PMSTPCOL PEmails

From: Tai, Tom
Sent: Wednesday, August 19, 2009 1:48 PM
To: Price, John E
Cc: STPCOL; Mookhoek, William
Subject: Draft RAI 3223 for Chapter 3.3.2
Attachments: RAI 3223 03.03.2-xx.doc

John,

Attached for your information is a draft of RAI 3223 for Chapter 3.3.2. Please let me know if you need a conference call to clarify. If I do not receive your request by 8/26, the RAI will be formally issued to STP.

Regards

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Email Number: 1635

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From: Tai, Tom

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Recipients:
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Request for Additional Information No. 3223 Revision 2

South Texas Project Units 3 and 4
South Texas Project Nuclear Operating Co
Docket No. 52-012 and 52-013
SRP Section: 03.03.02 - Tornado Loads
Application Section: 03.03.02

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

03.03.02-***

RAI 3.3.2-1

With respect to the design and analysis of STP 3 and 4 site-specific Seismic Category I structures including the UHS structure, the applicant is requested to discuss in detail (1) the aspects of structural and seismic analysis and design that are not in compliance with the applicable SRP Section 3.7 and 3.8 acceptance criteria, and for each deviation from the SRP acceptance criteria justify the identified deviations, and (2) discuss site-specific analyses performed in order maintain structural integrity of the UHS structure subject to load combinations including the tornado loads.

03.03.02-***

RAI 3.3.2-2

With respect to STP UHS structural design to ensure structural integrity against tornado impact effects, discuss in detail, the results of both the local damage and structural response evaluations performed for controlling UHS wall and roof panels.

03.03.02-***

RAI 3.3.2-3

The applicant stated that “Tornado missile impact effects on the UHS basin and cooling tower enclosures, and the RSW pump houses are evaluated for the following two conditions:

(a) Local damage in terms of penetration, perforation, and spalling, which is evaluated using the TM 5-855-1 formula (Reference 3H.6-1).

(b) Structural response in terms of deformation limits, strain energy capacity, structural integrity, and structural stability, which is evaluated in accordance with BC-TOP-9A (Reference 3H.6-2).

Provide a discussion of the use of the TM 5-855-1 formula (Reference 3H.6-1) and BC-TOP-9A (Reference 3H.6-2) methods as compared to their corresponding SRP acceptance criteria/methodology, and justify their deviations from the same.

03.03.02-***

RAI 3.3.2-4

Appendix 3H.6.4.3.4.3 Reinforced Concrete Load Combinations lists the following:

$U = 1.4D + 1.4F + 1.7L + 1.7H + 1.7\ R_o$
$U = 1.4D + 1.4F + 1.7L + 1.7H + 1.7W + 1.7\ R_o$
$U = D + F + L + H + To + R_o + W_t$
$U = D + F + L_o + H' + T_o + R_o + E'$
$U = 1.05D + 1.05F + 1.3L + 1.3H + 1.05To + 1.3R_o$
$U = 1.05D + 1.05F + 1.3L + 1.3H + 1.3W + 1.05T_o + 1.3R_o$

Discuss the differences in load factors as well as the load combinations of the above equations compared to their corresponding SRP acceptance criteria/load combinations, and justify the deviations from the SRP acceptance criteria.

The STP applicant states that for the UHS basin, the required strength defined by the above load combinations are multiplied by the following Environmental Durability Factors (S) defined in ACI 350:

Flexural strength ..... S = 1.30
Axial tension (including hoop tension)..... S = 1.65
Excess shear strength carried by shear reinforcement..... S = 1.30

The applicant is requested to discuss any past nuclear facility UHS/intake structures related operating experience that would support the adequacy of the above design practices.

03.03.02-***

RAI 3.3.2-5

Radwaste Service Building is now designed as non-Seismic Category I. Please confirm that the design will prevent the collapse of this building on to adjacent seismic Category I buildings and any missiles generated are bounded by the STP 3 and 4 DBT missiles.

03.03.02-***

RAI 3.3.2-6

Section 3.3.3.4 of the STP 3 and 4 FSAR states that the design criteria for plant structures, systems and components (SSCs) not designed for wind loads are as follows: Such SSCs not designed for wind loads are analyzed using the 1.11 importance factor or are checked to ensure that their mode of failure will not affect the ability of safety-related SSCs to perform their intended safety functions. The applicant is requested to provide more detailed discussion of the approaches and analyses to be used by STP to ensure that site-specific SSCs not designed for tornado loads are analyzed and checked

to ensure that their mode of failure will not affect the ability of safety-related SSCs to perform their intended safety functions. Also, discuss the codes and standards (e.g., ASCE-SEI 7-05) that will be used to ensure realization of the expected SSC performance outcome. The discussion should refer to pertinent SRP acceptance criteria or guidance that was relied upon in performing the analyses.

03.03.02-***

RAI 3.3.2-7

STP Units 3 and 4 COL FSAR Section 3.3.2.2, Determination of Forces on Structures, incorporated by reference the ABWR DCD. In the ABWR DCD design, the conversion of tornado wind velocity into loads on structures and elements followed the methods described in Bechtel Topical Report BC-TOP-3-A, Revision 3 “Tornado and Extreme Wind Design Criteria for Nuclear Power Plants”.

The Bechtel Topical Report, BC-TOP -3-A, is not endorsed in Standard Review Plan (SRP) and the conversion of design wind velocity into velocity pressure and design wind pressures in BC-TOP -3-A may be different from the procedures given in ASCE/SEI 7-05, which is approved in the SRP. Please clarify the approach for the design and analysis of STP Units 3 and 4 site-specific structures, including the UHS structure.

03.03.02-***

RAI 3.3.2-8

The applicant is requested to confirm that the design of site-specific category I structures including the UHS structure for load combinations including tornado loads should be in accordance with ASCE 7-05, with exposure coefficients K_z corresponding to exposure D.

03.03.02-***

RAI 3.3.2-9

In STP Units 3 and 4 COL FSAR Applicant has committed to use IBC 2006, which is also adopted by the State of Texas, and not IBC 2003 as referenced in Section 3.3.4 of FSAR. Applicant shall revise and amend section 3.3.4 (and other sections if applicable) to reflect the incorporation of IBC 2006 as one of the codes the plant has been designed for.