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**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION**

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03/29/2013

**US-APWR Design Certification**

**Mitsubishi Heavy Industries**

**Docket No. 52-021**

**RAI NO.:** NO. 960-6709 REVISION 0  
**SRP SECTION:** 03.07.02 – Seismic System Analysis  
**APPLICATION SECTION:** 3.7.2  
**DATE OF RAI ISSUE:** 09/24/2012

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**QUESTION NO. 03.07.02-223:**

MHI's TR MUAP-12002 (R0), "Sliding Evaluation and Results," did not provide the load combination that will be used in the sliding stability analysis. Therefore, the applicant is requested to identify and describe what loads will be included along with the seismic load.

Also, because this is a nonlinear analysis, where superposition cannot be used, describe at what point in the analysis the loads will be applied and describe how they will be applied. If there are any deviations from the load combination identified in the acceptance criteria of SRP 3.8.5 for sliding stability analysis, provide the technical basis and justification.

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**ANSWER:**

The loads considered in the sliding analysis are listed in Section 4.5.2 of the Technical Report MUAP-12002, Rev. 1. The input seismic acceleration time histories are compatible with the certified seismic design response spectra (CSDRS). Therefore the basic load combination used in the sliding analysis corresponds to Load Combination C specified in Standard Review Plan (SRP) 3.8.5 II.3 (which includes the Safe-Shutdown Earthquake (SSE)), with some modifications, as discussed below:

1. The Live Loads recommended for dynamic analysis (i.e., 25-percent of the floor design live load and 75-percent of the roof design snow load) are included in addition to the Dead Loads. These loads are included in the sliding analysis to maintain consistency with the SASSI soil-structure interaction (SSI) analyses that provided the base input accelerations for the sliding analyses and that were performed with Live Loads. A sensitivity study on the effect of Live Loads on the sliding analysis results concluded that the presence of Live Loads does not have a significant effect (see Appendix B.1.1 of Technical Report MUAP-12002, Rev. 1).
2. The static lateral soil and groundwater pressures are neglected, based on the fact that each structure is embedded on four sides. As discussed in Section 4.5.3 of Technical Report, MUAP-12002, Rev. 1, neglecting static lateral earth pressures is conservative for the results of sliding analysis.

3. The dynamic lateral soil and groundwater pressures are neglected. As demonstrated based on a quantitative analysis in Sections 5.2.1.3 and 5.3.1.3 for the reactor building (R/B) complex and the turbine building (T/B), respectively, these pressures are offset by resistance forces that have been conservatively neglected.

All static loads are applied at time zero and maintained throughout the entire analysis. The dynamic loads (translational and rotational accelerations) are applied as time history loads, in addition to the static loads. Superposition is not used in the nonlinear sliding analysis.

**Impact on DCD**

There is no impact on the DCD.

**Impact on R-COLA**

There is no impact on the R-COLA.

**Impact on S-COLA**

There is no impact on the S-COLA.

**Impact on PRA**

There is no impact on the PRA.

**Impact on Technical/Topical Report**

There is no impact on the Technical/Topical Report.

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This completes MHI's response to the NRC's question.