

ArevaEPRDCPEm Resource

From: WILLIFORD Dennis (AREVA) [Dennis.Williford@areva.com]
Sent: Tuesday, January 10, 2012 5:21 PM
To: Tesfaye, Getachew
Cc: BENNETT Kathy (AREVA); DELANO Karen (AREVA); ROMINE Judy (AREVA); RYAN Tom (AREVA)
Subject: Response to U.S. EPR Design Certification Application RAI No. 505 (5902,5735,5869,5754,5803,5950,5744), FSAR Ch. 7, Supplement 7
Attachments: RAI 505 Supplement 7 Response US EPR DC.pdf

Getachew,

On September 29, 2011, AREVA NP Inc. provided a schedule for technically correct and complete responses to the 34 questions in RAI 505. In Supplement 1 sent on October 27, 2011, and Supplement 2 sent on November 17, 2011, AREVA NP provided a revised schedule for technically correct and complete responses to 33 questions and a preliminary revised schedule for Question 07.01-33. AREVA NP provided Supplement 3 on November 22, 2011 to provide a final response to 4 questions. On December 9, 2011, AREVA NP provided Supplement 4 to revise the schedule for 7 questions. On December 14, 2011, AREVA NP provided Supplement 5 to revise the schedule for 5 questions. On December 15, 2011, AREVA NP provided Supplement 6 to provide a complete and final response to 6 questions.

The attached file, "RAI 505 Supplement 7 Response US EPR DC.pdf" provides technically correct and complete final responses to 2 of the remaining 24 questions. Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 505 Question 07.08-48.

The following table indicates the respective pages in the response document, "RAI 505 Supplement 7 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 505 — 07.08-44	2	3
RAI 505 — 07.08-48	4	5

The schedule for a technically correct and complete response to the remaining 22 questions has changed as provided below. The preliminary schedule for the response to Question 07.01-33 is being reevaluated and a new supplement with a revised schedule will be transmitted by January 25, 2012.

Question #	Response Date
RAI 505 — 07.01-33	January 25, 2012
RAI 505 — 07.01-34	April 5, 2012
RAI 505 — 07.01-35	April 26, 2012
RAI 505 — 07.01-36	February 9, 2012
RAI 505 — 07.01-37	March 8, 2012
RAI 505 — 07.01-38	February 9, 2012
RAI 505 — 07.01-39	February 9, 2012
RAI 505 — 07.01-40	February 9, 2012

RAI 505 — 07.01-41	February 9, 2012
RAI 505 — 07.01-42	February 9, 2012
RAI 505 — 07.01-44	February 9, 2012
RAI 505 — 07.01-45	April 26, 2012
RAI 505 — 07.01-46	April 26, 2012
RAI 505 — 07.01-47	February 9, 2012
RAI 505 — 07.01-48	February 9, 2012
RAI 505 — 07.01-49	February 9, 2012
RAI 505 — 07.01-50	April 26, 2012
RAI 505 — 07.01-51	February 9, 2012
RAI 505 — 07.03-38	April 26, 2012
RAI 505 — 07.05-10	March 8, 2012
RAI 505 — 07.08-47	April 26, 2012
RAI 505 — 07.09-71	April 5, 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

From: WILLIFORD Dennis (RS/NB)

Sent: Thursday, December 15, 2011 1:49 PM

To: 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. 505 (5902,5735,5869,5754,5803,5950,5744), FSAR Ch. 7, Supplement 6

Getachew,

On September 29, 2011, AREVA NP Inc. provided a schedule for technically correct and complete responses to the 34 questions in RAI 505. In Supplement 1 sent on October 27, 2011, and Supplement 2 sent on November 17, 2011, AREVA NP provided a revised schedule for technically correct and complete responses to 33 questions and a preliminary revised schedule for Question 07.01-33. AREVA NP provided Supplement 3 on November 22, 2011 to provide a final response to 4 questions. On December 9, 2011, AREVA NP provided Supplement 4 to revise the schedule for 7 questions. On December 14, 2011, AREVA NP provided Supplement 5 to revise the schedule for 5 questions.

The attached file, "RAI 505 Supplement 6 Response US EPR DC.pdf" provides technically correct and complete responses to 6 of the remaining 30 questions. Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the responses. Also appended to this file are affected pages of Technical Reports ANP-10304 and ANP-10309P. Revisions to these Technical Reports will be submitted by separate letter after completion of all responses to RAI 505.

The following table indicates the respective pages in the response document, "RAI 505 Supplement 6 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 505 — 07.03-37	2	3
RAI 505 — 07.04-15	4	5
RAI 505 — 07.05-11	6	6
RAI 505 — 07.08-43	7	8
RAI 505 — 07.08-45	9	10
RAI 505 — 07.08-49	11	12

The schedule for a technically correct and complete response to the remaining 24 questions remains unchanged. The preliminary schedule for the response to Question 07.01-33 is being reevaluated and a new supplement with a revised schedule will be transmitted by January 25, 2012.

Question #	Response Date
RAI 505 — 07.01-33	January 25, 2012
RAI 505 — 07.01-34	January 10, 2012
RAI 505 — 07.01-35	February 9, 2012
RAI 505 — 07.01-36	January 10, 2012
RAI 505 — 07.01-37	January 19, 2012
RAI 505 — 07.01-38	January 10, 2012
RAI 505 — 07.01-39	January 10, 2012
RAI 505 — 07.01-40	January 10, 2012
RAI 505 — 07.01-41	January 10, 2012
RAI 505 — 07.01-42	January 10, 2012
RAI 505 — 07.01-44	January 10, 2012
RAI 505 — 07.01-45	February 9, 2012
RAI 505 — 07.01-46	February 9, 2012
RAI 505 — 07.01-47	January 10, 2012
RAI 505 — 07.01-48	January 10, 2012
RAI 505 — 07.01-49	January 10, 2012
RAI 505 — 07.01-50	January 10, 2012
RAI 505 — 07.01-51	January 10, 2012
RAI 505 — 07.03-38	February 9, 2012
RAI 505 — 07.05-10	January 19, 2012
RAI 505 — 07.08-44	January 10, 2012
RAI 505 — 07.08-47	January 10, 2012
RAI 505 — 07.08-48	January 10, 2012
RAI 505 — 07.09-71	January 10, 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**From:** WILLIFORD Dennis (RS/NB)**Sent:** Wednesday, December 14, 2011 11:30 AM**To:** 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. 505 (5902,5735,5869,5754,5803,5950,5744), FSAR Ch. 7, Supplement 5

Getachew,

On September 29, 2011, AREVA NP Inc. provided a schedule for technically correct and complete responses to the 34 questions in RAI 505. In Supplement 1 sent on October 27, 2011, and Supplement 2 sent on November 17, 2011, AREVA NP provided a revised schedule for technically correct and complete responses to 33 questions and a preliminary revised schedule for Question 07.01-33. AREVA NP provided Supplement 3 on November 22, 2011 to provide a final response to 4 questions. On December 9, 2011, AREVA NP provided a revised schedule for 7 questions.

The schedule for the response to four questions (Questions 7.1-35, 7.1-45, 7.1-46, and 7.3-38) is being changed, as indicated in bold below. In addition, the preliminary schedule for the response to Question 07.01-33 has been revised as indicated. This schedule is being reevaluated and a new supplement with a revised schedule will be transmitted by January 25, 2012. The schedule for a technically correct and complete response to the remaining 25 questions remains unchanged.

Question #	Response Date
RAI 505 — 07.01-33	January 25, 2012
RAI 505 — 07.01-34	January 10, 2012
RAI 505 — 07.01-35	February 9, 2012
RAI 505 — 07.01-36	January 10, 2012
RAI 505 — 07.01-37	January 19, 2012
RAI 505 — 07.01-38	January 10, 2012
RAI 505 — 07.01-39	January 10, 2012
RAI 505 — 07.01-40	January 10, 2012
RAI 505 — 07.01-41	January 10, 2012
RAI 505 — 07.01-42	January 10, 2012
RAI 505 — 07.01-44	January 10, 2012
RAI 505 — 07.01-45	February 9, 2012
RAI 505 — 07.01-46	February 9, 2012
RAI 505 — 07.01-47	January 10, 2012
RAI 505 — 07.01-48	January 10, 2012
RAI 505 — 07.01-49	January 10, 2012
RAI 505 — 07.01-50	January 10, 2012
RAI 505 — 07.01-51	January 10, 2012

RAI 505 — 07.03-37	January 19, 2012
RAI 505 — 07.03-38	February 9, 2012
RAI 505 — 07.04-15	January 19, 2012
RAI 505 — 07.05-10	January 19, 2012
RAI 505 — 07.05-11	January 19, 2012
RAI 505 — 07.08-43	January 19, 2012
RAI 505 — 07.08-44	January 10, 2012
RAI 505 — 07.08-45	January 10, 2012
RAI 505 — 07.08-47	January 10, 2012
RAI 505 — 07.08-48	January 10, 2012
RAI 505 — 07.08-49	January 19, 2012
RAI 505 — 07.09-71	January 10, 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

From: RYAN Tom (RS/NB)
Sent: Friday, December 09, 2011 8:35 AM
To: Getachew.Tesfaye@nrc.gov
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WILLIFORD Dennis (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 505 (5902,5735,5869,5754,5803,5950,5744), FSAR Ch. 7, Supplement 4

Getachew,

On September 29, 2011, AREVA NP Inc. provided a schedule for technically correct and complete responses to the 34 questions in RAI 505. On October 27, 2011, and November 17, 2011, AREVA NP provided a revised schedule for technically correct and complete responses to 33 questions and a preliminary revised schedule for Question 07.01-33. On November 22, 2011, AREVA NP provided a final response to four questions.

The schedule for the response to the questions 7.1-37, 7.3-37, 7.4-15, 7.5-10, 7.5-11, 7.8-43, and 7.8-49 is being changed and indicated in bold below, the remaining 23 questions remains unchanged, as indicated below. In addition, the preliminary schedule for a response to Question 07.01-33 remains unchanged. The schedule for Question 07.01-33 is being reevaluated and a new supplement with a revised schedule will be transmitted by December 14, 2011.

Question #	Response Date
RAI 505 — 07.01-33	December 14, 2011
RAI 505 — 07.01-34	January 10, 2012

RAI 505 — 07.01-35	January 10, 2012
RAI 505 — 07.01-36	January 10, 2012
RAI 505 — 07.01-37	January 19, 2012
RAI 505 — 07.01-38	January 10, 2012
RAI 505 — 07.01-39	January 10, 2012
RAI 505 — 07.01-40	January 10, 2012
RAI 505 — 07.01-41	January 10, 2012
RAI 505 — 07.01-42	January 10, 2012
RAI 505 — 07.01-44	January 10, 2012
RAI 505 — 07.01-45	January 10, 2012
RAI 505 — 07.01-46	January 10, 2012
RAI 505 — 07.01-47	January 10, 2012
RAI 505 — 07.01-48	January 10, 2012
RAI 505 — 07.01-49	January 10, 2012
RAI 505 — 07.01-50	January 10, 2012
RAI 505 — 07.01-51	January 10, 2012
RAI 505 — 07.03-37	January 19, 2012
RAI 505 — 07.03-38	January 10, 2012
RAI 505 — 07.04-15	January 19, 2012
RAI 505 — 07.05-10	January 19, 2012
RAI 505 — 07.05-11	January 19, 2012
RAI 505 — 07.08-43	January 19, 2012
RAI 505 — 07.08-44	January 10, 2012
RAI 505 — 07.08-45	January 10, 2012
RAI 505 — 07.08-47	January 10, 2012
RAI 505 — 07.08-48	January 10, 2012
RAI 505 — 07.08-49	January 19, 2012
RAI 505 — 07.09-71	January 10, 2012

Sincerely,

***Tom Ryan 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

From: WILLIFORD Dennis (RS/NB)

Sent: Tuesday, November 22, 2011 2:51 PM

To: 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. 505 (5902,5735,5869,5754,5803,5950,5744), FSAR Ch. 7, Supplement 3

Getachew,

On September 29, 2011, AREVA NP Inc. provided a schedule for technically correct and complete responses to the 34 questions in RAI 505. On October 27, 2011, and November 17, 2011, AREVA NP provided a revised schedule for technically correct and complete responses to 33 questions and a preliminary revised schedule for Question 07.01-33.

After discussions with NRC staff, the attached file, "RAI 505 Supplement 3 Response US EPR DC.pdf" provides technically correct and complete responses to 4 of the 34 questions. Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the responses to RAI 505 Question 07.07-23, Question 07.08 -46 and Question 07.09.02-72.

The following table indicates the respective pages in the response document, "RAI 505 Supplement 3 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 505 — 07.01-43	2	3
RAI 505 — 07.07-23	4	4
RAI 505 — 07.08-46	5	5
RAI 505 — 07.09-72	6	7

The schedule for the response to the remaining 30 questions remains unchanged, as indicated below. In addition, the preliminary revised schedule for a response to Question 07.01-33 remains unchanged. The schedule for Question 07.01-33 is being reevaluated and a new supplement with a revised schedule will be transmitted by December 14, 2011.

Question #	Response Date
RAI 505 — 07.01-33	December 14, 2011
RAI 505 — 07.01-34	January 10, 2012
RAI 505 — 07.01-35	January 10, 2012
RAI 505 — 07.01-36	January 10, 2012
RAI 505 — 07.01-37	December 11, 2011
RAI 505 — 07.01-38	January 10, 2012
RAI 505 — 07.01-39	January 10, 2012
RAI 505 — 07.01-40	January 10, 2012
RAI 505 — 07.01-41	January 10, 2012
RAI 505 — 07.01-42	January 10, 2012
RAI 505 — 07.01-44	January 10, 2012
RAI 505 — 07.01-45	January 10, 2012
RAI 505 — 07.01-46	January 10, 2012
RAI 505 — 07.01-47	January 10, 2012
RAI 505 — 07.01-48	January 10, 2012
RAI 505 — 07.01-49	January 10, 2012
RAI 505 — 07.01-50	January 10, 2012
RAI 505 — 07.01-51	January 10, 2012
RAI 505 — 07.03-37	December 11, 2011

RAI 505 — 07.03-38	January 10, 2012
RAI 505 — 07.04-15	December 11, 2011
RAI 505 — 07.05-10	December 11, 2011
RAI 505 — 07.05-11	December 11, 2011
RAI 505 — 07.08-43	December 11, 2011
RAI 505 — 07.08-44	January 10, 2012
RAI 505 — 07.08-45	January 10, 2012
RAI 505 — 07.08-47	January 10, 2012
RAI 505 — 07.08-48	January 10, 2012
RAI 505 — 07.08-49	December 11, 2011
RAI 505 — 07.09-71	January 10, 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

From: WILLIFORD Dennis (RS/NB)
Sent: Thursday, November 17, 2011 5:44 PM
To: 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. 505 (5902,5735,5869,5754,5803,5950,5744), FSAR Ch. 7, Supplement 2

Getachew,

On September 29, 2011, AREVA NP Inc. provided a schedule for technically correct and complete responses to the 34 questions in RAI 505. On October 27, 2011, AREVA NP provided a revised schedule for technically correct and complete responses to 13 questions and a preliminary revised schedule for Question 07.01-33.

The schedule for the final responses has been revised, as indicated in bold below. In addition, the preliminary revised schedule for a response to Question 07.01-33 has been revised. The schedule for Question 07.01-33 is being reevaluated and a new supplement with a revised schedule will be transmitted by December 14, 2011.

Question #	Response Date
RAI 505 — 07.01-33	December 14, 2011
RAI 505 — 07.01-34	January 10, 2012
RAI 505 — 07.01-35	January 10, 2012
RAI 505 — 07.01-36	January 10, 2012
RAI 505 — 07.01-37	December 11, 2011
RAI 505 — 07.01-38	January 10, 2012

RAI 505 — 07.01-39	January 10, 2012
RAI 505 — 07.01-40	January 10, 2012
RAI 505 — 07.01-41	January 10, 2012
RAI 505 — 07.01-42	January 10, 2012
RAI 505 — 07.01-43	December 11, 2011
RAI 505 — 07.01-44	January 10, 2012
RAI 505 — 07.01-45	January 10, 2012
RAI 505 — 07.01-46	January 10, 2012
RAI 505 — 07.01-47	January 10, 2012
RAI 505 — 07.01-48	January 10, 2012
RAI 505 — 07.01-49	January 10, 2012
RAI 505 — 07.01-50	January 10, 2012
RAI 505 — 07.01-51	January 10, 2012
RAI 505 — 07.03-37	December 11, 2011
RAI 505 — 07.03-38	January 10, 2012
RAI 505 — 07.04-15	December 11, 2011
RAI 505 — 07.05-10	December 11, 2011
RAI 505 — 07.05-11	December 11, 2011
RAI 505 — 07.07-23	December 11, 2011
RAI 505 — 07.08-43	December 11, 2011
RAI 505 — 07.08-44	January 10, 2012
RAI 505 — 07.08-45	January 10, 2012
RAI 505 — 07.08-46	December 11, 2011
RAI 505 — 07.08-47	January 10, 2012
RAI 505 — 07.08-48	January 10, 2012
RAI 505 — 07.08-49	December 11, 2011
RAI 505 — 07.09-71	January 10, 2012
RAI 505 — 07.09-72	January 10, 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

From: WILLIFORD Dennis (RS/NB)
Sent: Thursday, October 27, 2011 11:22 AM
To: 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. 505 (5902,5735,5869,5754,5803,5950,5744), FSAR Ch. 7, Supplement 1

Getachew,

On September 29, 2011, AREVA NP Inc. provided a schedule for a technically correct and complete response to the 34 questions in RAI 505.

The schedule for the final response to Questions 07.01-38, 07.01-44, 07.01-45, 07.01-46, 07.01-47, 07.01-48, 07.01-49, 07.01-50, 07.01-51, 07.03-38, 07.08-43, 07.08-47, 07.08-48 has been revised, as indicated in bold below. In addition, a preliminary revised schedule for a technically correct and complete response to Question 07.01-33 is provided below. The schedule for Question 07.01-33 is being reevaluated and a new supplement with a revised schedule will be transmitted by November 17, 2011.

Question #	Response Date
RAI 505 — 07.01-33	November 17, 2011
RAI 505 — 07.01-34	December 8, 2011
RAI 505 — 07.01-35	November 17, 2011
RAI 505 — 07.01-36	December 8, 2011
RAI 505 — 07.01-37	December 8, 2011
RAI 505 — 07.01-38	January 10, 2012
RAI 505 — 07.01-39	December 8, 2011
RAI 505 — 07.01-40	December 8, 2011
RAI 505 — 07.01-41	November 17, 2011
RAI 505 — 07.01-42	December 20, 2011
RAI 505 — 07.01-43	November 17, 2011
RAI 505 — 07.01-44	January 10, 2012
RAI 505 — 07.01-45	January 10, 2012
RAI 505 — 07.01-46	January 10, 2012
RAI 505 — 07.01-47	January 10, 2012
RAI 505 — 07.01-48	January 10, 2012
RAI 505 — 07.01-49	January 10, 2012
RAI 505 — 07.01-50	January 10, 2012
RAI 505 — 07.01-51	January 10, 2012
RAI 505 — 07.03-37	November 17, 2011
RAI 505 — 07.03-38	January 10, 2012
RAI 505 — 07.04-15	November 17, 2011
RAI 505 — 07.05-10	November 17, 2011
RAI 505 — 07.05-11	November 17, 2011
RAI 505 — 07.07-23	November 17, 2011
RAI 505 — 07.08-43	January 10, 2012
RAI 505 — 07.08-44	December 8, 2011
RAI 505 — 07.08-45	December 8, 2011
RAI 505 — 07.08-46	December 8, 2011
RAI 505 — 07.08-47	January 10, 2012
RAI 505 — 07.08-48	January 10, 2012
RAI 505 — 07.08-49	November 17, 2011
RAI 505 — 07.09-71	December 8, 2011
RAI 505 — 07.09-72	December 8, 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

From: WILLIFORD Dennis (RS/NB)

Sent: Thursday, September 29, 2011 11:04 AM

To: 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. 505 (5902,5735,5869,5754,5803,5950,5744), FSAR Ch. 7

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 505 Response US EPR DC.pdf," provides a schedule since a technically correct and complete response to the 34 questions cannot be provided at this time.

The following table indicates the respective pages in the response document, "RAI 505 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 505 — 07.01-33	2	2
RAI 505 — 07.01-34	3	3
RAI 505 — 07.01-35	4	4
RAI 505 — 07.01-36	5	5
RAI 505 — 07.01-37	6	6
RAI 505 — 07.01-38	7	7
RAI 505 — 07.01-39	8	8
RAI 505 — 07.01-40	9	9
RAI 505 — 07.01-41	10	10
RAI 505 — 07.01-42	11	11
RAI 505 — 07.01-43	12	12
RAI 505 — 07.01-44	13	13
RAI 505 — 07.01-45	14	14
RAI 505 — 07.01-46	15	15
RAI 505 — 07.01-47	16	16
RAI 505 — 07.01-48	17	18
RAI 505 — 07.01-49	19	19
RAI 505 — 07.01-50	20	20
RAI 505 — 07.01-51	21	22
RAI 505 — 07.03-37	23	23

RAI 505 — 07.03-38	24	24
RAI 505 — 07.04-15	25	25
RAI 505 — 07.05-10	26	26
RAI 505 — 07.05-11	27	27
RAI 505 — 07.07-23	28	28
RAI 505 — 07.08-43	29	29
RAI 505 — 07.08-44	30	30
RAI 505 — 07.08-45	31	31
RAI 505 — 07.08-46	32	32
RAI 505 — 07.08-47	33	33
RAI 505 — 07.08-48	34	34
RAI 505 — 07.08-49	35	35
RAI 505 — 07.09-71	36	36
RAI 505 — 07.09-72	37	37

A complete answer is not provided for the 34 questions. The schedule for a technically correct and complete response to these questions is provided below.

Please note that the date for the response to Question 07.01-33 is a commitment date to provide a final schedule for the response in a follow-up letter.

Question #	Response Date
RAI 505 — 07.01-33	October 27, 2011
RAI 505 — 07.01-34	December 8, 2011
RAI 505 — 07.01-35	November 17, 2011
RAI 505 — 07.01-36	December 8, 2011
RAI 505 — 07.01-37	December 8, 2011
RAI 505 — 07.01-38	December 20, 2011
RAI 505 — 07.01-39	December 8, 2011
RAI 505 — 07.01-40	December 8, 2011
RAI 505 — 07.01-41	November 17, 2011
RAI 505 — 07.01-42	December 20, 2011
RAI 505 — 07.01-43	November 17, 2011
RAI 505 — 07.01-44	December 20, 2011
RAI 505 — 07.01-45	December 20, 2011
RAI 505 — 07.01-46	December 20, 2011
RAI 505 — 07.01-47	December 8, 2011
RAI 505 — 07.01-48	December 20, 2011
RAI 505 — 07.01-49	December 20, 2011
RAI 505 — 07.01-50	December 20, 2011
RAI 505 — 07.01-51	December 20, 2011
RAI 505 — 07.03-37	November 17, 2011
RAI 505 — 07.03-38	December 20, 2011
RAI 505 — 07.04-15	November 17, 2011
RAI 505 — 07.05-10	November 17, 2011

RAI 505 — 07.05-11	November 17, 2011
RAI 505 — 07.07-23	November 17, 2011
RAI 505 — 07.08-43	December 20, 2011
RAI 505 — 07.08-44	December 8, 2011
RAI 505 — 07.08-45	December 8, 2011
RAI 505 — 07.08-46	December 8, 2011
RAI 505 — 07.08-47	December 20, 2011
RAI 505 — 07.08-48	December 20, 2011
RAI 505 — 07.08-49	November 17, 2011
RAI 505 — 07.09-71	December 8, 2011
RAI 505 — 07.09-72	December 8, 2011

Sincerely,

Dennis Williford, P.E.
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From: Tesfaye, Getachew [<mailto:Getachew.Tesfaye@nrc.gov>]
Sent: Tuesday, August 30, 2011 1:23 PM
To: ZZ-DL-A-USEPR-DL
Cc: Zhang, Deanna; Morton, Wendell; Spaulding, Deirdre; Mott, Kenneth; Truong, Tung; Zhao, Jack; Mills, Daniel; Jackson, Terry; Canova, Michael; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 505 (5902,5735,5869,5754,5803,5950,5744), FSAR Ch. 7

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on August 12, 2011, and discussed with your staff on August 22 and 25, 2011. No change is made to the draft RAI as a result of those discussions. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs. For any RAIs that cannot be answered within 30 days, it is expected that a date for receipt of this information will be provided to the staff within the 30 day period so that the staff can assess how this information will impact the published schedule.

Thanks,
Getachew Tesfaye
Sr. Project Manager
NRO/DNRL/NARP
(301) 415-3361

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 3679

Mail Envelope Properties (2FBE1051AEB2E748A0F98DF9EEE5A5D4A53AAB)

Subject: Response to U.S. EPR Design Certification Application RAI No. 505
(5902,5735,5869,5754,5803,5950,5744), FSAR Ch. 7, Supplement 7
Sent Date: 1/10/2012 5:20:34 PM
Received Date: 1/10/2012 5:21:04 PM
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Response to

**Request for Additional Information No. 505 (5902,5735,5869,5754,5803,5950,5744),
Supplement 7**

8/30/2011

U. S. EPR Standard Design Certification

AREVA NP Inc.

Docket No. 52-020

SRP Section: 07.01 - Instrumentation and Controls - Introduction

SRP Section: 07.03 - Engineered Safety Features Systems

SRP Section: 07.04 - Safe Shutdown Systems

SRP Section: 07.05 - Information Systems Important to Safety

SRP Section: 07.07 - Control Systems

SRP Section: 07.08 - Diverse Instrumentation and Control Systems

SRP Section: 07.09 - Data Communication Systems

Application Section: FSAR Chapter 7

**QUESTIONS for Instrumentation, Controls and Electrical Engineering 1
(AP1000/EPR Projects) (ICE1)**

Question 07.08-44:**OPEN ITEM**

The staff requests the applicant to provide, in accordance with Item II.Q of SECY-93-087 and the BTP-7-19 acceptance criteria, a manual reactor coolant pump (RCP) trip.

The requirements of 10 CFR Part 50, Appendix A, GDC 13, state that appropriate controls shall be provided to maintain variables and systems that can affect the fission process, the integrity of the reactor core, the reactor coolant pressure boundary, and the containment and its associated systems, within prescribed operating ranges. The requirements of GDC 22 state that design techniques, such as functional diversity or diversity in component design and principles of operation, shall be used to the extent practical to prevent loss of the protection function. The guidance of SRP 7.8, states that: "The adequacy of the set of manual control and display functions is reviewed to confirm it is sufficient to monitor the plant states and to actuate systems required by the control room operators to place the nuclear plant in a hot-shutdown condition and to control the following critical safety functions: reactivity control, core heat removal, *reactor coolant inventory*, containment isolation, and containment integrity." The applicant used its small-break loss of coolant accident (SBLOCA) sensitivity studies to determine the latest RCP manual trip time utilizing D3 best-estimate analysis assumptions, including the availability of all four trains of SIS, and has found that the maximum peak cladding temperature (PCT) for SBLOCA remains well within the 10 CFR 50.46 acceptance criteria even if the RCPs are not tripped, and concluded that the sensitivity studies also demonstrates that a RCP trip during an SBLOCA event with an software common-cause failure (SWCCF) in the PS is not needed to mitigate the event. However, the staff finds that based on the applicant's "Small Break LOCA" event analysis of Section A.3.7.3.2 contained in the Technical Report ANP-10304 plant response event descriptions, which state:

- During an SBLOCA with RCPs running, a greater amount of inventory could be lost out the break than with RCPs tripped.
- The most limiting SBLOCA is in the cold leg pipe at the discharge side of the RCPs.
- With an SWCCF in the PS, the RCPs continue operating, with the opportunity to be tripped (manually) at a later time.

Since the DAS is not credited with an automatic RCP trip function, then a diverse D3 manual RCP trip is necessary to address the listed SRP 7.8 guidance and requirements. The diverse D3 manual RCP trip should be designed according to the defense-in-depth and diversity policy listed in Item II.Q of the SRM to SECY-93-087, the guidance of SRP 7.8 and the SRP BTP 7-19 acceptance criteria. The staff could not identify a credited diverse manual RCP trip within the manual controls as listed in the Technical Report ANP-10304.

Response to Question 07.08-44:

A SBLOCA sensitivity analysis was performed for a spectrum of break sizes and RCP trip times, as documented in RAI 413, Question 07.08-36, and incorporated into Technical Report ANP-10304. The results of the sensitivity analysis indicate that the maximum PCT remains below the 10 CFR 50.46 criteria for the entire break spectrum, whether the RCPs are operating or not. For larger breaks, the primary system is depressurized enough to actuate MHSI and recover RCS inventory. For smaller breaks, the CVCS charging is sufficient to keep the core

covered prior to MHSI injection. In either case, a manual RCP trip is not required to maintain RCS inventory.

The staff, on Page 7-223 of the Safety Evaluation With Open Items for Chapter 7, stated, "In a January 28, 2011, Response to RAI 413, Question 07.08-36, the applicant clarified that neither operator action criteria, nor a D3 coping procedure for tripping the RCPs during a SBLOCA are necessary. In addition, the applicant revised Technical Report ANP-10304, Section 3.7.3.2 to include an expanded description of the evaluation of the effect of the RCP trip on SBLOCA simulations. The staff finds that the revision adequately addressed the absence of a RCP trip during a SBLOCA and, therefore, considers the January 28, 2011, response to RAI 413, Question 07.08-36 acceptable and consider this question resolved."

FSAR Impact:

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

Question 07.08-48:**OPEN ITEM**

The staff requests the applicant to provide the credited quality assurance descriptions and commitments for the non-safety related portions of the signal conditioning and distribution system (SCDS) and the safety information and control system (SICS).

10CFR50.62(c)(1) state that anticipated transients without scram (ATWS) equipment must be designed to perform its function in a reliable manner. The guidance of SRP 7.8 states that Generic Letter 85-06, "Quality Assurance Guidance for ATWS Equipment That Is Not Safety-Related," provides acceptable guidance for the quality assurance of diverse I&C systems and components. The staff reviewed the U.S. EPR FSAR, Tier 1, Table 2.4.25-3, and determined that the SCDS safety-related outputs do not consist of diverse actuation system (DAS) output connection(s). Therefore, DAS diverse connections are provided by the non-safety related portions of the SCDS. In addition, Figure 2-1 of Technical Report ANP-10304 demonstrate that credited DAS controls and indications are implemented on the non-safety related portions of the SICS.

The staff was not able to identify quality assurance design commitments regarding the non-safety related portions of SCDS and SICS that are used for DAS/ATWS design implementation and mitigation.

Response to Question 07.08-48:

10CFR50.62(c)(1) states: "each pressurized water reactor must have equipment from sensor output to final actuation device, that is diverse from the reactor trip system, to automatically initiate the auxiliary (or emergency) feedwater system and initiate a turbine trip under conditions indicative of an ATWS."

The DAS provides eight reactor trip functions to respond to an ATWS. Each of these RT functions receives sensor information from the safety-related outputs of the SCDS. These functions and their respective sensors are:

- RT on low SG pressure (SG Pressure).
- RT on low SG level (SG Level (NR)).
- RT on high SG level (SG Level (NR)).
- RT on low RCS flow (two loops) (RCS Loop Flow).
- RT on low-low RCS flow (one loop) (RCS Loop Flow).
- RT on high neutron flux (power range) (Neutron Flux from PRD).
- RT on low hot-leg pressure (Hot Leg Pressure (WR)).
- RT on high pressurizer pressure (Pressurizer Pressure (NR)).

A turbine trip signal is generated automatically upon the generation of a reactor trip signal. Additionally, the emergency feedwater system is actuated from DAS on low SG level (SG Level (WR)).

The U.S. EPR FSAR Tier 1, Table 2.4.25-3, which lists the safety-related outputs of the SCDS will be updated to include DAS as a destination for the sensors listed above. As a result, there are no outputs from the non-safety related portions of SCDS used in the ATWS equipment of DAS .

The non-safety-related I&C equipment is designed, fabricated, erected, and tested under the quality assurance program described in ANP-10266A, Addendum A. This quality assurance program is consistent with the guidance of Generic Letter 85-06. This includes the non-safety-related portions of SCDS and SICS used for DAS/ATWS design implementation. U.S. EPR FSAR Tier 2, Sections 7.1.1.3.1 and 7.1.1.4.8, will be revised to discuss the quality assurance program for the non-safety-related portions of SCDS and SICS.

FSAR Impact:

U.S. EPR FSAR Tier 1, Table 2.4.25-3, and U.S. EPR FSAR Tier 2, Sections 7.1.1.3.1 and 7.1.1.4.8, will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

Table 2.4.25-3—Signal Conditioning and Distribution System Output Signals (32 Sheets)

Item #	Signal	Destination Recipient	# Divisions
1	6.9 kV Bus Voltage	Protection System	4
2	Annulus Ventilation System Gamma Activity	Safety Information and Control System	4
3	Chemical and Volume Control System (CVCS) Boron Concentration	Protection System	4
4	Cold Leg Temperature (NR)	Protection System	4
5	Cold Leg Temperature (WR)	Protection System, Safety Information and Control System	4
6	Containment Equipment Compartment Pressure	Protection System	4
7	Containment Equipment Compartment Containment Service Compartment Delta Pressure	Protection System	4
8	Containment High Range Activity	Protection System, Safety Information and Control System	4
9	Containment Service Compartment Pressure (NR)	Protection System	4
10	Containment Service Compartment Pressure (WR)	Protection System, Safety Information and Control System	4
11	Core Outlet Thermocouples Wide Range Temperature	Safety Information and Control System	4
12	CVCS Charging Flow	Protection System	4
13	RCP Differential Pressure	Protection System	4
14	Emergency Feedwater Flow	Safety Automation System, Safety Information and Control System	4
15	Hot Leg Pressure (NR)	Protection System	4
16	Hot Leg Pressure (WR)	Protection System, Safety Information and Control System, <u>Diverse Actuation System</u>	4
17	Hot Leg Temperature (NR)	Protection System	4
18	Hot Leg Temperature (WR)	Protection System, Safety Information and Control System	4
19	Low Head Safety Injection Flow (WR)	Safety Information and Control System	4

Table 2.4.25-3—Signal Conditioning and Distribution System Output Signals (32 Sheets)

Item #	Signal	Destination Recipient	# Divisions
20	Main Control Room (MCR) Air Intake Activity	Protection System	4
21	Main Steam Line Activity	Protection System, Safety Information and Control System	4
22	Medium Head Safety Injection Flow (WR)	Safety Information and Control System	4
23	Neutron Flux from Intermediate Range Detector (IRD)	Protection System, Safety Information and Control System	4
24	Neutron Flux from Power Range Detector (PRD)	Protection System, Safety Automation System, Diverse Actuation System	4
25	Neutron Flux from Self Powered Neutron Detectors (SPND)	Protection System	4
26	Neutron Flux from Source Range (SRD)	Safety Information and Control System	4
27	Pressurizer Level (NR)	Protection System	4
28	Pressurizer Pressure (NR)	Protection System, Safety Information and Control System, Diverse Actuation System	4
29	RCP Bus Breaker Position	Protection System	4
30	RCP Breaker Position	Protection System	4
31	RCS Loop Flow	Protection System, Diverse Actuation System	4
33	RCS Loop Level	Protection System	4
34	RCP Speed	Protection System	4
35	SG Level (NR)	Protection System, Diverse Actuation System	4
36	SG Level (WR)	Protection System, Diverse Actuation System , Safety Information and Control System, Safety Automation System	4

↑
RAI 505,
Q. 07.08-48

Table 2.4.25-3—Signal Conditioning and Distribution System Output Signals (32 Sheets)

RAI 505,
Q. 07.08-48

Item #	Signal	Destination Recipient	# Divisions
37	SG Pressure	Protection System, Safety Information and Control System, Safety Automation System, <u>Diverse Actuation System</u>	4
38	Temperature compensated rod cluster control assembly (RCCA) positions	Protection System	4
<u>39</u>	<u>Reactor Trip Contactor Position</u>	<u>Protection System</u>	<u>4</u>
<u>40</u>	<u>Containment Hydrogen Concentration</u>	<u>Protection System</u>	<u>2</u>
<u>41</u>	<u>Core Outlet Temperature</u>	<u>Protection System</u>	<u>4</u>

on the QDS for situational awareness. The QDS consists of a display, computer, and input devices such as a touch screen or trackball.

The SICS is implemented with the TXS I&C platform, the QDS platform, and hardwired I&C equipment.

Qualification Requirements

The safety-related equipment used in SICS is qualified for environmental, seismic, electromagnetic interference and radio frequency interference (EMI/RFI) conditions in accordance with the environmental qualification program described in Section 3.11.

RAI 505,
Q. 07.08-48

Quality Requirements

Safety-related hardwired I&C will meet the general quality requirements outlined in ANP-10266A. The non-safety-related portions of the SICS are designed, fabricated, erected, and tested under the quality assurance program described in ANP-10266A, Addendum A. This quality assurance program is consistent with the guidance of Generic Letter 85-06.

Diversity Requirements

There are no diversity requirements for SICS. See the U.S. EPR Diversity and Defense-in-Depth Assessment Technical Report (ANP-10304) (Reference 8) for further information on defense-in-depth and diversity.

Data Communications

Data communications implemented in the SICS include:

- PS-SICS (QDS) – uni-directional (PS to SICS), point-to-point data connections implemented with the TXS Ethernet protocol.

Power Supply

The safety-related portion of the SICS is powered from the Class 1E uninterruptible power supply (EUPS). The EUPS provides backup power with two-hour batteries and the EDGs in the case of a loss of offsite power (LOOP). In the event of a station blackout (SBO), the EUPS has the capability of receiving power from the station blackout diesel generators (SBODGs).

The non-safety-related portion of the SICS is powered from the 12-hour uninterruptible power supply (12UPS). The 12UPS provides backup power with 12-hour batteries and the SBODGs during a LOOP.

The electrical power systems are described in detail in Chapter 8.

Qualification Requirements

The equipment used in the SCDS is qualified for environmental, seismic, electromagnetic interference, and radio frequency interference (EMI/RFI) conditions in accordance with the environmental qualification program described in Section 3.11.

RAI 505,
Q. 07.08-48

Quality Requirements

The SCDS is designed under the TXS quality program described in Section 7.1.1.2.1._

The non-safety-related portions of the SCDS are designed, fabricated, erected, and tested under the quality assurance program described in ANP-10266A, Addendum A. This quality assurance program is consistent with the guidance of Generic Letter 85-06.

Diversity Requirements

The signal conditioning and distribution modules are diverse from the digital TXS function processors. See Reference 8 for more information on diversity and defense-in-depth.

Data Communications

There are no data communications in the SCDS.

Power Supply

The safety-related SCDS equipment is powered from the Class 1E uninterruptible power supply (EUPS). The EUPS provides backup power with two-hour batteries and the EDGs in the case of a LOOP. In the event of an SBO, the EUPS has the capability of receiving power from the SBODGs.

The non-safety-related SCDS equipment in the Safeguard Buildings is powered from the 12UPS. The 12UPS provides backup power with 12-hour batteries and the SBODGs during a LOOP.

The non-safety-related SCDS equipment in the Emergency Power Generating Buildings and the Essential Service Water Pump Buildings is powered from an UPS and diesel backed source.

7.1.1.5 Black Box I&C Systems

7.1.1.5.1 Control Rod Drive Control System

Classification

The CRDCS is classified as non-safety-related, supplemented grade (NS-AQ). The trip contactors are safety-related.