CCNPP3COLA PEmails

From: Arora, Surinder
Sent: Wednesday, June 16, 2010 7:34 AM
To: 'Poche, Robert'; 'cc3project@constellation.com'
Cc: CCNPP3COL Resource; Hawkins, Kimberly; Chakrabarti, Samir; Colaccino, Joseph; Biggins, James; Vrahoretis, Susan; Miernicki, Michael; Chazell, Russell
Subject: DRAFT RAI 252 SEB2 4787
Attachments: DRAFT RAI 252 SEB2 4787.doc

Rob,

Attached is DRAFT RAI No. 252 (eRAI No. 4787). You have until June 30, 2010, to review this RAI and decide whether you need a conference call to discuss the question in this RAI before the final issuance. After the phone call or on June 30, 2010, the RAI will be finalized and sent to you for response. You will then have 30 days to provide a technically complete response or an expected response date for the RAI.

Thanks.

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Created By: Surinder.Arora@nrc.gov

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Request for Additional Information No. 252 (eRAI 4787)
DRAFT
6/16/2010

Calvert Cliffs Unit 3
UniStar
Docket No. 52-016
SRP Section: 03.07.01 - Seismic Design Parameters
Application Section: FSAR 3.7.1

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

03.07.01-15

Follow-Up to Question 03.07.01-3

In order for the staff to complete its review of site reconciliation of the Emergency Power Generating Building (EPGB) and the Emergency Service Water Building (ESWB) structures, and how these meet the acceptance criteria of SRP 3.7.2, the applicant is requested to address the following issues related to the use of structural backfill, structure-soil-structure interaction (SSSI) effects, dynamic soil properties and the frequency transmission characteristics of the combined soil-structure model:

- Section 3.7.1.1.1.2 indicates that the Foundation Input Response Spectra (FIRS) developed for the EPGB and ESWB structures included structural backfill in the site soil column models. It appears that structural backfill has also been used for the Common Basemat Intake Structures (CBIS). The applicant is requested to provide the following information regarding the structural backfill for these structures.

    - Since the site soil column models assume uniform horizontal layers of infinite lateral extent, the applicant should describe the extent to which the backfill for each structure meets this assumption, and include in the discussion what effect the actual lateral extent of the backfill has on the site soil column analyses results.

    - Since the in-situ properties of the backfill are not yet known, what was the basis for low strain dynamic properties assumed for the structural backfill, and why are these considered to be valid?

    - The staff did not identify an ITAAC in the Application which requires confirmation of the in-situ backfill properties used in the soil-column analyses. The Applicant should provide an ITAAC to confirm these properties or explain why one is not needed.

- In the discussion of how SSSI effects were determined on page 3F-160, it appears that the same seismic model of the nuclear island (NI) Common Basemat Structures described in FSAR Section 3.7.2 (Revision 1) of the U.S. EPR FSAR was used for the Calvert Cliffs site. The seismic analysis of the NI has been revised by AREVA and is now an embedded finite element model. The applicant is requested to provide a quantitative comparison of the SSSI effects based on the surface-founded EPR models with a model that includes the embedment of the NI and the actual foundation elevations of the EPGB and ESWB.

- Figure 3.7-24 provides iterated velocity profiles for the BE, UB and LB soil cases presumably to be used for the soil structure interaction (SSI) analyses of the EPGB and ESWB structures. These profiles are typically obtained from the mean and plus/minus one sigma randomized site response analyses and typically have the same shape, such as those in Figure 3.7-22 for the Common Basemat Nuclear Island. The UB profile down to a depth of a little over 40 feet has a shape that appears to be different from the shapes of the BE and LB profiles. The applicant is requested to describe how this profile was developed and its technical basis.

- In FSAR Section 3F.2 on page 3F-161, it states that lower bound shear wave velocity profiles are calculated as the minimum using Equation 3F-6 and $BE(V_s)/(1.5)^{.5}$. Similarly, the upper bound shear wave velocity profiles are calculated using the maximum calculated from Equation 3F-7and $BE(V_s)/(1.5)^{.5}$. The use of $BE(V_s)/(1.5)^{.5}$ for both cases appears to be in error. The applicant is requested to correct the FSAR and confirm that the upper bound and lower bound shear wave velocities shown in Tables 3F-3 through 3F-8 have been calculated correctly.

- Table 3F-3, 3F-4 and 3F-5 provide unit weights of soil layers. Layers 1-12 indicate a unit weight of 0.145 k/ft^3. This value is similar to the unit weight of concrete and seems quite high to be the unit weight of soil. A similar situation occurs in Table 3F-6, 3F-7 and 3F-8 in layers 1-10 for the intake area. The applicant is requested to describe the type of soil in these layers and confirm that the value of the unit weight indicated in the tables is correct.

Per SRP 3.7.1, Structural Acceptance Criteria 4.A.vii, the SSI models for the EPGB and ESWB need to be evaluated to confirm that the dynamic models are of adequate refinement to capture the response of the structures throughout the frequency range of interest including the high frequency responses. For soft soil case(s), the transmission characteristics of a dynamic model are limited by the transmission capability of the soil elements, which have a much lower stiffness than the concrete structural elements. As a result, insufficient modeling of the soil layers may limit the frequency content of the earthquake time history input to the structural model. The applicant is requested to present the results of any sensitivity studies that were performed to assure that the seismic models meet the above SRP criterion, and include this information in the FSAR. If sensitivity studies were not performed, the applicant is requested to provide the technical basis for how it meets the criterion of the SRP.