October 24, 2008

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

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 14 RELATED TO THE SRP SECTION 09.02.01 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 301-415-6256 or by e-mail at dennis.galvin@nrc.gov.

Sincerely,

/RA/

Dennis Galvin, Project Manager
ESBWR/ABWR Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

Docket Nos. 052-0024

eRAI Tracking No. 1136

Enclosure:
Request for Additional Information

October 24, 2008

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

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 14 RELATED TO THE SRP SECTION 09.02.01 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.

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Sincerely,
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Dennis Galvin, Project Manager
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Docket Nos. 052-0024
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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
Grand Gulf, Unit 3 COLA
Entergy Operations, Inc.
Docket No. 52-024
SRP Section: 09.02.01 - Station Service Water System
Application Section: 9.2.1

QUESTIONS

09.02.01-1

Tier 1 of the ESBWR DCD, Section 4.1, specifies as a COL interface requirement that the plant-specific Plant Service Water System (PSWS) be capable of removing 2.02×10^7 MJ (1.92×10^{10} BTU) over a period of seven days without active makeup. The proposed Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) specify a cooling tower basin water inventory requirement as a way of demonstrating that the heat removal capability specified by the DCD has been satisfied. While water inventory is an important factor that must be addressed by the ITAAC, it does not demonstrate that the cooling towers are capable of dissipating the specified heat load. The capability of cooling towers to dissipate heat is dependent upon a number of other factors that should be taken into consideration, such as cooling tower design attributes; the capability to satisfy the PSWS pump minimum net positive suction head (NPSH) requirements for the most limiting cooling tower basin water level, temperature, and flow conditions; the maximum allowed PSWS water supply temperature; and the most limiting meteorological assumptions that pertain to the site for determining: (a) heat dissipation capability, and (b) water inventory requirements. Transient analyses that take these factors into consideration (including margin for expected degradation and operating flexibility) and confirmatory testing are usually necessary in order to adequately demonstrate that cooling tower performance satisfies the specified heat removal requirement. Also, the extent and basis for using the combined normal power heat sink (NPHS) and auxiliary heat sink (AHS) cooling tower basin inventories for Trains A and B were not described. Additional information is needed to address consideration of these factors such that the specified cooling tower performance capability is adequately demonstrated for both defense-in-depth and regulatory treatment of non-safety systems (RTNSS) functions, and the Final Safety Analysis Report (FSAR) and ITAAC need to be revised accordingly to describe the plant licensing basis in this regard.

09.02.01-2

In response to COL Information Item 9.2.1-1-A, “Material Selection,” the applicant proposes to use fiberglass reinforced polyester pipe (FRPP) in locations where the Plant Service Water System (PSWS) pipe is buried to preclude long-term corrosion. The review criteria specified by the SRP relative to pipe failure is based on the use of metal pipe. In order to assure that the use of nonmetallic pipe will not adversely impact safety-related structures, systems, and components (SSCs) or those that satisfy the RTNSS criteria, the following additional information needs to be reflected in the applicable sections of the FSAR and plant-specific ITAAC as appropriate:

a.) The criteria and limitations for using FRPP.
b.) An evaluation of the impact of using FRPP on PSWS reliability and availability assumptions, especially during seismic events and water hammer transients that can occur.
c.) A revised evaluation of the consequences (including flooding effects) of pipe failure during seismic events. Unless otherwise justified by the applicant, the evaluation should assume the failure of all FRPP in addition to the failures that are postulated for metallic pipe and the other considerations that are specified by the SRP Sections 3.6.1 and 3.6.2.

d.) Operating experience considerations and measures being taken to address vulnerabilities that have been identified in this regard.

09.02.01-3

COL Information Item 9.2.1-1-A, “Material Selection,” indicates that the applicant needs to specify plant-specific Plant Service Water System (PSWS) material selections based on water quality analysis in order to preclude long-term corrosion and fouling. The response to this COL Information Item only addressed material selection for buried piping but did not provide material specifications for any other parts of the PSWS, including those for the cooling towers [normal power heat sink (NPHS)/auxiliary heat sink (AHS)] and related components. Additional information is needed to specify and explain the material selections that pertain to the rest of the PSWS.

09.02.01-4

Tier 2 of the DCD, Section 9.2.1.6, “COL Information,” specifies in part that the COL applicant needs to establish provisions to preclude long-term corrosion and fouling based on site water quality analysis. The FSAR does not explain what specific vulnerabilities are considered to be pertinent based upon operational experience that applies and why chemical treatment alone is sufficient for addressing these vulnerabilities. Chemical treatment is a common practice and suitable for addressing service water system corrosion and fouling problems to some extent, but it is usually implemented as part of a more comprehensive program (or collection of programs) to address service water system vulnerabilities. For example, considerations for precluding long-term corrosion and fouling of service water systems typically include: (i) establishing a program of surveillance and control techniques (such as chemical treatment) to prevent flow blockage problems due to biofouling; (ii) establishing a routine inspection and maintenance program to assure that corrosion, erosion, protective coating failure, silting, biofouling and others that are applicable cannot degrade defense-in-depth and RTNSS cooling functions that are credited; and (iii) establishing a test program to verify (initially and periodically) the heat transfer capability of heat exchangers that are important to safety has not degraded over time. Additional information needs to be included in the FSAR to: a) describe corrosion and fouling mechanisms and vulnerabilities that are anticipated based on industry operating experience and the plant-specific location, and b) describe programmatic controls that will be implemented to address these considerations and to assure that PSWS performance [including normal power heat sink (NPHS) and auxiliary heat sink (AHS)] will not degrade over time.

09.02.01-5

Tier 2 of the ESBWR DCD, Section 9.2.1.2, indicates that the heat rejection facilities are dependent upon actual site conditions and provides conceptual design information (CDI) for the standard plant design. Section 9.2.1.2 of the GGNS FSAR replaces the CDI with plant-specific information, but does not indicate what part of the information is plant-specific vs. what is standard plant design information. Additionally, the GGNS FSAR does not fully address all of the CDI that is discussed in the detailed system description under Section 9.2.1.2 of the DCD. In order to avoid possible confusion in the future relative to the GGNS design basis and the change process that applies, clarification is needed to indicate what part of the information in the FSAR is plant-specific (such as with double brackets).

For example, DCD Tier 2, Figure 9.1-1, PSWS Simplified Diagram, shows the heat sink, cooling tower basin, cooling towers, basin fill lines and blowdown lines, return piping, motor operated valves, and flow elements all circled as "conceptual design information". Based on this design drawing, some of the text

under DCD 9.2.1.2 is conceptual. The GGNS COL detailed system description does not have these system components described as GGNS CDI.

09.02.01-6

Tier 2 of the DCD, Section 9.2.1.2, indicates that the heat rejection facilities are dependent upon actual site conditions and provides conceptual design information (CDI) for the standard plant design. Section 9.2.1.2 of the Grand Gulf 3 FSAR replaced the CDI with plant-specific information (GGNS CDI), indicating that the heat rejection facility for GGNS 3 consists of natural draft and mechanical draft cooling towers. In order for the NRC to determine if the cooling towers are capable of performing their defense-in-depth and RTNSS functions, the GGNS CDI needs to include cooling tower design attributes that are credited (such as minimum number of fans needed); the minimum net positive suction head (NPSH) requirement for the PSWS pumps and available margin based on the most limiting cooling tower basin water level, temperature, and flow conditions; the maximum allowed PSWS water supply temperature; the most limiting meteorological assumptions that pertain to the site for determining: (a) heat dissipation capability, and (b) water inventory requirements; and cooling tower performance considerations related to proximity of structures and other cooling towers. The GGNS CDI also needs to describe plant-specific vulnerabilities and degradation mechanisms that are anticipated based on operational experience and site location, potential impacts of postulated cooling tower failures and other interactions on safety-related SSCs, and how these considerations are addressed. In addition to explaining bounding conditions and limiting assumptions, the GGNS CDI needs to describe programmatic controls being implemented to assure that the functional capability of the cooling towers will be maintained over the life of the plant.

09.02.01-7

Section 9.2.1.2 (under Operation) specifies that "during normal power operation, plant service water system (PSWS) flow is directed to the normal plant heat sink (NPHS) cooling tower where heat removed from the reactor component cooling water system (RCCWS) and Turbine Component Cooling Water System (TCCWS) is rejected to the NPHS. During this mode of operation, the NPHS basin provides makeup to the alternate heat sink (AHS) basin. During other modes of power operation, PSWS flow is directed to the AHS cooling tower where heat removed from the RCCWS and TCCWS is rejected to the AHS. During this mode of operation, makeup to the AHS basin is provided from the Station Water System (SWS)". While this supplemental information explains how makeup is provided to the AHS depending on how the PSWS is aligned for heat rejection, it is not clear what the different “modes” of power operation are. This is especially confusing because the term “mode” has a specific meaning in the Technical Specifications, and specific modes of power operation are not assigned for when the NPHS or the AHS should be used. The FSAR needs to be revised to eliminate this confusion and to better explain when the NPHS vs. the AHS will be used for various operating, transient, and accident conditions.

09.02.01-8

Although the initial plant test program specified by Tier 2 of the DCD for plant service water system (PSWS) is incorporated by reference, the test program does not verify that performance of the PSWS [including normal power heat sink (NPHS)/alternate heat sink (AHS)] satisfies design specifications for the various configurations and heat loads. Consequently, additional information is needed to describe how the design capability of the PSWS will be verified by the initial plant test program.