PMSTPCOL PEmails

From: Tai, Tom
Sent: Wednesday, December 02, 2009 9:32 AM
To: Price, John E
Cc: STPCOL; Mookhoek, William
Subject: STP Draft RAI 4046 for Chapter 3.8.4
Attachments: RAI 4046 03.08.04-xx.doc

John,

Attached for your information and use is a draft copy of RAI 4046 for Chapter 3.8.4. This is a supplement to RAI 2964 (Questions 03.08.04-1 & 2), RAI 2965 (Questions 03.08.04-5, 6, 9, 10, 12, & 13), and RAI 3323 (Questions 03.08.04-14, 15 & 16).

Please let me know if you need a clarification phone call on or before 12/9. If I do not hear from you by then, this RAI will be issued formally.

Regards

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Hearing Identifier: SouthTexas34Public_EX
Email Number: 1938

Mail Envelope Properties (0A64B42AAA8FD4418CE1EB5240A6FED107A3D43032)

Subject: STP Draft RAI 4046 for Chapter 3.8.4
Sent Date: 12/2/2009 9:31:31 AM
Received Date: 12/2/2009 9:31:34 AM
From: Tai, Tom

Created By: Tom.Tai@nrc.gov

Recipients:
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Tracking Status: None

Post Office: HQCLSTR02.nrc.gov

Files	**Size**	**Date & Time**
MESSAGE	508	12/2/2009 9:31:34 AM
RAI 4046 03.08.04-xx.doc	46074	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

Request for Additional Information No. 4046 Revision 3

South Texas Project Units 3 and 4
South Texas Project Nuclear Operating Co
Docket No. 52-012 and 52-013
SRP Section: 03.08.04 - Other Seismic Category I Structures
Application Section: FSAR 3.8

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

03.08.04-***

Follow-up to Question 03.08.04-1 (RAI 2964)

The staff reviewed the applicant's response to Question 03.08.04-1 and needs the following additional clarification and information to complete its review:

a) In its response the applicant uses the term "at-rest seismic lateral earth pressure in non-yielding walls." In general, "at-rest" soil pressure relates to static lateral soil pressure on non-yielding walls due to the self-weight of soil including effects due to hydrostatic pressure and surcharge pressure. The dynamic soil pressure is calculated separately and added to the lateral pressure due to static loads (e.g., at-rest, hydrostatic, surcharge, etc.). Therefore, the applicant is requested to clarify the terminology of "at-rest seismic lateral earth pressure" used to describe lateral loads in the response to this RAI.

b) For the staff to conclude that the design of structures with deep foundations, such as the Reactor Building (RB) and Control Building (CB), is satisfactory for the site, the site-specific design loads are needed to compare with the design loads used for the DCD. Lateral soil pressure is one such load. Therefore, please provide the lateral soil pressures for the RB and the CB, and compare these calculated pressures with those used in the ABWR standard plant design. Please also confirm if the effects of adjacent structures are considered in computing the lateral soil pressures, and if not, provide the justification for not doing so.

03.08.04-***

Follow-up to Question 03.08.04-2 (RAI 2964)

The applicant's response to Question 03.08.04-2 states that the Radwaste Building (RWB) will be designed in accordance with the requirements of RG 1.143, Revision 2. The applicant also discussed the design criteria for this building for seismic category II/I evaluation. In order for the staff to conclude that the Radwaste Building design meets the requirements of RG 1.143, and also meets the requirement in ABWR DCD Section 3.7.2.8, item (3), the FSAR needs to include sufficient design information for the building to demonstrate that the design meets the pertinent design criteria. Guidance provided in

SRP Section 3.8.4 may be used for providing such information. Therefore, the applicant is requested to provide design information for the RWB in the FSAR that includes more detailed description of the structure; applicable codes, standards and specifications; loads and load combinations including live loads, seismic loads, thermal loads, flood loads, tornado loads, lateral soil pressure, etc.; design and analysis procedures; structural acceptance criteria; materials and quality control; design of critical sections, stability evaluation, etc.

03.08.04-***

Follow-up to Question 03.08.04-5 (RAI 2965)

The applicant's response to Question 03.08.04-5 regarding placing a chemical agent on the exposed concrete surface of the mudmat provides descriptive explanations of the waterproofing. Per the SRP 3.8.5 guidance, the applicant needs to show that the foundation can transfer the forces from the structure to soil with the proper factor of safety. Also, because a new material is being used, the applicant needs to provide additional data on testing and other relevant information to meet guidance of SRP 3.8.5. Therefore, the applicant is requested to provide the following additional information, and update FSAR as appropriate:

(1) the specific material that will be used for the waterproof membrane; sufficient data showing that the selected waterproofing will adequately protect the concrete foundations against degradation from soil/groundwater conditions at the STP Units 3 and 4 site;

(2) the final thickness of the membrane based on the physical properties of the selected material;

(3) the application procedures for all aspects of the coating application including batch qualification, surface preparation, application techniques, film thickness, cure time, and repairs;

(4) tests demonstrating that the waterproofing requirements and the coefficient of friction required to transfer seismic loads for STP Units 3 and 4 have been met;

(5) methods for testing that simulate field conditions to demonstrate that the minimum required coefficient of friction is achieved by the structural concrete fill-waterproof membrane structural interface; and documentation summarizing the basis for determining that the material will meet the friction factor and waterproofing requirements;

(6) site-specific sliding evaluation for the Reactor Building (RB) and the Control Building (CB) to demonstrate that the minimum coefficient of friction needed for maintaining the minimum factor of safety against sliding is available at all sliding interfaces between the structures and foundation soil; and,

(7) specification and properties of the structural concrete fill below the RB and CB foundations.

03.08.04-***

Follow-up to Question 03.08.04-9 (RAI 2965)

In its response to Question 03.08.04-9, the applicant stated that for computation of global seismic loads, the live load is limited to the expected live load present during normal plant operation, Lo. This load has been defined as 25% of the operating floor and roof live loads. In FSAR Section 3H.6.4.3.4, the applicant has used a full live load for load combinations not involving a seismic load, and Lo for loading combinations involving seismic load. Although it is acceptable to consider 25% of design live load for computation of global seismic loads, the basis for considering only 25% of live load in loading combinations involving seismic load is not understood. The load combination that includes the seismic load needs to include the full live load effects per the guidance of SRP 3.8.4 and ACI 349. Therefore, the applicant is requested to clarify the use of a reduced live load (expected live load) in the seismic load combinations.

03.08.04-***

Follow-up to Question 03.08.04-10 (RAI 2965)

In FSAR Subsection 3H.6.4.3.3.5, Revision 3, the applicant defines extreme snow load (S_E) as 5.5 psf. The applicant has subsequently used this S_E in loading combinations. However, for load combinations involving extreme snow, the roof load due to an extreme winter precipitation event per ISG-7 should be considered. According to the applicant's response to Question 03.08.04-14, this load was determined to be 47 lbs/ft^2 based on the maximum accumulated water on roof during an extreme winter precipitation event. Therefore, the applicant is requested to elaborate in this section how the extreme snow load used in load combination for roof design was determined following the guidance provided in ISG-7, and report the design load to be used in load combination for roof design. This information is needed to establish consistency between load definition and its use in corresponding load combination.

03.08.04-***

Follow-up to Question 03.08.04-12 (RAI 2965)

The applicant's response to Question 03.08.04-12 refers to the response submitted for RAI 03.07.01-13 (see letter U7-C-STP-NRC-090112, dated August 20, 2009). However, a review of the FSAR subsections identified in that response reveals that the response provided only a definition of these loads, and the thermal, hydrostatic and lateral soil pressure load values are not provided. Therefore, the applicant is requested to include in the FSAR the values of the thermal, hydrostatic and lateral soil pressure loads that are used in the analysis.

03.08.04-***

Follow-up to Question 03.08.04-13 (RAI 2965)

In its response to Question 03.08.04-13, the applicant referred to FSAR mark-up provided in response to question 03.07.01-13 for structural analysis and design information for site-specific seismic category I structures (Letter U7-C-STP-NRC-090112 dated August 20, 2009). The staff noted that the above referenced response did not include all tables and figures referenced in the FSAR mark-up, and these are stated to be provided later. In addition, the level of detail included in FSAR Section 3H.6.6.3 regarding structural design of the various elements of site-specific structures is not sufficiently descriptive, and is not similar to that included in the ABWR DCD. Therefore, the applicant is requested to include in FSAR Section 3H.6.6.3 description of the various steel and concrete elements of the site-specific structures including how these elements are designed including design results.

03.08.04-***

Follow-up to Question 03.08.04-14 (RAI 3323)

The applicant's response to Question 03.08.04-14 explained that since the maximum parapet height for ABWR standard plant seismic category I structures is 9 inches, roof load during the extreme winter precipitation event may not exceed 47 lbs/ft^2, which is less than the roof design live load of 50 lbs/ft^2. The applicant is requested to explain why any potential incidental live loads on the roof need not be considered concurrent with the extreme winter precipitation event. Also, since the maximum parapet height of 9 inches is used as the basis for computing the extreme winter precipitation load on the roof, the applicant is requested to include this information in the FSAR. The requested information will establish the adequacy of roof design live load, and include in the FSAR critical design information.

03.08.04-***

Follow-up to Question 03.08.04-15 (RAI 3323)

The applicant's response to Question 03.08.04-15 provides a conceptual design for the interface connection between the Reactor Service Water (RSW) Piping Tunnels and the RSW Pump Houses and the Control Buildings. The applicant states that the interface design will be finalized during detailed design. The response does not include any information regarding size, dimension, and material for the interface, or calculated data to support the displacement capacity requirement of the joint. Therefore, the applicant is requested to provide detailed information to demonstrate that the design joint has enough deformation capacity to accommodate the deformation demand that is obtained from analysis to confirm that the tunnel interface will maintain integrity, and confirm that loads due to interaction of the tunnel and the building are appropriately included in the design. The applicant is also requested to include in the FSAR critical design information pertaining to the design of the interface, e.g., separation gap, calculated differential displacement, material and stiffness properties of the interface material, etc. Please also address potential degradation of the interface material due to groundwater, in-service inspection of the interface material, and measures against potential in-leakage of groundwater.

03.08.04-***

Follow-up to Question 03.08.04-16 (RAI 3323)

In the response to Question 03.08.04-16, the applicant provided details of how hydrodynamic loads were included in the Ultimate Heat Sink (UHS) finite element model following the guidance provided in SRP 3.7.3, but did not include any information in the FSAR. The applicant is requested to include in the FSAR a summary description about how hydrodynamic loads were included in the UHS structure model to meet the guidance provided in SRP 3.7.3, Acceptance Criterion 14.

03.08.04-***

Follow-up to Question 03.08.04-6 (RAI 2965)

The applicant states in its response to Question 03.08.04-6 that the details of the Structural Integrity Test (SIT) and the instrumentation required for the test will be provided in the ASME Construction Specification, but does not indicate when the information will be available for review by the staff. Since COL License Information Item 3.25 requires that the applicant provide the details of the SIT and the instrumentation for review and approval by the NRC, the applicant is requested to either provide the information for staff review, or provide plans to meet the requirements of the license information item using guidance provided in RG 1.206, Section C.III.4.3.