

## ArevaEPRDCPEm Resource

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**From:** WILLIFORD Dennis (AREVA) [Dennis.Williford@areva.com]  
**Sent:** Thursday, January 03, 2013 4:57 PM  
**To:** Snyder, Amy  
**Cc:** DELANO Karen (AREVA); LEIGHLITER John (AREVA); ROMINE Judy (AREVA); RYAN Tom (AREVA); WILLS Tiffany (AREVA); WELLS Russell (AREVA); Miernicki, Michael  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 36  
**Attachments:** RAI 422 Supplement 36 Response US EPR DC.PDF

Amy,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 422 on September 2, 2010, noting that the schedule for 61 of the 63 questions was being further evaluated with additional schedule information to be provided by October 4, 2010. AREVA NP provided technically correct and complete final responses to 2 of the remaining 63 questions on September 9, 2010, as committed. The schedule for a technically correct and complete response to the remaining 61 questions was revised based on the additional evaluations performed since the initial schedule was provided on September 2, 2010. This revised schedule was provided on September 27, 2010. The schedule for a technically correct and complete response to 6 of the remaining 61 questions was revised based on additional evaluations performed since the revised schedule was provided on September 27, 2010. This revised schedule was provided on November 2, 2010. The schedule for a technically correct and complete response to 16 of the remaining 61 questions was revised November 22, 2010 to allow additional time for AREVA NP to interact with the NRC. AREVA NP provided technically correct and complete FINAL responses to 11 of the remaining 61 questions on December 22, 2010, as committed. The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised January 12, 2011 to allow additional time for AREVA NP to interact with the NRC. The schedule for a technically correct and complete response to 5 of the remaining 50 questions was revised January 13, 2011 to allow additional time for AREVA NP to address NRC comments. The schedule for a technically correct and complete response to 3 of the remaining 50 questions was revised January 27, 2011 based on additional evaluations performed since the initial schedule was provided. The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 8, 2011 to allow additional time for AREVA NP to interact with the NRC. The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 10, 2011 based on additional evaluations performed since the initial schedule was provided. The schedule for a technically correct and complete response to 16 of the remaining 50 questions was revised February 17, 2011 based on additional evaluations performed since the initial schedule was provided. The schedule for a technically correct and complete response to 18 of the remaining 50 questions was revised with Supplement 12 on March 16, 2011 to allow additional time for AREVA NP to interact with the NRC. AREVA NP provided a technically correct and complete FINAL response to 1 of the remaining 50 questions with Supplement 13 on March 24, 2011, as committed. AREVA NP provided technically correct and complete FINAL responses to 8 of the remaining 49 questions with Supplement 14 on March 30, 2011, as committed. The schedule for a technically correct and complete response to 32 of the remaining 41 questions was revised with Supplement 15 on March 31, 2011 to allow additional time for AREVA NP to interact with the NRC. The schedule for a technically correct and complete response to 6 of the remaining 41 questions was revised with Supplement 16 on April 13, 2011 to allow additional time for AREVA NP to interact with the NRC. The schedule for a technically correct and complete response to 3 of the remaining 41 questions was revised with Supplement 17 on April 20, 2011 to allow additional time for AREVA NP to interact with the NRC. The schedule for a technically correct and complete response to 29 of the remaining 41 questions was revised with Supplement 18 on May 11, 2011 to allow additional time for AREVA NP to interact with the NRC. AREVA NP provided technically correct and complete FINAL responses to 3 of the remaining 41 questions with Supplement 19 on May 20, 2011, as committed. The schedule for a technically correct and complete response to 9 of the remaining 38 questions was revised with Supplement 20 on May 25, 2011. AREVA NP provided technically correct and complete FINAL responses to 5 of the remaining 38 questions with Supplement 21 on June 1, 2011, as committed. The schedule for a technically correct and complete response to 28 of the remaining 33

questions was revised with Supplement 22 on June 6, 2011. AREVA NP provided a technically correct and complete revised FINAL response to Question 03.09.02-139 with Supplement 23 on June 24, 2011. AREVA NP provided technically correct and complete FINAL responses to 16 of the remaining 33 questions with Supplement 24 on July 7, 2011, as committed.

The schedule for technically correct and complete final responses to the remaining 17 questions was revised with Supplement 25 on July 12, 2011. AREVA NP provided a technically correct and complete FINAL response to 3 of the 17 remaining questions of RAI 422 and a revised response to Question 03.09.02-88 with Supplement 26 on July 29, 2011. AREVA NP provided a technically correct and complete FINAL response to 3 of the 14 remaining questions of RAI 422 with Supplement 27 on August 22, 2011. The schedule for technically correct and complete final responses to the remaining 11 questions was revised with Supplement 28 on September 9, 2011. AREVA NP provided a technically correct and complete FINAL response to 4 of the 11 remaining questions of RAI 422 with Supplement 29 on September 27, 2011. AREVA NP provided a technically correct and complete FINAL response to 1 of the 7 remaining questions of RAI 422 and a revised response to Questions 03.09.02-87 and 03.09.02-112 with Supplement 30 on October 18, 2011. AREVA NP provided a revised schedule for the responses to the remaining 6 questions with Supplement 31 on November 17, 2011 and Supplement 32 on December 15, 2011. AREVA NP Inc. provided a technically correct and complete final response to 5 of the 6 remaining questions in RAI 422 with Supplement 33 on January 13, 2012. AREVA NP provided a revised schedule for the responses to the remaining question with Supplement 34 on February 17, 2012. AREVA NP Inc. provided a technically correct and complete final response to the remaining question in RAI 422 with Supplement 35 on March 22, 2012.

The attached file, "RAI 422 Supplement 36 Response US EPR DC.pdf", provides a technically correct and complete revised FINAL response to Question 03.09.02-144. A response to this question was originally sent to the NRC on June 1, 2011 in RAI 422 Supplement 21. While performing a review of ANP-10306P, "Comprehensive Vibration Assessment Program for U.S. EPR™ Reactor Internals Technical Report", AREVA NP identified an error in Section A.2.3.3 of Appendix A of ANP-10306P, which erroneously stated that orientation of elbows is inconsequential with respect to acoustic resonance detection methods. Accordingly, the response to RAI 422, Question 03.09.02-144 and Section A.2.3.3 of Appendix A of ANP-10306P have been revised to indicate that the orientation of upstream elbows modifies the flow past the entrance to standpipes; thus, this is a criterion for determining similarity of pipe systems. This error has been entered into the AREVA NP corrective action program. Revision 1 to ANP-10306P will be submitted to NRC under separate correspondence.

The following table indicates the respective pages in the response document, "RAI 422 Supplement 36 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 422 — 03.09.02-144	2	3

This concludes the formal AREVA NP response to RAI 422, and there are no questions from this RAI for which AREVA NP has not provided responses.

Sincerely,

**Dennis Williford, P.E.**  
**U.S. EPR Design Certification Licensing Manager**  
**AREVA NP Inc.**

7207 IBM Drive, Mail Code CLT 2B  
 Charlotte, NC 28262  
 Phone: 704-805-2223  
 Email: [Dennis.Williford@areva.com](mailto:Dennis.Williford@areva.com)

---

**From:** WILLIFORD Dennis (RS/NB)  
**Sent:** Thursday, March 22, 2012 5:31 PM  
**To:** [Getachew.Tesfaye@nrc.gov](mailto:Getachew.Tesfaye@nrc.gov)  
**Cc:** BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WELLS Russell (RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 35

Getachew,

AREVA NP Inc. letter NRC:12:015 dated March 22, 2012 provides a technically correct and complete final response to the single remaining question in RAI 422. AREVA NP considers some of the material contained in the response to be proprietary information. As required by 10 CFR 2.390(b), an affidavit is provided to support the withholding of the proprietary information from public disclosure. Proprietary and non-proprietary versions of the enclosure to this letter are provided separately.

Enclosed with the letter as a part of the response are affected pages of ANP-10306P, "Comprehensive Vibration Assessment Program for U.S. EPR Reactor Internals Technical Report," in redline-strikeout format which support the response to RAI 422 Question 03.09.02-108.

The following table indicates the respective pages in the response that contain AREVA NP's final response to the subject question.

Question #	Start Page	End Page
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This concludes the formal AREVA NP response to RAI 422, and there are no questions from this RAI for which AREVA NP has not provided responses.

Sincerely,

***Dennis Williford, P.E.***  
***U.S. EPR Design Certification Licensing Manager***  
***AREVA NP Inc.***

7207 IBM Drive, Mail Code CLT 2B  
Charlotte, NC 28262  
Phone: 704-805-2223  
Email: [Dennis.Williford@areva.com](mailto:Dennis.Williford@areva.com)

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**From:** WILLIFORD Dennis (RS/NB)  
**Sent:** Friday, February 17, 2012 5:20 PM  
**To:** [Getachew.Tesfaye@nrc.gov](mailto:Getachew.Tesfaye@nrc.gov)  
**Cc:** BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WELLS Russell (RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 34

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 422 on September 2, 2010, noting that the schedule for 61 of the 63 questions was being further evaluated with additional schedule information to be provided by October 4, 2010. AREVA NP provided technically correct and complete final responses to 2 of the remaining 63 questions on September 9, 2010, as committed. The schedule for a technically correct and complete response to the remaining 61 questions was revised based on the additional evaluations performed since the initial schedule was provided on September 2, 2010. This revised schedule was provided on September 27, 2010. The schedule for a technically correct and complete response to 6 of the remaining 61 questions was revised based on additional evaluations performed since the revised schedule was provided on September 27, 2010. This revised schedule was provided on November 2, 2010. The schedule for a technically correct and complete response to 16 of the remaining 61 questions was revised November 22, 2010 to allow additional time for AREVA NP to interact with the NRC. AREVA NP provided technically correct and complete FINAL responses to 11 of the remaining 61 questions on December 22, 2010, as committed. The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised January 12, 2011 to allow additional time for AREVA NP to interact with the NRC. The schedule for a technically correct and complete response to 5 of the remaining 50 questions was revised January 13, 2011 to allow additional time for AREVA NP to address NRC comments. The schedule for a technically correct and complete response to 3 of the remaining 50 questions was revised January 27, 2011 based on additional evaluations performed since the initial schedule was provided. The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 8, 2011 to allow additional time for AREVA NP to interact with the NRC. The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 10, 2011 based on additional evaluations performed since the initial schedule was provided. The schedule for a technically correct and complete response to 16 of the remaining 50 questions was revised February 17, 2011 based on additional evaluations performed since the initial schedule was provided. The schedule for a technically correct and complete response to 18 of the remaining 50 questions was revised with Supplement 12 on March 16, 2011 to allow additional time for AREVA NP to interact with the NRC. AREVA NP provided a technically correct and complete FINAL response to 1 of the remaining 50 questions with Supplement 13 on March 24, 2011, as committed. AREVA NP provided technically correct and complete FINAL responses to 8 of the remaining 49 questions with Supplement 14 on March 30, 2011, as committed. The schedule for a technically correct and complete response to 32 of the remaining 41 questions was revised with Supplement 15 on March 31, 2011 to allow additional time for AREVA NP to interact with the NRC. The schedule for a technically correct and complete response to 6 of the remaining 41 questions was revised with Supplement 16 on April 13, 2011 to allow additional time for AREVA NP to interact with the NRC. The schedule for a

technically correct and complete response to 3 of the remaining 41 questions was revised with Supplement 17 on April 20, 2011 to allow additional time for AREVA NP to interact with the NRC. The schedule for a technically correct and complete response to 29 of the remaining 41 questions was revised with Supplement 18 on May 11, 2011 to allow additional time for AREVA NP to interact with the NRC. AREVA NP provided technically correct and complete FINAL responses to 3 of the remaining 41 questions with Supplement 19 on May 20, 2011, as committed. The schedule for a technically correct and complete response to 9 of the remaining 38 questions was revised with Supplement 20 on May 25, 2011. AREVA NP provided technically correct and complete FINAL responses to 5 of the remaining 38 questions with Supplement 21 on June 1, 2011, as committed. The schedule for a technically correct and complete response to 28 of the remaining 33 questions was revised with Supplement 22 on June 6, 2011. AREVA NP provided a technically correct and complete revised FINAL response to Question 03.09.02-139 with Supplement 23 on June 24, 2011. AREVA NP provided technically correct and complete FINAL responses to 16 of the remaining 33 questions with Supplement 24 on July 7, 2011, as committed.

The schedule for technically correct and complete final responses to the remaining 17 questions was revised with Supplement 25 on July 12, 2011. AREVA NP provided a technically correct and complete FINAL response to 3 of the 17 remaining questions of RAI 422 and a revised response to Question 03.09.02-88 with Supplement 26 on July 29, 2011. AREVA NP provided a technically correct and complete FINAL response to 3 of the 14 remaining questions of RAI 422 with Supplement 27 on August 22, 2011. The schedule for technically correct and complete final responses to the remaining 11 questions was revised with Supplement 28 on September 9, 2011. AREVA NP provided a technically correct and complete FINAL response to 4 of the 11 remaining questions of RAI 422 with Supplement 29 on September 27, 2011. AREVA NP provided a technically correct and complete FINAL response to 1 of the 7 remaining questions of RAI 422 and a revised response to Questions 03.09.02-87 and 03.09.02-112 with Supplement 30 on October 18, 2011. AREVA NP provided a revised schedule for the responses to the remaining 6 questions with Supplement 31 on November 17, 2011 and Supplement 32 on December 15, 2011. AREVA NP Inc. provided a technically correct and complete final response to 5 of the 6 remaining questions in RAI 422 with Supplement 33 on January 13, 2012.

The schedule for a technically correct and complete final response to the single remaining question has been changed as provided below.

Question #	Response Date
RAI 422 — 03.09.02-108	March 22, 2012

Sincerely,

**Dennis Williford, P.E.**  
**U.S. EPR Design Certification Licensing Manager**  
**AREVA NP Inc.**

7207 IBM Drive, Mail Code CLT 2B  
Charlotte, NC 28262  
Phone: 704-805-2223  
Email: [Dennis.Williford@areva.com](mailto:Dennis.Williford@areva.com)

---

**From:** WILLIFORD Dennis (CORP/QP)  
**Sent:** Friday, January 13, 2012 4:57 PM  
**To:** [Getachew.Tesfaye@nrc.gov](mailto:Getachew.Tesfaye@nrc.gov)  
**Cc:** BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WELLS Russell (RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 33

Getachew,

AREVA NP Inc. letter NRC:12:001 dated January 13, 2012 provides a technically correct and complete final response to 5 of the 6 remaining questions in RAI 422. AREVA NP considers some of the material contained in the response to be proprietary information. As required by 10 CFR 2.390(b), an affidavit is provided to support the withholding of the proprietary information from public disclosure. Proprietary and non-proprietary versions of the enclosure to this letter are provided separately.

The following table indicates the respective pages in the enclosed response that contain AREVA NP's final response to the subject questions.

Question #	Start Page	End Page
RAI 422 — 03.09.02-99	2	4
RAI 422 — 03.09.02-103	5	7
RAI 422 — 03.09.02-107	8	9
RAI 422 — 03.09.02-114	10	17
RAI 422 — 03.09.02-119	18	20

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

Question #	Response Date
RAI 422 — 03.09.02-108	February 22, 2012

Sincerely,

**Dennis Williford, P.E.**  
**U.S. EPR Design Certification Licensing Manager**  
**AREVA NP Inc.**

7207 IBM Drive, Mail Code CLT 2B  
Charlotte, NC 28262  
Phone: 704-805-2223  
Email: [Dennis.Williford@areva.com](mailto:Dennis.Williford@areva.com)

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**From:** WILLIFORD Dennis (RS/NB)  
**Sent:** Thursday, December 15, 2011 1:21 PM  
**To:** [Getachew.Tesfaye@nrc.gov](mailto:Getachew.Tesfaye@nrc.gov)  
**Cc:** BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WELLS Russell (RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 32

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 422 on September 2, 2010, noting that the schedule for 61 of the 63 questions was being further evaluated with additional schedule information to be provided by October 4, 2010.

AREVA NP provided technically correct and complete final responses to 2 of the remaining 63 questions on September 9, 2010, as committed.

The schedule for a technically correct and complete response to the remaining 61 questions was revised based on the additional evaluations performed since the initial schedule was provided on September 2, 2010. This revised schedule was provided on September 27, 2010.

The schedule for a technically correct and complete response to 6 of the remaining 61 questions was revised based on additional evaluations performed since the revised schedule was provided on September 27, 2010. This revised schedule was provided on November 2, 2010.

The schedule for a technically correct and complete response to 16 of the remaining 61 questions was revised November 22, 2010 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided technically correct and complete FINAL responses to 11 of the remaining 61 questions on December 22, 2010, as committed.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised January 12, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 5 of the remaining 50 questions was revised January 13, 2011 to allow additional time for AREVA NP to address NRC comments.

The schedule for a technically correct and complete response to 3 of the remaining 50 questions was revised January 27, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 8, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 10, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 16 of the remaining 50 questions was revised February 17, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 18 of the remaining 50 questions was revised with Supplement 12 on March 16, 2011 to allow additional time for AREVA NP to interact with the NRC.



AREVA NP provided a technically correct and complete FINAL response to 1 of the remaining 50 questions with Supplement 13 on March 24, 2011, as committed.

AREVA NP provided technically correct and complete FINAL responses to 8 of the remaining 49 questions with Supplement 14 on March 30, 2011, as committed.

The schedule for a technically correct and complete response to 32 of the remaining 41 questions was revised with Supplement 15 on March 31, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 6 of the remaining 41 questions was revised with Supplement 16 on April 13, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 3 of the remaining 41 questions was revised with Supplement 17 on April 20, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 29 of the remaining 41 questions was revised with Supplement 18 on May 11, 2011 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided technically correct and complete FINAL responses to 3 of the remaining 41 questions with Supplement 19 on May 20, 2011, as committed.

The schedule for a technically correct and complete response to 9 of the remaining 38 questions was revised with Supplement 20 on May 25, 2011.

AREVA NP provided technically correct and complete FINAL responses to 5 of the remaining 38 questions with Supplement 21 on June 1, 2011, as committed.

The schedule for a technically correct and complete response to 28 of the remaining 33 questions was revised with Supplement 22 on June 6, 2011.

AREVA NP provided a technically correct and complete revised FINAL response to Question 03.09.02-139 with Supplement 23 on June 24, 2011.

AREVA NP provided technically correct and complete FINAL responses to 16 of the remaining 33 questions with Supplement 24 on July 7, 2011, as committed.

The schedule for technically correct and complete final responses to the remaining 17 questions was revised with Supplement 25 on July 12, 2011.

AREVA NP provided a technically correct and complete FINAL response to 3 of the 17 remaining questions of RAI 422 and a revised response to Question 03.09.02-88 with Supplement 26 on July 29, 2011.

AREVA NP provided a technically correct and complete FINAL response to 3 of the 14 remaining questions of RAI 422 with Supplement 27 on August 22, 2011.

The schedule for technically correct and complete final responses to the remaining 11 questions was revised with Supplement 28 on September 9, 2011.

AREVA NP provided a technically correct and complete FINAL response to 4 of the 11 remaining questions of RAI 422 with Supplement 29 on September 27, 2011.

AREVA NP provided a technically correct and complete FINAL response to 1 of the 7 remaining questions of RAI 422 and a revised response to Questions 03.09.02-87 and 03.09.02-112 with Supplement 30 on October 18, 2011.

AREVA NP provided a revised schedule for the responses to the remaining 6 questions with Supplement 31 on November 17, 2001.

The schedule for technically correct and complete final responses to the remaining 6 questions has been revised as provided below.

Question #	Response Date
RAI 422 — 03.09.02-99	February 22, 2012
RAI 422 — 03.09.02-103	February 22, 2012
RAI 422 — 03.09.02-107	February 22, 2012
RAI 422 — 03.09.02-108	February 22, 2012
RAI 422 — 03.09.02-114	February 22, 2012
RAI 422 — 03.09.02-119	February 22, 2012

Sincerely,

**Dennis Williford, P.E.**  
**U.S. EPR Design Certification Licensing Manager**  
**AREVA NP Inc.**  
7207 IBM Drive, Mail Code CLT 2B  
Charlotte, NC 28262  
Phone: 704-805-2223  
Email: [Dennis.Williford@areva.com](mailto:Dennis.Williford@areva.com)

---

**From:** WILLIFORD Dennis (RS/NB)  
**Sent:** Thursday, November 17, 2011 5:15 PM  
**To:** [Getachew.Tesfaye@nrc.gov](mailto:Getachew.Tesfaye@nrc.gov)  
**Cc:** BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WELLS Russell (RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 31

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 422 on September 2, 2010, noting that the schedule for 61 of the 63 questions was being further evaluated with additional schedule information to be provided by October 4, 2010.

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The schedule for a technically correct and complete response to 6 of the remaining 61 questions was revised based on additional evaluations performed since the revised schedule was provided on September 27, 2010. This revised schedule was provided on November 2, 2010.

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AREVA NP provided a technically correct and complete FINAL response to 4 of the 11 remaining questions of RAI 422 with Supplement 29 on September 27, 2011.

AREVA NP provided a technically correct and complete FINAL response to 1 of the 7 remaining questions of RAI 422 and a revised response to Questions 03.09.02-87 and 03.09.02-112 with Supplement 30 on October 18, 2011.

The schedule for technically correct and complete final responses to the remaining 6 questions has been revised as provided below.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-99	<b>December 18, 2011</b>
RAI 422 — 03.09.02-103	<b>December 18, 2011</b>
RAI 422 — 03.09.02-107	<b>December 18, 2011</b>
RAI 422 — 03.09.02-108	<b>December 18, 2011</b>
RAI 422 — 03.09.02-114	<b>December 18, 2011</b>
RAI 422 — 03.09.02-119	<b>December 18, 2011</b>

Sincerely,

***Dennis Williford, P.E.***  
***U.S. EPR Design Certification Licensing Manager***  
***AREVA NP Inc.***

7207 IBM Drive, Mail Code CLT 2B  
Charlotte, NC 28262  
Phone: 704-805-2223  
Email: [Dennis.Williford@areva.com](mailto:Dennis.Williford@areva.com)

---

**From:** WILLIFORD Dennis (RS/NB)  
**Sent:** Tuesday, October 18, 2011 5:42 PM  
**To:** [Getachew.Tesfaye@nrc.gov](mailto:Getachew.Tesfaye@nrc.gov)  
**Cc:** BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WELLS Russell (RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 30

Getachew,

AREVA NP Inc. letter NRC:11:107 dated October 18, 2011 provides a technically correct and complete final response to 1 of the 7 remaining questions in RAI 422. A revised response is also being provided to Questions 03.09.02-87 and 03.09.02-112. AREVA NP considers some of the material contained in the response to be proprietary information. As required by 10 CFR 2.390(b), an affidavit is provided to support the withholding of the proprietary information from public disclosure. Proprietary and non-proprietary versions of the enclosure to this letter are provided separately.

The enclosure to this letter includes affected pages of ANP-10306P, "Comprehensive Vibration Assessment Program for U.S. EPR Reactor Internals Technical Report," in redline-strikeout format to support the response to RAI 422 Question 03.09.02-87.

The following table indicates the respective pages in the enclosed response that contain AREVA NP's final response to the subject questions.

Question #	Start Page	End Page
RAI 422 — 03.09.02-87	2	3
RAI 422 — 03.09.02-104	4	9
RAI 422 — 03.09.02-112	10	11

The schedule for a technically correct and complete final response to the remaining 6 questions is unchanged as provided below.

Question #	Response Date
RAI 422 — 03.09.02-99	November 22, 2011
RAI 422 — 03.09.02-103	November 22, 2011
RAI 422 — 03.09.02-107	November 22, 2011
RAI 422 — 03.09.02-108	November 22, 2011
RAI 422 — 03.09.02-114	November 22, 2011
RAI 422 — 03.09.02-119	November 22, 2011

Sincerely,

***Dennis Williford, P.E.***  
***U.S. EPR Design Certification Licensing Manager***  
***AREVA NP Inc.***

7207 IBM Drive, Mail Code CLT 2B  
 Charlotte, NC 28262  
 Phone: 704-805-2223  
 Email: [Dennis.Williford@areva.com](mailto:Dennis.Williford@areva.com)

---

**From:** WILLIFORD Dennis (RS/NB)  
**Sent:** Tuesday, September 27, 2011 3:14 PM  
**To:** [Getachew.Tesfaye@nrc.gov](mailto:Getachew.Tesfaye@nrc.gov)  
**Cc:** BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WELLS Russell (RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 29

Getachew,

AREVA NP Inc. letter NRC:11:104 dated September 27, 2011 provides a technically correct and complete final response to 4 of the 11 remaining questions in RAI 422. AREVA NP considers some of the material contained in the response to be proprietary information. As required by 10 CFR 2.390(b), an affidavit is provided to

support the withholding of the proprietary information from public disclosure. Proprietary and non-proprietary versions of the enclosure to this letter are provided separately.

The enclosure to this letter includes affected pages of ANP-10306P, "Comprehensive Vibration Assessment Program for U.S. EPR Reactor Internals Technical Report," in redline-strikeout format to support the response to RAI 422 Question 03.09.02-101. The markup to this technical report also reflects changes that were provided in the response to RAI 458, Question 03.09.02-151.

The following table indicates the respective pages in the response that contain AREVA NP's final response to the subject questions.

Question #	Start Page	End Page
RAI 422 — 03.09.02-87	2	3
RAI 422 — 03.09.02-100	4	4
RAI 422 — 03.09.02-101	5	7
RAI 422 — 03.09.02-112	8	8

The schedule for a technically correct and complete final response to the remaining 7 questions has been changed as provided below.

Question #	Response Date
RAI 422 — 03.09.02-99	<b>November 22, 2011</b>
RAI 422 — 03.09.02-103	<b>November 22, 2011</b>
RAI 422 — 03.09.02-104	<b>November 22, 2011</b>
RAI 422 — 03.09.02-107	<b>November 22, 2011</b>
RAI 422 — 03.09.02-108	<b>November 22, 2011</b>
RAI 422 — 03.09.02-114	<b>November 22, 2011</b>
RAI 422 — 03.09.02-119	<b>November 22, 2011</b>

Sincerely,

**Dennis Williford, P.E.**  
**U.S. EPR Design Certification Licensing Manager**  
**AREVA NP Inc.**

7207 IBM Drive, Mail Code CLT 2B  
 Charlotte, NC 28262  
 Phone: 704-805-2223  
 Email: [Dennis.Williford@areva.com](mailto:Dennis.Williford@areva.com)

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**From:** WILLIFORD Dennis (RS/NB)  
**Sent:** Friday, September 09, 2011 2:42 PM  
**To:** [Getachew.Tesfaye@nrc.gov](mailto:Getachew.Tesfaye@nrc.gov)  
**Cc:** BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WELLS Russell (RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 28

Getachew,

AREVA NP Inc. letter NRC:11:087 dated August 19, 2011 provided a technically correct and complete final response to 3 of the remaining 14 questions in RAI 422. The schedule for a technically correct and complete response to the remaining 11 questions has been changed as provided below.

Question #	Response Date
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Question #	Response Date
RAI 422 — 03.09.02-87	October 13, 2011
RAI 422 — 03.09.02-99	October 13, 2011
RAI 422 — 03.09.02-100	October 13, 2011
RAI 422 — 03.09.02-101	October 13, 2011
RAI 422 — 03.09.02-103	October 13, 2011
RAI 422 — 03.09.02-104	October 13, 2011
RAI 422 — 03.09.02-107	October 13, 2011
RAI 422 — 03.09.02-108	October 13, 2011
RAI 422 — 03.09.02-112	October 13, 2011
RAI 422 — 03.09.02-114	October 13, 2011
RAI 422 — 03.09.02-119	October 13, 2011

Sincerely,

**Dennis Williford, P.E.**  
**U.S. EPR Design Certification Licensing Manager**  
**AREVA NP Inc.**

7207 IBM Drive, Mail Code CLT 2B  
Charlotte, NC 28262  
Phone: 704-805-2223  
Email: [Dennis.Williford@areva.com](mailto:Dennis.Williford@areva.com)

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**From:** WILLIFORD Dennis (RS/NB)  
**Sent:** Monday, August 22, 2011 8:33 AM  
**To:** [Getachew.Tesfaye@nrc.gov](mailto:Getachew.Tesfaye@nrc.gov)  
**Cc:** BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB);  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 27

Getachew,

AREVA NP Inc. letter NRC:11:087 dated August 19, 2011 provides a technically correct and complete final response to 3 of the remaining 14 questions in RAI 422. AREVA NP considers some of the material contained in the response to be proprietary information. As required by 10 CFR 2.390(b), an affidavit is provided to support the withholding of the proprietary information from public disclosure. Proprietary and non-proprietary versions of the enclosure to this letter are provided separately.

The enclosure includes affected pages of ANP-10306P, "Comprehensive Vibration Assessment Program for U.S. EPR Reactor Internals Technical Report," in redline-strikeout format to support the response to RAI 422 Question 03.09.02-85.

The following table indicates the respective pages in the enclosure that contain AREVA NP's final response to the subject questions.

Question #	Start Page	End Page
RAI 422 — 03.09.02-84	2	2
RAI 422 — 03.09.02-85	3	6
RAI 422 — 03.09.02-110	7	10

The schedule for the technically correct and complete response to the remaining 11 questions is unchanged and is provided below.

Question #	Response Date
RAI 422 — 03.09.02-87	September 13, 2011
RAI 422 — 03.09.02-99	September 13, 2011
RAI 422 — 03.09.02-100	September 13, 2011
RAI 422 — 03.09.02-101	September 13, 2011
RAI 422 — 03.09.02-103	September 13, 2011
RAI 422 — 03.09.02-104	September 13, 2011
RAI 422 — 03.09.02-107	September 13, 2011
RAI 422 — 03.09.02-108	September 13, 2011
RAI 422 — 03.09.02-112	September 13, 2011
RAI 422 — 03.09.02-114	September 13, 2011
RAI 422 — 03.09.02-119	September 13, 2011

Sincerely,

**Dennis Williford, P.E.**  
**U.S. EPR Design Certification Licensing Manager**  
**AREVA NP Inc.**

7207 IBM Drive, Mail Code CLT 2B  
Charlotte, NC 28262  
Phone: 704-805-2223  
Email: [Dennis.Williford@areva.com](mailto:Dennis.Williford@areva.com)

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**From:** WELLS Russell (RS/NB)  
**Sent:** Friday, July 29, 2011 6:11 PM  
**To:** 'Tesfaye, Getachew'  
**Cc:** WILLIFORD Dennis (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); RYAN Tom (RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 26

Getachew,

AREVA NP Inc. letter NRC 11:080 dated July 29, 2011 provides a technically correct and complete final response to 3 of the 17 remaining questions of RAI 422, as shown in the below table. Additionally, the enclosed response contains a revised response to Question 03.09.02-88 which was originally submitted to NRC in RAI 422 Supplement 24. The final response that was submitted to Question 03.09.02-88 in RAI 422 Supplement 24 inadvertently omitted Figure 03.09.02-88-1 from the RAI response. The revised response contains this figure.

AREVA NP considers some of the material contained in the response to be proprietary. As required by 10 CFR 2.390(b), an affidavit is attached to support the withholding of the information from public disclosure. Proprietary and non-proprietary versions of the enclosure to this letter are provided separately.

Appended to this response are affected pages of ANP-10306P, "Comprehensive Vibration Assessment Program for U.S. EPR Reactor Internals Technical Report," in redline-strikeout format which support the response to RAI 422 Questions 03.09.02-131 and 03.09.02-140.

The following table indicates the respective pages in the enclosed response that contain AREVA NP's final response to the subject questions.

Question #	Start Page	End Page
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RAI 422 — 03.09.02-88	2	4
RAI 422 — 03.09.02-131	5	5
RAI 422 — 03.09.02-134	6	6
RAI 422 — 03.09.02-140	7	9

The schedule for the technically correct and complete final response to the remaining 14 questions is unchanged and is provided below.

Question #	Response Date
RAI 422 — 03.09.02-84	September 13, 2011
RAI 422 — 03.09.02-85	September 13, 2011
RAI 422 — 03.09.02-87	September 13, 2011
RAI 422 — 03.09.02-99	September 13, 2011
RAI 422 — 03.09.02-100	September 13, 2011
RAI 422 — 03.09.02-101	September 13, 2011
RAI 422 — 03.09.02-103	September 13, 2011
RAI 422 — 03.09.02-104	September 13, 2011
RAI 422 — 03.09.02-107	September 13, 2011
RAI 422 — 03.09.02-108	September 13, 2011
RAI 422 — 03.09.02-110	September 13, 2011
RAI 422 — 03.09.02-112	September 13, 2011
RAI 422 — 03.09.02-114	September 13, 2011
RAI 422 — 03.09.02-119	September 13, 2011

*Sincerely,*

*Russ Wells for*  
**Dennis Williford, P.E.**  
**U.S. EPR Design Certification Licensing Manager**  
**AREVA NP Inc.**  
7207 IBM Drive, Mail Code CLT 2B  
Charlotte, NC 28262  
Phone: 704-805-2223  
Email: [Dennis.Williford@areva.com](mailto:Dennis.Williford@areva.com)

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**From:** WILLIFORD Dennis (RS/NB)  
**Sent:** Tuesday, July 12, 2011 4:08 PM  
**To:** Tesfaye, Getachew  
**Cc:** BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WELLS Russell (RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 25

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 422 on September 2, 2010, noting that the schedule for 61 of the 63 questions was being further evaluated with additional schedule information to be provided by October 4, 2010.

AREVA NP provided technically correct and complete FINAL responses to 2 of the remaining 63 questions on September 9, 2010, as committed.

The schedule for a technically correct and complete response to the remaining 61 questions was revised based on the additional evaluations performed since the initial schedule was provided on September 2, 2010. This revised schedule was provided on September 27, 2010.

The schedule for a technically correct and complete response to 6 of the remaining 61 questions was revised based on additional evaluations performed since the revised schedule was provided on September 27, 2010. This revised schedule was provided on November 2, 2010.

The schedule for a technically correct and complete response to 16 of the remaining 61 questions was revised November 22, 2010 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided technically correct and complete FINAL responses to 11 of the remaining 61 questions on December 22, 2010, as committed.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised January 12, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 5 of the remaining 50 questions was revised January 13, 2011 to allow additional time for AREVA NP to address NRC comments.

The schedule for a technically correct and complete response to 3 of the remaining 50 questions was revised January 27, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 8, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 10, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 16 of the remaining 50 questions was revised February 17, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 18 of the remaining 50 questions was revised with Supplement 12 on March 16, 2011 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided a technically correct and complete FINAL response to 1 of the remaining 50 questions with Supplement 13 on March 24, 2011, as committed.

AREVA NP provided technically correct and complete FINAL responses to 8 of the remaining 49 questions with Supplement 14 on March 30, 2011, as committed.

The schedule for a technically correct and complete response to 32 of the remaining 41 questions was revised with Supplement 15 on March 31, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 6 of the remaining 41 questions was revised with Supplement 16 on April 13, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 3 of the remaining 41 questions was revised with Supplement 17 on April 20, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 29 of the remaining 41 questions was revised with Supplement 18 on May 11, 2011 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided technically correct and complete FINAL responses to 3 of the remaining 41 questions with Supplement 19 on May 20, 2011, as committed.

The schedule for a technically correct and complete response to 9 of the remaining 38 questions was revised with Supplement 20 on May 25, 2011.

AREVA NP provided technically correct and complete FINAL responses to 5 of the remaining 38 questions with Supplement 21 on June 1, 2011, as committed.

The schedule for a technically correct and complete response to 28 of the remaining 33 questions was revised with Supplement 22 on June 6, 2011.

AREVA NP provided a technically correct and complete revised FINAL response to Question 03.09.02-139 with Supplement 23 on June 24, 2011.

AREVA NP provided technically correct and complete FINAL responses to 16 of the remaining 33 questions with Supplement 24 on July 7, 2011, as committed.

The schedule for technically correct and complete final responses to the remaining 17 questions has been revised as provided below.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-84	<b>September 13, 2011</b>
RAI 422 — 03.09.02-85	<b>September 13, 2011</b>
RAI 422 — 03.09.02-87	<b>September 13, 2011</b>
RAI 422 — 03.09.02-99	<b>September 13, 2011</b>
RAI 422 — 03.09.02-100	<b>September 13, 2011</b>
RAI 422 — 03.09.02-101	<b>September 13, 2011</b>
RAI 422 — 03.09.02-103	<b>September 13, 2011</b>
RAI 422 — 03.09.02-104	<b>September 13, 2011</b>
RAI 422 — 03.09.02-107	<b>September 13, 2011</b>
RAI 422 — 03.09.02-108	<b>September 13, 2011</b>
RAI 422 — 03.09.02-110	<b>September 13, 2011</b>
RAI 422 — 03.09.02-112	<b>September 13, 2011</b>
RAI 422 — 03.09.02-114	<b>September 13, 2011</b>
RAI 422 — 03.09.02-119	<b>September 13, 2011</b>
RAI 422 — 03.09.02-131	<b>September 13, 2011</b>
RAI 422 — 03.09.02-134	<b>September 13, 2011</b>
RAI 422 — 03.09.02-140	<b>September 13, 2011</b>

Sincerely,

***Dennis Williford, P.E.***  
***U.S. EPR Design Certification Licensing Manager***  
***AREVA NP Inc.***

7207 IBM Drive, Mail Code CLT 2B  
Charlotte, NC 28262  
Phone: 704-805-2223  
Email: [Dennis.Williford@areva.com](mailto:Dennis.Williford@areva.com)

---

**From:** WILLIFORD Dennis (RS/NB)  
**Sent:** Thursday, July 07, 2011 5:10 PM  
**To:** Tesfaye, Getachew  
**Cc:** BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WELLS Russell

(RS/NB)

**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 24

Getachew,

AREVA NP Inc. letter NRC:11:073 dated July 7, 2011 provides a technically correct and complete final response to 16 of the 33 remaining questions for RAI 422. Additionally, a revised response is provided for Question 03.09.02-136 which was originally submitted to the NRC in Supplement 5 on December 22, 2010. AREVA NP considers some of the material contained in the response to be proprietary information. As required by 10 CFR 2.390(b), an affidavit is provided to support the withholding of the proprietary information from public disclosure. Proprietary and non-proprietary versions of the enclosure to this letter are provided separately.

Included in the response are affected pages of ANP-10306P, "Comprehensive Vibration Assessment Program for U.S. EPR Reactor Internals Technical Report," in redline-strikeout format which support the response to RAI 422 Questions 03.09.02-109, 03.09.02-118, 03.09.02-121, and 03.09.02-136.

The following table indicates the respective pages in the enclosure that contain AREVA NP's final response to the subject questions.

<b>Question #</b>	<b>Start Page</b>	<b>End Page</b>
RAI 422 — 03.09.02-82	2	4
RAI 422 — 03.09.02-88	5	6
RAI 422 — 03.09.02-98	7	12
RAI 422 — 03.09.02-102	13	13
RAI 422 — 03.09.02-109	14	14
RAI 422 — 03.09.02-111	15	15
RAI 422 — 03.09.02-113	16	16
RAI 422 — 03.09.02-115	17	18
RAI 422 — 03.09.02-116	19	19
RAI 422 — 03.09.02-117	20	20
RAI 422 — 03.09.02-118	21	21
RAI 422 — 03.09.02-120	22	27
RAI 422 — 03.09.02-121	28	28
RAI 422 — 03.09.02-122	29	29
RAI 422 — 03.09.02-127	30	30
RAI 422 — 03.09.02-136	31	33
RAI 422 — 03.09.02-145	34	35

The schedule for the technically correct and complete response to the remaining 17 questions is unchanged and is provided below.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-84	July 13, 2011
RAI 422 — 03.09.02-85	July 13, 2011
RAI 422 — 03.09.02-87	July 13, 2011
RAI 422 — 03.09.02-99	July 13, 2011
RAI 422 — 03.09.02-100	July 13, 2011
RAI 422 — 03.09.02-101	July 13, 2011
RAI 422 — 03.09.02-103	July 13, 2011
RAI 422 — 03.09.02-104	July 13, 2011
RAI 422 — 03.09.02-107	July 13, 2011

Question #	Response Date
RAI 422 — 03.09.02-108	July 13, 2011
RAI 422 — 03.09.02-110	July 13, 2011
RAI 422 — 03.09.02-112	July 13, 2011
RAI 422 — 03.09.02-114	July 13, 2011
RAI 422 — 03.09.02-119	July 13, 2011
RAI 422 — 03.09.02-131	July 13, 2011
RAI 422 — 03.09.02-134	July 13, 2011
RAI 422 — 03.09.02-140	July 13, 2011

Sincerely,

**Dennis Williford, P.E.**  
**U.S. EPR Design Certification Licensing Manager**  
**AREVA NP Inc.**  
7207 IBM Drive, Mail Code CLT 2B  
Charlotte, NC 28262  
Phone: 704-805-2223  
Email: [Dennis.Williford@areva.com](mailto:Dennis.Williford@areva.com)

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**From:** WILLIFORD Dennis (RS/NB)  
**Sent:** Friday, June 24, 2011 4:46 PM  
**To:** 'Tefaye, Getachew'  
**Cc:** BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WELLS Russell (RS/NB); HAMMOND Philip (RS/PT)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 23

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 422 on September 2, 2010, noting that the schedule for 61 of the 63 questions was being further evaluated with additional schedule information to be provided by October 4, 2010.

AREVA NP provided technically correct and complete FINAL responses to 2 of the remaining 63 questions on September 9, 2010, as committed.

The schedule for a technically correct and complete response to the remaining 61 questions was revised based on the additional evaluations performed since the initial schedule was provided on September 2, 2010. This revised schedule was provided on September 27, 2010.

The schedule for a technically correct and complete response to 6 of the remaining 61 questions was revised based on additional evaluations performed since the revised schedule was provided on September 27, 2010. This revised schedule was provided on November 2, 2010.

The schedule for a technically correct and complete response to 16 of the remaining 61 questions was revised November 22, 2010 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided technically correct and complete FINAL responses to 11 of the remaining 61 questions on December 22, 2010, as committed.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised January 12, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 5 of the remaining 50 questions was revised January 13, 2011 to allow additional time for AREVA NP to address NRC comments.

The schedule for a technically correct and complete response to 3 of the remaining 50 questions was revised January 27, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 8, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 10, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 16 of the remaining 50 questions was revised February 17, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 18 of the remaining 50 questions was revised with Supplement 12 on March 16, 2011 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided a technically correct and complete FINAL response to 1 of the remaining 50 questions with Supplement 13 on March 24, 2011, as committed.

AREVA NP provided technically correct and complete FINAL responses to 8 of the remaining 49 questions with Supplement 14 on March 30, 2011, as committed.

The schedule for a technically correct and complete response to 32 of the remaining 41 questions was revised with Supplement 15 on March 31, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 6 of the remaining 41 questions was revised with Supplement 16 on April 13, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 3 of the remaining 41 questions was revised with Supplement 17 on April 20, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 29 of the remaining 41 questions was revised with Supplement 18 on May 11, 2011 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided technically correct and complete FINAL responses to 3 of the remaining 41 questions with Supplement 19 on May 20, 2011, as committed.

The schedule for a technically correct and complete response to 9 of the remaining 38 questions was revised with Supplement 20 on May 25, 2011.

AREVA NP provided technically correct and complete FINAL responses to 5 of the remaining 38 questions with Supplement 21 on June 1, 2011, as committed.

The schedule for a technically correct and complete response to 28 of the remaining 33 questions was revised with Supplement 22 on June 6, 2011.

The attached file, "RAI 422 Supplement 23 Response US EPR DC.pdf", provides a technically correct and complete revised FINAL response to Question 03.09.02-139. A response to this question was originally sent to the NRC on December 22, 2010 in RAI 422 Supplement 5. Based on discussions with NRC staff, it was determined that the following changes were required to this response:

- Last sentence of Part B of the response changed ANP-10306P, Table 5-1 to ANP-10306P, Table 5-4

- Part C of the response changed ANP-10306P, Table 5-1 to ANP-10306P, Figure 5-1

The revised response contains change bars to reflect the above changes.

The following table indicates the respective pages in the response document, "RAI 422 Supplement 23 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 422 — 03.09.02-139	2	4

The schedule for technically correct and complete final responses to the remaining 33 questions is unchanged and is provided below.

Question #	Response Date
RAI 422 — 03.09.02-82	July 13, 2011
RAI 422 — 03.09.02-84	July 13, 2011
RAI 422 — 03.09.02-85	July 13, 2011
RAI 422 — 03.09.02-87	July 13, 2011
RAI 422 — 03.09.02-88	July 13, 2011
RAI 422 — 03.09.02-98	July 13, 2011
RAI 422 — 03.09.02-99	July 13, 2011
RAI 422 — 03.09.02-100	July 13, 2011
RAI 422 — 03.09.02-101	July 13, 2011
RAI 422 — 03.09.02-102	July 13, 2011
RAI 422 — 03.09.02-103	July 13, 2011
RAI 422 — 03.09.02-104	July 13, 2011
RAI 422 — 03.09.02-107	July 13, 2011
RAI 422 — 03.09.02-108	July 13, 2011
RAI 422 — 03.09.02-109	July 13, 2011
RAI 422 — 03.09.02-110	July 13, 2011
RAI 422 — 03.09.02-111	July 13, 2011
RAI 422 — 03.09.02-112	July 13, 2011
RAI 422 — 03.09.02-113	July 13, 2011
RAI 422 — 03.09.02-114	July 13, 2011
RAI 422 — 03.09.02-115	July 13, 2011
RAI 422 — 03.09.02-116	July 13, 2011
RAI 422 — 03.09.02-117	July 13, 2011
RAI 422 — 03.09.02-118	July 13, 2011
RAI 422 — 03.09.02-119	July 13, 2011
RAI 422 — 03.09.02-120	July 13, 2011
RAI 422 — 03.09.02-121	July 13, 2011
RAI 422 — 03.09.02-122	July 13, 2011
RAI 422 — 03.09.02-127	July 13, 2011
RAI 422 — 03.09.02-131	July 13, 2011
RAI 422 — 03.09.02-134	July 13, 2011
RAI 422 — 03.09.02-140	July 13, 2011
RAI 422 — 03.09.02-145	July 13, 2011

Sincerely,

**Dennis Williford, P.E.**  
**U.S. EPR Design Certification Licensing Manager**  
**AREVA NP Inc.**  
7207 IBM Drive, Mail Code CLT 2B  
Charlotte, NC 28262  
Phone: 704-805-2223  
Email: [Dennis.Williford@areva.com](mailto:Dennis.Williford@areva.com)

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**From:** WILLIFORD Dennis (RS/NB)  
**Sent:** Monday, June 06, 2011 5:58 PM  
**To:** Tesfaye, Getachew  
**Cc:** BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); HAMMOND Philip (RS/PT)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 22

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 422 on September 2, 2010, noting that the schedule for 61 of the 63 questions was being further evaluated with additional schedule information to be provided by October 4, 2010.

AREVA NP provided technically correct and complete FINAL responses to 2 of the remaining 63 questions on September 9, 2010, as committed.

The schedule for a technically correct and complete response to the remaining 61 questions was revised based on the additional evaluations performed since the initial schedule was provided on September 2, 2010. This revised schedule was provided on September 27, 2010.

The schedule for a technically correct and complete response to 6 of the remaining 61 questions was revised based on additional evaluations performed since the revised schedule was provided on September 27, 2010. This revised schedule was provided on November 2, 2010.

The schedule for a technically correct and complete response to 16 of the remaining 61 questions was revised November 22, 2010 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided technically correct and complete FINAL responses to 11 of the remaining 61 questions on December 22, 2010, as committed.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised January 12, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 5 of the remaining 50 questions was revised January 13, 2011 to allow additional time for AREVA NP to address NRC comments.

The schedule for a technically correct and complete response to 3 of the remaining 50 questions was revised January 27, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 8, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 10, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 16 of the remaining 50 questions was revised February 17, 2011 based on additional evaluations performed since the initial schedule was provided.



The schedule for a technically correct and complete response to 18 of the remaining 50 questions was revised with Supplement 12 on March 16, 2011 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided a technically correct and complete FINAL response to 1 of the remaining 50 questions with Supplement 13 on March 24, 2011, as committed.

AREVA NP provided technically correct and complete FINAL responses to 8 of the remaining 49 questions with Supplement 14 on March 30, 2011, as committed.

The schedule for a technically correct and complete response to 32 of the remaining 41 questions was revised with Supplement 15 on March 31, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 6 of the remaining 41 questions was revised with Supplement 16 on April 13, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 3 of the remaining 41 questions was revised with Supplement 17 on April 20, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 29 of the remaining 41 questions was revised with Supplement 18 on May 11, 2011 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided technically correct and complete FINAL responses to 3 of the remaining 41 questions with Supplement 19 on May 20, 2011, as committed.

The schedule for a technically correct and complete response to 9 of the remaining 38 questions was revised with Supplement 20 on May 25, 2011.

AREVA NP provided technically correct and complete FINAL responses to 5 of the remaining 38 questions with Supplement 21 on June 1, 2011, as committed.

The schedule for the response to the 28 questions highlighted below in bold is being revised. The schedule for technically correct and complete final responses to the remaining 33 questions is summarized below.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-82	<b>July 13, 2011</b>
RAI 422 — 03.09.02-84	<b>July 13, 2011</b>
RAI 422 — 03.09.02-85	<b>July 13, 2011</b>
RAI 422 — 03.09.02-87	July 13, 2011
RAI 422 — 03.09.02-88	July 13, 2011
RAI 422 — 03.09.02-98	<b>July 13, 2011</b>
RAI 422 — 03.09.02-99	<b>July 13, 2011</b>
RAI 422 — 03.09.02-100	<b>July 13, 2011</b>
RAI 422 — 03.09.02-101	<b>July 13, 2011</b>
RAI 422 — 03.09.02-102	<b>July 13, 2011</b>
RAI 422 — 03.09.02-103	<b>July 13, 2011</b>
RAI 422 — 03.09.02-104	<b>July 13, 2011</b>
RAI 422 — 03.09.02-107	<b>July 13, 2011</b>
RAI 422 — 03.09.02-108	<b>July 13, 2011</b>
RAI 422 — 03.09.02-109	<b>July 13, 2011</b>
RAI 422 — 03.09.02-110	<b>July 13, 2011</b>
RAI 422 — 03.09.02-111	<b>July 13, 2011</b>
RAI 422 — 03.09.02-112	<b>July 13, 2011</b>

Question #	Response Date
RAI 422 — 03.09.02-113	July 13, 2011
RAI 422 — 03.09.02-114	July 13, 2011
RAI 422 — 03.09.02-115	July 13, 2011
RAI 422 — 03.09.02-116	July 13, 2011
RAI 422 — 03.09.02-117	July 13, 2011
RAI 422 — 03.09.02-118	July 13, 2011
RAI 422 — 03.09.02-119	July 13, 2011
RAI 422 — 03.09.02-120	July 13, 2011
RAI 422 — 03.09.02-121	July 13, 2011
RAI 422 — 03.09.02-122	July 13, 2011
RAI 422 — 03.09.02-127	July 13, 2011
RAI 422 — 03.09.02-131	July 13, 2011
RAI 422 — 03.09.02-134	July 13, 2011
RAI 422 — 03.09.02-140	July 13, 2011
RAI 422 — 03.09.02-145	July 13, 2011

Sincerely,

**Dennis Williford, P.E.**  
**U.S. EPR Design Certification Licensing Manager**  
**AREVA NP Inc.**

7207 IBM Drive, Mail Code CLT 2B  
Charlotte, NC 28262  
Phone: 704-805-2223  
Email: [Dennis.Williford@areva.com](mailto:Dennis.Williford@areva.com)

---

**From:** WILLIFORD Dennis (RS/NB)  
**Sent:** Wednesday, June 01, 2011 6:09 PM  
**To:** 'Tesfaye, Getachew'  
**Cc:** BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); HAMMOND Philip (RS/PT)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 21

Getachew,

AREVA NP Inc. letter NRC 11:055 dated June 1, 2011 provides a technically correct and complete response to 5 of the 38 remaining questions for RAI 422. AREVA NP considers some of the material contained in the response to be proprietary information. As required by 10 CFR 2.390(b), an affidavit is provided to support the withholding of the proprietary information from public disclosure. A proprietary and non-proprietary version of the enclosure to this letter are provided separately.

The following table indicates the respective pages in the enclosure that contain AREVA NP's final response to the subject questions.

Question #	Start Page	End Page
RAI 422 — 03.09.02-90	2	3
RAI 422 — 03.09.02-94	4	4
RAI 422 — 03.09.02-124	5	5
RAI 422 — 03.09.02-138	6	6
RAI 422 — 03.09.02-144	7	8

The schedule for a technically correct and complete final response to the remaining 33 questions is unchanged and is provided below.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-82	June 15, 2011
RAI 422 — 03.09.02-84	June 15, 2011
RAI 422 — 03.09.02-85	June 15, 2011
RAI 422 — 03.09.02-87	July 13, 2011
RAI 422 — 03.09.02-88	July 13, 2011
RAI 422 — 03.09.02-98	June 15, 2011
RAI 422 — 03.09.02-99	June 15, 2011
RAI 422 — 03.09.02-100	June 15, 2011
RAI 422 — 03.09.02-101	June 15, 2011
RAI 422 — 03.09.02-102	June 15, 2011
RAI 422 — 03.09.02-103	June 15, 2011
RAI 422 — 03.09.02-104	June 15, 2011
RAI 422 — 03.09.02-107	June 15, 2011
RAI 422 — 03.09.02-108	June 15, 2011
RAI 422 — 03.09.02-109	June 15, 2011
RAI 422 — 03.09.02-110	June 15, 2011
RAI 422 — 03.09.02-111	June 15, 2011
RAI 422 — 03.09.02-112	June 15, 2011
RAI 422 — 03.09.02-113	June 15, 2011
RAI 422 — 03.09.02-114	June 15, 2011
RAI 422 — 03.09.02-115	June 15, 2011
RAI 422 — 03.09.02-116	June 15, 2011
RAI 422 — 03.09.02-117	June 15, 2011
RAI 422 — 03.09.02-118	June 15, 2011
RAI 422 — 03.09.02-119	June 15, 2011
RAI 422 — 03.09.02-120	June 15, 2011
RAI 422 — 03.09.02-121	June 15, 2011
RAI 422 — 03.09.02-122	June 15, 2011
RAI 422 — 03.09.02-127	July 13, 2011
RAI 422 — 03.09.02-131	June 15, 2011
RAI 422 — 03.09.02-134	July 13, 2011
RAI 422 — 03.09.02-140	July 13, 2011
RAI 422 — 03.09.02-145	June 15, 2011

Sincerely,

**Dennis Williford, P.E.**  
**U.S. EPR Design Certification Licensing Manager**  
**AREVA NP Inc.**  
 7207 IBM Drive, Mail Code CLT 2B  
 Charlotte, NC 28262  
 Phone: 704-805-2223  
 Email: [Dennis.Williford@areva.com](mailto:Dennis.Williford@areva.com)

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**From:** WILLIFORD Dennis (RS/NB)  
**Sent:** Wednesday, May 25, 2011 8:22 AM

**To:** 'Tesfaye, Getachew'

**Cc:** BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); HAMMOND Philip (RS/PT); WELLS Russell (RS/NB)

**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 20

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 422 on September 2, 2010, noting that the schedule for 61 of the 63 questions was being further evaluated with additional schedule information to be provided by October 4, 2010.

AREVA NP provided technically correct and complete FINAL responses to 2 of the remaining 63 questions on September 9, 2010, as committed.

The schedule for a technically correct and complete response to the remaining 61 questions was revised based on the additional evaluations performed since the initial schedule was provided on September 2, 2010. This revised schedule was provided on September 27, 2010.

The schedule for a technically correct and complete response to 6 of the remaining 61 questions was revised based on additional evaluations performed since the revised schedule was provided on September 27, 2010. This revised schedule was provided on November 2, 2010.

The schedule for a technically correct and complete response to 16 of the remaining 61 questions was revised November 22, 2010 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided technically correct and complete FINAL responses to 11 of the remaining 61 questions on December 22, 2010, as committed.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised January 12, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 5 of the remaining 50 questions was revised January 13, 2011 to allow additional time for AREVA NP to address NRC comments.

The schedule for a technically correct and complete response to 3 of the remaining 50 questions was revised January 27, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 8, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 10, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 16 of the remaining 50 questions was revised February 17, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 18 of the remaining 50 questions was revised with Supplement 12 on March 16, 2011 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided a technically correct and complete FINAL response to 1 of the remaining 50 questions with Supplement 13 on March 24, 2011, as committed.

AREVA NP provided technically correct and complete FINAL responses to 8 of the remaining 49 questions with Supplement 14 on March 30, 2011, as committed.

The schedule for a technically correct and complete response to 32 of the remaining 41 questions was revised with Supplement 15 on March 31, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 6 of the remaining 41 questions was revised with Supplement 16 on April 13, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 3 of the remaining 41 questions was revised with Supplement 17 on April 20, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 29 of the remaining 41 questions was revised with Supplement 18 on May 11, 2011 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided technically correct and complete FINAL responses to 3 of the remaining 41 questions with Supplement 19 on May 20, 2011, as committed.

The schedule for the response to the 9 questions shown below in bold is being revised. The schedule for technically correct and complete final responses to the other 29 questions is unchanged. The revised schedule for the remaining 38 questions is summarized below.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-82	June 15, 2011
RAI 422 — 03.09.02-84	June 15, 2011
RAI 422 — 03.09.02-85	June 15, 2011
<b>RAI 422 — 03.09.02-87</b>	<b>July 13, 2011</b>
<b>RAI 422 — 03.09.02-88</b>	<b>July 13, 2011</b>
<b>RAI 422 — 03.09.02-90</b>	<b>July 13, 2011</b>
<b>RAI 422 — 03.09.02-94</b>	<b>July 13, 2011</b>
RAI 422 — 03.09.02-98	June 15, 2011
RAI 422 — 03.09.02-99	June 15, 2011
RAI 422 — 03.09.02-100	June 15, 2011
RAI 422 — 03.09.02-101	June 15, 2011
RAI 422 — 03.09.02-102	June 15, 2011
RAI 422 — 03.09.02-103	June 15, 2011
RAI 422 — 03.09.02-104	June 15, 2011
RAI 422 — 03.09.02-107	June 15, 2011
RAI 422 — 03.09.02-108	June 15, 2011
RAI 422 — 03.09.02-109	June 15, 2011
RAI 422 — 03.09.02-110	June 15, 2011
RAI 422 — 03.09.02-111	June 15, 2011
RAI 422 — 03.09.02-112	June 15, 2011
RAI 422 — 03.09.02-113	June 15, 2011
RAI 422 — 03.09.02-114	June 15, 2011
RAI 422 — 03.09.02-115	June 15, 2011
RAI 422 — 03.09.02-116	June 15, 2011
RAI 422 — 03.09.02-117	June 15, 2011
RAI 422 — 03.09.02-118	June 15, 2011
RAI 422 — 03.09.02-119	June 15, 2011
RAI 422 — 03.09.02-120	June 15, 2011
RAI 422 — 03.09.02-121	June 15, 2011
RAI 422 — 03.09.02-122	June 15, 2011
<b>RAI 422 — 03.09.02-124</b>	<b>July 13, 2011</b>
<b>RAI 422 — 03.09.02-127</b>	<b>July 13, 2011</b>

Question #	Response Date
RAI 422 — 03.09.02-131	June 15, 2011
<b>RAI 422 — 03.09.02-134</b>	<b>July 13, 2011</b>
<b>RAI 422 — 03.09.02-138</b>	<b>July 13, 2011</b>
<b>RAI 422 — 03.09.02-140</b>	<b>July 13, 2011</b>
RAI 422 — 03.09.02-144	June 15, 2011
RAI 422 — 03.09.02-145	June 15, 2011

Sincerely,

**Dennis Williford, P.E.**  
**U.S. EPR Design Certification Licensing Manager**  
**AREVA NP Inc.**

7207 IBM Drive, Mail Code CLT 2B  
Charlotte, NC 28262  
Phone: 704-805-2223  
Email: [Dennis.Williford@areva.com](mailto:Dennis.Williford@areva.com)

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**From:** WILLIFORD Dennis (RS/NB)  
**Sent:** Friday, May 20, 2011 4:56 PM  
**To:** 'Tesfaye, Getachew'  
**Cc:** BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); HAMMOND Philip (RS/PT); CORNELL Veronica (External RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 19

Getachew,

AREVA NP Inc. letter NRC 11:044 dated May 19, 2011 provides a technically correct and complete FINAL response to 3 of the 41 remaining questions (Questions 03.09.02-105, 03.09.02-106, and 03.09.02-123) for RAI 422. AREVA NP considers some of the material contained in the response to be proprietary information. As required by 10 CFR 2.390(b), an affidavit is provided to support the withholding of the proprietary information from public disclosure. Proprietary and non-proprietary versions of the enclosure to this letter are provided separately.

The following table indicates the respective pages in the enclosure that contain AREVA NP's final response to the subject questions.

Question #	Start Page	End Page
RAI 422 — 03.09.02-105	2	2
RAI 422 — 03.09.02-106	3	3
RAI 422 — 03.09.02-123	4	4

The schedule for technically correct and complete final responses to the remaining 38 questions is unchanged and is provided below:

Question #	Response Date
RAI 422 — 03.09.02-82	June 15, 2011
RAI 422 — 03.09.02-84	June 15, 2011
RAI 422 — 03.09.02-85	June 15, 2011
RAI 422 — 03.09.02-87	June 1, 2011

Question #	Response Date
RAI 422 — 03.09.02-88	June 1, 2011
RAI 422 — 03.09.02-90	June 1, 2011
RAI 422 — 03.09.02-94	June 1, 2011
RAI 422 — 03.09.02-98	June 15, 2011
RAI 422 — 03.09.02-99	June 15, 2011
RAI 422 — 03.09.02-100	June 15, 2011
RAI 422 — 03.09.02-101	June 15, 2011
RAI 422 — 03.09.02-102	June 15, 2011
RAI 422 — 03.09.02-103	June 15, 2011
RAI 422 — 03.09.02-104	June 15, 2011
RAI 422 — 03.09.02-107	June 15, 2011
RAI 422 — 03.09.02-108	June 15, 2011
RAI 422 — 03.09.02-109	June 15, 2011
RAI 422 — 03.09.02-110	June 15, 2011
RAI 422 — 03.09.02-111	June 15, 2011
RAI 422 — 03.09.02-112	June 15, 2011
RAI 422 — 03.09.02-113	June 15, 2011
RAI 422 — 03.09.02-114	June 15, 2011
RAI 422 — 03.09.02-115	June 15, 2011
RAI 422 — 03.09.02-116	June 15, 2011
RAI 422 — 03.09.02-117	June 15, 2011
RAI 422 — 03.09.02-118	June 15, 2011
RAI 422 — 03.09.02-119	June 15, 2011
RAI 422 — 03.09.02-120	June 15, 2011
RAI 422 — 03.09.02-121	June 15, 2011
RAI 422 — 03.09.02-122	June 15, 2011
RAI 422 — 03.09.02-124	June 1, 2011
RAI 422 — 03.09.02-127	June 1, 2011
RAI 422 — 03.09.02-131	June 15, 2011
RAI 422 — 03.09.02-134	June 1, 2011
RAI 422 — 03.09.02-138	June 1, 2011
RAI 422 — 03.09.02-140	June 1, 2011
RAI 422 — 03.09.02-144	June 15, 2011
RAI 422 — 03.09.02-145	June 15, 2011

*Sincerely,*

**Dennis Williford, P.E.**  
**U.S. EPR Design Certification Licensing Manager**  
**AREVA NP Inc.**

7207 IBM Drive, Mail Code CLT 2B  
Charlotte, NC 28262  
Phone: 704-805-2223  
Email: [Dennis.Williford@areva.com](mailto:Dennis.Williford@areva.com)

---

**From:** WELLS Russell (RS/NB)

**Sent:** Wednesday, May 11, 2011 10:11 AM

**To:** 'Tesfaye, Getachew'

**Cc:** HAMMOND Philip (RS/PT); Miernicki, Michael; BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB)

**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 18

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 422 on September 2, 2010, noting that the schedule for 61 of the 63 questions was being further evaluated with additional schedule information to be provided by October 4, 2010.

AREVA NP provided technically correct and complete FINAL responses to 2 of the remaining 63 questions on September 9, 2010, as committed.

The schedule for a technically correct and complete response to the remaining 61 questions was revised based on the additional evaluations performed since the initial schedule was provided on September 2, 2010. This revised schedule was provided on September 27, 2010.

The schedule for a technically correct and complete response to 6 of the remaining 61 questions was revised based on additional evaluations performed since the revised schedule was provided on September 27, 2010. This revised schedule was provided on November 2, 2010.

The schedule for a technically correct and complete response to 16 of the remaining 61 questions was revised November 22, 2010 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided technically correct and complete FINAL responses to 11 of the remaining 61 questions on December 22, 2010, as committed.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised January 12, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 5 of the remaining 50 questions was revised January 13, 2011 to allow additional time for AREVA NP to address NRC comments.

The schedule for a technically correct and complete response to 3 of the remaining 50 questions was revised January 27, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 8, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 10, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 16 of the remaining 50 questions was revised February 17, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 18 of the remaining 50 questions was revised with Supplement 12 on March 16, 2011 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided a technically correct and complete FINAL response to 1 of the remaining 50 questions with Supplement 13 on March 24, 2011, as committed.



AREVA NP provided technically correct and complete FINAL responses to 8 of the remaining 49 questions with Supplement 14 on March 30, 2011, as committed.

The schedule for a technically correct and complete response to 32 of the remaining 41 questions was revised with Supplement 15 on March 31, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 6 of the remaining 41 questions was revised with Supplement 16 on April 13, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 3 of the remaining 41 questions was revised with Supplement 17 on April 20, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response for 29 of the remaining 41 questions as shown in bold, is revised to allow additional time for AREVA NP to interact with the NRC. The schedule for the remaining questions is unchanged.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-82	June 15, 2011
<b>RAI 422 — 03.09.02-84</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-85</b>	<b>June 15, 2011</b>
RAI 422 — 03.09.02-87	June 1, 2011
RAI 422 — 03.09.02-88	June 1, 2011
RAI 422 — 03.09.02-90	June 1, 2011
RAI 422 — 03.09.02-94	June 1, 2011
RAI 422 — 03.09.02-98	June 15, 2011
<b>RAI 422 — 03.09.02-99</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-100</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-101</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-102</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-103</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-104</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-105</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-106</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-107</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-108</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-109</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-110</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-111</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-112</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-113</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-114</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-115</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-116</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-117</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-118</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-119</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-120</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-121</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-122</b>	<b>June 15, 2011</b>
<b>RAI 422 — 03.09.02-123</b>	<b>June 15, 2011</b>
RAI 422 — 03.09.02-124	June 1, 2011
RAI 422 — 03.09.02-127	June 1, 2011

Question #	Response Date
<b>RAI 422 — 03.09.02-131</b>	<b>June 15, 2011</b>
RAI 422 — 03.09.02-134	June 1, 2011
RAI 422 — 03.09.02-138	June 1, 2011
RAI 422 — 03.09.02-140	June 1, 2011
<b>RAI 422 — 03.09.02-144</b>	<b>June 15, 2011</b>
RAI 422 — 03.09.02-145	June 15, 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*

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*434-942-6375 (cell)*

*Fax: 434-382-3884*

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

---

**From:** WELLS Russell (RS/NB)

**Sent:** Wednesday, April 20, 2011 6:32 AM

**To:** 'Tesfaye, Getachew'

**Cc:** HAMMOND Philip (RS/PT); BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB)

**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 17

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 422 on September 2, 2010, noting that the schedule for 61 of the 63 questions was being further evaluated with additional schedule information to be provided by October 4, 2010.

AREVA NP provided technically correct and complete FINAL responses to 2 of the remaining 63 questions on September 9, 2010, as committed.

The schedule for a technically correct and complete response to the remaining 61 questions was revised based on the additional evaluations performed since the initial schedule was provided on September 2, 2010. This revised schedule was provided on September 27, 2010.

The schedule for a technically correct and complete response to 6 of the remaining 61 questions was revised based on additional evaluations performed since the revised schedule was provided on September 27, 2010. This revised schedule was provided on November 2, 2010.

The schedule for a technically correct and complete response to 16 of the remaining 61 questions was revised November 22, 2010 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided technically correct and complete FINAL responses to 11 of the remaining 61 questions on December 22, 2010, as committed.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised January 12, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 5 of the remaining 50 questions was revised January 13, 2011 to allow additional time for AREVA NP to address NRC comments.

The schedule for a technically correct and complete response to 3 of the remaining 50 questions was revised January 27, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 8, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 10, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 16 of the remaining 50 questions was revised February 17, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 18 of the remaining 50 questions was revised with Supplement 12 on March 16, 2011 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided a technically correct and complete FINAL response to 1 of the remaining 50 questions with Supplement 13 on March 24, 2011, as committed.

AREVA NP provided technically correct and complete FINAL responses to 8 of the remaining 49 questions with Supplement 14 on March 30, 2011, as committed.

The schedule for a technically correct and complete response to 32 of the remaining 41 questions was revised with Supplement 15 on March 31, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 6 of the remaining 41 questions was revised with Supplement 16 on April 13, 2011 to allow additional time for AREVA NP to interact with the NRC and is provided below.

The schedule for a technically correct and complete response to 3 of the remaining 41 questions, as shown in bold, is revised to allow additional time for AREVA NP to interact with the NRC and is provided below. The schedule for the remaining questions is unchanged.

<b>Question #</b>	<b>Response Date</b>
<b>RAI 422 — 03.09.02-82</b>	<b>June 15, 2011</b>
RAI 422 — 03.09.02-84	May 12, 2011
RAI 422 — 03.09.02-85	May 12, 2011
RAI 422 — 03.09.02-87	June 1, 2011
RAI 422 — 03.09.02-88	June 1, 2011
RAI 422 — 03.09.02-90	June 1, 2011
RAI 422 — 03.09.02-94	June 1, 2011
<b>RAI 422 — 03.09.02-98</b>	<b>June 15, 2011</b>
RAI 422 — 03.09.02-99	May 12, 2011
RAI 422 — 03.09.02-100	May 12, 2011
RAI 422 — 03.09.02-101	May 12, 2011
RAI 422 — 03.09.02-102	May 12, 2011
RAI 422 — 03.09.02-103	May 12, 2011
RAI 422 — 03.09.02-104	May 12, 2011
RAI 422 — 03.09.02-105	May 12, 2011

Question #	Response Date
RAI 422 — 03.09.02-106	May 12, 2011
RAI 422 — 03.09.02-107	May 12, 2011
RAI 422 — 03.09.02-108	May 12, 2011
RAI 422 — 03.09.02-109	May 12, 2011
RAI 422 — 03.09.02-110	May 12, 2011
RAI 422 — 03.09.02-111	May 12, 2011
RAI 422 — 03.09.02-112	May 12, 2011
RAI 422 — 03.09.02-113	May 12, 2011
RAI 422 — 03.09.02-114	May 12, 2011
RAI 422 — 03.09.02-115	May 12, 2011
RAI 422 — 03.09.02-116	May 12, 2011
RAI 422 — 03.09.02-117	May 12, 2011
RAI 422 — 03.09.02-118	May 12, 2011
RAI 422 — 03.09.02-119	May 12, 2011
RAI 422 — 03.09.02-120	May 12, 2011
RAI 422 — 03.09.02-121	May 12, 2011
RAI 422 — 03.09.02-122	May 12, 2011
RAI 422 — 03.09.02-123	May 12, 2011
RAI 422 — 03.09.02-124	June 1, 2011
RAI 422 — 03.09.02-127	June 1, 2011
RAI 422 — 03.09.02-131	May 12, 2011
RAI 422 — 03.09.02-134	June 1, 2011
RAI 422 — 03.09.02-138	June 1, 2011
RAI 422 — 03.09.02-140	June 1, 2011
RAI 422 — 03.09.02-144	May 12, 2011
<b>RAI 422 — 03.09.02-145</b>	<b>June 15, 2011</b>

*Sincerely,*

*Russ Wells*

*U.S. EPR Design Certification Licensing Manager*

**AREVA NP, Inc.**

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*Fax: 434-382-3884*

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

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**From:** WELLS Russell (RS/NB)

**Sent:** Wednesday, April 13, 2011 6:09 PM

**To:** 'Tefaye, Getachew'

**Cc:** HAMMOND Philip (RS/PT); BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB)

**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 16

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 422 on September 2, 2010, noting that the schedule for 61 of the 63 questions was being further evaluated with additional schedule information to be provided by October 4, 2010.

AREVA NP provided technically correct and complete FINAL responses to 2 of the remaining 63 questions on September 9, 2010, as committed.

The schedule for a technically correct and complete response to the remaining 61 questions was revised based on the additional evaluations performed since the initial schedule was provided on September 2, 2010. This revised schedule was provided on September 27, 2010.

The schedule for a technically correct and complete response to 6 of the remaining 61 questions was revised based on additional evaluations performed since the revised schedule was provided on September 27, 2010. This revised schedule was provided on November 2, 2010.

The schedule for a technically correct and complete response to 16 of the remaining 61 questions was revised November 22, 2010 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided technically correct and complete FINAL responses to 11 of the remaining 61 questions on December 22, 2010, as committed.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised January 12, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 5 of the remaining 50 questions was revised January 13, 2011 to allow additional time for AREVA NP to address NRC comments.

The schedule for a technically correct and complete response to 3 of the remaining 50 questions was revised January 27, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 8, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 10, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 16 of the remaining 50 questions was revised February 17, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 18 of the remaining 50 questions was revised with Supplement 12 on March 16, 2011 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided a technically correct and complete FINAL response to 1 of the remaining 50 questions with Supplement 13 on March 24, 2011, as committed.

AREVA NP provided technically correct and complete FINAL responses to 8 of the remaining 49 questions with Supplement 14 on March 30, 2011, as committed.

The schedule for a technically correct and complete response to 32 of the remaining 41 questions was revised with Supplement 15 on March 31, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 6 of the remaining 41 questions, as shown in bold, is revised to allow additional time for AREVA NP to interact with the NRC and is provided below. The schedule for the remaining questions is unchanged.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-82	May 5, 2011
RAI 422 — 03.09.02-84	May 12, 2011
RAI 422 — 03.09.02-85	May 12, 2011
RAI 422 — 03.09.02-87	<b>June 1, 2011</b>
RAI 422 — 03.09.02-88	<b>June 1, 2011</b>
RAI 422 — 03.09.02-90	June 1, 2011
RAI 422 — 03.09.02-94	June 1, 2011
RAI 422 — 03.09.02-98	May 5, 2011
RAI 422 — 03.09.02-99	May 12, 2011
RAI 422 — 03.09.02-100	May 12, 2011
RAI 422 — 03.09.02-101	May 12, 2011
RAI 422 — 03.09.02-102	May 12, 2011
RAI 422 — 03.09.02-103	May 12, 2011
RAI 422 — 03.09.02-104	May 12, 2011
RAI 422 — 03.09.02-105	May 12, 2011
RAI 422 — 03.09.02-106	May 12, 2011
RAI 422 — 03.09.02-107	May 12, 2011
RAI 422 — 03.09.02-108	May 12, 2011
RAI 422 — 03.09.02-109	May 12, 2011
RAI 422 — 03.09.02-110	May 12, 2011
RAI 422 — 03.09.02-111	May 12, 2011
RAI 422 — 03.09.02-112	May 12, 2011
RAI 422 — 03.09.02-113	May 12, 2011
RAI 422 — 03.09.02-114	May 12, 2011
RAI 422 — 03.09.02-115	May 12, 2011
RAI 422 — 03.09.02-116	May 12, 2011
RAI 422 — 03.09.02-117	May 12, 2011
RAI 422 — 03.09.02-118	May 12, 2011
RAI 422 — 03.09.02-119	May 12, 2011
RAI 422 — 03.09.02-120	May 12, 2011
RAI 422 — 03.09.02-121	May 12, 2011
RAI 422 — 03.09.02-122	May 12, 2011
RAI 422 — 03.09.02-123	May 12, 2011
RAI 422 — 03.09.02-124	<b>June 1, 2011</b>
RAI 422 — 03.09.02-127	<b>June 1, 2011</b>
RAI 422 — 03.09.02-131	May 12, 2011
RAI 422 — 03.09.02-134	<b>June 1, 2011</b>
RAI 422 — 03.09.02-138	June 1, 2011
RAI 422 — 03.09.02-140	<b>June 1, 2011</b>
RAI 422 — 03.09.02-144	May 12, 2011
RAI 422 — 03.09.02-145	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*

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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:** Thursday, March 31, 2011 9:37 AM  
**To:** 'Tefaye, Getachew'  
**Cc:** HAMMOND Philip (RS/PT); BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 15

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 422 on September 2, 2010, noting that the schedule for 61 of the 63 questions was being further evaluated with additional schedule information to be provided by October 4, 2010.

AREVA NP provided technically correct and complete FINAL responses to 2 of the remaining 63 questions on September 9, 2010, as committed.

The schedule for a technically correct and complete response to the remaining 61 questions was revised based on the additional evaluations performed since the initial schedule was provided on September 2, 2010. This revised schedule was provided on September 27, 2010.

The schedule for a technically correct and complete response to 6 of the remaining 61 questions was revised based on additional evaluations performed since the revised schedule was provided on September 27, 2010. This revised schedule was provided on November 2, 2010.

The schedule for a technically correct and complete response to 16 of the remaining 61 questions was revised November 22, 2010 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided technically correct and complete FINAL responses to 11 of the remaining 61 questions on December 22, 2010, as committed.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised January 12, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 5 of the remaining 50 questions was revised January 13, 2011 to allow additional time for AREVA NP to address NRC comments.

The schedule for a technically correct and complete response to 3 of the remaining 50 questions was revised January 27, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 8, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 10, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 16 of the remaining 50 questions was revised February 17, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 18 of the remaining 50 questions was revised with Supplement 12 on March 16, 2011 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided a technically correct and complete FINAL response to 1 of the remaining 50 questions with Supplement 13 on March 24, 2011, as committed.

AREVA NP provided technically correct and complete FINAL responses to 8 of the remaining 49 questions with Supplement 14 on March 30, 2011, as committed.

The schedule for a technically correct and complete response to 32 of the remaining 41 questions, as shown in bold, is revised to allow additional time for AREVA NP to interact with the NRC and is provided below. The schedule for the remaining questions is unchanged.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-82	May 5, 2011
RAI 422 — 03.09.02-84	<b>May 12, 2011</b>
RAI 422 — 03.09.02-85	<b>May 12, 2011</b>
RAI 422 — 03.09.02-87	April 28, 2011
RAI 422 — 03.09.02-88	April 28, 2011
RAI 422 — 03.09.02-90	<b>June 1, 2011</b>
RAI 422 — 03.09.02-94	<b>June 1, 2011</b>
RAI 422 — 03.09.02-98	May 5, 2011
RAI 422 — 03.09.02-99	<b>May 12, 2011</b>
RAI 422 — 03.09.02-100	<b>May 12, 2011</b>
RAI 422 — 03.09.02-101	<b>May 12, 2011</b>
RAI 422 — 03.09.02-102	<b>May 12, 2011</b>
RAI 422 — 03.09.02-103	<b>May 12, 2011</b>
RAI 422 — 03.09.02-104	<b>May 12, 2011</b>
RAI 422 — 03.09.02-105	<b>May 12, 2011</b>
RAI 422 — 03.09.02-106	<b>May 12, 2011</b>
RAI 422 — 03.09.02-107	<b>May 12, 2011</b>
RAI 422 — 03.09.02-108	<b>May 12, 2011</b>
RAI 422 — 03.09.02-109	<b>May 12, 2011</b>
RAI 422 — 03.09.02-110	<b>May 12, 2011</b>
RAI 422 — 03.09.02-111	<b>May 12, 2011</b>
RAI 422 — 03.09.02-112	<b>May 12, 2011</b>
RAI 422 — 03.09.02-113	<b>May 12, 2011</b>
RAI 422 — 03.09.02-114	<b>May 12, 2011</b>
RAI 422 — 03.09.02-115	<b>May 12, 2011</b>
RAI 422 — 03.09.02-116	<b>May 12, 2011</b>
RAI 422 — 03.09.02-117	<b>May 12, 2011</b>
RAI 422 — 03.09.02-118	<b>May 12, 2011</b>
RAI 422 — 03.09.02-119	<b>May 12, 2011</b>
RAI 422 — 03.09.02-120	<b>May 12, 2011</b>
RAI 422 — 03.09.02-121	<b>May 12, 2011</b>
RAI 422 — 03.09.02-122	<b>May 12, 2011</b>
RAI 422 — 03.09.02-123	<b>May 12, 2011</b>
RAI 422 — 03.09.02-124	April 28, 2011
RAI 422 — 03.09.02-127	April 28, 2011
RAI 422 — 03.09.02-131	<b>May 12, 2011</b>
RAI 422 — 03.09.02-134	April 28, 2011



Question #	Response Date
RAI 422 — 03.09.02-138	June 1, 2011
RAI 422 — 03.09.02-140	April 28, 2011
RAI 422 — 03.09.02-144	May 12, 2011
RAI 422 — 03.09.02-145	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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*Fax: 434-382-3884*

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

**From:** WELLS Russell (RS/NB)

**Sent:** Wednesday, March 30, 2011 2:41 PM

**To:** Tesfaye, Getachew

**Cc:** HAMMOND Philip (RS/PT); BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB)

**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 14

Getachew,

AREVA NP Inc. letter NRC 11:033 dated March 29, 2011 provides a technically correct and complete response to 8 of the 49 remaining questions for RAI 422. AREVA NP considers some of the material contained in the response to be proprietary information. As required by 10 CFR 2.390(b), an affidavit is provided to support the withholding of the proprietary information from public disclosure. Proprietary and non-proprietary versions of the enclosure to this letter are provided separately.

The following table indicates the respective pages in the enclosure that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 422 — 03.09.02-89	2	2
RAI 422 — 03.09.02-91	3	3
RAI 422 — 03.09.02-92	4	5
RAI 422 — 03.09.02-93	6	7
RAI 422 — 03.09.02-95	8	9
RAI 422 — 03.09.02-96	10	11
RAI 422 — 03.09.02-97	12	12
RAI 422 — 03.09.02-142	13	13

The schedule for the technically correct and complete response to the remaining 41 questions is unchanged and is provided below.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-82	May 5, 2011
RAI 422 — 03.09.02-84	April 7, 2011
RAI 422 — 03.09.02-85	April 7, 2011
RAI 422 — 03.09.02-87	April 28, 2011
RAI 422 — 03.09.02-88	April 28, 2011
RAI 422 — 03.09.02-90	April 28, 2011
RAI 422 — 03.09.02-94	April 28, 2011
RAI 422 — 03.09.02-98	May 5, 2011
RAI 422 — 03.09.02-99	April 6, 2011
RAI 422 — 03.09.02-100	April 6, 2011
RAI 422 — 03.09.02-101	April 6, 2011
RAI 422 — 03.09.02-102	April 6, 2011
RAI 422 — 03.09.02-103	April 6, 2011
RAI 422 — 03.09.02-104	April 6, 2011
RAI 422 — 03.09.02-105	April 6, 2011
RAI 422 — 03.09.02-106	April 6, 2011
RAI 422 — 03.09.02-107	April 6, 2011
RAI 422 — 03.09.02-108	April 6, 2011
RAI 422 — 03.09.02-109	April 7, 2011
RAI 422 — 03.09.02-110	April 6, 2011
RAI 422 — 03.09.02-111	April 6, 2011
RAI 422 — 03.09.02-112	April 6, 2011
RAI 422 — 03.09.02-113	April 7, 2011
RAI 422 — 03.09.02-114	April 7, 2011
RAI 422 — 03.09.02-115	April 7, 2011
RAI 422 — 03.09.02-116	April 7, 2011
RAI 422 — 03.09.02-117	April 7, 2011
RAI 422 — 03.09.02-118	April 7, 2011
RAI 422 — 03.09.02-119	April 7, 2011
RAI 422 — 03.09.02-120	April 7, 2011
RAI 422 — 03.09.02-121	April 7, 2011
RAI 422 — 03.09.02-122	April 7, 2011
RAI 422 — 03.09.02-123	April 7, 2011
RAI 422 — 03.09.02-124	April 28, 2011
RAI 422 — 03.09.02-127	April 28, 2011
RAI 422 — 03.09.02-131	April 7, 2011
RAI 422 — 03.09.02-134	April 28, 2011
RAI 422 — 03.09.02-138	April 28, 2011
RAI 422 — 03.09.02-140	April 28, 2011
RAI 422 — 03.09.02-144	April 7, 2011
RAI 422 — 03.09.02-145	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)

**From:** WELLS Russell (RS/NB)  
**Sent:** Thursday, March 24, 2011 6:01 PM  
**To:** Tesfaye, Getachew  
**Cc:** HAMMOND Philip (RS/PT); BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 13

Getachew,

AREVA NP Inc. letter NRC 11:027 dated March 24, 2011 provides a technically correct and complete response to 1 of the 50 remaining questions (i.e., 03.09.02-126) for RAI 422. AREVA NP considers some of the material contained in the response to be proprietary information. As required by 10 CFR 2.390(b), an affidavit is provided to support the withholding of the proprietary information from public disclosure. Proprietary and non-proprietary versions of the enclosure to this letter are provided separately.

The following table indicates the respective pages in the enclosure that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 422 — 03.09.02-126	2	5

The schedule for the technically correct and complete response to the remaining 49 questions is unchanged and is provided below.

Question #	Response Date
RAI 422 — 03.09.02-82	May 5, 2011
RAI 422 — 03.09.02-84	April 7, 2011
RAI 422 — 03.09.02-85	April 7, 2011
RAI 422 — 03.09.02-87	April 28, 2011
RAI 422 — 03.09.02-88	April 28, 2011
RAI 422 — 03.09.02-89	April 28, 2011
RAI 422 — 03.09.02-90	April 28, 2011
RAI 422 — 03.09.02-91	April 28, 2011
RAI 422 — 03.09.02-92	April 28, 2011
RAI 422 — 03.09.02-93	April 28, 2011
RAI 422 — 03.09.02-94	April 28, 2011
RAI 422 — 03.09.02-95	April 28, 2011
RAI 422 — 03.09.02-96	April 28, 2011
RAI 422 — 03.09.02-97	April 28, 2011
RAI 422 — 03.09.02-98	May 5, 2011
RAI 422 — 03.09.02-99	April 6, 2011
RAI 422 — 03.09.02-100	April 6, 2011
RAI 422 — 03.09.02-101	April 6, 2011

Question #	Response Date
RAI 422 — 03.09.02-102	April 6, 2011
RAI 422 — 03.09.02-103	April 6, 2011
RAI 422 — 03.09.02-104	April 6, 2011
RAI 422 — 03.09.02-105	April 6, 2011
RAI 422 — 03.09.02-106	April 6, 2011
RAI 422 — 03.09.02-107	April 6, 2011
RAI 422 — 03.09.02-108	April 6, 2011
RAI 422 — 03.09.02-109	April 7, 2011
RAI 422 — 03.09.02-110	April 6, 2011
RAI 422 — 03.09.02-111	April 6, 2011
RAI 422 — 03.09.02-112	April 6, 2011
RAI 422 — 03.09.02-113	April 7, 2011
RAI 422 — 03.09.02-114	April 7, 2011
RAI 422 — 03.09.02-115	April 7, 2011
RAI 422 — 03.09.02-116	April 7, 2011
RAI 422 — 03.09.02-117	April 7, 2011
RAI 422 — 03.09.02-118	April 7, 2011
RAI 422 — 03.09.02-119	April 7, 2011
RAI 422 — 03.09.02-120	April 7, 2011
RAI 422 — 03.09.02-121	April 7, 2011
RAI 422 — 03.09.02-122	April 7, 2011
RAI 422 — 03.09.02-123	April 7, 2011
RAI 422 — 03.09.02-124	April 28, 2011
RAI 422 — 03.09.02-127	April 28, 2011
RAI 422 — 03.09.02-131	April 7, 2011
RAI 422 — 03.09.02-134	April 28, 2011
RAI 422 — 03.09.02-138	April 28, 2011
RAI 422 — 03.09.02-140	April 28, 2011
RAI 422 — 03.09.02-142	April 28, 2011
RAI 422 — 03.09.02-144	April 7, 2011
RAI 422 — 03.09.02-145	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)*

---

**From:** WELLS Russell (RS/NB)

**Sent:** Wednesday, March 16, 2011 3:08 PM

**To:** 'Tefaye, Getachew'

**Cc:** DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); HAMMOND Philip (RS/PT)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 12

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 422 on September 2, 2010, noting that the schedule for 61 of the 63 questions was being further evaluated with additional schedule information to be provided by October 4, 2010.

AREVA NP provided technically correct and complete FINAL responses to 2 of the remaining 63 questions on September 9, 2010, as committed.

The schedule for a technically correct and complete response to the remaining 61 questions was revised based on the additional evaluations performed since the initial schedule was provided on September 2, 2010. This revised schedule was provided on September 27, 2010.

The schedule for a technically correct and complete response to 6 of the remaining 61 questions was revised based on additional evaluations performed since the revised schedule was provided on September 27, 2010. This revised schedule was provided on November 2, 2010.

The schedule for a technically correct and complete response to 16 of the remaining 61 questions was revised November 22, 2010 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided technically correct and complete FINAL responses to 11 of the remaining 61 questions on December 22, 2010, as committed.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised January 12, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 5 of the remaining 50 questions was revised January 13, 2011 to allow additional time for AREVA NP to address NRC comments.

The schedule for a technically correct and complete response to 3 of the remaining 50 questions was revised January 27, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 8, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 10, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 16 of the remaining 50 questions was revised February 17 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 18 of the remaining 50 questions is revised to allow additional time for AREVA NP to interact with the NRC and is provided below.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-87	April 28, 2011
RAI 422 — 03.09.02-88	April 28, 2011
RAI 422 — 03.09.02-89	April 28, 2011
RAI 422 — 03.09.02-90	April 28, 2011
RAI 422 — 03.09.02-91	April 28, 2011
RAI 422 — 03.09.02-92	April 28, 2011

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-93	April 28, 2011
RAI 422 — 03.09.02-94	April 28, 2011
RAI 422 — 03.09.02-95	April 28, 2011
RAI 422 — 03.09.02-96	April 28, 2011
RAI 422 — 03.09.02-97	April 28, 2011
RAI 422 — 03.09.02-124	April 28, 2011
RAI 422 — 03.09.02-126	April 28, 2011
RAI 422 — 03.09.02-127	April 28, 2011
RAI 422 — 03.09.02-134	April 28, 2011
RAI 422 — 03.09.02-138	April 28, 2011
RAI 422 — 03.09.02-140	April 28, 2011
RAI 422 — 03.09.02-142	April 28, 2011

The schedule for a technically correct and complete response to the remaining 50 questions is provided below.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-82	May 5, 2011
RAI 422 — 03.09.02-84	April 7, 2011
RAI 422 — 03.09.02-85	April 7, 2011
RAI 422 — 03.09.02-87	April 28, 2011
RAI 422 — 03.09.02-88	April 28, 2011
RAI 422 — 03.09.02-89	April 28, 2011
RAI 422 — 03.09.02-90	April 28, 2011
RAI 422 — 03.09.02-91	April 28, 2011
RAI 422 — 03.09.02-92	April 28, 2011
RAI 422 — 03.09.02-93	April 28, 2011
RAI 422 — 03.09.02-94	April 28, 2011
RAI 422 — 03.09.02-95	April 28, 2011
RAI 422 — 03.09.02-96	April 28, 2011
RAI 422 — 03.09.02-97	April 28, 2011
RAI 422 — 03.09.02-98	May 5, 2011
RAI 422 — 03.09.02-99	April 6, 2011
RAI 422 — 03.09.02-100	April 6, 2011
RAI 422 — 03.09.02-101	April 6, 2011
RAI 422 — 03.09.02-102	April 6, 2011
RAI 422 — 03.09.02-103	April 6, 2011
RAI 422 — 03.09.02-104	April 6, 2011
RAI 422 — 03.09.02-105	April 6, 2011
RAI 422 — 03.09.02-106	April 6, 2011
RAI 422 — 03.09.02-107	April 6, 2011
RAI 422 — 03.09.02-108	April 6, 2011
RAI 422 — 03.09.02-109	April 7, 2011
RAI 422 — 03.09.02-110	April 6, 2011
RAI 422 — 03.09.02-111	April 6, 2011
RAI 422 — 03.09.02-112	April 6, 2011
RAI 422 — 03.09.02-113	April 7, 2011
RAI 422 — 03.09.02-114	April 7, 2011

Question #	Response Date
RAI 422 — 03.09.02-115	April 7, 2011
RAI 422 — 03.09.02-116	April 7, 2011
RAI 422 — 03.09.02-117	April 7, 2011
RAI 422 — 03.09.02-118	April 7, 2011
RAI 422 — 03.09.02-119	April 7, 2011
RAI 422 — 03.09.02-120	April 7, 2011
RAI 422 — 03.09.02-121	April 7, 2011
RAI 422 — 03.09.02-122	April 7, 2011
RAI 422 — 03.09.02-123	April 7, 2011
RAI 422 — 03.09.02-124	April 28, 2011
RAI 422 — 03.09.02-126	April 28, 2011
RAI 422 — 03.09.02-127	April 28, 2011
RAI 422 — 03.09.02-131	April 7, 2011
RAI 422 — 03.09.02-134	April 28, 2011
RAI 422 — 03.09.02-138	April 28, 2011
RAI 422 — 03.09.02-140	April 28, 2011
RAI 422 — 03.09.02-142	April 28, 2011
RAI 422 — 03.09.02-144	April 7, 2011
RAI 422 — 03.09.02-145	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)

---

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

**Sent:** Thursday, February 17, 2011 10:23 AM

**To:** 'Tefsaye, Getachew'

**Cc:** DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); HAMMOND Philip (RS/PT)

**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 11

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 422 on September 2, 2010, noting that the schedule for 61 of the 63 questions was being further evaluated with additional schedule information to be provided by October 4, 2010.

AREVA NP provided technically correct and complete FINAL responses to 2 of the remaining 63 questions on September 9, 2010, as committed.

The schedule for a technically correct and complete response to the remaining 61 questions was revised based on the additional evaluations performed since the initial schedule was provided on September 2, 2010. This revised schedule was provided on September 27, 2010.

The schedule for a technically correct and complete response to 6 of the remaining 61 questions was revised based on additional evaluations performed since the revised schedule was provided on September 27, 2010. This revised schedule was provided on November 2, 2010.

The schedule for a technically correct and complete response to 16 of the remaining 61 questions was revised November 22, 2010 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided technically correct and complete FINAL responses to 11 of the remaining 61 questions on December 22, 2010, as committed.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised January 12, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 5 of the remaining 50 questions was revised January 13, 2011 to allow additional time for AREVA NP to address NRC comments.

The schedule for a technically correct and complete response to 3 of the remaining 50 questions was revised January 27, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 8, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 10, 2011 based on additional evaluations performed since the initial schedule was provided and is provided below.

The schedule for a technically correct and complete response to 16 of the remaining 50 questions is revised based on additional evaluations performed since the initial schedule was provided and is provided below.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-84	April 7, 2011
RAI 422 — 03.09.02-85	April 7, 2011
RAI 422 — 03.09.02-109	April 7, 2011
RAI 422 — 03.09.02-113	April 7, 2011
RAI 422 — 03.09.02-114	April 7, 2011
RAI 422 — 03.09.02-115	April 7, 2011
RAI 422 — 03.09.02-116	April 7, 2011
RAI 422 — 03.09.02-117	April 7, 2011
RAI 422 — 03.09.02-118	April 7, 2011
RAI 422 — 03.09.02-119	April 7, 2011
RAI 422 — 03.09.02-120	April 7, 2011
RAI 422 — 03.09.02-121	April 7, 2011
RAI 422 — 03.09.02-122	April 7, 2011
RAI 422 — 03.09.02-123	April 7, 2011
RAI 422 — 03.09.02-131	April 7, 2011
RAI 422 — 03.09.02-144	April 7, 2011

The schedule for a technically correct and complete response to the remaining 50 questions (including the information above) is provided below.



<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-82	May 5, 2011
RAI 422 — 03.09.02-84	April 7, 2011
RAI 422 — 03.09.02-85	April 7, 2011
RAI 422 — 03.09.02-87	March 24, 2011
RAI 422 — 03.09.02-88	March 24, 2011
RAI 422 — 03.09.02-89	March 24, 2011
RAI 422 — 03.09.02-90	March 24, 2011
RAI 422 — 03.09.02-91	March 24, 2011
RAI 422 — 03.09.02-92	March 24, 2011
RAI 422 — 03.09.02-93	March 24, 2011
RAI 422 — 03.09.02-94	March 24, 2011
RAI 422 — 03.09.02-95	March 24, 2011
RAI 422 — 03.09.02-96	March 24, 2011
RAI 422 — 03.09.02-97	March 24, 2011
RAI 422 — 03.09.02-98	May 5, 2011
RAI 422 — 03.09.02-99	April 6, 2011
RAI 422 — 03.09.02-100	April 6, 2011
RAI 422 — 03.09.02-101	April 6, 2011
RAI 422 — 03.09.02-102	April 6, 2011
RAI 422 — 03.09.02-103	April 6, 2011
RAI 422 — 03.09.02-104	April 6, 2011
RAI 422 — 03.09.02-105	April 6, 2011
RAI 422 — 03.09.02-106	April 6, 2011
RAI 422 — 03.09.02-107	April 6, 2011
RAI 422 — 03.09.02-108	April 6, 2011
RAI 422 — 03.09.02-109	April 7, 2011
RAI 422 — 03.09.02-110	April 6, 2011
RAI 422 — 03.09.02-111	April 6, 2011
RAI 422 — 03.09.02-112	April 6, 2011
RAI 422 — 03.09.02-113	April 7, 2011
RAI 422 — 03.09.02-114	April 7, 2011
RAI 422 — 03.09.02-115	April 7, 2011
RAI 422 — 03.09.02-116	April 7, 2011
RAI 422 — 03.09.02-117	April 7, 2011
RAI 422 — 03.09.02-118	April 7, 2011
RAI 422 — 03.09.02-119	April 7, 2011
RAI 422 — 03.09.02-120	April 7, 2011
RAI 422 — 03.09.02-121	April 7, 2011
RAI 422 — 03.09.02-122	April 7, 2011
RAI 422 — 03.09.02-123	April 7, 2011
RAI 422 — 03.09.02-124	March 23, 2011
RAI 422 — 03.09.02-126	March 23, 2011
RAI 422 — 03.09.02-127	March 23, 2011
RAI 422 — 03.09.02-131	April 7, 2011
RAI 422 — 03.09.02-134	March 23, 2011
RAI 422 — 03.09.02-138	March 24, 2011
RAI 422 — 03.09.02-140	March 23, 2011
RAI 422 — 03.09.02-142	March 24, 2011

Question #	Response Date
RAI 422 — 03.09.02-144	April 7, 2011
RAI 422 — 03.09.02-145	May 5, 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)

---

**From:** BRYAN Martin (External RS/NB)  
**Sent:** Thursday, February 10, 2011 9:06 AM  
**To:** 'Tesfaye, Getachew'  
**Cc:** DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); HAMMOND Philip (RS/PT)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 10

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 422 on September 2, 2010, noting that the schedule for 61 of the 63 questions was being further evaluated with additional schedule information to be provided by October 4, 2010.

AREVA NP provided technically correct and complete FINAL responses to 2 of the remaining 63 questions on September 9, 2010, as committed.

The schedule for a technically correct and complete response to the remaining 61 questions was revised based on the additional evaluations performed since the initial schedule was provided on September 2, 2010. This revised schedule was provided on September 27, 2010.

The schedule for a technically correct and complete response to 6 of the remaining 61 questions was revised based on additional evaluations performed since the revised schedule was provided on September 27, 2010. This revised schedule was provided on November 2, 2010.

The schedule for a technically correct and complete response to 16 of the remaining 61 questions was revised November 22, 2010 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided technically correct and complete FINAL responses to 11 of the remaining 61 questions on December 22, 2010, as committed.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised January 12, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 5 of the remaining 50 questions was revised January 13, 2011 to allow additional time for AREVA NP to address NRC comments.

The schedule for a technically correct and complete response to 3 of the remaining 50 questions was revised January 27, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised February 8, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions is revised based on additional evaluations performed since the initial schedule was provided and is provided below.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-99	April 6, 2011
RAI 422 — 03.09.02-100	April 6, 2011
RAI 422 — 03.09.02-101	April 6, 2011
RAI 422 — 03.09.02-102	April 6, 2011
RAI 422 — 03.09.02-103	April 6, 2011
RAI 422 — 03.09.02-104	April 6, 2011
RAI 422 — 03.09.02-105	April 6, 2011
RAI 422 — 03.09.02-106	April 6, 2011
RAI 422 — 03.09.02-107	April 6, 2011
RAI 422 — 03.09.02-108	April 6, 2011
RAI 422 — 03.09.02-110	April 6, 2011
RAI 422 — 03.09.02-111	April 6, 2011
RAI 422 — 03.09.02-112	April 6, 2011

The schedule for a technically correct and complete response to the remaining 50 questions is provided below.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-82	May 5, 2011
RAI 422 — 03.09.02-84	February 24, 2011
RAI 422 — 03.09.02-85	February 24, 2011
RAI 422 — 03.09.02-87	March 24, 2011
RAI 422 — 03.09.02-88	March 24, 2011
RAI 422 — 03.09.02-89	March 24, 2011
RAI 422 — 03.09.02-90	March 24, 2011
RAI 422 — 03.09.02-91	March 24, 2011
RAI 422 — 03.09.02-92	March 24, 2011
RAI 422 — 03.09.02-93	March 24, 2011
RAI 422 — 03.09.02-94	March 24, 2011
RAI 422 — 03.09.02-95	March 24, 2011
RAI 422 — 03.09.02-96	March 24, 2011
RAI 422 — 03.09.02-97	March 24, 2011
RAI 422 — 03.09.02-98	May 5, 2011
RAI 422 — 03.09.02-99	April 6, 2011
RAI 422 — 03.09.02-100	April 6, 2011
RAI 422 — 03.09.02-101	April 6, 2011
RAI 422 — 03.09.02-102	April 6, 2011
RAI 422 — 03.09.02-103	April 6, 2011
RAI 422 — 03.09.02-104	April 6, 2011
RAI 422 — 03.09.02-105	April 6, 2011

Question #	Response Date
RAI 422 — 03.09.02-106	April 6, 2011
RAI 422 — 03.09.02-107	April 6, 2011
RAI 422 — 03.09.02-108	April 6, 2011
RAI 422 — 03.09.02-109	February 24, 2011
RAI 422 — 03.09.02-110	April 6, 2011
RAI 422 — 03.09.02-111	April 6, 2011
RAI 422 — 03.09.02-112	April 6, 2011
RAI 422 — 03.09.02-113	February 24, 2011
RAI 422 — 03.09.02-114	February 24, 2011
RAI 422 — 03.09.02-115	February 24, 2011
RAI 422 — 03.09.02-116	February 24, 2011
RAI 422 — 03.09.02-117	February 24, 2011
RAI 422 — 03.09.02-118	February 24, 2011
RAI 422 — 03.09.02-119	February 24, 2011
RAI 422 — 03.09.02-120	February 24, 2011
RAI 422 — 03.09.02-121	February 24, 2011
RAI 422 — 03.09.02-122	February 24, 2011
RAI 422 — 03.09.02-123	February 24, 2011
RAI 422 — 03.09.02-124	March 23, 2011
RAI 422 — 03.09.02-126	March 23, 2011
RAI 422 — 03.09.02-127	March 23, 2011
RAI 422 — 03.09.02-131	February 24, 2011
RAI 422 — 03.09.02-134	March 23, 2011
RAI 422 — 03.09.02-138	March 24, 2011
RAI 422 — 03.09.02-140	March 23, 2011
RAI 422 — 03.09.02-142	March 24, 2011
RAI 422 — 03.09.02-144	February 24, 2011
RAI 422 — 03.09.02-145	May 5, 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)

---

**From:** BRYAN Martin (External RS/NB)  
**Sent:** Tuesday, February 08, 2011 11:19 AM  
**To:** Tesfaye, Getachew  
**Cc:** DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); HAMMOND Philip (RS/PT)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 9

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 422 on September 2, 2010, noting that the schedule for 61 of the 63 questions was being further evaluated with additional schedule information to be provided by October 4, 2010.

AREVA NP provided technically correct and complete FINAL responses to 2 of the remaining 63 questions on September 9, 2010, as committed.

The schedule for a technically correct and complete response to the remaining 61 questions was revised based on the additional evaluations performed since the initial schedule was provided on September 2, 2010. This revised schedule was provided on September 27, 2010.

The schedule for a technically correct and complete response to 6 of the remaining 61 questions was revised based on additional evaluations performed since the revised schedule was provided on September 27, 2010. This revised schedule was provided on November 2, 2010.

The schedule for a technically correct and complete response to 16 of the remaining 61 questions was revised November 22, 2010 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided technically correct and complete FINAL responses to 11 of the remaining 61 questions on December 22, 2010, as committed.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised January 12, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 5 of the remaining 50 questions was revised January 13, 2011 to allow additional time for AREVA NP to address NRC comments.

The schedule for a technically correct and complete response to 3 of the remaining 50 questions was revised January 27, 2011 based on additional evaluations performed since the initial schedule was provided.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions is revised to allow additional time for AREVA NP to interact with the NRC and is provided below.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-87	March 24, 2011
RAI 422 — 03.09.02-88	March 24, 2011
RAI 422 — 03.09.02-89	March 24, 2011
RAI 422 — 03.09.02-90	March 24, 2011
RAI 422 — 03.09.02-91	March 24, 2011
RAI 422 — 03.09.02-92	March 24, 2011
RAI 422 — 03.09.02-93	March 24, 2011
RAI 422 — 03.09.02-94	March 24, 2011
RAI 422 — 03.09.02-95	March 24, 2011
RAI 422 — 03.09.02-96	March 24, 2011
RAI 422 — 03.09.02-97	March 24, 2011
RAI 422 — 03.09.02-138	March 24, 2011
RAI 422 — 03.09.02-142	March 24, 2011

The schedule for a technically correct and complete response to the remaining 50 questions (including the information above) is provided below.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-82	May 5, 2011
RAI 422 — 03.09.02-84	February 24, 2011
RAI 422 — 03.09.02-85	February 24, 2011
RAI 422 — 03.09.02-87	March 24, 2011
RAI 422 — 03.09.02-88	March 24, 2011
RAI 422 — 03.09.02-89	March 24, 2011
RAI 422 — 03.09.02-90	March 24, 2011
RAI 422 — 03.09.02-91	March 24, 2011
RAI 422 — 03.09.02-92	March 24, 2011
RAI 422 — 03.09.02-93	March 24, 2011
RAI 422 — 03.09.02-94	March 24, 2011
RAI 422 — 03.09.02-95	March 24, 2011
RAI 422 — 03.09.02-96	March 24, 2011
RAI 422 — 03.09.02-97	March 24, 2011
RAI 422 — 03.09.02-98	May 5, 2011
RAI 422 — 03.09.02-99	February 15, 2011
RAI 422 — 03.09.02-100	February 15, 2011
RAI 422 — 03.09.02-101	February 15, 2011
RAI 422 — 03.09.02-102	February 15, 2011
RAI 422 — 03.09.02-103	February 15, 2011
RAI 422 — 03.09.02-104	February 15, 2011
RAI 422 — 03.09.02-105	February 15, 2011
RAI 422 — 03.09.02-106	February 15, 2011
RAI 422 — 03.09.02-107	February 15, 2011
RAI 422 — 03.09.02-108	February 15, 2011
RAI 422 — 03.09.02-109	February 24, 2011
RAI 422 — 03.09.02-110	February 15, 2011
RAI 422 — 03.09.02-111	February 15, 2011
RAI 422 — 03.09.02-112	February 15, 2011
RAI 422 — 03.09.02-113	February 24, 2011
RAI 422 — 03.09.02-114	February 24, 2011
RAI 422 — 03.09.02-115	February 24, 2011
RAI 422 — 03.09.02-116	February 24, 2011
RAI 422 — 03.09.02-117	February 24, 2011
RAI 422 — 03.09.02-118	February 24, 2011
RAI 422 — 03.09.02-119	February 24, 2011
RAI 422 — 03.09.02-120	February 24, 2011
RAI 422 — 03.09.02-121	February 24, 2011
RAI 422 — 03.09.02-122	February 24, 2011
RAI 422 — 03.09.02-123	February 24, 2011
RAI 422 — 03.09.02-124	March 23, 2011
RAI 422 — 03.09.02-126	March 23, 2011
RAI 422 — 03.09.02-127	March 23, 2011
RAI 422 — 03.09.02-131	February 24, 2011
RAI 422 — 03.09.02-134	March 23, 2011
RAI 422 — 03.09.02-138	March 24, 2011
RAI 422 — 03.09.02-140	March 23, 2011
RAI 422 — 03.09.02-142	March 24, 2011
RAI 422 — 03.09.02-144	February 24, 2011

Question #	Response Date
RAI 422 — 03.09.02-145	May 5, 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:** Thursday, January 27, 2011 11:41 AM  
**To:** 'Tesfaye, Getachew'  
**Cc:** DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); HAMMOND Philip (RS/PT)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 8

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 422 on September 2, 2010, noting that the schedule for 61 of the 63 questions was being further evaluated with additional schedule information to be provided by October 4, 2010.

AREVA NP provided technically correct and complete FINAL responses to 2 of the remaining 63 questions on September 9, 2010, as committed.

The schedule for a technically correct and complete response to the remaining 61 questions was revised based on the additional evaluations performed since the initial schedule was provided on September 2, 2010. This revised schedule was provided on September 27, 2010.

The schedule for a technically correct and complete response to 6 of the remaining 61 questions was revised based on additional evaluations performed since the revised schedule was provided on September 27, 2010. This revised schedule was provided on November 2, 2010.

The schedule for a technically correct and complete response to 16 of the remaining 61 questions was revised November 22, 2010 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided technically correct and complete FINAL responses to 11 of the remaining 61 questions on December 22, 2010, as committed.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised January 12, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 5 of the remaining 50 questions was revised January 13, 2011 to allow additional time for AREVA NP to address NRC comments.

The schedule for a technically correct and complete response to 3 of the remaining 50 questions is revised based on additional evaluations performed since the initial schedule was provided and is provided below.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-82	May 5, 2011
RAI 422 — 03.09.02-98	May 5, 2011
RAI 422 — 03.09.02-145	May 5, 2011

The schedule for a technically correct and complete response to the remaining 50 questions is provided below.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-82	May 5, 2011
RAI 422 — 03.09.02-84	February 24, 2011
RAI 422 — 03.09.02-85	February 24, 2011
RAI 422 — 03.09.02-87	February 16, 2011
RAI 422 — 03.09.02-88	February 16, 2011
RAI 422 — 03.09.02-89	February 16, 2011
RAI 422 — 03.09.02-90	February 16, 2011
RAI 422 — 03.09.02-91	February 16, 2011
RAI 422 — 03.09.02-92	February 16, 2011
RAI 422 — 03.09.02-93	February 16, 2011
RAI 422 — 03.09.02-94	February 16, 2011
RAI 422 — 03.09.02-95	February 16, 2011
RAI 422 — 03.09.02-96	February 16, 2011
RAI 422 — 03.09.02-97	February 16, 2011
RAI 422 — 03.09.02-98	May 5, 2011
RAI 422 — 03.09.02-99	February 15, 2011
RAI 422 — 03.09.02-100	February 15, 2011
RAI 422 — 03.09.02-101	February 15, 2011
RAI 422 — 03.09.02-102	February 15, 2011
RAI 422 — 03.09.02-103	February 15, 2011
RAI 422 — 03.09.02-104	February 15, 2011
RAI 422 — 03.09.02-105	February 15, 2011
RAI 422 — 03.09.02-106	February 15, 2011
RAI 422 — 03.09.02-107	February 15, 2011
RAI 422 — 03.09.02-108	February 15, 2011
RAI 422 — 03.09.02-109	February 24, 2011
RAI 422 — 03.09.02-110	February 15, 2011
RAI 422 — 03.09.02-111	February 15, 2011
RAI 422 — 03.09.02-112	February 15, 2011
RAI 422 — 03.09.02-113	February 24, 2011
RAI 422 — 03.09.02-114	February 24, 2011
RAI 422 — 03.09.02-115	February 24, 2011
RAI 422 — 03.09.02-116	February 24, 2011
RAI 422 — 03.09.02-117	February 24, 2011
RAI 422 — 03.09.02-118	February 24, 2011
RAI 422 — 03.09.02-119	February 24, 2011
RAI 422 — 03.09.02-120	February 24, 2011
RAI 422 — 03.09.02-121	February 24, 2011
RAI 422 — 03.09.02-122	February 24, 2011
RAI 422 — 03.09.02-123	February 24, 2011



Question #	Response Date
RAI 422 — 03.09.02-124	March 23, 2011
RAI 422 — 03.09.02-126	March 23, 2011
RAI 422 — 03.09.02-127	March 23, 2011
RAI 422 — 03.09.02-131	February 24, 2011
RAI 422 — 03.09.02-134	March 23, 2011
RAI 422 — 03.09.02-138	February 16, 2011
RAI 422 — 03.09.02-140	March 23, 2011
RAI 422 — 03.09.02-142	February 16, 2011
RAI 422 — 03.09.02-144	February 24, 2011
RAI 422 — 03.09.02-145	May 5, 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:** Thursday, January 13, 2011 5:44 PM  
**To:** 'Tefaye, Getachew'  
**Cc:** DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); HAMMOND Philip (RS/PT)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 7

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 422 on September 2, 2010, noting that the schedule for 61 of the 63 questions was being further evaluated with additional schedule information to be provided by October 4, 2010.

AREVA NP provided technically correct and complete FINAL responses to 2 of the remaining 63 questions on September 9, 2010, as committed.

The schedule for a technically correct and complete response to the remaining 61 questions was revised based on the additional evaluations performed since the initial schedule was provided on September 2, 2010. This revised schedule was provided on September 27, 2010.

The schedule for a technically correct and complete response to 6 of the remaining 61 questions was revised based on additional evaluations performed since the revised schedule was provided on September 27, 2010. This revised schedule was provided on November 2, 2010.

The schedule for a technically correct and complete response to 16 of the remaining 61 questions was revised November 22, 2010 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided technically correct and complete FINAL responses to 11 of the remaining 61 questions on December 22, 2010, as committed.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions was revised January 12, 2011 to allow additional time for AREVA NP to interact with the NRC.

The schedule for a technically correct and complete response to 5 of the remaining 50 questions is revised to allow additional time for AREVA NP to address NRC comments and is provided below.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-124	March 23, 2011
RAI 422 — 03.09.02-126	March 23, 2011
RAI 422 — 03.09.02-127	March 23, 2011
RAI 422 — 03.09.02-134	March 23, 2011
RAI 422 — 03.09.02-140	March 23, 2011

The schedule for a technically correct and complete response to the remaining 50 questions is provided below.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-82	February 24, 2011
RAI 422 — 03.09.02-84	February 24, 2011
RAI 422 — 03.09.02-85	February 24, 2011
RAI 422 — 03.09.02-87	February 16, 2011
RAI 422 — 03.09.02-88	February 16, 2011
RAI 422 — 03.09.02-89	February 16, 2011
RAI 422 — 03.09.02-90	February 16, 2011
RAI 422 — 03.09.02-91	February 16, 2011
RAI 422 — 03.09.02-92	February 16, 2011
RAI 422 — 03.09.02-93	February 16, 2011
RAI 422 — 03.09.02-94	February 16, 2011
RAI 422 — 03.09.02-95	February 16, 2011
RAI 422 — 03.09.02-96	February 16, 2011
RAI 422 — 03.09.02-97	February 16, 2011
RAI 422 — 03.09.02-98	February 24, 2011
RAI 422 — 03.09.02-99	February 15, 2011
RAI 422 — 03.09.02-100	February 15, 2011
RAI 422 — 03.09.02-101	February 15, 2011
RAI 422 — 03.09.02-102	February 15, 2011
RAI 422 — 03.09.02-103	February 15, 2011
RAI 422 — 03.09.02-104	February 15, 2011
RAI 422 — 03.09.02-105	February 15, 2011
RAI 422 — 03.09.02-106	February 15, 2011
RAI 422 — 03.09.02-107	February 15, 2011
RAI 422 — 03.09.02-108	February 15, 2011
RAI 422 — 03.09.02-109	February 24, 2011
RAI 422 — 03.09.02-110	February 15, 2011
RAI 422 — 03.09.02-111	February 15, 2011
RAI 422 — 03.09.02-112	February 15, 2011
RAI 422 — 03.09.02-113	February 24, 2011
RAI 422 — 03.09.02-114	February 24, 2011
RAI 422 — 03.09.02-115	February 24, 2011

Question #	Response Date
RAI 422 — 03.09.02-116	February 24, 2011
RAI 422 — 03.09.02-117	February 24, 2011
RAI 422 — 03.09.02-118	February 24, 2011
RAI 422 — 03.09.02-119	February 24, 2011
RAI 422 — 03.09.02-120	February 24, 2011
RAI 422 — 03.09.02-121	February 24, 2011
RAI 422 — 03.09.02-122	February 24, 2011
RAI 422 — 03.09.02-123	February 24, 2011
RAI 422 — 03.09.02-124	March 23, 2011
RAI 422 — 03.09.02-126	March 23, 2011
RAI 422 — 03.09.02-127	March 23, 2011
RAI 422 — 03.09.02-131	February 24, 2011
RAI 422 — 03.09.02-134	March 23, 2011
RAI 422 — 03.09.02-138	February 16, 2011
RAI 422 — 03.09.02-140	March 23, 2011
RAI 422 — 03.09.02-142	February 16, 2011
RAI 422 — 03.09.02-144	February 24, 2011
RAI 422 — 03.09.02-145	February 24, 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)

---

**From:** BRYAN Martin (External RS/NB)  
**Sent:** Wednesday, January 12, 2011 3:58 PM  
**To:** 'Tsfaye, Getachew'  
**Cc:** DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); HAMMOND Philip (RS/PT)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 6

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 422 on September 2, 2010, noting that the schedule for 61 of the 63 questions was being further evaluated with additional schedule information to be provided by October 4, 2010.

AREVA NP provided technically correct and complete FINAL responses to 2 of the remaining 63 questions on September 9, 2010, as committed.

The schedule for a technically correct and complete response to the remaining 61 questions was revised based on the additional evaluations performed since the initial schedule was provided on September 2, 2010. This revised schedule was provided on September 27, 2010.

The schedule for a technically correct and complete response to 6 of the remaining 61 questions was revised based on additional evaluations performed since the revised schedule was provided on September 27, 2010. This revised schedule was provided on November 2, 2010.

The schedule for a technically correct and complete response to 16 of the remaining 61 questions was revised November 22, 2010 to allow additional time for AREVA NP to interact with the NRC.

AREVA NP provided technically correct and complete FINAL responses to 11 of the remaining 61 questions on December 22, 2010, as committed.

The schedule for a technically correct and complete response to 13 of the remaining 50 questions is revised to allow additional time for AREVA NP to interact with the NRC and is provided below.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-87	February 16, 2011
RAI 422 — 03.09.02-88	February 16, 2011
RAI 422 — 03.09.02-89	February 16, 2011
RAI 422 — 03.09.02-90	February 16, 2011
RAI 422 — 03.09.02-91	February 16, 2011
RAI 422 — 03.09.02-92	February 16, 2011
RAI 422 — 03.09.02-93	February 16, 2011
RAI 422 — 03.09.02-94	February 16, 2011
RAI 422 — 03.09.02-95	February 16, 2011
RAI 422 — 03.09.02-96	February 16, 2011
RAI 422 — 03.09.02-97	February 16, 2011
RAI 422 — 03.09.02-138	February 16, 2011
RAI 422 — 03.09.02-142	February 16, 2011

The schedule for a technically correct and complete response to the remaining 50 questions is provided below.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-82	February 24, 2011
RAI 422 — 03.09.02-84	February 24, 2011
RAI 422 — 03.09.02-85	February 24, 2011
RAI 422 — 03.09.02-87	February 16, 2011
RAI 422 — 03.09.02-88	February 16, 2011
RAI 422 — 03.09.02-89	February 16, 2011
RAI 422 — 03.09.02-90	February 16, 2011
RAI 422 — 03.09.02-91	February 16, 2011
RAI 422 — 03.09.02-92	February 16, 2011
RAI 422 — 03.09.02-93	February 16, 2011
RAI 422 — 03.09.02-94	February 16, 2011
RAI 422 — 03.09.02-95	February 16, 2011
RAI 422 — 03.09.02-96	February 16, 2011
RAI 422 — 03.09.02-97	February 16, 2011
RAI 422 — 03.09.02-98	February 24, 2011
RAI 422 — 03.09.02-99	February 15, 2011
RAI 422 — 03.09.02-100	February 15, 2011
RAI 422 — 03.09.02-101	February 15, 2011
RAI 422 — 03.09.02-102	February 15, 2011
RAI 422 — 03.09.02-103	February 15, 2011
RAI 422 — 03.09.02-104	February 15, 2011
RAI 422 — 03.09.02-105	February 15, 2011

Question #	Response Date
RAI 422 — 03.09.02-106	February 15, 2011
RAI 422 — 03.09.02-107	February 15, 2011
RAI 422 — 03.09.02-108	February 15, 2011
RAI 422 — 03.09.02-109	February 24, 2011
RAI 422 — 03.09.02-110	February 15, 2011
RAI 422 — 03.09.02-111	February 15, 2011
RAI 422 — 03.09.02-112	February 15, 2011
RAI 422 — 03.09.02-113	February 24, 2011
RAI 422 — 03.09.02-114	February 24, 2011
RAI 422 — 03.09.02-115	February 24, 2011
RAI 422 — 03.09.02-116	February 24, 2011
RAI 422 — 03.09.02-117	February 24, 2011
RAI 422 — 03.09.02-118	February 24, 2011
RAI 422 — 03.09.02-119	February 24, 2011
RAI 422 — 03.09.02-120	February 24, 2011
RAI 422 — 03.09.02-121	February 24, 2011
RAI 422 — 03.09.02-122	February 24, 2011
RAI 422 — 03.09.02-123	February 24, 2011
RAI 422 — 03.09.02-124	January 20, 2011
RAI 422 — 03.09.02-126	January 20, 2011
RAI 422 — 03.09.02-127	January 20, 2011
RAI 422 — 03.09.02-131	February 24, 2011
RAI 422 — 03.09.02-134	January 20, 2011
RAI 422 — 03.09.02-138	February 16, 2011
RAI 422 — 03.09.02-140	January 20, 2011
RAI 422 — 03.09.02-142	February 16, 2011
RAI 422 — 03.09.02-144	February 24, 2011
RAI 422 — 03.09.02-145	February 24, 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)

---

**From:** BRYAN Martin (External RS/NB)  
**Sent:** Wednesday, December 22, 2010 7:28 PM  
**To:** Tesfaye, Getachew  
**Cc:** DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); HAMMOND Philip (RS/PT); 'Carneal, Jason'  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 5

Getachew,

The proprietary and non-proprietary versions of RAI 422 are submitted via AREVA NP Inc. letter, "Response to U.S. EPR Design Certification Application RAI No. 422, Supplement 5" NRC10:116, dated December 22, 2010. An

affidavit to support withholding of information from public disclosure, per 10CFR2.390(b), is provided as an enclosure to that letter.

The following table indicates the respective pages in the response that contain AREVA NP's response to 11 of the remaining 61 questions.

<b>Question #</b>	<b>Start Page</b>	<b>End Page</b>
RAI 422 — 03.09.02-125	2	3
RAI 422 — 03.09.02-128	4	5
RAI 422 — 03.09.02-129	6	7
RAI 422 — 03.09.02-130	8	9
RAI 422 — 03.09.02-132	10	12
RAI 422 — 03.09.02-133	13	13
RAI 422 — 03.09.02-135	14	15
RAI 422 — 03.09.02-136	16	18
RAI 422 — 03.09.02-137	19	19
RAI 422 — 03.09.02-139	20	22
RAI 422 — 03.09.02-141	23	25

The schedule for the technically correct and complete responses to the remaining 50 questions is unchanged and is provided below.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-82	February 24, 2011
RAI 422 — 03.09.02-84	February 24, 2011
RAI 422 — 03.09.02-85	February 24, 2011
RAI 422 — 03.09.02-87	January 12, 2011
RAI 422 — 03.09.02-88	January 12, 2011
RAI 422 — 03.09.02-89	January 12, 2011
RAI 422 — 03.09.02-90	January 12, 2011
RAI 422 — 03.09.02-91	January 12, 2011
RAI 422 — 03.09.02-92	January 12, 2011
RAI 422 — 03.09.02-93	January 12, 2011
RAI 422 — 03.09.02-94	January 12, 2011
RAI 422 — 03.09.02-95	January 12, 2011
RAI 422 — 03.09.02-96	January 12, 2011
RAI 422 — 03.09.02-97	January 12, 2011
RAI 422 — 03.09.02-98	February 24, 2011
RAI 422 — 03.09.02-99	February 15, 2011
RAI 422 — 03.09.02-100	February 15, 2011
RAI 422 — 03.09.02-101	February 15, 2011
RAI 422 — 03.09.02-102	February 15, 2011
RAI 422 — 03.09.02-103	February 15, 2011
RAI 422 — 03.09.02-104	February 15, 2011
RAI 422 — 03.09.02-105	February 15, 2011
RAI 422 — 03.09.02-106	February 15, 2011
RAI 422 — 03.09.02-107	February 15, 2011
RAI 422 — 03.09.02-108	February 15, 2011
RAI 422 — 03.09.02-109	February 24, 2011

Question #	Response Date
RAI 422 — 03.09.02-110	February 15, 2011
RAI 422 — 03.09.02-111	February 15, 2011
RAI 422 — 03.09.02-112	February 15, 2011
RAI 422 — 03.09.02-113	February 24, 2011
RAI 422 — 03.09.02-114	February 24, 2011
RAI 422 — 03.09.02-115	February 24, 2011
RAI 422 — 03.09.02-116	February 24, 2011
RAI 422 — 03.09.02-117	February 24, 2011
RAI 422 — 03.09.02-118	February 24, 2011
RAI 422 — 03.09.02-119	February 24, 2011
RAI 422 — 03.09.02-120	February 24, 2011
RAI 422 — 03.09.02-121	February 24, 2011
RAI 422 — 03.09.02-122	February 24, 2011
RAI 422 — 03.09.02-123	February 24, 2011
RAI 422 — 03.09.02-124	January 20, 2011
RAI 422 — 03.09.02-126	January 20, 2011
RAI 422 — 03.09.02-127	January 20, 2011
RAI 422 — 03.09.02-131	February 24, 2011
RAI 422 — 03.09.02-134	January 20, 2011
RAI 422 — 03.09.02-138	January 12, 2011
RAI 422 — 03.09.02-140	January 20, 2011
RAI 422 — 03.09.02-142	January 12, 2011
RAI 422 — 03.09.02-144	February 24, 2011
RAI 422 — 03.09.02-145	February 24, 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)

---

**From:** BRYAN Martin (External RS/NB)  
**Sent:** Monday, November 22, 2010 12:11 PM  
**To:** 'Tesfaye, Getachew'  
**Cc:** DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); HAMMOND Philip (RS/PT)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 4

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 422 on September 2, 2010, noting that the schedule for 61 of the 63 questions was being further evaluated with additional schedule information to be provided by October 4, 2010.

AREVA NP provided technically correct and complete FINAL responses to 2 of the remaining 63 questions on September 9, 2010, as committed.

The schedule for a technically correct and complete response to the remaining 61 questions was revised based on the additional evaluations performed since the initial schedule was provided on September 2, 2010. This revised schedule was provided on September 27, 2010.

The schedule for a technically correct and complete response to 6 of the remaining 61 questions was revised based on additional evaluations performed since the revised schedule was provided on September 27, 2010. This revised schedule was provided on November 2, 2010.

The schedule for 16 of the remaining 61 questions is being revised and provided below to allow additional time for AREVA NP to interact with the NRC.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-124	January 20, 2011
RAI 422 — 03.09.02-125	January 20, 2011
RAI 422 — 03.09.02-126	January 20, 2011
RAI 422 — 03.09.02-127	January 20, 2011
RAI 422 — 03.09.02-128	January 20, 2011
RAI 422 — 03.09.02-129	January 20, 2011
RAI 422 — 03.09.02-130	January 20, 2011
RAI 422 — 03.09.02-132	January 20, 2011
RAI 422 — 03.09.02-133	January 20, 2011
RAI 422 — 03.09.02-134	January 20, 2011
RAI 422 — 03.09.02-135	January 20, 2011
RAI 422 — 03.09.02-136	January 20, 2011
RAI 422 — 03.09.02-137	January 20, 2011
RAI 422 — 03.09.02-139	January 20, 2011
RAI 422 — 03.09.02-140	January 20, 2011
RAI 422 — 03.09.02-141	January 20, 2011

The schedule for a technically correct and complete response to the remaining 61 questions is provided below.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-82	February 24, 2011
RAI 422 — 03.09.02-84	February 24, 2011
RAI 422 — 03.09.02-85	February 24, 2011
RAI 422 — 03.09.02-87	January 12, 2011
RAI 422 — 03.09.02-88	January 12, 2011
RAI 422 — 03.09.02-89	January 12, 2011
RAI 422 — 03.09.02-90	January 12, 2011
RAI 422 — 03.09.02-91	January 12, 2011
RAI 422 — 03.09.02-92	January 12, 2011
RAI 422 — 03.09.02-93	January 12, 2011
RAI 422 — 03.09.02-94	January 12, 2011
RAI 422 — 03.09.02-95	January 12, 2011
RAI 422 — 03.09.02-96	January 12, 2011
RAI 422 — 03.09.02-97	January 12, 2011
RAI 422 — 03.09.02-98	February 24, 2011
RAI 422 — 03.09.02-99	February 15, 2011
RAI 422 — 03.09.02-100	February 15, 2011



<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-101	February 15, 2011
RAI 422 — 03.09.02-102	February 15, 2011
RAI 422 — 03.09.02-103	February 15, 2011
RAI 422 — 03.09.02-104	February 15, 2011
RAI 422 — 03.09.02-105	February 15, 2011
RAI 422 — 03.09.02-106	February 15, 2011
RAI 422 — 03.09.02-107	February 15, 2011
RAI 422 — 03.09.02-108	February 15, 2011
RAI 422 — 03.09.02-109	February 24, 2011
RAI 422 — 03.09.02-110	February 15, 2011
RAI 422 — 03.09.02-111	February 15, 2011
RAI 422 — 03.09.02-112	February 15, 2011
RAI 422 — 03.09.02-113	February 24, 2011
RAI 422 — 03.09.02-114	February 24, 2011
RAI 422 — 03.09.02-115	February 24, 2011
RAI 422 — 03.09.02-116	February 24, 2011
RAI 422 — 03.09.02-117	February 24, 2011
RAI 422 — 03.09.02-118	February 24, 2011
RAI 422 — 03.09.02-119	February 24, 2011
RAI 422 — 03.09.02-120	February 24, 2011
RAI 422 — 03.09.02-121	February 24, 2011
RAI 422 — 03.09.02-122	February 24, 2011
RAI 422 — 03.09.02-123	February 24, 2011
RAI 422 — 03.09.02-124	January 20, 2011
RAI 422 — 03.09.02-125	January 20, 2011
RAI 422 — 03.09.02-126	January 20, 2011
RAI 422 — 03.09.02-127	January 20, 2011
RAI 422 — 03.09.02-128	January 20, 2011
RAI 422 — 03.09.02-129	January 20, 2011
RAI 422 — 03.09.02-130	January 20, 2011
RAI 422 — 03.09.02-131	February 24, 2011
RAI 422 — 03.09.02-132	January 20, 2011
RAI 422 — 03.09.02-133	January 20, 2011
RAI 422 — 03.09.02-134	January 20, 2011
RAI 422 — 03.09.02-135	January 20, 2011
RAI 422 — 03.09.02-136	January 20, 2011
RAI 422 — 03.09.02-137	January 20, 2011
RAI 422 — 03.09.02-138	January 12, 2011
RAI 422 — 03.09.02-139	January 20, 2011
RAI 422 — 03.09.02-140	January 20, 2011
RAI 422 — 03.09.02-141	January 20, 2011
RAI 422 — 03.09.02-142	January 12, 2011
RAI 422 — 03.09.02-144	February 24, 2011
RAI 422 — 03.09.02-145	February 24, 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)

---

**From:** BRYAN Martin (External RS/NB)  
**Sent:** Tuesday, November 02, 2010 3:35 PM  
**To:** 'Tesfaye, Getachew'  
**Cc:** DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); HAMMOND Philip (RS/PT); CORNELL Veronica (External RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 3

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 422 on September 2, 2010, noting that the schedule for 61 of the 63 questions was being further evaluated with additional schedule information to be provided by October 4, 2010.

AREVA NP provided technically correct and complete FINAL responses to 2 of the remaining 63 questions on September 9, 2010, as committed.

The schedule for a technically correct and complete response to the remaining 61 questions was revised based on the additional evaluations performed since the initial schedule was provided on September 2, 2010. This revised schedule was provided on September 27, 2010.

The schedule for a technically correct and complete response to 6 of the remaining 61 questions is revised and provided below based on additional evaluations.

Question #	Response Date
RAI 422 — 03.09.02-82	February 24, 2011
RAI 422 — 03.09.02-84	February 24, 2011
RAI 422 — 03.09.02-85	February 24, 2011
RAI 422 — 03.09.02-98	February 24, 2011
RAI 422 — 03.09.02-144	February 24, 2011
RAI 422 — 03.09.02-145	February 24, 2011

The schedule for a technically correct and complete response to the remaining 61 questions is provided below.

Question #	Response Date
RAI 422 — 03.09.02-82	February 24, 2011
RAI 422 — 03.09.02-84	February 24, 2011
RAI 422 — 03.09.02-85	February 24, 2011
RAI 422 — 03.09.02-87	January 12, 2011
RAI 422 — 03.09.02-88	January 12, 2011
RAI 422 — 03.09.02-89	January 12, 2011
RAI 422 — 03.09.02-90	January 12, 2011
RAI 422 — 03.09.02-91	January 12, 2011
RAI 422 — 03.09.02-92	January 12, 2011
RAI 422 — 03.09.02-93	January 12, 2011
RAI 422 — 03.09.02-94	January 12, 2011

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-95	January 12, 2011
RAI 422 — 03.09.02-96	January 12, 2011
RAI 422 — 03.09.02-97	January 12, 2011
RAI 422 — 03.09.02-98	February 24, 2011
RAI 422 — 03.09.02-99	February 15, 2011
RAI 422 — 03.09.02-100	February 15, 2011
RAI 422 — 03.09.02-101	February 15, 2011
RAI 422 — 03.09.02-102	February 15, 2011
RAI 422 — 03.09.02-103	February 15, 2011
RAI 422 — 03.09.02-104	February 15, 2011
RAI 422 — 03.09.02-105	February 15, 2011
RAI 422 — 03.09.02-106	February 15, 2011
RAI 422 — 03.09.02-107	February 15, 2011
RAI 422 — 03.09.02-108	February 15, 2011
RAI 422 — 03.09.02-109	February 24, 2011
RAI 422 — 03.09.02-110	February 15, 2011
RAI 422 — 03.09.02-111	February 15, 2011
RAI 422 — 03.09.02-112	February 15, 2011
RAI 422 — 03.09.02-113	February 24, 2011
RAI 422 — 03.09.02-114	February 24, 2011
RAI 422 — 03.09.02-115	February 24, 2011
RAI 422 — 03.09.02-116	February 24, 2011
RAI 422 — 03.09.02-117	February 24, 2011
RAI 422 — 03.09.02-118	February 24, 2011
RAI 422 — 03.09.02-119	February 24, 2011
RAI 422 — 03.09.02-120	February 24, 2011
RAI 422 — 03.09.02-121	February 24, 2011
RAI 422 — 03.09.02-122	February 24, 2011
RAI 422 — 03.09.02-123	February 24, 2011
RAI 422 — 03.09.02-124	December 1, 2010
RAI 422 — 03.09.02-125	December 1, 2010
RAI 422 — 03.09.02-126	December 1, 2010
RAI 422 — 03.09.02-127	December 1, 2010
RAI 422 — 03.09.02-128	December 1, 2010
RAI 422 — 03.09.02-129	December 1, 2010
RAI 422 — 03.09.02-130	December 1, 2010
RAI 422 — 03.09.02-131	February 24, 2011
RAI 422 — 03.09.02-132	December 1, 2010
RAI 422 — 03.09.02-133	December 1, 2010
RAI 422 — 03.09.02-134	December 1, 2010
RAI 422 — 03.09.02-135	December 1, 2010
RAI 422 — 03.09.02-136	December 1, 2010
RAI 422 — 03.09.02-137	December 1, 2010
RAI 422 — 03.09.02-138	January 12, 2011
RAI 422 — 03.09.02-139	December 1, 2010
RAI 422 — 03.09.02-140	December 1, 2010
RAI 422 — 03.09.02-141	December 1, 2010
RAI 422 — 03.09.02-142	January 12, 2011
RAI 422 — 03.09.02-144	February 24, 2011
RAI 422 — 03.09.02-145	February 24, 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)

---

**From:** BRYAN Martin (External RS/NB)  
**Sent:** Monday, September 27, 2010 7:37 PM  
**To:** 'Tesfaye, Getachew'  
**Cc:** DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); HAMMOND Philip (RS/PT)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 2

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 422 on September 2, 2010, noting that the schedule for 61 of the 63 questions was being further evaluated with additional schedule information to be provided by October 4, 2010.

AREVA NP provided technically correct and complete FINAL responses to 2 of the remaining 63 questions on September 9, 2010, as committed.

The schedule for a technically correct and complete response to the remaining 61 questions is revised and provided below based on the additional evaluations performed since the initial schedule was provided on September 2, 2010.

Question #	Response Date
RAI 422 — 03.09.02-82	February 15, 2011
RAI 422 — 03.09.02-84	February 15, 2011
RAI 422 — 03.09.02-85	February 15, 2011
RAI 422 — 03.09.02-87	January 12, 2011
RAI 422 — 03.09.02-88	January 12, 2011
RAI 422 — 03.09.02-89	January 12, 2011
RAI 422 — 03.09.02-90	January 12, 2011
RAI 422 — 03.09.02-91	January 12, 2011
RAI 422 — 03.09.02-92	January 12, 2011
RAI 422 — 03.09.02-93	January 12, 2011
RAI 422 — 03.09.02-94	January 12, 2011
RAI 422 — 03.09.02-95	January 12, 2011
RAI 422 — 03.09.02-96	January 12, 2011
RAI 422 — 03.09.02-97	January 12, 2011
RAI 422 — 03.09.02-98	February 15, 2011
RAI 422 — 03.09.02-99	February 15, 2011
RAI 422 — 03.09.02-100	February 15, 2011
RAI 422 — 03.09.02-101	February 15, 2011
RAI 422 — 03.09.02-102	February 15, 2011
RAI 422 — 03.09.02-103	February 15, 2011

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-104	February 15, 2011
RAI 422 — 03.09.02-105	February 15, 2011
RAI 422 — 03.09.02-106	February 15, 2011
RAI 422 — 03.09.02-107	February 15, 2011
RAI 422 — 03.09.02-108	February 15, 2011
RAI 422 — 03.09.02-109	February 24, 2011
RAI 422 — 03.09.02-110	February 15, 2011
RAI 422 — 03.09.02-111	February 15, 2011
RAI 422 — 03.09.02-112	February 15, 2011
RAI 422 — 03.09.02-113	February 24, 2011
RAI 422 — 03.09.02-114	February 24, 2011
RAI 422 — 03.09.02-115	February 24, 2011
RAI 422 — 03.09.02-116	February 24, 2011
RAI 422 — 03.09.02-117	February 24, 2011
RAI 422 — 03.09.02-118	February 24, 2011
RAI 422 — 03.09.02-119	February 24, 2011
RAI 422 — 03.09.02-120	February 24, 2011
RAI 422 — 03.09.02-121	February 24, 2011
RAI 422 — 03.09.02-122	February 24, 2011
RAI 422 — 03.09.02-123	February 24, 2011
RAI 422 — 03.09.02-124	December 1, 2010
RAI 422 — 03.09.02-125	December 1, 2010
RAI 422 — 03.09.02-126	December 1, 2010
RAI 422 — 03.09.02-127	December 1, 2010
RAI 422 — 03.09.02-128	December 1, 2010
RAI 422 — 03.09.02-129	December 1, 2010
RAI 422 — 03.09.02-130	December 1, 2010
RAI 422 — 03.09.02-131	February 24, 2011
RAI 422 — 03.09.02-132	December 1, 2010
RAI 422 — 03.09.02-133	December 1, 2010
RAI 422 — 03.09.02-134	December 1, 2010
RAI 422 — 03.09.02-135	December 1, 2010
RAI 422 — 03.09.02-136	December 1, 2010
RAI 422 — 03.09.02-137	December 1, 2010
RAI 422 — 03.09.02-138	January 12, 2011
RAI 422 — 03.09.02-139	December 1, 2010
RAI 422 — 03.09.02-140	December 1, 2010
RAI 422 — 03.09.02-141	December 1, 2010
RAI 422 — 03.09.02-142	January 12, 2011
RAI 422 — 03.09.02-144	January 12, 2011
RAI 422 — 03.09.02-145	January 12, 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)

**From:** BRYAN Martin (External RS/NB)  
**Sent:** Thursday, September 09, 2010 11:40 AM  
**To:** Tesfaye, Getachew  
**Cc:** DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); CORNELL Veronica (External RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 1

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 422 on September 2, 2010.

The attached file, "RAI 422 Supplement 1 Response US EPR DC.pdf" provides technically correct and complete FINAL responses to 2 of the remaining 63 questions, as committed

The following table indicates the respective pages in the response document, "RAI 422 Supplement 1 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 422 — 03.09.02-86	2	2
RAI 422 — 03.09.02-143	3	5

The schedule for the technically correct and complete responses to the remaining 61 questions is unchanged and is provided below.

Question #	Response Date
RAI 422 — 03.09.02-82	October 4, 2010
RAI 422 — 03.09.02-84	October 4, 2010
RAI 422 — 03.09.02-85	October 4, 2010
RAI 422 — 03.09.02-87	October 4, 2010
RAI 422 — 03.09.02-88	October 4, 2010
RAI 422 — 03.09.02-89	October 4, 2010
RAI 422 — 03.09.02-90	October 4, 2010
RAI 422 — 03.09.02-91	October 4, 2010
RAI 422 — 03.09.02-92	October 4, 2010
RAI 422 — 03.09.02-93	October 4, 2010
RAI 422 — 03.09.02-94	October 4, 2010
RAI 422 — 03.09.02-95	October 4, 2010
RAI 422 — 03.09.02-96	October 4, 2010
RAI 422 — 03.09.02-97	October 4, 2010
RAI 422 — 03.09.02-98	October 4, 2010
RAI 422 — 03.09.02-99	October 4, 2010
RAI 422 — 03.09.02-100	October 4, 2010
RAI 422 — 03.09.02-101	October 4, 2010
RAI 422 — 03.09.02-102	October 4, 2010
RAI 422 — 03.09.02-103	October 4, 2010
RAI 422 — 03.09.02-104	October 4, 2010
RAI 422 — 03.09.02-105	October 4, 2010
RAI 422 — 03.09.02-106	October 4, 2010
RAI 422 — 03.09.02-107	October 4, 2010
RAI 422 — 03.09.02-108	October 4, 2010

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-109	October 4, 2010
RAI 422 — 03.09.02-110	October 4, 2010
RAI 422 — 03.09.02-111	October 4, 2010
RAI 422 — 03.09.02-112	October 4, 2010
RAI 422 — 03.09.02-113	October 4, 2010
RAI 422 — 03.09.02-114	October 4, 2010
RAI 422 — 03.09.02-115	October 4, 2010
RAI 422 — 03.09.02-116	October 4, 2010
RAI 422 — 03.09.02-117	October 4, 2010
RAI 422 — 03.09.02-118	October 4, 2010
RAI 422 — 03.09.02-119	October 4, 2010
RAI 422 — 03.09.02-120	October 4, 2010
RAI 422 — 03.09.02-121	October 4, 2010
RAI 422 — 03.09.02-122	October 4, 2010
RAI 422 — 03.09.02-123	October 4, 2010
RAI 422 — 03.09.02-124	October 4, 2010
RAI 422 — 03.09.02-125	October 4, 2010
RAI 422 — 03.09.02-126	October 4, 2010
RAI 422 — 03.09.02-127	October 4, 2010
RAI 422 — 03.09.02-128	October 4, 2010
RAI 422 — 03.09.02-129	October 4, 2010
RAI 422 — 03.09.02-130	October 4, 2010
RAI 422 — 03.09.02-131	October 4, 2010
RAI 422 — 03.09.02-132	October 4, 2010
RAI 422 — 03.09.02-133	October 4, 2010
RAI 422 — 03.09.02-134	October 4, 2010
RAI 422 — 03.09.02-135	October 4, 2010
RAI 422 — 03.09.02-136	October 4, 2010
RAI 422 — 03.09.02-137	October 4, 2010
RAI 422 — 03.09.02-138	October 4, 2010
RAI 422 — 03.09.02-139	October 4, 2010
RAI 422 — 03.09.02-140	October 4, 2010
RAI 422 — 03.09.02-141	October 4, 2010
RAI 422 — 03.09.02-142	October 4, 2010
RAI 422 — 03.09.02-144	October 4, 2010
RAI 422 — 03.09.02-145	October 4, 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)

---

**From:** BRYAN Martin (External RS/NB)  
**Sent:** Thursday, September 02, 2010 5:18 PM  
**To:** 'Tesfaye, Getachew'

**Cc:** DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); CORNELL Veronica (External RS/NB); Miernicki, Michael

**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 422 Response US EPR DC.pdf," provides a schedule since a technically correct and complete response to the RAI 422 questions is not provided. The schedule for questions OTHER than 03.09.02-86 and 03.09.02-143 is being further evaluated with additional information to be provided by the date listed below of October 4, 2010.

The following table indicates the respective pages in the response document, "RAI 422 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

<b>Question #</b>	<b>Start Page</b>	<b>End Page</b>
RAI 422 — 03.09.02-82	2	3
RAI 422 — 03.09.02-84	4	4
RAI 422 — 03.09.02-85	5	5
RAI 422 — 03.09.02-86	6	6
RAI 422 — 03.09.02-87	7	7
RAI 422 — 03.09.02-88	8	8
RAI 422 — 03.09.02-89	9	9
RAI 422 — 03.09.02-90	10	10
RAI 422 — 03.09.02-91	11	11
RAI 422 — 03.09.02-92	12	12
RAI 422 — 03.09.02-93	13	13
RAI 422 — 03.09.02-94	14	14
RAI 422 — 03.09.02-95	15	15
RAI 422 — 03.09.02-96	16	16
RAI 422 — 03.09.02-97	17	17
RAI 422 — 03.09.02-98	18	18
RAI 422 — 03.09.02-99	19	19
RAI 422 — 03.09.02-100	20	20
RAI 422 — 03.09.02-101	21	21
RAI 422 — 03.09.02-102	22	22
RAI 422 — 03.09.02-103	23	23
RAI 422 — 03.09.02-104	24	24
RAI 422 — 03.09.02-105	25	25
RAI 422 — 03.09.02-106	26	26
RAI 422 — 03.09.02-107	27	27
RAI 422 — 03.09.02-108	28	28
RAI 422 — 03.09.02-109	29	29
RAI 422 — 03.09.02-110	30	30
RAI 422 — 03.09.02-111	31	31
RAI 422 — 03.09.02-112	32	32
RAI 422 — 03.09.02-113	33	33
RAI 422 — 03.09.02-114	34	34
RAI 422 — 03.09.02-115	35	35
RAI 422 — 03.09.02-116	36	36
RAI 422 — 03.09.02-117	37	37
RAI 422 — 03.09.02-118	38	38
RAI 422 — 03.09.02-119	39	39



<b>Question #</b>	<b>Start Page</b>	<b>End Page</b>
RAI 422 — 03.09.02-120	40	40
RAI 422 — 03.09.02-121	41	41
RAI 422 — 03.09.02-122	42	42
RAI 422 — 03.09.02-123	43	43
RAI 422 — 03.09.02-124	44	44
RAI 422 — 03.09.02-125	45	45
RAI 422 — 03.09.02-126	46	46
RAI 422 — 03.09.02-127	47	47
RAI 422 — 03.09.02-128	48	48
RAI 422 — 03.09.02-129	49	49
RAI 422 — 03.09.02-130	50	50
RAI 422 — 03.09.02-131	51	51
RAI 422 — 03.09.02-132	52	52
RAI 422 — 03.09.02-133	53	53
RAI 422 — 03.09.02-134	54	54
RAI 422 — 03.09.02-135	55	55
RAI 422 — 03.09.02-136	56	56
RAI 422 — 03.09.02-137	57	57
RAI 422 — 03.09.02-138	58	58
RAI 422 — 03.09.02-139	59	60
RAI 422 — 03.09.02-140	61	61
RAI 422 — 03.09.02-141	62	62
RAI 422 — 03.09.02-142	63	63
RAI 422 — 03.09.02-143	64	65
RAI 422 — 03.09.02-144	66	66
RAI 422 — 03.09.02-145	67	67

A complete answer is not provided for 63 of the 63 questions. The schedule for a technically correct and complete response to these questions is provided below.

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-82	October 4, 2010
RAI 422 — 03.09.02-84	October 4, 2010
RAI 422 — 03.09.02-85	October 4, 2010
RAI 422 — 03.09.02-86	October 12, 2010
RAI 422 — 03.09.02-87	October 4, 2010
RAI 422 — 03.09.02-88	October 4, 2010
RAI 422 — 03.09.02-89	October 4, 2010
RAI 422 — 03.09.02-90	October 4, 2010
RAI 422 — 03.09.02-91	October 4, 2010
RAI 422 — 03.09.02-92	October 4, 2010
RAI 422 — 03.09.02-93	October 4, 2010
RAI 422 — 03.09.02-94	October 4, 2010
RAI 422 — 03.09.02-95	October 4, 2010
RAI 422 — 03.09.02-96	October 4, 2010
RAI 422 — 03.09.02-97	October 4, 2010
RAI 422 — 03.09.02-98	October 4, 2010
RAI 422 — 03.09.02-99	October 4, 2010
RAI 422 — 03.09.02-100	October 4, 2010
RAI 422 — 03.09.02-101	October 4, 2010

<b>Question #</b>	<b>Response Date</b>
RAI 422 — 03.09.02-102	October 4, 2010
RAI 422 — 03.09.02-103	October 4, 2010
RAI 422 — 03.09.02-104	October 4, 2010
RAI 422 — 03.09.02-105	October 4, 2010
RAI 422 — 03.09.02-106	October 4, 2010
RAI 422 — 03.09.02-107	October 4, 2010
RAI 422 — 03.09.02-108	October 4, 2010
RAI 422 — 03.09.02-109	October 4, 2010
RAI 422 — 03.09.02-110	October 4, 2010
RAI 422 — 03.09.02-111	October 4, 2010
RAI 422 — 03.09.02-112	October 4, 2010
RAI 422 — 03.09.02-113	October 4, 2010
RAI 422 — 03.09.02-114	October 4, 2010
RAI 422 — 03.09.02-115	October 4, 2010
RAI 422 — 03.09.02-116	October 4, 2010
RAI 422 — 03.09.02-117	October 4, 2010
RAI 422 — 03.09.02-118	October 4, 2010
RAI 422 — 03.09.02-119	October 4, 2010
RAI 422 — 03.09.02-120	October 4, 2010
RAI 422 — 03.09.02-121	October 4, 2010
RAI 422 — 03.09.02-122	October 4, 2010
RAI 422 — 03.09.02-123	October 4, 2010
RAI 422 — 03.09.02-124	October 4, 2010
RAI 422 — 03.09.02-125	October 4, 2010
RAI 422 — 03.09.02-126	October 4, 2010
RAI 422 — 03.09.02-127	October 4, 2010
RAI 422 — 03.09.02-128	October 4, 2010
RAI 422 — 03.09.02-129	October 4, 2010
RAI 422 — 03.09.02-130	October 4, 2010
RAI 422 — 03.09.02-131	October 4, 2010
RAI 422 — 03.09.02-132	October 4, 2010
RAI 422 — 03.09.02-133	October 4, 2010
RAI 422 — 03.09.02-134	October 4, 2010
RAI 422 — 03.09.02-135	October 4, 2010
RAI 422 — 03.09.02-136	October 4, 2010
RAI 422 — 03.09.02-137	October 4, 2010
RAI 422 — 03.09.02-138	October 4, 2010
RAI 422 — 03.09.02-139	October 4, 2010
RAI 422 — 03.09.02-140	October 4, 2010
RAI 422 — 03.09.02-141	October 4, 2010
RAI 422 — 03.09.02-142	October 4, 2010
RAI 422 — 03.09.02-143	October 12, 2010
RAI 422 — 03.09.02-144	October 4, 2010
RAI 422 — 03.09.02-145	October 4, 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)

---

**From:** Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]  
**Sent:** Tuesday, August 03, 2010 2:01 PM  
**To:** ZZ-DL-A-USEPR-DL  
**Cc:** Wong, Yuken; Dixon-Herrity, Jennifer; Patel, Jay; Miernicki, Michael; Colaccino, Joseph; ArevaEPRDCPEm Resource  
**Subject:** U.S. EPR Design Certification Application RAI No. 422 (4792), FSARCh. 3

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on June 15, 2010, and discussed with your staff on July 29, 2010. Drat RAI Question 03.09.02-83 was deleted 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:** 4145

**Mail Envelope Properties** (554210743EFE354B8D5741BEB695E656092826)

**Subject:** Response to U.S. EPR Design Certification Application RAI No. 422, FSARCh. 3, Supplement 36  
**Sent Date:** 1/3/2013 4:57:29 PM  
**Received Date:** 1/3/2013 4:57:44 PM  
**From:** WILLIFORD Dennis (AREVA)

**Created By:** Dennis.Williford@areva.com

**Recipients:**

"DELANO Karen (AREVA)" <Karen.Delano@areva.com>  
Tracking Status: None  
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**Response to**

**Request for Additional Information No. 422, Supplement 36**

**8/3/2010**

**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**

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

**Question 03.09.02-144**

The applicant stated that only representative trains of piping systems are monitored as part of the CVAP. The staff requested an explanation of how a problem area will be identified so that corrective action can be taken, or describe how measuring representative piping systems will determine that excessive vibration is not occurring in non-instrumented piping systems. The applicant explained in their response to Question 03.09.02-64, in Response to Request for Additional Information No. 331, Supplement 2, that if an acoustic resonance occurs on one line, the same is expected at nearly the same flow conditions in the other representative lines. In the event that a resonant response is measured, the piping will be identified by determining the characteristic dimensions, e.g. diameter and length, required for the resonant frequency to occur. These characteristic parameters will be used to identify the piping that is in resonance.

The staff reviewed this approach and noted that the applicant's definition of a representative piping system requires meeting the criteria described below:

1. It must be part of the same overall plant system (e.g. Main Steam System)
2. It must have the same components and similar piping routing – particularly for branch piping.
3. The main piping must have the same diameter and have essentially the same flow conditions.
4. Distances to the first upstream elbow and distances between standpipes need to be essentially the same.
5. Branch piping needs to have the same length and diameter in the systems.

The applicant is requested to provide the criteria and /or metrics employed to determine when piping meets the “essentially the same” criteria used in determining distance to the upstream elbow, distance between standpipe and flow conditions and clarify if elbows are required to have the same orientation relative to the branch line.

**Response to Question 03.09.02-144**

This response to RAI 422, Question 03.09.02-144, supersedes in its entirety the response provided to RAI 422 Question 03.09.02-144, in Supplement 21.

The orientation of elbows relative to the branch line does not impact the propagation of acoustic waves or effects of acoustic wave reflections. However, the orientation of upstream elbows modifies the flow past the entrance to standpipes; therefore, this is a criterion for determining similarity of pipe systems.

The diameter should be within tolerances typical of piping classes.

The distance to the upstream elbow and the orientation of the standpipe to that elbow, and distance between standpipes do impact acoustic resonance phenomenon due to impact on Strouhal numbers, frequencies as well as amplitudes of standing waves as the result of interference. In order to keep piping systems tuned to comparable acoustic behavior, the allowable deviations of distances is based on construction tolerances of the piping system.

The flow conditions of piping system lines are considered “essentially the same” when they are within 2 percent of the design conditions.

The representative piping that will be instrumented is the one that is most likely to develop acoustic resonance. Sensitivity to acoustic resonance determination is based on detailed analysis, considering Strouhal numbers and other pertinent acoustic factors as outlined in the Technical Report ANP-10306P.

**FSAR Impact:**

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

**Technical Report Impact:**

Appendix A of ANP-10306P, “Comprehensive Vibration Assessment Program for U.S. EPR Reactor Internals Technical Report,” Revision 1, was revised to reflect the changes as a result of this question.

Comprehensive Vibration  
Assessment Program for  
the U.S. EPR™ Reactor  
Internals Technical Report  
Markups



## A.2.2 Control Valve and Operator in Resonance

Another type of acoustic resonance is a control valve with a downstream acoustic mode as described in Reference 14. This may be prevented by verifying that the natural frequency of the control valve and operator is not near an acoustic resonance frequency of the downstream piping by design or by providing damping as shown in Reference 14.

## A.2.3 Identification of Acoustic Resonance by Testing

### A.2.3.1 Acoustic Resonance Caused by Flow Past Standpipes

Acoustic resonance of a standpipe or other dead leg on a system is distinctive and readily noted, as experience indicates. As described in Reference 13, the distinguishing characteristics of this resonance are pure-tone, single frequency, high amplitude excitation in a flow rate range at a frequency in excess of 100 Hertz. Frequency is related to a fraction of a wavelength of a closed-end branch line. Amplitude changes rapidly with flow rate, with amplitude increasing as a flow rate is approached from above or below. The flow rate is determined by the acoustic resonance frequency of the branch line, the flow rate past the entrance, and the diameter of the entrance. The amplitude is not decreased significantly over piping lengths typical of a power plant.

If acoustic resonance is identified in a piping system during pre-operational testing, the source will be identified using the distinguishing characteristics, and measures will be taken to mitigate resonance.

### A.2.3.2 Acoustic Resonance Caused by Control Valve and Operator

Another type of acoustic resonance is a control valve with a downstream acoustic mode as described in Reference 14. This may be prevented by verifying that the natural frequency of the control valve is not near an acoustic resonance frequency of the downstream piping by design or by providing damping as shown in Reference 14. The distinguishing characteristics of this type of acoustic resonance are similar to those of acoustic resonance past a closed end branch line as described above except that the frequency is lower, typically below 30 Hertz.

### A.2.3.3 Acoustic Resonance Detection Method

A monitoring system is placed on representative piping trains that are most likely to develop acoustic resonance. Sensitivity to acoustic resonance determination is based on detailed analysis, considering Strouhal numbers and other pertinent acoustic factors as outlined in the Section A.2.1.

Monitoring is not required for other piping trains that are essentially the same. The following criteria must be satisfied to qualify the piping as essentially the same:

- Part of the same overall plant system (e.g., main steam system).
- Have the same components and pipe routing, particularly for branch piping, and distances within tolerances typical of piping classes. The distance to the upstream elbow and distance

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between standpipes do impact acoustic resonance phenomenon due to impact on Strouhal numbers, frequencies as well as amplitudes of standing waves as the result of interference. In order to keep piping systems tuned to comparable acoustic behavior, the allowable deviations of distances is based on construction tolerances of the piping system.

- Main piping must have the same diameter within tolerances typical of piping classes, and flow conditions within two percent of the design conditions. The flow conditions of piping system lines are considered “essentially the same” when they are within two percent of the design conditions because these affect the flow field past the entrance to branch piping.
- Have the same distance between the first upstream elbow and the standpipes, within tolerances typical of piping classes. The orientation of elbows relative to the branch line does not impact the propagation of acoustic waves or effects of acoustic wave reflections. However, the orientation of elbows is a criterion for determining similarity of pipe systems (Reference 17).
- Branch piping must have the same length and diameter within the systems, within tolerances typical of piping classes. The diameter should be within tolerances typical of piping classes.

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This monitoring system is designed to detect a well-established standing wave. Therefore, the method is limited to high coherence of signals between pressure stations. The symmetrically circumferential strain gauges are designed to cancel out lobular shell modes of vibration. Therefore, the frequency range of applicability is well below the "breathing" shell mode of the pipe. Therefore, the deformation of the pipe, as measured by the strain gauges is caused by pressure inside the pipe. The frequency limit is approximately 200 Hz.

This method is based on hoop strain measurement using four strain gauges oriented. The strain gauges are equally spaced around the circumference in 90 degree increments. Longitudinally, two strain gauge stations are placed on a sufficiently long straight pipe section (distant from structural discontinuity estimated by formula  $2.5\sqrt{Rt}$ , R is defined as  $(R1 + R2) / 2$  and t is defined as  $(t1 + t2) / 2$  (where t1 and t2 are the minimum thicknesses at each of the regions considered, and R1 and R2 are the minimum midsurface radii of curvature), outside of suspect locations for generation of acoustic pressure waves. The longitudinal spacing is designed to avoid half-wavelengths of the waves. Therefore, the spacing is less than  $C/2f$ , where C is the speed of sound of the medium inside the pipe at applicable pressure and temperature and f is the upper bound frequency of 200 Hz.

The strain reading from the strain gauge stations are calibrated for the particular geometry of the pipe section as described in the equation below. The pressure signals occur at a higher frequency than temperature fluctuations, and any possible bending effects due to pipe vibration are eliminated as a result of the strain gauges circuit setup. The strain oscillation reading, for a predetermined period (typically a few seconds), is caused by acoustic pressure waves only and is transformed into pressure amplitudes. This is accomplished by averaging the strain gauge readings, and subtracting the time-averaged mean to obtain the oscillating strains that are related to oscillating pressure. The sampling rate of measurements should be at least 2000 Hz. This strain oscillation will be directly transformed into pressure amplitudes based on the following equation. This equation assumes that the passing wave does not affect the axial stresses.