

ArevaEPRDCPEm Resource

From: Tesfaye, Getachew
Sent: Tuesday, May 25, 2010 5:22 PM
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Subject: Draft - U.S. EPR Design Certification Application RAI No. 412(4744), FSAR Ch. 3
Attachments: Draft RAI_412_SEB2_4744.doc

Attached please find draft RAI No. 412 regarding your application for standard design certification of the U.S. EPR. If you have any question or need clarifications regarding this RAI, please let me know as soon as possible, I will have our technical Staff available to discuss them with you.

Please also review the RAI to ensure that we have not inadvertently included proprietary information. If there are any proprietary information, please let me know within the next ten days. If I do not hear from you within the next ten days, I will assume there are none and will make the draft RAI publicly available.

Thanks,
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Request for Additional Information No. 412(4744), Revision 0

5/25/2010

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 03.07.02 - Seismic System Analysis
Application Section: 03.07.02

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

03.07.02-73

RAI from Audit, 4/26-30, 2010

During the staff review of the calculation documenting the SSI Analysis of the Nuclear Island (NI) Common Basemat Structure (Calculation No.32-7002884-000), there were two items identified which require further clarification to assure that the design of the NI meets the earthquake design requirements of GDC 2. First, it was noted that pressure distributions on the shear key (see example on page 419) appear to be oscillatory and somewhat random. AREVA is requested to describe how the distribution was determined, whether or not it is valid, and if valid, how this pressure distribution will be used for earthquake design of the shear key and for the calculation of interface loads between the shear key and the NI foundation mat.

Second, many of the transfer functions such as those on page 696 of the calculation exhibit spikes. AREVA is requested to describe the cause of these spikes and to quantify the impact these spikes have on the stability of the computed seismic response of the NI structure.

03.07.02-74

RAI from Audit 4/26-30, 2010

As part of the staff review of the SSI analysis of the Nuclear Island (NI) Common Basemat Structure, AREVA was asked to describe how seismic fluid-structure interaction was considered for those structures containing water in the NI (e.g., the IRWST, the spent fuel pool, etc.). AREVA stated that the entire mass of water is treated as a lumped mass which is added to the mass of the structure in which it is contained. In general the staff was satisfied with the method described but to ensure the analysis and design of the NI meets the requirements of GDC 2 for earthquake design and that the loads due to the seismic response of the water have been properly determined, the staff requests that AREVA provide the following information regarding fluid/structure interaction:

1. Describe how the contained water is modeled in the seismic analysis of the NI;
2. If convective loads are ignored, provide the basis for not considering them;
3. Justify the freeboard is sufficient to accommodate sloshing in the IRWST;

4. Provide the basis for water level assumptions when determining the effects of sloshing;
5. If they exist, describe the effect of sloshing loads; and,
6. Evaluate potential overspill in Spent Fuel Pool.

Provide the basis for not considering a seismic hydrodynamic impact load on the bottom of the spent fuel pool, the IRWST, or any other significant pool or tank in the NI, due to the response of the water from an earthquake acting in the vertical direction.