December 9, 2008

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

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 27 RELATED TO SRP SECTION 2.4.2, 2.4.12, AND 2.4.13 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 301-415-2890 or by e-mail at Andrea.Johnson@nrc.gov.

Sincerely,

/RA/

Andrea M. Johnson, Project Manager
ESBWR/ABWR Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

Docket No. 052-0024

Enclosure:
Request for Additional Information

December 9, 2008

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

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 27 RELATED TO SRP SECTION 2.4.2, 2.4.12, AND 2.4.13 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 301-415-2890 or by e-mail at Andrea.Johnson@nrc.gov.

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Andrea M. Johnson, Project Manager
ESBWR/ABWR Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

Docket No. 052-0024

Docket No. 052-0024
Enclosure:
Request for Additional Information
ADAMS Accession No. ML083430714 NRO-002

OFFICE	RSAC/TR	RSAC/BC	NGE1/PM	OGC	NGE1/L-PM
NAME	CCook	RRaione	AJohnson	MCarpentier	AJohnson
DATE	08/06/08	10/29/08	10/30//08	11/12/08	12/09/08

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

OFFICIAL RECORD COPY

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 27 RELATED TO SRP SECTION 2.4.2, 2.4.12, AND 2.4.13 FOR THE GRAND GULF COMBINED LICENSE APPLICATION DATED DECEMBER 9, 2008

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Grand Gulf, Unit 3 COLA
Entergy Operations, Inc.
Docket No. 52-024
SRP Section: 02.04.02 - Floods
Application Section: 02.04.02 - Floods

QUESTIONS for Hydrologic Engineering Branch (RHEB)

02.04.02-1

NRC staff has reviewed the flooding analysis described in FSAR Section 2.4.2 and the probable maximum flood described in Section 2.4.3. In accordance with requirements based on 10 CFR 100.20(c) and 10 CFR 52.79(b), staff requests that additional information for the following:

(a) For the Basin B analysis, the water surface elevation value reported in the FSAR, Section 2.4.3.5.2 is slightly lower than the design criteria, which is 1 ft below the design grade elevation of 134.0 ft. The applicant is requested to confirm the location and the value of water surface elevation computed by the model that is used to determine compliance for Stream B.

(b) For the Basin B analysis, the water surface elevation at the upstream end of the culvert was found to be sensitive to the Manning's roughness of the channel and to increased blockage of the culvert. Both of these are possible during a PMF event due to debris being flushed from the basin. Because the water surface elevation produced by the applicant is close to the design criteria, the staff requests that the applicant explain why values selected for roughness coefficient are reasonable.

02.04.02-2

In accordance with requirements based on 10 CFR 100.20(c) and 10 CFR 52.79(b), the staff reviewed the local intense precipitation and flooding analysis presented in FSAR Section 2.4.2 and calculation CALC-019. It is suggested by Corps of Engineers guidance [ER 1110-8-2(FR)], that peaking the unit hydrograph may be a conservative assumption for use of unit hydrographs in design. The staff requests that the applicant provide a discussion regarding linearity of the unit hydrograph.

02.04.02-3

In accordance with requirements based on 10 CFR 100.20(c) and 10 CFR 52.79(b), the staff reviewed the HEC-RAS flooding analysis by independently reviewing the input files provided by the applicant (ML821102361). Staff has determined the HEC-RAS input file for the analysis of Basin A includes a partially obstructed culvert, whereas, the applicant has stated that the culvert was assumed to be totally blocked. The staff requests that the applicant justify this apparent inconsistency.

02.04.02-4

In accordance with requirements based on 10 CFR 100.20(c) and 10 CFR 52.79(b), the staff reviewed the response dated August 29, 2008 (ML824609080) to unresolved data information need #6 from the staff audit (ML081980156). In their response, the applicant provided substantial reasons why the culvert should not become obstructed and documented that a Limiting Condition for Operation is included in the GGNS Unit 1 Technical Requirements Manual. Although this submitted information has provided some basis for the conclusion, additional information is requested that will discuss the supporting assumption that 50 percent blockage of the culvert is sufficiently conservative.

The staff requests that the applicant provide additional detail regarding the characteristics of the debris and its potential to affect the operation of the culvert or provide sufficient documentation of accepted guidance to support the statement that 50 percent obstruction of the culvert is conservative.

Grand Gulf, Unit 3 COLA
Entergy Operations, Inc.
Docket No. 52-024
SRP Section: 02.04.12 - Groundwater
Application Section: 02.04.12 - Groundwater

QUESTIONS for Hydrologic Engineering Branch (RHEB)

02.04.12-1

NRC staff has reviewed the applicant's justification for not providing a system to monitor groundwater conditions after completion of the plant. In accordance with the requirements of 10 CFR 20.1406, and referencing additional guidance provided by NRC RG 4.21, the staff requests that the applicant provide either (1) a detailed justification for omission of a groundwater monitoring system (with particular regard to its potential role in monitoring possible radionuclide releases to groundwater), or (2) a conceptual description of a proposed groundwater monitoring system. Such a description, although not necessarily detailed, should cover approximate numbers and locations of monitoring wells, kinds of sampling and measurement to be conducted, parameters to be analyzed or measured, frequency of sampling and measurement, record keeping, procedures for analyzing and interpreting the observations, how triggers for remedial action will be identified, and how a complete formal monitoring plan will be developed. Because groundwater is far below the surface, provisions for monitoring the vadose zone should be included as appropriate.

02.04.12-2

NRC staff has reviewed the groundwater analysis results described in FSAR Section 2.4.12, and supplemental information provided by Entergy in its August 29, 2008 letter (CNRO-2008-00029). In accordance with requirements based on 10 CFR 100.20(c)(3) and 10 CFR 52.79(a)(1)(iii), the staff requests that the applicant provide a description of the process used to evaluate conceptual site models of the subsurface environment in order to rule out the possibility of problematically high future groundwater levels.

The staff is aware that current groundwater levels near Unit 3 are much lower than the maximum groundwater level specified as an ESBWR site parameter, i.e., 2 feet below site grade; current groundwater conditions are addressed satisfactorily in the sources cited above. However, alternative conceptual models might predict higher water levels in the future. Such models might include, for example, changes in recharge conditions resulting from plant construction, extreme recharge events, extremely high water levels in the Mississippi River for an extended period, and alterations in subsurface conditions resulting from construction.

The description should cover (1) how the set of plausible conceptual models was developed, (2) how the models were applied to estimate the maximum likely groundwater level under the most conservative plausible conditions, (3) how the conservative assumptions employed in the conceptual site model compensate for observed spatial and temporal variability, and (4) whether the resulting uncertainty in the maximum groundwater elevation is within the substantial margin to the maximum groundwater level requirement of 2 feet below site grade.

Grand Gulf, Unit 3 COLA
Entergy Operations, Inc.
Docket No. 52-024
SRP Section: 02.04.13 - Accidental Releases of Radioactive Liquid Effluents in Ground and Surface Waters
Application Section: 02.04.13 - Accidental Releases of Radioactive Liquid Effluents in Ground and Surface Waters

QUESTIONS for Hydrologic Engineering Branch (RHEB)

02.04.13-1

NRC staff has reviewed the source term for the radioactive liquid effluent release scenario with reference to Branch Technical Position BTP 11-6, section B.2, “Radioactive Source Term”. Regarding source concentrations of radionuclides included in this scenario, the applicant cites DCD Table 12.2-13a which provides source inventory for the major radwaste components. This table does not include data on iodine-129, technetium-99, or uranium-235. However, the applicant’s Table 2.4.13-202 provides a comparison of liquid release concentrations and includes these isotopes. NRC staff requests that the applicant describe the origin of the source concentrations included in the analysis. Are they included as (1) fission products because of their potentially significant dose at low concentrations, (2) as decay progeny because they are produced during transport of the parent, or (3) both? Also, please provide a justification for the use of source inventory data from Table 12.2-13a, in light of the statement in ESBWR DCD Tier 2, section 12.2.1.4 that “[t]hese inventories should not be construed to represent sources for offsite release.”

02.04.13-2

NRC staff has reviewed the applicant’s analysis of the accidental release of radioactive liquid effluents in accordance with requirements based on 10 CFR 100.20(c), and referencing additional guidance provided by NRC SRP 2.4.13 and Branch Technical Position BTP 11-6. This analysis considers adsorption of selected radionuclides that may retard their movement and establish a longer travel time in the groundwater environment, thereby decreasing concentration through a longer period of decay. Chelating agents used at some plants during short-term operations (flushing and cleaning during outages) may not be stored routinely on-site and may not appear on lists of chemicals provided in the application (e.g., SSAR Table 2.2-5, FSAR Table 2.2-201). If chelating agents found their way into radioactive liquid waste, then they could influence the adsorption of the radionuclides in the environment. The presence of chelating agents in some radioactive liquid waste has been shown to decrease or eliminate adsorption of the radionuclide. Thus, if present, how have chelating agents been accounted for in distribution coefficients?

02.04.13-3

Revised Version:

NRC staff has reviewed the applicant's analysis of the accidental release of radioactive liquid effluents in accordance with requirements based on 10 CFR 100.20(c), and referencing additional guidance provided by NRC SRP 2.4.13 and Branch Technical Position BTP 11-6. In its analysis of radionuclide transport by groundwater, the applicant has, for certain radionuclides, used distribution coefficients measured from on-site soil samples. Distribution coefficients for certain other radionuclides were assumed to be zero, "which is conservative since it assumes no retardation during transport." (FSAR p. 2-166)

However, this assumption is not necessarily conservative under all conditions. Using a mixture of non-zero and (assumed) zero distribution coefficients in modeling may lead to non-conservatism, because different radionuclides that would, in fact, arrive at the receptor the same time might then be incorrectly modeled as arriving at different times. This could occur, for example, in a case where two radionuclides have the same actual distribution coefficient, but one is modeled using an assumed zero distribution coefficient, and the second modeled using a measured, non-zero distribution coefficient. The first radionuclide would then be modeled as moving much faster than the second. Thus, although the two radionuclides would actually arrive together at the receptor and produce a combined dose, the model would show them as arriving separately and thus producing only their lower separate doses.

The staff requests that the applicant provide an additional analysis that uses a different kind of conservative assumption regarding the radionuclides for which distribution coefficients are not measured. This assumption is that the peak concentrations of these radionuclides arrive at the receptor at the same time as the peak concentration of other radionuclides (i.e., those having measured, non-zero distribution coefficients), or else, if multiple radionuclides are present in significant concentrations, at the time that would maximize the limiting value as defined by the sum of fractions rule described in 10 CFR 20, Appendix B, Table 2, footnote 4.

02.04.13-4

NRC staff has reviewed the applicant's analysis of the accidental release of radioactive liquid effluents in accordance with requirements based on 10 CFR 100.20(c), and referencing additional guidance provided by NRC SRP 2.4.13 and Branch Technical Position BTP 11-6. BTP 11-6 provides guidance in assessing potential release of radioactive liquids at the nearest potable water supply, located in an unrestricted area, for direct human consumption or indirectly through animals, crops, and food processing. BTP 11-6 further states the evaluation of the release considers the use of water for direct human consumption or indirectly through animals (livestock watering), crops (agricultural irrigation), and food processing (water as an ingredient).

The analysis does not include a discussion of pathways other than drinking water. The analysis should discuss these other pathways, especially the pathways such as fish and crop irrigation that may result in concentration of the source term. Either discuss other pathways, or justify why they need not be included.