

## ArevaEPRDCPEm Resource

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**From:** WELLS Russell (AREVA) [Russell.Wells@areva.com]  
**Sent:** Tuesday, April 05, 2011 11:03 AM  
**To:** Tesfaye, Getachew  
**Cc:** LENTZ Tony (EXTERNAL AREVA); BENNETT Kathy (AREVA); DELANO Karen (AREVA); ROMINE Judy (AREVA); RYAN Tom (AREVA)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 411, FSAR Ch. 14, Supplement 7  
**Attachments:** RAI 411 Supplement 7 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 4 questions in RAI No. 411 on July 12, 2010. A revised schedule was provided in Supplement 1 on September 13, 2010, Supplement 2 on October 14, 2010, and Supplement 3 on November 29, 2010. Supplement 4 was submitted on January 17, 2011 which provided a technically correct and complete response to 1 of the 4 questions. A revised schedule for the remaining three questions was provided in Supplement 5 on February 10, 2011 and Supplement 6 on March 16, 2011. The attached file, "RAI 411 Supplement 7 Response US EPR DC.pdf," provides technically correct and complete responses to 1 of the remaining 3 questions, as committed.

The following table indicates the respective pages in the response document, "RAI 411 Supplement 7 Response US EPR DC.pdf," that contain AREVA NP's response to one question.

Question #	Start Page	End Page
RAI 411 — 14.03.11-4	2	4

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

Question #	Response Date
RAI 411 — 14.03.03-48	May 5, 2011
RAI 411 — 14.03.03-49	May 5, 2011

*Sincerely,*

*Russ Wells*

*U.S. EPR Design Certification Licensing Manager*

*AREVA NP, Inc.*

*3315 Old Forest Road, P.O. Box 10935*

*Mail Stop OF-57*

*Lynchburg, VA 24506-0935*

*Phone: 434-832-3884 (work)*

*434-942-6375 (cell)*

*Fax: 434-382-3884*

*[Russell.Wells@Areva.com](mailto:Russell.Wells@Areva.com)*

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**From:** WELLS Russell (RS/NB)  
**Sent:** Wednesday, March 16, 2011 3:16 PM  
**To:** 'Tesfaye, Getachew'

**Cc:** DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); LENTZ Tony (External RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 411, FSAR Ch. 14, Supplement 6

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 4 questions in RAI No. 411 on July 12, 2010. A revised schedule was provided in Supplement 1 on September 13, 2010, Supplement 2 on October 14, 2010, Supplement 3 on November 29, 2010. Supplement 4 was submitted on January 17, 2011 which provided a technically correct and complete response to 1 of the 4 questions (Question 14-3-11-5). A revised schedule was provided in Supplement 5 on February 10, 2011.

In order to allow time for interaction with the NRC, the schedule for a technically correct and complete FINAL response to the remaining 3 questions for this RAI has been revised and is provided below:

<b>Question #</b>	<b>Response Date</b>
RAI 411 — 14.03.03-48	May 5, 2011
RAI 411 — 14.03.03-49	May 5, 2011
RAI 411 — 14.03.11-4	May 5, 2011

*Sincerely,*

*Russ Wells*

*U.S. EPR Design Certification Licensing Manager*

*AREVA NP, Inc.*

*3315 Old Forest Road, P.O. Box 10935*

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*[Russell.Wells@Areva.com](mailto:Russell.Wells@Areva.com)*

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**From:** BRYAN Martin (External RS/NB)

**Sent:** Thursday, February 10, 2011 10:41 AM

**To:** Tesfaye, Getachew

**Cc:** DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); WELLS Russell (RS/NB)

**Subject:** Response to U.S. EPR Design Certification Application RAI No. 411, FSAR Ch. 14, Supplement 5

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 4 questions in RAI No. 411 on July 12, 2010. A revised schedule was provided in Supplement 1 on September 13, 2010, Supplement 2 on October 14, 2010, and Supplement 3 on November 29, 2010. Supplement 4 was submitted on January 17, 2011 which provided a technically correct and complete response to 1 of the 4 questions (Question 14-3-11-5).

In order to allow time for interaction with the NRC, the schedule for a technically correct and complete FINAL response to the remaining 3 questions for this RAI has been revised and is provided below:

<b>Question #</b>	<b>Response Date</b>
RAI 411 — 14.03.03-48	March 17, 2011

RAI 411 — 14.03.03-49	March 17, 2011
RAI 411 — 14.03.11-4	March 17, 2011

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 (External RS/NB)  
**Sent:** Monday, January 17, 2011 10:13 AM  
**To:** 'Tesfaye, Getachew'  
**Cc:** DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); WELLS Russell (RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 411, FSAR Ch. 14, Supplement 4

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 4 questions in RAI No. 411 on July 12, 2010. A revised schedule was provided in Supplement 1 on September 13, 2010, Supplement 2 on October 14, 2010, and Supplement 3 on November 29, 2010. Based on discussions with NRC, the attached file, "RAI 411 Supplement 4 Question 14-3-11-5 Response US EPR DC.pdf" provides a technically correct and complete responses to 1 of the 4 questions, as committed.

The following table indicates the respective pages in the response document, "RAI 411 Supplement 4 Question 14-3-11-5 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 411 — 14.03.11-5	2	2

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

Question #	Response Date
RAI 411 — 14.03.03-48	February 17, 2011
RAI 411 — 14.03.03-49	February 17, 2011
RAI 411 — 14.03.11-4	February 17, 2011

Sincerely,

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

**From:** BRYAN Martin (External RS/NB)  
**Sent:** Monday, November 29, 2010 6:14 PM  
**To:** 'Tefaye, Getachew'  
**Cc:** DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); WELLS Russell (RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 411, FSAR Ch. 14, Supplement 3

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 4 questions in RAI No. 411 on July 12, 2010. A revised schedule was provided in Supplement 1 on September 13, 2010 and Supplement 2 on October 14, 2010.

In order to allow time for interaction with the NRC, the schedule for a technically correct and complete FINAL response to this RAI has been revised and is provided below:

<b>Question #</b>	<b>Response Date</b>
RAI 411 — 14.03.03-48	February 17, 2011
RAI 411 — 14.03.03-49	February 17, 2011
RAI 411 — 14.03.11-4	February 17, 2011
RAI 411 — 14.03.11-5	February 17, 2011

Sincerely,

Martin (Marty) C. Bryan  
U.S. EPR Design Certification Licensing Manager  
AREVA NP Inc.  
Tel: (434) 832-3016  
702 561-3528 cell  
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**From:** BRYAN Martin (External RS/NB)  
**Sent:** Thursday, October 14, 2010 1:42 PM  
**To:** 'Tefaye, Getachew'  
**Cc:** DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); LENTZ Tony (External RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 411, FSAR Ch. 14, Supplement 2

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 4 questions in RAI No. 411 on July 12, 2010. A revised schedule was provided in Supplement 1 on September 13, 2010.

AREVA NP is unable to provide a response to the remaining questions at this time. The schedule for a technically correct and complete response to the remaining questions has been changed and is provided below:

<b>Question #</b>	<b>Response Date</b>
RAI 411 — 14.03.03-48	December 2, 2010
RAI 411 — 14.03.03-49	December 2, 2010
RAI 411 — 14.03.11-4	December 2, 2010
RAI 411 — 14.03.11-5	December 2, 2010

Sincerely,

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

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**From:** BRYAN Martin (External RS/NB)  
**Sent:** Monday, September 13, 2010 4:18 PM  
**To:** 'Tesfaye, Getachew'  
**Cc:** DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); LENTZ Tony (External RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 411, FSAR Ch. 14, Supplement 1

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the 4 questions in RAI No. 411 on July 12, 2010.

AREVA NP is unable to provide a response to the remaining questions at this time. The schedule for a technically correct and complete response to the remaining questions has been changed and is provided below:

Question #	Response Date
RAI 411 — 14.03.03-48	October 15, 2010
RAI 411 — 14.03.03-49	October 15, 2010
RAI 411 — 14.03.11-4	October 15, 2010
RAI 411 — 14.03.11-5	October 15, 2010

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:** Monday, July 12, 2010 4:34 PM  
**To:** 'Tesfaye, Getachew'  
**Cc:** DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); LENTZ Tony F (EXT)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 411, FSAR Ch. 14

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 411 Response US EPR DC.pdf," provides the schedule for technically correct and complete responses to these questions.

The following table indicates the respective pages in the response document, "RAI 411 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 411 — 14.03.03-48	2	2
RAI 411 — 14.03.03-49	3	4
RAI 411 — 14.03.11-4	5	5
RAI 411 — 14.03.11-5	6	6

A complete answer is not provided for 4 of the 4 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 411 — 14.03.03-48	September 13, 2010
RAI 411 — 14.03.03-49	September 13, 2010
RAI 411 — 14.03.11-4	September 13, 2010
RAI 411 — 14.03.11-5	September 13, 2010

Martin (Marty) C. Bryan  
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 Tel: (434) 832-3016  
 702 561-3528 cell  
[Martin.Bryan.ext@areva.com](mailto:Martin.Bryan.ext@areva.com)

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**From:** Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]  
**Sent:** Friday, June 11, 2010 10:22 AM  
**To:** ZZ-DL-A-USEPR-DL  
**Cc:** Ng, Ching; Dixon-Herrity, Jennifer; Grady, Anne-Marie; Jackson, Christopher; McKirgan, John; Miernicki, Michael; Carneal, Jason; Colaccino, Joseph; ArevaEPRDCPEm Resource  
**Subject:** U.S. EPR Design Certification Application RAI No. 411(4734,4721), FSAR Ch. 14

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on May 25, 2010, and discussed with your staff on June 9, 2010. Drat RAI Question 14.03.03-49 was 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:** 2814

**Mail Envelope Properties** (1F1CC1BBDC66B842A46CAC03D6B1CD41042EEF86)

**Subject:** Response to U.S. EPR Design Certification Application RAI No. 411, FSAR Ch. 14, Supplement 7  
**Sent Date:** 4/5/2011 11:02:41 AM  
**Received Date:** 4/5/2011 11:02:57 AM  
**From:** WELLS Russell (AREVA)

**Created By:** Russell.Wells@areva.com

**Recipients:**

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Tracking Status: None  
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Tracking Status: None  
"RYAN Tom (AREVA)" <Tom.Ryan@areva.com>  
Tracking Status: None  
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Tracking Status: None

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<b>Files</b>	<b>Size</b>	<b>Date &amp; Time</b>
MESSAGE	12623	4/5/2011 11:02:57 AM
RAI 411 Supplement 7 Response US EPR DC.pdf		71180

**Options**

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

**Response to**

**Request for Additional Information No. 411(4734, 4721), Supplement 7**

**6/11/2010**

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

**AREVA NP Inc.**

**Docket No. 52-020**

**SRP Section: 14.03.03 - Piping Systems and Components - Inspections, Tests, Analyses,  
and Acceptance Criteria**

**SRP Section: 14.03.11 - Containment Systems and Severe Accidents - Inspections, Tests,  
Analyses, and Acceptance Criteria**

**Application Section: FSAR Section 14.3**

**QUESTIONS for Engineering Mechanics Branch 2 (ESBWR/ABWR Projects) (EMB2)**

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



**Question 14.03.11-4:****Follow-up to RAI 104, Question 14.3.11-1(b)****Hydrogen Monitoring System.**

Per 10 CFR 50.44(c)(4)(ii), equipment must be provided for monitoring hydrogen in the containment. Equipment for monitoring hydrogen must be functional, reliable, and capable of continuously measuring the concentration of hydrogen in the containment atmosphere following a significant beyond design-basis accident for accident management, including emergency planning.

Per US EPR FSAR, section 6.2.5.1, the HMS measures the hydrogen concentration in containment during and after the accident, and remains functional during and after exposure to accident environmental conditions (10 CFR 50.44(c)(4)(ii)).

While the high range monitors are not safety related, they are safety significant, similar to the PARs and the SAHRS.

Since both the low and the high range HMS equipment are part of the CGCS design basis, add the high range hydrogen monitoring system (HMS) equipment to Table 2.4.14-1, so that the HMS ITAAC will verify that both the low range and the high range monitors display and alarm in the main control room.

**Response to Question 14.03.11-4:**

AREVA NP based its development of U.S. EPR FSAR Tier 1 on Standard Review Plan (SRP) 14.3. SRP 14.3 states that not all information required for compliance with regulations and described in Tier 2 is required to be in Tier 1 and have ITAAC. SRP 14.3 describes a graded approach to selecting information from Tier 2 and including that information in Tier 1 with ITAAC. SRP 14.3 specifies specific non-safety-related criteria for inclusion in Tier 1 such as severe accident, anticipated transient without scram (ATWS), and fire protection.

U.S. EPR FSAR Tier 2 material is screened to determine if it is "safety significant" as described in U.S. EPR FSAR Tier 2, Section 14.3. This screening process uses criteria developed from SRP 14.3, Appendixes A and C. The first process uses discipline checklists that include ITAAC criteria based on guidance in SRP, Section 14.3. For example, the discipline checklist for systems provides guidance to create ITAAC for the following features:

- Major safety-related features.
- Equipment that is seismic, EQ, or 1E.
- Safety-related equipment.
- Design features provided for severe accident mitigation, station blackout (SBO), and ATWS.
- Significant system features identified in the applicable SRPs for the system.
- Significant safety-related (and non-safety-related) functions derived from those listed in system design requirements documents.

The second process involves an expert review panel that selects safety-significant features based on assumptions and insights from key safety and integrated plant safety analyses in U.S. EPR FSAR Tier 2, where plant performance is dependent on contributions from multiple systems. This process is based on guidance in SRP 14.3, Page 14.3-21. Results of the expert review panel meetings are provided in U.S. EPR FSAR Tier 2, Tables 14.3-1 through 14.3-7.

Specifically:

SRP 14.3, Appendix A, Page 14.3-16 states:

“The applicant should put the top-level design features and performance characteristics that were the most significant to safety in the Tier 1 design descriptions. The level of detail in Tier 1 is governed by a graded approach to the SSCs of the design, based on the safety significance of the functions they perform.”

“For example, safety-related SSCs should be described in Tier 1 with a relatively greater amount of information. Other SSCs should also be included based on their importance to safety, such as containment isolation aspects of non-safety systems. Some non-safety aspects of SSCs need not be discussed in Tier 1. This graded approach recognizes that although many aspects of the design are important to safety, the level of design detail in Tier 1 and verification of the key design features and performance characteristics should be commensurate with the significance of the safety functions to be performed.”

SRP 14.3, Page 14.3-17 states:

“The level of detail specified in the ITAAC should be commensurate with the safety significance of the functions and bases for that SSC.”

SRP 14.3, Appendix A, Page 14.3-21 states:

“The staff is particularly interested in ensuring that the assumptions and insights from key safety and integrated plant safety analyses in Tier 2, where plant performance is dependent on contributions from multiple systems of the design, are adequately considered in Tier 1. Addressing these assumptions and insights in Tier 1 ensures that the integrity of the fundamental analyses for the design are preserved in an as-built facility referencing the certified design. These analyses include flooding analyses, over-pressure protection, containment analyses, core cooling analyses, fire protection, transient analyses, anticipated transient without scram analyses, steam generator tube rupture analyses (PWRs only), radiological analyses, USIs/GSIs and TMI items, or other key analyses as specified by the staff. Therefore, applicants should provide information, in tabular form, in Section 14.3 that cross references the important design information and parameters of these analyses to their treatment in Tier 1. The cross-references should be sufficiently detailed to allow a COL applicant or licensee to consider whether a proposed design change impacts the treatment of these parameters in Tier 1.”

SRP 14.3, Appendix A, Page 14.3-17 states:

“Also, the scope of the ITAAC is consistent with the SSCs that are in the design descriptions. In general, each system has one or more ITAAC that verify the information in the design descriptions. The system ITAAC should verify that the key design characteristics

and performance requirements of the SSCs are verified. The level of detail specified in the ITAAC should be commensurate with the safety significance of the functions and bases for that SSC.”

SRP 14.3, Appendix C, Page 14.3-24 states:

“This section is not repeated here, but it provides a discussion of what should be included as a ‘key feature’, and therefore by exclusion what does not have to be addressed in Tier 1 and hence ITAAC.”

As is stated in this question, these non-safety-related monitors are less “safety significant” than the safety-related monitors.

Lack of inclusion in U.S. EPR FSAR Tier 1 does not mean the COL applicant does not have to address the items described in U.S. EPR FSAR Tier 2. The COL applicant must comply with U.S. EPR FSAR Tier 2 or take exception to it. Further evidence of this is provided in the inspection manual chapters have separate chapters on ITAAC (IMC 2503) inspections and non-ITAAC (2504) inspections.

U.S. EPR FSAR Tier 1, Section 3.7 completes the identification of the minimum inventory of alarms and controls in control room.

**FSAR Impact:**

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