

## ArevaEPRDCPEm Resource

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**From:** Tesfaye, Getachew  
**Sent:** Monday, August 31, 2009 8:09 AM  
**To:** 'usepr@areva.com'  
**Cc:** Spicher, Terri; Dixon-Herrity, Jennifer; Miernicki, Michael; Patel, Jay; Colaccino, Joseph; ArevaEPRDCPEm Resource  
**Subject:** U.S. EPR Design Certification Application RAI No. 287 (3504), FSAR Ch. 3  
**Attachments:** RAI\_287\_EMB1\_3504.doc

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on August 27, 2009, and on August 28, 2009, you informed us that the RAI is clear and no further clarification is needed. As a result, no change is made to the draft RAI, except corrections to some typographical errors that you identified. 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 date for receipt of this information will be provided to the staff within the 30 day period so that the staff can assess how this information will impact the published schedule.

Thanks,  
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**Hearing Identifier:** AREVA\_EPR\_DC\_RAIs  
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8/31/2009

U. S. EPR Standard Design Certification

AREVA NP Inc.

Docket No. 52-020

SRP Section: 03.09.02 - Dynamic Testing and Analysis of Systems Structures and Components

Application Section: 3.9.2.2

QUESTIONS for Engineering Mechanics Branch 1 (AP1000/EPR Projects) (EMB1)

03.09.02-61

**Follow-up to RAI Question No. 03.09.02-39**

In RAI 03.09.02-39, the staff requested additional information with respect to the loading combinations for the HVAC ductwork and the HVAC supports as stated in FSAR Tier 2, Tables 3A-1 and 3A-2. RAI 03.09.02-39 was a supplemental question to RAI 03.09.02-4. RAI 03.09.02-4 was issued by the staff to request AREVA to explain why loading and loading combinations for Service Levels B are not required. For Service Level D, explain why it is not required unless a design pressure differential (DPD) load is applicable; discuss what would be the required loadings and loading combinations to be considered with DPD. The staff also requests AREVA to discuss the methods of combining the dynamic loads (including seismic loads), and the bases of the combinations.

In reply AREVA NP stated that the information in the two load combination tables, Table 3A-1, HVAC Ductwork Load Combinations and Table 3A-2, HVAC Support and Restraint Load Combinations is similar to the information in Tables SA-4212, Ductwork Load Combinations and SA-4216, Load Combinations for Supports, of the ASME AG-1-2003 Code. AREVA stated in reply to RAI 03.09.02-4, that they (AREVA) requested ASME to clarify the load combinations, which would then be used as a means of addressing the staff's concerns in tables 3A-1 and 3A-2. To date, AREVA has not received a response from ASME.

In RAI 03.09.02-39, the staff requested a new review of the issue raised in RAI 03.09.02-4 since the AREVA response, based on the requested ASME clarification, does not have a defined completion date and is likely to remain an open item.

To clarify the staff's request, additional background information is contained below:

ASME Article AA-D-3400 Allowable Design Stresses – Service Level B, C, or D

Service levels are assigned to load combinations to define allowable stresses used in the design of ductwork members and assemblies subject to occasional or infrequent loads. The allowable stress for each service level is proportioned to service level A stress levels as defined in article AA-D-3400.

ASME Table SA-4212 – Load Combinations

The ASME AG-1-2003 Code defines the rules for ductwork seismic load combinations in Article SA-4000, SA-4211(f).

(f) **Seismic loads (SL)**. Loads that are the result of the envelope of the operating basis earthquake (OBE) and the safe shutdown earthquake (SSE). As overall system functionalism is not generally compromised by loads from the OBE, the SSE will govern the design. **As an option** (bold underline added for emphasis), the OBE and SSE may be considered separately with the OBE loads used for the Level B load combination.

As stated above, seismic loads (SL) can be evaluated using an enveloped of OBE and SSE or can be evaluated individually, with the OBE loads evaluated in the Service Level B load combination.

ASME Table SA-4212 (which is also AREVA Table 3A-1), indicates that OBE loads are not required in evaluating Component Service Level B because the envelope loads from OBE and SSE (defined as SL) are considered in Level C. The RAI 03.09.02-4 question refers to the need for discussion in the FSAR on how AREVA is addressing the SL loads: envelop or individual evaluation. Therefore, the staff requested AREVA to explain why loading and loading combinations for Service Levels B are not required. Since the OBE analysis and design cases are not a requirement for the U.S. EPR, it can be inferred that only SSE loads are used in the seismic load evaluation. However, an explanation of how the seismic loads are addressed and comply with Table SA-4212 and SA-4216 seismic requirements should be presented. The answer to the original RAI 03.09.02-4, and supplemental RAIs 03.09.02-39 and 03.09.02-61, is expected to explain how OBE loads (i.e. Service Level B) are evaluated.

#### ASME Table SA-4216 – Load Combinations For Supports

The ASME AG-1-2003 Code defines the rules for ductwork support load combinations including design pressure differential loads in Article SA-4000, SA-4211(h).

2. Subarticle SA-4211 (h), enclosed below, states the following

(h) **Design Pressure Differential (DPD)**. The dynamic external pressure loads resulting from a design basis accident (DBA), intermediate break accident (IBA), or small break accident (SBA). Generally, HVAC should be routed outside the local pipe break affected area. If HVAC is subjected to these loads, the Design Specification (Subarticle SA-4600) shall address the station specific design requirements considering a Service Level D load combination.

As stated above, design pressure differential loads (DPD) are required in the evaluation of ductwork supports if the ductwork is located in pipe break affected areas.

ASME Table SA-4216 (which is also AREVA Table 3A-2), indicates that evaluating Component Service Level D is not required unless DPD is applicable (i.e. the ductwork is in a pipe break affected area). The answer to the original RAI 03.09.02-4, and supplemental RAIs 03.09.02-39 and 03.09.02-61, refers to the need for discussion in the FSAR on the location of ductwork with respect to pipe break affected areas and if the ductwork support design includes DPD. If DPD is included in the ductwork support design, AREVA is requested to explain how the loads are combined for service level D.