## ArevaEPRDCPEm Resource

**From:** Pederson Ronda M (AREVA NP INC) [Ronda.Pederson@areva.com]
**Sent:** Friday, May 08, 2009 1:42 PM
**To:** Getachew Tesfaye
**Cc:** BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); BEELMAN Ronald J (AREVA NP INC)
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 209, FSARCh. 6
**Attachments:** RAI 209 Response US EPR DC.pdf

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 209 Response US EPR DC.pdf" provides a schedule since a technically correct and complete response to the one question is not provided.

The following table indicates the respective pages in the response document, "RAI 209 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

| Question # | Start Page | End Page |
|---|---|---|
| RAI 209 — 06.02.01-14 | 2 | 3 |

The schedule for a technically correct and complete response to this question is provided below.

| Question # | Response Date |
|---|---|
| RAI 209 — 06.02.01-14 | December 18, 2009 |

To support an efficient review, AREVA NP has requested a public meeting in May, 2009 to provide further details of the response intermediate deliverables.

Sincerely,

*Ronda Pederson*
ronda.pederson@areva.com
Licensing Manager, U.S. EPR Design Certification
**AREVA NP Inc.**
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**From:** Getachew Tesfaye [mailto:Getachew.Tesfaye@nrc.gov]
**Sent:** Wednesday, April 08, 2009 3:43 PM
**To:** ZZ-DL-A-USEPR-DL
**Cc:** Walton Jensen; Christopher Jackson; Jason Carneal; Joseph Colaccino; ArevaEPRDCPEm Resource
**Subject:** U.S. EPR Design Certification Application RAI No. 209 (2460), FSARCh. 6

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on April 1, 2009, and discussed with your staff on April 7, 2009. Except for a minor editorial correction, no

changes were made to the Draft RAI Questions as a result of that discussion. 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,
Getachew Tesfaye
Sr. Project Manager
NRO/DNRL/NARP
(301) 415-3361

**Hearing Identifier:** AREVA_EPR_DC_RAIs
**Email Number:** 456

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**Subject:** Response to U.S. EPR Design Certification Application RAI No. 209, FSARCh. 6
**Sent Date:** 5/8/2009 1:42:08 PM
**Received Date:** 5/8/2009 1:42:11 PM
**From:** Pederson Ronda M (AREVA NP INC)

**Created By:** Ronda.Pederson@areva.com

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| RAI 209 Response US EPR DC.pdf | 61439 | |

**Options**
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**Reply Requested:** No
**Sensitivity:** Normal
**Expiration Date:**
**Recipients Received:**

**Response to**

**Request for Additional Information No. 209 (2460), Revision 0**

**4/08/2009**

**U. S. EPR Standard Design Certification**
**AREVA NP Inc.**
**Docket No. 52-020**
**SRP Section: 06.02.01 - Containment Functional Design**
**Application Section: 6.02.01 and ANP-10299P**

**QUESTIONS for Containment and Ventilation Branch 1 (AP1000/EPR Projects) (SPCV)**

**Question 06.02.01-14:**

Section 6.2 of ANP-10299 describes correlation of containment test data using single and multi-node GOTHIC models for containment test facilities. For large break LOCA simulations, the single node GOTHIC models generally predict conservative results for the first several minutes of the tests. After the first several minutes, results are under predicted using the one node GOTHIC models. The peak calculated containment pressure for US-EPR is now calculated to occur at 90 minutes for the limiting large break LOCA. The staff therefore concludes that this analysis should be performed using a multi-noded containment model.

Findings presented in (Karwat, H., "State of the Art Report on Containment Thermal Hydraulics and Hydrogen Distribution," NEA/CSNI, June 1999) indicate that break elevation within the containment is an important consideration. Breaks low in the containment were found to promote atmospheric mixing whereas breaks high in the containment were found to result in steam stratification in the containment dome which once established was very stable. See Section 4.4.3.3 of the Karwat report. The steam lines of the US-EPR are located high within the containment. Analysis of steam line breaks would therefore not be appropriate with a one node containment model since the effects of stratification cannot be evaluated. The staff therefore concludes that containment analyses of steam line breaks should be preformed using a multi-noded containment model.

In the case of the U.S. EPR, the adequacy of the location and size of the foils together with the location and size of the dampers to sufficiently mitigate the consequences of large breaks needs to be demonstrated. Furthermore, since the rupture foils might not rupture in case of small breaks, the size and location of the convection foils, and the size and location of the dampers, should be demonstrated to be sufficient to mitigate the consequences of small LOCAs and small MSLBs.

Section 6.2.1.5 of ANP-10299P describes simulation of containment response to a small break LOCA. The single node GOTHIC model was found to under predict both containment pressures and temperatures whereas the multi-node GOTHIC model made much better predictions. The staff therefore concludes that containment analyses of small break LOCAs should be preformed using a multi-noded containment model.

There are at least five compartments in the U.S. EPR with closed ceilings. The four SG components are equipped with foils. The fifth compartment, the pressurizer compartment has no foils in its ceiling. It should be shown that this design is sufficient even if the break is in the pressurizer compartment.

Provide analyses of the events of FSAR Section 6.2.1 "Containment Functional Design" including the consequences of small breaks using a multi-noded containment model. Demonstrate that the noding detail is adequate to model the effects of containment stratification. Demonstrate that the noding arrangement does not produce artificial circulation patterns as discussed Section 22.10 of the GOTHIC Users Manual, NAI 8907-02 Rev. 17, January 2006. Demonstrate that the design of the Containment Atmospheric Circulation System (foils and dampers) is sufficient to maintain the containment pressure and temperature within acceptable limits following postulated design basis LOCA or MSLB events.

**Response to Question 06.02.01-14:**

A response to this question will be provided by December 18, 2009.