CCNPP3COLA PEmails

From: Arora, Surinder
Sent: Friday, October 02, 2009 10:42 AM
To: 'Poche, Robert'; 'cc3project@constellation.com'
Cc: CCNPP3COL Resource; Chakrabarti, Samir; Samaddar, Sujit; Colaccino, Joseph; Miernicki, Michael; Biggins, James; Vrahoretis, Susan; Hair, Christopher
Subject: FINAL RAI No. 179 SEB2 3700
Attachments: FINAL RAI 179 SEB2 3700.doc

Rob,

Attached please find the subject request for additional information (RAI). The draft of this RAI was provided to you on September 15, 2009. No clarification phone call was requested during the draft review period on this RAI.

The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs. For any RAIs that cannot be answered within 30 days, it is expected that a schedule date for submitting your technically correct and complete response will be provided to the staff within the 30 day period so that the staff can assess how this information will impact the review schedule.

Your response letter should also include a statement confirming that the response does or does not contain any sensitive or proprietary information.

Thanks.

SURINDER ARORA, PE
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Sent Date: 10/2/2009 10:42:26 AM
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From: Arora, Surinder

Created By: Surinder.Arora@nrc.gov

Recipients:
"CCNPP3COL Resource" <CCNPP3COL.Resource@nrc.gov>
Tracking Status: None
"Chakrabarti, Samir" <Samir.Chakrabarti@nrc.gov>
Tracking Status: None
"Samaddar, Sujit" <Sujit.Samaddar@nrc.gov>
Tracking Status: None
"Colaccino, Joseph" <Joseph.Colaccino@nrc.gov>
Tracking Status: None
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Tracking Status: None
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Tracking Status: None
"Vrahoretis, Susan" <Susan.Vrahoretis@nrc.gov>
Tracking Status: None
"Hair, Christopher" <Christopher.Hair@nrc.gov>
Tracking Status: None
"'Poche, Robert'" <Robert.Poche@constellation.com>
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Tracking Status: None

Post Office: HQCLSTR01.nrc.gov

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MESSAGE	1449	10/2/2009 10:42:27 AM
FINAL RAI 179 SEB2 3700.doc	36858	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
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Request for Additional Information No. 179 (eRAI 3700)

10/2/2009

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

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

03.07.01-13

Follow-up Question to Partial Response to RAI 58, Question 03.07.01-3

The staff reviewed the partial response to RAI No. 58, Question 03.07.01-3 submitted by the applicant in its letter UN#09-329 dated July 29, 2009. The staff's assessment only addresses the response provided by the applicant regarding the seismic analysis of the Emergency Power Generating Building (EPGB) and the Essential Service Water Building (ESWB). The other issues addressed in the original question have future response dates. In response to the question as to why a confirmatory analysis was not performed for the EPGB and ESWB, the applicant states that a site-specific analysis based on CCNPP Unit 3 site-specific design SSE response spectrum and strain compatible soil properties, including the effects of structural fill and structure-soil-structure interaction due to the Nuclear Island (NI) will be performed for these structures. The applicant is requested to provide a description of the analysis and analysis results for the EPGB and ESWB in the CCNPP FSAR including comparisons with the results (structural accelerations and in-structure response spectra) of the analyses that served as the design basis for the U.S. EPR FSAR.

03.07.01-14

Follow-up Question to RAI No. 58, Question 03.07.01-2

As a follow-up to RAI No. 58, Question 03.07.01-2, the applicant is requested to provide the following additional information:

1. The applicant has stated that the soil-structure interaction (SSI) model used for confirmatory analysis of the NI common basemat structure is identical to the SSI model used for the US EPR FSAR (Figure 3.7.2-63 of the U.S. EPR FSAR). However, there are differences that should have been considered in the NI confirmatory analysis model for CCNPP Unit 3. These differences are:

    - Nodes used to determine structure-soil-structure interaction (SSSI) effects of the nuclear island (NI) on the response of the Emergency Power Generating Buildings (EPGB) and Essential Service Water Buildings (ESWB) should be located at the proper elevations of these structures and not at the same elevation as the NI foundation as was done in the U.S. EPR FSAR.

- The NI is an embedded structure, not surface founded.

- The subgrade layering at CCNPP is not the same as that used for the soft soil case for the U.S. EPR FSAR.

The applicant is requested to explain why the confirmatory analysis model for the CCNPP Unit 3 NI did not reflect the differences cited above and what impact these differences will have on the results of the analysis.

2. The applicant has stated that a parametric analysis was performed to determine the effect of NI embedment on the seismic results for this structure. The applicant is requested to provide the details of the parametric analyses including the definition of input motion and how it was derived for the embedded model. The applicant should provide results from the parametric analyses and provide a comparison to results for the surface founded NI seismic model.

3. The applicant has stated that the NI common basemat structure confirmatory SSI analysis is based on undisturbed in-situ material. Discrete thin strata or localized areas of the foundation bearing soils may be encountered during construction that do not meet the COLA required soil properties. In the event substandard materials are encountered the applicant has stated they will be replaced with engineered structural fill that has characteristics comparable to the site soil properties of the undisturbed material considered in the analyses, or a site-specific validation will be performed. Unless the proposed construction methods will make use of excavation support systems considering vertical cuts with rigid vertical walls providing excavation support, it is anticipated that excavation will extend to some potentially significant area to the sides of the NI. Therefore, even if soft soils are not encountered below the foundation of the NI, fill materials will impact the SSI evaluation. If only top-down excavation methods with vertical excavation support are to be used, the CCNPP FSAR should so state. If backfill will be used to the side of the NI, the methods that will be used to assess the impact of fill on the SSI process need to be provided. If fill materials are to be used to the side of the NI, the potential impact of this fill on the seismic response of safety related structures adjacent to the NI, including potential two- and three-dimensional effects on the SSI, needs to be described.

4. In response to a question regarding how groundwater effects are treated in the SSI confirmatory analysis the applicant stated that for submerged soil layers, the water P-wave velocity (4800 fps) is used where the soil P-wave velocity is less than that of water. However, if the groundwater (GW) table is close to the foundation elevation, the soils above and below the GW elevation will be represented by different S-wave and P-wave parameters. Such a two-layer configuration was not included in the U.S. EPR site configuration profiles for the generic design. The applicant should provide an explanation of how this potential discontinuity in velocities impact the SSI evaluations and how they compare with those developed for the generic design.

5. The applicant has stated that two computer codes, SOILSIM and RVTSITE were used in the development of the FIRS for the Seismic Category I structures. The current NRC Interim Staff Guidance and NEI guidance document that summarize the processes to be used for transfer of probabilistic ground motions to different elevations in the soil column refer to the time-domain SHAKE code and not the RVTSITE apparently based on random vibration theory. The applicant should

provide information on the appropriateness of using this model for site response analyses and compare its application to that of SHAKE.

6. The Risk Engineering Code SOILSIM has embedded within it an assumed layer correlation model for the randomization of site soil columns from which the BE, UB and LB soil columns used in the SSI calculations are determined as well as the corresponding GMRS and FIRS spectra. The applicant should provide information on the adequacy of this correlation model for the soil conditions at the CCNPP site, provide plots of velocity versus depth for each of the randomized soil columns used to develop the GMRS and indicate whether or not the resulting site columns are appropriate for the geotechnical/geological site data available and whether this correlation model reduces the computed FIRS and GMRS spectra as compared to other correlation models that can be assumed to be appropriate.