dated February 27, 2008, Entergy Operations Incorporated (EOI) submitted for approval a combined license application pursuant to 10 CFR Part 52. The U. S. Nuclear Regulatory Commission (NRC) staff is performing a detailed review of this application to enable the staff to reach a conclusion on the safety of the proposed application.

The NRC staff has identified that additional information is needed to continue portions of the review. The staff's request for additional information (RAI) is contained in the enclosure to this letter. To support the review schedule, you are requested to respond within 30 days of the date of this letter. If changes are needed to the safety analysis report, the staff requests that the RAI response include the proposed wording changes.

If you have any questions or comments concerning this matter, I can be reached at 301-415-4045 or by e-mail at Mark.Tonacci@nrc.gov.

Sincerely,

/RA/

Mark Tonacci, Senior Project Manager
ESBWR/ABWR Projects Branch 2
Division of New Reactor Licensing
Office of New Reactors

Docket Nos. 052-0024

eRAI Tracking No. 536 and 1462

Enclosure:
Request for Additional Information

October 27, 2008

Mr. Thomas L. Williamson
Manager, GGNS COLA Project
Entergy Nuclear
1340 Echelon Parkway
Jackson, MS 39213

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Dear Mr. Williamson:

By letter dated February 27, 2008, Entergy Operations Incorporated (EOI) submitted for approval a combined license application pursuant to 10 CFR Part 52. The U. S. Nuclear Regulatory Commission (NRC) staff is performing a detailed review of this application to enable the staff to reach a conclusion on the safety of the proposed application.

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Mark Tonacci, Senior Project Manager
ESBWR/ABWR Projects Branch 2
Division of New Reactor Licensing
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Docket Nos. 052-0024
eRAI Tracking No. 536 and 1462
Enclosure:
Request for Additional Information

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***Approval captured electronically in the electronic RAI system.**

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Request for Additional Information No. 536

Grand Gulf, Unit 3 COLA
Entergy Operations, Inc.
Docket No. 52-024
SRP Section: 03.07.01 - Seismic Design Parameters
Application Section: 3.7.1.1

QUESTION for Structural Engineering Branch 2 (ESBWR/ABWR Projects) (SEB2)

03.07.01-1

With respect to GGNS Unit 3 COL Application Section 3.7.1.1, Site Specific Design Ground Motion Response Spectra, the GGNS applicant states, in part, that:

"... The site-specific GMRS/FIRS are compared with Certified Seismic Design Response Spectra (CSDRS) in Table 2.0-201. The GMRS/FIRS are enveloped by the CSDRS except for excedance below 0.2 Hz for the horizontal motion and below about 0.15 Hz for the vertical motion. This excedance does not have an adverse impact on the seismic design of the ESBWR Standard Plant because:

a.) There are no structural frequencies below 0.2 Hz. in the frequency range of importance to structural response (frequencies greater than 0.2 Hz); the CSDRS are higher.
b.) Although pools in Reactor Building/Fuel Building (RBFB) have sloshing frequencies less than 0.2 Hz, sloshing response is only a small portion of overall seismic-induced hydrodynamic loads on the pool structure and does not govern. The majority of hydrodynamic loads are due to the impulsive response of the water. Impulsive response is a function of the pool structure response at structural frequencies. The FIRS are enveloped by the CSDRS in the frequency range of importance to structural response (frequencies greater than 0.2 Hz). The impulsive response inherent in the CSDRS-based design is typically an order of magnitude higher than the sloshing response at lower accelerations of the FIRS.
c.) The CSDRS for the Fire Water Service Complex (FWSC) is 1.35 times the RBFB/Control Building (CB) CSDRS. The FWSC sloshing frequency is 0.24 Hz and is enveloped by the CSDRS.
d.) The higher FIRS below 0.2 Hz are irrelevant to the CB because the CB does not contain water pools.
e.) The vertical excedance at frequencies below 0.15 Hz is inconsequential because vertical earthquake components do not induce sloshing.

Therefore, the adequacy of CSDRS is confirmed for Unit 3 application."

Provide response to the following items:

With reference to item (a) above, GGNS asserts that there are no structural frequencies below 0.2 Hz. in the frequency range of importance to structural response. Pursuant to SRP Section 3.7.1 subsection II.1.A.i and II.1.A.ii acceptance criteria, GGNS should provide pertinent quantitative analysis data to support its assertion. One example of the analysis data needed to support the GGNS' assertion may include the Eigen vectors (mode shapes), Eigen values and their corresponding modal participation factors that are derived from the seismic analysis of GGNS RB/FB and CB structures. Provide the above data or their equivalent to validate the item (a) assertion.

With reference to item (b) above, discuss the methodology used in computing the sloshing frequencies and sloshing response of the pools in Reactor Building/Fuel Building (RB/FB), and list the analysis results for the pools in the RB/FB. Based on the analysis results, demonstrate that the sloshing response is only a small portion of overall seismic-induced hydrodynamic loads on the pool structure and does not govern. Explain the rationale for the GGNS' statement that majority of hydrodynamic loads are due to the impulsive response of the water and compare the method used in determining the impulsive response to those used in ACI 350.3 or equivalent codes and standards. Lastly, use the RB/FB analysis results to justify the GGNS' statement that the impulsive response inherent in the CSDRS-based design is typically an order of magnitude higher than the sloshing response at lower accelerations of the FIRS.

Note: The following item is not required to be answered in your RAI response but should be resolved in the DC before the technical reviewer can conclude his safety evaluation on this section. *With reference to item (c) above, provide the technical basis for asserting that the CSDRS for the Fire Water Service Complex (FWSC) is 1.35 times the RBFB/Control Building (CB) CSDRS (The use of the 1.35 factor in defining the CSDRS for the FWSC is part of the unresolved RAI 3.7-63 of the ESBWR DC application).*

With reference to item (c) above, discuss the computational basis for asserting that the FWSC sloshing frequency is 0.24 Hz, thus, is enveloped by the CSDRS.

With reference to item (e) above, GGNS stated that the vertical excedance at frequencies below 0.15 Hz is inconsequential because vertical earthquake components do not induce sloshing. It should be noted that under the influence of vertical excitation, liquid exerts a symmetric hydrodynamic pressure on tank wall. Knowledge of this pressure is essential in properly assessing the safety and strength of tank wall against buckling. For any of the circular tanks in GGNS RB/FB, as applicable, discuss how the effect of the vertical spectral excedance at frequencies below 0.15 Hz on tank wall buckling was evaluated to support the GGNS' statement that the vertical excedance at frequencies below 0.15 Hz is inconsequential

Request for Additional Information No. 1462

Grand Gulf, Unit 3 COLA
Entergy Operations, Inc.
Docket No. 52-024
SRP Section: 03.07.01 - Seismic Design Parameters
Application Section: FSAR Section 3.7.1

QUESTION for Structural Engineering Branch 2 (ESBWR/ABWR Projects) (SEB2)

03.07.01-2
With respect to the applicant's assertion provided in the GGNS Unit 3 COL Application FSAR Section 3.7.1.1.5 that: “Approach 3 of NUREG/CR-6728 was used to develop FIRS at the various foundation levels and did not require the use of acceleration time history,” it should be noted that the acceptability of NUREG/CR-6728 and that of Enclosure 1 to Entergy's June 30, 2008 letter titled, "Supplemental Information Regarding Methodology Used to Develop Horizontal and Vertical Site-Specific Hazard Consistent Uniform Hazard Response Spectra," are still under review by the staff, and staff acceptance of the above applicant’s assertion is predicated on a satisfactory completion of the staff review.

The staff requests the applicant to discuss if the Random Vibration Theory (RVT) approach was used in conjunction with the Approach 3 in generating the site specific FIRS shown in GGNS Unit 3 COL Application FSAR Figures 2.0-201 and 2.0-202.