

## ArevaEPRDCPEm Resource

---

**From:** BRYAN Martin (EXT) [Martin.Bryan.ext@areva.com]  
**Sent:** Friday, February 26, 2010 4:01 PM  
**To:** Tesfaye, Getachew  
**Cc:** DELANO Karen V (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); ROMINE Judy (AREVA NP INC); PANNELL George L (AREVA NP INC)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 286, FSAR Ch. 7, Supplement 4  
**Attachments:** RAI 286 Supplement 4 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. provided responses to 8 of the 18 questions of RAI No. 286 on November 13, 2009. AREVA NP submitted Supplement 1 to the response on December 18, 2009 to address 4 of the remaining 10 questions. AREVA NP submitted Supplement 2 to the response on January 22, 2010 to provide a revised schedule for the remaining questions. AREVA NP submitted Supplement 3 to the response on February 19, 2010 to address 2 of the remaining 6 questions. The attached file, "RAI 286 Supplement 4 Response US EPR DC.pdf" provides technically correct and complete responses to 1 of the remaining 4 questions.

The following table indicates the respective pages in the response document, "RAI 286 Supplement 4 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 286 — 07.09-47	2	3

The schedule for technically correct and complete responses to the remaining 3 questions is unchanged and provided below:

Question #	Response Date
RAI 286 — 07.08-9	April 16, 2010
RAI 286 — 07.09-46	March 5, 2010
RAI 286 — 07.09-49	March 5, 2010

Sincerely,

Martin (Marty) C. Bryan  
Licensing Advisory Engineer  
AREVA NP Inc.  
Tel: (434) 832-3016  
Martin.Bryan@areva.com

---

**From:** DUNCAN Leslie E (AREVA NP INC)  
**Sent:** Friday, February 19, 2010 5:16 PM  
**To:** 'Tesfaye, Getachew'  
**Cc:** DELANO Karen V (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); ROMINE Judy (AREVA NP INC); PANNELL George L (AREVA NP INC)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 286, FSAR Ch. 7, Supplement 3

Getachew,

AREVA NP Inc. provided responses to 8 of the 18 questions of RAI No. 286 on November 13, 2009. AREVA NP submitted Supplement 1 to the response on December 18, 2009 to address 4 of the remaining 10 questions. AREVA NP submitted Supplement 2 to the response on January 22, 2010 to provide a revised schedule for the remaining questions. The attached file, "RAI 286 Supplement 3 Response US EPR DC.pdf" provides technically correct and complete responses to 2 of the remaining 6 questions. The schedule for a technically correct and complete response to question 07.09-47 remains unchanged, and the schedule for technically correct and complete responses to questions 07.08-9, 07.09-46, and March 5, 2010 has been changed.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which supports the response to RAI 286 Question 07.08-7.

The following table indicates the respective pages in the response document, "RAI 286 Supplement 3 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 286 — 07.08-7	2	2
RAI 286 — 07.09-52	3	4

The schedule for a technically correct and complete response to question 07.09-47 remains unchanged and is provided below. The schedule for technically correct and complete responses to questions 07.08-9, 07.09-46, and March 5, 2010 has been changed and is provided below.

Question #	Response Date
RAI 286 — 07.08-9	April 16, 2010
RAI 286 — 07.09-46	March 5, 2010
RAI 286 — 07.09-47	February 26, 2010
RAI 286 — 07.09-49	March 5, 2010

Sincerely,

Les Duncan  
 Licensing Engineer  
**AREVA NP Inc.**  
 An AREVA and Siemens Company  
 Tel: (434) 832-2849  
[Leslie.Duncan@areva.com](mailto:Leslie.Duncan@areva.com)

---

**From:** DUNCAN Leslie E (AREVA NP INC)  
**Sent:** Friday, January 22, 2010 6:39 PM  
**To:** 'Teshfaye, Getachew'  
**Cc:** BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); PANNELL George L (AREVA NP INC)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 286, FSAR Ch. 7, Supplement 2

Getachew,

AREVA NP Inc. provided responses to 8 of the 18 questions of RAI No. 286 on November 13, 2009. AREVA NP submitted Supplement 1 to the response on December 18, 2009 to address 4 of the remaining 10 questions.

AREVA NP is unable to provide a response to the 5 RAI No. 286 questions with a commitment date of January 22, 2010. The commitment date for these 5 questions has been changed to February 19, 2010 to allow time to

incorporate comments and feedback from the upcoming 1/25/10-1/26/10 meeting with the NRC related to U.S. EPR FSAR Chapter 7.

The schedule for a technically correct and complete response to RAI 286 Question 07.09-47 is unchanged and provided below. The schedule for technically correct and complete responses to the other 5 RAI questions has been changed and is provided below:

Question #	Response Date
RAI 286 — 07.08-7	February 19, 2010
RAI 286 — 07.08-9	February 19, 2010
RAI 286 — 07.09-46	February 19, 2010
RAI 286 — 07.09-47	February 26, 2010
RAI 286 — 07.09-49	February 19, 2010
RAI 286 — 07.09-52	February 19, 2010

Sincerely,

Les Duncan  
 Licensing Engineer  
**AREVA NP Inc.**  
 An AREVA and Siemens Company  
 Tel: (434) 832-2849  
[Leslie.Duncan@areva.com](mailto:Leslie.Duncan@areva.com)

---

**From:** Pederson Ronda M (AREVA NP INC)  
**Sent:** Friday, December 18, 2009 12:04 PM  
**To:** 'Tesyfaye, Getachew'  
**Cc:** BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); KOWALSKI David J (AREVA NP INC); PANNELL George L (AREVA NP INC)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 286, FSAR Ch. 7, Supplement 1

Getachew,

AREVA NP Inc. provided responses to 8 of the 18 questions of RAI No. 286 on November 13, 2009. The attached file, "RAI 286 Supplement 1 Response US EPR DC.pdf" provides technically correct and complete responses to 4 of the remaining 10 questions, as committed.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which supports the response to RAI 286 Questions 07.06-3 and 07.07-19.

The following table indicates the respective pages in the response document, "RAI 286 Supplement 1 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 286 — 07.06-3	2	2
RAI 286 — 07.07-19	3	3
RAI 286 — 07.09-53	4	6
RAI 286 — 07.09-57	7	7

The schedule for a technically correct and complete response to the remaining questions is unchanged and provided below.

Question #	Response Date
RAI 286 — 07.08-7	January 22, 2010
RAI 286 — 07.08-9	January 22, 2010
RAI 286 — 07.09-46	January 22, 2010
RAI 286 — 07.09-47	February 26, 2010
RAI 286 — 07.09-49	January 22, 2010
RAI 286 — 07.09-52	January 22, 2010

Sincerely,

*Ronda Pederson*

[ronda.pederson@areva.com](mailto:ronda.pederson@areva.com)

Licensing Manager, U.S. EPR Design Certification

**AREVA NP Inc.**

An AREVA and Siemens company

3315 Old Forest Road

Lynchburg, VA 24506-0935

Phone: 434-832-3694

Cell: 434-841-8788

---

**From:** Pederson Ronda M (AREVA NP INC)

**Sent:** Friday, November 13, 2009 3:34 PM

**To:** 'Tesfaye, Getachew'

**Cc:** BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); PANNELL George L (AREVA NP INC)

**Subject:** Response to U.S. EPR Design Certification Application RAI No. 286, FSAR Ch. 7

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information RAI 286. The attached file, "RAI 286 Response US EPR DC" provides technically correct and complete responses to 8 of the 18 questions.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 286 Questions 07.08-8, 07.09-50, 07.09-55 and 07.09-58.

The following table indicates the respective page(s) in the response document, "RAI 286 Response US EPR DC," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 286 — 07.06-3	2	2
RAI 286 — 07.07-18	3	4
RAI 286 — 07.07-19	5	5
RAI 286 — 07.08-7	6	6
RAI 286 — 07.08-8	7	7
RAI 286 — 07.08-9	8	8
RAI 286 — 07.09-46	9	9
RAI 286 — 07.09-47	10	10
RAI 286 — 07.09-49	11	11
RAI 286 — 07.09-50	12	12
RAI 286 — 07.09-51	13	13

RAI 286 — 07.09-52	14	14
RAI 286 — 07.09-53	15	15
RAI 286 — 07.09-54	16	17
RAI 286 — 07.09-55	18	18
RAI 286 — 07.09-56	19	20
RAI 286 — 07.09-57	21	21
RAI 286 — 07.09-58	22	22

A complete answer is not provided for 10 of the 18 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 286 — 07.06-3	December 18, 2009
RAI 286 — 07.07-19	December 18, 2009
RAI 286 — 07.08-7	January 22, 2010
RAI 286 — 07.08-9	January 22, 2010
RAI 286 — 07.09-46	January 22, 2010
RAI 286 — 07.09-47	February 26, 2010
RAI 286 — 07.09-49	January 22, 2010
RAI 286 — 07.09-52	January 22, 2010
RAI 286 — 07.09-53	December 18, 2009
RAI 286 — 07.09-57	December 18, 2009

Sincerely,

*Ronda Pederson*

[ronda.pederson@areva.com](mailto:ronda.pederson@areva.com)

Licensing Manager, U.S. EPR Design Certification

**AREVA NP Inc.**

An AREVA and Siemens company

3315 Old Forest Road  
 Lynchburg, VA 24506-0935  
 Phone: 434-832-3694  
 Cell: 434-841-8788

---

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

**Sent:** Wednesday, October 14, 2009 8:06 PM

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

**Cc:** Cheung, Calvin; Mott, Kenneth; Zhang, Deanna; Spaulding, Deirdre; Jackson, Terry; Canova, Michael; Guardiola, Maria; Colaccino, Joseph; ArevaEPRDCPEm Resource

**Subject:** U.S. EPR Design Certification Application RAI No. 286(3567,3561,3562,3563), FSAR Ch. 7

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on August 27, 2009, and discussed with your staff on September 3, 2009. Draft RAI Question 07.09-48 was deleted and Draft RAI Questions 07.09-47, 07.09-51, and 07-09-52 were modified 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:** 1184

**Mail Envelope Properties** (BC417D9255991046A37DD56CF597DB710567DE28)

**Subject:** Response to U.S. EPR Design Certification Application RAI No. 286, FSAR Ch. 7, Supplement 4  
**Sent Date:** 2/26/2010 4:01:22 PM  
**Received Date:** 2/26/2010 4:01:27 PM  
**From:** BRYAN Martin (EXT)

**Created By:** Martin.Bryan.ext@areva.com

**Recipients:**

"DELANO Karen V (AREVA NP INC)" <Karen.Delano@areva.com>  
Tracking Status: None  
"BENNETT Kathy A (OFR) (AREVA NP INC)" <Kathy.Bennett@areva.com>  
Tracking Status: None  
"ROMINE Judy (AREVA NP INC)" <Judy.Romine@areva.com>  
Tracking Status: None  
"PANNELL George L (AREVA NP INC)" <George.Pannell@areva.com>  
Tracking Status: None  
"Tesfaye, Getachew" <Getachew.Tesfaye@nrc.gov>  
Tracking Status: None

**Post Office:** AUSLYNCMX02.adom.ad.corp

<b>Files</b>	<b>Size</b>	<b>Date &amp; Time</b>
MESSAGE	10935	2/26/2010 4:01:27 PM
RAI 286 Supplement 4 Response US EPR DC.pdf		64355

**Options**

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

**Response to**

**Request for Additional Information No. 286, Supplement 4 (3567, 3561, 3562,  
3563), Revision 1**

**10/14/2009**

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

**AREVA NP Inc.**

**Docket No. 52-020**

**SRP Section: 07.06 - Interlock Systems Important to Safety**

**SRP Section: 07.07 - Control Systems**

**SRP Section: 07.08 - Diverse Instrumentation and Control Systems**

**SRP Section: 07.09 - Data Communication Systems**

**Application Section: FSAR Ch. 7**

**QUESTIONS for Instrumentation, Controls and Electrical Engineering 1**

**(AP1000/EPR Projects) (ICE1)**



**Question 07.09-47:**

Follow-up to RAI Question Nos. 07.09-6, 07.09-14, and 07.09-18

Demonstrate the estimated response time of the computerized portion of the Protection System (PS) is within the bounding time limits established for the PS within the U.S. EPR DC-FSAR, Table 15.0-7 and Table 15.0-8. In addition, identify the Inspection, Test, Analysis, and Acceptance Criteria (ITAAC) that verifies the protection system meets the response times assumed in the accident analyses.

10 CFR 50.55a(h) incorporates by reference IEEE Std. 603-1991. IEEE Standard 603-1991, Clause 4.10 requires identification of the critical points in time or plant conditions for which the protective actions must be initiated and the point in time or plant conditions that define the proper completion of the safety function. The critical points in time are determined by the reactor protection system response time modeled in the accident analyses. The protection system should be designed and tested to meet the response times assumed in the accident analyses.

In response to the NRC staff's request for additional information (RAI) 4 for ANP-10281, "U.S. EPR Digital Protection System Report," the applicant stated:

"The methodology used to estimate the response time of the computerized portion of the PS establishes a theoretical bounding response time for the typical types of functions performed by the PS....The final response time of the PS will be verified to be within the bounding time limits established for the PS."

U.S. EPR FSAR Tier 2, Table 15.0-7—Reactor Trip Setpoints and Delays Used in the Accident Analysis and Table 15.0-8—Engineered Safety Features Functions Used in the Accident Analysis list the time delay assumed for each protective function performed by the Protection System (PS). Verify that the estimated response times provided in the Attachment B of the Second Request For Additional Information for the U.S. Digital Protection Topical Report are consistent with the timing delays assumed in U.S. EPR DC-FSAR, Table 15.0-7 and Table 15.0-8. Identify the ITAAC that verifies the as-installed PS response time, from sensor output to final actuation device, is bounded by the PS response time used in the U.S. EPR DC-FSAR, Tables 15.0-7 and 15.0-8 accident analysis. In addition, describe how the time delay of the PACS module is incorporated into the PS response time analysis in ANP-10281P.

**Response to Question 07.09-47:**

The bounding PS response times discussed in the Second Request for Additional Information for ANP-10281(P), Attachment B are consistent with the response time assumptions used in the accident analysis and listed in U.S. EPR FSAR Tier 2, Table 15.0-7 and Table 15.0-8. If needed, AREVA NP can provide supporting documentation, such as a function-by-function demonstration of consistency, for NRC audit.

Refer to U.S. EPR FSAR Tier 1, Section 2.4.1, Item 4.24 and associated ITAAC, which has been added in the Response to RAI 285 Supplement 4, Question 07.03-25 and addresses verification that the PS response times support accident analysis assumptions.

The Second Request for Additional Information for ANP-10281(P), Attachment B, Paragraph one states:

“The total response time for a given function consists of several sub-intervals that span from a process variable exceeding a pre-defined limit to completion of the protective function. The sub-interval addressed herein accounts for the computerized portion of the protection channel, and is defined as the time from sensor conditioning output to RT breaker input terminals for RT functions, or to input terminals of the PACS for ESF actuation functions.”

The priority and actuator control system (PACS) is not included in the PS response time analysis. Time delays introduced by the priority module in the PACS are included with the response time of the actuator it controls and is verified through response time testing of the actuator.

**FSAR Impact:**

The U.S. EPR FSAR will not be changed as a result of this question.