

Bi-weekly Seismic Call Agenda

Date: 2016-03-23

Topics:

1. RAI 129-8085, Question 03.08.01-4:
The NRC is to clarify if there is more feedback regarding the response approach to (two different ASME Code editions and addenda). KHNP provided a comparison of the design provisions of NE code editions and addenda to the NRC on 2016-03-08.
2. RAI 183-8197, Q 03.07.02-1:
Discussion regarding KHNP's response approach took place during the 2016-03-09 bi-weekly call. KHNP is to provide the convergence criteria which will be used for the ACS SASSI analysis for inclusion of higher modes.

KHNP INPUT

The convergence criteria are being prepared.

3. RAI 253-8300, Question 03.07.01-5:

Feedback from NRC

The label "CSDRS" in the new figures in the DCD markup should be replaced with "CSDRS anchored at 0.1 g."

The site response transfer functions, at the foundation level relative to the free field surface motions, are generally greater than 1 between 3 Hz and 20 Hz for the S6 and S7 soil cases, indicating that the CSDRS at the foundation level should generally be higher than the CSDRS (at the ground surface) in that frequency range. However, Figure 3.7A-12 shows the opposite (i.e., the $CSDRS_{ff}$ is lower than CSDRS). The staff requests the applicant provide further explanation on which dips in the transfer functions for S6 and S7 would cause the dips in the response spectra shown in Figure 3.7A-12.

KHNP INPUT

The label will be changed from "CSDRS" to "CSDRS anchored at 0.1g" in the DCD mark up.

The site response transfer functions shown in Figures 11 through 14 of the response to the RAI are computed for the soil profiles S6 and S7 from half-space to structure foundation elevations. Because the foundation of the EDGB is located relatively close to the ground surface elevation, the site response transfer functions at the foundation level of the EDGB are similar as the transfer functions at the ground surface, as shown in Figure 5-23 of technical report APR1400-E-S-NR-14001-P/NP, Rev.0. Also, since the CSDRS are defined at the ground surface, $CSDRS_{ff}$ of the EDGB should be similar to the CSDRS. The site response transfer functions of the NI are lower than the transfer functions of the EDGB between 3 Hz and 20 Hz, as shown in Figures 11 through 14 of the response to RAI. Therefore, $CSDRS_{ff}$ of the NI should be lower than the $CSDRS_{ff}$ of the EDGB and the CSDRS.

4. RAI 253-8300, Question 03.07.01-8:

Feedback from NRC

The RAI response is acceptable to the staff. The markup to the APR1400-E-S-NR-14001-P, Rev.0 is also acceptable. However, since these two groundwater tables are used for calculating different loads, i.e., design groundwater table for hydrostatic load, hydrodynamic load, and the buoyancy load, while the extreme groundwater for seismic analysis of Seismic Category I structures), they should be described in the DCD. Therefore, the applicant is requested to propose a markup to an appropriate DCD section to indicate this important aspect.

KHNP INPUT

The following sentence will be added to DCD Tier 2, Subsection 3.7.1.3, "Supporting Media for Seismic Category I Structures";

"To generate more conservative seismic responses, groundwater table elevation is considered to be at the ground surface in the seismic analyses of the seismic Category I structures."

5. RAI 199-8223, Question 03.08.05-11

KHNP has revised the RAI response to include the revisions discussed during the bi-weekly call on 2016-03-09 (member forces, development length, and portion beyond RCB).

KHNP compared the load combinations of the ASME and ACI codes applied in the NI common basemat analysis, and found that there are four kinds of loads that exist in the ACI load combination but do not exist in the ASME load combination. The loads which are not in the ASME load combination are the operating pressure, miscellaneous loads, crane and trolley load, and the hydrostatic load. As described in the response to RAI 255-8285, Question 03.08.05-13, operating pressure and miscellaneous loads do not have an effect on the global behavior of the basemat, and these loads were not considered in the NI common basemat analysis. The crane and trolley load is already considered in the NI common basemat analysis as self-weight of the fuel handling overhead crane. The hydrostatic load in the AB tanks was not considered in the analysis due to its minor effect on the basemat. In addition, the effect of the soil pressure on the RCB foundation is negligibly small because the size of the AB foundation is large (348 ft x 353 ft as described in DCD Section 3.8A.2.4.1) and the distance between the RCB foundation and the AB outside wall is long. Most of the soil pressure on the side walls of the AB foundation is transmitted through the AB internal walls and has little effect on the behavior of the RCB foundation.

6. RAI 199-8223, Question 03.08.01-13

KHNP has revised the RAI response by attaching the VSL brochures which show the type of prestressing system used for APR 1400 Design. KHNP has attempted to obtain the historical information regarding the prestressing system by requesting the vendor to provide the information. However, KHNP could not obtain the information from the vendor since such information is considered confidential. Most Korean NPPs in service use the VSL E5-55 prestressing system. The VSL E6-42 system has been applied to Shin-Kori Units 3&4, which is the latest NPP in service in Korea, and is a first of a kind application. Thus, the only NPP which uses the VSL E6-42 system is Shin-Kori Units 3&4. There is no reported degradation or other problems with the prestressing system.

7. RAI 255-8285, Question 03.08.05-7

KHNP would like to discuss with the NRC the work scope of structural design considering to the construction sequence.

Based on the soil properties of Table 3.7A-1, the use of construction sequence analysis results is very limited. The limits of the construction sequence analysis due to the uncertainty of the generic geotechnical parameters are below.

1. The analysis will refer to the construction sequence of Shin-Kori units 3&4 for the NI building structures.
 2. The variety of uniformity of soil layering will not be Accounted for.
 3. Based on the sand soil characteristic, the settlements will occur instantaneously, so the short-term settlement will be checked.
 4. The effect of the design of Seismic Category I structures will not accounted for due to the uncertainty of the generic geotechnical parameters if the settlements does not exceed the allowable settlement in Table 2.0-1 of DCD.
8. RAI 255-8285, Question 03.08.05-18
KHNP would like to confirm the NRC's feedback received during the 3.8 public meeting has been appropriately incorporated.
9. KHNP to provide updated schedule of drafts to be communicated with NRC

Outstanding Draft RAI Responses

RAI	Question	Draft Due Date	Draft Provided	Feedback Provided	Action With
182-8160	03.07.01-4	N/A	3/15/2016	N	NRC
252-8299	03.07.02-7	7/31/2016	N	N/A	KHNP
252-8299	03.07.02-11	7/31/2016	N	N/A	KHNP
252-8299	03.07.02-12	TBD	N	N/A	KHNP
252-8299	03.07.02-14	N/A	3/8/2016	N	NRC
252-8299	03.07.02-15	N/A	2/19/2016	N	NRC
129-8085	03.08.01-1	N/A	2/19/2016	N	NRC
129-8085	03.08.01-4	N/A	3/8/2016	N	NRC
226-8235	03.07.02-5	3/21/2016	N	N/A	KHNP
226-8235	03.07.02-6	10/7/2016	N	N/A	KHNP
183-8197	03.07.02-1	8/12/2016	N	N/A	KHNP
183-8197	03.07.02-4	TBD	N	N/A	KHNP
199-8223	03.08.01-8	4/29/2016	N	N/A	KHNP

199-8223	03.08.01-9	N/A	2/23/2016	N	NRC
199-8223	03.08.01-10	TBD	N	N/A	KHNP
199-8223	03.08.01-11	N/A	3/18/2016	N	KHNP
199-8223	03.08.01-13	N/A	3/18/2016	N	KHNP
200-8225	03.08.02-2	3/25/2016	N	N/A	KHNP
227-8274	03.08.04-1	N/A	3/4/2016	N	NRC
227-8274	03.08.04-3	N/A	3/7/2016	N	NRC
227-8274	03.08.04-4	N/A	3/4/2016	N	NRC
227-8274	03.08.04-9	N/A	3/4/2016	N	NRC
267-8301	03.07.03-1	4/8/2016	N	N/A	KHNP
267-8301	03.07.03-3	3/25/2016	N	N/A	KHNP
255-8285	03.08.05-18	N/A	3/21/2016	N	NRC