

## ArevaEPRDCPEm Resource

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**From:** BRYAN Martin (EXTERNAL AREVA) [Martin.Bryan.ext@areva.com]  
**Sent:** Tuesday, July 13, 2010 6:01 PM  
**To:** Tesfaye, Getachew  
**Cc:** Carneal, Jason; DELANO Karen (AREVA); BENNETT Kathy (AREVA); SLAY Lysa (AREVA); COLEMAN Sue (AREVA); PATTON Jeff (AREVA); RYAN Tom (AREVA); WILLIFORD Dennis (AREVA); GARDNER George Darrell (AREVA); ROMINE Judy (AREVA)  
**Subject:** DRAFT Response to U.S. EPR Design Certification Application RAI No. 378, Supplement 3, FSAR Ch. 6  
**Attachments:** DRAFT RAI 378 Supplement 3 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 15 questions of RAI 378 on May 24, 2010. Supplement 1 response to RAI No. 378 was sent on July 8, 2010 with a revised response schedule to provide an opportunity to interact with the NRC staff on questions 6.2.01-83, 6.2.1-85, 6.2.1-87, 6.2.1-91, 6.2.2-45, and 6.2.3-06.

The attached file, "DRAFT RAI 378 Supplement 3 Response US EPR DC.pdf" provides a technically correct and complete response to Question 6.2.3-06.

The following table indicates the respective pages in the response document, "DRAFT RAI 378 Supplement 3 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 378 — 06.02.03-6	2	2

Sincerely,

Martin (Marty) C. Bryan  
U.S. EPR Design Certification Licensing Manager  
AREVA NP Inc.  
Tel: (434) 832-3016  
702 561-3528 cell  
[Martin.Bryan.ext@areva.com](mailto:Martin.Bryan.ext@areva.com)

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**From:** BRYAN Martin (EXT)  
**Sent:** Thursday, July 08, 2010 1:50 PM  
**To:** 'Tesfaye, Getachew'  
**Cc:** DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); GUCWA Len T (EXT)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 378, Supplement 1, FSAR Ch. 6

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 15 questions of RAI 378 on May 24, 2010. To provide an opportunity to interact with the NRC on the response, a revised schedule is provided below for providing technically correct and complete responses to RAI 378 questions 6.2.01-83, 6.2.1-85, 6.2.1-87, 6.2.1-91, 6.2.2-45, and 6.2.3.06.

Question #	Response Date
RAI 378 — 06.02.01-82	August 12, 2010
RAI 378 — 06.02.01-83	<b>August 5, 2010</b>
RAI 378 — 06.02.01-84	August 12, 2010
RAI 378 — 06.02.01-85	<b>August 5, 2010</b>
RAI 378 — 06.02.01-86	August 31, 2010
RAI 378 — 06.02.01-87	<b>August 5, 2010</b>
RAI 378 — 06.02.01-88	August 12, 2010
RAI 378 — 06.02.01-89	August 12, 2010
RAI 378 — 06.02.01-90	August 12, 2010
RAI 378 — 06.02.01-91	<b>August 5, 2010</b>
RAI 378 — 06.02.01-92	August 31, 2010
RAI 378 — 06.02.01-93	August 31, 2010
RAI 378 — 06.02.02-45	<b>October 27, 2010</b>
RAI 378 — 06.02.03-6	<b>August 12, 2010</b>

Sincerely,

Martin (Marty) C. Bryan  
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**From:** BRYAN Martin (EXT)  
**Sent:** Monday, May 24, 2010 5:50 PM  
**To:** 'Tesfaye, Getachew'  
**Cc:** DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); GUCWA Len T (EXT)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 378, FSAR Ch. 6

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 378 Response US EPR DC.pdf" provides a technically correct and complete response to 1 of the 15 questions.

The following table indicates the respective pages in the response document, "RAI 378 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 378 — 06.02.01-82	2	2
RAI 378 — 06.02.01-83	3	3
RAI 378 — 06.02.01-84	4	4
RAI 378 — 06.02.01-85	5	5
RAI 378 — 06.02.01-86	6	6
RAI 378 — 06.02.01-87	7	7
RAI 378 — 06.02.01-88	8	8
RAI 378 — 06.02.01-89	9	9
RAI 378 — 06.02.01-90	10	10
RAI 378 — 06.02.01-91	11	11
RAI 378 — 06.02.01-92	12	12

RAI 378 — 06.02.01-93	13	13
RAI 378 — 06.02.02-45	14	14
RAI 378 — 06.02.02-46	15	16
RAI 378 — 06.02.03-6	17	17

A complete answer is not provided for 14 of the 15 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 378 — 06.02.01-82	August 12, 2010
RAI 378 — 06.02.01-83	July 8, 2010
RAI 378 — 06.02.01-84	August 12, 2010
RAI 378 — 06.02.01-85	July 8, 2010
RAI 378 — 06.02.01-86	August 31, 2010
RAI 378 — 06.02.01-87	July 8, 2010
RAI 378 — 06.02.01-88	August 12, 2010
RAI 378 — 06.02.01-89	August 12, 2010
RAI 378 — 06.02.01-90	August 12, 2010
RAI 378 — 06.02.01-91	July 8, 2010
RAI 378 — 06.02.01-92	August 31, 2010
RAI 378 — 06.02.01-93	August 31, 2010
RAI 378 — 06.02.02-45	July 8, 2010
RAI 378 — 06.02.03-6	July 14, 2010

Sincerely,

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**From:** Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]

**Sent:** Friday, April 23, 2010 9:41 AM

**To:** ZZ-DL-A-USEPR-DL

**Cc:** Jensen, Walton; Peng, Shie-Jeng; Hayes(NRO), Michelle; Ashley, Clinton; Jackson, Christopher; McKirgan, John; Carneal, Jason; Colaccino, Joseph; ArevaEPRDCPEm Resource

**Subject:** U.S. EPR Design Certification Application RAI No. 378 (4409,4513,4490), FSAR Ch. 6

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on March 17, 2010, and discussed with your staff on April 13 and 16, 2010. Draft RAI Questions 06.02.01-87 and 06.02.01-89 were modified as a result of those discussions. 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:** 1682

**Mail Envelope Properties** (BC417D9255991046A37DD56CF597DB7106DA38F4)

**Subject:** DRAFT Response to U.S. EPR Design Certification Application RAI No. 378, Supplement 3, FSAR Ch. 6  
**Sent Date:** 7/13/2010 6:01:15 PM  
**Received Date:** 7/13/2010 6:02:25 PM  
**From:** BRYAN Martin (EXTERNAL AREVA)  
**Created By:** Martin.Bryan.ext@areva.com

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<b>Files</b>	<b>Size</b>	<b>Date &amp; Time</b>
MESSAGE	6156	7/13/2010 6:02:25 PM
DRAFT RAI 378 Supplement 3 Response US EPR DC.pdf		284213

**Options**

**Priority:** Standard  
**Return Notification:** No  
**Reply Requested:** No  
**Sensitivity:** Normal  
**Expiration Date:**  
**Recipients Received:**

**Response to**

**Request for Additional Information No. 378(4409, 4513, 4490), Revision 2  
Supplement 3**

**4/23/2010**

**U.S. EPR Standard Design Certification**

**AREVA NP Inc.**

**Docket No. 52-020**

**SRP Section: 06.02.01 - Containment Functional Design**

**SRP Section: 06.02.02 - Containment Heat Removal Systems**

**SRP Section: 06.02.03 - Secondary Containment Functional Design**

**Application Section: 06.02.**

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

**Question 06.02.03-6:**

As a follow-up to question 6.2.3-3 the staff was unable to reproduce the conclusions in the RAI response. The applicant stated that it would take 23 hours for post-accident heat to diffuse through the metal penetrations. However, the staff believes that it is possible for the large metal penetrations like the equipment hatch or personnel hatch to conduct heat into the secondary containment in less than 23 hours. Provide a more detailed explanation as to why it will take 23 hours to conduct heat through the steel components. Include analysis assumptions in the explanation so that the staff can perform confirmatory calculations. Alternatively, the applicant could conservatively calculate the heat transfer and include it in the design basis of the ventilation system.

**Response to Question 06.02.01-6:**

AREVA NP performed an analysis, using the HEATING7 computer code, to determine the time it would take for post-accident heat to diffuse from the U.S. EPR primary containment, through the large metal penetrations, and into the secondary containment annulus.

A finite difference model of a typical penetration was used in the analysis. This axisymmetric model has a steel cylindrical penetration, typical of equipment hatch sleeves, penetrating the inner containment wall, surrounded by concrete. During the analysis, the inner-end face surface of the sleeve is suddenly exposed to containment steam. The temperature along the length of the sleeve versus time is calculated.

Input parameters used to maximize the temperature response are:

- The primary containment wall consists of layers of various materials. The main portion of the containment in contact with the annulus is concrete. There is an air gap between the concrete and a painted stainless steel liner. In this analysis, the primary containment wall is considered to be made only of concrete. This is conservative because there is less resistance to heat transfer.
- The primary containment design temperature is used for the primary containment loss of coolant accident (LOCA) steam temperature. This creates a bounding analysis that is conservative.
- The far edge of the model's steel cylinder is conservatively modeled as adiabatic; in fact, it will be exposed to containment annulus air and will stay cool longer.

The results show that 305 seconds into the event, the temperature increase (of at least 0.1°F) has penetrated 13.4 inches along the 51.2 inch long sleeve penetration. Therefore, the temperature will not have increased by the time the annulus ventilation system starts and actively cools the outer face of the inner containment wall. This is consistent with the earlier conclusion that penetrations are not a significant source of heat leakage.