RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.:	252-8299
SRP Section:	03.07.02 – Seismic System Analysis
Application Section:	3.7.2
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Question No. 03.07.02-13

10 CFR 50 Appendix S requires that the safety functions of structures, systems, and components (SSCs) must be assured during and after the vibratory ground motion associated with the safe shutdown earthquake (SSE) ground motion through design, testing, or qualification methods. In accordance with 10 CFR 50 Appendix S, the staff reviews the adequacy of the seismic analysis methods used to demonstrate that SSCs can withstand seismic loads and remain functional. DCD Table 3.7-14, 3.7-17, and 3.7-20 report maximum response acceleration values for the CS, IS and AB, respectively. Staff review did not find a clear description whether the values are taken from the ISRS computed from SASSI or the peak of the response time histories computed from SASSI. To assist the staff requests the applicant to indicate the source of these values. If these values were computed from the SASSI ISRS, the staff requests the applicant to provide comparison of the values in the aforementioned Tables and the peak values of the corresponding acceleration time histories.

Response

The maximum response acceleration values in Tables 3.7-14, 3.7-17, and 3.7-20 of DCD Tier 2 are obtained by using the maximum g values in the response acceleration time histories from the SASSI analysis. DCD Tier 2, Subsection 3.7.2.2 will be revised to specify the source of the maximum response acceleration values.

Impact on DCD

DCD Tier 2, Subsection 3.7.2.2 will be revised as indicated in the attachment associated with this response.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical, or Environmental Report.

APR1400 DCD TIER 2

A total of 150 modes and their frequencies from the modal analysis of the FEM for the emergency diesel generator building are computed. Figures 3.7-37, 3.7-38, and 3.7-39 show the first major X-, Y-, and Z-mode shapes, respectively, and modal frequencies and participating mass ratios are summarized in Table 3.7-13.

The seismic response parameters resulting from the combined effect of both horizontal and one vertical seismic input motions are obtained by using the square root of the sum of the squares (SRSS) method. The soil-structure interaction analyses for nine soil profiles developed to represent generic site conditions and one fixed-base analysis are performed for the seismic Category I structures. The final analysis results are obtained by enveloping both soil-structure interaction analysis results and fixed-base analysis results.

The seismic responses maximum absolute nodal accelerations, maximum displacements relative to the top of foundation mat, and maximum member forces for the reactor containment building containment structure, reactor containment building internal structure, auxiliary building, and emergency diesel generator building are presented in Tables 3.7-14 through 3.7-25.

3.7.2.3 <u>Procedures Used for Analytical Modeling</u>

The maximum response acceleration values are obtained from the peak of the response time histories computed by soil-structure interaction analysis.

3.7.2.3.1 Designation of Systems versus Subsystems

The calculation of the dynamic response of a nuclear power plant subject to an earthquake loading is divided into two categories. The first is the safety-related main structural system and the second is the safety-related subsystem. The safety-related main structural system category refers to the analysis of standard plant buildings and structures that house and/or support safety-related systems. The safety-related subsystems category refers to smaller safety-related SSCs supported by the safety-related main structural systems.

The safety-related structures that are analyzed in the main structural system analysis are:

- a. Reactor containment building prestressed concrete containment structure and reinforced concrete internal structure
- b. Reinforced concrete auxiliary building